



# *Fauna of India*

**HOMOPTERA : APHIDOIDEA**

**PART 6**

**SUBFAMILY GREENIDEINAE**

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# THE FAUNA OF INDIA



**THE FAUNA OF INDIA  
AND  
THE ADJACENT COUNTRIES**

**HOMOPTERA**

**APHIDOIDEA**

*Part 6*

**SUBFAMILY : GREENIDEINAE**

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*Edited by the Director, Zoological Survey of India  
1993*

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*Published* : September, 1993

Price :

Indian Rs.480/00; Foreign : £ 25/00 or \$ 35/00

Printed in India by Vishnu Datagraphics, 97, Park Street, Calcutta 700 016  
and Published By the Director, Zoological Survey of India,  
Calcutta 700 020

## EDITOR'S PREFACE

The superfamily Aphodoidea is known to have at least two sub-families, *viz.* Hormaphidoidea and Greenidenae, which are distinctive in restricted distribution, host-preference and biological features. The present volume of Fauna of India – Aphidoidea embodies the results of investigations on Indian greenidine fauna, which represent nearly 65 percent of the World Fauna. This volume as such presents the updated information on the major taxa of the subfamily, members of which are mostly known from South Asia.

This work is expected to be of use to the aphidologists in the subcontinental region and also to the specialists engaged in studies of insect-plant co-evolution, phylogeny and distribution of phytophagous groups.

6th August, 1993  
Calcutta

A. K. GHOSH  
Director



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## INTRODUCTION

The tropical forest aphid fauna in South-east Asia, although small, seem to be larger than anywhere else. The present day distribution of Greenideinae and Hormaphidinae seem to be centered here, although in the past these groups may have been more widely distributed (Blackman and Eastop, 1984). India shared about 63% of the Greenidine fauna of the World and North-east India has been known to share little more than 54%. Endemism has been found to be more than 80 percent (Agarwala and Ghosh, M.R., 1985).

Raychaudhuri (1956) reviewed the taxonomy of the *genus* Greenidea and related genera of the World known till then. That work included 7 species from India but none from North-east India. Raychaudhuri and Chatterjee (1980) provided keys to the identification of 58 species under 11 genera in the Subfamily from North-east India and Bhutan. This account included 5 species and 1 subspecies belonging to 4 genera in the Tribe Cervaphidini and 53 species and 3 subspecies belonging to 7 genera in the Tribe Greenideini. Ghosh, A.K. (1982) provided an account of Cervaphidini of the World. Subsequently Agarwala and Ghosh, A.K. (1984) provided a check-list of 83 species belonging to 10 genera under the Subfamily Greenideinae from India. Ghosh, A.K. (1987) provided a detailed account on Biotaxonomy of Greenideinae including the genera and species known from India.

Clearly, many taxa were described in this Subfamily since the first major work of Raychaudhuri (1956). Many of these taxa have been listed in the World aphid catalogue by Eastop and Lambers (1976) with modifications in Taxonomic status. The present work was aimed at providing an updated account of the interesting Subfamily from Indian Region.

## HISTORY

Subfamily Greenideinae was proposed by Takahashi (1931) to accommodate genera like *Eutrichosiphum* Essig and Kuwana, *Greenidea* Schouteden, *Greenideoida* van der Goot and *Paratrichosiphum* Takahashi which possess a combinations of characters like body-tubercles, long and hairy siphunculi and long body hairs with variable apices. Earlier Börner (1930) placed these genera in Tribe Thelaxini of the Subfamily Thelaxinae. The Subfamily Greenideinae has since been accepted widely and is now considered to be composed of two well-defined Tribes viz. Greenideini and Cervaphidini.

## PHYLOGENY

Takahashi (1931) suggested that the members of Subfamily Greenideinae evolved in the Tertiary from a common ancestor having close affinity with

Aphidinae on one hand and Lachninae on the other. Mackauer (1965) in a tentative phylogenetic tree of Aphidoidea based on their aphidiid parasites, showed Greenideinae as distinct from other Aphididae. Heie (1967) proposed that the Greenideinae along with Drepanosiphinae and Chaitophorinae evolved as three different lines, which he later (1981) modified and suggested that Greenideinae possibly evolved from an yet unknown line which had some ancestral link with Drepanosiphinae. No fossil record of Cervaphidini is known but for Greenideini, 3 fossils are known from Lower Miocene of Europe where these aphids are now non-existent. By retention of some characters of the Mesozoic aphids, like primary rhinaria on all segments (as in *Anomalaphis casmiri*) on one hand and acquired advanced characters such as well developed siphunculi (in many cases), Greenideinae exhibit an interesting combination of characters, the functional aspect of which remains to be explored.

### BIOLOGY

Mordvilko (1934) thought that the group evolved on plants of Fagaceae and other primitive host plants and later radiated to more recent host plants. The members of the group in the tropical and subtropical regions mostly have anholocyclic life cycles.

Takahashi and Sorin (1959) found that *Allotrichosiphon kashicola* (Kurisaki) has only 2 generations a year in Osaka, Japan but a few more generations at Tokyo; fundatrix is produced in summer (May) and sexuales are produced by the second generation; each alate female lays 15 eggs on an average on the under surface of leaves, where they remain for 11 months before hatching. Similar life cycle has been proposed for *Greenidea* (*Trichosiphum*) *okajimai* and *Eutrichosiphum tattakanum* (Takahashi) except that in the latter species, the alate sexual forms are produced by the 4th and later generations from May to July and 4-9 generations are produced in a year (Sorin, 1960). In contrast in species like *G. (T.) kuwanai* (Pergande), *G. (T.) nipponica* Suenaga, *Mollitrichosiphum tenuicorpus* Okajima and *Eutrichosiphum* spp., all occurring on *Quercus* in Japan, sexuales are produced in autumn or winter.

Hales and Carver (1976) provided a detail account of life cycle of *Schoutedenia ralumensis* (= *S. lutea* v.d. Goot) from Australia where eggs are laid between November to May and fundatrices emerge in mid-September and viviparae are produced by the end of September, alate males start to appear by late October and thereafter both sexuales and viviparae continue to be present on the host plant, *Breynia oblongifolia*, until May.

Most members of Greenideinae in India are recorded by their viviparous morphs only and in case of nine species where sexual morphs are known, evidence of egg laying by the oviparous female is still wanting.

In India, two species of *Greenideinae*, *Cervaphis schouteniae* v.d.Goot and *Greenideoida ceyloniae* v.d.Goot have been studied in detail for their biology by Agarwala and Dixon (1986) and Agarwala *et al.* (1989), respectively. *Cervaphis schouteniae* occurs from February to October in North-East India and mainly colonises *Microcos peniculatus*. This species reproduces profusely from February to May during which period the host plants actively produce new leaves and twigs. No sexual morph has been recorded. In case of *G. ceyloniae*, alate fundatrix initiates the colony in autumn (October). Viviparous populations gradually build-up through October-January, then a slight decline occurs with the rise in temperature in late February and the populations, in most of the years, disappear by the middle of March. Emigrant alatae produced towards the end of population-cycle seem to move to distant areas of uphill where slightly cooler climate help these emigrant alatae to establish new colonies for rest of the period until the return migration to the lower areas. Ghosh, A.K. (1987) has given an account of sexuales of Greenideinae known from the World.

#### HOST PLANT ASSOCIATION

The host plant association of Greenideinae in the world ranges from Magnolidae through Hammamelide Dillenidae Rosidae Asteridae, thus being fully restricted to Magnoliatae (= Dicotyledons).

An analysis of species-wise association reveals that nearly 25 per cent of the total species have been recorded from Fagaceae. The genera of Greenideinae infesting Fagaceae include *Allotrivosiphon*, *Brevitrivosiphon*, *Cervaphis*, *Eutrivosiphum*, *Greenidea*, *Greenideoida* and *Mollitrivosiphum*. It is apparent that some of the species of all the six genera of Greenideini are associated with Fagaceae, but only one species of *Cervaphis* out of 9 genera of Cervaphidini inhabits Fagaceae; most of the Cervaphidine genera are known to be associated with Asteridae (Apocynaceae), Rosidae (Euphorbiaceae, Leguminosae, Myrtaceae), Dillenidae (Tiliaceae, Sterculiaceae) and Ulmaceae and seem to have a limited association with Hammamelidae.

Host range of Greenideinae in India comprises of 85 species belonging to 68 genera and 35 families with the largest number (about 80%) of species infesting plants of Fagaceae. An aphid- host catalogue from India is provided at the end.

Ecologically, each species of Greenideinae is likely to be monoc-

cious (Dixon, 1985) but in practice a number of species of both Greenideini and Cervaphidini Tribes have been reported to occur on more than one host species. A correct understanding of the host plant association demands a more closer and detail study in cases of most of the recorded species of both aphid and its recorded host plants. Ghosh, A.K. (1987) has discussed in detail the trend of host plant association on a global scale.

### DISTRIBUTION

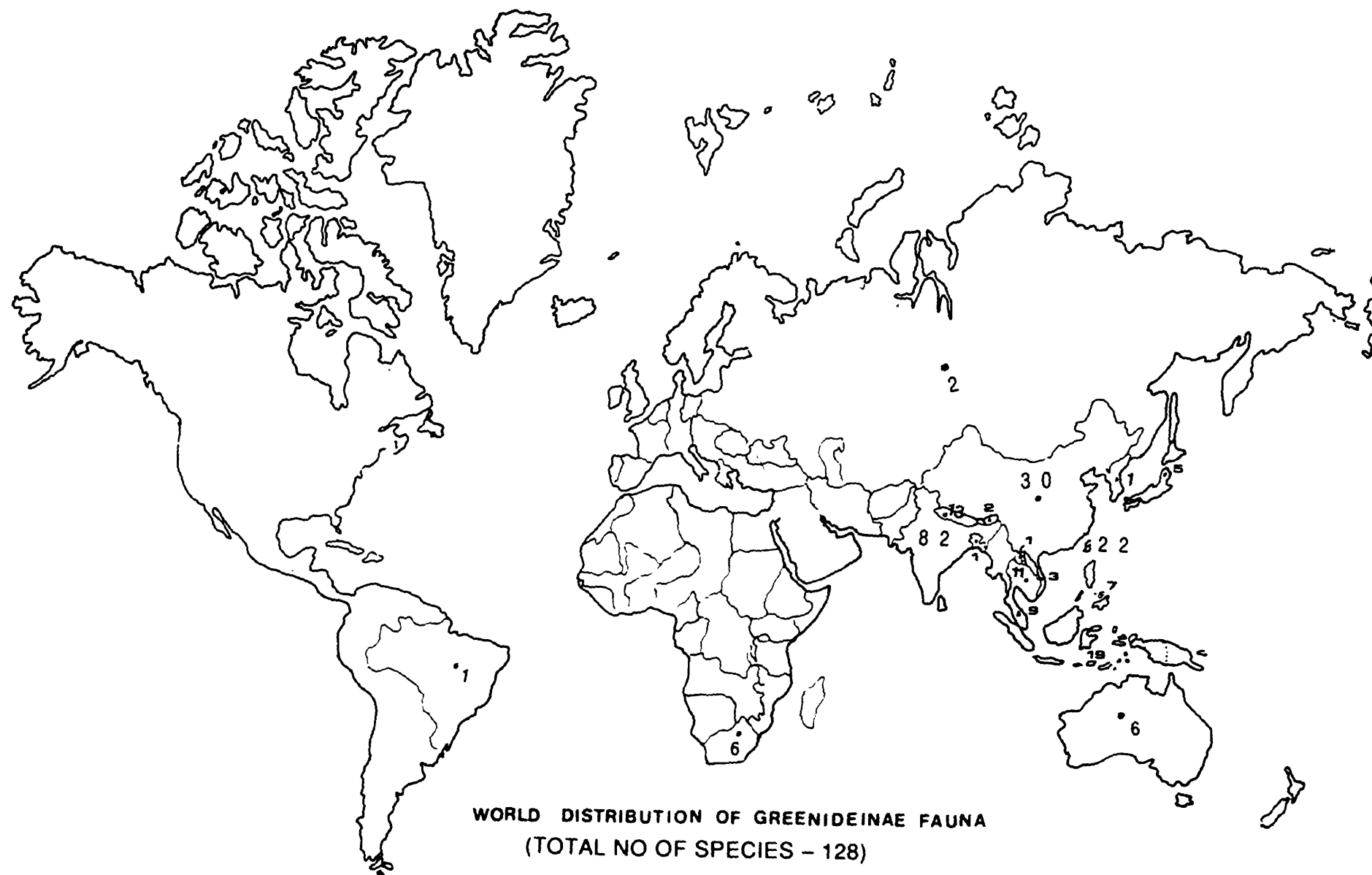
Most of the members of Greenideinae are Oriental in distribution except for a few from the eastern Palaeartic, Ethiopian, Australian and Neotropical regions (Fig. 1). Of the fossil aphids described from the Lower Miocene in Yugoslavia, *Aphis macrostyla* has been placed under Greenideini (Mordvilko, 1924, 1934; Heie, 1967). Presumably primitive groups, whose present day distribution is limited to South America, East Asia or Australia, were once represented in Europe in Tertiary (Heie, 1967) and the occurrence of *Aphis macrostyla* in Europe tends to support this hypothesis.

### TAXONOMY

Eastop and Lambers (1976) listed 121 species under the Subfamily Greenideinae which included 112 species under 7 genera in the tribe Greenideini and 18 species under 9 genera in the tribe Cervaphidini. Of these records, 74 species and 4 subspecies were distributed in India, representing 64.46% of the World-Fauna in this Subfamily. The latest records Greenideinae Fauna from India (uptil the end of 1991) show 93 species and 9 subspecies.

After revision of the Subfamily from the Indian subcontinent, World-Fauna is now known by 128 species (inclusive of subspecies) of which nearly 65% of the species are known from India.

In the course of this study, 5 new species have been described and another 11 species have been treated as new synonyms. One species has been considered as secondary junior homonym from Nepal. Besides, new records of 2 species and 2 subspecies have been made from India (Table 1 ).



WORLD DISTRIBUTION OF GREENIDEINAE FAUNA  
(TOTAL NO OF SPECIES - 128)

Fig. 1

Table 1. Additions and alternations in the Subfamily Greenideinae from India

- A. New species
1. *Eutrichosiphum blackmanum*
  2. *E. manaliensis*
  3. *E. neotattakanum*
  4. *Greenidea (Trichosiphum) camelliae*
  5. *Mollitrichosiphum trilokum*
- B. New synonyms (species) (= valid names)
1. *Brevitrichosiphum nungsieri* (= *B. mukerjii*)
  2. *Eutrichosiphum garhwalense* (= *E. assamense*)
  3. *E. manoji* (= *E. quercifoliae*)
  4. *E. takahashii* (= *E. pseudopasaniae*)
  5. *E. taoi* (= *E. assamense*)
  6. *Greenidea neoficicola* (= *G. ficicola*)
  7. *G. (Trichosiphum) schoutedeniae* (= *G. (T.) bucktonis*)
  8. *Mollitrichosiphum acutihirsutum* (= *M. buddleiae*)
  9. *M. alni* (= *M. montanum*)
  10. *M. alnifoliae* (= *M. montanum*)
  11. *M. shinjii* (= *M. tenuicorpus*)
- C. New Synonym (genus) (= valid names)
1. *Holotrichosiphon* (= *Eutrichosiphum*)
- D. New Records from India
1. *Cervaphis rappardi rappardi*
  2. *Greenidea formosana formosana*
  3. *Greenidea schimae*
  4. *Shoutedenia ralumensis*

Two Tribes are recognised in the Subfamily and these can be distinguished by the following key.

Body in apterae viviparae always with small to large finger-like processi placed marginally or pleurally, these present either segmentally or on any

one or more abdominal segments; in alatae viviparae these processi reduced or absent; siphunculi with few short hairs .....

.....Cervaphidini

Body in apterae and alatae viviparae never with any finger-like processi; siphunculi with many long hairs .....

..... Greenideini

So far twenty genera have been proposed in the Subfamily. Eastop and Lambers (1976) considered 16 of these genera as valid and rest as synonyms of other known genera. Raychaudhuri and Chatterjee (1980) recognised 11 genera from North-East India. In this study 10 genera and 84 species and subspecies have been dealt.

#### LIST OF GENERA, SPECIES AND SUBSPECIES

Tribe : CERVAPHIDINI

I. *Anomalosiphum* Takahashi

1. *indigoferae* Ghosh, Ghosh and Raychaudhuri

II. *Cervaphis* van der Goot

2. *quercus* Takahashi

3. *rappardi indica* Basu, A.N.

4. *rappardi rappardi* Hille Ris Lambers

5. *schouteniae* v.d. Goot

III. *Schoutedenia* Rübsaamen

6. *emblica* Patel and Kulkarni

7. *ralumansis* Rübsaamen

IV *Sumatraphis* Takahashi

8. *celti* Takahashi

Tribe : GREENIDEINI

V *Allotrichosiphum* Takahashi

9. *assamense* Raychaudhuri, Ghosh, Banerjee and Ghosh

VI. *Brevitrichosiphon* Raychaudhuri, Ghosh, Banerjee and Ghosh

10. *mukerjii* Raychaudhuri, Ghosh, Banerjee and Ghosh

VII. *Eutrichosiphum* Essig and Kuwana

11. *alnicola* Basu, A.N.
12. *arunachali* Basu, Ghosh and Raychaudhuri
13. *assamense* Ghosh, Basu and Raychaudhuri
14. *atini* Raychaudhuri and Chatterjee
15. *betulae* Mondal, Chatterjee and Raychaudhuri
16. *blackmanum* Agarwala and Ghosh n.sp.
17. *dauidi* Raychaudhuri
18. *dubium* van der Goot
19. *flavum* Takahashi
20. *jugeshwari* Singh, Raychaudhuri and Raychaudhuri
21. *khasyanum* Ghosh and Raychaudhuri
22. *litseae* Raychaudhuri, Raha and Raychaudhuri
23. *makii* Raychaudhuri and Chatterjee
24. *manaliensis* Agarwala and Ghosh n.sp.
25. *manipurensense* Singh, Raychaudhuri and Raychaudhuri
26. *minutum* v. d. Goot
27. *neoalnicola* Raychaudhuri, Ghosh and Das
28. *neotattakanum* Agarwala and Ghosh n.sp.
29. *nepalensis* (*nomen novum*)
30. *pseudopasaniae* Szelegiewicz
31. *pyri* Chakrabarti, Ghosh and Raychaudhuri
32. *quercifoliae* Raychaudhuri, Ghosh, Banerjee and Ghosh
33. *querciphaga* Chakrabarti and Maity
34. *rameshi* Raychaudhuri, Chatterjee and Raychaudhuri
35. *raychaudhurii* Ghosh, A.K.
36. *russellae* Ghosh, Ghosh and Raychaudhuri
37. *sankari* Raychaudhuri, Ghosh, Banerjee and Ghosh
38. *sensoriatum* Ghosh, A.K.
39. *sikkimense* Ghosh, Banerjee and Ghosh

- 40. *subinoyi* Raychaudhuri, Ghosh, Banerjee and Ghosh
- 41. *tapatii* Mondal, Chatterjee and Raychaudhuri
- 42. *tattakanum* Takahashi

VIII. *Greenidea* Schouteden

- 43. *aborensis* Ghosh, A.K.
- 44. *artocarp* Westwood
- 45. *decaspermi* Takahashi
- 46. *ficicola* Takahashi
- 47. *himansui* Raychaudhuri, Ghosh Banerjee and Ghosh
- 48. *longicornis* Ghosh, Ghosh and Raychaudhuri
- 49. *longirostris* Basu, A.N.
- 50. *photiniphaga* Raychaudhuri, Ghosh, Banerjee and Ghosh
- 51. *schimae* Takahashi
- 52. (*Neogreenidea*) *ayyari* Raychaudhuri, Ghosh, Banerjee and Ghosh
- 53. (*Neogreenidea*) *longisetosa* Raychaudhuri, Ghosh, Banerjee and Ghosh
- 54. (*Neogreenidea*) *querciphaga* Raychaudhuri, Ghosh, Banerjee and Ghosh
- 55. (*Paragreenidea*) *parthenocissi* Saha and Chakrabarti
- 56. (*Paragreenidea*) *symplocosis* Ghosh, Basu and Raychaudhuri
- 57. (*Trichosiphum*) *anonae* Pergande
- 58. (*Trichosiphum*) *brachyunguis* Chatterjee, Mondal and Raychaudhuri
- 59. (*Trichosiphum*) *bucktonis* Ghosh, Basu and Raychaudhuri
- 60. (*Trichosiphum*) *camelliae* Agarwala and Ghosh n. sp.
- 61. (*Trichosiphum*) *formosana formosana* Maki
- 62. (*Trichosiphum*) *formosana heeri* Raychaudhuri, Ghosh, Banerjee and Ghosh
- 63. (*Trichosiphum*) *gigantea* Ghosh and Raychaudhuri
- 64. (*Trichosiphum*) *haldari* Maity and Chakrabarti

65. (*Trichosiphum*) *heterotricha* Ghosh, A.K.
66. (*Trichosiphum*) *kumaoni* Chakrabarti and Raychaudhuri
67. (*Trichosiphum*) *prunicola* Ghosh, Banerjee and Raychaudhuri
68. (*Trichosiphum*) *quercicola* Basu, Ghosh and Raychaudhuri
69. (*Trichosiphum*) *sikkimensis* Raychaudhuri, Ghosh, Banerjee and Ghosh
70. (*Trichosiphum*) *spinotibium* Raychaudhuri and Chatterjee

IX. *Greenideoida* van der Goot

71. (*Neogreenideoida*) *bengalensis* Raychaudhuri and Chatterjee
72. (*Paragreenideoida*) *bhalukpongensis* Ghosh, Banerjee and Raychaudhuri
73. (*Paragreenideoida*) *ceyloniae* v. d. Goot
74. (*Pentatrichosiphum*) *lambersi* Basu, A. N.
75. (*Penatrachosiphum*) *luteum* Basu, A. N.

X. *Mollitrachosiphum* Suenaga

76. *godavariensis* Das and Raychaudhuri
77. *nigriabdominalis* Agarwala, Mondal and Raychaudhuri
78. *tenuicarpus* Okajima
79. *trilokum* Agarwala and Ghosh n. sp.
80. (*Metatrachosiphon*) *buddleiae* Ghosh, Banerjee and Raychaudhuri
81. (*Metatrachosiphon*) *kazirangi* Ghosh, A.K.
82. (*Metatrachosiphon*) *montanum* v. d. Goot
83. (*Metatrachosiphon*) *nandii* Basu, A.N.
84. (*Metatrachosiphon*) *rhusae* Ghosh, A.K.

[ + 2 unidentified species of *Eutrachosiphum* I, II]

#### SOURCES OF MATERIALS

Efforts were made to procure the 'types' or designated specimens of described or recorded taxa of Greenideinae from India and other parts of the World. As a result, specimens were obtained from the following sources

	Source	No. of specimens
1.	The Natural History Museum, London	132
2.	Calcutta University, Deptt. of Zoology	272
3.	Commonwealth Institute of Entomology, London	17
4.	Institute Pasteur, Paris	14
5.	Kalyani University, Deptt. of Zoology, Kalyani	26
6.	Manipur University, Deptt.. of Life Sciences, Imphal	33
7.	Tamil Nadu Agricultural Research Institute, Coimbatore	05
8.	Tripura University, Deptt. of Life Science, Agartala	101
9.	Zoological Survey of India, Calcutta	802
10.	University of Agricultural Sciences, Bangalore	06
	Total :	1408

New collections of Greenideinae have been made from the States of Tripura and Mizoram in North-East India. Both these States were relatively little explored in the past surveys for aphids. Repeated collections in the two states resulted in the new collections of 42 samples of Greenideinae.

As a result, a total of 1566 specimens of Greenideinae were available which formed the basis of revision of this aphid group.

*Abbreviations used in the text*

alate/alatae viviparae	— Alate viviparous female/s
aptera/apterae viviparae	— Apterous viviparous female/s
b.d.III	— Basal diameter of antennal segment III
B.M.	— The Natural History Museum, London
base	— base of last antennal segment
C.U.	— Calcutta University
C.I.B.C.	— Commonwealth Institution of Biological Control, Indian Station
C.I.E.	— Commonwealth Institute of Entomology, London.

Coll.	— Collector of Specimens
F.T.C.	— First tarsal chaetotaxy
h.t.2	— Second segment of hindtarsus
indet.	— Unidentified
K.U.	— Kalyani University
L. Body	— Length of body
L. ant.	— Length of antenna
misident.	— a case of misidentification
mm	— millimetre
M	— Median vein of forewing
M.U.	— Manipur University
New Syn.	— New Synonym
p.t.	— Processus terminalis
siph	— Length of Siphunculi
T.U.	— Tripura University
U.A.S.	— University of Agricultural Sciences, Bangalore.
U.R.S., urs	— Ultimate rostral segments
W body	— Width of body
Z.S.I.	— Zoological Survey of India
antennal segments I, II, III, IV, V,	— Length of antennal segments I, II, III, IV, V

#### TRIBE CERVAPHIDINI

(Figs. 2-5)

#### Key to the identification of genera

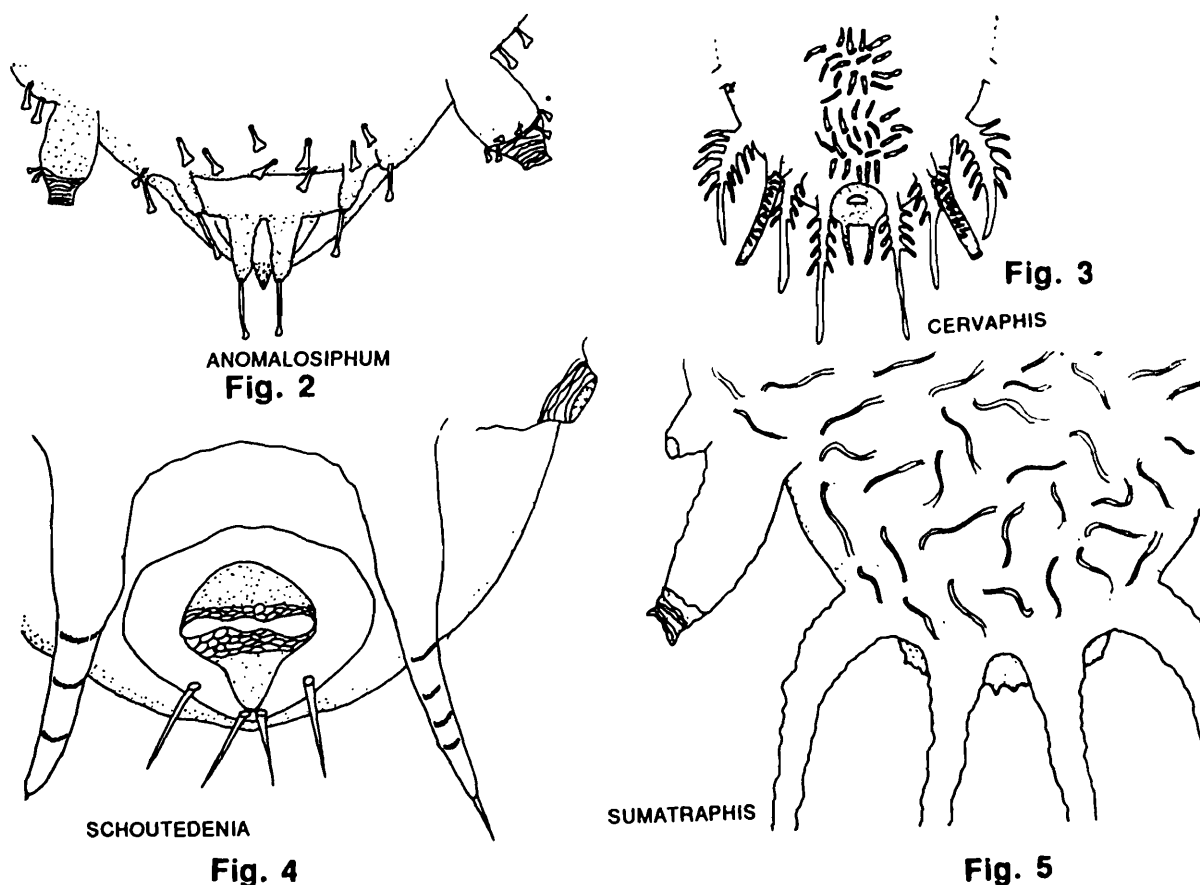
1. Paired tubercles or processi present only on 7th or on the 7th and 8th tergites of abdomen ; cauda rounded or with a median stylus ..... 2  
 Paired tubercles or processi also present on anterior tergites of abdomen ; Cauda never with a median stylus ..... 3

2. Siphunculi on low cones ; cauda rounded ; 7th abdominal tergite with only one pair of distinct tubercles ; antennae 5-segmented in both apterae and alatae viviparae ..... *Schoutedenia* Rübsaamen

Siphunculi long, swollen ; Cauda triangular, with a median stylus ; 7th and 8th tergites each with a pair of slender, hair-bearing tubercles; antennae 4-segmented in apterae and 5-segmented in alate viviparae ..... *Anomalosiphum* Takahashi

3. Body processi mostly branched in apterae viviparae ; spiracles distinct and normal ; siphunculi long, about 0.22-0.45 x as long as body ..... *Cervaphis* van der Goot

Body processi never branched in apterae viviparae ; spiracles distinctly protruding ; siphunculi short, at most about 0.12 x as long as body ..... *Sumatraphis* Takahashi



Figs. 2-5. Posterior parts of body of apterae viviparae showing tubercles and hairs on abdomen.

Genus 1. *Anomalosiphum* Takahashi, 1934

1934. *Anomalosiphum* Takahashi, R., *Stylops*, 3 : 54 ; Tao, C.C., 1947. *Notes d' entomologie*, 11 : 149; Ghosh, A. K., Ghosh M. R. and Raychaudhuri, D. N.,

1971. *Oriental Ins.*, 6 : 333 ; Calilung, V. J., 1980, *Philipp. Ent.*, 4 : 14.

Type species : *Anomalosiphum pithecolobii* Takahashi, 1934.

**Morphology** Body brown to dark brown in apterae, pale to pale brown in alatae. Head smooth, fused with prothorax in apterae, distinct in alatae, lateral frontal tubercles wanting. Eyes multi-faceted, small, of 14-15 ommatidia in apterae; large, more than 100 ommatidia in alatae. Antennae 4-segmented in apterae, 5-segmented in alatae; flagellum weakly imbricated throughout; processus terminalis shorter than base of last antennal segment; flagellar hairs short, with blunt or fan-shaped apices; in alatae sub-circular secondary rhinaria present all along on segments III, IV and sometime the base of V; primary rhinaria smooth, round. Rostrum long and slender; ultimate rostral segments about 2.0 x second segment of hind tarsus; segments 4 and 5 indistinctly separated; segment 4 either without or with a pair of secondary hairs. Dorsum of abdomen in apterae brown to dark brown ; tergites 1st-5th with marginal round pigmented areas ; dorsum in alatae pale, without any such area ; dorsal hairs short, with fan-shaped apices in apterae and slightly expanded apices in alatae ; 6th tergite with marginal hair-bearing protuberances; 7th and 8th tergites each with finger-like hair bearing processi in apterae, in alatae such processi reduced, on 7th tergite only. Siphunculi cylindrical on basal 0.75 portion and gently subcylindrical on apical 0.25 portion, short, with a sub-apical ring of 4-5 hairs and 4-5 rows of interconnecting striae and with an apical flange. Cauda broad, with a distinct median stylus, bearing 6-7 fine hairs. Legs concolorous with body in both apterae and alatae, first tarsal segments each with 3 hairs. Wings with veins bordered brown ; forewings with Media once-branched ; hindwings with only a distal oblique vein.

**Discussion** : Takahashi (1934) described the genus with *Anomalosiphum pithecolobii* as the type species from Taiwan. The original description was based on alatae viviparous females collected on *Pithecolobium lucidum*, a plant of Leguminosae. Since then, three more species namely *A. takahashii* by Tao (1947) from China, *A. indigoferae* by Ghosh *et al.* (1971) from India and *A. murphyi* Agarwala and Martin (ms. name) from Singapore and Malaysia have been described. As a result, the genus is now represented by 4 distinct species.

**Biology** : The described species of the genus are known by their viviparous female morphs only and appear to lead anholocyclic life cycle. These species infest plants of Leguminosae only, in one case an alate of *A. indigoferae* has been recorded from *Phyllanthus* sp. (Euphorbiaceae).

**Distribution** : China, India, Malaysia, Singapore, Taiwan.

**Type species** *Anomalosiphum pithecolobii* Takahashi (1934) deposited in the collection of Taiwan Agricultural Research Institute, Taipei, Taiwan.

1. *Anomalosiphum indigoferae* Ghosh, Ghosh and Raychaudhuri  
(Figs. 6a-e, 7a-d)

1971. *Anomalosiphum indigoferae* Ghosh, A. K., Ghosh, M. R. and Raychaudhuri, D. N., *Oriental Ins.*, 6 : 333.
1981. *Anomalosiphum indigoferae*, Raychaudhuri, D. N. and Chatterjee, M., In. "Taxonomy of the aphids of north-east India and Bhutan", (ed) D. N. Raychaudhuri, 316.

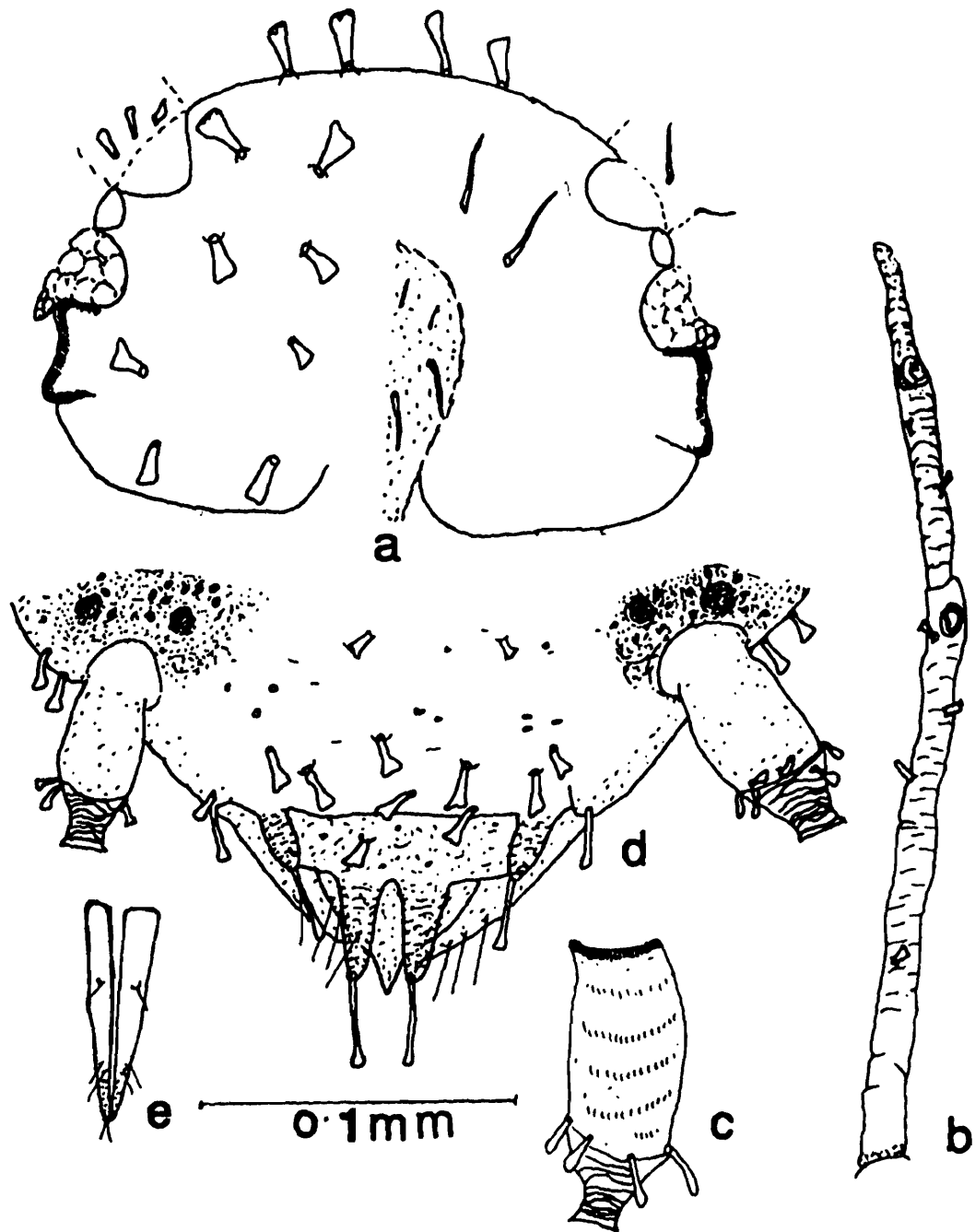


Fig. 6

Figs. 6la-e *Anomalosiphum indigoferae*, apterous viviparous female morph : a head, b antennae, c u.r.s., d posterior abdominal tergites, e siphunculus

*Apterous viviparous female* : Body brown to dark brown, 1.11-1.50 mm in length and 0.64-0.83 mm maximum width in the region of 4th abdominal segment. Head smooth, with few small hairs and with a pair of frontal processi, 0.05 mm long. Antennae 4-segmented, 0.46-0.57 mm long, 0.38-0.45 x as long as body; gradually more distinctly imbricated apicad; flagellar hairs short, with blunt apices; processus terminalis 0.04-0.05 mm long, 0.27-0.33 x as long as base of last antennal segment. Rostrum long; ultimate rostral segments slender, 0.14-0.15 mm long, 1.87-2.14 x as long as second segment of hind tarsus. Abdominal dorsum pale brown to brown, with segmentally arranged marginal pigmented areas on 1st- 5th tergites; dorsal hairs short, with fan-shaped apices; hair-bearing processi present on post-siphuncular tergites, a pair of marginal protuberances placed one on each side of 6th tergite, a pair of small sub-marginal finger-like processi present on 7th tergite and a pair of long median finger-like processi on 8th tergite. Siphunculi short, sub-cylindrical, 0.12-0.13 mm long, 0.08-0.02 x as long as the body; apical 0.25 portion with 4-8 rows of interconnecting striae, with a sub-apical ring of 4-5 hairs and distinct apical flange. Cauda oval, with a distinct stylus which is imbricated and with few spines and bearing 4-7 fine hairs. Legs concolorous with rest of the body; first tarsal segments each with 3 hairs.

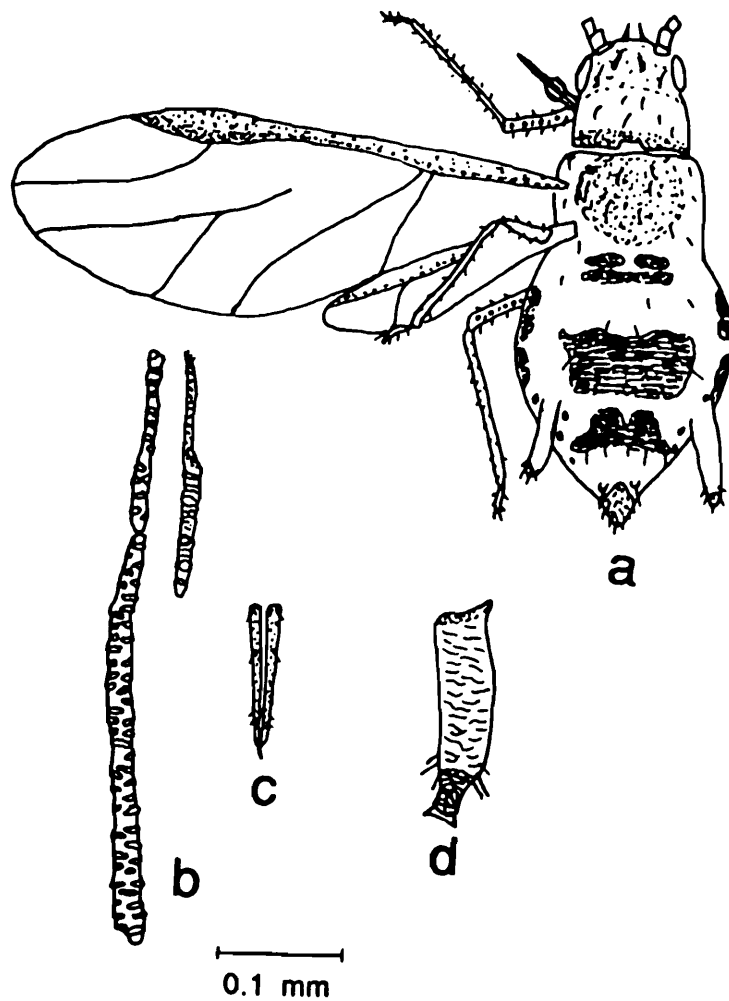
*Measurements in mm. :*

	Length	Width	Antenna
1.	1.46	0.79	0.56
2.	1.50	0.83	0.57
3.	1.20	0.70	0.46
4.	1.26	0.75	0.50
5.	1.30	0.78	0.50
6.	1.11	0.65	0.50
7.	1.12	0.64	0.50

Antennal segments		Urs	ht2	Siph
III	IV			
0.30	0.12+0.04	0.15	0.07	0.13
0.32	0.11+0.05	0.15	0.08	0.13
0.23	0.10+0.05	0.14	0.07	0.12
0.26	0.10+0.05	0.14	0.07	0.12
0.26	0.10+0.05	0.15	0.07	0.13
0.26	0.10+0.05	0.15	0.07	0.12
0.26	0.10+0.05	0.15	0.07	0.13

(1,2 *Indigofera* sp., Pashoke, West Bengal, 18.iii.1971, C.U. Colls., 3,4,5 unidentified host, Sikkim, 24. iii. 1970, C.U. Colls., 6,7 *Indigofera* sp., Durbin, Kalimpong, West Bengal, 12. ii. 1970, C.U. Colls.)

*Alate viviparous female* : Body elongated oval, pale 1.48 mm long and 0.69 mm as maximum width. Head smooth, without any tubercle or process; dorsal hairs short, with fine apices. Antennae 5- segmented, 0.96 mm long, 0.65 x as long as body; flagellum weakly imbricated on segments III and IV, distinctly so on the last segment; transversely elongate secondary



**Fig. 7**

Figs. 7a-d.: *A. indigoferae*, alate viviparous female morph : a body, b antennae, c u.r.s., d siphunculus.

rhinaria present throughout on segments III, IV and base of the last segment; processus terminalis 0.06 mm long, 0.60 x as long as base of last antennal segment, bearing 4 apical hairs. Rostrum reaching hind coxae; slender, 0.16 mm long, 2.0 x as long as second segment of hind tarsus. Abdominal dorsum smooth, without any sclerite or pigmentation; dorsal hairs arranged segmentally, 6-8 on 1st-7th tergites and 5 on 8th tergite, with acute or subacute apices; spinal hairs longer than pleural and marginal ones; 7th tergite with a pair of hair-bearing rudimentary processi. Siphunculi cylindrical over 0.75 portion of the length from base, distal 0.25 portion somewhat narrow, with 3-4 rows of interconnecting striae, 0.15 mm long, about 0.10 x as long as the body, bearing a subapical ring of 4-5 long hairs. Cauda transversely oval; median stylus indistinguishable, bearing a few long hairs. Subanal plate short, broadly rounded and hairy. Legs pale brown; femora and tibiae smooth; first tarsal segments each with 3 hairs. Wing venation normal; pterostigma pigmented throughout. Media in forewings once-branched; hindwings with one oblique vein.

*Measurements in mm. :*

Length			Width	Antenna		
1.48			0.69	0.96		
Antennal segments			Urs	ht2	Siph	
III	IV	V				
0.43	0.26	0.10+0.06	0.16	0.08	0.15	

(1, *Phyllanthus* sp., Samalbong, West Bengal, 9. vi. 1969, C.U. Colls.)

*Other morphs* : Not known.

*Materials examined* : 1 alate viviparous female from *Phyllanthus* sp., Samalbong, West Bengal, 9.vi.1969, Coll. M. R. Ghosh ; 2 apterous viviparous females from *Indigofera* sp., Durbin, Kalimpong, West Bengal, 12.ii.1970, Coll. not known, 3 apterous viviparous females from indet. plant of Leguminosae, Singtam, Sikkim, 24.xii.1970, Coll. M. R. Ghosh ; 2 apterous viviparous females and 2 nymphs from *Indigofera* sp., Pashoke, West Bengal, 18.iii.1971, Coll. not known.

*Discussion* : This species stands distinct from the type species, *A. pithecolobii*, in having shorter body and antennae, siphunculi with strong spinular striations in apterae, and in having antennal segment IV with many secondary rhinaria and also a few on segment V in alate viviparae. Another allied species, *A. murphyi* Agarwala and Martin is easily distinguishable from *A. indigofera* in having longer body, siphunculi and antennae and in the ratios of antennal segment II to ultimate rostral segments, siphunculi to ultimate rostral segments, body to siphunculi and antennal segment III to processus

terminalis. The species is known from viviparous morphs, and appears to lead anholocyclic life cycle on its host *Indigofera* sp.

*Distribution* : India : Sikkim, West Bengal.

*Types* : In the collections of Entomology Laboratory, Department of Zoology, University of Calcutta, India.

### Genus 2. *Cervaphis* van der Goot, 1917

1917. *Cervaphis* Goot, P. van der, *Contr. Faune Ind. Neerl.*, 1(3) : 1; Hille Ris Lambers, D. 1956, *Ent. Ber.*, 16 : 13 ; Raychaudhuri, D. N. and Chatterjee, M., 1980. In "Taxonomy of the aphids of North East India and Bhutan" 317; Ghosh, A. K. 1982, *Oriental Ins.*, 16 : 84.

Type-species : *Cervaphis schouteniae* van der Goot, 1917.

*Morphology* : Body oval, pale to brown. Apteræ viviparæ with processii placed marginally and pleurally, a pair of marginal processii placed on all segments of thorax and abdomen besides on the frons of head, each of the marginal processii have 4-6 pairs of lateral hair-bearing branches except on 8th abdominal tergite; the main stem of all the processii without a terminal hair, except the frontal processii and that on the 8th abdominal tergite; one pair of pleural processii present on each of the thoracic segments and on 2nd abdominal segment, each of the pleural processii bearing one pair of lateral branches, basally; length of marginal and pleural processii variable in different species. Alate viviparæ and alate oviparæ with such processii either absent or reduced to hair-bearing low tubercles. Head smooth, fused with prothorax in apteræ, distinctly separated in alatae. Antennæ 3 or 4-segmented in apteræ, 5-segmented in alatae, shorter than body; apteræ without secondary rhinaria; in alatae segment III with 4-11 small to large, oval, somewhat bulging rhinaria along one side; primary rhinaria round, non-ciliated; processus terminalis longer than base of the last antennal segment, if distinctly separated from segment III; in apteræ flagellar hairs short or long, on high sockets and with expanded or slightly bifurcated or dagger-shaped apices; in alatae these hairs short, on normal sockets and with blunt or acute to acuminate apices. Rostrum long, reaching upto the beginning of the abdomen ; ultimate rostral segments slender and acute, about 0.83-2.22 x as long as 2nd segment of hind tarsus and with 5-6 minute accessory hairs on segment 4. Abdominal tergum in apteræ pale brown, sclerotic, smooth, warty near the marginal branched processii ; in alatae tergum pale, sclerotic, usually with a solid brown spino-pleural patch on tergites 2-4, light brown broken patches present spino-pleurally on the post-siphuncular tergites and marginally all along abdomen; dorsal hairs numerous ; in apteræ hairs placed on high sockets, with usually lanceolate, expanded or dagger-shaped apices, some smaller ones with acute to acuminate apices, a group of spinal hairs longer than the rest, their sockets as long as or longer than

hairs, having blunt or dagger-shaped apices; in alatae hairs small except on 8th tergite, on normal sockets. In apterae siphunculi pale, cylindrical except very gently swollen on distal 0.20 portion, bearing a subapical ring of 4-5 hairs near the narrowed apex and with a distinct apical flange; in alatae siphunculi darker and thinner. Cauda broadly oval; in apterae bearing a distinct stylus; in alatae, stylus is absent or indistinct; caudal hairs shorter than those on the oval subanal plate. Legs pale, smooth; in alatae with some spinules near the apices of tibiae; tibial hairs moderately long, with fine to blunt apices; first tarsal segments with 5 hairs; 3 long and 2 short hairs on each of the first tarsus. Wing venation normal; pterostigma; nearly colourless on anterior half.

*Discussion* van der Goot (1917) described the genus with *C. schouteniae* as the type species from Java. Subsequently Takahashi (1918) described *C. quercus* from Thailand, Hille Ris Lambers (1956) described *C. echinata* and *C. rappardi* from Java and Basu (1961) described a subspecies, *C. rappardi indica* from India. The other species described under the genus have since been found to be the synonym of one of the aforesaid species (viz., *C. cambodiensis* Takahashi, 1941 = *C. schouteniae*, and *Diverosiphum kunugii* Shinji, 1922 = *C. quercus*). Thus the genus is now recognised by 4 species distributed in East and South-East Asia, of which 3 are now known from India. Hille Ris Lambers (1956) gave a detailed taxonomic account of the genus and A. K. Ghosh (1982) reviewed the species under the genus. Agarwala *et al* (1985) provided the nymphal morphology of all the instars of *C. schouteniae*. The long and branched processi in apterae, and long curved siphunculi with apical rings of hairs help to distinguish the members of *Cervaphis* from other genera.

*Biology* Species of the genus feed on the trees or shrubs belonging to Families Fagaceae, Leguminosae, Meliaceae, Tiliaceae and Sterculiaceae. The genus is largely represented in the hot and wet forests of East and South-East Asia. Except for alate oviparous female morph of *C. quercus*, rest of the species have been recorded by their viviparous morphs only and no sexual reproduction is noticed. Agarwala and Dixon (1986) studied *C. schouteniae* colonising *Microcos peniculatus* in North-East India and this species seems to remain active during the hottest and wet periods of the year. Quite likely, the species of the genus have evolved from the parthenogenetic clones without resorting to break in viviparity. *Trioxys peniculatus* Agarwala, Saha and Mahapatra, 1985 is the only species of parasitoid (Hymenoptera : Aphidiidae) recorded for *schouteniae* under the genus. Coccinellid predators, *Menochilus sexmaculatus* (Fab.) and *Scymnus* sp., have been noted feeding on *C. schouteniae* in North-East India (Agarwala and Ghosh, 1988).

*Distribution* : India : North-East India; Cambodia, Indonesia (Java), Thailand, The Philippines, Korea, and Japan.

*Type species* : *Cervaphis schouteniae* van der Goot, 1917, location of the types not known.

Key to the species of *Cervaphis*

*Aprteous viviparous female* :

1. Spinal hairs on dorsum of abdomen fused to form a median 4-branched stellate processus ; flagellar hairs short, 0.03 mm long ; on *Quercus* sp. (Fagaceae) ..... *C. quercus* Takahashi  
 Spinal hairs on dorsum of abdomen remain distinct ; flagellar hairs longer, 0.06-0.10 mm long ..... 2
2. Dorsal abdominal hairs many, acute, lanceolate or slightly bifid; siphunculi long, 0.37 x as long as the body; on *Actinophora*, *Grewia*, *Microcos* (Tiliaceae); *Pterospermum* (Sterculiaceae), *Amoora* (Meliaceae) ..... *C. schouteniae* van der Goot  
 Dorsal hairs numerous, blunt or with nearly globular apices ; siphunculi short, 0.23 x as long as the body ; on *Nephelium* (Sapindaceae), *Theobroma* (Sterculiaceae) and *Cajanus* (Leguminosae) ..... *C. rappardi* Hille Ris Lambers

*Alate viviparous female* :

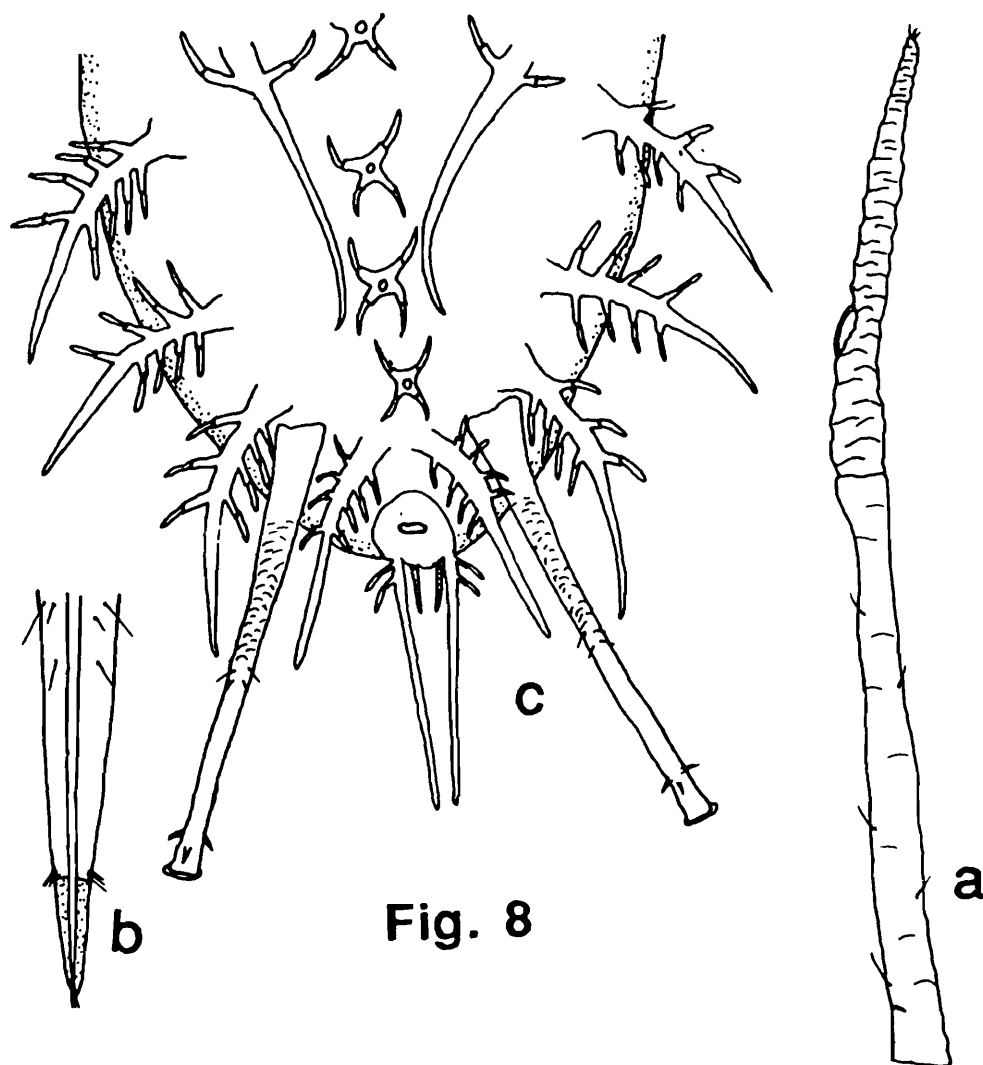
1. Siphunculi pale throughout, 0.42 x as long as the body ; antennal segment III with 4-6 secondary rhinaria ..... *C. quercus* Takahashi  
 Siphunculi never pale throughout, less than 0.40 x as long as the body ; antennal segment III with 6 or more secondary rhinaria ..... 2
2. Siphunculi dark brown throughout ; ultimate rostral segments 1.50-1.70 x as long as second segment of hind tarsus ; processus terminalis 1.31-1.88 x as long as base of last antennal segment ..... *C. schouteniae* van der Goot  
 Siphunculi brown on basal half and pale brown on distal half, 0.27-0.32 x as long as the body ; ultimate rostral segments 1.77- 2.28 x as long as second segment of hind tarsus ; processus terminalis 1.66-2.14 x as long as base of last antennal segment ..... *C. rappardi* Hille Ris Lambers

2. *Cervaphis quercus* Takahashi  
 (Figs. 8a-c, 9a-c, 10a-c)

1918. *Cervaphis quercus* Takahashi, R., *Doubts. zasshi.*, 30 : 458.

1931. *Diverosiphum kunugii*, Takahashi, R., *Dept. Agric. Govt. Res. Formosa*. pt. 6 : 1-127.
1956. *Cervaphis quercus*, Hille Ris Lambers, D., *Ent. Ber.*, 16 : 132.
1980. *Cervaphis quercus*, Raychaudhuri, D. N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhuttan", (ed.) D. N. Raychaudhuri, 319.

*Apterous viviparous female* : Body oval, brown; 1.32-1.73 mm long and 0.65-0.87 mm as maximum width in the region of 2nd and 3rd abdominal segments. Head smooth; frontal processi including their apical hairs 0.34-0.43 mm



Figs. 8a-c.: *Cervaphis quercus*, Apterous viviparous female morph : a antennal segments III and IV, b u.r.s., c posterior portion of abdomen.

long, 0.04-0.61 x as long as antennae. Antennae 4-segmented; 0.53-0.65 mm long, 0.32-0.42 x as long as the body; flagellum weakly imbricated; flagellar hairs short, with blunt apices, longest one on segment III 0.03 mm long; processus terminalis 0.11-0.13 mm long, 0.52-0.55 x as long as base of last antennal segment. Rostrum slender, pointed; ultimate rostral segments 0.18-0.22 mm long, 1.80-2.33 x as long as second segment of hind tarsus, 4th segment bearing 6 minute hairs, 3 on each side. Each of the thoracic tergites with marginal branched processi projecting inward posteriorly upto the next segment. Abdomen with 4 pairs of marginal branched processi on pre-siphuncular segments and 2 pairs on post-siphuncular segments; 1st segment with only one pair of hair-bearing once-branched processi projecting inward and posteriorly, which are 0.10-0.11 mm long; each of the thoracic tergites with 4 spinal hairs on high sockets, the two anterior ones longer than the two posterior ones; abdominal tergites with similar hairs fused centrally to produce a stellate processi; these and other hairs on the pleural and marginal regions mostly with dagger-shaped apices. Siphunculi truncated, slightly swollen on distal 0.33 portion, 0.59-0.75 mm long, with a subapical ring of 4-5 hairs and an apical flange. Cauda broadly oval bearing many long pointed hairs. Legs concolorous with head; first tarsal segments with 5 hairs. Otherwise as in other species of the genus.

*Measurements in mm :*

	Length	Width	Antenna
1.	1.52	0.67	0.65
2.	1.59	0.79	0.59
3.	1.66	0.79	0.58
4.	1.62	0.85	0.52
5.	1.73	0.85	0.57
6.	1.42	0.65	0.57
7.	1.41	0.65	0.53
8.	1.32	0.62	0.58
9.	1.69	0.80	0.59
10.	1.65	0.87	0.53

Antennal segments		Urs	ht <sub>2</sub>	Siph
III	IV			
0.28	0.12+0.13	0.22	0.11	0.75
0.27	0.11+0.12	0.22	0.10	0.74
0.27	0.10+0.12	0.22	0.12	0.75
0.29	0.11+0.13	0.20	0.11	0.75
0.29	0.12+0.12	0.22	0.10	0.74

0.27	0.11+0.12	0.20	0.09	0.65
0.26	0.09+0.11	0.22	0.11	0.59
0.27	0.10+0.12	0.21	0.10	0.75
0.28	0.10+0.12	0.21	0.09	0.68
0.22	0.09+0.11	0.18	0.09	0.70

(1-7, *Quercus* sp., Golf Links, Shillong, 6.ix.1976, Z.S.I. Colls ; 8-10, unidentified host, Morrangknag, Shillong, ?. viii. 1965, B.M. Coll.)

*Alate viviparous female* : Body oblong, brown, 1.71 mm long and 0.68 mm as maximum width. Head smooth. Antennae 5-segmented, 0.33 mm long, 0.51 x as long as the body ; flagellum distinctly imbricated, bearing 4-6 round secondary rhinaria on segment III, longest hair on this segment 0.02 mm long, flagellar hairs pointed or obtuse in apices; processus terminalis 0.15 mm long and 1.25 x base of the last antennal segment. Rostrum reaches upto mesothorax; ultimate rostral segments pointed at tip, 0.17 mm long, 1.12 x as long as second segment of hind tarsus, 4th segment bearing 4 minute secondary hairs. Abdominal dorsum with a solid brown patch in spinal region extending over 3rd-5th tergites, rest of the tergites with broken light brown patches on spino-pleural and marginal regions ; marginal branched processi absent, reduced to low tubercles bearing many tiny hairs ; dorsal hairs on low tuberculate bases, with fine or blunt apices, longest one on anterior tergites 0.02 mm long. Siphunculi usually pale, light brown at the basal and apical portions, 0.72 mm long, 0.42 x as long as the the body, more distinctly imbricated than in apterous viviparae, with a subapical ring of 5 hairs and an apical flange. Cauda broadly oval, bearing many pointed hairs. First tarsal segments with 5 hairs. Forewings with Media once-branched, runs short of subcosta; hindwings with 2 oblique veins.

*Measurements in mm :*

	Length	Width	Antenna		
1.	1.71	0.68	0.88		
	Antennal segments		Urs	ht2	Siph
	III	IV	V		
	0.30	0.19	0.12+0.15	0.17	0.08
					0.72

(1-unidentified host, Morrangknag, Shillong, ?.viii.65, B.M. Colls.)

*Alate oviparous female* : Body pale brown, 1.54-2.05 mm long and 0.60-0.86 mm wide in the middle of abdomen. Head smooth. Antennae 5-segmented, 0.67-0.98 mm long ; flagellum imbricated, bearing 5- 6 round secondary rhinaria on segment III ; processus terminalis 1.05-1.22 x as long as

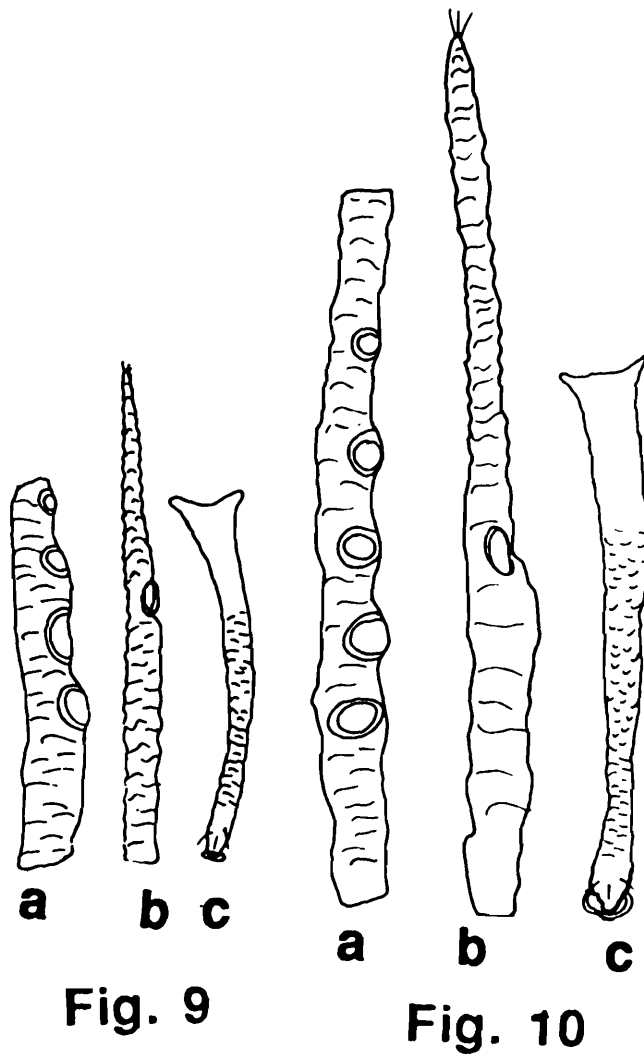


Fig. 9

Fig. 10

Figs. 9a-c. : *C. quercus*, alate viviparous female morph : a antennal segment III, b p.t., c siphunculus, Figs. 10a-c.: *C. quercus*, alate oviparous female morph : a antennal segment III, b p.t., c siphunculus.

base of the antennal segment ; flagellar hairs short, with blunt apices, longest one 0.01-0.02 mm long. Ultimate rostral segments 0.17-0.20 mm long, 2.00-2.42 x as long as second segment of hind tarsus ; bearing 4-5 minute secondary hairs. Dorsum of abdomen smooth, with a spino-pleural light brown patch on 3rd-5th tergites ; other segments with a few broken light brown sclerites on spino-pleural or marginal areas ; marginal low tubercles distinguishable on ante-siphuncular tergites, each bearing many tiny hairs ; dorsal hairs very small, on normal sockets with acute or blunt apices and placed in group of 2-4 hairs distributed irregularly. Siphunculi brown, 0.68-0.82 mm long. Caudal stylus just visible. Subanal plate lined with numerous fine hairs. Female genitalia well-developed. Otherwise as in alate viviparous female.

*Measurements in mm*

	Length			Width	Antenna	
1.	1.76			0.75	0.67	
2.	2.05			0.86	0.98	
3.	1.69			0.72	0.73	
4.	1.55			0.60	0.83	
	Antennal segments			Urs	ht <sub>2</sub>	Siph
	III	IV	V			
	0.28	0.20	0.11+0.17	0.17	0.09	0.74
	0.33	0.18	0.16+0.19	0.17	0.07	0.82
	0.25	0.18	0.10+0.12	0.19	0.09	0.73
	0.30	0.18	0.10+0.16	0.17	0.10	0.68

(1-4. unidentified host, Morrangknag, Shillong, ?.viii.1965, B.M. Colls.)

*Alate male* : Body 1.40 mm long and 0.57 mm wide in the middle of abdomen. Head brown. Antennae 5-segmented, 0.84 mm long and 0.60 x as long as the body ; flagellum gradually more strongly imbricated apicad, segment III with 4 round accessory rhinaria, primary rhinaria non-ciliated ; processus terminalis 1.22 x as long as base of the last antennal segment ; flagellar hairs short, with acute apices, longest one on segment III 0.01 mm long. Dorsum of abdomen sparsely spinulose, densely so on the venter ; transverse sclerotic bands present on tergites II, III and IV but broken margino-pleurally or narrow spino-pleural bands present on other tergites ; marginal processi absent, these reduced to low tubercles on anterior tergites, placed on wide sclerotic bases and studded with many small hairs ; dorsal hairs short, tergites I-V with a set of bunch of 3-5 hairs placed one each in spinal and pleural areas besides the individual hairs ; tergite VI with only a pair of pleural and tergite VII with a pair of spinal bunch of hairs ; longest hair on anterior tergites 0.01 mm long. Siphunculi brown, broad at base and rest thin, with spinular imbrications, bearing 8-10 hairs along its length and an apical ring of 4-5 hairs. Male genitalia well-developed. Femora and tibiae pale brown at base and brown at apex. Other characters as in alate viviparous female and alate oviparous female.

*Measurements in mm :*

	Length			Width	Antenna	
1.	1.40			0.57	0.84	
	Antennal segments			Urs	ht <sub>2</sub>	Siph
	III	IV	V			
	0.30	0.19	0.13+0.16	0.16	0.07	0.61

(1, *Quercus* sp., Imphal, Manipur, 9.vii.1991, M.U. Colls.)

*Nymphs (apteroid)* : Body 0.74-1.29 mm long ; antennae 4- segmented, 0.30-0.38 mm long, processus terminalis as long as to shorter than base of last antennal segment ; ultimate rostral segments 0.23-0.25 mm long, 2.56-2.78 x as long as second segment of hind tarsus; siphunculus 0.31-0.43 mm long; abdominal dorsum smooth, spinal hairs distinctly separated in the first instar, a faint cuticular ring present at the base in the second instar; cuticular ring prominent in the third instar and spinal hairs fused at bases in the fourth instar; dorsal hairs many, on high sockets and with blunt apices.

*Measurements in mm of nymphal instars (apteroid)\**

Characters	I instar	II instar	III instar	IV instar
L. Body	0.74	0.95	1.09	1.29
W. body	0.37	0.44	0.51	0.54
L. ant.	0.30	0.34	0.37	0.38
ant. III	0.09	0.11	0.12	0.13
base	0.07	0.06	0.08	0.08
p.t.	0.07	0.09	0.09	0.09
u.r.s.	0.23	0.23	0.25	0.25
h.t.2	0.08	0.09	0.09	0.09
siph.	0.31	0.36	0.37	0.43

\* average of 12 specimens.

(I-IV instars, *Quercus* sp., Golf Links, Shillong, 6.ix.1976, Z.S.I. Colls.)

*Nymphs (alatooid)* : Body 1.42-1.72 mm long ; antennae 4-segmented, 0.40-0.44 mm long ; processus terminalis 1.20-1.30 x as long as the body ; ultimate rostral segments 0.15-0.17 mm long and 1.67- 1.70 x as long as second segment of hind tarsus ; siphunculi 0.62-0.73 mm long ; abdominal dorsum with sclerotic bands or patches, dorsal hairs on low bases and with fine apices.

*Measurements in mm :*

	Length	Width	Antenna		
1.	1.72	0.82	0.44		
2.	1.42	0.60	0.40		
	Antennal segments		Urs	ht <sub>2</sub>	Siph
	III	IV			
	0.26	0.09+0.12	0.17	0.10	0.62
	0.22	0.10+0.12	0.15	0.09	0.73

(1-2, unidentified host, Morrangkang, Shillong, ?.viii.1965, B.M. Colls.)

*Materials examined* : 26 apterous viviparous females, 5 alate viviparous

females, 18 alate oviparous females, and 2 alatoid nymphs from unidentified host, Morrangkang, Shillong,? viii.1965, Coll. CIBC, India ; 7 apterous viviparous females and many nymphs from *Quercus* sp., Golf Links, Shillong, 6.iv.1976, Coll. M. S. Jyrwa ; 15 viviparous females, 4 alate oviparous females, 1 alate male and many nymphs from *Quercus serrata*, Mantripukhri, Manipur, 24.v.1991, Coll. K. Shantibala.

*Other morphs* : Not known.

*Discussion* : Takahashi (1918) described the species from Formosa, now Taiwan, and considered *Diverosiphum kunugii* Shinji, 1922 from Japan as its synonym (Takahashi, 1931). Hille Ris Lambers (1956) while agreeing with this arrangement, preferred to consider *Diverosiphum* as a subgenus of *Cervaphis* because of the fact that the first instar nymph and adults of *Cervaphis* spp., from non- quercus hosts show furcated hairs compared to simple hairs in the first instar and stellate median hairs in the adults, on *Quercus*. Eastop and Hille Ris Lambers (1976), however, did not discriminate between *Cervaphis* and *Diverosiphum* and considered the later a synonym of the former.

Type materials of *C. quercus* and *D. kunugii* were not accessible for the present study and the opinion of Eastop and Hille Ris Lambers (*op. cit.*) is followed here.

*Biology* : This is the only oak-infesting species of the genus in India. Takahashi (1918) while describing the species from Taiwan mentioned about the occurrence of alate oviparous females in summer. From India, alate oviparous females along with apterous and alate viviparous females were collected in the summer. Female oviparous morph is being described separately by Shantibala *et al* (1993).

*Distribution* India : Meghalaya ; Japan, Korea, and Taiwan.

*Types* : In the collection of Agricultural Research Institute, Taipei, Taiwan.

***Cervaphis rappardi* Hille Ris Lambers**  
(Figs. 11a-c, 12a-c)

1956. *Cervaphis rappardi* Hille Ris Lambers, D., *Ent.Ber.*, 16 :130.

1980. *Cervaphis rappardi*, Calilung, V.J., *Philipp. Ent.*, 4 : 15.

Hille Ris Lambers (1956) described the species on the basis of large samples of apterous and alate viviparous females infesting *Nephelium lappaceum*, a fruit tree, and *Theobroma cacao* (Cacao plant) from Java (In-

onesia). Since then Calilung (1980) found a stray alate viviparous female in a water trap in the Philippines.

Samples of aphids showing many similarities with *C. rappardi* have been collected from West Bengal, Assam and Manipur in India infesting *Cajanus cajan* and *C. indicus* (pigeon pea). Basu (1961) described the specimens from West Bengal under a new subspecies, *C. rappardi indica*. Specimens from Assam and Manipur were subsequently considered to be the *C. rappardi indica* by Ghosh (1974) and Raychaudhuri (1980) respectively.

A review of the published information and re-examination of the samples from Java, and from W. Bengal, Assam and Manipur in India, suggest that populations of *C. rappardi* exist as two distinct subspecies which can be separated by the following key :

1. Siphunculi entirely pale, 0.31-0.39 mm long, 0.27-0.32 x as long as the body ..... *C. rappardi rappardi* Hille Ris Lambers
2. Siphunculi pale near the base and middle, brown at the base and apex; 0.25-0.38 mm long; 0.17-0.26 x as long as the body ..... *C. rappardi indica* Basu, A. N.

Following key characters, specimens from Java and Assam belong to *C. rappardi rappardi* H.R.L. and those from West Bengal and Manipur, are considered under *C. rappardi indica*. Besides key characters, statistical analysis (difference between the means of two samples when population variance not assumed to be equal) show significant difference in the two populations (Table 2).

Table 2. Difference between means of samples from Java and Assam considered as *C. rappardi rappardi* H.R.L., and from W Bengal and Manipur considered as *C. rappardi indica*

Characters	Mean values of samples from				df	t	P
	Java + Assam		West Bengal + Manipur				
	M	SD	M	SD			
L. body	1.38 ± 0.08		1.53 ± 0.08		41	6.08	<0.001
L. ant.	0.38 ± 0.03		0.04 ± 0.02		43	6.37	<0.001
L. siph.	0.35 ± 0.03		0.07 ± 0.02		20	2.59	<0.02
L. frontal processi	0.18 ± 0.03		0.19 ± 0.02		40	1.04	0.10

However, similar analysis, when made with the Indian specimens together (W Bengal + Assam + Manipur) show that they are not significantly different from that of Javan specimens (Table 3). This implies that the two populations have not become quite independent in spite of certain differences in their morphology and a limited gene flow between them is not ruled out. *C. rappardi indica* is being retained here as a subspecies for the time being.

Table 3. Difference between means of samples of *C. rappardi* S.L. from India and Java.

Characters	Mean values of samples from		df	t	P
	India M SD	Java M SD			
L. body	1.47 ± 0.11	1.34 ± 0.11	13	0.22	NS
L. ant.	0.42 ± 0.04	0.39 ± 0.05	9	1.53	NS
L. siph.	0.35 ± 0.03	0.37 ± 0.03	10	1.56	NS
L. frontal processi	0.19 ± 0.03	0.17 ± 0.03	10	1.61	NS

### 3. *Cervaphis rappardi rappardi* Hille Ris Lambers

1956. *Cervaphis rappardi* Hille Ris Lambes, D., *Ent. Ber.*, 16 : 130.

1974. *Cervaphis rappardi indica*, Ghosh, A.K., *Oriental Ins.*, 8 : 162.

1980. *Cervaphis rappardi*, Calilung, V. J., *Philipp. Ent.*, 4:15.

*Apterous viviparous female* : Body pale; 1.36-1.46 mm long and 0.66-0.82 mm as maximum width in the region of abdominal segments II and III. Head smooth; frontal processi including terminal hairs 0.17-0.23 mm long, 0.45-0.61 x as long as antennae. Antennae 3-segmented, the division between segments III and IV either indistinct or obsolete; 0.36-0.39 mm long, 0.25-0.28 x as long as the body; segment III smooth, with many long thick hairs placed on high sockets; longest hair 0.06-0.08 mm long; processus terminalis imbricated, 0.07-0.09 mm long, 1.29-1.80 x as long as base of the last antennal segment. Rostrum slender, acute; ultimate rostral segments 0.13 mm long, 1.30-1.44 x as long as second segments of hind tarsus; 4th segment bearing 5-6 minute hairs. Marginal branched processi on thorax and abdomen well-developed; number of branches variable on different segments : first thoracic segment with 4 pairs, 2nd-3rd thoracic segments and abdominal segments 1st-5th each with 6 pairs, and abdominal segment 7th-8th with 5 pairs of branches on each of the marginal processi; pleural

branched processi less well-developed, not easily distinguishable on 2nd abdominal tergite. Abdominal dorsum smooth, strongly sclerotic; dorsal hairs numerous, almost equal in length, with blunt apices, on high sockets, these being half as long as the length of hairs and those of spinal hairs subequal to longer; spinal hairs arranged radially. Siphunculi entirely pale, cylindrical; 0.31-0.39 mm long, 0.94-1.08 x as long as antennae, with a well-developed apical flange and a subapical ring of 4-5 hairs. Cauda broadly oval with a distinct stylus, bearing few long pointed hairs. Subanal plate with long, thick and pointed hairs. First tarsal segments each with 5 hairs.

*Measurements in mm:*

	Length	Width	Antenna
1.	1.43	0.80	0.36
2.	1.42	0.77	0.38
3.	1.36	0.75	0.38
4.	1.37	0.82	0.38
5.	1.44	0.78	0.38
6.	1.46	0.80	0.39
7.	1.42	0.77	0.37
8.	1.36	0.66	0.36

Antennal segments		urs	ht <sub>2</sub>	Siph	frontal processi
III	IV				
0.16	0.05 + 0.07	0.13	0.09	0.39	0.22
0.16	0.05 + 0.08	0.13	0.08	0.36	0.23
0.16	0.05 + 0.09	0.13	0.09	0.35	0.22
0.15	0.06 + 0.09	0.13	0.09	0.36	0.17
0.15	0.05 + 0.08	0.13	0.09	0.33	0.22
0.16	0.06 + 0.09	0.13	0.10	0.34	0.21
0.15	0.04 + 0.07	0.13	0.10	0.31	0.19
0.15	0.07 + 0.09	0.13	0.10	0.33	0.17

(1-8, *Cajanus indicus*, Karimganj, Assam, 8. xi. 1972, Z.S.I. Colls.)

*Nymphs (apteroid)* : Body 0.59-1.26 mm long and 0.29-0.75 mm as maximum width; antennae 4-segmented, 0.22-0.44 mm long, 0.27-0.37 x as long as the body ; processus terminalis 0.05-0.11 mm long, 1.0-1.75 x as long as base of the last antennal segment; ultimate rostral segments 0.19-0.20 mm long, 2.0-2.71 x as long as second segment of hind tarsus; siphunculi 0.05-0.35 mm long.

*Measurements in mm\** :

Charaters	I instar	II instar	III instar	IV instar
L.body	0.59	1.03	1.15	1.26
W. Body	0.29	0.51	0.52	0.75
L. ant.	0.22	0.31	0.31	0.44
ant.III	0.05	0.10	0.11	0.19
base	0.05	0.06	0.06	0.06
p.t.	0.05	0.08	0.08	0.11
u.r.s.	0.19	0.20	0.20	0.20
h.t.2	0.07	0.09	0.10	0.10
siph.	0.05	0.24	0.30	0.35

\*average of 11 specimens

*Other morphs* Not known from India. Alate viviparous female is known from Java and The Philippines.

*Alate viviparous female* : The following description is adopted from Hille Ris Lambers (1956) and Calilung (1980) based on specimens from Java and the Philippines.

Body 1.65-1.73 mm long. Cephalic dorsum with a group of 5-6 small hairs near each of the multicorneal eyes and between those 2 pleural hairs and 4-5 spinal hairs. Antennae 5-segmented, 0.93 mm long, about 0.4 x as long as the body; segment III bearing 5-11 large, bulging, somewhat tuberculate, transversely oval rhinaria along one side; primary rhinaria large, round and non-ciliated; processus terminalis 1.17 x as long as base of the last antennal segment; Rostrum tapering to a point; ultimate rostral segments 1.83 x as long as second segment of hind tarsus; segments 4 and 5 very distinct. Hairs on dorsum of abdomen numerous, very small, on normal sockets and not placed in a recognisable pattern. Siphunculi blackish, thin, about 0.49 mm long, 0.25-0.27 x as long as the body, with 4-5 hairs near the apex and a flange. Caudal stylus just visible. Forewings with Media once-branched; hindwings without an oblique vein.

*Measurements in mm*

	Length	Width	Antenna			
1.	1.65	*	0.93			
2.	1.73	*	0.81			
	Antennal segments			urs	ht2	Siph
	III	IV	V			
	0.39	0.14	0.13 + 0.16	*	*	0.49
	*	*	*	*	*	0.45

(1, *Theobroma cacao*, Lowokwaroe, Java, 25.x.1951, H.R.L. Colls., 2, YPT, Davao Expt. Sta. Cate, B.M. Colls. Slide no 257/69).

\* measurements not provided in literature.

*Material examined* : 17 apterous viviparous females and many nymphs from *Cajanus indicus*, Karimganj, Assam, 8.xi.1972, Coll. Sukla.

This species seems to lead monoecious life cycle in the region.

*Types* : In the collection of The Natural History Museum London, England.

#### 4. *Cervaphis rappardi indica* Basu, A.N.

(Figs. 11a-c 12a-c)

1961. *Cervaphis rappardi indica* Basu, A.N., *Curr. Sci.*, 30 : 390.
1981. *Cervaphis rappardi indica*, Raha, S.K. and Raychaudhuri, D.N., *Entomon*, 6 : 318.
1981. *Cervaphis rappardi indica*, Raychaudhuri, D.N. and Chatterjee M., In "Taxonomy of the aphids of north-east India and Bhutan", (ed) D.N. Raychaudhuri, 319.

*Apterous viviparous female* : Body oval, pale to pale brown; 1.42- 1.53 mm long and 0.48-0.77 mm as maximum width in the region of abdominal 2nd-3rd segments. Head smooth; frontal processi including terminal hairs 0.17-0.24 mm long, 0.36-0.58 x as long as antennae. Antennae 3-segmented; 0.41-0.46 mm long, 0.28-0.32 x as long as the body; flagellar hairs on high sockets with blunt to acute apices; longest hair 0.01 mm long; processus terminalis 0.08-0.12 mm long, 1.0-1.33 x as long as base of the last antennal segment. Rostrum long and pointed; ultimate rostral segments 0.15-0.22 mm long, 0.83-1.33 x as long as second segment of hind tarsus. Abdominal dorsum pale; dorsal hairs and marginal processi similar to *C. rappardi* H.R.L. S.S. Siphunculi pale near the middle, pale brown to brown at the base and apex, 0.17-0.26 x as long as body, with a distinct apical flange and a subapical ring of 4 hairs, otherwise as in *C. rappardi* H.R.L. S.S.

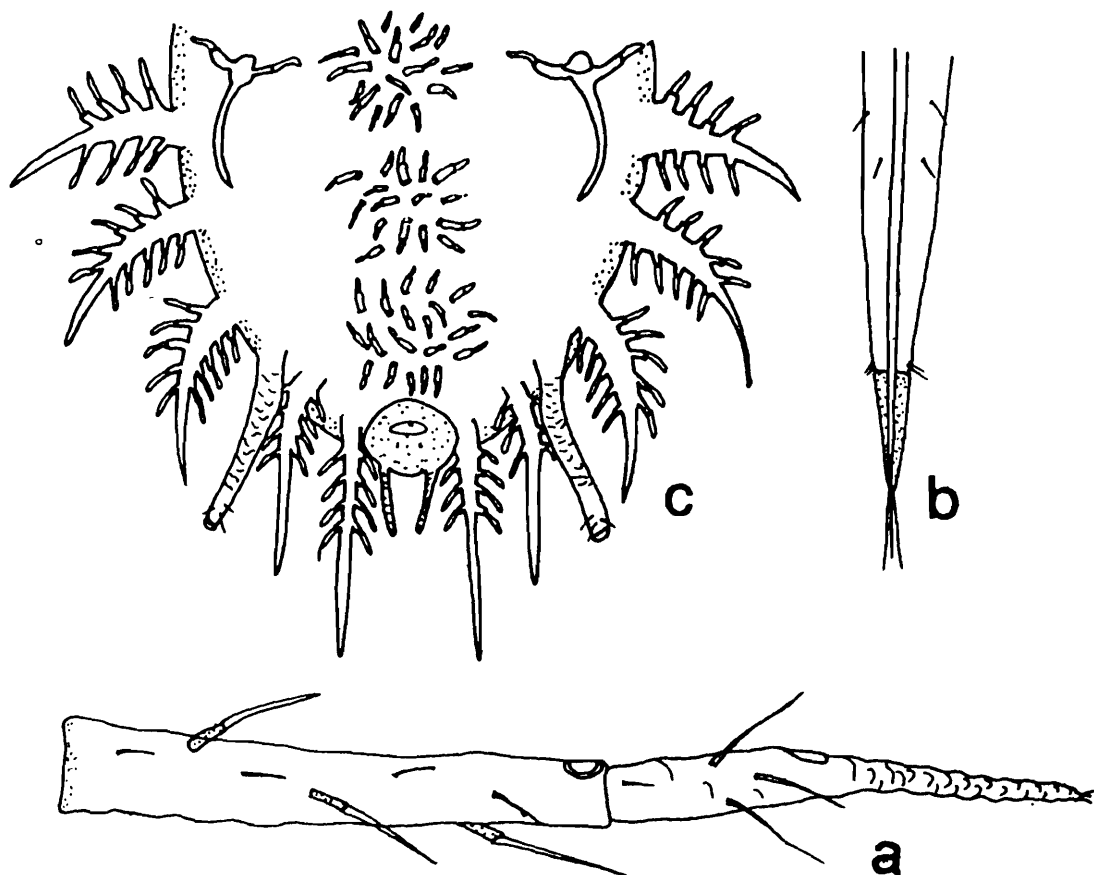
#### *Measurements in mm*

	Length	Width	Antenna
1.	1.42	0.70	0.46
2.	1.46	0.87	0.46
3.	1.44	0.86	0.41
4.	1.53	0.96	0.44
5.	1.46	0.77	0.41

Antennal segments		urs	ht2	Siph	Frontal processi
III	IV				
0.15	0.06 + 0.08	0.15	0.18	0.26	0.20
0.15	0.06 + 0.08	0.17	0.17	0.38	0.17
0.10	0.08 + 0.08	0.15	0.15	0.36	0.20
0.13	0.05 + 0.06	0.20	0.15	0.37	0.27
0.13	0.06 + 0.08	0.22	0.17	0.37	0.24

(1-5. *Cajanus cajan*, Canchipur, Manipur, 20.xii. 1988, T.U. Colls.)

*Alate viviparous female* : Body elongate, 1.15-1.52 mm long and 0.61-0.73 mm as maximum width. Head brown, smooth; frontal processi reduced to acute horns, these with terminal blunt hairs, 0.01-0.02 mm long and 0.06-0.07 x as long as antennal segment II; dorsal hairs short, with blunt apices. Antennae 5-seg-



**Fig. 11**

Figs. 11a-c. : *Cervaphis rappardi indica*, apterous viviparous female morph : a antennal segments III and IV, b u.r.s., c posterior portion of abdomen.

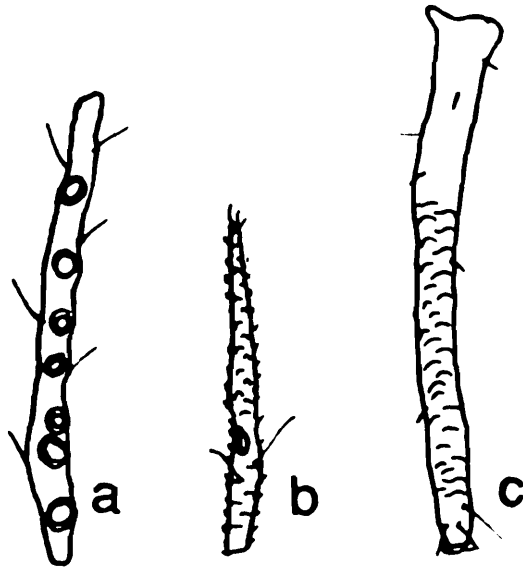


Fig. 12

Fig. 12a-c. : *C. rappardi indica*, alate viviparous female morph : a antennal segment III, b p.t., c siphunculus,

mented, 0.07-0.83 mm long, 0.53-0.60 x as long as the body; flagellum pale brown, distinctly imbricated throughout, more so on the last segment; segment III with 6-11 protuberant, transversely oval secondary rhinaria distributed all along one side; flagellar hairs short, on normal sockets, with bluntish apices, longest hair on segment III 1.14-1.80 x as long as basal diameter of processus terminalis; p.t. 0.15-0.16 mm long, 1.66-2.14 x as long as base of the last antennal segment. Rostrum long, pointed at tip, reaching upto just beyond midcoxae; ultimate rostral segments 0.16-0.18 mm long, 1.77-2.28 x as long as second segment of hind tarsus; 4th segment with 6 minute secondary hairs. Marginal processi reduced to low tubercles bearing many tiny hairss. Abdominal dorsum pale, with a nearly solid patch covering 3rd-4th tergites; margino-pleural patches on 2nd-4th tergites and spino-pleural narrow bands on 6th and 7th tergites; dorsal hairs many, very small, on normal sockets. Siphunculi long, cylindrical, thin, brown on basal half, pale brown on distal half; 0.37-0.43 mm long, 0.27-0.32 x as long as the body; with an apical flange and a subapical ring of 3 hairs. Cauda broadly oval, with a hardly distinguishable stylus; bearing 6 long hairs. Wings well-developed; forewings with veins blackish, pterostigma darker in the distal region but clear in the anterior region; Media once-branched; veins in hindwings paler, hardly distinguishable.

*Measurements in mm*

	Length			Width	Antenna	
1.	1.15			0.61	0.70	
2.	1.50			0.69	0.80	
3.	1.52			0.73	0.83	
4.	1.50			0.73	0.83	
	Antennal segmentgs			urs	ht2	Siph
	III	IV	V			
	0.30	0.08	0.07 + 0.15	0.16	0.07	0.37
	0.39	0.07	0.08 + 0.16	0.17	0.09	0.43
	0.36	0.07	0.09 + 0.15	0.16	0.09	0.42
	0.38	0.08	0.09 + 0.16	0.18	0.08	0.42

(1-2, *Cajanus cajan*, Uripok, Manipur, 16.x.1990, T.U. Colls; 3-4, *Cajanus cajan*, Yumnam, Manipur, 14. xi. 1989, T.U. Colls.)

*Other morphs* : Not known.

*Material examined* : 5 apterous viviparous females from *Cajanus cajan*, Canchipur, Manipur, 20.xii.1988, Coll. T.K. Singh; 2 alate viviparous females from *C. cajan*, Yumnam, Manipur, 14.xi.1989.

*Discussion* : Basu, A.N. (1961) distinguished this subspecies from *C. rappardi* H. R.L. S.S. in having longer body and in the ratios of frontal processi and siphunculi to antennae besides the siphunculi darker near the apices.

*Distribution* : India : Manipur.

*Types* : In the collection of State Agricultural Research Institute, Calcutta, West Bengal.

### 5. *Cervaphis schouteniae* v.d. Goot

(Figs. 13 a-c, 14 a-e, 15-17)

1917. *Cervaphis schouteniae* Goot, P. van der, *Contr. Faune Ind. Neerl.*, 1 : 1.  
 1941. *Cervaphis cambodiensis* Takahashi, R., *Govt. Agr. Res. Inst. Formosa Rept.*, 78 : 1.  
 1956. *Cervaphis schouteniae*, Hille Ris Lambers, D., *Ent. Ber.*, 16 : 130.  
 1985. *Cervaphis schouteniae*, Agarwala, B.K., Saha, S. and Ghosh, A.K., *Bull. Zool. Surv. India*, 7 : 49.

*Apterous viviparous female* : Body elongated oval, brown; 1.52- 1.72 mm in length and 0.67-0.92 mm maximum width in the region of 2nd-3rd abdominal segments. Head smooth, with a pair of branched frontal processi,

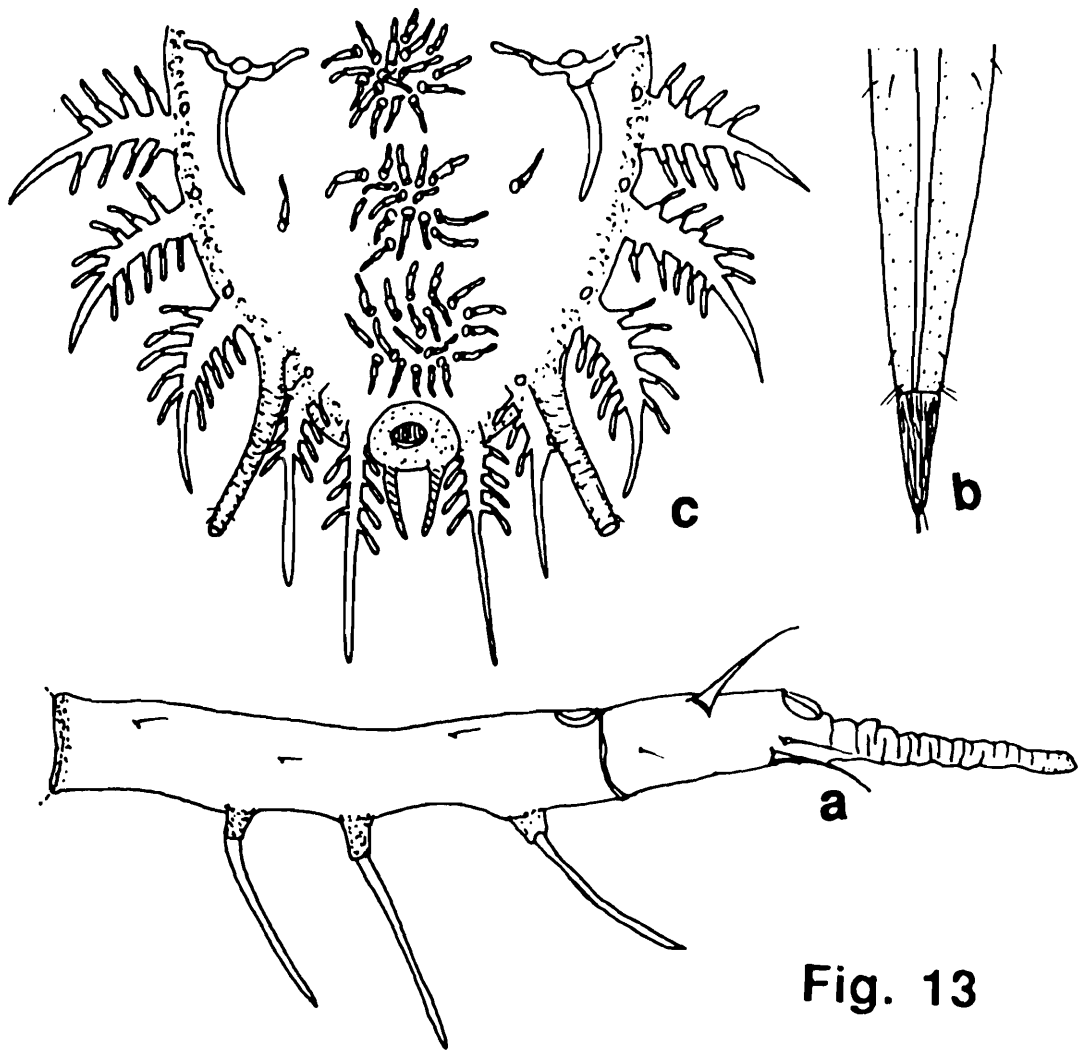


Fig. 13

Fig. 13a-c. : *Cervaphis schouteniae*, apterous viviparous female morph : a flagellum, b u.r.s., c posterior part of abdomen.

0.25-0.27 mm long including terminal hairs, 0.52-0.53 x as long as antennae. Antennae 4-segmented, 0.46-0.55 mm long, 0.31-0.35 x as long as the body; flagellum smooth, flagellaer hairs placed on high sockets and mostly with blunt and a few with bifid apices; longer hairs 0.02-0.03 mm long; processus terminalis 0.10-0.12 mm long, and 0.53-0.60 x as long as base of last antennal segment. Rostrum slender, pointed; ultimate rostral segments 0.17-0.21 mm long, 1.70-2.22 x as long as second segment of hind tarsus, bearing 3-4 minute secondary hairs on segment 4. Marginal branched processi present as in *Cervaphis quercus* and *C. rappardi*; pleural branched processi well-developed. Abdominal dorsum smooth, usually pale brown or yellowish; (5 specimens collected from *Pterospermum* sp. in north of eartern India (Arunachal Pradesh) show spinal and pleural dark bands); dorsal hairs on high sockets with blunt, dagger-shaped or lanceolate apices; spinal hairs longer than other hairs, 6 in a group on each tergite. Siphunculi long, cylindrical, 0.52-0.63 mm long, 0.34-0.38 x as long as the body, gently swollen near the apex, bearing a subapical ring of 4-5 hairs before a distinct apical flange. Cauda oval with a distinct stylus; caudal hairs long and thin; first tarsal segments

with 5 hairs. Otherwise as in *Cervaphis rappardi*.

*Measurements in mm*

	Length	Width	Antenna
1.	1.72	0.77	0.53
2.	1.65	0.92	0.51
3.	1.54	0.73	0.46
4.	1.59	0.85	0.47
5.	1.56	0.84	0.46
6.	1.63	0.80	0.50
7.	1.56	0.84	0.53
8.	1.54	0.85	0.53
9.	1.68	0.90	0.52
10.	1.67	0.87	0.55
11.	1.59	0.87	0.55
12.	1.52	0.70	0.53

Antennal segments		urs	ht2	Siph
III	IV			
0.24	0.10 + 0.12	0.20	0.09	0.63
0.23	0.09 + 0.11	0.19	0.09	0.56
0.20	0.07 + 0.10	0.18	0.10	0.52
0.23	0.07 + 0.10	0.19	0.10	0.61
0.20	0.08 + 0.10	0.18	0.10	0.55
0.23	0.09 + 0.10	0.18	0.10	0.61
0.26	0.08 + 0.11	0.21	0.09	0.63
0.26	0.08 + 0.11	0.19	0.09	0.62
0.25	0.07 + 0.12	0.19	0.09	0.61
0.26	0.09 + 0.11	0.19	0.09	0.65
0.26	0.09 + 0.11	0.19	0.09	0.60
0.25	0.09 + 0.11	0.17	0.10	0.56

( 1-6, *Microcos paniculatus*, Agartala, Tripura, ?v.82, T.U. Colls., 7-8, *Pterospermum* sp., Arunachal Pradesh, 1.xii. 1969, C.U. Colls., 9-12, *Microcos paniculatus*, Shillong, Meghalaya, 3.v.1979, C.U. Colls.)

*Alate viviparous female* : Body 1.34-1.81 mm long and 0.43-0.79 mm as maximum width in the region of 2nd-3rd abdominal segments. Head smooth;

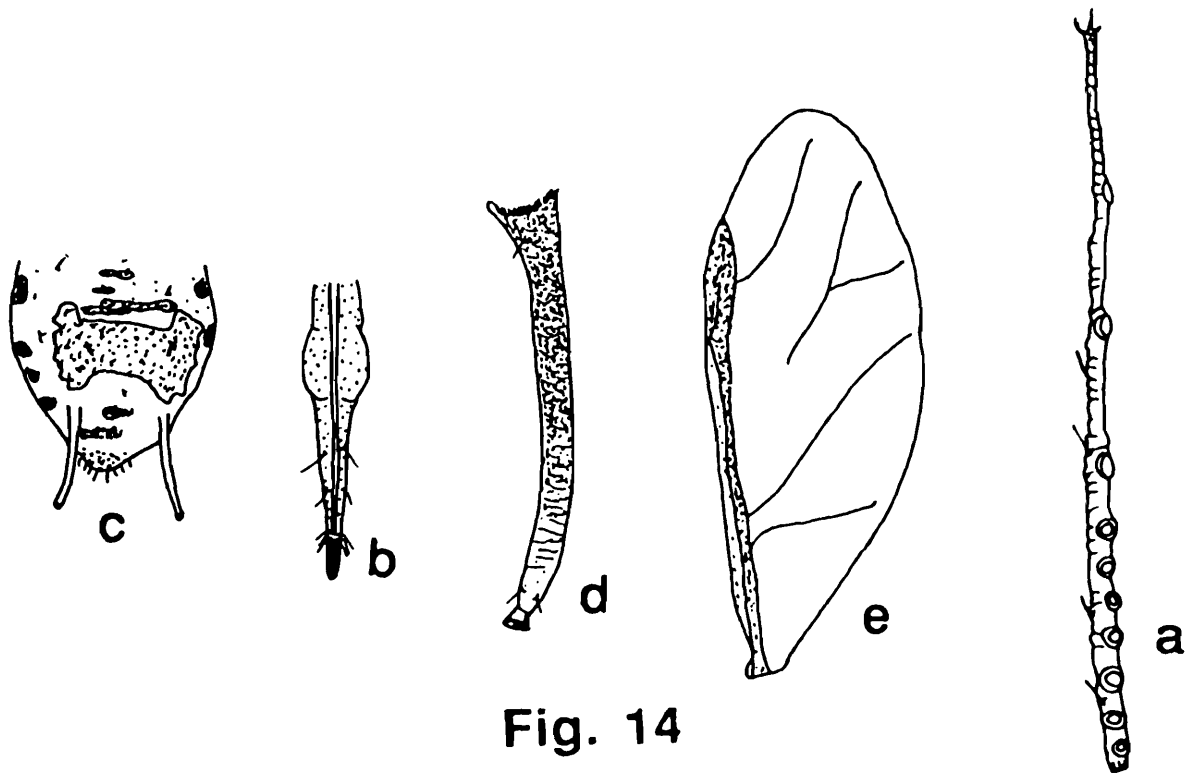


Fig. 14

Fig. 14a-e. : *C. schouteniae*, alate viviparous female morph : a flagellum, b u.r.s., c dorsum of abdomen, d siphunculus, e forewing.

dorsal hairs comprised of 1 pair each of spinal and pleural hairs and two pairs of lateral hairs on each side between the compound eyes, otherwise similar to flagellar hairs. Eyes large with tuberculate triommatidia. Frontal processi distinguishable as large tubercles, each bearing 3-4 hairs, of which one is very short. Antennae 5-segmented, 0.76-0.87 mm long, 0.48-0.57 x as long as the body; flagellum imbricated, bearing 6-8 round secondary rhinaria on segment III, flagellar hairs short, on normal sockets and with blunt or acute to acuminate apices: processus terminalis 0.17-0.20 mm long, 1.31-1.88 x as long as base of the last antennal segment. Rostrum pointed at tip; ultimate rostral segments stiletto-shaped; 0.15-0.17 mm long, 1.50-1.70 x as long as second segment of hind tarsus, bearing 4-5 minute secondary hairs on segment 4. Abdominal dorsum strongly sclerotic; 2nd-4th segments with a solid spino-pleural pigmented patch and continuous marginal bands; other segments with broken bands of sclerites; marginal processi reduced to hairy knobs; dorsal hairs small, similar to flagellar hairs, without any pattern. Siphunculi dark brown, strongly imbricated, cylindrical, 0.45-0.57 mm long and 0.31-0.37 x as long as the body. Cauda without a processus. Tibiae densely imbricated on distal half. Wings with veins bordered brown; pterostigma brown throughout, more so distally; Media one-branch. Otherwise as in apterous viviparous female.

*Measurements in mm*

	Length	Width	Antenna
1.	1.34	0.43	0.77
2.	1.40	0.53	0.76
3.	1.55	0.69	0.76
4.	1.81	0.79	0.87
5.	1.73	0.69	0.85

	Antennal segments			urs	ht2	Siph
	III	IV	V			
0.27	0.11	0.11 + 0.19		0.15	0.09	0.50
0.28	0.13	0.09 + 0.17		0.16	0.10	0.45
0.24	0.12	0.13 + 0.17		0.15	0.10	0.50
0.29	0.15	0.14 + 0.20		0.16	0.16	0.56
0.30	0.15	0.13 + 0.17		0.17	0.10	0.57

(1-5, *Microcos paniculatus*, Agartala, Tripura, ?v.1982, T.U. Colls.)

*Nymphs (apteroid)*

*First Instar* : Marginal processi unbranched; antennal segments III and IV indistinctly separated; dorsal abdominal hairs arising from stout base and with bifurcated apices; siphunculi without any hair or an apical flange; first tarsal segments each with 2 hairs.

*Second Instar* : Marginal processi branched, bearing small hairs; antennal segments III and IV indistinctly separated; dorsal abdominal hairs with blunt or dagger-shaped apices; siphunculi with few hairs and an indistinct flange; first tarsal segments each with 4 hairs.

*Third and Fourth Instars* : Marginal and frontal processi branched; antennal segments III and IV distinctly separated; dorsal abdominal hairs on high sockets; siphunculi with distinct apical flange and a pre-apical ring of 3-4 hairs; first tarsal segments each with 5 hairs.

*Measurements in mm of nymphal instars (apteroid) \* of C. schouteniae*

Characters	First Instar	Second Instar	Third Instar	Fourth Instar
L. body	0.59-0.66	0.68-0.74	0.90-1.12	1.41-1.65
W. body	0.26-0.30	0.29-0.37	0.48-0.65	0.72-0.96
L. ant.	0.24-0.27	0.28-0.30	0.37-0.42	0.49-0.54
ant.seg. III	0.05-0.06	0.08-0.09	0.14-0.15	0.20-0.23
p.t.	0.07-0.07	0.07-0.08	0.10-0.11	0.11-0.13
base	0.05-0.06	0.05-0.06	0.06-0.08	0.08-0.10
u.r.s.	0.15-0.16	0.14-0.16	0.16-0.19	0.17-0.18

h.t.2	0.07-0.08	0.08-0.08	0.08-0.09	0.08-0.10
Siph.	0.06-0.06	0.20-0.22	0.35-0.42	0.53-0.61
L.front.	0.11-0.14	0.15-0.16	0.20-0.26	0.31-0.37
processi				
L. last processi	0.18-0.22	0.29-0.31	0.43-0.53	0.67-0.74

\*average of 8 specimens

Other morphs : Not known.

*Material examined* : 8 apterous viviparous females and 2 nymphs from *Pterospermum* sp., Bhalukpong, Arunachal Pradesh, 1.xii.1969, Coll. H. Banerjee; 3 apterous viviparous females and 2 nymphs from *Microcos paniculatus*, Shillong, Meghalaya, 3.v.1970, Coll. H. Banerjee; 4 apterous viviparous females and 4 nymphs from *Microcos paniculatus*, Agartala, Tripura, ?. iii. 1982, Coll. B.K. Agarwala; 5 apterous viviparous females and 6 alate viviparous females from *M. Paniculatus*, ?v.1982, Coll.B.K. Agarwala.

*Discussion*: This species is known by viviparous morphs only. Specimens from Indonesia, Malaysia and Thailand were compared with those of Indian region in respect of morphometry. Generally the specimens agreed in most of the characters (Table 4). However, length of body and siphunculi shortened gradually from north to south along the distribution range of the species (figs. 15-16). This implies that specimens from India in the north to Indonesia in the south represent a series of contiguous populations showing the formation of a smooth cline (fig.17) Eventhough the specimens from India and Indonesia are separated by pronounced gaps in their length of body and siphunculi but considering the clinal tendency of changes in these characters, recognition of subspecies is denied.

Table 4. Mean values of measurements of some of the external characters of apterous viviparous females of *C. schouteniae* from its distribution range.

Characters	India	Thailand	Malaysia	Indonesia
L. body	1.61	1.51	1.42	1.37
W.body	0.83	0.89	0.78	0.82
L. ant.	0.51	0.49	0.54	0.49
ant. III	0.24	0.22	0.25	0.22
base	0.08	0.08	0.09	0.09
p.t.	0.10	0.11	0.10	0.10
u.r.s.	0.19	0.19	0.18	0.18
h.t.2	0.09	0.08	0.09	0.08
Siph.	0.60	0.52	0.48	0.49
N	12	06	03	06

(India : *Microcos paniculatus* and *Pterospermum* sp.; Thailand : *Dipterocarpus tuberculatus*, B.M. Colls., Malaysia : *Theobroma cacao* and *Grewia tomentosa*,

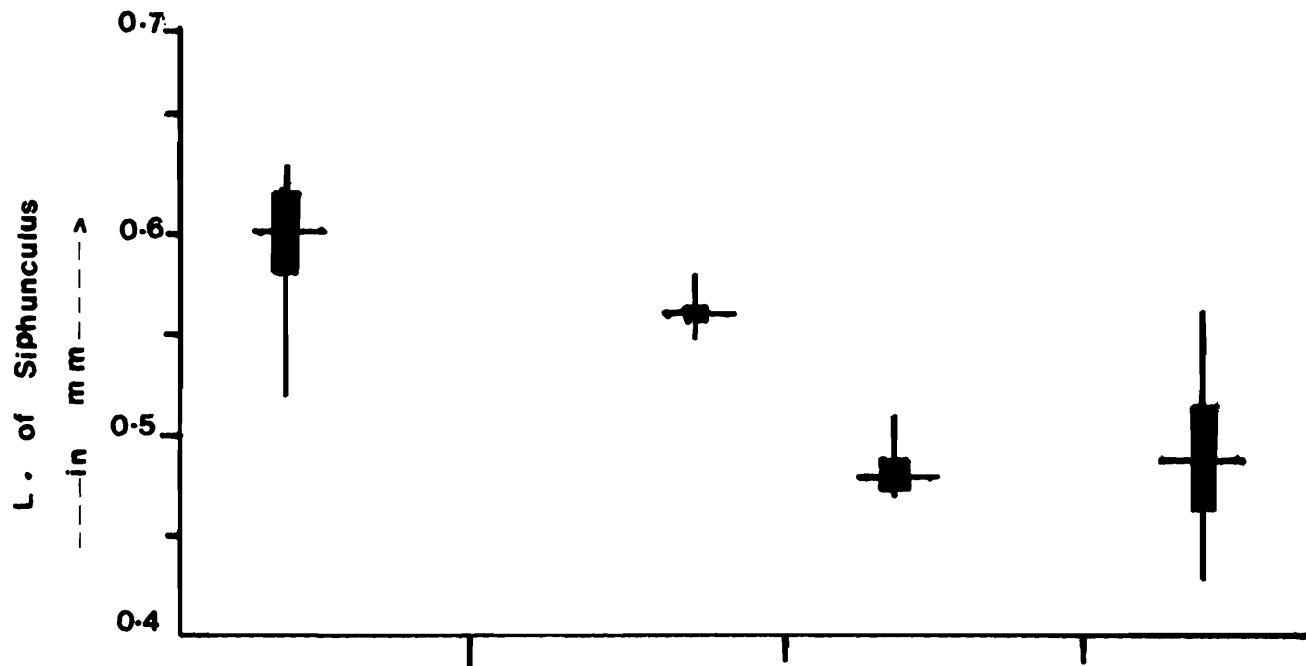


Fig. 15

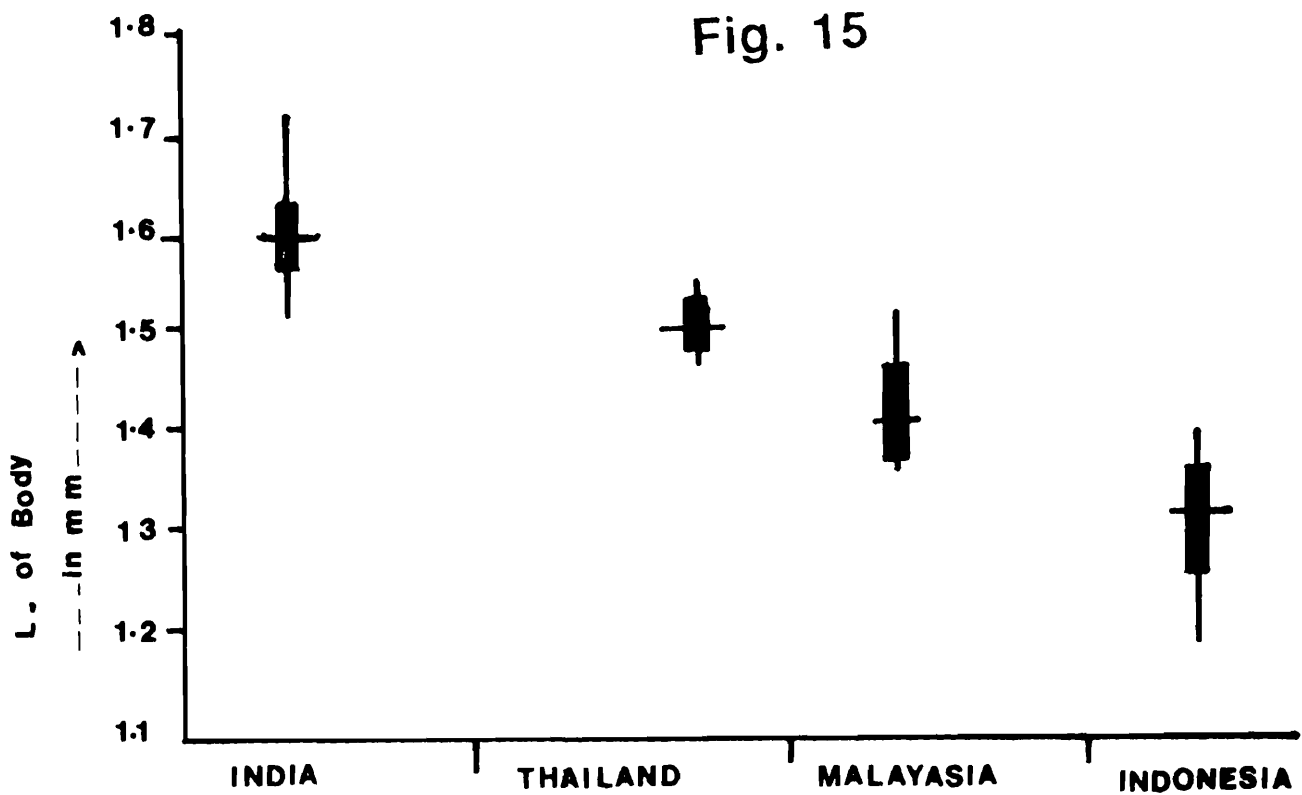


Fig. 16

Figs. 15 & 16 : Clinal variations in the populations of *Cervaphis schouteniae*. 15 : variation in length of siphunculus, 16 : variation in length of body. (vertical lines indicate the total variation of the sample, the broad portions show standard deviations and the cross bars indicate the means).

B.M. Colls.; Indonesia : *Actinophora* sp. and *Pterospermum* sp., B.M. Colls.)

Specimens collected from *Pterospermum* spp. from India and Indonesia exhibited shorter and darker body compared to specimens collected from other hosts (Table 5). This seems to be an instance of host-induced variation.

Table 5. Comparison of body length in specimens of apterous viviparous females of *C. schouteniae* collected from *Pterospermum* sp. and other hosts in India and Indonesia.

Locality	N	Mean length of body in mm	
		<i>Pterospermum</i> sp. MSD	Other hosts MSD
India	8	1.54 ± 0.14	1.61 ± 0.07
Indonesia	4	1.33 ± 0.085	1.46 ± 0.083

*Microcos paniculatus* is the common host of *C. schouteniae* in North-east India on which it occurs from March to October (in Tripura). This insect colonise younger leaves along the mid-rib or primary veins and multiplies rapidly in the warmer months (April-May) coinciding the apical growth of its hosts. Alatae

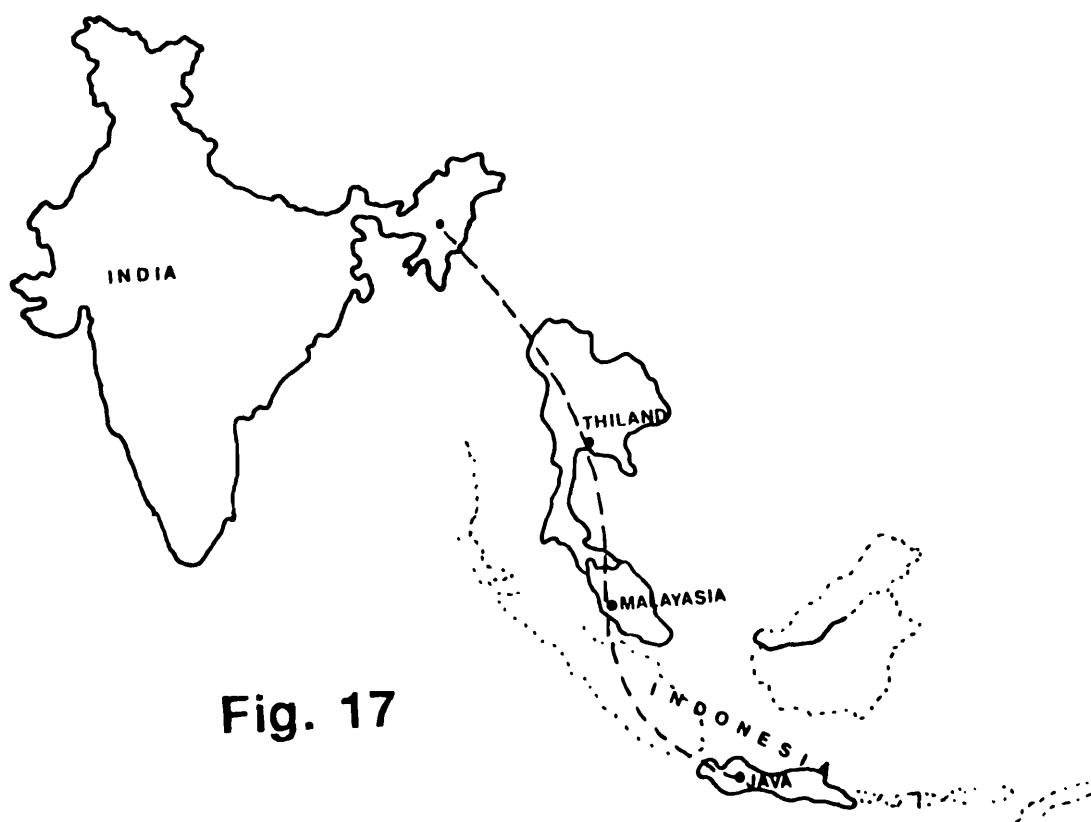


Fig. 17

Fig. 17 : Distribution of *Cervaphis schouteniae* : cline formation.

immigrants settle on *M. paniculatus* towards the end of February and build up the population during March-May, after which population gradually declines until the beginning of November when alate migrants are only seen. Soon the alatae disappear but the alternate host still remains unknown.

*Distribution* : India : Arunachal Pradesh, Meghalya, Tripura; Indonesia, Malaysia, the Philippinnes, Thailand and Vietnam.

*Types* : Original material is reportedly lost (Hille Ris Lambers, 1956).

### Genus 3. *Schoutedenia* Rübсаamen, 1905

1905. *Schoutedenia* Rübсаamen, *Marcellia*, 4 : 19; Eastop, V.F. 1966, *Aust. J. Zool.*, 14 : 502; Raychaudhuri, D.N. and Chatterjee M., 1980. In "Taxonomy of the aphids of north-east India and Bhutan", 320; Ghosh, A. K., 1982, *Oriental Ins.*, 16 : 89; Remaudiere, G., 1988, *Bull. Soc. ent. Fr.*, 93 : 66.

*Type species* : *Schoutedenia ralumensis* Rübсаamen, 1905.

1920. *Cerciaphis* Theobald, F.V., 1920. *Bull. Ent. Res.*, 19 : 70.

*Type species* : *Cerciaphis bougainvilliae* Theobald, 1920.

1927. *Setaphis* van der Goot, P. 1927. *Contrib. Fauna Indes. Neerl.*, 1 : 153.

1942. *Setaphidia* Strand, 1942. *Folia zool. Hydrobiol.*, 11 : 393.

*Type species* : *Setaphis luteus* van der Goot, 1917.

*Morphology* : Body green to olive green or yellowish to lemon yellow in life. Head flat between the bases of antennae, without any tubercle, fused with pronotum in apterous morphs and separated in alate morphs; dorsal cephalic hairs few, short and with blunt apices. Eyes 3-faceted in apterous morphs and multi-faceted in alate morphs. Antennae 5-segmented, 0.74-1.28 mm long and about 0.47-0.88 x as long as the body, more distinctly imbricated apicad; secondary rhinaria absent in apterous viviparae but usually present on segments III and IV in alate viviparae, apterous oviparae and alate males; flagellar hairs very short, sparse, 0.07-0.01 mm long, with blunt apices, processus terminalis 0.05-0.16 mm long, 0.37-0.90 x as long as base of the last antennal segment. Ultimate rostral segments short, blunt, extend upto midcoxae or little beyond; 0.68-0.93 x as long as second segment of hind tarsus. Abdominal dorsum pale with reticular network of hexagones throughout, both in apterae and alatae; dorsal hairs short and blunt in apterae, short and with fine apices in alatae; 7th tergite bears a pair of long, hair-bearing dark processi with spinular imbrications. Siphunculi cone-shaped, brown, reticulated on basal half and 4-5 concentric rings on apical half, bearing 4-5 short hairs with blunt apices in apterae, and with acute apices in alatae. Cauda oval with 4 long hairs. Legs

pale brown in apterae, brown to dark brown in alatae, with spinular imbrications throughout; first tarsal segments each with 3 hairs. Wings bordered dark brown; forewings with pterostigma running all along the Costa, Media once-branched; hindwings brown, reduced, without any oblique vein.

*Discussion* : Rübsaamen (1905) described the genus with *ralumensis* as the type species from New Guinea. Baker (1920) grouped the genus with a small group of closely related genera that were not placed under any Subfamily. Eastop and Lambers (1976) listed *Setaphis luteus* v.d. Goot 1917, *S. viridis* v.d. Goot 1917 and *Cerciaphis emblica* Patel and Kulkarni 1953 along with *ralumensis* under the genus *Schoutedenia*. A.K.Ghosh (1982) considered two species under the genus, viz., *ralumensis* and *lutea*, and *Cerciaphis bougainvilliae* Theobald 1920, *C. emblica* Patel and Kulkarni, *Setaphis viridis* v.d. Goot, *S. formosana* Takahashi 1929 and *Schoutedenia emblica andharaka* David and Hille Ris Lambers 1956 were listed as synonymous with *lutea* (v.d. Goot, 1917). Remaudiere (1988) revised the genus and recognised only one species *ralumensis*, and rest of the aforesaid species as its synonymy. However, Remaudiere (1990) in a note rectified his earlier decision and recognised *S. emblica* as the second species under the genus. In doing so, he (op. cit.) considered *S. emblica andhraka* as its only synonymy. Specimens of *Schoutedenia* collected from different parts of India, Nepal, Pakistan and Sri Lanka and variably reported as *S. lutea*, *S. emblica*, *S. emblica andhraka* and *S. ralumensis* have been examined. It has now been found that both *ralumensis* and *emblica* are represented in the Indian region and can be distinguished easily by the key.

*Biology* : Members of *Schoutedenia* have been collected from plants belonging to Families Euphorbiaceae, Juglandaceae, Musaceae, Rosaceae and Urticaceae from India. A review of literature (Hales and Carver, 1976; Remaudiere, 1988) suggests that plants of Euphorbiaceae are the natural hosts of the genus and all other plants represent the temporary or casual hosts. Both, *ralumensis* and *emblica*, are known by their viviparous and the later also by sexual morphs from India. Hales and Carver (1976) provided an account of annual cycle of *lutea* (= *ralumensis*) from Australia where the species leads a monoecious holocyclic life cycle. In India, sexual morphs have been found in the autumn and early winter period whereas in Australia these are mostly recorded in summer and early autumn. The species lay eggs in leaf axils or cracks in the bark. Fundatrices hatched in early spring.

*Distribution*: India, Africa, Australia, Indonesia, Malaysia, Nepal, Pakistan, Sri Lanka and Taiwan.

*Type species* : *Schoutedenia ralumensis* Rübsaamen, 1905, location of types not known.

Key to the species of *Schoutedenia*

Processus terminalis 0.069-0.094 mm long, 0.38-0.60 x as long as base of the last antennal segment and 0.56-1.0 x as long as ultimate rostral segments. .... *S. emblica* (Patel and Kulkarni)

Processus terminalis 0.087-0.167 mm long, 0.53-0.85 x as long as base of the last antennal segment and 1.14-1.65 x as long as ultimate rostral segments. .... *S. ralumensis* Rübsaamen

6. *Schoutedenia emblica* (Patel and Kulkarni)  
(Figs. 18-20 a-c)

1952. *Cerciaphis emblica* Patel, G.S. and Kulkarni, H.L., *Curr. Sci.*, 21 : 350.
1956. *Schoutedenia emblica andhraka* David, S.K. and Hille Ris Lambers, D., *Indian J. Ent.*, 18 : 41-44.
1962. *Schoutedenia lutea partim emblica* Ghosh, A.K. and Raychaudhuri, D.N., *J. Asiatic Soc. Beng.*, 4 : 1-4.
1982. *Schoutedenia lutea partim emblica*, Ghosh, A.K., *Oriental Ins.*, 16 : 89.
1988. *Schoutedenia ralumensis partim emblica*, Remaudiere, G., *Bull. Soc. ent. Fr.*, 93 : 66.
1990. *Schoutedenia emblica*, Remaudiere, G., *Bull. Soc. ent. Fr.*, 94 : 9.

*Apterous viviparous female*: Body pale green in life; 1.42-1.77 mm in length and 0.71-1.25 mm as the maximum width. Head flat, without frontal or lateral tubercle; dorsal cephalic hairs short, with blunt apices, 6 on each side, 0.04-0.06 mm long. Antennae 5-segmented, pale brown to brown, 0.62-0.87 mm long and 0.47-0.59 x as long as the body; flagellum imbricated, segment III in some specimens with 1-3 small round secondary rhinaria; processus terminalis 0.05-0.08 mm long and 0.47-0.71 x as long as base of the last antennal segment, 0.38-0.75 x as long as second segment of hind tarsus and 1.21-1.92 x as long as ultimate rostral segments. Rostrum short, reaching upto midcoxae; ultimate rostral segments blunt, 0.08-0.12 mm long, 0.73-0.86 x as long as second segment of hind tarsus, segment 4 with 1 or 2 short pointed accessory hairs. Abdominal dorsum pale, with non-spinular polygons all over, each polygon filled with reticulations; dorsal hairs sparse, short and with blunt apices, the longest one on anterior tergites 0.04-0.06 mm long; venter with spinular imbrications all over; 7th tergite with a pair of pleurally placed finger-like processi, brown, 0.19-0.29 mm long and with spinular imbrications. Siphunculi conical, broadest at base and a ring-like apex, 0.04-0.09 mm long and 0.03-0.05 x as long as body, with 3-4 short spinular interconnecting striae.

Cauda broadly oval, with 2 long and fine hairs. Legs pale brown; femora on distal half with spinular imbrications, such imbrications distributed all along the inner margin and distal 1/3rd region of tibiae; first tarsal segments with 3 hairs.

*Measurements in mm :*

	Length	Width	Antenna
1.	1.68	1.02	0.84
2.	1.57	0.83	0.74
3.	1.77	1.25	0.87
4.	1.54	0.92	0.82
5.	1.50	0.80	0.80
6.	1.48	0.71	0.74
7.	1.46	1.09	0.78
8.	1.79	1.04	0.85
9.	1.57	0.93	0.62
10.	1.61	0.87	0.83
11.	1.50	0.84	0.86
12.	1.60	0.82	0.76
13.	1.42	0.86	0.88

Antennal segments			urs	ht2	Siph
III	IV	V			
0.32	0.15	0.18 + 0.08	0.10	0.12	0.08
0.27	0.15	0.15 + 0.06	0.10	0.12	0.06
0.35	0.19	0.17 + 0.05	0.10	0.12	0.09
0.34	0.17	0.15 + 0.08	0.09	0.12	0.07
0.33	0.17	0.15 + 0.07	0.10	0.12	0.06
0.30	0.16	0.12 + 0.08	0.08	0.12	0.06
0.31	0.15	0.14 + 0.07	0.10	0.10	0.06
0.36	0.16	0.15 + 0.08	0.10	0.12	0.06
0.41	0.19	0.17 + 0.07	0.12	0.14	0.06
0.32	0.16	0.16 + 0.06	0.10	0.12	0.05
0.33	0.16	0.17 + 0.07	0.11	0.12	0.04
0.24	0.12	0.21 + 0.06	0.10	0.11	0.04
0.34	0.17	0.16 + 0.07	0.10	0.11	0.04

(1-2, *Phyllanthus emblica*, Shillong, Meghalaya, 18.iii.1969, C.U. Colls.; 3, *P. emblica*, Pashoke, Darjeeling, West Bengal, 26.vii.1971, C.U. Colls.; 4-6, *P. emblica*, Tindivankar, Coimbatore, Tamil Nadu, 21.ix.1957, B.M. Coll.; 7, *P. emblica*, Coimbatore, 7.vi.1949, B.M. Coll.; 9, *P. emblica*, Janakpur, Nepal,

5.vi.1966, B.M. Coll., 10-13, *P. emblica*, Bapatla, Andhra Pradesh, 14.viii.1951, B.M. Colls.)

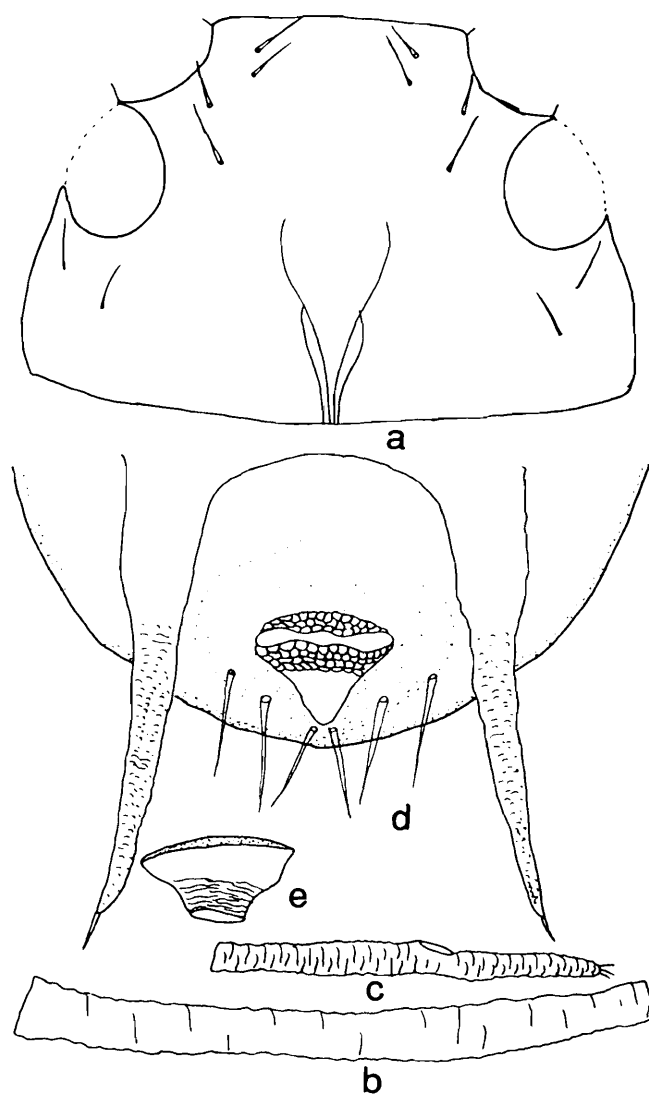


Fig. 18

Figs. 18a-e : *Schoutedenia emblica*, apterous viviparous female morph : a - dorsum of head, b - antennal segment III, c - p.t., d - 7th tergite and genital plate, e - siphunculus.

*Alate viviparous female* : Body 1.29-1.60 mm long and 0.58-0.73 mm as the maximum width. Dorsal cephalic hairs short with blunt apices, 4 hairs on each side and two median in the posterior region. Antennae 5-segmented, 0.58-0.70 x as long as the body; segments I and II scabrous; flagellum imbricated throughout, segment III with 16-25 and IV with 3-5 round secondary rhinaria distributed all along; processus terminalis 0.40-0.64 x as long as base of the last antennal

segment, 0.60-0.72 x as long as second segment of hind tarsus and 0.77-1.0 x as long as ultimate rostral segments. Rostrum reaching midcoxae; ultimate rostral segments 0.69-0.80 x as long as second segment of hind tarsus, bearing 1 or 2 short pointed accessory hairs. Abdominal dorsum pale, with polygons enclosing non-spinular network throughout; dorsal hairs sparse, with blunt to slightly swollen apices; venter with spinular transverse striae all over; processus on 7th tergite 0.19-0.29 mm long. Siphunculi 0.20-0.05 mm long and 0.015-0.038 x as long as body. Wings with veins bordered deep brown; forewings with Media once-branched; hindwings without oblique vein.

*Measurements in mm :*

	Length	Width	Antenna
1.	1.29	0.58	0.82
2.	1.60	0.73	0.93
3.	1.37	0.58	0.97
4.		abdomen missing	0.92
5.	1.46	0.72	0.96

	Antennal segments			urs	ht2	Siph
	III	IV	V			
0.34	0.15	0.15 + 0.07	0.09	0.12	0.05	
0.39	0.19	0.16 + 0.08	0.10	0.12	0.05	
0.45	0.16	0.17 + 0.07	0.08	0.10	0.02	
0.30	0.19	0.14 + 0.09	0.09	0.13	missing	
0.38	0.19	0.19 + 0.07	0.10	0.12	0.04	

(1, *Phyllanthus emblica*, Bapatla, Andhra Pradesh, 14.viii.1951, B.M. Colls.; 2, *P. emblica*, Tindivankar, Tamil Nadu, 21.ix.1957, B.M. Colls.; 3, *P. emblica* Poona, Maharashtra, ? .xi.1950., B.M. Colls.; 4, *P. emblica*, Janakpur, Nepal, 5.vi.1966, B.M. Colls.; 5, Yellow pan water trap, Agartala, Tripura, 2.iii. 1983, T.U. Colls.).

*Apterous oviparous female* : Body pale, 1.44-1.66 mm long and 0.77-0.92 mm as maximum width. Head scabrous anteriorly, with polygons laterally and medially. Antennae 5-segmented, 0.57-0.59 x as long as body; flagellum pale, imbricated, segments III, IV and V pale on basal 0.50-0.66 portion, rest dusky brown; processus terminalis 0.50 x as long as base of the last antennal segment and 0.80-0.90 x as long as the ultimate rostral segment. Rostrum reaching hind coxae; ultimate rostral segments 0.83 x as long as second segment of hind tarsus. Abdominal dorsum pale, covered with polygons enclosing non-spinular reticulations; processus on 7th tergite 0.22-0.25 mm long. Siphunculi with 4-5 concentric striae near the apex bearing 3-4 hairs and about 0.03 x as long as body. Legs pale, hind femora with 16-21 round accessory rhinaria. Genital disc

studded with many long and short hairs arranged in rings; claspers well-developed. Otherwise as in apterous viviparous female.

*Measurements in mm*

	Length			Width	Antenna	
	III	IV	V		urs	ht2
1.	0.36	0.19	0.18 + 0.09	0.10	0.12	0.05
2.	0.33	0.16	0.16 + 0.08	0.10	0.12	0.05

(1-2 *Phyllanthus emblica*, Bapatala, Andhra Pradesh, 4.x.1951, B.M. Colls.)

*Apterous male* : Body dusky pale, 1.06-1.21 mm long and 0.60-0.61 mm as maximum width. Antennae 5-segmented, 0.72-0.88 x as long as body; flagellum imbricated, segments III and IV respectively with 21-23 and 8-10 small round secondary rhinaria distributed all along the length; processus terminalis 0.44 x as long as base of the last antennal segment and 0.09 x as long as ultimate rostral segments. Rostrum reaching hind coxae; ultimate rostral segment 0.75 x as long as second segment of hind tarsus; processi on 7th tergite 0.19-0.21 mm long. Siphunculi 0.04 x as long as the body; Femora and tibiae desely imbricated. Genital disc with few hairs; male

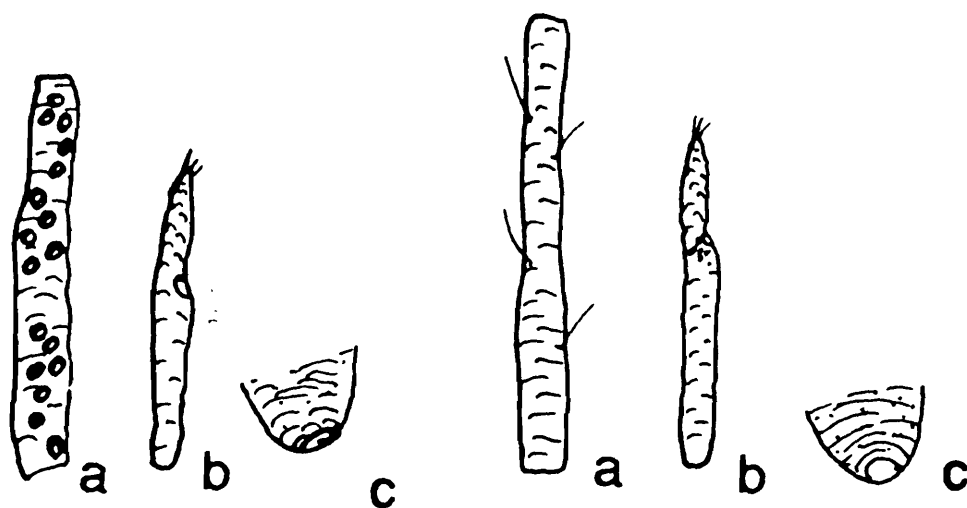


Fig. 19

Fig. 20

Figs. 19a-c : *S. emblica*, apterous oviparous female morph : a antennal segment III, b p.t., c siphunculus. Figs. 20a-c : *S. emblica*, apterous male morph : a antennal segment III, b p.t., c siphunculus.

genitalia well-developed. Otherwise as in apterous viviparous female.

*Measurements in mm :*

	Length	Width	Antenna
1.	1.21	0.60	0.87
2.	1.06	0.61	0.93

Antennal segments			urs	ht <sub>2</sub>	Siph
III	IV	V			
0.32	0.20	0.18 + 0.08	0.09	0.12	0.05
0.37	0.19	0.18 + 0.08	0.09	0.12	0.04

(1-2, *Phyllanthus emblica*, Bapatala, Andhra Pradesh, 14.viii.1951, B.M. Colls.)

*Material examined* : 1 apterous viviparous female and many nymphs from *Phyllanthus emblica*, Coimbatore, Tamil Nadu, ?.vi.1949, Coll. S.K.David; 1 alate viviparous female from *P. emblica*, Poona, Maharashtra, ?.ix.1950, Coll. G.A. Patel (holotype); 4 apterous viviparous females, 1 alate viviparous female, 2 alate males and many nymphs from *P. emblica*, Bapatala, Andhra Pradesh, 14.viii.1951, Coll. S.K.David; 2 apterous viviparous females from *P. emblica*, Bapatala, Andhra Pradesh, 4.x.1951, Coll. S.K.David; 3 apterous viviparous females and 1 alate viviparous female from *P. emblica*, Tindivankar, Tamil Nadu, 21.x.1957, Coll. S.K.David; 1 apterous viviparous female and 1 alate viviparous female from *P. emblica*, Janakpur, Nepal, 5.vi.1966, Coll. K.C. Sharma; 2 apterous viviparous females from *P. emblica*, Shillong, Meghalaya, 18.iii.1969, Coll. R.C. Basu; 1 apterous viviparous female from *P. emblica*, Pashoke, West Bengal, 26.vii.1971, Coll. unknown; 1 alate viviparous female from Yellow-pan water trap, Agartala, Tripura, 2.iii.1983, Coll. K. Dasgupta; 1 apterous viviparous female from 'Brinjal', Vellayani, Tamil Nadu, 7.viii. 1985, Coll. K. Saradamma.

*Biology* : The species infests *Phyllanthus emblica* in its distribution range covering eastern, western and southern India and Nepal. Sexual morphs were collected once in autumn in South India which suggests that the species might be holocyclic atleast in part of its distribution range.

*Distribution* : India : Andhra Pradesh, Maharashtra, Meghalaya, Tamil Nadu, Tripura, West Bengal; Nepal.

*Types* : Holotype in the collection of the Department of Entomology, The Natural History Museum, London.

**7. *Schoutedenia ralumensis* Rübsaamen**  
(Figs. 21 a-e)

1905. *Schoutedenia ralumensis*, Rübsaamen, F.H., *Marcellia*, 4: 5- 25.
1917. *Setaphis luteus* and *S. viridis* v.d Goot, P., *Contrib. Faune Indes Neerl.*, 1: 155.
1920. *Cerciaphis bougainvilleae*, Theobald, F.V, *Bull. Ent. Res.*, 19 : 70.
1929. *Setaphis formosanus* Takahashi, R., *Trans. Nat. Hist. Soc. Formosa*, 19 : 92-103.
1982. *Schoutedenia ralumensis*, Ghosh, A.K., *Oriental Ins.*, 16 : 80.
1988. *Schoutedenia ralumensis*, Remaudiere, G., *Bull. Soc. ent. Fr.*, 93 : 67

*Apterous viviparous female* : Body 1.26-1.77 mm long and 0.85-1.12 mm as maximum width. Head without lateral frontal tubercles. Antennae 5-segmented, 0.85-1.26 mm long and 0.55-0.75 x as long as body; flagellum imbricated; processus terminalis 0.12-0.15 mm long, 0.74-0.86 x as long as base of last antennal segment, 1.07- 1.29 x as long as second joint of hindtarsus and 1.20-1.70 x as long as ultimate rostral segments. Ultimate rostral segments with blunt apex, 0.08-0.09 mm long and 0.68-0.93 x as long as second joint of hind tarsus. Dorsum of abdomen pale, with reticulated polygons all over; dorsal hairs short and blunt, 7th tergite with a pair of pleural finger-like processi. Siphunculi 0.06-0.08 mm long and 0.04-0.05 x as long as body. Cauda with 2 long and fine hairs. Femora and tibiae with spinular imbrications mostly of apical half, otherwise as in apterae viviparae of *S. emblica*.

*Measurements in mm :*

	Length	Width	Antenna
1.	1.69	1.00	0.94
2.	1.77	0.99	1.04
3.	1.62	1.07	1.09
4.	1.73	1.12	1.06
5.	1.58	1.02	1.19
6.	1.51	0.96	0.94
7.	1.68	0.96	1.26
8.	1.29	0.90	0.88
9.	1.26	0.85	0.85
10.	1.87	1.07	1.13
11.	1.70	0.99	1.12

Antennal segments			urs	ht2	Siph
III	IV	V			
0.33	0.17	0.16 + 0.14	0.09	0.12	0.08
0.39	0.19	0.17 + 0.14	0.09	0.12	0.07
0.46	0.19	0.17 + 0.15	0.09	0.12	0.06
0.46	0.18	0.17 + 0.14	0.09	0.12	0.06
0.40	0.19	0.17 + 0.14	0.09	0.11	0.07
0.32	0.13	0.15 + 0.12	0.08	0.11	0.06
0.46	0.23	0.18 + 0.13	0.09	0.12	0.07
0.32	0.17	0.15 + 0.12	0.08	0.12	0.06
0.30	0.18	0.15 + 0.13	0.08	0.11	0.06
0.53	0.19	0.16 + 0.12	0.09	0.10	0.08
0.50	0.19	0.16 + 0.12	0.08	0.11	0.06

(1-2, *Flueggia macrophylla*, Mongbul, West Bengal, 14.vi.1971, C.U. Colls; 3-4, *Phyllanthus hamaltonicus*, Barnihar, Meghalaya, 31.vii.1973, Z.S.I. Colls., 5-7, indet. host, Darehoipara, Tripura, 28.x.1975, Z.S.I.Colls., 8-9, indet. host, Mangan, Sikkim, 22.ix.1984, T.U. Colls., 10-11, *Phyllanthus floribundus*, Maboke, Pakistan, 25.viii.1970, T.U. Colls.).

*Alate viviparous female* : Body 1.37-1.74 mm long and 0.53-0.84 mm as maximum width. Antennae 5-segmented, 1.03-1.27 mm long and 0.67-0.82 x as long as body; flagellum imbricated throughout, segment III with 32-49 and segment IV with 3-7 small round secondary rhinaria distributed all along, processus terminalis 0.10-0.16 mm long, 0.59-0.80 x as long as base of last antennal segment, 0.88-1.33 x as long as second joint of hind tarsus and 1.17-1.73 x as long as ultimate rostral segments. Ultimate rostral segments 0.07-0.11 mm long and 0.65-0.93 x as long as second joint of hind tarsus. Dorsum of abdomen with polygons enclosing non-spinular reticulations throughout; dorsal hairs fewer, with blunt to slightly swollen apices, siphunculi 0.05- 0.06 mm long and 0.028-0.043 x as long as body. Otherwise as in alatae viviparae of *S. emblica*.

*Measurements in mm :*

	Length	Width	Antenna
1.	1.75	0.72	1.20
2.	1.66	0.73	1.22
3.	1.39	0.79	1.14
4.	1.52	0.69	1.03
5.	1.74	0.77	1.21
6.	1.74	0.69	1.27

7.	1.66	0.73	1.20
8.	1.45	0.73	1.07
9.	1.37	0.53	1.10
10.	1.70	0.84	1.02

Antennal segments			urs	ht2	Siph
III	IV	V			
0.49	0.25	0.19 + 0.15	0.11	0.12	0.06
0.51	0.24	0.20 + 0.15	0.08	0.12	0.06
0.46	0.24	0.21 + 0.13	0.08	0.12	0.06
0.45	0.21	0.17 + 0.10	0.08	0.12	0.05
0.52	0.23	0.21 + 0.15	0.08	0.12	0.06
0.56	0.25	0.19 + 0.15	0.09	0.12	0.05
0.51	0.25	0.24 + 0.11	0.09	0.12	0.06
0.42	0.22	0.19 + 0.12	0.08	0.12	0.06
0.44	0.22	0.16 + 0.16	0.07	0.09	0.06
0.33	0.23	0.20 + 0.13	0.08	0.07	0.06

(1, *Flueggia macrophylla*, Mongbul, West Bengal, 14.vi.1971, C.U. Colls., 2-7, *Phyllanthus hamiltonicus*, Barnihat, Meghalaya, 31.vii.1973, Z.S.I. Colls., 8, indet. host, Shillong, Meghalaya, 8.x.1973, Z.S.I. Colls.; 9-10, indet. host, Fetekro, Pakistan (No. 05622), 2.vii.1975 T.U., Colls.).

*Other morphs* : Not known.

*Material examined* : 4 apterous viviparous females from *Phyllanthus floribundus*, Maboke, Pakistan, 25.vii.1970, Coll. Matile; 4 apterous and 1 alate viviparous females and 8 nymphs from *Flueggia macrophylla*, Mongbul, West Bengal, 14.vi.1971, Coll. No. PLK 5107; 6 apterous and 5 alate viviparous females from *Phyllanthus hamiltonicus*, Barnihat, Meghalaya, 31.vii.1973. Coll. M. Dutta; 2 apterous and 9 alate viviparous females from an indet. host, Shillong, Meghalaya, 8.x.1973, Coll. A.C. Sukla; 11 apterous viviparous females from an indet. host, Darehripara, Tripura, 28.x.1975, Coll. K. Deb; 2 apterous viviparous females and 1 nymph from an indet. host, Mangan, Sikkim, Coll. not known.

*Discussion* : This species is distinguishable from the only other species known under the genus by the characters provided in the key to the identification of species.

*Biology* : This species also infest species of *Flueggia* and *Phyllanthus* like its conspecific, *S. emblica* and share part of its distribution range in North-east India. No sexual morph has so far been found in India. Hales and Carver

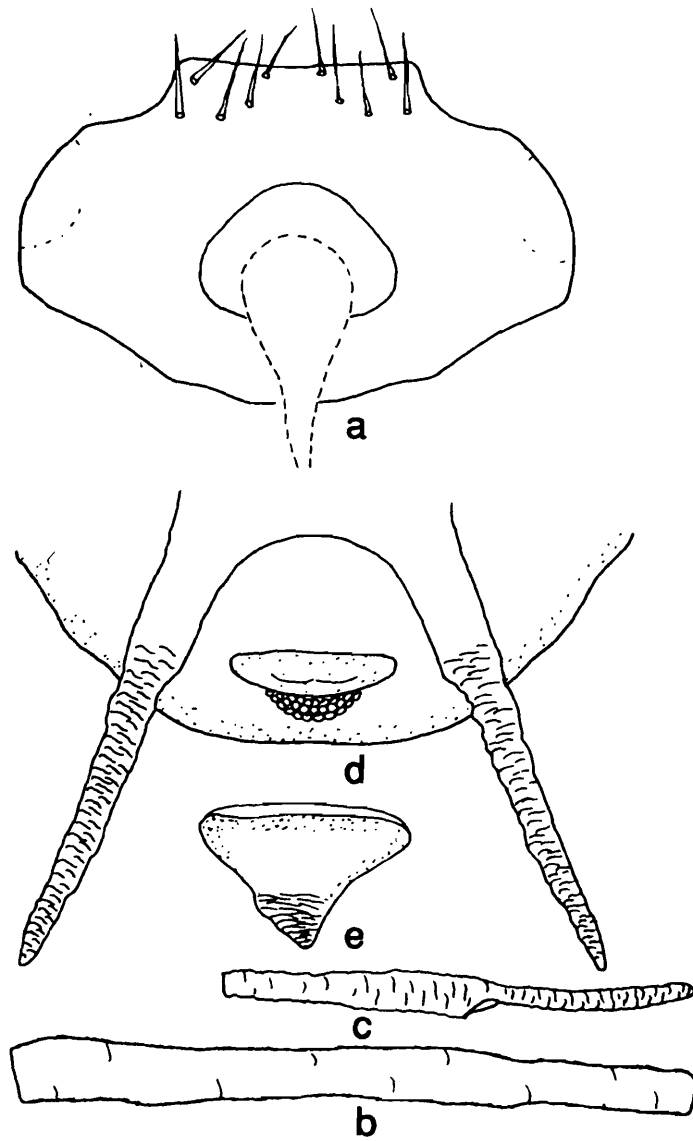


Fig. 21

Figs. 21a-e : *Schoutedenia ralumensis*, apterous viviparous female morph : a dorsum of head, b antennal segment III, c p.t., d 7th tergite, e siphunculus.

(1976) reported both the sexuals morphs from Australia.

*Distribution* : India : Meghalaya, Sikkim, Tripura, West Bengal; Africa, Australia, Indonesia, Malaysia, Pakistan, Taiwan.

*Types* : Location of types not known.

#### Genus 4. *Sumatraphis* Takahashi, R., 1935

1935. *Sumatraphis* Takahashi, R., *Miscena Zool. Sumatrana*, 97 : 2; Raychaudhuri, D.N. and Chatterjee, M., 1980. In "Taxonomy of the aphids of north-east

India and Bhutan" 321; Ghosh, A.K., 1982, *Oriental Ins.*, 16 : 91.

*Type species* : *Sumatraphis celti* Takahashi, 1953.

*Morphology* : Body brown to dark brown. Head sparsely rugose, fused with prothorax in apterae, distinct in alatae; frons convex, without lateral tubercles; dorsal hairs 3 pairs, moderately long and with swollen apices in apterae, fine apices in alatae. Eyes multi-faceted and with ocular tubercles in alatae, only 3-faceted in apterae. Antennae 4-segmented in apterae, 5-segmented in alatae, shorter than body; flagellum weakly imbricated basally, distinctly so in the apical 0.25 region of penultimate and last segment; flagellar hairs very short, with swollen apices in apterae and with acute or slightly blunt apices in alatae; primary rhinaria finely ciliated; secondary rhinaria absent in apterae, present on segment III in alatae; processus terminalis shorter than base of the last antennal segment. Rostrum extending beyond hindcoxae; ultimate rostral segments longer than the 2nd segment of hind tarsus, bearing 2-3 pairs of minute accessory hairs. Abdominal dorsum and rest of the body concolorous with the head; spiracles protruding both in apterae and alatae; dorsum of abdomen in apterae, strongly rugose, bearing unbranched marginal processi, one pair on each segment, these becoming longer caudad and each bearing 3-4 hairs similar to that on flagellum; in alatae marginal processi much reduced but bearing longer and finer hairs; alatae with a dark spino-pleural patch on pre-siphuncular tergites and broken spino-pleural and marginal patches on post-siphuncular tergites; dorsal hairs in apterae similar to dorsal cephalic hairs, in alatae these are longer and finer. Siphunculi 0.07-0.09 x as long as the body, broader basally and tapering apically; imbricated, swollen on inner side, with an apical flange and a few rows of interconnecting striae near the apex preceded by a ring of 4-5 short hairs. Cauda broadly oval, bearing 2 hairs on small warty processi. Subanal plate round, posterior margins spiny. Coxae and femora bearing strong spines; tibiae and tarsi smooth; first tarsal segments with 5 hairs. Forewings with media once-branched and hindwings with 2 oblique veins.

*Discussion* Takahashi (1935) described the genus from Sumatra with *Sumatraphis celti* as the type species. Since then this species has been collected from Manipur, Meghalaya, Sikkim, Tamil Nadu and West Bengal in India and from Nepal and Taiwan. So far the genus has remained 'monotypic' and known by apterous and alate viviparous female morphs only. The genus is easily distinguishable from its nearest relatives *Brasilaphis* Mordvilko, *Anomalosiphum* Takahashi, *Anomalaphis* Baker and *Schoutedenia* Rübсаamen in the possession of distinctly protruding spiracles.

*Biology* : The viviparous morphs are greenish or greenish brown in life. The species infested *Celtis tetrandra* in the type-locality (Sumatra). Since then the apterous and alate morphs of this species have also been recorded from

the same host species in Manipur and Tamil Nadu in India. The other recorded hosts of the species from India are : *Mallotus* sp. (Euphorbiaceae) (Raychaudhuri, 1981), *Quercus* sp. (Fagaceae) (Agarwala, 1980) and *Sida* sp. (Euphorbiaceae) (Raychaudhuri and Chatterjee, 1980). *Celtis tetrandra* seems to be the 'main' host of the species. In India the species is found to be active during winter (November-December) and summer (May) months in the hills.

*Distribution* : India : Manipur, Meghalaya, Sikkim, Tamil Nadu, West Bengal; Indonesia (Sumatra), Nepal and Taiwan.

*Type species* : *Sumatraphis celti* Takahashi, 1935, deposited in the collection of the Taiwan Agricultural Research Institute, Taipei, Taiwan.

### 8. *Sumatraphis celti* Takahashi (Figs. 22 a-e)

1935. *Sumatraphis celti* Takahashi, R., *Miscena Zool. Sumatra*, 97 : 2.  
 1980. *Sumatraphis celti*, Raychaudhuri, D.N. and Chatterjee, M., *In "Taxonomy of the aphids of north-east India and Bhutan"*, 321.  
 1983. *Sumatraphis Celti*, Das, B.C. and Raychaudhuri, D.N., *Rec. zool. Sur. India*, Occ. paper No. 51 : 41.

*Apterous viviparous female* : Body oval, rugose, dark brown, 1.37-1.91 mm long and 0.93-1.22 mm in width in the middle of the abdomen. Head rugose, fused with pronotum; dorsal cephalic hairs short, with blunt apices; eyes 13-faceted. Antennae 4-segmented, 0.23 x as long as body; flagellum distinctly imbricated; flagellar hairs short, with blunt apices; processus terminalis 0.04 mm long and 0.33 x as long as base of last antennal segment. Rostrum extending beyond hind coxae; ultimate rostral segments 0.12-0.15 mm long and 1.34-1.68 x as long as second segment of hind tarsus; rostral segments 4 and 5 indistinctly separated, segment 4 with 4-6 accessory hairs. Abdominal dorsum heavily corrugated, each abdominal tergite with a pair of marginal processi, these becoming longer caudad and bearing 4-5 hairs including apical spine; other dorsal hairs short with blunt apices. Siphunculi short, broad at base, swollen at middle and tapering towards apex, with distinct apical flange and a few pre-apical interconnecting striae; 0.09-0.17 mm long and 0.07-0.09 x as long as body and bear few short hairs. Cauda rounded, bearing 2 hairs with swollen apices on small wart processi. Legs pale brown; femora with distinct spines on inner half; tibiae and tarsi smooth; first tarsal segments with 5 hairs including a short peg-like hair.

*Measurements in mm :*

	Length	Width	Antenna
1.	1.56	0.99	0.36

Antennal segments		urs	ht2	Siph
III	VI			
0.19	0.08 + 0.04	0.16	0.09	0.16

(1, *Sida* sp., Reang, Kalimpong, West Bengal, 9.ix.1969, C.U. Colls.)

*Alate viviparous female* : Body elongated oval, 1.50-1.76 mm long and 0.82-0.90 mm in width in the middle of the abdomen. Head brown, front convex, without any lateral tubercles. Antennae dark, 5-segmented, 0.45-0.60 as long as the body; flagellar hairs with acute to acuminate apices; segment II

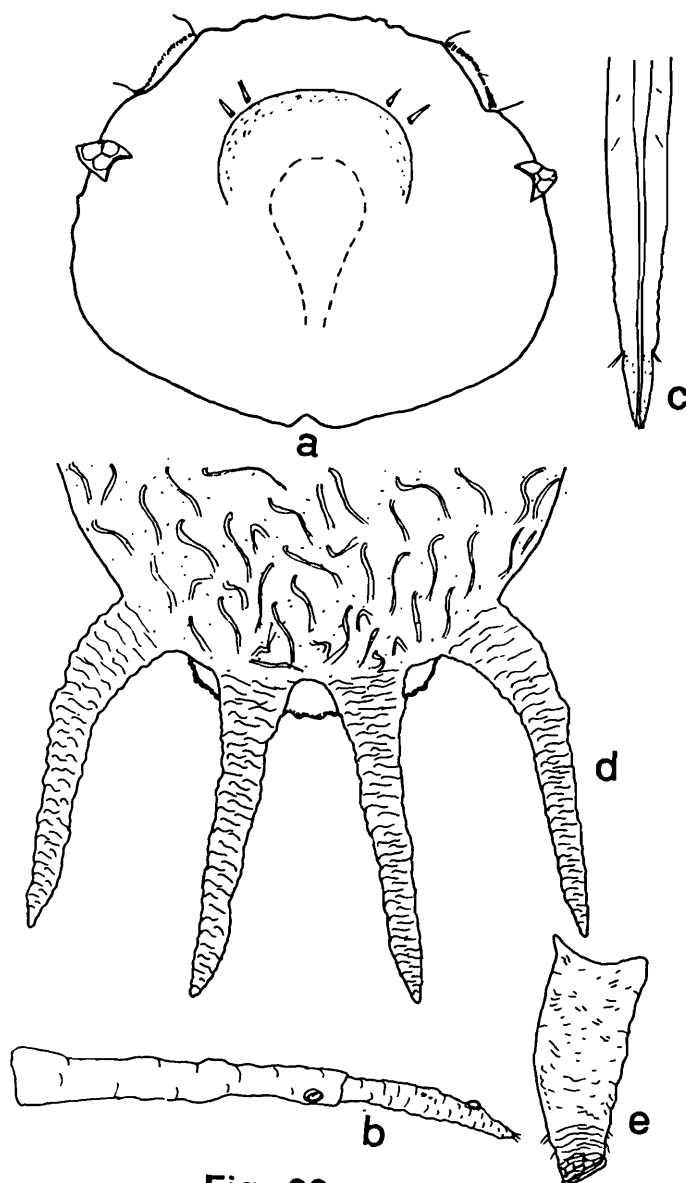


Fig. 22

Figs. 22a-e : *Sumatraphis celti*, apterous viviparous female morph : a head, b flagellum, c u.r.s., d posterior part of abdomen, e siphunculus.

with 18-20 large protuberant secondary rhinaria distributed over the entire length. Rostrum extending beyond midcoxae; ultimate rostral segments somewhat stiletto-shaped, 1.60-2.37 x as long as second segment of hind tarsus. Abdominal dorsum with tubercles arranged spinally and marginally and with a central sclerotic spino-pleural patch having irregular margin on anterior tergites besides a few isolated patches marginally and centrally on posterior tergites; 7th tergite with a pair of lateral protuberances. Siphunculi basally broad and tapering at the very apex, 0.10-0.11 x as long as body, bearing 5-6 hairs having acuminate apices. Cauda semilunar. Femora distally on 0.75 portion gradually darker; tarsi and apices of tibiae dark; rest of the legs paler; first tarsal segments each with 5 hairs including a short peg-like hair. Media of forewings once-branched; hindwings with 2 oblique veins.

*Measurements in mm*

	Length	Width	Antenna			
1.	1.50	0.90	0.91			
2.	1.76	0.82	0.79			
	Antennal segments			urs	ht <sub>2</sub>	Siph.
III	IV	V				
0.50	0.12	0.15 + 0.04	0.15	0.09	0.17	
0.39	0.14	0.13 + 0.04	0.19	0.08	0.20	

(1, in yellow pan trap, Shillong, Meghalaya, 12.v.1977, in literature Raychaudhuri *et al.* 1977; 2, in yellow pan trap, Shreemahal, Kathmandu, Nepal, 5.v.1966, B.M. Colls.)

*Nymphs (alatoid)* : A few specimens of 4th instar alatoid nymphs could be examined for their morphometry : Body 1.42-1.53 mm long and 0.88-0.99 mm as maximum width. Antennae 4-segmented, 0.24- 0.28 x as long as the body; without secondary rhinaria; processus terminalis 0.33-0.44 x as long as base of last antennal segment. Ultimate rostral segments 0.14-0.17 mm long, 1.27-1.77 x as long as second segment of hind tarsus. Abdomen with paired marginal processi, these becoming longer and darker caudad; dorsum brown, heavily rugose. Siphunculi 0.12-0.16 mm long, 0.08-0.11 x as long as body, with a distinct apical flange and a pre-apical ring of 3-4 hairs. Cauda round. Legs concolorous with head and abdomen.

*Measurements in mm :*

	Length	Width	Antenna
1.	1.42	0.88	0.43
2.	1.53	0.99	0.43
3.	1.45	0.97	?

Antennal segments		urs	ht2	Siph.
III	IV			
0.22	0.09 + 0.04	0.15	0.09	0.17
0.19	0.09 + 0.03	0.14	0.11	0.14
0.20	0.09 + 0.04	0.17	0.11	0.16

(1-3, *Sida* sp., Reang, Kalimpong, West Bengal, 9.ix.1969, C.U. Colls.)

*Other Morphs* : Not known.

*Materials examined* : 1 apterous viviparous female and 3 alatoid nymphs from *Sida* sp., Reang, Kalimpong, West Bengal, 9.ix.1969, Coll. not known, (slide no. PLK 588); 1 alate viviparous female in YPT, Shreemahal, Kathmandu, Nepal, Coll. K.C. Sharma.

*Discussion* : The genus and the species has been treated here sensu Takahashi (1935).

*Biology* : Similar to under the genus.

*Distribution* : India : Manipur, Meghalaya, Tamil Nadu, West Bengal; Indonesia (Sumatra); Nepal; Taiwan.

*Types* : Deposited in the collection of the Taiwan Agricultural Research Institute, Taipei, Taiwan.

### TRIBE GREENIDEINI

#### Key to the identification of genera

1. Body hairs on raised sockets, with capitate or expanded apices in both apterae and alate viviparae ..... *Allotrichosiphum* Takahashi  
 Body hairs usually on normal sockets, never with capitate or expanded apices.....2
2. Siphunculi in apterae barrel-shaped, small, about 0.18 x as long as body; dorsal hairs on abdomen minute, mostly with blunt and some with slightly expanded or subacute apices .....  
 ..... *Brevitrichosiphon* Raychaudhuri, Ghosh, Banerjee and Ghosh  
 Siphunculi in apterae never as above; dorsal hairs on abdomen long or short, with variable apices .....3
3. Cauda transversely oval, with a median stylus; siphunculi reticulated with transversely elongated cells on one or both surfaces, either near the base or

- throughout ..... *Greenidea* Schoutede
- Cauda never with a median stylus; siphunculi never reticulated as above .....4
- 4 Ultimate rostral segments usually pointed, rarely obtuse or subacute; segments 4 and 5 distinctly separated .....5
- Ultimate rostral segments blunt, segments 4 and 5 distinctly divided.....*Greenideoida* van der Goot
5. Hindtibiae with stridulatory ridges in the form of transverse cuts; flagellar and siphuncular hairs long and fine; siphunculi long, cylindrical.....*Mollitrichosiphum* Suenaga
- Hindtibiae without any stridulatory ridge; flagellar hairs long and short, with various apices; siphunculi usually curved outwards.....*Eutrichosiphum* Essig and Kuwana

Genus 5. *Allotrichosiphum* Takahashi, 1962

1962. *Allotrichosiphum* Takahashi, R., *Trans. shikoku ent. Soc.*, 7 : 70; Raychaudhuri, D.N., Ghosh, M.R., Banerjee, H., and Ghosh, A.K., 1973, *Kontyu*, 41 : 54.

*Type species* : *Trichosiphum kashicola* Kurisaki, M., 1920.

*Morphology* : Body brown. Head smooth, bearing 3 - 4 pairs of capitate hairs on dorsum; lateral front tubercles absent. Eyes multi-faceted in both apterae and alate viviparae. Antennae 5-segmented, segments I and II smooth; flagellum gradually distinctly imbricated apicad; processus terminalis as long as to little longer than base of last antennal segment; flagellar hairs few, short and capitate or blunt; apterae without secondary rhinarium; alatae with such rhinaria on segment III and sometimes also on segment IV. Rostrum long; ultimate rostral segments about twice as long as second segment of hind tarsus. Dorsum of abdomen smooth, pale brown in apterae, with some dark marginal patches in alatae; dorsal hairs fewer, some shorter and others longer, placed on raised sockets and with capitate apices. Siphunculi slender, curved outward, about 0.28 x as long as the body, spinulose near the apex, bearing few short hairs of capitate apices. Cauda semioval, without discernible hairs. Legs pale and smooth; first tarsal segments with 7 hairs. Wing venation normal.

*Discussion* : Takahashi (1962) described the genus from Japan based on *Trichosiphum kashicola* Kurisaki, 1920. Raychaudhuri *et al.* (1973) described the second species *A. assamense* from India. Both the species of the genus, also recognised by Eastop and Lambers (1976), remain distributed in Japan and India respectively.

*Biology* : The genus is recorded by viviparous morphs only. The recorded hosts plants belong to the family Fagaceae.

*Type species* : *Trichosiphum kashicola* Kurasaki, 1920 deposited in the collection of Entomological Institute, Hokkaido University, Japan.

9. *Allotrichosiphum assamense* Raychaudhuri, Ghosh, Banerjee and Ghosh  
(Figs. 23 a-e)

1970. *Allotrichosiphum kashicola*, Gosh, A.K., Basu, R.C. and Raychaudhuri, D.N., *Oriental Ins.*, 4 : 65-76.
1973. *Allotrichosiphum assamense* Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M. and Ghosh, A.K., *Kontyu*, 41 : 53-73.
1980. *Allotrichosiphum assamense*, Raychaudhuri, D.N. and Chatterjee, M. in "Taxonomy of the Aphids of north east and Bhutan", 323-324.

*Apterous viviparous female* : Body pear-shaped, brown in colour ; 1.61 mm long and 0.73 mm wide. Head smooth, convex at middle; without lateral frontal tubercles and with 3 - 4 pairs of capitate hairs on dorsum. Antennae 5-segmented, pale, 0.59 mm long, 0.37 x as long as the body; flagellum gradually more distinctly imbricated from base towards apex; processus terminalis 0.09 mm long and 1.80 x base of last segment; antennal segment III bearing many long and short hairs, longer hairs with capitate apices and 3.27 x as long as basal diameter of segment III; shorter hairs with acuminate apices and about 0.50 x as long as basal diameter of segment III. Rostrum long, reaching upto hindcoxae; ultimate rostral segments pointed, 0.26 mm long and 2.88 x as long as second segment of hind tarsus. Dorsum of abdomen smooth, sclerotised locally, pale brown to brown; long and short hairs with spatulate apices occur intermingled upto 7th abdominal tergite; longest hair on anterior tergites about 6.0 x and shortest hair about 1.0 x as long as basal diameter of antennal segment III; 7th tergite with 2 hairs. Siphunculi pale, curved outward, gradually more distinctly spinulose apicad, 0.46 mm long and 0.28 x as long as the body. Cauda transversely semioval or triangular. Legs pale and smooth; first tarsal segments each with 7 hairs.

*Measurements in mm*

	Length	Width	Antenna			
1.	1.61	0.73	0.59			
	Antennal segments			urs	ht2	Siph
	III	IV	V			
	0.23	0.13	0.05 + 0.09	0.26	0.09	0.46

(1, *Quercus dealbata*, Cherrapunji, Assam, India 27. xii. 1969, C.U. Colls.)

*Other morphs* : Not known.

*Material examined* : 1 apterous viviparous female from *Quercus dealbata*, Cherrapunji, Meghalaya, India, 27. xii. 1969, Coll. H. Banerjee.

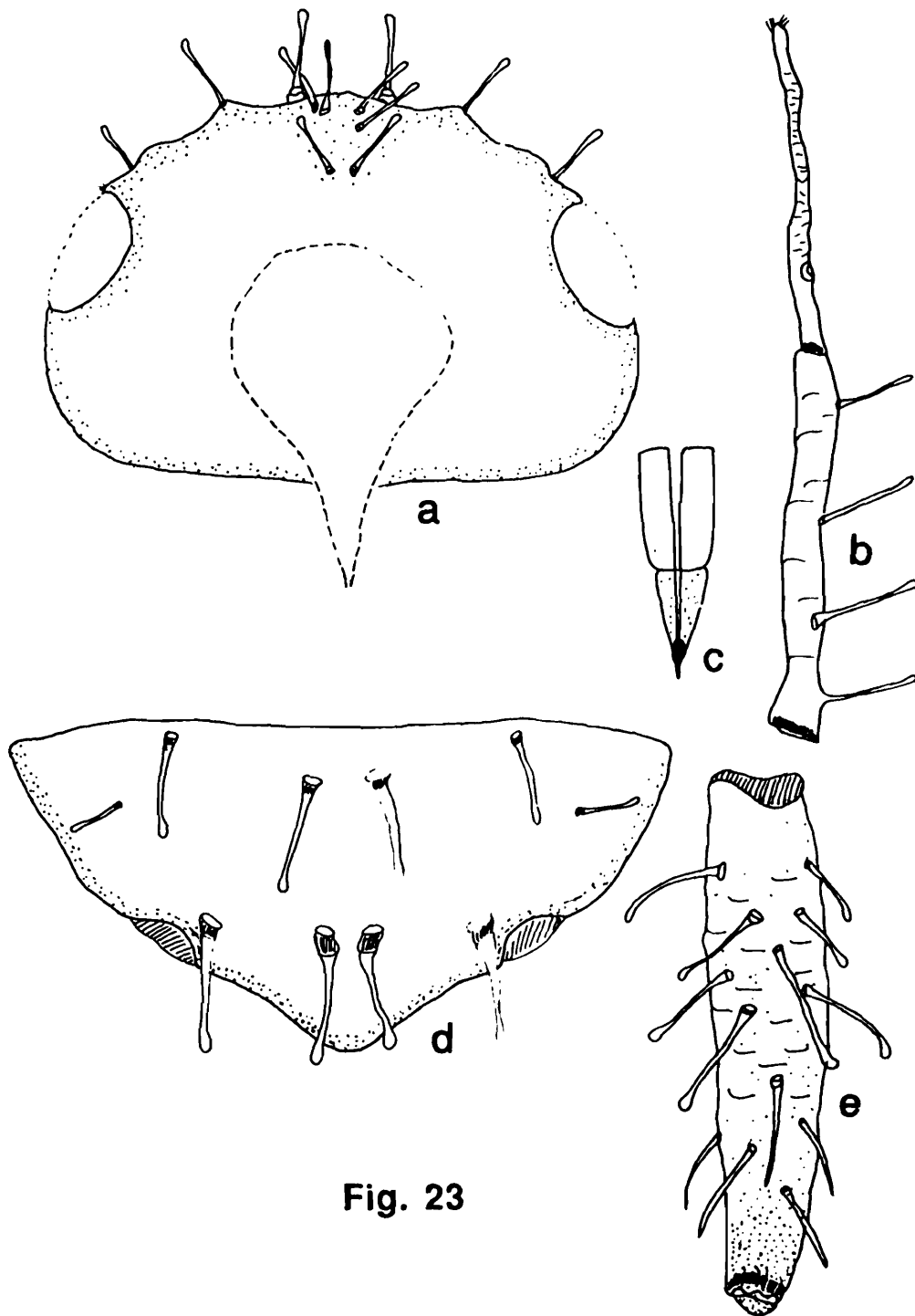


Fig. 23

Figs. 23a-e: *Allotrichosiphum assamense*, apterous viviparous female morph : a head, b flagellum, c u.r.s., d posterior part of abdomen, e siphunculus.

*Discussion* : The species is so far known by a solitary specimen, the holotype. Morphometry of the holotype, as provided in the original description (Raychaudhuri *et al.* 1973), differs from the measurements of the same specimen, as provided by Raychaudhuri and Chatterjee (1980). We have

examined the holotype and the actual measurements, (Table 1), differ from both the aforesaid measurements which, hereafter, have become redundant.

Table 6. Morphometry of the holotype of *Allotrichosiphum assamense*

Characters	Measurements (mm)		
	Raychaudhuri <i>et al.</i> (1973)	Rauchaudhuri and Chatterjee (1980)	Actual
L.body	1.60	2.85	1.61
W.body	0.80	1.33	0.73
L. ant.	0.70	1.23	0.59
seg. III	0.27	0.51	0.23
seg. IV	0.10	0.19	0.13
seg. V (base + p.t)	(0.13 + 0.69)	(0.24 + 0.18)	(0.09 + 0.05)
u.r.s	0.20	0.38	0.26
h.t. 2	0.10	0.19	0.09
Siphunculi	0.45	0.82	0.46

*Distribution* : India : Meghalaya.

*Type* : In the collection of Entomology Labarotory, Department of Zoology, University of Calcutta , India.

Genus 6. *Brevitrichosiphon* Raychaudhuri, Ghosh, Banerjee and Ghosh, 1973

1973. *Brevitrichosiphon* Raychaudhuri, D.N., Ghosh, M.R., Bnerjee, H., and Ghosh, A. K. *Kontyu*, 41 : 54; Singh, T.K., Raychaudhuri, D. and Raychaudhuri, D.N. 1979, *Entomon*, 4 : 361; Raychaudhuri, D.N. and Chatterjee, M., 1980. In "Taxonomy of the aphids of north east India and Bhutan", 325.

*Type species* : *Brevitrichosiphon mukerjii* Raychaudhuri, Ghosh, Banerjee, Ghosh, 1973.

*Morphology* : Body pear-shaped, dark. Head smooth; frons convex, without lateral frontal turbercles; dorsal cephalic hairs long, with slightly blunt to acuminate apices. Antennae 5 segmented, about 0.35 x as long as the body; flagellar hairs similar to dorsal cephalic ones; processus terminalis as long as base of the last antennal segment. Rostrum reaching middle of the abdomen; ultimate rostral segments elongated; segment 4 bearing short secondary hairs. Dorsum of abdomen sclerotised throughout, smooth spino-pleurally but densely spinulose on the margins, ventrally spinulose locally; dorsal hairs short and long, on normal sockets. Siphunculi blackish, barrel-shaped, curved outward, about 0.18 x as long as the body, sparsely hairy, some long and a few short.

Cauda transversely conical. Legs pale and largely smooth; second segment of hind tarsus about 0.32 x as long as ultimate rostral segments; first tarsal segments with 7 hairs.

*Discussion* : Raychaudhuri *et al.* (1973) described the genus from West Bengal, India, which show similarities with *Eutrichosiphum* but differs from it chiefly in having barrel-shaped blackish siphunculi, about 0.18 x as long as the body and bearing few hairs. Raychaudhuri (1980) reported an additional material form Meghalaya but did not provided its measurements. Since then another species has been described from Manipur as *B. nungsireiae* by Singh *et al.* (1979).

On comparing the type specimes of *mukerjii* and *nungsireiae* it is evident that the latter species can be included under *mukerjii* in view of minor variation range as given in Table 7 below.

Table 7. Morphometry (in mm) of *mukerjii* and *nungsireiae*

Characters	<i>mukerjii</i> (West Bengal)	<i>nungsireiae</i> (Manipur)	<i>mukerjii</i> (= <i>nungsireiae</i> )
L.body	1.26 - 1.52	1.35 - 1.36	1.26 - 1.52
W.body	0.75 - 0.77	0.70 - 0.72	0.70 - 0.77
L.ant.	0.50	0.48	0.48 0.50
u.r.s	0.20 - 0.26	0.26 - 0.28	0.26 - 0.28
h.t.2	0.08 - 0.90	0.07 - 0.08	0.07 - 0.09
Siphunculi	0.23	0.26 - 0.27	0.23 - 0.27
Longest hair on ant. III	0.03 - 0.035	0.03 - 0.035	0.03 - 0.035
Longest hair on anterior tergites	0.03 - 0.035	0.03 - 0.04	0.03 - 0.04

*Biology* : No host record is known for the type specimens of *mukerjii* from West Bengal. Singh *et al.* (1979) reported *Quercus* sp. as the host of *nungsireiae* from Manipur. All the collections, so far reported, have been made during December and February and are known by apterous viviparous morphs only. Summer collection of the genus may possibly bring out more facts about the morphology and biology of its species.

*Distribution* : India : Manipur, Meghalaya, West Bengal.

*Type species* : *Brevitrichosiphon mukerjii* Raychaudhuri, Ghosh Banerjee and Ghosh, 1973; deposited in the collections of Entomology Laboratory, Department of Zoology, University of Calcutta.

10. *Brevitrichosiphon mukerjii* Raychaudhuri, Ghosh, Banerjee and Ghosh  
(Figs. 24 a-c )

1970. *Allotrichosiphon kashicola*, Ghosh, A.K., Basu, R.C. and Raychaudhuri, D.N., *Oriental Ins.*, 4 : 65 (misident. )
1973. *Brevitrichosiphon mukerjii* Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M. and Ghosh, A.K., *Kontyu*, 41 : 53.
1979. *Brevitrichosiphon nungsireiae* Singh, T.K., Raychaudhuri, D. and Raychaudhuri, D.N., *Entomon*, 4 : 361. (New Syn.)
1980. *Brevitrichosiphon mukerjii*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan", 325.

*Apterous viviparous female* : Body 1.26 - 1.52 mm long and 0.70 - 0.77 mm as maximum width near the middle of abdomen. Head brown, smooth; anterior of dorsum with 2 pairs of spinal and one pair each of pleural and lateral hairs, posterior side with one pair of spinal and lateral hairs; dorsal cephalic hairs of almost similar lengths (0.03 - 0.04 mm) and with bluntish to acuminate apices. Antennae 5-segmented, pale, 0.48 - 0.50 mm long; basal 2-segments nearly smooth; flagellum gradually more distinctly imbricated apicad; flagellar hairs short or long, longer hairs placed on the inner margins; longest ones 0.03 - 0.035 mm long; processus terminalis nearly as long as base of last antennal segment. Rostrum long, reaching beyond hindcoxae, up to the middle of abdomen; ultimate rostral segments elongated, slender, 0.02 - 0.28 mm long, 2.9 - 3.1 x as long as second segment of hind tarsus; segment IV bearing 4 - 5 short secondary hairs. Dorsum of abdomen dark, more so in the centre; bearing few short and many long hairs, similar to dorsal cephalic hairs in length and apices. Siphunculi barrel - shaped, black, 0.23 - 0.27 mm long, 0.18 x as long as the body; densely spinulose, spinules arranged in transverse rows up to the tip of apex; bearing a few short and some long hairs of bluntish apices. Cauda transversely conical, bearing 4 long hairs. Legs concolorous with antennae, smooth except femora with sparse spinules near the margins; h.t.2 0.07 - 0.08 mm long, about 0.32 x as long as ultimate rostral segments; first tarsal segments with 7 hairs.

*Measurements in mm :*

	Length	Width	Antenna			
1.	1.52	0.77	0.50			
2.	1.35	0.70	0.48			
3.	1.36	0.72	0.48			
	Antennal segments			urs	ht2	Siph
	III	IV	V			
	0.16	0.09	0.1 + 0.1	0.26	0.08	broken
	0.15	0.08	0.09 + 0.1	0.26	0.07	0.26
	0.14	0.07	0.1 + 0.1	0.28	0.078	0.27

(1, unidentified host, Kalimpong, West Bengal, 12.ii.1970, C.U. Colls.; 2,3 *Quercus* sp., Snakeithel, Manipur, 16. xii. 1971, C.U. Colls)

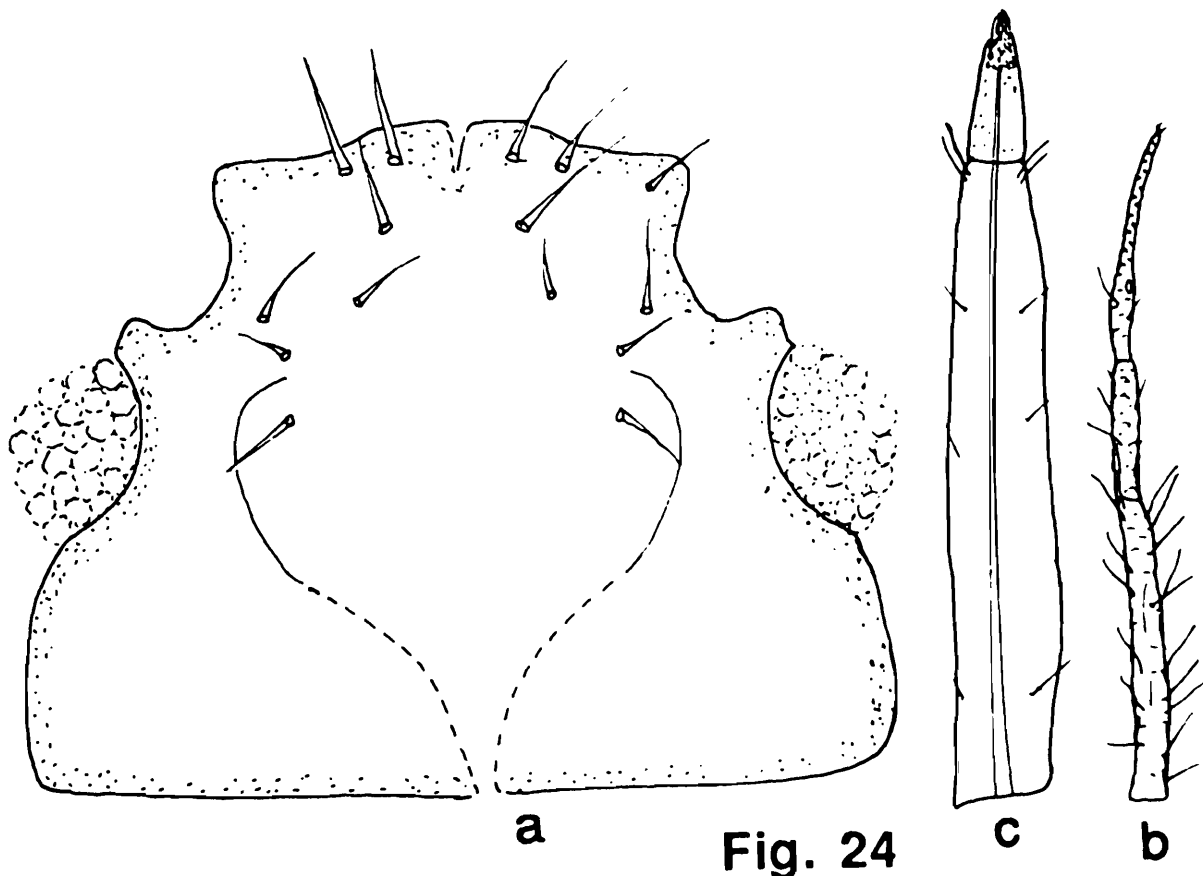
*Materials examined* : 1 apterous viviparous female from an unidentified host, Mahanadia, Kalimpong, West Bengal, 12.ii.1970, Coll. M.R. Ghosh; 2 apterous viviparous females from *Quercus* sp., Snakeithel, Manipur, 16.xii. 1971, Coll. T.K.Singh.

*Other morphs* : Not known.

*Discussion* : In view of *B. nungsireiae* being synonymised with *B. mukerjii* (see discussion under genus), the genus is now composed of one species only. The specimens from Manipur represent the extended distribution of the species.

*Distribution* : India : Manipur, Meghalaya, West Bengal.

*Types* : In the collections of Entomology Laboratory, Department of Zoology, University of Calcutta, Calcutta, India.



Figs. 24a-c : *Brevitrichosiphon mukerjii*, apterous viviparous female morph : a head, b flagellum, c u.r.s.

Genus 7. *Eutrichosiphum* Essig and Kuwana, 1918

1908. *Trichosiphum* Pergande : Okajima, G., *Bull. Coll. Agric. Tokyo Imp. Univ.*, 8 : 23 (Partim).

1918. *Trichosiphum* Pergande : Maki, M., *Formosan Agric. Rev.* (in Japanese), 138 : 344 (*Partim*).
1918. *Trichosiphum pasariae* Okajima : Essig, O.E. and Kuwana, S. I., *Proc. Calif. Acad. Sci.* 4th ser. 8 : 97 (typus generis).
1922. *Goodea*, Shinji, *Zool. mag. Tokyo*, 34 : 731 : described as subgenus of *Greenidea* Schouteden, 1905 (typus subgeneris *Goodea narafoliae* Shiniji, 1922).
1931. *Paratrichosiphum*, Takahashi, R., *Aph. of Formosa*, Pt. 6 : 31 (typus-generis-*Greenidea tattakanum*, Takahashi, 1925) (*Partim*).
1956. *Holotrichosiphon*, Raychaudhuri, D.N., *Zool. Verh. Leiden*, 31 : 75 (typus generis : *Holotrichosiphon heterotrichum* Raychaudhuri, 1956, *ibid*).
1962. *Neoparatrichosiphum*, Ghosh, A.K. and Raychaudhuri, D.N., *J. Asiatic Soc.*, 4 : 107 (typus subgeneris *Neoparatrichosiphum khasyanum*, Ghosh and Raychaudhuri, 1962, *ibid*).
1973. *Neotrichosiphm*, Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M., and Ghosh, A.K., *Kontyu*, 41 : 59 (typus subgeneris *Neotrichosiphum subinoyi* Gosh *et al.*, 1973).

*Morphology* : Body elongated oval or pear shaped. Frontal tubercles absent or very weakly developed. Head smooth or spinulose; dorsal cephalic hairs few to many, short or long, with acute, acuminate, blunt or bifid apices; Antennae 5, and/or 6- segmented, pale brown, brown or dark brown, shorter than body; segments smooth, flagellum gradually more distinctly apicad; flagellar hairs long and short, mostly with acute or acuminate apices and seldom with blunt or furcated apices, longer ones mostly directed inwards, in alatae segment III with few to many small to big elongated, round or transversely oval secondary rhinaria distributed variably along the length of the segment, sometimes such rhinaria also present on segment IV; processus terminalis subequal to much longer than the base of the last antennal segment. Rostrum reaching hindcoxae or beyond; ultimate rostral segments short and obtuse or long, narrow, acute or tapering, 0.11 - 0.43 mm long, about 1.0 - 4.0 x as long as second joint of hindtarsus, segment 4 bearing few to many accessory hairs. Dorsum of abdomen pale to dark brown, either smooth or spinulose, spinules may be distributed either uniformly or locally, both in apterae and alatae with pattern of sclerotisation; dorsal hairs long and/or short, usually stout and stiff, sometimes thin, with acute, acuminate, blunt or branched apices. Siphunculi short or long, in alatae usually longer than in apterae; usually curved outwards, constricted at bases and apices, variably pigmented; either densely or sparsely spinulose, apical region with dense spinules arranged in transverse rows, non-reticulated in apterae but faintly to nearly distinctly reticulated in alatae; siphuncular hairs mostly long, few short, these either thorny or with acute, blunt or furcated apices in apterae; in alatae

hairs usually long and fine or with acute apices. Cauda broadly oval, with variable number of hairs. Subanal plate round. Legs pale to brown, femora ventrally with spinulose striae; tibiae usually imbricated near the distal end, rest smooth, first tarsal segments with 7 hairs. Wing venation normal, veins usually bordered brown.

*Discussion* : Essig and Kuwana (1918) described the genus *Eutrichosiphum* to accommodate *Trichosiphum pasaniae* Okajima which possessed 5-segmented antennae compared to 6-segmented antennae in the species of related genera. Takahashi (1931) broadened the concept of the genus to include species possessing cauda without a processus, tibiae without transverse striae and siphunculi shorter than the body. Raychaudhuri (1956) further broadened the idea of the genus to include species possessing long and acute ultimate rostral segments, Media in the forewings twice branched and in apterae the siphunculi show no trace of reticulation. Since then the number of species described under the genus has increased from 6 to more than 30. Most of the new species have been described from the himalayan hills of North-East India. Raychaudhuri and Chatterjee (1980) in their account transferred the subgenus *Ditrichosiphum* as a subgenus of the *Mollitrichosiphum* Suenaga and considered the genus *Paratrichosiphum* Takahashi as a subgenus of *Eutrichosiphum* to represent those species which possessed siphunculi with fine hairs and of similar lengths. They (op. cit.) also considered *Neoparatrichosiphum* as a subgenus to accommodate species which possessed siphuncular hairs of dissimilar lengths, some of which are with fine apices and some with furcated apices. In contrast, the nominate subgenus *Eutrichosiphum* represented those species which have 5-segmented antennae.

In our study comprising mounted materials of all the recorded (excluding *E. minutum*) species from India and some from outside, we noticed that distinctions made for the separation of subgenera of the genus do not stand well in many instances. We found species like *E. khasyanum*, *E. raychaudhurii* and *E. tattakanum* where specimens from the same collection of each species exhibited 5 and 6-segmented antennae. Similarly, we found several instances where the siphunculi possessed hairs of dissimilar lengths and apices but earlier considered to be belonging to *Paratrichosiphum* or *Eutrichosiphum* S.S.

In course of pursuing this study, it was also found that the reasons for distinguishing the genus *Holotrichosiphon* Raychaudhuri, 1956 from other genera of the Tribe Greenideinae do not augur well. The criterion of "the presence of hairs of very different lengths and apices on abdominal dorsum and siphunculi of apterae viviparae" in the species of *Holotrichosiphon*, mentioned by Raychaudhuri *et al.* 1977, has as well been found in some of the species of the genus *Eutrichosiphum*. *E. davidi* Raychaudhuri is one such example. Some other species also exhibit such a trait as would be evident from the descriptions

of the species in the following pages. Even though the member of the genus *Eutrichosiphum* exhibit heterogeneity in some of their taxonomic characters, the clustering of species in to subgenera appeared to be untenable in view of the prevalence of wide intraspecific variations and overlapping differences between species.

The genus *Eutrichosiphum* is considered here without any subdivision and is represented by 32 species from India. Genus *Holotrichosiphon* is considered to be new synonym of the genus *Eutrichosiphum*.

*Biology* : The species considered here under this genus infest plants belonging to Betulaceae, Fagaceae, Lauraceae, Malvaceae, Moraceae, Myrtaceae, Sterculiaceae, Styraceae and Theaceae but the majority of the records have been made from the plants of Fagaceae. The species live on young shoots and undersides of leaves of trees. Acyclical parthenogenesis seems to be the prevalent mode of reproduction in the genus except in some species where oviparous females and males have been found.

*Distribution* : China, India, Indonesia, Japan, Malaysia, Nepal, Pakistan, Taiwan and Thailand.

*Type-species* : *Trichosiphum pasaniae* Okajima, 1908, whereabouts of original types unknown; Cotypes in the collection of The Natural History Museum, London.

#### Key to the species of Genus *Eutrichosiphum*

##### *Apterous Viviparous Females*

1. None of the dorsal hairs on abdomen with furcated apices.....2  
At least some of the dorsal hairs on abdomen with furcated apices.....6
2. Dorsal hairs of abdomen thick and stiff, mostly thorny.....3  
Dorsal hairs of abdomen with acute, acuminate, blunt apices or a few thorny .....4
3. Siphunculi blackish, 0.65 - 0.86 mm long and 0.24 - 0.32 x as long as body; antennae 5 or 6-segmented ..... *dubium*  
Siphunculi pigmented, 0.25 - 0.30 mm long and 0.16 - 0.19 x as long as body; antennae 5-segmented .....*dauidi*
4. Dorsum of abdomen entirely spinulose; siphunculi densely spinulose throughout ..... *arunachali*  
Dorsum of abdomen smooth or locally spinulose; siphunculi sparsely spinulose on basal half .....5

5. Ultimate rostral segments 0.11 - 0.12 mm long and 1.0 - 1.30 x as long as h.t. 2..... *tapatii*  
 Ultimate rostral segments 0.19 - 0.23 mm long and 1.90 - 2.40 x as long as h.t. 2.....*pyri*
6. Most of the dorsal hairs on abdomen with branched apices, a few shorter ones with acute or blunt apices.....7  
 Some or a few of the dorsal hairs on abdomen with branched apices, others with acute, acuminate or blunt apices.....12
7. Abdominal dorsum smooth; antennae 5 or 6-segmented; u.r.s. obtuse at apex.....8  
 Abdominal dorsum spinulose entirely or locally; antennae 5-segmented .....10
8. U.r.s. with obtuse apex; abdominal dorsum sclerotised but pale.....9  
 U.r.s. with acute apex; abdominal dorsum sclerotised, dark brown ..... *atini*
9. P.t. subequal to 1.33 x as long as base of the last antennal segment; siphunculi 0.19 - 0.22 x as long as body ..... *manaliensis*  
 P.t. 1.60 - 1.72 x as long as base of the last antennal segment; siphunculi about 0.40 x as long as body ..... *raychaudhurii*
10. Abdominal dorsum locally spinulose ..... *jugeshwari*  
 Abdominal dorsum entirely spinulose ..... 11
11. Dorsum of head spinulose; siphunculi with a few hairs with furcated apices near the base ..... *subinoyi*  
 Dorsum of head smooth; none of the siphuncular hairs with furcated apices..... *pseudopasaniae*
12. Dorsum of head spinulose ..... *khasyanum*  
 Dorsum of head smooth ..... 13
13. Antennae 5 or 6-segmented; u.r.s. long and acute.....*tattakanum*  
 Antennae either 5 or 6-segmented; u.r.s. obtuse or long and tapering or acute.....14
14. Most of the dorsal hairs of abdomen with blunt apices..... 15  
 Most of the dorsal hairs of abdomen with acute, acuminate or some with blunt or furcated apices ..... 17
15. Dorsum of abdomen with a brown central patch extending on 3 - 5

- tergites; antennae 5 or 6-segmented ..... 16
- Dorsum of abdomen variably sclerotised, never with a brown central patch; antennae 6-segmented ..... *neotattakanum*
16. Antennae 5-segmented, 0.11 - 0.13 mm long and 1.32 - 1.48 x as long as h.t.2 ..... *manipurensis*
- Antennae 6-segmented, 0.23 - 0.27 mm long and 2.09 - 2.45 x as long as h.t.2 ..... *querciphaga*
17. Dorsum of abdomen locally spinulose ..... 18
- Dorsum of abdomen smooth ..... 23
18. Antennae 5-segmented ..... 19
- Antennae 6-segmented..... 21
19. Dorsal hairs of abdomen long, longest hairs on anterior tergites about 4.60 x as long as b.d. III ..... *sikkimensis*
- Dorsal hairs of abdomen less than 4.0 x as long as b.d. III ..... 20
20. U.r.s. long and tapering, 3.0 - 3.80 x as long as h.t.2 ..... *quercifoliae*
- U.r.s. 1.80 - 2.11 x as long as h.t.2 ..... *sankari*
21. Siphunculi densely spinulose throughout; u.r.s. less than 3.50 x as long as h.t.2 ..... *rameshi*
- Siphunculi sparsely spinulose except near the apical region which is densely spinulose; u.r.s. less than 3.0 x as long as h.t.2. .... 22
22. Siphunculi 0.60 - 0.85 mm long and 0.29 - 0.39 x as long as body ..... *blackmanum*
- Siphunculi 0.26 - 0.36 mm long and 0.15 - 0.19 x as long as body ..... *flavum*
23. Antennae 5-segmented; u.r.s. obtuse ..... 24
- Antennae 6-segmented; u.r.s long or short, acute or tapering ..... 25
24. Siphunculi densely spinulose throughout; u.r.s. 0.23 - 0.30 mm long ..... *assamense*
- Siphunculi sparsely spinulose on most of the portion, densely spinulose near the apex; u.r.s 0.17 - 0.20 mm long ..... *makii*
25. Siphunculi very short, 0.23 - 0.26 mm long, 0.12 - 0.16 x as long as body ..... *litseae*

- Siphunculi less than 0.40 mm long, atleast 0.22 x as long as body .....26
26. Processus terminalis long, 2.75 - 3.16 x as long as base of last antennal segment; longest hair on anterior tergites very long, 5.20 5.46 x as long as b.d. III ..... *betulae*
- Processus terminalis upto 2.50 x as long as base of last antennal segment; longest hair on anterior tergites at most 4.40 x as long as b.d.III ..... 27
27. Siphunculi densely spinulose throughout, 0.24 - 0.28 x as long as body; u.r.s. 2.73 - 3.66 x as long as h.t.2 ..... *russellae*
- Siphunculi sparsely spinulose on basal half and densely so on apical half, 0.30 - 0.42 x as long as body; u.r.s. 1.63 - 2.33 x as long as h.t.2 .....28
28. P.t. 1.90 - 2.20 x as long as base of last antennal segment; longest hairs on antennal segment III 3.80 - 4.60 x as long as b.d.III .....29
- P.t. 1.40 - 1.60 x as long as base of last antennal segment; longest hairs on antennal segment III 2.50 - 3.0 x as long as b.d. III; siphunculi 3.30 - 5.0 x as long as its maximum diameter ..... *neoalnicola*
29. Antennae 0.73 - 0.83 x as long as body; p.t. 2.70 - 2.82 x as long as base of segment VI; u.r.s. 2.26 - 2.30 x as long as h.t.2..... *nepalensis*
- Antennae 0.51 - 0.57 x as long as body; p.t. 1.90 - 2.20 x as long as base of segment VI; u.r.s. 1.90 - 2.10 x as long as h.t.2 ..... *alnicola*

*Alate Viviparous Females*

1. Siphunculi upto 0.50 x as long as body ..... 2
- Siphunculi more than 0.50 x as long as body ..... 8
2. Antennae 6-segmented, u.r.s. more than 0.25 mm long ..... 3
- Antennae 5-segmented; u.r.s. upto 0.25 mm long.....5
3. Antennal segment III with 10 - 13 secondary rhinaria ..... 4
- Antennal segment III with 34 - 38 secondary rhinaria ..... *russellae*
4. Cauda bearing 10 - 11 long and fine hairs; siphunculi 0.92 - 1.32 mm long and 11.30 - 11.50 x as long as its maximum width .....

- .....*tattakanum*
- Cauda bearing 6 - 7 hairs; siphunculi 0.84 mm long and 9.50 x as long as its maximum width ..... *khasyanum*
5. Longest hair on anterior tergites upto 1.0 x as long as b.d. III ..... 6
- Longest hair on anterior tergites not less than 2.30 x as long as b.d. III ..... 7
6. Antennal segment III with about 15 transversely oval secondary rhinaria, longest hair on this segment 4.0 x as long as b.d. III ..... *davidi*
- Antennal segment III with 12 - 20 elongated secondary rhinaria; longest hair on this segment about 3.0 x as long as b.d. III..... *pseudopasaniae*
7. Antennae 0.59 - 0.67 x as long as body, segment III with 15 - 19 secondary rhinaria; p.t. 1.30 - 1.33 x as long as base of last antennal segment; longest hair on anterior 2.30 - 2.50 x as long as b.d. III ..... *sankari*
- Antennae 0.80 - 0.90 x as long as body, segment III with 20 - 26 secondary rhinaria, p.t. 1.80 - 2.29 x as long as base of last antennal segment, longest hair on anterior tergites 3.10 - 4.10 x as long as b.d. III ..... *makii*
8. Antennae 5-segmented ..... 9
- Antennae 6-segmented ..... 10
9. Ultimate rostral segments long, sword-like 0.40 mm long and 2.71 x as long as h.t.2; antennal segment III with 29 - 30 secondary rhinaria ..... *arunachali*
- Ultimate rostral segments rather short, 0.16 - 0.17 mm long and 1.77 - 1.80 x as long as h.t.2; antennal segment III with 17 - 20 small secondary rhinaria ..... *subinoyi*
10. Secondary rhinaria on antennal segment III 40 or more ..... 11
- Secondary rhinaria on antennal segment III upto 20 ..... 12
11. Processus terminalis long, 2.23 - 2.24 x as long as base of last antennal segment; u.r.s. 2.60 - 2.92 x as long as h.t.2 ..... *sensoriatum*
- Processus terminalis short, about 0.75 x as long as base of last

- antennal segment; u.r.s. 1.92 x as long as h.t. 2; secondary rhinaria also present on segment IV ..... *flavum*
12. Siphunculi 0.75 x as long as body; antennae as long as body, segment III with 20 secondary rhinaria ..... *minutum*
- Siphunculi upto 0.63 x as long as body; antennae shorter than body, segment III with upto 16 secondary rhinaria ..... 13
13. Longest hair on anterior tergites 2.55 x as long as b.d. III; siphunculi about 11.10 x as long as body ..... *raychaudhurii*
- Longest hair on anterior tergites 4.40 x as long as b.d. III; siphunculi about 12.0 - 13.80 x as long as body

#### *Oviparous Females*

1. Apterous morph; u.r.s long, 3.10 x as long as h.t.2; siphunculi short, 0.25 x as long as body ..... *russellae*
- Alate morph; u.r.s. less than 3.0 x as long as h.t.2; siphunculi longer..... 2
2. Secondary rhinaria on segment III upto 13 ..... 3
- Secondary rhinaria on segment III 20 or more ..... 4
3. Segment 4 of u.r.s. with 14 accessory hairs; segment III with 10 - 13 secondary rhinaria ..... *alnicola*
- Segment 4 of u.r.s. with 10 - 12 accessory hairs; segment III with 8 - 10 secondary rhinaria ..... *tattakanum*
4. Segment III, IV and V with 34, 7 and 1 secondary rhinaria respectively, longer hairs on anterior tergites 2.0 - 2.33 x as long as b.d. III ..... *raychaudhurii*
- Only segment III with secondary rhinaria ..... 5
5. U.r.s. 2.90 x as long as h.t.2; longest hair on anterior tergites 1.10 x as long as b.d. III; segment III with 28 - 29 secondary rhinaria ..... *quercifoliae*
- U.r.s. 1.75 x as long as h.t.2; longest hair on anterior tergites, 2.70 x as long as b.d. III; segment III with 20 secondary rhinaria ..... *Eutrichosiphum* sp. 1

#### *Males*

1. Apterous morph; segment III with 25 secondary rhinaria; siphunculi 0.28 x as long as body ..... *russellae*

- Alate morph; segment III with upto 16 secondary rhinaria; siphunculi more than 0.30 x as long as body ..... 2
2. Segment III with 2 - 6 secondary rhinaria; siphunculi about 0.32 x as long as body ..... *assamense*
- Segment III with 6 or more secondary rhinaria; siphunculi not less than 0.38 x as long as body ..... 3
3. Antennae about 1.06 mm long; p.t. 10 x as long as base of last segment, segment III with 6-8 secondary rhinaria ..... *Eutrichosiphum* sp.II
- Antennae 2.07 - 2.11 mm long, p.t. 1.6 - 1.9 x as base of last segment, segment III with 9 - 16 secondary rhinaria; siphunculi 0.70 - 0.78 x as long as body ..... *alnicola*.

11. *Eutrichosiphum alnicola* (Basu, A.N., 1967)  
(Figs. 25 a - 32 a, 29 m - 30 m, 32 m)

1967. *Paratrichosiphum alnicola* Basu, A.N., *Bull. Ent.*, 18 : 14.
1980. *Eutrichosiphum* (*Paratrichosiphum*) *alnicola*, Raychaudhuri, D.N. and Chatterjee, M. In "Taxonomy of aphids of North-East India and Bhutan", (ed) Raychaudhuri, D.N., 336.
1980. *Eutrichosiphum* (*Paratrichosiphum*) *alnicola*, Raychaudhuri, D.N., Ghosh, L.K. and Das, S.K., *Ins. matsum.*, n.s. 20 : 64.
1984. *Eutrichosiphum* (*Paratrichosiphum*) *alnicola*, Saha, S. and Chakrabarti, S., *Proc. Zool. Soc. Calcutta*, 37 : 48.

*Apterous viviparous female* : Body elongated, about 1.81 - 2.69 mm long with 0.85 - 1.14 mm as maximum width. Fronts with a median slightly convex, without any lateral frontal prominence. Dorsum of head smooth, with many long hairs of acuminate apices. Antennae 1.23 - 1.52 mm long, about 0.51 - 0.62 mm long, about 0.51 - 0.62 as long as the body; segment III smooth, rest of the flagellum rather faintly imbricated; antennal hairs mostly long, with acute to subacute apices, the longer ones directed inwards, longest hairs on segment III about 3.80 - 4.0 x as long as basal diameter of the segment; processus terminalis 0.18 - 0.28 mm long, 1.80 - 2.20 x as long as base of segment VI. Rostrum reaching upto 2nd tergite of abdomen; ultimate rostral segments 0.18 - 0.28 mm long, 1.63 - 2.33 x as long as second segment of hind tarsus, bearing 4 - 6 accessory hairs. Dorsum of abdomen sclerotic, slightly wrinkled, with small roundish pigmented areas pleurally on 2 - 4th tergites; ventrally with spinules only marginally, leaving the median area free; dorsal hairs of various lengths, long hairs rather thick, both normal and furcated apices; longer hairs on anterior tergites 0.015 - 0.03 mm long

and about 4.0 - 4.40 x as long as basal diameter of antennal segment III, dorsal hairs with acute to subacute apices, the shorter ones about 0.6 - 0.8 x as long as the mentioned diameter; 7th tergite with 4 and 8th tergite with 2 hairs respectively. Siphunculi brownish, 0.70 - 1.13 mm long, about 5.60 - 5.90 x as long as their maximum width at base and about 0.30 - 0.42 x as long as body; siphuncular hairs numerous, with finely drawn out apices; longest hair upto 6.40 x as long as basal diameter of antennal segment III; with spinules in transverse rows on nearly apical half and scattered irregularly over the rest of the surface. Legs brown; femora and tibiae smooth.

*Measurement in mm*

	Length	Width	Antenna
1.	2.17	1.14	1.23
2.	2.21	1.14	1.12
3.	1.81	0.85	?
4.	2.29	1.04	1.23
5.	2.31	1.05	1.23
6.	2.16	1.05	1.35
7.	2.25	1.12	1.31

Antenal segments				urs	ht2	Siph.
III	IV	V	VI			
0.36	0.14	0.19	0.15 + 0.26	0.19	0.10	0.86
0.33	0.14	0.18	0.14 + 0.23	0.18	0.09	0.76
0.34	0.14	0.18	0.13 + ?	0.19	0.09	0.85
0.32	0.15	0.19	0.17 + 0.27	0.20	0.11	0.70
0.36	0.15	0.19	0.17 + 0.23	0.18	0.11	0.84
0.38	0.17	0.20	0.17 + 0.28	0.20	0.11	0.92
0.34	0.17	0.20	0.17 + 0.27	0.22	0.11	0.87

(1, *Alnus nepalensis*, Upper Shillong, Meghalya, 17. ix.1965, B.M. Coll., 2, indet. host, Kalimpong, West Bengal, 15.v.1967, B.M. Coll., 3, indet. host, Darjeeling, West Bengal, 14.xi.1968, B.M. Coll., 4 - 5, *A. nepalensis*, Kalimpong, West Bengal, 5.iv.1971, C.U. Coll., 6 - 7, *A. nepalensis*. Gayzing, Sikkim, 2.xii.1983, T.U. Coll.)

*Alate viviparous female* : Body elongated, about 2.34 - 3.01 mm long and 0.85 - 1.20 mm as the maximum width. Dorsum of head smooth; dorsal hairs many, long and with acuminate apices. Antennae 1.56 - 1.98 mm long and about 0.53 - 0.71 x as long as the body; segment III with 11 - 15 round to oval accessory rhinaria arranged in a row along the entire length of the segment;

longer hairs on segment III about 4.7 - 4.8 as long as basal diameter of the segment; processus terminalis 0.23 - 0.40 mm long, about 1.35 - 2.28 as long as base of antennal segment. Ultimate rostral segments 0.17 - 0.21 mm long and 1.60 - 2.0 x as long as second segment of hind tarsus. Dorsum of abdomen with a brownish sclerotic area extending from 2nd to 8th tergite which are fused with marginal sclerites on 2 - 5th tergites; dorsal hairs with finely drawn out apices, longest hair on anterior tergites 0.01 - 0.02 mm long and upto about 4.40 x as long as basal diameter of antennal segment III. Siphunculi dark brown, nearly cylindrical, slightly curved outwards near the apices, 1.40 - 1.89 mm long, about 0.51 - 0.63 x as long as the body and about 12.0 - 13.0 x as long as its maximum width. Legs with tibiae darker than femora. Wings bordered brown, venation normal, M-twice branched. Otherwise as in the apterous viviparous female.

*Measurements in mm*

	Length	Width	Antenna			
1.	2.34	0.91	?			
2.	2.51	1.0	1.56			

Antenal segments				urs	ht2	Siph.
III	IV	V	VI			
0.59	0.17	broken	broken	0.17	?	1.45
0.60	0.21	0.23	0.17 + 0.23	0.20	0.10	1.42

(1, *Alnus nepalensis*, Upper Shillong, Meghalaya, 17.ix.1965. B.M. Coll., 2, indet. host, Kalimpong, West Bengal, 20.xii.1968, C.U. Coll.)

*Alate male* : Body 2.19 - 2.44 mm long and 0.72 - 0.77 mm as maximum width. Head brown, bearing 20 - 26 long hairs with acuminate apices, the longest one on anterior discal 5.1 - 5.8 x as long as the basal diameter of antennal segment III. Antennae brown to deep brown, 2.07 - 2.11 mm long, 0.88 - 0.94 as long as body, segments I and II nearly smooth, rest gradually imbricated apicad; segment III with 9 - 16 round accessory rhinaria, the longest and shortest hairs on segment III 4.7 - 5.75 x and 1.28 - 2.43 x as long as the basal diameter of segment III respectively; processus terminalis 1.6 - 1.9 x as long as base of segment III. Ultimate rostral segments 1.8 - 2.0 x as long as second segment of hind tarsus and bears 8 accessory hairs; segment 4 about 4.7 - 5.62 x as long as segment 5. Abdomen sclerotic with small roundish pleural pigmented areas on 2 - 4th tergites; longest hairs on 7th and 8th tergites 2.43 - 3.7 x and 3.0 - 4.1 x as long as basal diameter of antennal segment III respectively. Siphunculi elongated, 1.74 - 1.80 mm long, 0.70 - 0.78 x as long as body and 14.0 - 16.9 x as long its maximum width.

Cauda wide, V-shaped with 8 hairs. Clasper bifurcated, each with 14-19 hairs. Other characters as in alate viviparous female.

*Measurements in mm*

	Length	Width	Antenna			
1.	2.31	0.71	2.07			
	Antenal segments			urs	ht2	Siph.
	III	IV	V	VI		
	0.80	0.33	0.30	0.18 + 0.29	0.23	0.10
						1.74

(1, *Aluns nepalensis*, Rana, Utar Pradesh, 17.x.1982, K.U. Coll.)

*Alate oviparous female* : No specimen of this morph was available for our examination. Raychaudhuri *et al.* (1980) described this morph based on exclusive collection of 7 alatae oviparae and 5 nymphs from *Quercus* sp. Previous collection of *alnicola* came mainly from *Alnus nepalensis*. Besides the difference in host, the reported alatae oviparae of *alnicola* differ in having stouter siphunculi (1.0 mm long) as against longer siphunculi in alate vivipara and alate male morphs (1.45 - 1.75 mm long). We reproduce the description of alate oviparous female morph as provided by Raychaudhuri *et al.* (1980) with our doubt regarding its exact placement.

"Body about 2.24 - 2.4 mm long with 0.82 - 1.02 mm as maximum width. Head pale brownish, smooth, bearing long dorsal hairs with acuminate apices. Antennae 6-segmented, about 0.72 - 0.79 x body, flagellar hairs long and fine, longest one on segment III being about 4.71 - 5.99 x b.d. III; segment III with 10 - 13 round secondary rhinaria distributed in a row over almost entire length; p.t. about 1.60 - 1.76 x base of segment VI. Rostrum reaching hind coxae; u.r.s. (4 + 5) long and pointed, about 1.41 - 2.18 x h.t.2; rostral segment IV with 14 secondary hairs. dorsum of abdomen with a median consolidated patch extending over 2nd - 4th tergites, besides irregular patches on tergite 1 and on margins of these segments, segment 5 with a distinct patch spinally in between siphunculi. Siphunculi long, cylindrical, about 0.42 - 0.44 x body, covered with numerous long and fine hairs and indistinct flange. Legs pale brown except distal portion of femora and tibiae which are slightly darker; hind tibiae with at most 2 pseudorhinaria - like structure. Subgenital plate densely hairy"

*Measurements in mm*

	Length	Width	Antenna
1.	2.38	0.87	1.72

Antenal segments				urs	ht2	Siph.
III	IV	V	VI			
0.52	0.24	0.28	0.19 + 0.33	0.17	0.12	1.0

(1, from *Quercus* sp., Mashobra, Himachal Pradesh, 28.x.1978, C.U. Coll.)

*Other morphs* : The species is known by apterous and alate viviparous morphs and alate male and alate oviparous female morphs.

*Materials examined* 1 apterous and 1 alate viviparous females from *Alnus nepalensis*, Upper Shillong, Meghalaya, 17.ix.1965, Coll. C.I.B.C., 1 apterous viviparous female from an unknown host, Kalimpong, West Bengal, 15.v.1967, Coll. S.G. Rajasingh; 2 apterous viviparous females from an indet. host, Darjeeling, West Bengal, 14.xi.1968, Coll. S.G. Rajasingh; 1 alate viviparous female from an unknown host, Kalimpong, West Bengal, 20.xii.1968, Coll. M.R. Ghosh; 2 apterous viviparous females from *A. nepalensis*, Kamshi, Kalimpong, West Bengal, 5.iv.1971, Coll. not known; 1 alate male from *A. nepalensis*, Rana, Uttar Pradesh, 17.x.1982, Coll. S. Raha; 3 apterous viviparous females from *A. nepalensis*, Gayzing, Sikkim, 2.xii.1983, Coll. S. Mahapatra.

*Discussion* : Basu, A.N. (1967) described the species from the himalayan hills of Darjeeling, West Bengal. Since then more materials of the species has been collected from its type- locality as well as in central and western parts of the Himalaya infesting the same host species. Taxonomically this species stands distinct in relation to other known species under the genus in respect of longer antennae and siphunculi and their ratios with that of the body.

*Biology* : This species is host-specific (*Alnus nepalensis* : Betulaceae) and is commonly found in the area of distribution. The species feed along the mid-rib and primary veins of the undersides of leaves, both tender and mature, and sheds off one of the two siphunculi when disturbed with a pointed object. Report of many alate males and alate oviparous females of this species occurring on the same host is suggestive of a monoceious holocyclic life cycle in the species atleast in parts of its distribution range.

*Distribution* : India : Himachal Pradesh, Meghalaya, Sikkim, Uttar Pradesh, West Bengal; Nepal.

*Types* : In the collection of the Department of Agriculture, Government of West Bengal, Calcutta, India. Paratypes are deposited in The Natural History Museum, London.

12. *Eutrichosiphum arunachali* Basu, Ghosh and Raychaudhuri  
(Figs. 25b-32b)

1972. *Eutrichosiphum (Eutrichosiphum) arunachali* Basu, R. C., Ghosh, A. K. and Raychaudhuri, D. N., *Sci. Cult.*, 38 : 494-495.
1980. *Eutrichosiphum (Eutrichosiphum) arunachali*, Raychaudhuri, D. N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D. N., 330.
1980. *Eutrichosiphum (Eutrichosiphum) arunachali*, Chatterjee, M., Mondal, P. K. and Raychaudhuri, D. N., *Entomon*, 6 : 363-366.

*Apterous viviparous female* : Body elongate, 1.64-1.92 mm long and 0.90-1.20 mm as maximum width. Head brown, dorsum smooth, frons somewhat convex medially, with 4 spinal and 2 pleural long hairs on each side besides many short hairs, all with acute or acuminate apices. Antennae 5-segmented, 0.45-0.55 x as long as the body, basal segments I and II concolorous with head, segment III pale, rest of the flagellum dusky to brown, flagellum gradually more distinctly imbricated apicad ; flagellar hairs of variable lengths, with acute apices, longest ones 0.06-0.09 mm long ; processus terminalis 1.09-1.66 x as long as base of the last antennal segment. Rostrum reaching little beyond hindcoxae ; ultimate rostral segments 0.17-0.23 mm long and 2.11-2.33 x as long as second joint of hind tarsus, bearing 12 accessory hairs. Dorsum of abdomen concolorous with head, spinulose throughout ; dorsal hairs long and short, several on each tergite except 7th tergite with 3-5 and 8th tergite with 2 hairs, with acute or acuminate apices, longest ones on anterior tergites 0.03-0.07 mm long. Siphunculi brown to dark brown, slightly curved outward, 0.39-0.53 mm long and 0.24-0.28 x as long as body and 5.16-6.33 x as long as the maximum width, covered with many long hairs and spinules which become denser apicad. Cauda semioval, with 7-8 hairs. Femora and tibiae rather pale, tarsi slightly darker, hairs on tibiae and femora with acute apices ; first tarsal segments with 7 hairs each.

*Measurements in mm :*

	Length	width	Antenna
1.	1.81	1.20	0.93
2.	1.92	1.14	0.96
3.	1.77	1.07	0.97
4.	1.80	1.04	1.0
5.	1.88	1.08	0.97
6.	1.64	0.90	0.77
7.	1.74	0.96	0.78
8.	1.63	0.95	0.76

Antennal segments			urs	ht2	Siph.
III	IV	V			
0.42	0.13	0.11 + 0.16	0.21	0.10	0.50
0.50	0.15	0.12 + 0.13	0.23	0.10	0.53
0.44	0.13	0.10 + 0.16	0.21	0.09	0.47
0.49	0.15	0.11 + 0.12	0.21	0.10	0.52
0.40	0.15	0.11 + 0.17	0.19	0.09	0.46
0.33	0.10	0.09 + 0.13	0.19	0.09	0.41
0.33	0.09	0.10 + 0.14	0.18	0.08	0.39
0.32	0.09	0.09 + 0.15	0.17	0.08	0.40

(1-6, *Quercus* sp., Timbong, Sikkim, 19.x.1975, C.U. Colls ; 7-8, *Quercus* sp., Paksing, NEFA, Arunachal Pradesh, 20.ii.1971, C.U. Colls.)

*Alate viviparous female* : This morph is known by only one specimen from the type locality.

Body elongated, about 1.84 mm long and 0.80 mm as maximum width. Antennae 5-segmented, 1.35 mm long and 0.73 x as long as the body, slightly darker than head, segment III with 29-30 transversely oval accessory rhinaria arranged throughout the length of the segment; processus terminalis 1.46 x as long as base of the last segment, flagellar hairs long, with acute apices, the longest one 0.11 mm long and 5.33 x as long as basal diameter of the segment. Rostrum reaches hindcoxae; ultimate rostral segment acute, 0.40 mm long and 2.71 x as long as second joint of hind tarsus. Abdominal dorsum sclerotized with uniformly distributed minute spinules, dorsal hairs both long and short, with acuminate or acute apices, longest hairs on anterior tergites 0.08 mm long, 7th and 8th tergites with 3 and 2 fine hairs respectively. Siphunculi dark brown, with faint reticulation on the middle portion and with transverse rows of spinules from the very base to apex which are dense towards the apical-most portion, slightly curved outward, 0.08 x as long as body and 8.35 x as long as its maximum width; hairs on siphunculi long and fine. Cauda semioval, with 8 hairs. Legs concolorous with head; hairs on legs with acute apices; tibiae nearly smooth excepting the apical portion with some spinules, first tarsal segments with 7 hairs each. Wing venation normal. Otherwise as in apterous viviparous females.

*Measurements in mm:*

	Length	Width	Antenna
1.	1.84	0.80	1.35

Antennal segments			urs	ht <sub>2</sub>	Siph.
III	IV	V			
0.70	0.17	0.13 + 0.19	0.19	0.07	0.08

(1, *Quercus* sp. Paksing, NEFA, Arunachal Pradesh. 20.xi.1971, C.U. Colls.)

*Other morphs* : Not known.

*Materials examined* : 3 apterous viviparous females and 1 alate viviparous female (paratypes) from *Quercus* sp., Paksing, Arunachal Pradesh (NEFA), 20.ii.1971, Coll. R.C.Basu; 6 apterous viviparous females from *Quercus* sp., Timbong, Sikkim, 19.x.1975, Coll. P.K.Mondal.

*Discussion* : The species is distinguishable from all the known species under the genus in the possession of body hairs exclusively with acute or acuminate apices. Basu *et al.* (1972) described the species from eastern extremity of Himalaya. Subsequent collection of material from the himalayan hills of Sikkim while agrees in the typical characters of the species, showed longer body parts and shorter hairs (Table 8).

Table 8. Biometrical data of *E. arunachali* from Sikkim and Arunachal Pradesh.

Body parts	Sikkim (N = 6)		Arunachal Pradesh (N = 3)	
	min.	max.	min.	max.
L. body	1.64	1.92	1.30	1.74
L. Ant.	0.77	1.0	0.95	0.96
Ant. seg.				
III	0.33	0.50	0.32	0.33
IV	0.10	0.15	0.09	0.09
V (base)	0.09	0.12	0.09	0.10
V (p.t.)	0.13	0.17	0.14	0.15
u.r.s.	0.19	0.23	0.17	0.18
h.t.2	0.09	0.10	0.08	0.08
Siphunculi	0.41	0.53	0.39	0.40

*Biology* : The species infests *Quercus* sp. in its distribution range of eastern Himalaya and is known by viviparous morphs only. There have been

one collection each from the type-locality in Arunachal Pradesh and in Sikkim. More collections may bring out new facts about its polymorphic variation and life cycle status.

*Distribution* : India: Arunachal Pradesh, Sikkim.

*Types* : In the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

13. *Eutrichosiphum assamense* Ghosh, Basu and Raychaudhuri  
(Figs. 25c 28c)

1969. *Eutrichosiphum assamense*, Ghosh, A.K., Basu, R.C. and Raychaudhuri, D.N., *Oriental Ins.*, 3: 247.
1970. *Eutrichosiphum taoi*, Ghosh, A.K., Basu, R.C. and Raychaudhuri, D.N., *Oriental Ins.*, 4 : 68 (new syn.)
1980. *Eutrichosiphum garhwalense*, Maity, S.P. and Chakrabarti, S., *Annales Zoologici*, 35 : 307 (new syn.)
1980. *Eutrichosiphum (Eutrichosiphum) assamense*, and *Eutrichosiphum (Eutrichosiphum) taoi*, Raychaudhuri, D.N. and Chatterjee, M. In "Taxonomy of the aphids of north-east India and Bhutan" 330, 334.

*Apterous viviparous female* : Body pear-shaped, 1.78-2.31 mm long and 0.90-1.24 mm as maximum width in the middle of abdomen. Head smooth; dorsal cephalic hairs long, with blunt or acuminate apices. Antennae 5-segmented, pale with dusky apices; 0.76-1.15 mm long, 0.32-0.51 x as long as the body, gradually more distinctly imbricated apicad; flagellar hairs shorts and long, fine, longest one on segment III 0.07-0.09 mm long; processus terminalis 0.14-0.23 mm long, 1.06-1.64 x as long as base of the last antennal segment. Rostrum reaching little beyond hindcoxae; ultimate rostral segments somewhat obtuse, 0.23-0.30 mm long, 1.92-2.72 x as long as second segment of hindtarsus, segment 4 with 6-11 short accessory hairs. Abdominal dorsum sclerotised spino-pleurally, rest pale to pale brown; entirely smooth; dorsal hairs long and short, with blunt, furcated or a few of acuminate apices; longest hair on anterior tergites 0.08-0.10 mm long; venter of abdomen spinulose, densely so on the margins. Siphunculi pale yellow, constricted at bases and apices, slightly swollen in the middle; 0.40-0.55 mm long, 0.22-0.31 x as long as body and 3.40-4.60 x as long as its maximum width; densely spinulose, bearing long hairs mostly with acute and a few with furcated apices on basal  $\frac{1}{3}$ rd portion. Cauda transversely semi-oval with 7-8 long hairs. Legs pale; femora with spinules on the apical half; tibiae smooth.

*Measurements in mm:*

	Length	Width	Antenna
1.	1.78	0.90	0.78
2.	1.82	0.96	0.76
3.	2.01	1.09	broken
4.	1.94	1.03	0.91
5.	2.80	0.94	0.93
6.	2.85	1.10	0.94
7.	2.15	1.14	1.05
8.	2.20	1.17	1.02
9.	1.95	0.91	1.14
10.	1.99	0.97	1.06
11.	2.16	1.16	0.95
12.	2.15	1.11	0.93
13.	2.23	1.21	1.02
14.	2.07	1.04	1.08
15.	2.0	1.04	1.08
16.	1.98	0.98	1.03
17.	2.29	1.23	0.93
18.	2.08	1.05	0.91

Antennal segments			urs	ht2	Siph.
III	IV	V			
0.27	0.13	0.11 + 0.15	0.26	0.11	0.40
0.26	0.13	0.10 + 0.14	0.27	0.11	0.41
broken			0.29	0.11	0.50
0.34	0.14	0.13 + 0.16	0.28	0.11	0.46
0.31	0.15	0.13 + 0.20	0.30	0.11	0.50
0.31	0.16	0.16 + 0.20	0.26	0.13	0.51
0.42	0.17	0.16 + 0.17	0.23	0.12	0.53
0.40	0.17	0.15 + 0.17	0.23	0.12	0.51
0.33	0.13	0.16 + 0.24	0.27	0.10	0.58
0.30	0.40	0.15 + 0.22	0.27	0.12	0.57
0.34	0.13	0.13 + 0.20	0.28	0.11	0.48

0.36	0.15	0.13 + 0.19	0.28	0.11	0.53
0.40	0.15	0.15 + 0.19	0.23	0.12	0.55
0.40	0.18	0.14 + 0.23	0.24	0.10	broken
0.40	0.17	0.16 + 0.21	0.24	0.10	0.53
0.36	0.17	0.16 + 0.20	0.23	0.10	0.50
0.34	0.15	0.13 + 0.19	0.26	0.11	0.55
0.36	0.14	0.13 + 0.16	0.24	0.10	0.50

(1-4, *Quercus fenestrata*, Shillong, Meghalaya, 12.vii.1966, C.U. Colls.; 5-6, *Quercus* sp., Mussoorie, Uttar Pradesh, 22.ix.1966, B.M.Colls.; 7-8, *Quercus* sp., Manali, Himachal Pradesh, 18.v.1969, B.M. Colls.; 9-10, an indet. host, Mawphlong Forest, Khasi Hills, Meghalaya, 11.v.1973, Z.S.I.Coll., 11-13, *Quercus* sp., Elephant Falls, Meghalaya, 18.v.1973, Z.S.I. Colls.; 14-16, *Quercus* sp., Mussoorie, Uttar Pradesh, 26.v.1978, KU.Colls.; 17, *Quercus* sp., Mawphlong, Meghalaya 11.v.1979, Z.S.I. Colls.; 18, *Quercus* sp., Canchipur, Manipur, date ?, C.U.Colls).

*Alate viviparous female* : Body elongated, 2.12-2.50 mm long and 0.84-1.09 mm as its maximum width at the middle of abdomen. Head smooth. Antennae 5 or 6-segmented, dark brown; 1.54-1.61 mm long, 0.67-0.76 x as long as the body; flagellar hairs long, with acuminate or blunt apices, longest one on segment III about 0.10 mm long; segment III with 11-12 round to transversely oval accessory rhinaria all along its length; processus terminalis 0.30-0.34 mm long, 1.20-1.88 x as long as base of the last antennal segment. Rostrum reaching little beyond hindcoxae; ultimate rostral segments 0.24-0.25 mm long, 2.0-2.50 x as long as second segment of hindtarsus. Dorsum of abdomen with transverse sclerotic bands on all tergites, smooth; dorsal hairs short or long, with acuminate or blunt apices, shortest and longest ones on anterior tergites 0.04 and 0.10 mm long respectively; venter spinulose. Siphunculi dark brown, with spinular imbrications, cylindrical, 0.88-.93 mm long, 0.39-0.45 x as long as body and about 9.78 x as long as its maximum width. Cauda broadly oval, with 8 long hairs, distorted in the mounted specimen. Wing venation normal; forewings with pterostigma brown; Media twice-branched, much short of pterostigma; hindwings with 2 oblique veins.

*Measurements in mm*

	Length	Width	Antenna
1.	2.05	0.83	1.54

Antennal segments			urs	ht2	Siph.
III	IV	V			
0.54	0.23	0.18 + 0.34	0.25	0.11	0.61

(1, *Quercus* sp., Malki, Shillong, Meghalaya, 19.v.1977, Z.S.I. Colls.).

*Alate oviparous female* : Body 2.60 mm long and 1.06 mm as maximum width. Antennae 0.65 x as long as the body, longest and shortest hairs on segment III 4.90 x and 2.50 x as long as the basal diameter of the segment respectively; processus terminalis 1.5 x as long as base of last antennal segment. Ultimate rostral segments 2.60 x as long as the second segment of hindtarsus; 4th segment 6.50 x as long as the 5th segment. The longest hair on 3rd abdominal tergite 3.50 x as long as the basal diameter of 3rd antennal segment, the longest hair on 7th tergite 1.83 x and on 8th tergite 4.70 x as long as the mentioned diameter, respectively. Subgenital plate with numerous hairs. Other characters same as in alate viviparous female.

*Measurements in mm*

	Length	Width	Antenna
*1.	2.60	1.06	1.69

Antennal segments			urs	ht2	Siph.
III	IV	V			
0.51	0.26	0.21 + 0.38	0.26	0.10	1.13

(1, *Quercus* sp., Mussoorie, Uttar Pradesh, 30.vii.1977, K.U. Colls.)

(\* material not examined, from original description).

*Alate male*: Body 2.01-2.49 mm long and 0.72-0.84 mm as maximum width. Head pale, smooth. Antennae pale, 0.70-0.97 x as long as the body; longer hairs mainly on inner side, the longest and shortest hairs on segment III 2.55-3.15 x and 0.88-1.0 x as long as basal diameter of segment III, respectively; segment III with 2-6 secondary rhinaria distributed over basal 0.70 portion; processus terminalis 0.85-1.25 x as long as base of the last segment. Rostrum with 4th segment about 6.0-7.50 x as long as 5th segment. Abdomen with marginal and spino-pleural segmental patches on 2nd-6th tergites; both short and long dorsal hairs with acuminate apices, longest hair on anterior abdominal tergites 1.62-2.18 x and on 7th and 8th tergites 0.88-1.42 x and 2.27-2.59 x as long as basal diameter of 3rd antennal segment, respectively. Siphunculi pale brown, 6.60-8.34 x as long as its maximum width, at base 2.0-2.51 x, at middle 2.51 x, and at apex about 1.50 x as long as the middle diameter of hind tibiae. Clasper bifurcated, each with 18-23 long and short

hairs. Other characters as in alate viviparous female.

*Measurements in mm*

	Length	Width	Antenna				
*1.	2.49	0.84	1.75				
	Antennal segments			urs	ht2	Siph.	
	III	IV	V	VI			
	0.60	0.26	0.25	0.21 + 0.24	0.26	0.12	0.81

(1, *Quercus* sp., Trijuginarayan, Uttar Pradesh, 2.vi.1978, K.U. Colls.)

(\*material not examined, from original description)

*Material examined* : 4 apterous viviparous females from *Quercus fenestrata*, Shillong, Meghalaya, 12.vii.1966, Coll. S.Biswas; 2 apterous viviparous females from *Quercus* sp., Mussoorie, Uttar Pradesh, 22.ix.1966, Coll. S.K.David; 2 apterous viviparous females from *Quercus* sp, Manali, Himachal Pradesh, 18.v. 1969, Coll. K. Narayanan; 3 apterous viviparous females from *Quercus* sp., Elephant Falls, Shillong, Meghalaya, 18.v.1973 Coll. A.K.Ghosh; 5 apterous viviparous females and 1 alate viviparous female from *Quercus* sp., Malki, Shillong, 19.v.1977, Coll. K.Deb; 3 apterous viviparous females from *Quercus* sp., Churachandpur, Manipur, date unknown, Coll. D. Raychaudhuri (slide No. M. 914); 3 apterous viviparous females and 1 nymph from *Quercus* sp., Mussoorie, Uttar Pradesh, 26.v.1978, Coll. S.P.Maity; 1 apterous viviparous female from *Quercus* sp., Mawphlong, Meghalaya, 11.v.1979, Coll. Not known.

*Discussion* Raychaudhuri and Chatterjee (1980) separated *assamense* and *taoi* by the abdominal dorsum being completely smooth in *assamense* and medially so in *taoi*. Examination of a series of materials of the two species, including paratypes of *assamense*, reveals that abdominal dorsum is entirely smooth in all the specimens of the two species. Few spinules apparently seen in the margins of *taoi*, in fact, are evident in all the specimens of the two species examined and these represent those of the venter which has smaller spinules in the middle and conspicuous spinules in margins of abdomen.

Maity and Chakrabarti (1980) distinguished *garhwalense* from *taoi* by the longer processus terminalis and shorter hairs on 8th tergite in the former. However, these differences do not stand good on comparing the materials of the respective species in our possession. Specimens designated as *taoi* from its type locality show processus terminallis as long as to longer than the base of the last antennal segment (1.0-1.54). The specimens of the three species show remarkable similarities in having 5-segmented antennae in 3rd and 4th instar

nymphs, 5-or 6-segmented antennae in apterae viviparae and siphunculi somewhat flabby (wider at middle than at basal and apical regions). The respective descriptions of *assamense*, *taoi* and *garhwalense* overlooked the presence of some of the hairs with furcated apices in the basal 1/3rd region of siphunculi. In these and other characters, viz. ultimate rostral segments, second segment of hindtarsus, flagellum, cauda and body hairs, the specimens of the three species do not show any discontinuous variation and, therefore, considered here to represent one species, *assamense* with *taoi* Chakrabarti, Ghosh and Raychaudhuri as the senior synonym and *garhwalense* Maity and Chakrabarti as the junior synonym.

Apart from above, *assamense*, *khasyanum* and *blackmanum* n.sp. share similarity in the possession of some of the hairs with furcated apices at the basal region of siphunculi. However, *assamense* stands distant from both the later species in having ultimate rostral segments with slightly obtuse apex (against tapering and acute apices in *khasyanum* and *blackmanum* n.sp.) and shorter siphunculi.

*Biology* : The species lives a monoecious life cycle on *Quercus* spp. atleast in parts of its area of distribution from Himachal Pradesh in the North-west and Manipur in the North-east of India. Most of the specimens examined were collected during summer and autumn months. Both the sexual morphs occurred during the late summer in the hills of Uttar Pradesh. This suggests that the species might be laying eggs in early autumn.

*Distribution* India Himachal Pradesh, Manipur, Meghalaya, Uttar Pradesh.

*Types* : In the collections of the Entomology Laboratory, Department of Zoology, University of Calcutta, Calcutta, India.

#### 14. *Eutirchosiphum atini* Raychaudhuri and Chatterjee

(Figs. 25z-28z)

1977. *Eutrichosiphum* (*Neoparatrichosiphum*) *atini*, Raychaudhuri, D.N. and Chatterjee, M., *Sci & Cult.*, 43 : 536.

*Apterous viviparous female* : Body elongated oval, 1.54-1.74 mm long and 0.82-0.88 mm as maximum width. Head brown, smooth with long and short hairs having acuminate to slightly furcated apices. Antennae 6-segmented, 0.72-0.81 mm long and 0.42-0.52 x as long as body; segment III pale on basal 0.75 portion and rest of the flagellum dark brown, flagellum gradually and distinctly imbricated from apical part of segment III, rest smooth; flagellar hairs sparse, with acuminate or slightly furcated apices, longest hair on segment III 0.03-0.04 mm long and 1.30- 1.71 x as long as the basal diameter of the segment; processus terminalis 0.13-0.15 mm long and 1.08-1.25 x as

long as the base of the last antennal segment; Rostrum reaches upto about 2nd abdominal segment; ultimate rostral segment slender and subacute, 0.18-0.19 mm long and 1.80-1.90 x as long as second joint of hindtarsus, with 10-12 fine accessory hairs. Dorsum of abdomen sclerotised, smooth, dark brown excepting the slightly paler lateral portion, both long and short hairs thick and with furcated apices but short hairs with acuminate apices; longest hair on anterior tergites 0.03-0.06 mm long and 2.0-3.0 x as long as the basal diameter of 3rd antennal segment; 7th tergite with two spinal and two lateral hairs and 8th tergite with only two spinal hairs, these hairs nearly of equal lengths and similar to anterior dorsal ones. Siphunculi dark brown, without any reticulation, densely spinulose throughout, spinules present in transverse rows, curved outwards, 0.38-0.49 mm long and 0.22-0.28 x as long as body; hairs on the siphunculi thick and with acuminate or slightly frucated apices, the furcated hairs mostly restricted upto the basal half of siphunculi, longest hair 1.50-2.50 x as long as the basal diameter of the siphunculi, Cauda semi-oval, with only two hairs which also with slightly frucated apices. Legs nearly concolorous with the head, tarsi darker; hairs on legs with acuminate to acute apices; femora with spinulose striae on venter; tibiae smooth.

*Measurements in mm*

	Length	Width	Antenna
1.	1.54	0.80	0.81
2.	1.59	0.82	0.72
3.	1.72	0.84	0.78
4.	1.72	0.82	?
5.	1.74	0.88	?

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.24	0.10	0.12	0.12 + 0.15	0.19	0.10	0.42
0.18	0.07	0.10	0.12 + 0.13	0.18	0.10	0.39
0.19	0.09	0.12	0.12 + 0.15	0.19	0.10	0.44
0.16	0.09	0.10	0.10 + ?	0.18	0.10	0.38
0.25	0.11	0.13	?	0.19	0.10	0.49

(1-5, an indet, host, Jabbai, Mashobra, Simla, Himachal Pradesh, 30.vi.1971, C.U. Colls).

*Other morphs* : Not known.

*Material examined* 5 apterous viviparous females from an indet. host,

Jabbai, Mashobra, Simla, Himachal Pradesh, 30.v.1971, Coll. A.N.Choudhuri.

*Discussion* : Among its Congenerics, this species comes close to *E. assamense* in having u.r.s. subacute, dorsum of abdomen smooth, some of the tergal and siphuncular hairs thick and with furcated apices but differs from the later in having shorter u.r.s. and siphunculi densely spinulose throughout.

*Biology* : This species is so far known by its type specimens collected from an indet. host from the western Himalaya of India.

*Distribution* : India : Himachal Pradesh.

*Types* : In the collections of Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

15. *Eutrichosiphum betulae* Mondal, Chatterjee, and Raychaudhuri  
(Figs. 25d 28d)

1979. *Eutrichosiphum* (*Neoparatrichosiphum*) *betulae* Mondal, P.K., Chatterjee, M. and Raychaudhuri, D.N., *Entomon*, 4 : 77-80.

*Apterous viviparous female* : Body elongated, oval, pale brown, about 2.89-3.42 mm long and about 1.33-1.72 mm as maximum width. Head pale brown; dorsum smooth and with long fine hairs, 7 hairs on each side. Antennae 6-segmented, about 2.51-2.61 mm long and 0.78-0.85 x as long as the body; segments I, II and III concolorous with head, other segments brown; flagellum gradually distinctly imbricated apicad; segment III with shorter hairs on inner margin and longer hairs with acute apices on outer margin, the longest ones 0.19-0.20 mm long and 4.0-4.61 x as basal diameter of the segment, processus terminalis long, 2.74- 3.16 x as long as base of segment IV Rostrum long, reaching second abdominal segment; ultimate rostral segments (4 + 5 ) 0.30 mm long, 1.95-2.37 x as long as second joint of hind tarsus and bearing 10-14 accessory hairs. Abdominal tergum smooth, with many long and fine hairs having acuminate apices, a few with bifurcated or acute apices, the longest ones on anterior tergites 0.19-0.20 mm long and 5.20-5.46 x as basal diameter of antennal segment III. Siphunculi brown, slightly darker at apex, outwardly curved, 1.54-1.61 mm long and 0.45-0.51 x as long as body and 7.14- 11.0 x as long as its maximum width, covered with numerous long hairs, mostly having acute to acuminate apices, a few basal hairs with furcated apices. Cauda broadly oval with 8 long hairs. Femora pale and smooth, tibiae slightly darker; first tarsal segments with 7 hairs each.

*Measurements in mm*

	Length	Width	Antenna
1.	3.42	1.72	2.61
2.	3.15	1.52	?

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.65	0.36	0.40	0.28 + 0.77	0.30	0.15	1.61
0.65	0.34	0.42	0.26 broken	0.30	0.15	1.54

*Other morphs* : Not known

*Materials examined* : 2 apterous viviparous females from *Betula* sp., Phodang, Sikkim, 19.x.1975, Coll. P.K. Mondal.

*Discussion* : The species is easily distinguishable from its closest ally *E. raychaudhurii* Ghosh, A.K and majority of the other species under the genus in having very long processus terminalis and long and thin body hairs.

*Biology* : The species is known from its type locality in the eastern Himalaya and so far represented by apterous viviparous morph only.

*Distribution* : India : Sikkim.

*Types* : In the collections of Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

#### 16. *Eutrichosiphum blackmanum* Agarwala and Ghosh n.sp.

(Figs. 25e 28e)

1962. *Paratrichosiphum tattakanum assamensis*, Ghosh, A.K. and Raychaudhuri, D.N., *J. Asiatic Soc.*, 4 : 112, *Partim*.

*Apterous viviparous female* : Body pale brown, 1.89-2.49 mm long and 1.02-1.27 mm as maximum width. Head brown with many long hairs, with acuminate apices. Antennae concolorous with head, 6- segmented, 1.15-1.53 mm long and 0.55-0.63 x as long as body; flagellum gradually distinctly imbricated apicad, flagellar hairs long and short, longer ones on the inner margin and shorter ones mostly on the outer margin, longest hairs on segment III about 3.30 x as long as basal diameter of the segment; processus terminalis 0.21-0.31 mm long and 1.50-1.93 x as long as the base of last antennal segment. Rostrum reaching upto 1st abdominal tergite, long, slender and acute; ultimate rostral segments (4+5) 0.27-0.30 mm long and 2.25-2.50 x as long as second joint of hindtarsus, with accessory hairs. Dorsum of abdomen pale, sclerotized on spino-plural area of 2-4th tergites, smooth except for spinules seen on the margins; dorsal hairs long and short, occur intermingled, with acute, slightly blunt, furcated (bi-or multi-) apices; longest hairs on anterior tergites 0.09-0.10 mm long and about 3.0 x as long as basal diameter of 3rd antennal segment; 7th and 8th tergites each with 2 spinal hairs and about 3.0 x as long as the mentioned diameter. Siphunculi pale brown, curved outwards, 0.60-0.85 mm long and 0.29-0.35 x as long as body; spinulose throughout,

sparsely so on basal 1/4th and densely so on distal 1/3rd region; siphuncular hairs mostly long, some short, with acuminate, acute or furcated apices, the later type occurring on basal 1/3rd region. Cauda semioval, with 8-9 hairs. Legs pale, yellowish brown; femora faintly spinulose on the venter; tibiae smooth, without a distinguishable tuft of spines.

*Measurements in mm*

	Length	Width	Antenna
1.	2.44	1.21	1.36
2.	2.38	1.20	1.45
3.	2.35	1.05	1.50
4.	2.47	1.21	1.41
5.	2.49	1.27	1.53
6.	2.44	1.08	1.42
7.	1.89	1.02	1.15
8.	2.32	1.18	1.44
9.	2.47	1.09	1.39
10.	2.34	1.20	1.45

Antennal segments				urs	ht2	Siph
III	IV	V	VI			
0.49	0.19	0.25	0.16 + 0.31	0.28	0.12	0.82
0.48	0.19	0.25	0.18 + 0.28	0.28	0.12	0.82
0.45	0.19	0.24	0.18 + 0.28	0.28	0.12	0.84
0.43	0.16	0.22	0.16 + 0.28	0.28	0.12	0.85
0.48	0.19	0.24	0.18 + 0.28	0.30	0.12	0.79
0.39	0.19	0.24	0.18 + 0.27	0.27	0.12	0.82
0.36	0.13	0.18	0.15 + 0.23	0.30	0.12	0.60
0.45	0.19	0.22	0.15 + 0.27	0.27	0.12	0.79
0.42	0.18	0.22	0.15 + 0.28	0.30	0.12	0.79
0.46	0.19	0.22	0.15 + 0.27	0.27	0.12	0.82

(1-6, *Quercus* sp., Elephanta Falls, Khasi Hills, Meghalaya, 6.vi. 1973, Z.S.I. Colls.; 7-10, an indet. host, New Colony, Shillong, Meghalaya, 21.viii.1974, Z.S.I. Colls.).

*Other morphs* : Not known.

*Materials examined* : Holotype : apterous viviparous female from *Quercus*

sp., Elephanta Falls, Khasi Hills, Meghalaya, 6.vi. 1973 Coll. A.K. Ghosh; Paratypes : 7 apterous viviparous females and 3 nymphs, collection data similar to the hototype; 6 apterous viviparous females and 4 nymphs from an indet. host, New Colony, Shillong, Meghalaya, 21.viii. 1974, Coll. Sukla.

*Discussion* : Ghosh and Raychaudhuri (1962) distinguished *E. tattakanum assamensis* as distinct subspecies of *tattakanum* (Takahashi) from eastern Himalaya. Subsequently, Raychaudhuri and Chatterjee (1980) considered this subspecies as a synonym of *E. khasyanum* (Ghosh and Raychaudhur). After examining a number of specimens designated as *E. tattakanum* and *E. tattakanum assamense*, it is found that a part of this collection belongs to *khasyanum*, and another part of the rest is distinguished as a new species which is described here. The new species, *E. blackmanum*, agrees with *tattakanum* in general morphology but stands distinct in having some of the hairs on basal 0.33 portion of siphunculi with distinctly furcated apices in the apterous viviparous morph. In this and some other characters, the new species show resemblance with *E. khasyanum* but is distinguishable from the later in having longer processus terminalis and in the ratio of p.t./base (Table 9) besides the shape of the ultimate rostral segments which is tapering on distal half in *khasyanum* but not so in *blackmanum*.

Table 9 : Differences in the morphometry of *E. khasyanum* and *E. blackmanum*.

Body parts	<i>E. khasyanum</i> n = 5	<i>E. blackmanum</i> n = 10
P. t.	0.17- 0.19	0.23 - 0.31
p.t./base	1.09- 1.30	1.54-1.93

*Biology* : The new species forms part of a complex of greenideine species infestig oak trees in the eastern Himalaya, khasi hills in particular.

*Distribution* : India : Meghalaya.

*Types* : In the collections of Zoological Survey of India, Calcutta, India.

### 17. *Eutrichosiphum davidi* Raychaudhuri

(Figs. 25f - 28f)

1956. *Eutrichosiphum davidi*, Raychaudhuri, D.N. 1956. *Zool, verh, Leiden*, 31 : 11.

1980. *Eutrichosiphum (Eutrichosiphum) davidi*, Raychaudhuri, D.N. and Chatterjee M, In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N., 330.

*Apterous viviparous female* : Body elongated, 1.55-1.72 mm long and

0.80-0.86 mm as maximum width. Frons convex. Head smooth; dorsal cephalic hairs long and fine, 3 pairs in the middle besides a few laterad. Antennae 5-segmented, brown except segment III pale, 0.48-0.59 mm long and 0.30-0.36 x as long as body; segment III faintly imbricated on 0.66 portion, rest of the flagellum more distinctly imbricated; flagellar hairs long with nearly acute apices, longest hair on segment III 0.05 mm long and 2.10-2.20 x as long as basal diameter of the segment; processus terminalis 0.13-0.14 mm long, 1.62-1.90 x as long as the base of last antennal segment and 0.70-0.75 x as long as segment III. Rostrum reaching little beyond 2nd abdominal segment; ultimate rostral segments slender and acute, about 0.23 mm long and 2.55- 3.2 x as long as second joint of the hindtarsus, segment 4 6.50 x as long as segment 5, with 12-14 accessory long and fine hairs. Dorsum of abdomen sclerotized, pale brown to blackish brown and strongly spinulose; dorsal hairs long, thick and stiff, with normal acute apices, with short thin hairs occurring in between upto the 6th tergite; longest hair on the anterior tergites 0.05 mm long and 2.3-2.40 x as long as basal diameter of 3rd antennal segment, 7th tergite with 6 or more hairs of which 2 are much longer than the others, about 3.80-4.20 x as long as basal diameter of 3rd antennal segment; 8th tergite with only two hairs, about 4.20-4.70 x as long as the mentioned diameter. Siphunculi pigmented, with slightly darker apex, 0.25-0.30 mm long and 0.16-0.19 x as long as body, curved outwards, 4.20-4.40 x as long as its maximum width; hairs on siphunculi numerous and of two types, longer ones with finely drawn out apices and short ones thorny. Cauda with 8-10 very long and fine hairs. Legs pale; femora with spinulose transverse striae ventrally; tibiae almost smooth.

*Measurements in mm :*

	Length	Width	Antenna		
1.	1.55	0.80	0.48		
	Antennal segments		urs	ht2	Siph.
	III	IV	V		
	0.16	0.07	0.08+0.13	0.23	0.09
					0.25

(1, *Quercus* sp. Ootacmond; Karnataka, 21.v.1966, Z.S.I. Coll.).

*Alate viviparous female* : Body elongated, 1.70-2.05 mm long and 0.72-0.90 mm as maximum width. Head smooth, with very small frontal tubercles. Antennae 5-segmented; segment III with 15 transversely oval accessory rhinaria; longest hair on segment III 4.0 x as long as basal diameter of the

segment. Ultimate rostral segments about 0.19 mm long and 2.11-2.60 x as long as second joint of hindtarsus. Dorsum of abdomen brown, with faint pattern of wavy coalescing striae, sclerotised shield on 1-5th tergites; dorsal hairs mostly very short, longest hair on anterior tergites 0.80 x as long as the basal diameter of 3rd antennal segment, 7th tergite with two very long hairs, 3.40 x as long as the mentioned diameter. Siphunculi black, 0.56-0.79 mm long and 0.36-0.38 x as long as body, indistinctly reticulated or imbricated, slightly curved outwards; hairs on the siphunculi numerous, all with acute apices, longest hair 3.30 x as long as diameter of the siphunculi near their base, spinulose in distinct transverse rows on about distal 0.25 portion, a few more scattered ones basad of that area. Femora as dark as head, with spinulose transverse striae on ventral side; tibiae paler than femora, with the very bases and apices as dark as or darker than the apices of femora, almost smooth. Media twice-branched and hind wings with two oblique veins; otherwise as in apterous viviparous female.

*Measurements in mm :*

	Length	Width	Antenna			
1.	2.50	0.90	—			
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
—	broken			0.19	0.09	0.79

(1, Yellow Pan Water Trap, Kathmandu, Nepal, 9.vii.1965, B.M. Colls.)

*Other morphs* : Not known.

*Materials examined* : 1 apterous viviparous female from *Quercus serrata*, Ootacmond, Karnataka, 22.i.1955, Coll. S.K. David; 1 apterous viviparous female from *Quercus* sp., Ootacmond, Karnataka, 21.v.1966, Coll. S.K. David; 2 apterous viviparous females, 1 alate viviparous female and 1 nymph from unknown host, Ootacmond, Karnataka, 29.iii.1967, Coll. S.K. David; 1 alate viviparous female from YPT, Kathmandu, Nepal, 9.vii.1965, Coll. K.C. Sharma.

*Discussion* : This species is distinguishable from all other species known under the genus in possessing long, conspicuous and numerous spinules on the dorsum of thorax and abdomen in apterous viviparous female morph.

*Biology* : The species infests Oak tress in the area of distribution which extends from South-west of Nilgiri Hills to eastern and Central Himalayas in the north of the Indian subcontinent.

*Distribution* : India : Karnataka, Sikkim, Tamil Nadu; Nepal.

*Types* : In the collections of the Department of Entomology, The Natural History Museum, London.

18. *Eutrichosiphum dubium* (van der Goot)  
(Figs. 25g 28g)

1917. *Trichosiphum dubium*, van der Goot, P., *Rec. Indian Museum*, 13:178.  
 1929. *Greenida dubius*, Takahashi, R., *Trans. Nat. Hist. Soc. Formosa*, 19 : 527.  
 1931. *Holotrichosiphum dubium*, Takahashi, R., *Aphididae of Formosa*, 6 : 32.  
 1956. *Holotrichosiphon dubium*, Raychaudhuri, D.N., *Zool. Verh., Leiden*, 31 : 76.  
 1977. *Holotrichosiphon dubium*, Raychaudhuri, D.N., Chatterjee, M. and Raychaudhuri, D., *Oriental Ins.*, 11 : 286.  
 1980. *Holotrichosiphon dubius*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed.) Raychaudhuri, D.N., 352.

*Apterous viviparous female* : Body pear-shaped, 2.39-3.0 mm long and 1.02-1.82 mm maximum width. Head somewhat dark, smooth. Antennae 5- or 6-segmented, 1.20-1.56 mm long and 0.45-0.55, x as long as body; pale with basal segments as dark as head and with the very apex of segment V and the whole of segment VI blackish; flagellum imbricated from base to apex; longer hairs on segment III with subacute or acuminate apices, 0.07-0.12 mm long and 1.90-2.80 x as long as basal diameter of the segment; processus terminalis 0.24-0.32 mm long and 1.66-2.13 x as long as base of the last antennal segment. Rostrum reaching the middle of the body; ultimate rostral segments 0.32-0.41 mm long and 2.57-3.45 x as long as second joint of hindtarsus and with 18-24 accessory hairs of very different lengths. Dorsum of abdomen light brown to dark brown, paler in the middle, spinulose, but the spinules often indistinct and scattered, marginally almost smooth; long and short dorsal hairs numerous, intermingled, longer ones with subacute or acuminate apices, longest hair on anterior tergites about 0.13 mm long and 2.20-2.80 x as long as basal diameter of 3rd antennal segment, shorter ones much more numerous and thorny, about 0.4-0.54 x as long as the mentioned diameter; 7th tergite with a great many hairs of very different lengths, 8th tergite with only two thicker hairs, about 3.0 x as long as basal diameter of 3rd antennal segment. Siphunculi blackish-brown, with paler base, 0.63-0.86 mm long and 0.24-0.32 x as long as body and about 3.65-4.70 x as long as its maximum width, constricted at base and apex, slightly curved outwards at apex, indistinctly reticulated only at the very base on the underside; long and short hairs with acute, acuminate or bluntish apices occur intermingled over the entire length of the siphunculi;

spinules present from the very base to apex, becoming much longer near the apex. Cauda obtusely conical, with about 6-8 long and fine hairs. Legs brown; femora with transverse striae on the ventral side; tibiae smooth.

*Measurements in mm :*

	Length	Width	Antenna
1.	2.39	1.27	1.20
2.	2.63	1.50	1.20
3.	2.88	1.68	1.44
4.	2.90	1.82	1.45
5.	3.05	1.75	1.54
6.	3.03	1.79	1.54
7.	2.46	1.41	1.36
8.	2.71	1.54	1.42
9.	2.87	1.55	1.48
10.	3.00	1.73	1.56

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.38	0.14	0.14	0.13 + 0.24	0.32	0.11	0.63
0.40	0.16	0.10	0.13 + 0.24	0.33	0.10	0.64
0.61	0.15	0.11	0.13 + 0.26	0.38	0.11	0.86
0.61	0.16	0.11	0.13 + 0.26	0.37	0.12	0.86
0.70	0.21	—	0.15 + 0.26	0.41	0.14	0.77
0.73	0.21	—	0.15 + 0.25	0.40	0.14	0.80
0.50	0.25	—	0.14 + 0.28	0.36	0.13	0.80
0.55	0.26	—	0.15 + 0.29	0.36	0.14	0.85
0.67	0.21	—	0.15 + 0.32	0.39	0.14	0.73
0.57	0.34	—	0.17 + 0.31	0.38	0.14	0.77

(1-2, *Lithocarpus* sp., Suisha, Taiwan, 25.v.1929, B.M. Colls; 3-4, *Passania grifithii*, Lamlongi, Manipur, 29.ix.1971, C.U. Colls; 5-6 *Castanopsis* sp., Risa Colony, Shillong, Meghalaya, 27.ix.1972, Z.S.I. Colls.; 7-8, and indet. host, Garampani, Meghalaya, 10.xii.1975, Z.S.I. Colls.; 9-10, *Castanopsis* sp., Risa Colony, Shillong, Meghalaya, 27.iv.1977, Z.S.I. Colls.).

*Other morphs* : Not known.

*Materials examined* : 4 apterous viviparous females and 16 nymphs from

*Lithocarpus* sp., Suisha, Taiwan, 25.v.1929, Coll. R.Takahashi; 2 apterous viviparous females and 1 nymph from *Quercus dealbata* Lamlongi, Manipur, 29.ix.1971, Coll. T.K. Singh; 2 apterous viviparous females from an indet. host, Malki Reserve Forest, Shillong, Meghalaya, 28.x.1975, Coll. R.S. Giri; 2 apterous viviparous females and 4 nymphs from an indet. host, Jaintia Hills, Meghalaya, 10.xii.1975, Coll. S.K. Chandra; 2 apterous viviparous females and 12 nymphs from Malki, Shillong, Meghalaya, 8.vii.1976, Coll. K. Deb; 1 apterous viviparous female and 6 nymphs from *Quercus* sp., Laitkar Peak, Shillong, Meghalaya, 23.ix.1976, Coll. unknown, (Z.S.I. NO. 1056); 4 apterous viviparous females and 16 nymphs from *Castanopsis* sp., Risa Colony, Shillong, Meghalaya, 27.iv.1977, Coll. P.B. Thapa.

*Discussion* : This species is distinguishable from its close relatives *heterotrichum*, *rameshi* and *russellae* under the genus in having stouter siphunculi and flagellum imbricated throughout its length.

*Biology* : Not known.

*Distribution* : India : Meghalaya, Manipur, West Bengal; China, Taiwan.

*Types* : van der Goot deposited the type materials in the Indian Museum, Calcutta, but it was lost in a flood damage at Benaras, in course of evacuation (Raychaudhuri, 1956). Neotypes are in the collections of the Natural History Museum, London.

### 19. *Eutrichosiphum flavum* Takahashi

(Figs. 25h - 28h, 29n -30n, 32n)

1941. *Paratrichosiphum flavum*, Takahashi, R., *Rep. Govt. Agric. Res. Inst. Taiwan*, 78 : 8.
1956. *Paratrichosiphum flavum* Raychaudhuri, D.N., *Zool. Verh. Leiden*, 31 : 101.
1980. *Eutrichosiphum* (*Neopatrighosiphum*) *flavum*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N., 334.
1980. *Eutrichosiphum* (*Neopatrighosiphum*) *flavum*, Singh, T.K., Raychaudhuri, D., Raha, S.K. and Raychaudhuri, D.N., *Entomon*, 5 : 145.

*Apterous viviparous female* : Body orange yellow, elongated, 1.60- 2.35 mm long and 0.85-1.41 mm as maximum width. Head smooth, pale brown, dorsal cephalic hairs long and short, with acuminate apices. Antennae 6-segmented, concolorous with head except distal 2 segments dusky, 0.55-0.82 mm long and 0.37-0.45 x as long as body; flagellum gradually more distinctly imbricated apicad, flagellar hairs long and short, mostly with subacute to blunt and some with slightly bifid apices, longest hair on 3rd segment about 1.87 x as long as basal diameter of the segment; processus terminalis 0.10-0.15 mm

long and 0.90-1.20 x as long as base of the last antennal segment. Rostrum reaching the hindcoxae; ultimate rostral segments long and narrow, 0.26-0.29 mm long and 2.36-2.90 x as long as second segment of hindtarsus. Dorsum of abdomen sclerotized, smooth except a few spinules antero-laterally; dorsal hairs many, long and short occur intermingled, longer ones with acuminate or furcated apices, shorter ones with blunt or furcated apices; longest hairs on anterior tergites about 2.62 x as long as the basal diameter of 3rd antennal segment. Siphunculi short, yellow, 0.26-0.36 mm long, 0.15-0.19 x as long as body and about 2.86 x as long as its maximum width, spinulose throughout, spinules conspicuous and dense on distal half; without reticulation; siphuncular hairs long with acuminate apices except on the basal and distal parts which are slightly bifid apically, longer hairs longer than the maximum width of siphunculus. Cauda rounded with 10 long hairs. Legs pale; tibiae not striate, bearing 3 slender spines apically.

*Measurements in mm :*

	Length	Width	Antenna
1.	1.95	1.13	0.75
2.	1.98	1.13	0.74
3.	2.04	1.21	0.82
4.	2.00	1.27	0.82
5.	1.29	1.20	0.75
6.	1.83	1.07	0.77
7.	1.77	1.23	0.80

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.21	0.09	0.10	0.11 + 0.11	0.26	0.11	0.31
0.21	0.09	0.09	0.10 + 0.12	0.26	0.10	0.30
0.24	0.11	0.10	0.12 + 0.13	0.29	0.10	0.33
0.24	0.10	0.10	0.11 + 0.13	0.29	0.10	0.35
0.23	0.11	0.09	0.11 + 0.11	0.26	0.10	0.35
0.26	0.10	0.09	0.11 + 0.10	0.26	0.10	0.29
0.24	0.11	0.10	0.12 + 0.11	0.26	0.10	0.34

(1-2, *Quercus dealbata*, Shillong, Meghalaya, 12.v.1970, C.U. Colls.; 3-4, *Castanopsis* sp., Shillong, Meghalaya, 18.v.1973, Z.S.I. Coll.; 5-7 *Quercus* sp., Shillong, Meghalaya, 30.v.1974, Z.S.I. Coll.; 8-9, *Litsea khasiana*, Motinagar, Shillong, Meghalaya, 26.v.1975, Z.S.I. Coll.)

*Alate viviparous female* : No specimen of this morph was available for our examination. Therefore the description of this morph is reproduced below from Singh *et al.* (1980) :-

“Body about 2.01 mm long with about 0.93 mm as its maximum width. Head pale brown. Antennae 6-segmented, pale brown, about 0.67 x length of body ; segment IV faintly imbricated, rest of flagellum gradually more distinctly imbricated ; segment III with 40 large transversely elongated secondary rhinaria distributed irregularly over its entire length, segment IV with 8 such rhinaria also over its entire length ; processus terminalis about 0.83 x base of segment VI ; flagellar hairs with acute to acuminate apices, longest hair on segment III about 0.20 x b.d III. Rostrum reaches hindcoxae ; segments 4+5 of rostrum about 1.92 x h.t. 2 and segment 4 about 6.66 x segment V and with about 8 secondary hairs. Abdominal dorsum smooth and with a spino-pleural patch on segments II-IV besides marginal patches on each of segments I-V ; dorsal hairs long with finely drawn out apices ; longest hair on anterior tergites about 1.44 x on 7th tergite, about 2.44 x on 8th tergite and about 3.0 x b.d. III respectively. Siphunculi dark brown, about 0.62 x body, at base about 2.30 x, at middle about 3.50 x and at apex about 2.0 x middle diameter of hindtibiae ; hairs on siphunculi mostly long with finely drawn out apices. Cauda semioval with about 8 hairs. Legs pale brown excepting apical portion of tibiae and whole of tarsi which are more dark ; femora with ventral spinulose striae ; tibiae smooth excepting spinulose apical portion, wing venation normal.”

*Measurements in mm :*

	Length	Width	Antenna			
1.	2.01	0.93	1.36			
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.57	0.19	0.16	0.16+0.15	0.21	0.11	0.62

(1, *Quercus* sp., Tuyangwaichong, Manipur, 19.vi.1974, C.U.Coll.)

*Alate oviparous female* : Body about 2.15-2.14 mm long and 0.92- 1.02 mm as maximum width. Head smooth; dorsal cephalic hairs long, with acuminate apices, 6 on each side. Antennae concolorous with head, 6-segmented, 1.07-1.34 mm long and 0.44-0.58 x as long as body ; flagellar hairs both long and short, longest hair on segment III about 1.88 x as long as basal diameter of the segment ; processus terminalis 0.13-0.15 mm long and 0.92-

0.94 x as long as basal part of the last antennal segment. Ultimate rostral segments 0.23-0.25 mm long and 2.30-2.50 x as long as second segment of hind tarsus. Dorsum of abdomen smooth, with marginal sclerotic patch on anterior tergites ; dorsal hairs long and short, with acuminate apices, longest and shortest hairs on anterior tergites 2.25-2.50 x and 1.12-1.25 x as long as basal diameter of 3rd antennal segment ; 8th tergite with 2 long and fine hairs, about 2.75 x as long as the mentioned diameter. Siphunculi somewhat club-shaped, smooth excepting distal 0.25 portion with spinulose transverse striae, 0.59-0.67 mm long, 0.26-0.27 x as long as body and 5.26-6.28 x as long as its maximum width. Cauda semi-oval, with 11-12 long and fine hairs. Subgenital plate transversely oval, with numerous hairs ; female genitalia well-developed. Legs dusky pale, without spinules or pseudosensoria. Wing venation normal. Otherwise as in alate viviparous female.

*Measurements in mm :*

	Length	Width	Antenna			
1.	2.29	0.97	1.34			
2.	2.41	1.02	1.07			
3.	2.15	0.92	1.15			
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.56	0.17	0.19	0.14 + 0.13	0.25	0.10	0.61
0.34	0.11	0.11	0.12 + 0.13	0.25	0.10	0.67
0.40	0.15	0.23	0.14 + 0.14	0.23	0.10	0.59

(1-3, *Litsea khasiana*, Shillong, Meghalaya, 26.v.1975, Z.S.I. Coll.)

*Other morphs* : Not known.

*Material examined* : 10 apterous viviparous females and 5 nymphs from *Quercus dealbata*, Shillong, Meghalaya, 12.v.1970, Coll. H. Banerjee ; 13 apterous viviparous females from *Castanopsis* sp., Elephanta Falls, Shillong, Meghalaya, 18.v.1973, Coll. A. K. Ghosh ; 4 apterous viviparous females and 3 nymphs from *Quercus* sp., Motinagar, Shillong, Meghalaya, 30.v.1974, Coll. M. S. Jyrwa, 3 apterous viviparous females and 9 nymphs from *Quercus* sp., Shillong, Meghalaya, 23.v.1974, Coll. M. S. Jyrwa ; 2 apterous viviparous and 3 alate oviparous females from *Litsea khasiana*, Motinagar, Shillong, Meghalaya, 26.v.1975, Coll. M. S. Jyrwa.

*Discussion* : Among its conspecifics under the genus, this species is easily distinguishable in having shorter processus terminalis and very short and thick

siphunculi. In India this species is so far known from parts of north-east India. Alate oviparous female is newly described here.

*Biology* : The collection records of the available materials suggest that this species infests plants of Fagaceae and Lauraceae in north-east India and Taiwan. However, the find of alate ovipara along with viviparous morphs on *Litsea khasiana* indicate that this host might be the 'main host' of the species.

*Distribution* : India : Manipur, Meghalaya; Indonesia, Taiwan.

*Types* : Probably deposited in Taiwan Agricultural Research Institute, Taipei (Taikoku), Taiwan.

20. *Eutrichosiphum jugeshwari* Singh, Raychaudhuri and Raychaudhuri  
(Figs. 25i-28i)

1979. *Eutrichosiphum jugeshwari*, Singh, T. K., Raychaudhuri, D. and Raychaudhuri, D. N., *Entomon*, 4 : 362.

*Apterous viviparous female* : Body elongated, 2.30-2.63 mm long and 0.92-0.99 mm as maximum width. Head pale brown and spinulose, anterior dorsal cephalic hairs long, posterior ones with bluntish to acuminate apices. Antennae 5-segmented, pale brown to brown, 1.19-1.32 mm long and 0.51-0.60 x as long as body ; flagellum more distinctly imbricated apicad, flagellar hairs with acuminate to bluntish apices, longest hairs on segment III 0.09 mm long and 1.80-2.80 x as long as basal diameter of the segment ; processus terminalis 0.19-0.21 mm long and 1.07-1.14 x as long as base of the last antennal segment. Rostrum reaching hindcoxae ; ultimate rostral segments 0.15-0.17 mm long and 1.53-1.70 x as long as second segment of hind tarsus, bearing 6 accessory hairs. Dorsum of abdomen pale, smooth in the middle and spinulose antero- laterally ; dorsal hairs short and long and mostly with furcated apices, longest hair on anterior tergites 0.06 mm long and 1.68- 2.30 x as long as basal diameter of 3rd antennal segment ; 7th and 8th tergites each with 2 rather stout hairs of acuminate apices, these about 3.0-3.54 x as long as the mentioned diameter. Siphunculi pale brown except the nearly black apex, spinulose, curved outwards, 1.11-1.20 mm long and 0.44-0.51 x as long as body and 6.91-10.0 x as long as its maximum width ; siphuncular hairs long with fine apices and a few shorter ones with similar apices, longest hairs 1.40-2.09 x as long as diameter of siphunculi at base. Cauda helmet-shaped, with 8 hairs. Legs pale; femora with faint spinulose striae ventrally on atleast distal 0.50 portion ; tibiae smooth, with a few rows of spinules near apex ; first tarsal chaetotaxy 7,7,7.

*Measurements in mm* :

	Length	Width	Antenna
1.	2.42	0.99	1.32

Antennal segments			urs	ht2	Siph.
III	IV	V			
0.53	0.24	0.19+0.21	0.17	0.10	1.20

(1, *Quercus* sp., Nungbi, Manipur, 11.xii.1972, C.U.Coll.)

*Other morphs* : Not known.

*Materials examined* : 1 apterous viviparous female and 1 alatoid nymph from *Quercus* sp., Nungbi, Manipur. 11.xi.1972, Coll. T. K. Singh.

*Discussion* : The species shows similarities with *E. quercifoliae* in having smooth median area on the dorsum of abdomen and in the ratio of siphunculus to body but can be distinguished from the latter by shorter u.r.s. and its ratio with h.t.2.

*Biology* : The species, known by apterous viviparous morph only, infests *Quercus* sp. in the area of its distribution which is so far known to be Manipur in north-east India.

*Distribution* : India : Manipur.

*Types* : In the collection of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

21. *Eutrichosiphum khasyanum* (Ghosh and Raychaudhuri)  
(Figs. 25j-28j, 29d-32d)

1962. *Paratrichosiphum* (*Neoparatrichosiphum*) *khasyanum*, Ghosh, A. K. and Raychaudhuri, D. N., *J. Asiat. Soc.*, 4 : 108.
1980. *Eutrichosiphum* (*Neoparatrichosiphum*) *khasyanum*, Raychaudhuri, D. N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhuan" (ed.) Raychaudhuri, D. N., 334.

*Apterous viviparous female* : Body pear-shaped, 1.86-2.47 mm long and 0.92-1.21 mm as maximum width. Head and thorax locally spinulose. Antennae pale, 5- or 6-segmented, 0.94-1.11 mm long and 0.38-0.57 x as long as body ; segments I and II slightly darker, basal half of segment III faintly imbricated, rest of the flagellum gradually more distinctly imbricated ; long and short hairs on flagellum occur intermingled, longer ones on the inner margin and shorter ones mostly on the outer ; longer hairs with acute or slightly acuminate apices and shorter ones with acute apices, longest hair on segment III about 0.10 mm long and 3.40 x as long as basal diameter of the segment ; processus terminalis 1.09-1.30 x as long as the base of last antennal segment. Rostrum reaching little beyond the hindcoxae; ultimate rostral seg-

ments long and tapering, 0.28-0.33 mm long and 2.53-3.0 x as long as second joint of the hindtarsus, with 10 fine accessory hairs. Dorsum of abdomen pale, sclerotized, without spinules, with numerous long and rather short dorsal hairs, these occur intermingled, the longer ones with acute or slightly furcated apices, longer hairs 3.10 x as long as the basal diameter of 3rd antennal segment ; shorter ones upto 0.84 x as long as the mentioned diameter ; 7th and 8th tergites each with two hairs of acute or acuminate apices, these about 3.0 x as long as the basal diameter of 3rd antennal segment. Siphunculi pale brown, with slightly darker apices, 0.52-0.60 mm long and 0.23- 0.31 x as long as body, constricted at base and apex, curved outwards and with no trace of reticulation ; long and short hairs occur intermingled, long hairs with acute apices, while short ones with acuminate apices except a few near the base with slightly furcated apices ; longest hair 2.0-2.10 x as long as the diameter of the siphunculi at base ; acute spinules present in distinct transverse rows on apical 0.20 portion and more dispersed over the rest of the surface. Cauda obtuse, with nine hairs. Legs pale, yellowish brown ; femora faintly spinulose, with transverse striae on the ventral side ; tibiae smooth, without any apical tuft of spine.

*Measurements in mm :*

	Length	Width	Antenna
1.	2.47	1.18	0.94
2.	2.38	1.21	1.06
3.	1.89	1.20	1.09
4.	2.10	1.20	1.06
5.	2.35	1.15	1.05

Antennal segments			urs	ht2	Siph.
III	IV	V			
0.37	0.15	0.13+0.17	0.30	0.12	0.58
0.45	0.16	0.15+0.18	0.28	0.12	0.60
0.45	0.19	0.15+0.19	0.33	0.12	0.60
0.42	0.18	0.16+0.19	0.30	0.10	0.52
0.42	1.18	0.16+0.18	0.30	0.12	0.57

(1-5, *Quercus* sp., Malki, Shillong, Meghalaya, 19.v.1977, ZSI. Coll.)

*Alate viviparous female* : Body brown, 2.05 mm long and 0.84 mm as its maximum width. Dorsum of head deep brown, smooth, with 8 long hairs each arranged antero-posteriorly in two rows in the spinal region, these with acute or acuminate apices. Antennae concolorous with head, 6-segmented, 1.38 mm long and 0.67 x as long as body ; flagellum more distinctly imbricated apicad,

segment III with 11 somewhat transversely oval accessory rhinaria distributed along the almost entire length ; flagellar hairs long and short, longer ones on the inner side, longest ones on segment III about 0.10 mm long and about 4.0 x as long as the basal diameter of the segment ; processus terminalis 0.27 mm long and 1.50 x as long as base of the last antennal segment. Rostrum reaching the abdomen ; ultimate rostral segments long, sword-like, 0.26 mm long and 2.50 x as long as second segment of hindtarsus, with 6-7 short fine hairs. Dorsum of abdomen smooth, wrinkled, ventrum spinulose ; transverse deep brown bands extending from margin to margin of 1-6th tergites ; 7th and 8th tergites with sclerotic patches ; dorsal hairs thin and fine, on anterior tergites about 0.12 mm long and about 1.50 x as long as basal diameter of 3rd antennal segment ; 7th and 8th tergites each with 2 long spinal hairs, about 3.33 x as long as the mentioned diameter. Siphunculi brown, cylindrical on basal half and somewhat swollen on distal half, 0.84 mm long, 0.40 x as long as body and about 9.50 x as long as its maximum width ; with spinular imbrications throughout, densely so near the apices ; siphuncular hairs mostly long, with acute to acuminate apices. Cauda semi-oval, with 6-7 long and fine hairs. Femora and tibiae smooth, somewhat scabrous on dorsum, spinulose on venter ; tibiae with a tuft of spine-like hairs near the apices. Wing venation normal ; Media-twice branched ; hindwings with two oblique veins.

*Measurements in mm :*

	Length	Width	Antenna			
1.	2.05	0.84	1.38			
Antennal segments				urs	ht <sub>2</sub>	Siph.
III	IV	V	VI			
0.52	0.19	0.24	0.18+0.27	0.26	0.10	0.84

(1, *Quercus* sp., Malki Shillong, Meghalaya, 19.v.1977, Z.S.I.Colls.).

*Other morphs* : Not known.

*Materials examined* : 5 apterous viviparous females and 1 alate viviparous female from *Quercus* sp., Malki, Shillong, Meghalaya, 19.v.1977, Coll. K. Deb.

*Discussion* : Ghosh and Raychaudhuri (1962) described the species under a new subgenus *Neoparatrichosiphum* in view of siphunculus possessing some of the hairs with furcated apices near the bases. Since than *E. assamense*, *E. tattakamum assamense* and *E. raychaudhurii*, all infesting *Quercus* spp., have also been recognised possessing similar siphunculi. However, *E. khasyanum*

stands distinct from these species in a combination of characters like the shorter processus terminalis (longer in *E. tattakanum assamense*), longer and tapering ultimate rostral segments (shorter and semi-obtuse in *E. assamense*) and few furcated hairs restricted to basal 0.33 region of the siphunculi (furcated hairs many and distributed beyond basal half of siphunculi in *E. raychaudhuri*). Alate viviparous morph is described here for the first time.

**Biology :** This species is known by the viviparous morphs only and infests oak trees in the Himalayas of central and eastern India and Nepal.

**Distribution :** India : Arunachal Pradesh, Meghalaya, Uttar Pradesh , Nepal.

**Types :** In the collections of the Zoological Survey of India, Calcutta.

**22. *Eutrichisophum litseae* Raychaudhuri, Raha and Raychaudhuri  
(Figs. 25k-28k)**

1977. *Eutrichisophum* (*Neoparatrichosiphum*) *litseae*, Raychaudhuri, D. N., Raha, S. K. and Raychaudhuri, D., *Entomon*, 2 : 72.

**Apterous viviparous female :** Body pear-shaped, 1.55-1.81 mm long and 0.90-1.07 mm as maximum width. Head pale brown, dorsal hairs with acuminate to slightly furcated apices. Antennae 6- segmented, pale except the basal 2 segments, the very apex of segment V and whole of segment VI slightly darker, 0.56-0.62 mm long and 0.33-0.40 x as long as body ; flagellum imbricated ; flagellum with long and short hairs occur intermingled and with acuminate apices ; processus terminalis 0.08-0.09 mm long and 0.79-1.0 x as long as the base of the last antennal segment ; Rostrum reaches upto first abdominal segment ; ultimate rostral segments 0.22-0.24 mm long and 2.30-2.66 x as long as second joint of hindtarsus, bearing 6 accessory hairs. Dorsum of abdomen pale and smooth ; dorsal hairs many, long and short hairs occur intermingled, these with acuminate to furcated apices ; longest hair on anterior tergites 0.05-0.07 mm long and 2.25 x as long as the basal diameter of 3rd antennal segment ; 7th tergite with 7-8 hairs, 4 of these are appreciably longer, 8th tergite with 2 long and fine hairs. Siphunculi pale, cigar-shaped, without any reticulation and with long and short hairs, the shorter ones being near the base, both long and short hairs mostly with acuminate apices and a few near the base with slightly furcated apices, 0.23-0.26 mm long and 0.12-0.16 x as long as body. Cauda helmet-shaped, with 6 hairs. Legs pale brown, femora and tarsi slightly darker, femora with spinulose striae ventrally near the apices, tibiae smooth with 4 thick spiny hairs near apices.

**Measurements in mm :**

	Length	Width	Antenna
1.	1.66	1.00	0.56

2.	1.64	0.96	0.58
3.	1.81	1.07	0.62

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.16	0.06	0.06	0.09 + 0.08	0.22	0.09	0.23
0.17	0.06	0.06	0.10 + 0.09	0.23	0.10	0.23
0.19	0.07	0.08	0.09 + 0.09	0.24	0.09	0.23

(1-3, *Litsea sebifera*, Churachanpur, Manipur, 22.vi.1976, C.U. Colls.).

*Other morphs* : Not known.

*Materials examined* : 3 apterous viviparous females and 5 nymphs from *Litsea sebifera* (Lauraceae), Churachanpur, Manipur, 22.vi.1976, Coll. D. Raychaudhuri.

*Discussion* : From all the species under the genus, possessing some of the hairs on siphunculi with furcated apices, *litseae* stands distinct in having processus terminalis shorter than the base of the last antennal segment besides other differences at the morphometrical level as provided in the key.

*Biology* : The species is so far known from its type-specimens collected from *Litsea sebifera*.

*Distribution* : India : Manipur.

*Types* : In the collections of Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

### 23. *Eutrichosiphum makii* Raychaudhuri and Chatterjee (Figs. 25 1-28 1, 29e-30e, 32e)

1974. *Eutrichosiphum (Eutrichosiphum) makii*, Raychaudhuri, D. N. and Chatterjee, M., *Kontyu.* 42 : 122.
1976. *Eutrichosiphum makii*, Ghosh, A. K., *Oriental Ins.*, 10 : 40.
1980. *Eutrichosiphum (Eutrichosiphum) makii*, Raychaudhuri, D. N. and Chatterjee, M. In "Taxonomy of the aphids of north-east India and Bhutan" (ed.) Raychaudhuri, D. N., 331.

*Apterous viviparous female* : Body pear-shaped, about 1.50-1.89 mm long and 0.81-1.11 mm as maximum width. Head smooth, with the anterior half pale brown and posterior half dark brown. Antennae 5-segmented, segments I and II

brown, segment III and basal 0.50 portion of segment IV pale and rest brown ; 0.98-1.25 mm long and 0.60-0.74 x as long as body ; flagellum gradually more distinctly imbricated distally, flagellar hairs long and short, longer ones with acute to acuminate apices and shorter hairs with bluntish apices, longest hair on antennal segment III about 3.30-3.90 x as long as basal diameter of the segment ; processus terminalis 1.58-2.30 x as long as the base of last antennal segment. Rostrum reaches upto 1st abdominal tergite ; ultimate rostral segments obtuse, 0.17-0.20 mm long and 1.40-1.80 x as long as second segment of hind tarsus, with 12 fine hairs. Dorsum of abdomen smooth, with a transverse band on 1st tergite, two partly broken to continuous longitudinal bands on the pleural area of 1-4 tergites and a solid blotch extending over 4-8 tergites, all these dark brown leaving the median area pale, four muscle plate- like structure present on posterior blotch , dorsal hairs long and short ; mostly with acuminate apices and a few longer ones with slightly furcated apices, longest and shortest hairs on anterior abdominal tergites about 4.20-4.40 and 0.55-0.61 x as long as basal diameter of 3rd antennal segment respectively ; 7th tergite with 2 long and stout hairs with acuminate apices besides 5 shorter hairs ; 8th tergite with only 2 long and fine hairs, longest hairs on 7th and 8th tergites 4.0-4.30 x and 3.30-3.80 x as long as basal diameter of 3rd antennal segment respectively. Siphunculi cigar-shaped, brown, without any reticulation, 0.55- 0.68 mm long, 0.29-0.41 x as long as body and 4.0-4.30 x as long as its maximum width ; siphuncular hairs mostly long and acute excepting a few shorter hairs with acuminate apices basad, longest hair about 1.90-2.60 x as long as the basal diameter of siphunculus. Cauda semi-oval, with 8 long and fine hairs. Legs pale brown ; femora with spinulose striae ventrally ; tibiae nearly smooth with very short and sparse spinules near the apices.

*Measurements in mm :*

	Length	Width	Antenna
1.	1.85	1.06	1.16
2.	1.96	1.10	1.18
3.	1.58	0.86	1.15
4.	1.78	0.99	?
5.	1.75	1.10	1.22
6.	1.89	1.11	?
7.	1.77	1.10	1.20
8.	1.72	1.08	1.25
9.	1.63	0.96	1.22

Antennal segments			urs	ht2	Siph.
III	IV	V			
0.37	0.18	0.15+0.32	0.20	0.12	0.55
0.39	0.18	0.13+0.30	0.20	0.12	0.60
0.37	0.18	0.17+0.29	0.18	0.10	0.56
0.44	0.17	broken	0.18	0.12	0.61
0.48	1.18	0.15+0.25	0.18	0.12	0.68
0.46	0.20	0.15+broken	0.18	0.12	0.68
0.46	0.18	0.15+0.25	0.18	0.12	0.68
0.46	0.18	0.17+0.29	0.18	0.10	0.63
0.44	0.18	0.17+0.27	0.18	0.10	0.68

(1-2, *Glochidion* sp., Wards lake, Shillong, Meghalaya, 26.viii.1970, C.U. Colls., 3-4, an indet. host, Botanic Garden, Shillong, Meghalaya, 9.x.1974, Z.S.I. Colls.; 5-7, *Litsea* sp., Botanic Garden, Shillong, Meghalaya, 12.ix.1974, Z.S.I. Coll. ; 8- 9, *Litsea* sp., Botanic Garden, Shillong, Meghalaya, 14.x.1974, Z.S.I. Coll.).

*Alate viviparous female* : Body 1.80-1.94 mm long and 0.72-0.77 mm as maximum width. Head and thorax brown. Antennae brown and 5- segmented, 1.50-1.70 mm long and 0.80-0.90 x as long as body ; flagellum feebly imbricated on segment III and gradually more distinctly imbricated apicad, segment III with 20-26 large oval accessory rhinaria distributed over entire length ; flagellar hairs long and acute, longest ones on segment III 5.90-6.80 x as long as basal diameter of the segment ; processus terminalis 0.34-0.39 mm long and 1.80-2.29 x as long as base of the last antennal segment. Ultimate rostral segments 0.17-0.18 mm long and 1.70-2.0 x as long as second segment of hind tarsus. Dorsum of abdomen smooth, dark brown with some intersegmental paler areas on 1-3 tergites ; dorsal hairs long and short, with fine apices, longer and shorter ones on anterior tergites 3.10-4.10 x and 1.10- 1.30 x as long as basal diameter of 3rd antennal segment. Siphunculi dark brown, 0.80-0.91 mm long, 0.44-0.50 x as long as body and 10.0-13.0 x as long as its maximum width , siphuncular hairs long, with acute apices, longest hair about 3.10-3.50 x as long as basal diameter of the siphunculus. Femora and tibiae nearly smooth. Wing venation normal. Otherwise as in apterous viviparous female.

*Measurements in mm* :

	Length	Width	Antenna
1.	1.85	0.75	1.59
2.	1.94	0.77	1.70

Antennal segments			urs	ht2	Siph.
III	IV	V			
0.68	0.20	0.17+0.39	0.17	0.10	0.86
0.72	0.27	0.20+0.36	missing	0.10	0.91

(1-2, *Litsea* sp., Botanic Garden, Shillong, Meghalaya, 14.x.1974, Z.S.I. Coll.).

*Other morphs* : Not known.

*Materials examined* : 4 apterous viviparous females from *Glochidion* sp., Wards lake, Shillong, Meghalaya, 26.viii.1970, Coll. S. Sarkar ; 4 apterous viviparous females and 4 nymphs from an indet. host, Botanic Garden, Shillong, Meghalaya, 9.x.1974, Coll. A. C. Sukla ; 3 apterous viviparous females from *Litsea* sp., 12.x.1974 and 3 apterous viviparous females, 5 alate viviparous females and 3 nymphs from *Litsea* sp., Botanic Garden, Shillong, Meghalaya, 14.x.1974, Coll. A. S. Sukla.

*Discussion* : This species is related to *E. minutum*, *E. pyri* and *E. tapatii* in having abdominal dorsum smooth but can be distinguished from these species by the characters as provided in the key to the identification of species under the genus.

*Biology* : The species has been collected mainly from *Litsea* spp. and known by its viviparous morphs only.

*Distribution* : India : Meghalaya, West Bengal.

*Types* : In the collections of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

**24. *Eutrichosiphum manaliensis* Agarwala and Ghosh n. sp.**  
(Figs. 25z1-28z1)

*Apterous viviparous female* : Body brown to dark brown, 1.81-1.86 mm long and 0.88-0.94 mm as maximum width. Frons without any prominence. Head smooth, dorsum with 2 antero-spinal, 1 median and 2 postero-lateral hairs on each side, these with blunt to acute apices, longest one about 1.78 x as long as the basal diameter of 3rd antennal segment. Antennae 6-segmented, 0.66-0.73 mm long and 0.35-0.40 x as long as body ; flagellum with segment III smooth except a few imbrications apicad ; flagellar hairs few, thick, with expanded or swollen apices, segment III with 4-6 longer hairs on the inner side and 2-4 smaller ones on the outer side, longest hair on segment III as long as the basal diameter of the segment ; processus terminalis 0.11-0.13 mm long and 1.10-1.30 x as long as base of the last antennal segment. Rostrum reaching hindcoxae ; ultimate rostral segments with obtuse apex, 0.17-0.20 mm long and

1.54-2.0 x as long as second segment of hindtarsus, segment 4 bearing 9-10 short fine accessory hairs. Dorsum of abdomen sclerotized, smooth, somewhat wrinkled pleurally ; dorsal hairs long and short, stiff, with blunt or furcated (bifid or multifid) apices, 10-12 longer hairs with 5-6 shorter hairs in between present on each of 1st-6th tergites, longest one on anterior tergites about 1.50 x as long as basal diameter of 3rd antennal segment ; 7th and 8th tergites with 4 and 2 long hairs respectively, those on 8th tergite with acute apices. Siphunculi dark brown, curved outward, with a broad base, a narrow apex and swollen medially, 0.36-0.40 mm long, 0.19-0.22 x as long as body and 2.70-2.78 x as long as its maximum width ; without any reticulation ; densely spinulose throughout ; siphuncular hairs long, thick, with furcated or acute apices. Cauda transversely oval, with 4-5 long hairs. Legs pale brown except tarsi somewhat darker and with spinulose striae on the inner margin of the apical half of femora.

*Measurements in mm :*

	Length	Width	Antenna
1.	1.84	0.89	0.66
2.	1.80	0.90	0.73
3.	1.86	0.94	0.70
4.	1.81	0.88	0.72

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.16	0.09	0.08	0.09 + 0.12	0.20	0.10	0.36
0.19	0.11	0.09	0.12 + 0.13	0.17	0.11	0.40
0.16	0.11	0.09	0.11 + 0.11	0.17	0.11	0.36
0.19	0.11	0.07	0.10+0.13	0.19	0.11	0.38

(1-4, *Betula utilis*, Manali, Himachal Pradesh, 18.v.1969, B.M. Colls.).

*Other morphs* : Not known.

*Materials examined* : 4 apterous viviparous females and 6 nymphs from *Betula utilis*, Manali, Himachal Pradesh, 18.v.1969, Coll. K. Narayanan.

*Discussion* : Four specimens of the new species were obtained from the collection of the Natural History Museum and marked as *Eutrichosiphum* / *Holotrichosiphum manaliensis* n. sp. During our extensive search of literature, we did not come across the published name of this species and, therefore, considering that it was nomen nudum, take opportunity to describe here for the first time. The species belongs to group of *Eutrichosiphum* species possessing

some of the siphuncular hairs with furcated apices. However, the new species is distinguishable from its congeners in having shorter p.t., u.r.s. with obtuse apex, segment III of antennae with very few hairs and with swollen apices and less number of tergal hairs on each segment.

*Biology* : The single collection of 4 apterous vivipara and 6 nymphs was collected from *Betula utilis* (Betulaceae).

*Distribution* : India : Himachal Pradesh.

*Types* : In the collection of the Natural History Museum, London.

25. *Eutrichosiphum manipurens* Singh, Raychaudhuri and Raychaudhuri  
(Figs. 25m-28m)

1979. *Eutrichosiphum manipurens*, Singh, T. K., Raychaudhuri, D. and Raychaudhuri, D. N., *Entomon*, 4 : 363.

*Apterous viviparous female* : Body 1.71-2.08 mm long and 0.90-1.0 mm as maximum width. Head pale, lateral frontal tubercles; with hardly developed dorsal cephalic hairs long and stout, with acuminate to bluntish apices. Antennae pale, 5-segmented, 0.88- 1.08 mm long and 0.46-0.59 x as long as body ; flagellum with short and long hairs, these with acuminate to bluntish apices, longest hairs on segment III 0.06 mm long and 1.78-2.36 x as long as basal diameter of the segment ; processus terminalis about 1.40-1.70 x as long as base of the last antennal segment. Rostrum reaching hindcoxae ; ultimate rostral segment 0.11-0.13 mm long and 1.32-1.48 x as long as second segment of hind tarsus, bearing 4 accessory hairs. Dorsum of abdomen pale, slightly rugose, without any spinules and with a brownish median patch extending on 2-4 tergites besides some scattered muscle plate-like structure arranged pleurally on 2-5 tergites ; anterior tergites each with 8-10 stout, stiff and sparse hairs of blunt apices, longest hairs 0.06 mm long and 1.30-1.38 x as long as basal diameter of 3rd antennal segment ; 7th tergite with 4 stout and stiff hairs, 1.64-2.18 x as long as basal diameter of 3rd antennal segment ; 8th tergite with 2 similar hairs, 2.16- 3.09 x as long as the mentioned diameter. Siphunculi pale brown, gradually becoming darker apicad so that distal 0.33 portion appears black, indistinctly reticulated with transverse hexagonal cells at base and with transverse rows of spinules, 0.71-0.83 mm long, 0.40-0.45 x as long as body and about 5.30-6.60 x as long as its maximum width ; siphuncular hairs mostly long and fine, a few shorter ones with similar apices. Cauda helmet-shaped; with 6-8 hairs. Legs pale, femora with spinules ventrally on distal 0.50 portion ; tibiae imbricated near apices.

*Measurements in mm :*

	Length	Width	Antenna			
1.	1.77	0.99	0.88			
	Antennal segments			urs	ht2	Siph.
	III	IV	V			
	0.45	0.15	0.14+0.20	0.11	0.08	0.71

(1, *Quercus* sp., Kangchup, Manipur, 13.xi.1971, C.U. Colls.)

*Other morphs* : Not known.

*Material examined* : 1 apterous viviparous female and 3 alatoid nymphs from *Quercus* sp., Kangchup, Manipur, 13.xi.1971, Coll. T K. Singh.

*Discussion* : The species show affinity with *E. subinoyi* in having a median brown patch on dorsum of abdomen and fewer number of stiff hairs on anterior tergites but can be distinguished from the latter in having median dorsal area of abdomen smooth and in other morphometrical differences.

This species also resembles *E. pyri* in having smooth abdominal dorsum and sparsely arranged hairs with blunt apices on anterior tergites but stands distinct by the presence of brownish median patch, longer and darker siphunculi and smaller ratio of u.r.s. to h.t.2.

*Biology* : The species, known by the apterous viviparous morph only, infests oak trees in its area of distribution which is so far known to be the Manipur in north-east India.

*Distribution* : India : Manipur.

*Types* In the collections of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

## 26 *Eutrichosiphum minutum* van der Goot

1916. *Trichosiphum minutum*, Goot, P. van der, *Rec. Ind. Mus.* 12 : 2.

1930. *Greenidea minuta*, Takahashi, R., *Trans. Nat. Hist. Soc. Formosa*, 20 : 325.

*Alate viviparous female* (described from literature) : Body 2.07 mm long and 0.86 mm as maximum width. Antennae 6-segmented, 1.98 mm long and nearly as long as body, segment III with about 20 broadly oval rhinaria. Siphunculi 1.53 mm long and 0.75 x as long as body and with many fine bristles. Cauda obsolete, without a small point at the apex. Wing venation as in *Greenidea* Schout. with Media II curved.

*Measurements in mm :*

		Length	Width	Antenna		
1.		2.07	0.86	1.98		
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.43	0.13	0.15	0.12 + 0.16	?	?	0.53

(1, from an unknown host, North-East India, *ca* 1430 m).

*Other morphs* : Not known.

*Material examined* : None.

*Discussion* : Goot (1916) described the species in brief. For want of a specimen, it is difficult to distinguish the species from its congeners. However, Eastop and Lambers (1976) have retained its taxonomic status. In possessing longer antennae and siphunculi, *E. minutum* seems to be a close relative of *E. alnicola* but might possibly be differing from the latter in having processus terminalis and body hairs shorter.

*Distribution* : North-East India.

*Types* : van der Goot deposited the type material in the Indian Museum, Calcutta. Raychaudhuri (1956) reported the loss of material due to the flood damage at Banaras, during evacuation.

**27. *Eutrichosiphum neoalnicola* Raychaudhuri, Ghosh and Das**  
(Figs. 25z2-28z2)

1980 *Eutrichosiphum* (*Paratrichosiphum*) *neoalnicola*, Raychaudhuri, D. N., Ghosh L. K. and Das, S. K., *Ins. matsum.*, 20 : 64.

*Apterous viviparous female* : "Body elongated, 1.66-2.10 mm long with 0.78-0.99 mm as its maximum width. Eyes large with distinct ocular tubercles. Head pale brown to dark brown, dorsal cephalic hairs long, about 0.13 mm long and about 3.4 x as long as basal diameter of segment III. Antennae 6-segmented, concolorous with head, about 0.50-0.60 x as long as body, segment III faintly imbricated ; processus terminalis about 1.30-1.60 x as long as base of last antennal segment and 0.70 x as long as segment III; flagellar hairs mostly long with incrassate apices, longest one on segment III about 2.60 x as long as basal diameter of the segment. Rostrum reaches almost upto middle of 2nd abdominal segment ; ultimate rostral segments about 2.10-2.50 x as long as second joint of hindtarsus, segment 4 about 7.50-8.50 x as long as segment 5, with 10 accessory hairs. Margins of pro-

meso- and metathoracic segments with fine spinules dorsally ; abdomen brownish, sclerotic and slightly wrinkled dorsally, ventrally with spinules only marginally ; dorsal hairs of various lengths, long hairs thick, with both fine and furcated apices, longest hair on anterior abdominal tergites about 3.0-3.50 x as long as basal diameter of segment III and shortest one about 1.0-1.50 x as long as the mentioned diameter ; 8th tergite with 2 fine hairs. Siphunculi brown, elongate, spindle-shaped, without reticulation but with spinules all over, 0.27-0.32 x as long as body, about 3.10-4.70 x as long as its maximum width ; width at base about 2.50, at middle about 3.20, and at apex about 1.80 x as long as middle width of hindtibiae ; siphuncular hairs numerous with finely drawn out apices, longest hair about 2.0 x as long as basal width of siphunculi and upto about 6.0 x as long as basal diameter of segment III. Cauda obtusely conical, with about 5 hairs. Legs concolorous with head except for darker tibiae and tarsi, femora smooth, with hairs having fine apices ; tibial hairs also with fine apices but the four apical ones thick and stout.

*Measurements in mm :*

	Length	Width	Antenna			
1.	1.66	0.78	0.97			
Antennal segment				urs	ht <sub>2</sub>	Siph.
III	IV	V	VI			
0.27	0.26	0.14	0.13 + 0.19	0.19	0.07	0.54

(1, *Quercus* sp., Nagwain, Himachal Pradesh, 7.vii.1970, C.U. Colls.)

*Other morph* : Not known.

*Material examined* : None.

*Discussion* None of the specimens of *E. neoalnicola* was available for our examination. Therefore, the description provided here has been reproduced from the publication of Raychaudhuri *et al.* (1980). This species was distinguished from *E. alnicola* in having p.t. and flagellar hairs shorter and stouter siphunculus beside more accessory hairs on rostral segment 4.

*Distribution* : India : Himachal Pradesh.

*Types* : In the collections of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

28. *Eutrichosiphum neotattakanum* Agarwala and Ghosh n. sp.  
(Figs. 25n-28n)

*Apterous viviparous female* : Body pale yellow to brown, 2.49-2.94 mm long and 1.42-1.59 mm as maximum width. Head brown, dorsum smooth locally spinulose on venter ; dorsal hairs long with acuminate or blunt apices, 8-9 hairs on each side. Antennae pale, 6-segmented, 1.23-1.63 mm long and 0.49-0.55 x as long as body ; flagellum more distinctly imbricated apicad, flagellar hairs short or long, on normal sockets, longer ones on the inner side with acute or slightly blunt apices, longest hairs on segment III 0.11-0.13 mm long ; processus terminalis 2.07-2.11 x as long as base of last antennal segment. Rostrum reaching upto 3rd abdominal segment; ultimate rostral segments elongated, 0.38- 0.43 mm long, with 8-10 short to moderately long accessory hairs and 3.17-3.58 x as long as second segment of hind tarsus. Dorsum of abdomen variably sclerotized, smooth ; spinulose throughout on the ventral surface ; dorsal hairs thick, many long, some short, with acuminate or slightly blunt apices, longest hairs on anterior tergites 0.11-0.13 mm long. Siphunculi brown, curved towards apex, spinulose throughout, bearing many long and a few short hairs, mostly with acuminate apices ; 0.60-0.80 mm long and 0.24- 0.27 x as long as body and 3.35-3.50 x as long as its maximum width. Cauda transversely oval, with 13-15 long hairs. Legs pale brown with faint imbrications.

*Measurements in mm* :

	Length	Width	Antenna			
1.	2.94	1.59	1.63			
2.	2.49	1.42	1.23			
3.	2.58	1.55	?			
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.53	0.17	0.20	0.17 + 0.36	0.43	0.12	0.80
0.34	0.13	0.18	0.13 + 0.27	0.41	0.12	0.60
0.41	0.11	0.21	0.14 broken	0.38	0.12	0.69

(1-2, *Castanopsis* Sp., Motinagar, Shillong, Meghalaya, 10.x.1974, Z.S.I. Coll., 3, *Quercus dealbata*, Happy Valley, Shillong, Meghalaya, 8.xii.1970, C.U. Coll.).

*Other morphs* : Not known.

*Materials examined* : Holotype : Apterous viviparous female from *Castanopsis* sp., Motinagar, Shillong, Meghalaya, 10.x.1974, Coll. M. S. Jyrwa ;

Paratypes 1 apterous viviparous female and 1 alatoid nymph, Collection data similar to the holotype ; 1 apterous viviparous female and 5 alatoid nymphs from *Quercus dealbata*, Happy Valley, Shillong, Meghalaya, 8.xii.1970, Coll. unknown ; slide no. PLA 3340.

*Discussion* The new species has *E. tattakanum* as its closest ally. The two species show many similarities in their morphology but long and narrow u.r.s. in the new species immediately distinguishes it from *tattakanum* and other congeneric species.

*Types* : In the collections of Zoological Survey of India, Calcutta, India.

### 29. *Eutrichosiphum nepalensis* Nomen Novum

1983. *Eutrichosiphum* (*Paratrichosiphum*) *alnifoliae* Das, B.C. and Raychaudhuri, D.N., *Rec. Zool. Surv. India*, Occ. Paper No. 51 : 44 (*Secondary Junior homonym*)
1958. *Paratrichosiphum alnifoliae* Tao, C.C., *J. agric. Res., Taipei*, 8:1
1976. *Eutrichosiphum alnifoliae* (Tao), Eastop, V.F. and Hill Ris Lambers, D., *Survey of the World's Aphids*, 197.

*Apterous viviparous female* : The following description is reproduced from Das and Raychaudhuri (1983) : "Body pale, about 3.18 - 3.48 mm long and 1.41 - 1.58 mm wide. Head smooth, frons convex, dorsal cephalic hairs long with subacute apices. Antennae 6-segmented, shorter than body; flagellum imbricated; flagellar hairs long with subacute apices, the longest one on segment III about 4.20 - 4.60 x b.d. III; secondary rhinaria absent; primary rhinaria ciliated; p.t. about 2.70 - 2.82 x base of segment VI. Mesothoracic furca stalked. Rostrum reaching beyond hindcoxae, segments 4 + 5 long, about 2.26 - 2.30 x h.t. 2, segment 4 about 6.50 - 7.00 x segment 5, with 8 secondary hairs, abdominal dorsum pale, smooth, except for some spinules on antero-lateral margin of anterior abdominal segments; hairs on dorsum long with subacute apices, a few with furcated apices, longest hairs on anterior tergites about 4.65 - 4.75 x b.d. III; 8th tergite with two long subacute hairs, these about 4.65 - 5.00 x b.d. III. Siphunculi long, cylindrical, spinulose, about 0.40 - 0.44 x body, slightly constricted at base and apex; hairs on siphunculi long with acute apices, longest one about 2.30 - 3.00 x basal diameter of siphunculi. Cauda semi-oval, 7 - 8 hairs. Legs pale, femora and tibiae with spinular imbrications, tibiae with a few stout thorn-like hairs arranged in longitudinal rows near the apices beside 4 similar hairs encircling the apices; F.T.C. 7,7,7"

*Materials examined at the time of original description* Holotype apterous viviparous female, Kirtipur, 9.x.1976; on *Alnus nepalensis*; 10 paratypes with the data same as holotype.

*Biological note* : Greenish insects were collected on the undersurface of leaves and tender shoots. Infestation was heavy and the leaves appeared slightly curled.

*Remarks* : This species comes close to *Eutrichosiphum* (*Paratrichosiphum*) *alnicola* (Basu) but differs in the following points: presence of thorny spine-like hairs near the apices of tibiae ; longest hairs on anterior abdominal tergites about 4.62 - 4.76 x b.d. III (vs 4.00 - 4.40); antenna about 0.73 - 0.83 x body (vs 0.51 - 0.57); p.t. about 2.70 - 2.82 x base of segment VI (vs. 1.90 - 2.20); rostral segments 4 + 5 about 2.26 - 2.30 h.t. 2 (vs. 1.90 - 2.10); siphunculi about 6.12 - 7.90 x maximum width (vs. 5.60 - 5.90); abdominal dorsum densely covered with thin and mostly non-furcated hairs (vs. dorsal hairs fewer and mostly with furcated apices).

*Discussion* : Tao (1958) described *alnifoliae* from Taiwan under *Paratrichosiphum*. Eastop and Lambers (1976) considered *Eutrichosiphum* and *Paratrichosiphum* as congeneric. The same view is followed here. Therefore *E. (Paratrichosiphum) alnifoliae* Das and Rarchaudhuri becomes a secondary junior homonym. This name is to be rejected following rules (Article 59, item C) of the Zoological Nomenclature and a new name, *nepalensis* (*nomen novum*) has been proposed here with the consent of the first author of the species.

### 30. *Eutrichosiphum pseudopasaniae* Szelegiewicz

(Figs. 25 o - 28 o, 29 f - 30 f, 32 e, 32 f)

1968. *Eutrichosiphum pseudopasaniae*, Szelegiewicz, H., *Annls. Zool. Warsz.*, 25 : 466.
1970. *Eutrichosiphum vandergooti*, Ghosh, A.K., Basu, R.C. and Raychaudhuri, D.N., *Oriental Ins.*, 4 : 65 (*misident.*)
1971. *Eutrichosiphum pseudopasaniae*, Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N., *Oriental Ins.*, 5: 211.
1973. *Eutrichosiphum takahashii*, Basu, R.C., Ghosh, A.K. and Raychaudhuri, D.N., *Proc. zool. Soc., Calcutta*, 26 : 95 (*new syn.*)
1974. *Eutrichosiphum pasaniae pseudopasaniae*, Raychaudhuri, D.N. and Chatterjee, M., *Indian J. Ent.*, 36 : 319.

*Apterous viviparous female* : Body pear-shaped, about 1.20 - 1.86 mm long with 0.69 - 1.02 mm as the maximum width. Head brown and smooth; front straight, without frontal tubercle ; dorsal cephalic hairs very long. Antennae 5-segmented, pale, 0.68 - 1.07 mm long and about 0.50 - 0.64 x as long as body; flagellum distinctly imbricated; flagellar hairs of various lengths, mostly with acute apices, the longest ones on segment III 0.06 - 0.10 mm long and 1.80 - 2.60 x as long as basal diameter of the segment; processus terminalis

0.13 - 0.20 mm long, about 1.30 - 1.88 x as long as the base of last antennal segment. Rostrum very long, pale, with black tip, reaching the middle of abdomen; ultimate rostral segment slender and acute, 0.17 - 0.23 mm long and 1.80 - 2.62 x as long as second joint of hind tarsus; segment 4 about 4.0 - 5.0 x as long as segment 5, with 12 - 14 fine accessory hairs. Tergum sclerotized, pale or only laterally brownish to blackish brown, spinulose; dorsal hairs both long and short, longer ones mostly with furcated or branched apices, rarely with normal acute apices; the longest hairs on anterior tergites 0.06 - 0.08 mm long and about 2.0 - 4.0 x as long as basal diameter of segment III; 8th tergite with 2 long hairs, with acute apices, upto 3.3 x as long as the mentioned diameter. Siphunculi brown, blackish at apex, curved outwards, densely covered with spinules arranged in rings, 0.34 - 0.67 mm long and about 0.22 - 0.37 x as long as body; siphuncular hairs numerous, all with acute apices, the longer hairs upto 0.12 - 0.19 mm long. Cauda with numerous spinulose striae. Femora smooth, sparsely spinulose ventrally; tibiae distinctly imbricated, hairs on tibiae upto 2.0 - 2.6 x as long as middle of the tibiae; first tarsal chaetotaxy 7,7,7.

*Measurements in mm :*

	Length	Width	Antenna
1.	1.68	0.93	0.97
2.	1.73	0.91	0.96
3.	1.52	0.90	0.88
4.	1.61	0.89	0.80
5.	1.57	0.87	?
6.	1.63	0.81	0.69
7.	1.28	0.69	0.73
8.	1.63	1.00	0.79
9.	1.71	0.98	0.82
10.	1.51	0.95	0.69
11.	1.62	1.02	0.85
12.	1.56	1.00	0.70
13.	1.50	0.90	0.68
14.	1.30	0.69	0.70
15.	1.20	0.70	0.70

Antennal segments			urs	ht <sub>2</sub>	Siph.
III	IV	V			
0.40	0.15	0.12 + 0.18	0.21	0.09	0.61
0.39	0.15	0.10 + 0.16	0.23	0.09	0.67

0.34	0.13	0.11 + 0.16	0.21	0.08	0.57
0.34	0.12	0.12 + 0.20	0.19	0.08	0.59
0.28	0.10	broken	0.17	0.08	0.41
0.26	0.09	0.10 + 0.14	0.20	0.10	0.37
0.29	0.09	0.10 + 0.16	0.19	0.10	0.42
0.34	0.10	0.09 + 0.15	0.20	0.09	0.46
0.32	0.10	0.10 + 0.15	0.19	0.09	0.46
0.29	0.09	0.09 + 0.13	0.18	0.09	0.36
0.37	0.13	0.09 + 0.17	0.19	0.09	broken
0.30	0.09	0.08 + 0.14	0.17	0.09	0.40
0.29	0.08	0.08 + 0.14	0.17	0.09	0.38
0.27	0.09	0.09 + 0.16	0.18	0.10	0.34
0.26	0.09	0.10 + 0.15	0.18	0.09	0.35

(1-3, *Castanopsis* sp., Thang Ha, Vietnam, 14.vi.1966, B.M. Coll., 4 - 5, *Glochidion*, sp., Shillong, Meghalaya, 24.ix.1969, C.U. Colls., 6 - 7, *Maesa indica*, Chaerrapunji, Meghalaya, 19.iv.1970, C.U. Colls., 8 - 13, *Castanopsis tribuloides*, Barapani, Meghalaya, 17.viii.1973, Z.S.I. Colls., 14 - 15, indet. host, Kongpikpi, Manipur, 16.i.1976, Z.S.I. Coll.).

*Alate viviparous female* : Body elongate, pear - shaped, 1.58 - 2.13 mm long and 0.61 - 0.85 mm as maximum width. Head pale brown, dorsum with many long hairs. Antennae 5-segmented, brown to dark brown with pale bases of segments IV and V; segment III with 12 - 25 elongated accessory rhinaria; flagellar hairs stiff, longer ones on segment III 0.06 - 0.10 mm long and about 3.0 x as long as basal diameter of the segment ; processus terminalis 0.17 - 0.20 mm long and 1.30 - 1.54 x as long as base of the last segment. Rostrum reaching beyond hindcoxae; ultimate rostral segments slender and acute, 0.18 - 0.25 mm long and 2.11 x as long as the second joint of hind tarsus, segment 4 4.0 - 5.12 x as long as segment 5. Dorsum of abdomen sclerotised, marginal sclerites distinct on 1 - 5th tergites; dorsal hairs with acute apices, those on anterior tergites 0.06 - 0.11 mm long and 0.66 - 1.0 x as long as basal diameter of antennal segment III; 8th tergite with 2 long hairs which are thrice as long as the mentioned diameter. Siphunculi dark brown, 0.63 - 0.96 mm long, 0.39 - 0.45 x as long as body and 9 - 10 x as long as its maximum width. Cauda pale, with 5 - 6 hairs. Legs pale brown, darker on apices of tibiae and whole of tarsi; distinct spinulose imbrications present on femora and near apices of tibiae. Wing venation normal; forewings with pterostigma dark and reaching upto one-third of radial sector.

*Measurements in mm :*

	Length	Width	Antenna		
1.	1.71	0.71	1.27		
2.	1.87	0.78	1.26		
Antennal segments			urs	ht2	Siph.
III	IV	V			
0.66	0.18	0.13 + 0.18	0.18	0.07	0.68
0.60	0.20	0.13 + 0.20	0.25	0.09	0.86

(1, indet. host, Shreemahal, Nepal, 15.v.1966, B.M. Coll.; 2, *Hibiscus rosa-sinensis*, Shillong, Meghalaya, 11.ix. 1969, C.U. Coll.).

*Other morph* Not known.

*Materials examined* : 3 apterous viviparous females from *Castanopsis* sp. Thang Ha, Vietnam, 14.vi,1966, Coll. R. Bielawski; 1 alate viviparous female from YPT, Shreemahal, Nepal, 15.v.1966, Coll. K.C.Sharma; 2 apterous viviparous females *Glochidion* sp., S.E.Falls, Shillong, Meghalaya, 24.ix.1969, Coll. R.C.Basu; 2 alate viviparous females from *Hibiscus rosa-sinensis*, Shillong, Meghalaya, Coll. R.C.Basu; 2 apterous viviparous females from *Maesa indica*, Cherrapunji, Meghalaya, 19.iv.1970, coll. not known (side no. A2131 of C.U.Coll.); 6 apterous viviparous females from *Castanopsis tripuloides*, Barapani, Meghalaya, 17.viii.1973, Coll. A.K.Ghosh; 2 apterous viviparous females and many nymphs from indet. host, Konogpikpi, Manipur, 16.i.1976, Coll. A.K.Ghosh.

*Discussion* : Raychaudhuri and Chatterjee (1974) compared materials of the species from India in relation to its closest ally *pasaniae* (Okajima). The two species are distinguishable in the ratio of segments 4 and 5 of the u.r.s. (Table 10). Considering this difference as of low value at the species level, Raychaudhuri and Chatterjee (op. cit.) treated *pseudopasaniae* as the subspecies of *pasaniae*.

We have examined the paratypes of *pseudopasaniae* from Vietnam and many materials of this species from India. We have also examined materials of *pasaniae* collected in China. Based on our study and the reported morphometrical data (cf. Raychaudhuri and Chatterjee, 1974), it appears that differences in the ratio of segments 4 and 5 of the u.r.s. of the two taxa are consistent. Moreover, populations of *pseudopasaniae* are now known from a wide distribution range Vietnam in the Far East to eastern, central and western Himalayas in the Middle East. Therefore, *pseudopasaniae* is considered here sensu Szelegiewicz (1968).

Basu *et al.* (1973) distinguished *takahashii* from *pseudopasaniae* by longer hairs on anterior tergites and by hairs on 7th tergite longer than those on 8th. However, in our comparison of the materials of the two taxa, including holotype of *takahashii*, did not show such distinctions (Table 10).

Table 10. Morphometrical data of some body parts of *pasaniae*, *pseudopasaniae* and *takahashii*.

Parts	<i>pasaniae</i>	<i>pseudopasaniae</i>	<i>takahashii</i>
u.r.s./h.t.2	2.0-2.11	1.80 2.62	2.37-2.42
u.r.s. 4/5	3.0-3.36	4.0-5.0	4.0
Longest hairs			
ant.seg.III	0.09	0.06-0.10	0.07-0.08
ant. terg.	0.06-0.07	0.05-0.07	0.06-0.08
7th terg.	0.08 0.10	0.06-0.10	0.08-0.10
8th terg.	0.08	0.06-0.10	0.08

*Biology* : The species is known by viviparous morphs only. Host range of the species include plants of Euphorbiaceae, Fagaceae and Guttiferac with majority of the available collections belonging to *Quercus* spp. and *Castanopsis* spp. (Fagaceae).

*Distribution* : India : Manipur, Meghalaya, Uttar Pradesh, West Bengal; Nepal, Vietnam.

*Type* : Holotype is in the collection of Research Institute of Pomology and Floriculture, Pomologiczna, Skierniewice, Poland. Some of the paratypes are deposited in the collection of The Natural History Museum, London.

### 31. *Eutrichosiphum pyri* Chakrabarti, Ghosh and Raychaudhuri (Figs. 25p - 28p)

1972. *Eutrichosiphum pyri*, Chakrabarti, S., Ghosh, A.K., and Raychaudhuri, D.N., *Oriental Ins.*, 6 : 389.

1980. *Eutrichosiphum (Eutrichosiphum) pyri* Raychaudhuri, D.N. and Chatterjee, M. In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N., 332.

*Apterous viviparous female* : Body pear-shaped, 1.68 - 2.04 mm long and

1.01 - 1.15 mm as maximum width. Head brown, longest hair on dorsum of head about 2.70 - 3.30 x as long as basal diameter of 3rd antennal segment. Antennae 5-segmented, with the very apex of segment IV and whole of segment V blackish-brown, rest coloured like head, 0.87 - 0.93 mm long and 0.43 - 0.51 x as long as body; segment III nearly smooth on basal half, rest of flagellum more distinctly imbricated apicad; flagellar hairs with bluntish to slightly expanded apices, longest hair on segment III 0.07 mm long and 2.20 - 3.0 x as long as the basal diameter of segment; processus terminalis 0.16 - 0.17 mm long and 1.20 - 1.50 x as long as the base of last antennal segment. Rostrum reaching slightly beyond hindcoxae, ultimate rostral segment 0.19 - 0.23 mm long and 1.90 - 2.40 x as long as the second joint of hindtarsus, with 6 - 8 accessory hairs. Dorsum of abdomen pale brown, smooth, short and long hairs occur intermingled, 14 - 15 hairs with blunt to slightly expanded apices per segment, longest hair on anterior tergites 0.07 - 0.08 mm long and 3.10 - 4.10 x as long as the basal diameter of 3rd antennal segment; 7th and 8th tergites each with 2 hairs with the apices similar to those on anterior tergites. Siphunculi slightly darker than head on basal 0.85 portion, rest almost black, cigar-shaped, curved outward at apex, 0.46 - 0.47 mm long, 0.23 - 0.27 x as long as body and 4.50 - 5.0 x as long as its maximum width; long and rather short hairs with acuminate to slightly blunt apices intermingled at least on the basal 0.66 portion, longest hair 2.0 x as long as the basal diameter of siphunculus. Cauda obtusely conical, with 6 hairs. Legs concolorous with head; femora smooth and without spinulose striae on venter but with fine granules on dorsum; long hairs on tibiae with finely drawn out apices but the rather shorter ones with apices similar to those on dorsum, the four tibial spines near apices not very different from other hairs.

*Measurements in mm :*

	Length	Width	Antenna		
1.	1.90	1.06	0.93		
2.	2.00	1.15	0.87		

Antennal segments			urs	ht2	Siph.
III	IV	V			
0.35	0.15	0.13 + 0.17	0.20	0.10	0.47
0.32	0.16	0.13 + 0.16	0.19	0.10	0.46

(1, *Pyrus communis*, Shillong, Meghalaya, 9.iv.1970. C.U. Coll., 2, an indet. host, Chaubatia, Uttar Pradesh, 13.iv.1970, C.U. Coll.).

*Other morphs* : Not known.

*Materials examined* : 1 apterous viviparous female from *Pyrus communis*, Shillong, Meghalaya, 9.iv.1970, Coll. H. Banerjee; 1 apterous viviparous female and 1 nymph from an indet. host, Chaubatia, Uttar Pradesh 13.iv.1970, Coll S.Chakrabarti.

*Discussion* : This species is characterised by the dorsum of abdomen smooth, tergal hairs short, distributed sparsely and with blunt to slightly expanded apices.

*Biology* : The species is so far known by its apterous viviparous morph only and recorded from *Pyrus communis* (Rosaceae).

*Distribution* : India : Meghalaya, Uttar Pradesh.

*Types* : In the collections of Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

32. *Eutrichosiphum quercifoliae* Raychaudhuri, Ghosh, Banerjee and Ghosh  
(Figs. 25 q - 28 q)

1973. *Eutrichosiphum* (*Eutrichosiphum*) *quercifoliae* Raychaudhuri, D.N., Ghosh, M.R., Banerjee, H. and Ghosh, A.K., *Kontyu*, 41 : 57.
1980. *Eutrichosiphum* (*Eutrichosiphum*) *quercifoliae*, Raychaudhuri, D.N. and Chatterjee, M. In "Taxonomy of aphids of north-east India and Bhutan (ed) Raychaudhuri, D.N., 332.
1981. *Eutrichosiphum* (*Eutrichosiphum*) *manoji*, Chatterjee, M., Mondal, P.K. and Raychaudhuri, D.N., *Entomon*, 6 : 363 (new syn).

*Apterous viviparous female* : Body 2.22 - 3.09 mm long and 0.96 - 1.38 mm as maximum width. Head pale brown, smooth; dorsal hairs many, long with acuminate to furcated apices. Antennae 5-segmented, 1.23 - 1.42 mm long, 0.51 - 0.65 x as long as the body, pale except the last segment which is brown; flagellum gradually more distinctly imbricated apicad; processus terminalis 1.17 - 1.70 x as long as the base of last antennal segment, flagellar hairs sparse, 0.09 - 0.11 mm long, incrassate to acute apices. Rostrum long, reaching upto 2nd abdominal segment; ultimate rostral segments slender and acute, 0.30 - 0.39 mm long, 3.0 - 3.80 x as long as second segment of hind tarsus and with 10 - 14 fine accessory hairs. Dorsum of abdomen pale, smooth except minute spinules present locally on anterior tergites; dorsal hair long and short, longer ones with furcated apices and shorter ones with acute or acuminate apices; longest and shortest hair on anterior tergites 0.11 and 0.07 mm long respectively, each of tergites 7 and 8 with 2 hairs and these about 2.70 - 3.40 and 3.0 - 3.70 x as long as the basal diameter of antennal segment

III respectively. Siphunculi pale, slightly curved near the apices, 1.07 - 1.37 mm long, 0.39-0.57 x as long as body and 6.90 - 8.60 x as long as its maximum width; siphuncular hairs mostly long and fine and a few shorter ones with acuminate apices, entirely spinulose, spinules denser towards apex. Cauda semi-oval, with 6 - 8 long and fine hairs. Legs concolorous with head, femora with spinulose striae ventrally; first tarsal segments bear 7 hairs each.

*Measurements in mm*

	Length	Width	Antenna
1.	2.54	1.03	1.39
2.	2.65	1.12	1.37
3.	2.46	0.99	1.28
4.	2.55	1.04	1.40
5.	2.66	1.30	1.42
6.	2.44	1.01	1.37
7.	3.09	1.29	1.35
8.	2.54	0.96	1.23
9.	2.51	1.00	1.23
10.	2.37	1.00	1.26

Antennal segments			urs	ht <sub>2</sub>	Siph.
III	IV	V			
0.55	0.23	0.17 + 0.29	0.30	0.09	1.20
0.57	0.23	0.17 + 0.28	0.30	0.10	1.17
0.55	0.23	0.17 + 0.27	0.33	0.10	1.02
0.55	0.24	0.16 + 0.30	0.32	0.10	1.18
0.60	0.24	0.15 + 0.25	0.39	0.12	1.37
0.49	0.36	0.17 + 0.20	0.36	0.10	0.96
0.60	0.25	0.15 + 0.18	0.37	0.12	1.37
0.53	0.20	0.15 + 0.23	0.30	0.09	1.15
0.53	0.20	0.15 + 0.23	0.33	0.10	1.20
0.54	0.23	0.15 + 0.23	0.36	0.10	1.07

(1 - 7, *Quercus* sp., Kamshi, Kalipmong, West Bengal, 3.xii.1970, C.U. Coll., 10, *Quercus* sp., Gangtok, Sikkim, 27.xi.1971, C.U. Coll.).

*Alate oviparous female* : Body elongated, 2.37 mm long with 0.84 mm as maximum width. Head brown; frons nearly straight. Antennae slightly darker

than the head, 0.69 x as long as the body; segment III with 28-29 large transversely oval secondary rhinaria distributed in a row over the entire length; flagellar hairs stout with acute apices. Ultimate rostral segments 0.29 mm long and as many times longer than second segment of hind tarsus, segment 4 4.80 x as long as segment 5, with 14 fine accessory hairs. Abdominal tergum sclerotised, pale, with scattered brownish patches, those on 2nd-4th tergites form solid blotch with irregular margins, with minute spinules anteriorly, laterally and posteriorly; dorsal hairs rather stiff and fine, longest hairs about 1.10 x as long as the basal diameter of antennal segment III; each of the 7th and 8th tergites with fine hairs of varied lengths, longest hair on 7th and 8th tergites about 1.6 x and 2.4 x as long as the mentioned diameter respectively. Siphunculus nearly cylindrical, long, brown with slightly darker distal half; faintly reticulated near base with minute scattered spinules excepting the apex where these are dense, about 0.53 x as long as body and about 13.3 x as long as the maximum width; siphuncular hairs long, stiff and fine. Cauda transversely oval, with about 6 long hairs. Genital plate extremely hairy ventrally, anal plate hairy but the hairs though long, less numerous. Legs brown with the apices of tibiae and tarsi darker; femora smooth with spinulose striae ventrally; tibiae smooth, with spinules on distal half, these gradually become longer apicad.

*Measurements in mm :*

	Length	Width	Antenna			
1.	2.37	0.84	1.64			
	Antennal segments			urs	ht2	Siph.
	III	IV	V			
	0.78	0.27	0.19 + 0.33	0.29	0.10	1.26

(1, *Quercus* sp., Mongpa, Darjeeling, West Bengal, 3.xii.1970, C.U. Coll.).

*Other morphs* : Not known.

*Material examined* : 2 apterous viviparous females (paratypes) and 2 nymphs from *Quercus* sp., Kameshi, Darjeeling, West Bengal, 3.xii.1970, Coll. M.R. Ghosh; 7 apterous viviparous females and 1 nymph from *Quercus* sp., Peshoke, Kalimpong, West Bengal, 11.xii.1970, Coll. M.R. Ghosh; 1 apterous viviparous female from *Quercus* sp., Gangtok, Sikkim, 27.xi.1971, Coll. M.R. Ghosh.

*Discussion* : Raychaudhuri *et al.* (1973) discriminated *quercifoliae* from *E. sinense* Raychaudhuri, 1956 and *E. shiicola* Takahashi, 1962 in having much longer rostral segments 4 + 5 in comparison to second segment of hind

tarsus. Chatterjee *et al.*(1981) discriminated *manoji* from *E. taoi* Ghosh, Basu and Raychaudhuri, 1970 in several characters.

We have examined the paratypes of *quercifoliae* and *manoji* but did not find any discontinuous variation in the morphometrics of the two species (Table 11). Apparently, authors of *manoji* described the species overlooking the existence of *quercifoliae*. Following law of priority, name *quercifoliae* is retained and *manoji* is considered as the synonym.

Table 11. Morphometrics of *E. quercifoliae* and *E. manoji*

Body parts	<i>E. quercifoliae</i>		<i>E. manoji</i>	
	Min.	Max.	Min.	Max.
L.body	2.46	2.65	2.37	2.56
L.ant	1.23	1.40	1.23	1.35
L. u.r.s.	0.30	0.35	0.36	0.38
L.h.t.2	0.09	0.10	0.10	0.10
L. siph.	1.02	1.20	1.07	1.20

*Biology* The species infests oak trees in the eastern Himalaya. Occurrence of alate oviparous female on *Quercus* sp. is suggestive of a possible monocious life cycle in the species.

*Distribution* India Sikkim, West Bengal.

*Types* : In the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

### 33. *Eutrichosiphum querciphaga* Chakrabarti and Maity

1980. *Eutrichosiphum* (*Paratrichosiphum*) *querciphaga*, Chakrabarti, S. and Maity, S.P. *Anal. Zoologici*, 35 : 97.

*Apterous viviparous female* : Body pale yellow, 1.84–2.10 mm long and 0.84–0.89 mm as maximum width. Head pale smooth, slightly wrinkled near the base of the antennae, dorsum with 16 hairs, these long and short, with acuminate to furcated apices. Antennae pale except the apices of segments IV, V and apical 0.50 portion of processus terminalis which are dusky, 1.17–1.26 mm long and 0.58–0.66 x as long as body; flagellum gradually and more distinctly imbricated towards the apices; flagellar hairs long and short, longer hairs with acute to flagellate apices, mostly on the inner surface and shorter

with blunt to acute apices on the outer surface of the flagellum, longest hair on segment III 0.08 - 0.11 mm long and 3.0 - 3.5 x as long as basal diameter of the segment; processus terminalis 0.23 - 0.26 mm long and 1.20 - 1.70 x as long as the base of last antennal segment. Rostrum long, reaching second abdominal segment; ultimate rostral segment 0.23 - 0.27 mm long and 2.09 - 2.45 x as long as the second joint of hindtarsus, with 6 accessory hairs. Dorsum of abdomen smooth, pale with a brown central patch extending on tergites 3 - 5; dorsal hairs long and stout, mostly with blunt or furcated apices; 7th tergite with 4 hairs, 2 long and 2 short; 8th tergite with 2 hairs, longest hair on anterior tergites 0.08 - 0.11 mm long and 3.1 - 4.0 x as long as basal diameter of the 3rd antennal segment, longest hair on 7th tergite 0.09 - 0.14 mm long and on 8th tergite 0.10 mm long. Siphunculi pale but dusky on apical 0.10 portion, curved outwards, sparsely spinulose near the base, rest densely spinulose, 0.66 - 0.69 mm long and 0.32 - 0.36 x as long as body and 5.0 - 6.0 x as long as its maximum width; hairs on siphunculi mostly long, a few basal shorter hairs, with furcated to acute apices. Cauda semioval, with 6 - 8 hairs. Subgenital plate with at least 8 hairs on the posterior margin and 4 hairs on the anterior margin. Legs pale brown to brown, hairs on femora and tibiae with acute or acuminate apices.

*Measurements in mm :*

	Length	Width	Antenna			
1.	1.93	0.85	1.18			
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.33	0.19	0.14	0.15+0.24	0.27	0.11	1.69

(1, *Quercus* sp., Mussoorie, Uttar Pradesh, 16.x.1976, K.U. Colls.).

*Other morphs* : Not known.

*Material examined* : 1 apterous viviparous female from *Quercus* sp., Mussoorie, U.P., 16.x.1976, Coll. S.P. Maity.

*Discussion* : This species shows some similarity with *E. manipurensis* in having central brown patch on the dorsum of abdomen, dorsal hairs stout with blunt apices and 7th tergite with 4 hairs. However, *E. querciphaga* differ from *E. manipurensis* in having longer u.r.s. and in the ratio of u.r.s./h.t.2.

*Biology* : This species is recorded by its apterous viviparous morph only and is known to infest *Quercus* sp. in western Himalaya.

*Distribution* : India : Uttar Pradesh.

*Types* : In the collections of Department of Zoology, University of Kalayani, West Bengal, India.

34. *Eutrichosiphum rameshi* (Raychaudhuri, Chatterjee and Raychaudhuri)  
(Figs. 25 r - 28 r)

1977. *Holotrichosiphon rameshi*, Raychaudhuri, D.N., Chatterjee, M. and Raychaudhuri, D., *Oriental Ins* 11 : 286.

*Apterous Viviparous female* : Body pear-shaped, 1.84 mm long and 1.03 mm as maximum width. Head smooth. Antennae 6-segmented, pale with last segment darker, 0.86 mm long and 0.42 x as long as body; flagellum basally smooth and distally distinctly imbricated, segmented III with 9-10 hairs with blunt apices, longest one is 0.07 mm long and 2.22 x as long as the basal diameter of the of the segment; processus terminalis 0.19 mm long, 1.72 x as long as base of last antennal segment and 0.81 x as long as segment III. Rostrum reaching upto 2nd abdominal segment; ultimate rostral segments 0.32 mm long and 3.50 x as long as second segment of hindtarsus. Dorsum of abdomen pale with sparse spinules on anterior tergites; dorsal hairs comparatively sparse, of very different lengths and with blunt or acuminate apices; longest hair on anterior tergites with acuminate apices, about 2.22 x as long as basal diameter of 3rd antennal segment; 7th and 8th tergites with 10 and 2 hairs respectively and longest ones of these about 2.22 x and 3.11 x as long as the mentioned diameter respectively. Siphunculi dark brown, constricted at base and apex, curved outwards, 0.38 mm long and 0.21 x as long as body, and about 3.0 x as long as its maximum width; short hairs intermingled with longer ones occur along the whole length of siphunculi; distinct transverse rows of spinules present from base to apex. Cauda semioval. Femora pale and with spinulose striae; tibiae slightly darker than femora and smooth.

*Measurements in mm* :

	Length	Width	Antenna			
1.	1.84	1.03	0.86			
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.23	0.08	0.12	0.12+0.19	0.32	0.09	0.38

(1, *Quercus dealbata*, Shillong, Meghalaya, 1.vii.1969, C.U. Colls.).

*Other morphs* : Not Known.

*Materials examined* : 1 apterous viviparous female and 2 nymphs from

*Quercus dealbata*, Shillong, Meghalaya, 1.vii.1969, Coll. R.C.Basu.

*Discussion* : This species differ from its close ally, *russellae* chiefly in having less number of flagellar and body hairs.

*Biology* : No information is available.

*Distribution* : India : Meghalaya.

*Type* : In the collections of Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

### 35. *Eutrichosiphum raychaudhurii* Ghosh

(Figs. 258 -28 s, 29g -30g, 31 f, 32g)

1969. *Paratrichosiphum* (*Neoparatrichosiphum*) *raychaudhurii* Ghosh, A.K., *Proc. Zool. Soc. Calcutta*, 22 : 224.
1974. *Paratrichosiphum* (*Neoparatrichosiphum*) *raychaudhurii*, Raychaudhuri, D.N. and Chatterjee, M., *Kontyu*, 42 : 124.
1980. *Eutrichosiphum* (*Neoparatrichosiphum*) *raychaudhurii*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan", (ed) Raychaudhuri, D.N. 335.

*Apterous viviparous female* : Body 2.0 - 2.45 mm long and 1.0 - 1.30 mm as maximum width. Head brown and spinulose. Antennae 5 or 6-segmented, 1.19 - 1.40 mm long, 0.55 - 0.66 x as long as body; flagellum pale on segments III, IV and basal half of V, rest blackish, gradually more distinctly imbricated from base to apex; processus terminalis about 1.62 - 2.20 x as long as the base of last antennal segment. Rostrum reaches a little beyond hindcoxae; ultimate rostral segments with obtuse apex, 0.19 - 0.22 mm long, 1.72 - 2.0 x as long as second segment of hind tarsus; segment 4 about 4.0 - 5.0 x as long as segment 5. Dorsum of abdomen sclerotized, yellowish brown, ventrally dark brown on disc of abdomen which appears like a shield leaving margins free; venter locally spinulose, densely so on the margins of abdomen; dorsal hairs long and short, occur intermingled, longer ones mostly with furcated apices, rest with acuminate apices, hairs on 7th and 8th tergites not clearly discernible but appears to be of same length as other longer hairs. Siphunculi yellowish brown, blackish along inner margins and at tip, 0.84 - 1.11 mm long, 0.35 - 0.45 x as long as body and 5.0 - 5.50 x as long as its maximum width at middle; constricted at base and apices, curved outwards, long and short hairs occur intermingled over entire surface, these with acute or furcated apices, longest hairs 2.33 - 2.50 x as long as basal diameter of siphunculus; spinulose throughout, densely so on apical one-third. Cauda semi-obtuse, with 9-hairs. Legs concolorous with body; femora dorsally with distinct but scattered

spinules, ventrally smooth; tibiae smooth with apical tuft of spines.

*Measurements in mm :*

	Length	Width	Antenna
1.	2.34	1.23	1.30
2.	2.20	1.11	1.28
3.	2.28	1.17	1.32
4.	2.29	1.15	1.19
5.	2.19	1.08	1.35
6.	2.45	1.30	1.40
7.	2.14	1.15	1.27

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.36	0.21	0.15	0.16 + 0.29	0.20	0.11	0.87
0.32	0.20	0.16	0.16 + 0.30	0.19	0.10	0.80
0.37	0.20	0.18	0.15 + 0.29	0.19	0.11	0.88
0.35	0.19	0.15	0.16 + 0.28	0.22	0.11	0.84
0.38	0.19	0.16	0.15 + 0.33	0.19	0.11	0.87
0.42	0.23	0.19	0.16 + 0.26	0.21	0.11	1.11
0.38	0.17	0.16	0.15 + 0.28	0.21	0.11	0.84

(1-3, *Alnus nepalensis*, Gangtok, Sikkim, 26.v.1970, C.U. Coll., 4-7, *A. nepalensis*, Shillong, Meghalaya, 11.v.1973, Z.S.I. Coll.).

*Alate viviparous female* : Body elongated, 2.28 - 2.61 mm long and 0.73 - 0.99 mm as maximum width. Head brown. Antenna 6-segmented, flagellum dark brown, 1.46 - 1.99 mm long and 0.64 - 0.76 x as long as body; flagellum distinctly imbricated apicad, segment III bearing 12 - 16 small to large, round to transversely oval accessory rhinaria distributed over the entire length excepting the very base and apex; flagellar hairs with acuminate apices, longest hair on 3rd antennal segment 0.13 mm long and 4.50 x the basal diameter of the segment; processus terminalis 0.26 - 0.33 mm long, 1.80 - 3.0 x as long as base of the last antennal segment. Rostrum reaches nearly the hindcoxae; ultimate restral segment 0.20 - 0.21 mm long and 1.75 - 1.80 x as long as second segment of hind tarsus, bearing 8 accessory hairs. Siphunculi dark brown, nearly cylindrical, 1.21 - 1.50 mm long, 0.53 - 0.57 x as long as body and about 11.10 x as long as its maximum width; siphuncular hairs all

long with acute apices, longest hair 2.50 x as long as basal diameter of the siphunculus. Cauda transversely semi-oval, with 6 hairs. Femora brown with the very base pale, nearly smooth, with scattered spinulose striae on venter; tibiae blackish brown, very indistinctly imbricated excepting near apex where imbrications are rather prominent. Wing venation normal; pterostigma extending upto basal 0.33 portion of the radial sector.

*Measurements in mm :*

	Length	Width	Antenna			
1.	2.61	0.99	1.99			
	Antennal segments			urs	ht <sub>2</sub>	Siph.
	III	IV	V	VI		
	0.63	0.28	0.25	0.18 + 0.37	0.21	0.12
						1.50

(1, an indet. host, Shillong, Meghalaya, 21.iv.1975, Z.S.I. Coll.)

*Alate oviparous female :* The only one specimen recorded of this morph was described by Singh *et al.* (1980). This specimen was not available for our examination. Therefore we reproduce here the original description :- "Body about 2.05 mm long with about 0.86 mm as maximum width. Head smooth, strongly sclerotized. Antennae dark brown, 6-segmented, about 0.70 x body, segments I and II smooth; flagellum gradually distinctly imbricated apicad; hairs on flagellum with acute to acuminate apices; longest one on segment III about 3.33 x b.d. III; segments III, IV and V with about 34, 7 and 1 subcircular rhinaria respectively. Rostrum long, reaching beyond midcoxae; u.r.s. with about 8 secondary hairs and about 2.93 x h.t.<sub>2</sub>; segment 4 about 6.72 x segment 5. Abdomen smooth with a large central sclerotic patch; dorsal hairs short and long with acute, acuminate or furcated apices, longest one on anterior tergites, 7th and 8th tergites being about 2.0 x, 2.33 x and 3.83 b.d. III respectively. Siphunculi dark brown, basally cylindrical followed by a swollen portion and then abruptly narrowed, with spinular imbrication on distal 0.50 portion, about 0.35 x body, at base about 2.33 x, at middle about 3.66 x and at apex 1.66 x middle diameter of hind tibiae; hairs on siphunculi with acute or acuminate apices. Cauda rounded, with many hairs. Subgenital and subanal plates with many fine hairs. Wing venation normal, M of forewings not reaching pterostigma."

*Measurements in mm :*

	Length	Width	Antenna
1.	2.05	0.86	1.44

Antennal segments				urs	ht <sub>2</sub>	Siph.
III	IV	V	VI			
0.54	0.18	0.19	0.16 + 0.23	0.26	0.09	0.16(?)

(1, *Alnus nepalensis*, Lamang, Manipur, 12.v.1979, C.U. Coll.)

*Other morphs* : Not Known.

*Materials examined* : 4 apterous viviparous females from *Alnus nepalensis*, Gangtok, Sikkim, 26.v.1970, Coll. A.K.Ghosh; 6 apterous viviparous females from *A. nepalensis*, Upper Shillong, Meghalaya, 11.v.1973, Coll. A.K.Ghosh; 1 alate viviparous female from an indet. host, Upper Shillong, Meghalaya, 20.iv.1975, Coll. A.K.Ghosh.

*Discussion* : This species resembles *E. assamense* and *E. khasyanum* in the possession of some of the hairs with furcated apices on siphunculi but can be easily distinguished in having more number of such hairs distributed beyond basal 0.50 portion of siphunculi besides morphomeric differences in body parts as provided in the key to the identification of species under the genus.

*Biology* : The species is known by viviparous morphs only and recorded by infesting *Alnus nepalensis* and *Quercus* spp. in the area of distribution.

*Distribution* : India : Meghalaya, Sikkim, Tamil Nadu, West Bengal.

*Types* : In the collections of Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

### 36. *Eutrichosiphum russellae* (Ghosh, Ghosh and Raychaudhuri)

(Figs. 25t - 28t, 29h-30h, 31g, 32h)

1971. *Holotrichosiphon russellae*, Ghosh, A.K., Ghosh, M.R., and Raychaudhuri, D.N., *Oriental Ins.*, 5 : 213.
1977. *Holotrichosiphon russellae*, Raychaudhuri, D.N., Chatterjee, M. and Raychaudhuri, D., *Oriental Ins.*, 11 : 287.
1980. *Holotrichosiphon russellae*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N., 353.

*Apterous viviparous female* : Body pale yellow to brown, 1.80 - 2.84 mm long and 1.20 - 1.68 mm as maximum width. Head brown, dorsum smooth, locally spinulose on venter; dorsal hairs long with acuminate or blunt apices, 8-9 hairs on each side. Antennae pale, 0.90 - 1.82 mm long and 0.49 - 0.55 x as long as body; segment III smooth except weakly imbricated at distal 1/4th region, rest of the flagellum more distinctly imbricated apicad; flagellar hairs

short or long, on normal sockets, longer ones on the outside with acute to slightly blunt apices, longest hairs on segment III 0.11 - 0.13 mm long; processus terminalis 0.22 - 0.31 mm long and 1.46 - 2.30 x as long as the base of last antennal segment. Rostrum reaching upto 3rd abdominal segment; ultimate rostral segment elongated, tapering towards apex, 0.33 - 0.38 mm long and 2.73 - 3.66 x as long as second segment of hindtarsus. Dorsum of abdomen variably sclerotized, smooth, spinulose throughout on the ventral surface, dorsal hairs thick, many long, some short, with acute, acuminate or slightly blunt apices, longest hairs on anterior tergites 0.07 - 0.12 mm long and about 3.0 - 3.33 x as long as basal diameter of 3rd antennal segment; 8th tergite with 2 spinal hairs of similar lengths. Siphunculi curved outwards, spinulose throughout, without, apical or basal constrictions, bearing many long and a few short hairs, mostly with acuminate apices; 0.50 - 0.70 mm long and 0.23 - 0.28 x as long as body and 3.55 - 3.50 x as long as its maximum width. Cauda transversely oval, with 13-15 long hairs. Legs brown; tibiae darker than femora, with faint imbrications.

*Measurements in mm :*

	Length	Width	Antenna				
1.	2.84	1.57	1.33				
2.	2.29	1.32	?				
3.	2.61	1.68	1.32				
4.	2.53	1.47	1.30				
5.	2.58	1.57	1.32				
6.	2.34	1.32	1.30				
7.	2.20	1.26	1.15				
8.	1.80	1.20	0.90				
9.	2.07	1.38	1.14				
10.	2.44	1.42	1.32				
11.	2.52	1.50	1.27				
12.	2.10	1.20	1.03				
13.	2.11	1.24	1.05				
14.	2.55	1.47	1.36				
15.	2.12	1.26	1.04				
16.	2.11	1.09	1.15				
17.	2.22	1.27	1.38				
	Antennal segments			urs	ht2	Siph.	
	III	IV	V	VI			
	0.41	0.11	0.19	0.15 + 0.30	0.38	0.11	0.61

0.37	0.10	0.18	0.13 + broken	0.33	0.10	0.60
0.43	0.12	0.18	0.15 + 0.28	0.36	0.12	0.61
0.42	0.12	0.18	0.13 + 0.30	0.33	0.10	0.63
0.43	0.12	0.18	0.15 + 0.28	0.36	0.12	0.70
0.45	0.12	0.18	0.15 + 0.25	0.34	0.12	0.67
0.34	0.10	0.18	0.13 + 0.22	0.34	0.11	0.52
0.24	0.09	0.18	0.10 + 0.22	0.33	0.09	0.46
0.37	0.10	0.16	0.13 + 0.24	0.34	0.10	0.58
0.45	0.12	0.18	0.15 + 0.27	0.34	0.10	0.64
0.40	0.12	0.18	0.15 + 0.27	0.36	0.10	0.61
0.30	0.09	0.15	0.11 + 0.24	0.34	0.10	0.50
0.32	0.09	0.16	0.12 + 0.23	0.33	0.10	0.57
0.46	0.09	0.20	0.14 + 0.31	0.36	0.11	0.68
0.30	0.11	0.15	0.11 + 0.23	0.36	0.10	0.53
0.37	0.10	0.16	0.13 + 0.27	0.32	0.10	0.54
0.51	0.10	0.18	0.15 + 0.28	0.33	broken	0.67

(1, *Quercus* sp., Takdah Forest, West Bengal, 31.v.1969, C.U.Coll.; 2, *Q. dealbata*, Happy Valley, Shillong, Meghalaya, 8.xii.1970, C.U.Coll.; 3, an indet, host, Mawphlong Forest, Khashi Hill, Meghalaya, 11.v.1973, Z.S.I.Colls.; 4, *Q. dealbata*, Mawphlong Forest, Khashi Hill, Meghalaya, 29.ix.1973, Z.S.I. Colls., 5-7, *Castanopsis* sp. Motinagar, Shillong, Meghalaya, 10.x.1974, Z.S.I. Colls., 8-9, *Castanopsis* sp., Shillong, Meghalaya, 17.viii.1974, Z.S.I.Colls., 10-11, *Quercus* sp., Shillong, Meghalaya, 28.vi.1974, Z.S.I.Colls., 12-13, *Castanopsis* sp., Shillong, Meghalaya, 17.viii.1974, Z.S.I. Colls., 14 15 *Castanopsis* sp., Shillong, Meghalaya, 10.x.1974, Z.S.I.Colls.; 16, *Quercus* sp., Shillong, Meghalaya, 8.viii.1974, Z.S.I.Colls.; 17, *Q. dealbata*, Mawphlong, Khashi Hill, Meghalaya, 29.ix.1973, Z.S.I.Colls.).

*Alate viviparous female* : Body elongated, brown, 2.70 - 2.77 mm long and 1.30 - 1.32 mm as maximum width. Head brown and smooth. Antennae 6-segmented, 1.80 - 2.22 mm long and 0.66 - 0.80 x as long as body, light brown, segment III with 34-38 strongly annular accessory rhinaria distributed over the entire length; processus terminalis nearly 1.82 - 2.0 x as long as base

of the last antennal segment. Dorsum of abdomen pale with spinal sclerites on each of the 1st -8th tergites, these being much smaller and separated on 1st-2nd tergites but on posterior tergites touching each other; paired marginal sclerites also present on 1st -5th tergites. Siphunculi dark brown to blackish, 0.97 - 1.10 mm long, 0.33 - 0.39 x as long as body and 6.0 x as long as their maximum width; siphuncular hairs long and short, nearly 2.50 - 6.0 x as long as basal diameter of 3rd antennal segment. Wing venation normal. Other characters as in apterae viviparae.

*Measurements in mm :*

				Length	Width	Antenna
1.				2.77	1.32	2.22
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.80	0.17	0.23	0.17 + 0.31	0.27	0.11	1.10

(1, *Quercus* sp., Shillong, Meghalaya, 1.vii.1969, C.U.Colls.).

*Apterous male* : Body 2.22 mm long and 1.27 mm as maximum width. Frons convex. Head smooth, with many long and short hairs, with acute to slightly blunt apices. Antennae 6-segmented, 1.38 mm long, 0.62 x as long as body; flagellum more distinctly imbricated apicad; segment III with 25 round to transversely oval accessory rhinaria, each with double rim, 0.06-0.09 mm in diameter distributed along the surface on one segment except near the base; flagellar hairs long and short, longer ones on the outer side, longest hair on segment III 0.10 mm long and about 2.0 x as long as basal diameter of the segment; processus terminalis 0.28 mm long and 1.86 x as long as the base of last antennal segment. Ultimate rostral segments 0.33 long, with about 8 small fine accessory hairs. Dorsum of abdomen smooth, variably sclerotized, spinulose on the venter; dorsal hairs similar to apterous viviparous female. Siphunculi dark brown, 0.67 mm long, about 0.28 x as long as body and 3.75 x as long as its maximum width; siphuncular hairs long and short, all with acute or acuminate apices, longer ones mostly on the distal half except near the base and apex. Cauda semi-oval. Legs brown, smooth; hind tarsi broken. Male genitalia well-developed. Otherwise as in the apterous viviparous female.

*Measurement in mm :*

	Length	Width	Antenna
1.	1.22	1.27	1.38

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.51	0.10	0.18	0.15 + 0.28	0.33	broken	0.67

(1, *Quercus dealbata*, Mawphlong, Meghalaya, 29.ix.1973, Z.S.I.Colls.)

*Apterous oviparous female* : Body 2.11 mm long and 1.09 mm as its maximum width. Head smooth; dorsal cephalic hairs many, both long and short, with acute or slightly blunt apices. Antennae 6- segmented, 1.15 mm long, 0.54 x as long as body; flagellum gradually more distinctly imbricated apicad, segment III with 14 - 17 small, nearly circular accessory rhinaria, 0.007 - 0.015 mm in diameter, distributed almost throughout the middle surface of the segment; flagellar hairs long and short, longer ones on the outer side, longest one on segments III 0.01 mm long and about 2.17 x as long as the basal diameter of the segment; processus terminalis 0.25 mm long and 1.92 x as long as the base of last antennal segment. Rostrum reaching 3rd abdominal tergite; ultimate rostral segment about 0.32 mm long and 3.10 x as long as second segment of hindtarsi, bearing 8 short and fine accessory hairs. Dorsum of abdomen smooth, variably sclerotized, spinulose entirely on the venter; dorsal hairs similar to apterous viviparous female; 8th tergite with 2 long spinal hairs, about 0.09 mm long and 2.0 x as long as the basal diameter of 3rd antennal segment. Siphunculi dark brown, 0.54 mm long, 0.25 x as long as body and 3.18 x as long as its maximum width; siphuncular hairs thick, long and short, with acute or acuminate apices. Cauda transversely oval, bearing 6-7 long and fine hairs. Legs smooth, tibiae darker than femora. Female genitalia well-developed. Otherwise as in apterous viviparous female.

*Measurements in mm* :

	Length	Width	Antenna				
1.	2.11	1.09	1.15				
	Antennal segments				urs	ht2	Siph.
	III	IV	V	VI			
	0.37	0.10	0.16	0.13 + 0.27	0.32	0.10	0.54

(1, *Quercus sp.* Shillong, Meghalaya, 8.viii.1974, Z.S.I.Colls.)

*Materials examined* : 1 apterous female from *Quercus sp.*, Takdah Forest, West Bengal, 31.v.1969, Coll. M.R.Ghosh; 1 alate viviparous female from *Quercus sp.*, Shillong, Meghalaya, 1.vii. 1969, Coll. R.Basu; 1 alate viviparous

female and 8 nymphs from an indet. host, Mawphlong Forest Hill, 4.xi.1972, Coll. A.K.Ghosh; 1 apterous viviparous female and 6 nymphs from *Q. dealbata*, Happy Valley, Shillong, Meghalaya, 8.xiii.1970, Coll. unknown (slide No PLA 3340), 1 apterous viviparous female and 3 nymphs from an indet. host, Mawphlong Forest, Meghalaya, 11.v.1973, Coll. A.K.Ghosh; 1 apterous viviparous female, 1 apterous male and 2 nymphs from *Q. dealbata*, Mawphlong, Meghalaya, 29.ix.1973, Coll. A.K.Ghosh; 6 apterous viviparous females and 3 nymphs from *Castanopsis* sp., Motinagar, Shillong, Meghalaya, 10.x.1974, Coll M.S. Jyrwa; 2 apterous viviparous females and 6 nymphs from *Castanopsis* sp., Shillong, Meghalaya, 17.viii.1974, Coll. M.S. Jyrwa; 1 apterous viviparous female and 11 nymphs from *Quercus* sp., Shillong, Meghalaya, 8.viii.1974, Coll. M.S. Jyrwa; 10 apterous viviparous females and 8 nymphs from *Quercus* sp., Shillong, Meghalaya, 28.vi.1974, Coll. M.S. Jyrwa; 1 alate viviparous female from an indet. host, unknown place and date (C.U. Coll. No. M 425).

*Discussion* : This species resembles *dubium* and *heterotrichum* in general morphology but is distinguishable in having tergum smooth, 3rd antennal segment partly imbricated at the distal  $\frac{1}{4}$  th region, siphunculi without a basal or apical construction and hairs on body and siphunculi generally longer.

*Biology* : Available materials of the species suggest it to be a holocyclic species on Oak in the state of Meghalaya.

*Distribution* : India : Meghalaya, West Bengal.

*Types* : In the collections of Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

**37. *Eutrichosiphum sankari* Raychaudhuri, Ghosh, Banerjee, Ghosh**  
(Figs. 25u - 28u, 29i - 30i, 32i)

1973. *Eutrichosiphum (Eutrichosiphum) sankari*, Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M, and Ghosh, A.K., *Kontyu*, 42 : 58.
1976. *Eutrichosiphum sankari*, Ghosh, A. K., *Oriental Ins.* 10 : 40.
1980. *Eutrichosiphum (Eutrichosiphum) sankari*, Raychaudhuri, D.N. and Chatterjee, M. In "Taxonomy of aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N.,332.

*Apterous viviparous female* : Body brown, pear-shaped; 1.37-1.89 mm long and 0.80-0.96 mm as maximum width. Head smooth, with many dorsal hairs. Antennae 5-segmented, 0.64-0.91 mm long, 0.39- 0.61 x as long as body; segments III and IV pale on basal 0.75 portion and rest brownish; flagellum gradually distinctly imbricated apicad, flagellar hairs with slightly acuminate apices, longest hairs of segment III 0.06-0.08 mm long, processus terminalis

1.06-1.50 x as long as the base of last antennal segment. Rostrum long and reaches just past the hindcoxae; ultimate rostral segments 0.18-0.23 mm long and 1.80-2.11 x as long as second joint of hind tarsus, with 10 fine hairs. Dorsum of abdomen brown to dark brown, somewhat wrinkled, spinulose; long and short dorsal hairs occur intermingled, most of the hairs with acuminate apices and a new with furcated apices, longest hairs on anterior tergites 0.05-0.07 mm long, 7th tergite with 5 hairs besides the usual marginal ones, these with subacute to furcated apices, 8th tergite with 2 long hairs, with subacute apices. Siphunculi short, dark, 0.36-0.51 mm long and 0.20-0.31 x as long as body; siphuncular hairs mostly long, with acute to subacute apices, a few near the base shorter with acuminate apices. Cauda rounded and with 2 hairs. Forefemora pale brownish, mid- and hindfemora brown to dark brown, all femora with spinulose striae ventrally; tibiae pale brown and smooth.

*Measurements in mm:*

	Length	Width	Antenna
1.	1.89	0.90	0.76
2.	1.63	0.86	0.70
3.	1.64	0.94	0.91
4.	1.56	0.80	0.71
5.	1.64	0.83	0.80
6.	1.50	0.81	0.64

Antennal segments			urs	ht <sub>2</sub>	Siph.
III	IV	V			
0.26	0.11	0.11 + 0.15	0.20	0.10	0.38
0.24	0.11	0.10 + 0.15	0.19	0.10	0.36
0.34	0.16	0.15 + 0.16	0.19	0.10	0.51
0.26	0.10	0.10 + 0.15	0.19	0.09	0.38
0.26	0.11	0.15 + 0.17	0.18	0.10	0.38
0.23	0.10	0.10 + 0.13	0.19	0.09	0.36

(1 indet. host, Darjeeling, West Bengal, 3.v.1970, C.U.Coll., 2, *Litsea cubeba* Shillong, Meghalaya, 8.viii.1974, Z.S.I. Coll.; 3-6, indet. host, Shillong, Meghalaya, 6.vi.1976, Z.S.I. Coll.).

*Alate viviparous female* : 1.74-1.79 mm long and 0.77-0.82 mm as maximum width. Head dark brown. Antennae 5-segmented, 1.04-1.17 mm long

and 0.59-0.67 x as long as body; flagellum gradually distinctly imbricated apicad, segment III bearing 15-19 oval accessory rhinaria, flagellar hairs long and acute, longest ones on segment III 0.10-0.15 mm long and about 5.0 x as long as basal diameter of the segment; processus terminalis 1.30-1.33 x as long as base of the last antennal segment. Ultimate rostral segment 0.18-0.19 mm long, 2.0-2.20 x as long as second segment of hindtarsus; segment 4 4.80-5.0 x as long as segment 5. Dorsum of abdomen dark brown except spinal area of 1-3rd tergites pale; dorsal hairs with acute apices, longer ones on anterior tergites 0.05-0.07 mm long and 2.3-2.5 x as long as basal diameter of segment III; hairs on 7th and 8th tergites about 0.07-0.08 mm long and 3.30-4.10 x as long as basal diameter of 3rd antennal segment. Siphunculi slender, dark brown; 0.68-0.73 mm long, 0.33-0.41 x as long as body and about 13.0 x as long as its maximum width; hairs on siphunculi long and acute. Legs darker on femora, apices of tibiae and tarsi, rest pale yellow; femora with ventral spinulose striae, more numerous on forefemora; apices of tibiae with sparse imbrications. Wing venation normal. Otherwise as in apterous viviparous female.

*Measurements in mm :*

	Length	Width	Antenna		
1.	1.74	0.77	1.04		
2.	1.75	0.82	1.16		

Antennal segments			urs	ht2	Siph.
III	IV	V			
0.53	0.15	0.13 + 0.17	0.18	0.09	0.69
0.53	0.19	0.15 + 0.17	0.18	0.09	0.68

(1-2 *Litsea cubeba*, Shillong, Meghalaya, 8.viii.1974, Z.S.I. Coll).

*Other morphs* : Not Known.

*Materials examined* : 1 apterous viviparous female from an indet. host, Lamahart, Darjeeling, West Bengal, 3.v.1970, Coll. S.D.Chakrabarti; 1 apterous viviparous female, 2 alate viviparous females and 3 nymphs from *Litsea cubeba*, Shillong, Meghalaya, 8.viii.1974, Coll. A.C.Sukla; 6 apterous viviparous females and 5 nymphs from an indet. host, Botanical Garden Shillong, Meghalaya, 6.vii.1976, Coll. K. Deb.

*Discussion* : This species can be distinguished from its nearest relative *pseudopasaniae* in having more hairs (5, median and pleural) on the 7th tergite.

*Biology* : The species is recorded by its viviparous morphs only and so far

endemic to North-east India. The type-materials were collected from an unidentified host.

*Distribution* India Meghalaya, West Bengal.

*Types* : In the collections of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta.

### 38. *Eutrichosiphum sensoriatum* (Ghosh, A.K.)

1974. *Paratrichosiphum sensoriatum* Ghosh, A. K., *Orient Ins.*, 8 : 172.

1980. *Eutrichosiphum* (*Paratrichosiphum*) *sensoriatum*, Raychaudhuri, D.N. and Chatterjee, M. In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N., 336

*Alate viviparous female* : Body dark brown, elongated, 3.08-3.55 mm long and 1.50-1.60 mm as maximum width. Head dark brown, hairs on head mostly with acute apices. Antennae 6-segmented, 2.10-2.40 mm long and 0.64-0.68 x as long as body; segment III with 43-45 narrow transverse accessory rhinaria distributed over its entire length, primary rhinaria on V and VI oval; hairs on flagellum with acute apices, longest one on segment III 0.10-0.13 mm long and 3.30 x as long as the basal diameter of the segment; processus terminalis 0.36-0.38 mm long and 2.23-2.24 x as long as base of the last antennal segment. Rostrum reaches abdomen; ultimate rostral segments long, slender, 0.38-0.40 mm long and 2.60-2.92 x as long as second segment of hindtarsus, segment 4 with 24 accessory hairs. Dorsum of abdomen pale, nearly smooth, with large extensive dark sclerotic pattern, anterior tergites pale and bear small pleural and marginal sclerites; 2nd-8th tergites each with broad spino-pleural sclerotic band and large marginal sclerotic patch, hairs on abdominal dorsum with acute apices, longest one on anterior tergites 0.08-0.11 mm long and 2.10 x as long as basal diameter of antennal segment III; 7th and 8th tergites each with 2 hairs, and 3.30 x and 3.0 x as long as the basal diameter of 3rd antennal segment respectively. Siphunculi black, paler near apical 0.20 portion, 1.73-1.80 mm long and 0.50-0.56 x as long as body; siphuncular surface reticulated nearly over entire length, acute spinules in distinct transverse rows present only near the apices; hairs on siphunculi with acute apices. Legs dark brown; femora sparsely spinulose ventrally. Forewings with subcosta and pterostigma dark brown, base of radius, cubitus and anal veins strongly pigmented, Media twice-branched.

#### *Measurements in mm*

	Length	Width	Antenna
1.	3.55	1.60	2.29
2.	3.08	1.50	2.10

III	Antennal segments			urs	ht <sub>2</sub>	Siph.
	IV	V	VI			
1.11	0.20	0.26	0.17 + 0.38	0.38	0.13	1.78
1.00	0.18	0.22	0.15 + 0.36	0.38	0.13	1.73

(1, an indet. host, Mawphlang Forest, Meghalaya, 4.xi.1972, Z.S.I. Coll., 2, an indet. host, Manipur, date unknown, slide no. M-425, C.U. Colls.).

*Other morphs* : Not known.

*Material examined* : 1 alate viviparous female from an indet. host, Mawphlang Forest, Meghalaya, 4.xi.1972, Coll. A.K.Ghosh; 1 alate viviparous female from Manipur, host, date of collection and collector's name unknown, Slide No. M-425.

*Discussion* The alate specimens of the species resembles *russellae* in general morphology but is distinguishable in having more number of longer hairs on inner side of antennal segment III, longer hairy siphunculi and more number of accessory rhinaria on 3rd antennal segment.

*Biology* : No information is available.

*Distribution* : India: Manipur, Meghalaya.

*Types* : In the collections of Zoological Survey of India, Calcutta, India.

39. *Eutrichosiphum sikkimense* Raychaudhuri, Ghosh, Banerjee and Ghosh  
(Figs. 25v 28v)

1973. *Paratrichosiphum* (*Paratrichosiphum*) *sikkimense* Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M. and Ghosh, A.K., *Kontyu*, 41 : 71.

1980. *Eutrichosiphum* (*Paratrichosiphum*) *sikkimense*, Raychaudhuri, D.N., and Banerjee, M., In "Taxonomy of the aphids of north-east India and Bhutan. (ed) Raychaudhuri, D.N., 336.

*Apterous viviparous female* : Body elongated oval, 2.64 mm long and 1.24 mm as maximum width. Head brown with long hairs. Antennae 5-segmented, short, 0.96 mm long and 0.36 x as long as body; segment 1 slightly darker, rest pale; flagellum more distinctly imbricated apicad from distal 0.26 portion of segment III, longer hairs on flagellum with acute apices and the shorter ones with acute or acuminate apices, longest hair on segment III 0.13 mm long and 4.60 x as long as the basal diameter of the segment; processus terminalis 0.16 mm long and 0.93 x as long as the base of last antennal segment. Rostrum reaching slightly beyond the hindcoxae; ultimate rostral segments 0.19 mm long and about 1.58 x as long as socond joint of hindtarsus, segment 4 with 10

long hairs. Dorsum of abdomen sclerotized, pale, slightly wrinkled with spinules; long and short dorsal hairs occur intermingled; longer hairs with acute, acuminate or slightly furcated apices and the shorter ones with acuminate apices, longest hair on first tergite 0.11 mm long and 4.6 x as long as basal diameter of 3rd antennal segment; 7th tergite with two long and fine spinal hairs and 8th tergite with two rather short fine hairs. Siphunculi short, yellow, 0.75 mm long, 0.28 x as long as body and 4.10 x as long as its maximum width; hairs on siphunculi long and fine, a few basal ones slightly shorter. Cauda transversely semi-oval, with only two long and fine hairs. Legs pale with tibiae slightly darker; femora smooth, with some spinular striae on the ventral surface; tibiae smooth.

*Measurements in mm*

	Length	Width	Antenna		
1.	2.64	1.24	0.96		
Antennal segments			urs	ht2	Siph.
III	IV	V			
0.34	0.15	0.15 + 0.16	0.19	0.12	0.75

(1, *Duabanga sonneratioides*, Singtam, Sikkim, 24.xii.1970, C.U. Colls.).

*Nymphs* (Probably third instar) : Body pale throughout, 1.92- 1.99 mm long and 6.75-0.84 mm as maximum width. Antennae 5-or 6- segmented, 0.84-0.96 mm long, 0.43-0.44 x as long as body; flagellum weakly imbricated, segment III faintly divided in 2 specimens with 6-segmented antennae; processus terminalis 0.83- 0.89 x as long as base of the last antennal segment. Ultimate rostral segments 0.15-0.16 mm long and 1.25-1.33 x as long as second joint of hindtarsus. Dorsum of abdomen pale, both long and short hairs occur intermingled, mostly with acuminate and some with acute or slightly indented apices. Siphunculi 0.65-0.64 mm long and 0.32-0.50 x as long as body. Legs pale.

*Measurements in mm :*

	Length	Width	Antenna
1.	1.98	0.66	0.85
2.	1.99	0.84	0.87
3.	1.92	0.75	0.84

Antennal segments			urs	ht <sub>2</sub>	Siph.
III	IV	V			
0.30	0.12	0.13 + 0.18	0.16	0.12	0.64
0.30	0.13	0.12 + 0.18	0.15	0.12	0.63
0.28	0.13	0.12 + 0.18	0.16	0.12	0.64

(1-3, *Duabanga sonneratioides*, Singtam, Sikkim, 24.xii.1970, C.U.Colls.).

*Other morphs* : Not known.

*Materials examined* : 1 apterous viviparous female and 3 nymphs from *Duabanga sonneratioides*, Singtam, Sikkim, 24.xii.1970, Coll. M.R. Ghosh.

*Discussion* : This species is so far known by its holotype and a few nymphs only. The species is characterised by the possession of 5- or 6-segmented antennae, dorsum of abdomen smooth and tergal hairs mostly long and fine besides some shorter hairs. In these characters, *E. sikkimense* resembles *E. javanicum* Raychaudhuri, 1956, but the two species are distinguishable in some other characters (Table 12).

Table 12: Differences in the body parts of *E. sikkimense* and *E. javanicum*

Body parts	<i>E. sikkimense</i>	<i>E. javanicum</i>
L. ant.*	0.96	1.37-1.38
L.p.t.*	0.16	0.24
Ant/body	0.36	0.61-0.73
p.t./base	0.93	1.50-1.80
u.r.s./h.t.2	1.56	1.80-2.0
Siph/body	0.28	0.37-0.41

\* measurements in mm

*Biology* : Not known.

*Distribution* : India : Sikkim.

*Types* : In the collections of Entomology laboratory, Department of Zoology, Calcutta University, Calcutta, India.

40. *Eutrichosiphum subinoyi* Raychaudhuri, Ghosh, Banerjee, and Ghosh  
(Figs. 25w-28w, 29k-30k, 31j, 32k)

1973. *Eutrichosiphum (Neotrichosiphum) subinoyi*, Raychaudhuri, D.N., Ghosh,

M.R., Banerjee, M. and Ghosh, A.K., *Kontyu*, 41 : 59.

1980. *Eutrichosiphum (Eutrichosiphum) subinoyi*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of aphids of north-east India and Bhutan", (ed) Raychaudhuri, D.N., 333.

*Apterous viviparous female* : Body pear-shaped, 1.38-2.08 mm long and 0.62-0.94 mm as maximum width. Head brownish and spinulose; cephalic hairs long, with acute apices. Antennae 6-segmented, 0.70-1.02 mm long and 0.49-0.51 x as long as body; segments I, II and basal part of segments III and IV concolorous with head, rest darker; flagellum distinctly imbricated from base to apex, flagellar hairs with blunt apices, longest hairs on segment III 0.04-0.06 mm long and about 2.70 x as long as its basal diameter; processus terminalis 0.14-0.17 mm long and 1.13-1.33 x as long the base of last antennal segment. Rostrum reaching upto 2nd abdominal segment; ultimate rostral segments 0.16-0.17 mm long and 1.77-2.70 x as long as second segment of hindtarsus, bearing 8 fine accessory hairs. Dorsum of abdomen sclerotized, pale, with a median brown patch, uniformly spinulose; dorsal hairs long and short, rather thick, occur intermingled, 10-12 hairs on each tergite, long hairs with multifid apices; longest hair on anterior tergites 0.04-0.06 mm long and about 2.20 x as long as basal diameter of segment III; 7 th and 8th tergites each with 2 long hairs, about 3.0 x as long as the mentioned diameter. Siphunculi brown near the base and gradually darker to black towards the apex, 0.51-0.54 mm long, 0.37 x as long as body and about 5.30 x as long as its maximum width; short and long hairs occur on siphunculi, most of these hairs with fine apices but some with blunt or slightly furcated apices. Cauda obtusely conical, with 6 hairs. Legs pale yellow with tibiae slightly darker, femora and tibiae smooth, femora with spinular striae ventrally.

*Measurements in mm*

	Length	Width	Antenna
1.	2.08	0.94	1.02
2.	1.43	0.63	0.73

Antennal segments			urs	ht <sub>2</sub>	Siph.
III	IV	V			
0.41	0.19	0.15 + 0.17	0.16	0.09	broken
0.23	0.14	0.12 + 0.16	0.16	0.09	0.54

(1 *Randia* sp., Dawki, Assam, 3.v.?, C.U.Coll., 2, *Pterospermum* sp., Shillong,

Meghalaya, 27.vii.1970, C.U.Coll.)

*Alate viviparous female* : Body elongated, 1.29-1.95 mm long and 0.61-0.69 mm as maximum width. Head indistinctly granulose on the dorsum. Antennae 5-segmented, 1.24-1.26 mm long and 0.63-0.97 x as long as body; flagellum distinctly imbricated from base towards apex, segment III with 17-20 small to large circular or transversely oval accessory rhinaria distributed over its entire length, hairs on antennal segment III with acute or acuminate apices, longest hair on this segment 0.08 mm long and about 2.40 x as long as basal diameter of the segment; processus terminalis 0.22-0.23 mm long and about 1.35 x as long as base of the last antennal segment. Rostrum with acute apex and reaches the hindcoxae; ultimate rostral segments acute and slender, 0.16-0.17 mm long and 1.77- 1.80 x as long as second segment of hindtarsus; segment 4 3.50 x as long as segment 5. Siphunculi brown, nearly smooth on basal 0.75 portion, rest faintly imbricated and with faint reticulations near base; 0.96-0.97 mm long and 0.49-0.75 x as long as body; hairs on the siphunculi nearly of equal lengths but a few near the base rather short, these hairs with acute apices, longest hairs about 1.80 x as long as the basal diameter of siphunculi. Wing venation normal. Otherwise as in apterous viviparous female.

*Measurement in mm* :

	Length	Width	Antenna			
1.	1.29	0.69	1.26			
	Antennal segments			urs	ht2	Siph.
	III	IV	V			
	0.54	0.20	0.17 + 0.23	0.16	0.09	0.54

(1, *Pterospermum* sp., Shillong, Meghalaya, 27.vii.1970, C.U.Coll.)

*Other morphs* : Not Known.

*Materials examined* 1 apterous and 1 alate viviparous females from *Pterospermum* sp., Botanical Garden, Shillong, Meghalaya, 27.vii.1970, Coll. S.Sarkar; 1 apterous viviparous female and 3 nymphs from *Randia* sp., Dawki, Assam, 3.v.?, B. Biswas.

*Discussion* : This species stands distinct from its congenics in the possession of fewer number of stiff hairs (10-12 per tergite) on abdominal tergites.

*Biology* : The species is known by its viviparous morphs only. The type materials were collected from a plant of Sterculiaceae. Subsequently another

collection was made from a plant of Rubiaceae. Both the hosts and their families are so far the exclusive records in association of a species of the Tribe Greenideini.

*Distribution* : India : Meghalaya.

*Types* : In the collections of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta.

41. *Eutrichosiphum tapatii* Mondal, Chatterjee and Raychaudhuri  
(Figs. 25x-28x)

1979. *Eutrichosiphum (Eutrichosiphum) tapatii*, Mondal, P.K. Chatterjee, M. and Raychaudhuri, D.N., *Entomon*, 4 : 77.

*Apterous viviparous female* : Body brown, 1.72-2.19 mm long and 0.88-1.05 mm as maximum width. Head brown, dorsal cephalic hairs short or long and with acute or acuminate apices. Antennae 5-segmented, 0.96-1.03 mm long and 0.47-0.55 x as long as body; flagellum gradually more distinctly imbricated apicad; flagellar hairs mostly with acuminate apices, longest one on segment III 0.08 mm long and 2.27-3.50 x as long as basal diameter of the segment; processus terminalis 0.17-0.18 mm long and 1.30-1.63 x as long as the base of the last antennal segment. Rostrum reaching beyond hindcoxae; ultimate rostral segments bluntish, bearing 4-6 accessory hairs, 0.11-0.12 mm long and 1.0-1.3 x as long as the second joint of hindtarsus. Dorsum of abdomen pale medially and with brown to dark brown patches anteriorly, laterally and posteriorly; short and long dorsal hairs having mostly acuminate apices occur intermingled, longest hair on anterior abdominal tergites about 0.08 mm long and 2.27-3.80 x as long as basal diameter of 3rd antennal segment, 7th and 8th tergites with 6 and 2 hairs respectively, longest hair on 7th tergite 2.50-3.18 x as long as basal diameter of 3rd antennal segment and that on 8th tergite 2.0-2.70 x as long as the mentioned diameter. Siphunculi brown to dark brown, curved outwards, 0.44-0.49 mm long, 0.22-0.25 x as long as body and 3.88-5.33 x as long as its maximum width; hairs on siphunculi short to long with acuminate apices, longest ones 2.0-2.50 x as long as the basal diameter of the siphunculi. Cauda transversely semi-oval, with 6-8 hairs. Femora pale with indistinct spinular striae on venter; tibiae slightly darker than femora.

*Measurements in mm* :

	Length	Width	Antenna
1.	2.19	1.11	1.03

Antennal segments			urs	ht2	Siph.
III	IV	V			
0.46	0.15	0.13 + 0.17	0.11	0.11	1.49

(1, an indet. host, Sanklang, 3.xi.1974, C.U. Colls.).

*Other morphs* : Not known.

*Material examined* : 1 apterous viviparous female and 1 nymph from an indet. host, Sanklang, Sikkim, 3.xi.1974, Coll. P.K. Mondal.

*Discussion* : This species is closely related to *E. makii* in having median area of dorsum of abdomen smooth and pale and dorsal hairs on abdomen with acuminate or furcated apices but can be distinguished in having shorter processus terminalis and u.r.s. and the later with blunt apex (longer and with obtuse apex in *E. makii*).

*Biology* : The species is known by apterous viviparous morph only and collected from plants of *Quercus* sp. and *Eugenia* sp. in North-western Himalaya of its distribution range (Raychaudhuri, Ghosh and Das, 1980).

*Distribution* : India : Himachal Pradesh, Sikkim, Uttar Pradesh.

*Types* : In the collections of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

#### 42. *Eutrichosiphum tattakanum* (Takahashi)

(Figs. 25y-28y, 29l, 31k 32l, 290-300)

1925. *Greenidea tattakanum*, takahashi, R., *Aph. Of Formosa*, p.t. 4 : 30.  
 1934. *Paratrichosiphum tattakanum*, Takahashi, R., *Aph. of Formosa*, pt. 6 : 31.  
 1956. *Paratrichosiphum tattakanum*, Raychaudhuri, D.N., *Zool. Verh. Leiden*, 31 : 94.

*Apterous viviparous female* : Body pear-shaped, about 1.99-2.88 mm long and 0.92-1.50 x as long as the maximum width. Head brown, smooth on the dorsum, locally spinulose on the venter, without any frontal prominence. Antennae 6-segmented, if 5-segmented then fourth instar nymphs with antennae 6-segmented, 1.11-1.56 mm long and 0.44-0.62 x as long as body; flagellum gradually more distinctly imbricated from base to apex, flagellar short or long, those on segment III mostly long, longest ones 0.07-0.09 mm long; processus terminalis 0.22-0.30 mm long, and 1.36-1.66 x as long as base of last antennal segment. Rostrum reaching upto the middle of the abdomen; ultimate rostral segments slender, 0.25-0.34 mm long, 1.92-2.83 x as long as second segment of hindtarsus, segment 4 with 10-14 long fine accessory hairs.

Dorsum of abdomen sclerotized, somewhat wrinkled, but ventrally covered with spinules; dorsal hairs numerous, short and long, thick with blunt, acuminate or furcated apices; longest hair on anterior tergites 0.07-0.10 mm long, 3.0-3.80 x as long as basal diameter of 3rd antennal segment, 7th and 8th tergites each with 2 long spinal hairs of acute apices, about 2.80-3.0 x as long as the mentioned diameter. Siphunculi brown to dark brown, curved outward, 0.46-0.94 mm long, 0.25-0.35 x as long as body, without any reticulation; siphuncular hairs numerous, mostly with acuminate and a few with bifid apices; covered with sparse spinules except apical 1/4th with acute spinules in distinct transverse rows. Cauda semi-circular, with 8-12 long and fine hairs. Legs pale brown; femora and tibiae with sparse imbrications near the apices.

*Measurements in mm :*

	Length	Width	Antenna
1.	1.96	1.20	1.11
2.	1.74	0.75	1.02
3.	1.86	0.97	1.05
4.	1.96	1.02	1.02
5.	2.26	1.21	1.26
6.	2.01	1.20	1.21
7.	2.34	1.11	1.29
8.	2.52	1.21	1.27
9.	1.99	0.90	1.05
10.	2.38	1.06	1.06
11.	2.20	1.30	1.33
12.	2.17	1.24	1.36
13.	1.98	0.93	1.14
14.	1.98	0.97	1.09
15.	1.96	0.94	1.05
16.	1.80	0.94	1.05
17.	1.98	0.97	1.23
18.	1.96	0.91	1.06
19.	2.05	1.02	1.05
20.	2.10	1.03	1.11
21.	2.05	1.08	1.00
22.	2.28	1.36	1.06
23.	2.29	1.29	1.36
24.	2.19	1.03	1.17
25.	2.32	1.17	1.21

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.33	0.13	0.16	0.15 + 0.22	0.25	0.12	0.60
0.30	0.10	0.15	0.13 + 0.22	0.25	0.10	0.52
0.28	0.12	0.16	0.15 + 0.21	0.27	0.12	0.54
0.42	0.13	—	0.13 + 0.21	0.24	0.12	0.46
0.40	0.15	0.19	0.15 + 0.24	0.27	0.12	0.70
0.39	0.15	0.12	0.13 + 0.24	0.24	0.12	0.67
0.36	0.16	0.19	0.18 + 0.27	0.27	0.12	0.78
0.39	0.21	0.24	0.18 + 0.27	0.27	0.13	0.82
0.25	0.10	0.16	0.15 + 0.22	0.25	0.12	0.63
0.42	0.18	—	0.17 + 0.22	0.25	0.13	0.78
0.42	0.16	0.19	0.15 + 0.27	0.28	0.12	0.78
0.42	0.18	0.21	0.15 + 0.27	0.30	0.12	0.72
0.30	0.13	0.18	0.16 + 0.24	0.27	0.12	0.60
0.30	0.10	0.18	0.15 + 0.22	0.27	0.12	0.57
0.25	0.12	0.16	0.15 + 0.24	0.25	0.12	0.58
0.27	0.13	0.15	0.13 + 0.22	0.30	0.10	0.49
0.37	0.15	0.18	0.16 + 0.24	0.30	0.12	0.64
0.27	0.13	0.16	0.15 + 0.22	0.27	0.12	0.53
0.28	0.10	0.16	0.15 + 0.22	0.25	0.12	0.57
0.30	0.12	0.18	0.16 + 0.22	0.25	0.12	0.57
0.39	0.16	—	0.15 + 0.19	0.25	0.12	0.57
0.33	0.12	0.15	0.13 + 0.21	0.25	0.12	—
0.37	0.18	0.22	0.18 + 0.27	0.27	0.12	0.70
0.34	0.15	0.18	0.15 + 0.22	0.27	0.12	0.67
0.36	0.16	0.19	0.15 + 0.22	0.27	0.12	0.72

(1-3, an indet. host, Tompo, Taiwan, 22.vii.1936, B.M. Colls; 4, *Quercus*

*dilatata*, Simla, Himachal Pradesh, 16.vi.1966, B.M. Colls., 5-6 *Quercus* sp., Churachanpur, Manipur, date ? C.U Colls., 7-8, *Q. coccinea*, Darjeeling, West Bengal, 14.v.1969, B.M. Colls.; 9-10, *Quercus* sp., Khasi Hills, Meghalaya, 6.vii.1973, Z.S.I. Colls.; 11-12, an indet. host. New Colony, Shillong, Meghalaya, 2.viii.1974, Z.S.I. Colls.; 13-15, an indet. host, Khasi Hills, Meghalaya, 11.v.1973, Z.S.I. Colls., 16-18, *Q. semicaprifoliae*, Kakani, Nepal, 9.vii.1975, B.M. Colls.; 19-20, *Quercus* sp., Gidakom, Bhutan, 18.vi.1985, C.I.E.A. Colls., 21, *Quercus* sp., New Tehri, Uttar Pradesh, 4.viii.1985, C.I.E.A. Colls., 22, *Quercus* sp., Anjanisain, Uttar Pradesh, 13.viii.1985, C.I.E.A. Colls., 23, *Q. leucotrichophora*, Muree, Pakistan, 6.viii.1988, G. Remaudiere Colls., 24-25, *Q. acutissima*, Ukhrul, Manipur, 23.x.1990, T.U. Colls.).

*Alate viviparous female* Body elongated, 2.20-3.14 mm long and 0.75-1.23 mm as maximum width. Head brown to dark; frons with a median flat prominence; dorsal hairs long, thin and fine. Antennae 6-segmented, concolorous with head, 1.61-2.16 mm long and 0.71-0.86 x as long as body; flagellum gradually more distinctly imbricated apicad, flagellar hairs long, the longest ones on segment III 0.10-0.11 mm long; segment III with 10-13 round to slightly transversely oval accessory rhinaria distributed in one row along the length of the segment; processus terminalis 0.29-0.37 mm long, 0.96-1.57 x as long as base of the last antennal segment. Ultimate rostral segment 0.25-0.30 mm long and 2.08-2.50 x as long as second segment of hindtarsus. Dorsum of abdomen locally sclerotised, without spinules, 1st tergite pale, rest brown; tergites 2-4 with sclerotic bands coalescing to form an almost solid block; dorsal hairs long and fine, longest hair on anterior tergites 0.04-0.05 mm long. Siphunculi deep brown, slightly swollen on the inner side on apical half, 0.92-1.32 mm long, 0.41-0.45 x as long as body and 11.30-11.50 x as long as their maximum width, distinctly reticulated throughout their entire length, strong spinules present in transverse rows near the apex; siphuncular hairs long and with fine and acuminate apices. Cauda semi-oval, bearing 10-11 long and fine hairs. Legs concolorous with head and siphunculi. Wing venation normal; forewings with Media twice branched; hindwings with 2 oblique veins.

*Measurements in mm*

	Length	Width	Antenna
1.	1.92	0.75	1.41
2.	2.74	1.08	1.89
3.	2.43	1.00	1.66

Antennal segments				urs	ht <sub>2</sub>	Siph.
III	IV	V	VI			
0.64	0.22	—	0.15 + 0.25	0.22	0.10	0.81
0.64	0.27	0.30	0.19 + 0.33	0.27	0.12	1.15
0.52	0.24	0.27	0.21 + 0.28	0.22	0.10	1.02

(1, an indet. host, Tompo, Taiwan, 22.viii.1936, B.M. Colls.; 2, *Quercus* sp., Gidakom, Bhutan, 18.vi.1985, B.M. Colls.; 3, *Quercus* sp., Anjanisain, Uttar Pradesh, 13.viii.1985, B.M. Colls.).

*Alate oviparous female* : Body 1.57-2.47 mm long and 0.62-1.05 mm as maximum width. Head brown, smooth, with several long and fine hairs. Antennae brown, 6-segmented, 1.15-1.63 mm long and 0.66- 0.73 x as long as body, flagellum gradually more distinctly imbricated apicad, flagellar hairs long and short, with fine apices, longest hairs on segment III 0.10 mm long and about 3.0- 3.20 x as long as basal diameter of the segment; processus terminalis 0.24-0.33 mm long and 1.56-2.25 x as long as base of last antennal segment. Ultimate rostral segments 0.18-0.23 mm long, 1.80-1.91 x as long as second segment of hindtarsus, with 10-12 short and fine accessory hairs. Dorsum of abdomen similar to alate viviparous female; dorsal hairs long and fine, longest hair on anterior tergites 2.50-2.58 x as long as the basal diameter of 3rd antennal segment. Siphunculi pale brown to brown, 0.59-0.83 mm long, 0.35-0.42 x as long as body and 8.77-10.15 x as long as its maximum width; sparsely spinulose throughout and densely so near the apical ends. Cauda semi-oval, with 5-6 long hairs. Genital plate with numerous long and fine hairs. Legs brown, wing venation normal. One of the specimens collected from Simla, Himachal Pradesh (7.vi.1968) showed three distinct eggs in the lumen of abdomen.

*Measurements in mm :*

	Length	Width	Antenna
1.	2.47	1.05	1.63
2.	1.98	0.77	1.64
3.	2.08	0.80	1.52
4.	1.88	0.63	1.44
5.	1.57	0.62	1.15
6.	1.80	0.71	1.20
7.	1.94	0.70	1.30

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.49	0.21	0.25	0.21 + 0.33	0.23	0.12	0.88
0.53	0.23	0.20	0.20 + 0.36	0.21	0.11	0.83
0.44	0.21	0.26	0.19 + 0.30	0.22	0.12	0.80
0.38	0.20	0.23	0.19 _ 0.30	0.21	0.11	0.74
0.30	0.13	0.19	0.17 + 0.24	0.18	0.10	0.59
0.36	0.13	0.15	0.15 + 0.24	0.20	0.10	0.64
0.38	0.17	0.21	0.16 + 0.25	0.20	0.11	0.69

(1, from an indet. host, Kufri, Himachal Pradesh, 7.vi.1968, B.M. Colls.; 2-7, an indet. host. Piege, Pakistan, ? 1987 Z.S.I. Colls.).

*Other morphs* Alate male has been recorded from Japan (Ghosh, 1987) but could not be examined. A description of this morph could not be traced in literature.

*Materials examined* : 6 apterous viviparous females, 1 alate viviparous female and 2 nymphs from an indet. host, Tompo, Taiwan, Coll. R. Takahashi; 1 alate viviparous female and 5 nymphs from *Quercus dilatata* Simla, Himachal Pradesh, 16.vi.1966, Coll. A.N. Choudhuri; 2 apterous viviparous females and 1 nymph from *Quercus* sp., Churachanpur, Manipur, date unknown, Coll. D. Raychaudhuri; 1 apterous oviparous female from an indet. host, Kufri, Simla, 7.vi.1968, Coll. "K.N. & S G R"; 2 apterous viviparous females from *Quercus coccinea*, Darjeeling, West Bengal, 14.v.1969, Coll. S.G. Rajasingh; 1 apterous viviparous female and 6 alatoid nymphs from *Q. dealbata*, Happy Valley, Shillong, Meghalaya, 8.vii.1970, Coll. not known (slide No. PLA 3340); 2 apterous viviparous females and 1 nymph from *Quercus* sp., Khasi Hills, Meghalaya, 6.vi.1973, Coll. A.K. Ghosh; 5 apterous viviparous females and 5 nymphs from an indet. host, New Colony, Shillong, Meghalaya, 21.viii.1974, Coll. A.K. Ghosh; 3 apterous viviparous females and 3 nymphs from an indet. host, Khasi Hills, Meghalaya, 11.v.1973, Coll. A.K. Ghosh; 3 apterous viviparous females and 5 alate viviparous females from *Q. semicaprifoliae*, Kakani, Nepal, 9.vii.1975, Coll. V.D. Bosch; 4 apterous viviparous females and 1 alate viviparous female from *Quercus* sp., Gidakom, Bhutan, 18.vi.1985, Coll. C.I.E.A., India (slide No. 203/17186 B.M. Colls.); 1 apterous viviparous female and 5 nymphs from *Quercus* sp., New Tehri, Uttar Pradesh, India, 4.viii.1985, Coll. "Bisht and Rana"; 1 apterous viviparous female and 1 alate viviparous female from *Quercus* sp., Anjanisain, Uttar Pradesh, 13.viii.1985, Coll. "Bisht and Rana"; 13 alate oviparous females from

unknown host, Pieve, Pakistan, ?.1987, Coll. "Naumann"; 1 apterous viviparous female from *Q. leucotrichophora*, Murree, Pakistan, 6.viii.1988, Coll. "Naumann"; 5 apterous viviparous females and 1 alate viviparous female from *Q. acutissima*, Ukhrul, Manipur, 23.x.1970, Coll. L. Somen.

**Discussion** : Takahashi (1925) described the species from Formosa, now Taiwan. Raychaudhuri (1956) provided an account of its morphology. A series of specimens from Bhutan, Nepal, Taiwan and Himachal Pradesh, Manipur, Meghalaya, Uttar Pradesh and West Bengal in India have been examined. The species is distinguishable from other species in the genus by the characters as provided in the key.

**Biology** : The species chiefly infests *Quercus* species in its distribution range. *Castanopsis formosana* was recorded as host from its type locality.

**Distribution** : India : Himachal Pradesh, Manipur, Meghalaya, Uttar Pradesh; Bhutan, Nepal, Japan, Pakistan, Taiwan.

**Types** : In Taiwan Agricultural Research Institute, Taipeh (Taihoku), Taiwan.

***Eutrichosiphum* sp. I.**  
(Figs. 29m-30m, 30p)

1956. *Paratrichosiphim* spec., Raychaudhuri, D.N., *Zool. Verh.*, Leiden, 31 : 96.

**Alate oviparous female** : Body elongated, 2.38 mm long and 1.0 mm as maximum width. Head brown, marginal tubercles present from segments 3 to 5 of abdomen. Antennae 6-segmented, blackish brown, with slightly paler basal segment, 2.18 mm long and 0.95 x as long as body; flagellum more distinctly imbricated from base towards apex, segment III with 20 transversely oval rhinaria not exactly placed in a row over 0.85 portion of the length of the segment, the rhinaria are unequal in size and not placed equidistantly; hairs on antennae with more or less blunt apices; longest hair on segment III about 3.60 x as long as basal diameter of the segment; processus terminalis 0.64 mm long and 2.30 x as long as base of the last antennal segment. Dorsum of abdomen sclerotic brown; dorsal hairs on tergite much thinner and with acute apices; longest hair on the anterior tergites of the abdomen about 2.70 x as long as basal diameter of 3rd antennal segments, short hairs with acute apices; 7th tergite without spinal hair; 8th tergite with two very long hairs, with acute apices, upto about 3.70 x as long as basal diameter of 3rd antennal segment. Rostrum reaching a little beyond the hindcoxae; ultimate rostral segments slender and acute; about 1.75 x as long as second joint of hindtarsi and with 12 long and fine hairs. Siphunculi blackish brown, reticulated imbricated near base; about 2.70 x as thick as the middle of the hindtibiae.

Cauda transversely rectangular, with rounded posterior angles, without a median process, with several long and fine hairs. Subanal plate semi-circular, projecting past the cauda, with a very large number of hairs on its dorsal surface; the subgenital plate exceedingly hairy. Femora pale brownish, the very apices as dark as the head; rather dispersally and superficially imbricated; tibiae darker than the femora, with the very bases and apices much darker, striate-imbricate on basal 0.66 portion from where the imbrications begin to disappear and spinules are plainly visible; apices of tibiae ventrally provided with 4 spines. Pterostigma extending up to a little more than 0.25 portion of the radial sector.

*Measurements in mm :*

	Length	Width	Antenna			
1.	2.28	1.00	2.18			
	Antennal segments			urs	ht2	Siph.
	III	IV	V	VI		
	0.54	0.27	0.32	0.29 + 0.64	?	? broken

(1, *Solanum lycopersicum*, Pusa, Central India, ? 1955, B.M. Colls.).

*Material examined* : 1 alate oviparous female from *Solanum lycopersicum*, Pusa, Central India, ? 1955, Coll. D.N. Raychaudhuri.

*Discussion* : Raychaudhuri (1956) provided an elaborate description of the lone specimen. We have also examined the same specimen and the description provided here is partly adopted from Raychaudhuri (1956). The specimen has very long antennae (0.95 x as long as body) and processus terminalis more than thrice the length of the base of antennal segment.

In these characters and because of the missing siphunculi in the sole specimen, the present sexual morph is difficult to be assigned to any known species under the genus.

*Distribution* : Central India.

*Type* : In the collection of the Natural History Museum, London.

***Eutrichosiphum* sp. II**  
(Figs. 29q-30q)

*Alate male* : Body pale, elongated, 1.57-1.83 mm long and 0.54- 0.60 mm as maximum width. Head pale brown, smooth; dorsal hairs long, with acute apices. Antennae 6-segmented, basal segments concolorous with head, rest

pale; about 1.06 mm long and 0.67 x as long as body; flagellum gradually more distinctly imbricated apicad, segment III with 6-8 semi-circular or transversely oval accessory rhinaria distributed on basal half, flagellar hairs long, with acute apices, longest hair on segment III about 4.4 x as long as the basal diameter of the segment; processus terminalis about 0.13 mm long and as long as the base of the last antennal segment. Rostrum reaching midcoxae, somewhat tapering; ultimate rostral segment 0.15 mm long, about 1.66 x as long as second joint of hindtarsus and bears almost indistinguishable small accessory hairs on segment 4. Dorsum of abdomen pale, smooth, with a pair each of pleural and marginal sclerotic patches on all tergites; dorsal hairs thin, with acute apices, longest hair on anterior tergites about 2.5 x as long as the basal diameter of 3rd antennal segment; 7th tergite with long spinal hairs. Siphunculi pale on basal 1/3rd, rest pale brown, somewhat swollen on distal half, 0.69-0.75 mm long, 0.38-0.47 x as long as body and about 7.5 x as long as its maximum width; hairs on siphunculi rather sparse, long and fine. Cauda triangular, with 5-6 long and fine hairs. Male genitalia well-developed. Wing venation normal, pterostigma touches radial sector; Media twice - branched; hindwings with 2 oblique veins.

*Measurements in mm :*

	Length	Width	Antenna
1.	1.57	0.58	1.06
2.	1.62	0.57	?
3.	1.83	0.60	?
4.	1.77	0.54	?

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.33	0.15	0.19	0.13 + 0.13	0.15	0.09	0.69
0.34	0.15	0.19	broken	0.15	0.09	0.75
0.37	0.18	broken	broken	0.15	0.09	0.75
broken				0.15	0.09	0.69

(1-4, *Leucosceptrum canum*, Darjeeling, West Bengal, 2.vi.1957, B.M.Colls.).

*Materials examined* : 4 alate males from *Leucosceptrum canum* (Solanaceae), Darjeeling, West Bengal, 2.vi.1957, Coll. A.N. Basu.

*Discussion* : These alate males could not be identified for their specific status in absence of viviparous morphs.

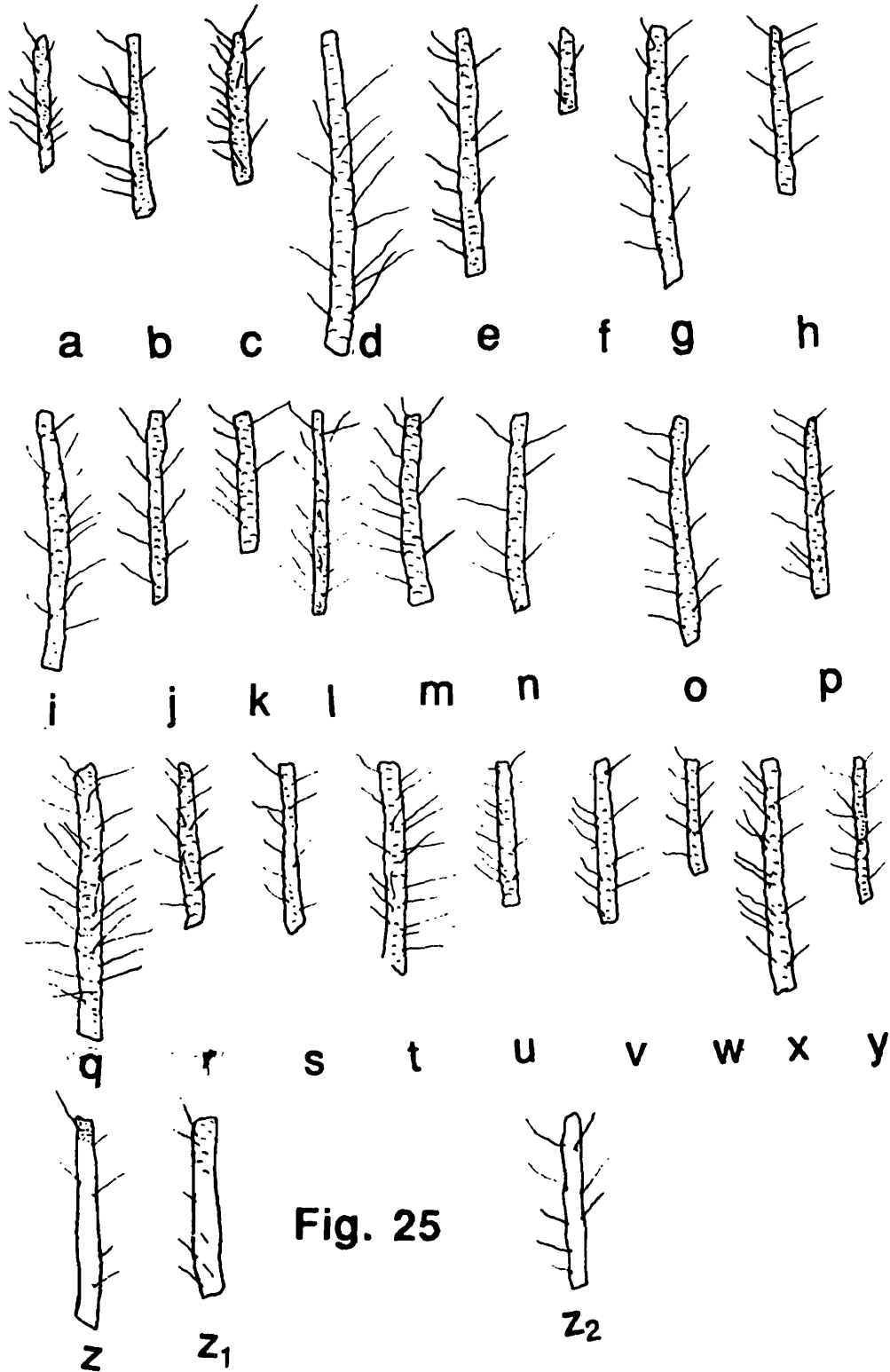


Fig. 25

Fig. 25a-z<sub>2</sub> : Species of *Eutrichosiphum*, apterous viviparous female morph : third antennal segment. a *alnicola*, b *arunachali*, c *assamense*, d *betulae*, e *blackmanum*, f *dauidi*, g *dubium*, h - *flavum*, i - *jugeshwari*, j *khasyanum*, k *litseae*, l *makii*, m *manipurense*, n *neotattakanum*, o *pseudopasaniae*, p *pyri*, q *quercifoliae*, r *rameshi*, s *raychaudhurii*, t *russellae*, u *sankari*, v *sikkimense*, w *subinoyi*, x *tapatii*, y *tattakanum*, z *atini*, z<sub>1</sub> *manaliensis*, z<sub>2</sub> *neoalnicola*.

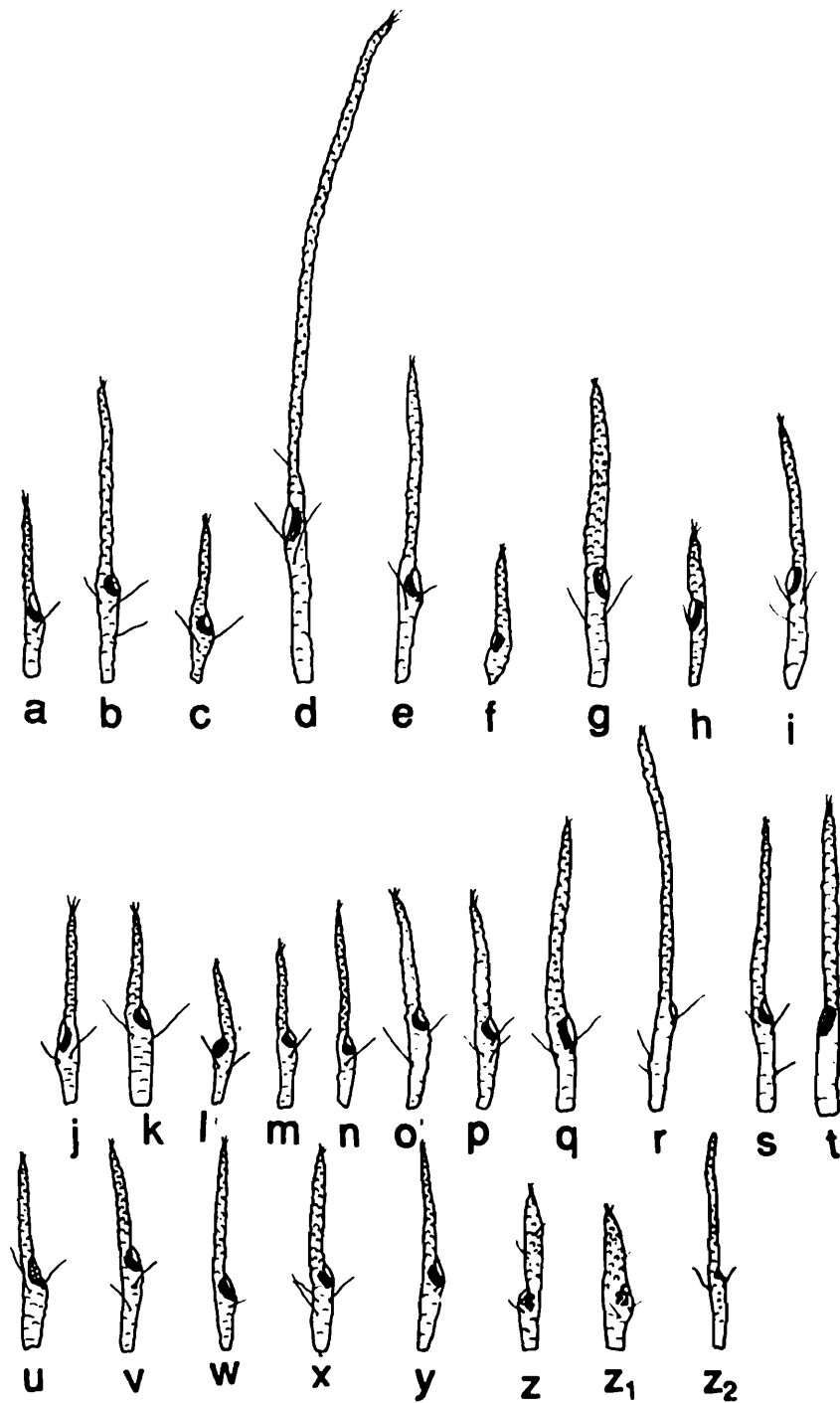


Fig. 26

Figs. 26a-z<sub>2</sub> : Species of *Eutrichosiphum*, apterous viviparous female morph : Processus terminalis. a *alinicola*, b *arunachali*, c *assamense*, d *betulae*, e *blackmanum*, f *davidi*, g *dubium*, h - *flavum*, i - *jugeshwari*, j *khasyanum*, k *litseae*, l *makii*, m *manipurensis*, n *neotattakanum*, o *pseudopasaniae*, p *pyri*, q *quercifoliae*, r *rameshi*, s *raychaudhurii*, t *russellae*, u *sankari*, v *sikkimense*, w *subinoyi*, x *tapatii*, y *tattakanum*, z *atini*, z<sub>1</sub> *manaliensis*, z<sub>2</sub> *neoalnicola*.

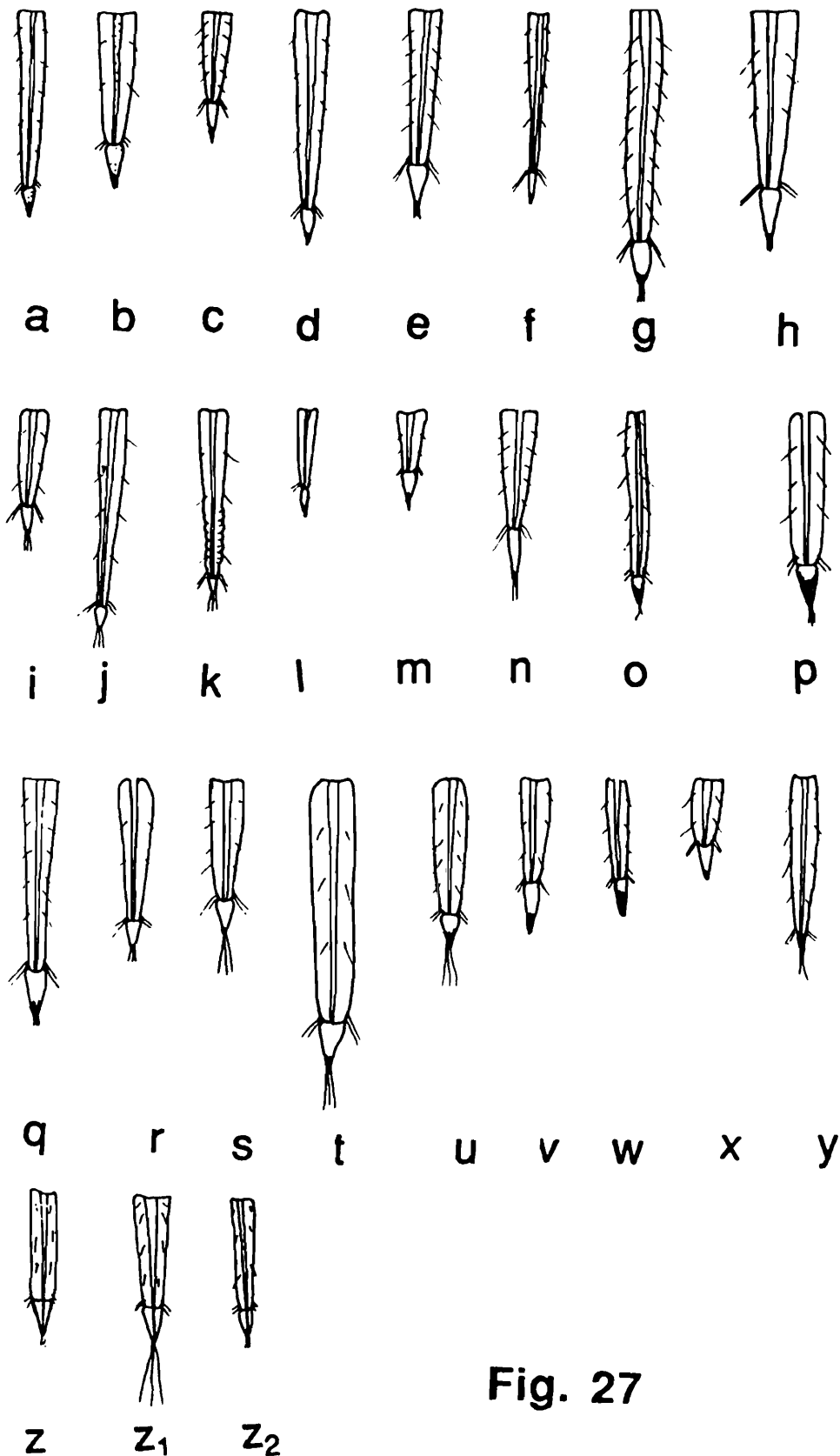


Fig. 27

Figs. 27a-z<sub>2</sub> : Species of *Eutrichosiphum*, apterous viviparous female morph : Ultimate rostral segments. a *alnicola*, b *arunachali*, c *assamense*, d *betulae*, e *blackmanum*, f *dauidi*, g *dubium*, h - *flavum*, i - *jugeshwari*, j *khasyanum*, k *litseae*, l *makii*, m *manipurense*, n *neotattakanum*, o *pseudopasaniae*, p *pyri*, q *quercifoliae*, r *rameshi*, s *raychaudhurii*, t *russellae*, u *sankari*, v *sikkimense*, w *subinoyi*, x *tapatii*, y *tattakanum*, z *atini*, z<sub>1</sub> *manaliensis*, z<sub>2</sub> *neoalnicola*.

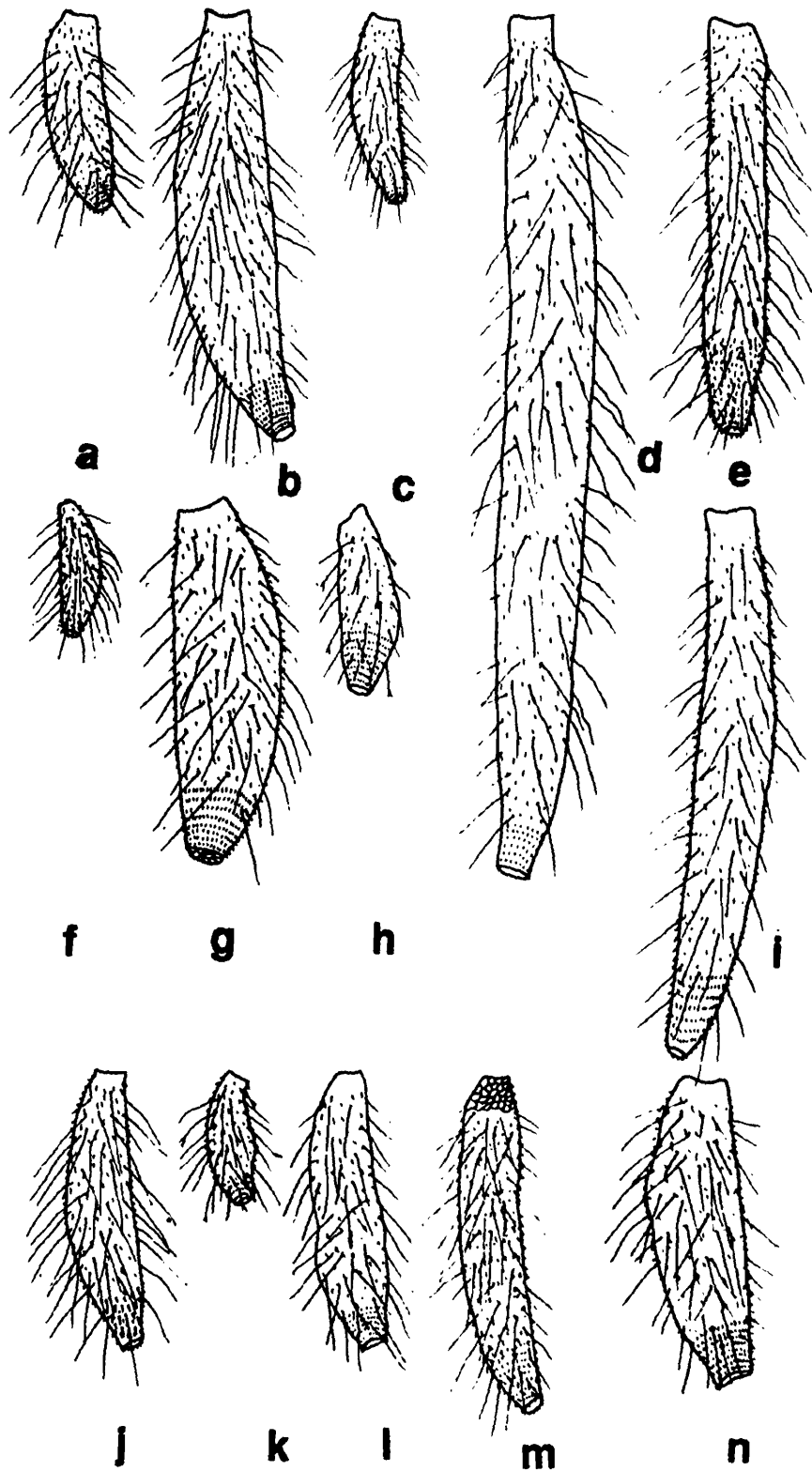


Fig. 28

Figs. 28a-n: Species of *Eutrichosiphum*, apterous viviparous female morph : siphunculus. a *alnicola*, b *arunachali*, c *assamense*, d *betulae*, e *blackmanum*, f *dauidi*, g *dubium*, h *flavum*, i *jugeshwari*, j *khasyanum*, k *litseae*, l *makii*, m *manipurense*, n *neotattakanum*.

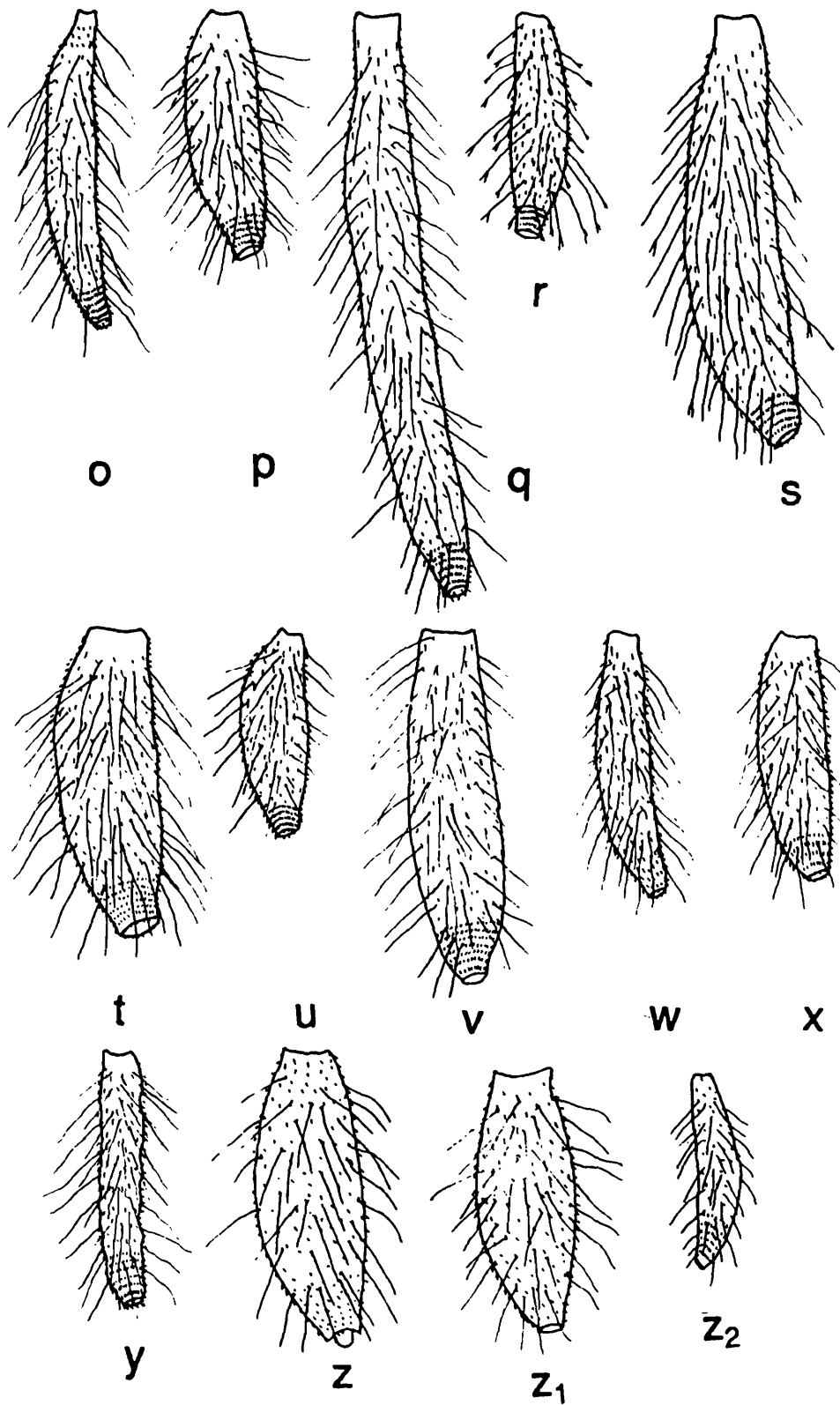


Fig. 28

Figs. 28o-z: Species of *Eutrichosiphum*, apterous viviparous female morph : siphunculus. o *pseudopasaniae*, p *pyri*, q *quercifoliae*, r *rameshi*, s *raychaudhurii*, t *russellae*, u *sankari*, v *sikkimense*, w *subinoyi*, x *tapatii*, y *tattakanum*, z *atini*, z<sub>1</sub> *manaliensis*, z<sub>2</sub> *neoalnicola*.

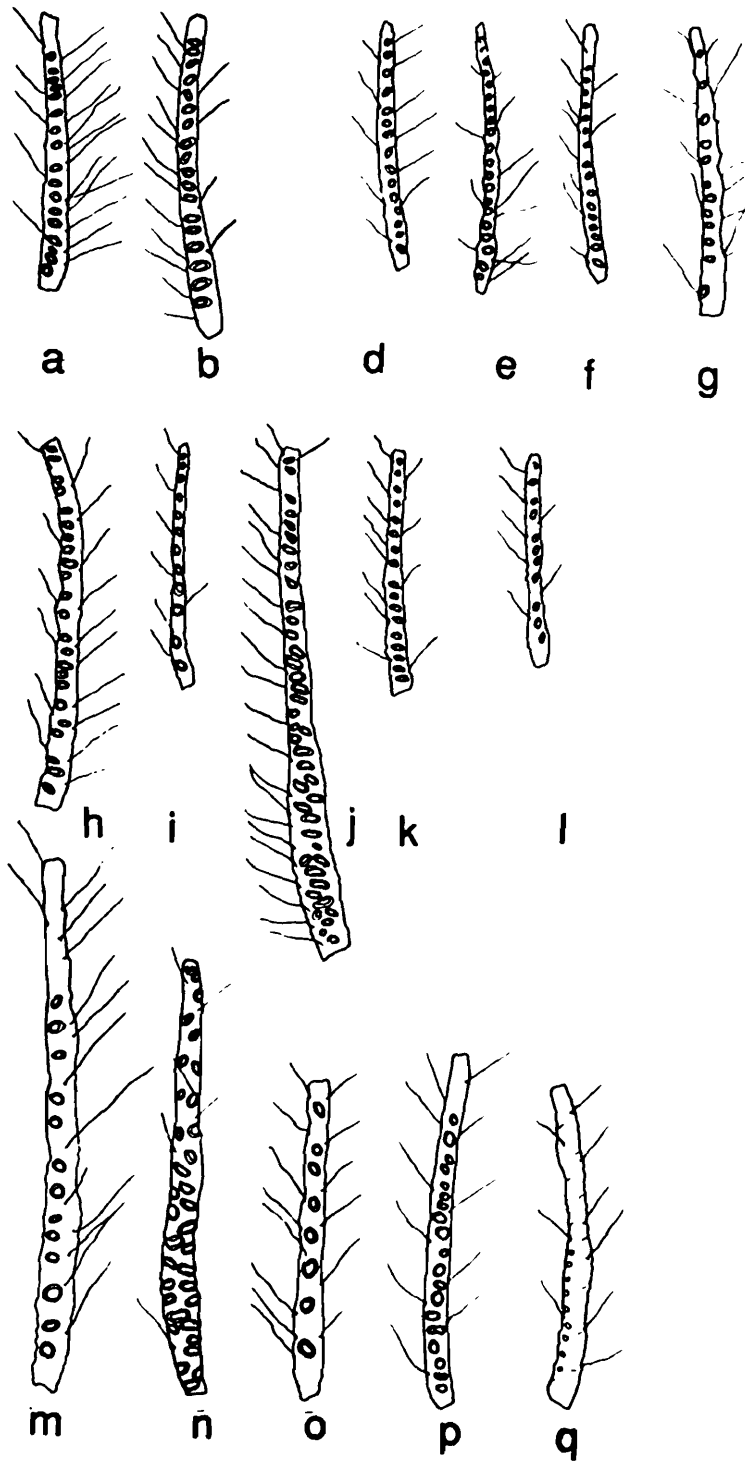
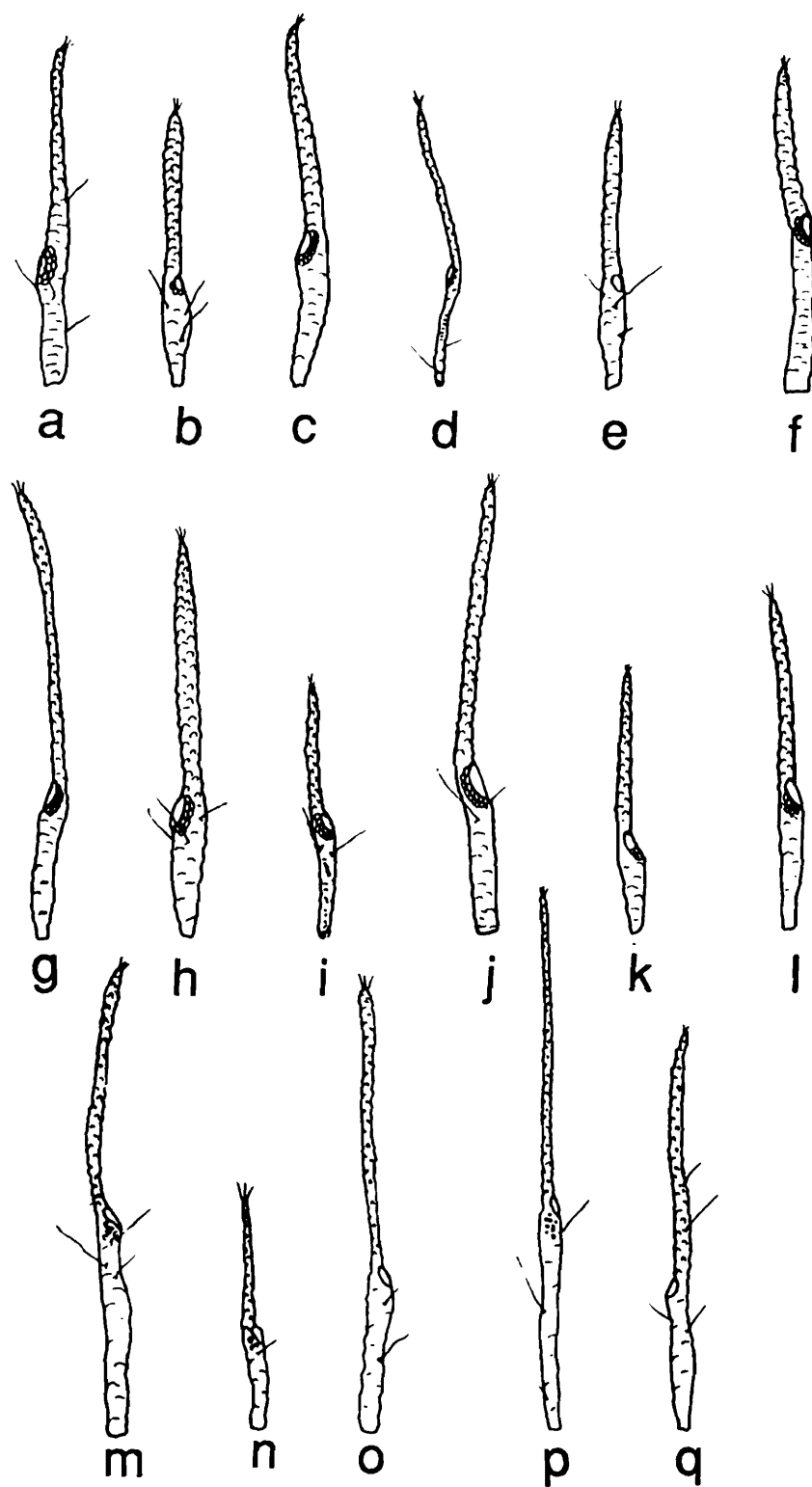


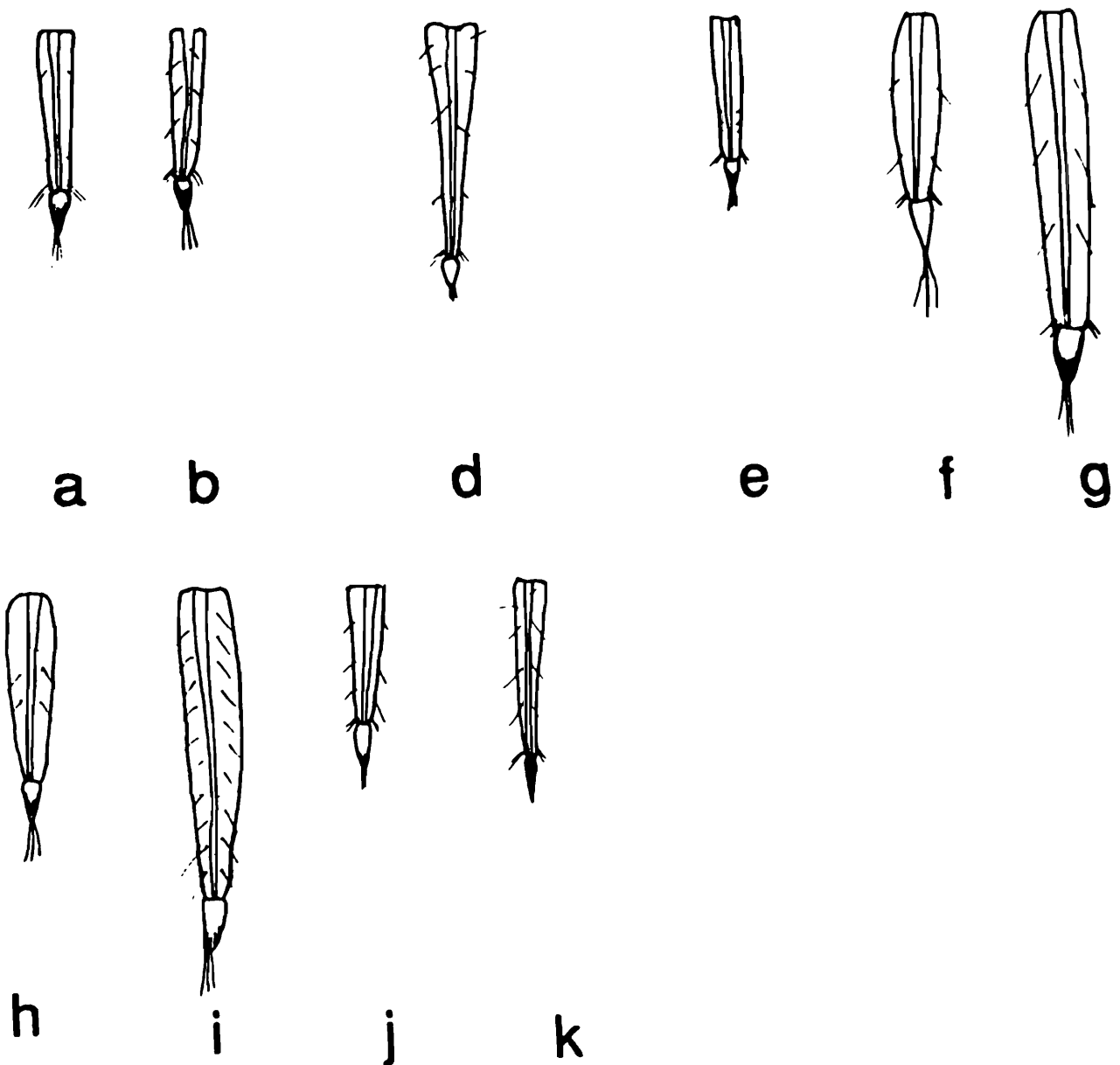
Fig. 29

Figs. 29a-l : Species of *Eutrichosiphum*, alate viviparous female morph : antennal segment III. a *alnicola* b *arunachali*, d *khasyanum*, e *makii*, f *pseudopasaniae*, g *raychaudhurii*, h *russellae*, i *sankari*, j *sensoriatum*, k *subinoyi*, l *tattakanum*. Figs. 29m-q : Species of *Eutrichosiphum*, alate oviparous female and male morphs : antennal segment III. m *alnicola*, n - *flavum*, o *tattakanum*, p sp. I, q sp. II.



**Fig. 30**

Figs. 30a-l : Species of *Eutrichosiphum*, alate viviparous female morph : processus terminalis. a *alnicola*, b *arunachali*, d *khasyanum*, e *makii*, f *pseudopasaniae*, g *raychaudhurii*, h - *russellae*, i *sankari*, j *sensoriatum*, k *subinoyi*, l *tattakanum*. Figs. 30m-q : Species of *Eutrichosiphum*, alate oviparous female and male morphs : processus terminalis. m *alnicola*, n *flavum*, o *tattakanum*, p sp. I, q sp. II.



**Fig. 31**

Figs. 31a-k : Species of *Eutrichosiphum*, alate viviparous female morph : ultimate rostral segments. a *alnicola*, b *arunachali*, d *khasyanum*, e *pseudopasaniae*, f *raychaudhurii*, g *russellae*, i *sensoriatum*, j *subinoyi*, k *tattakanum*.

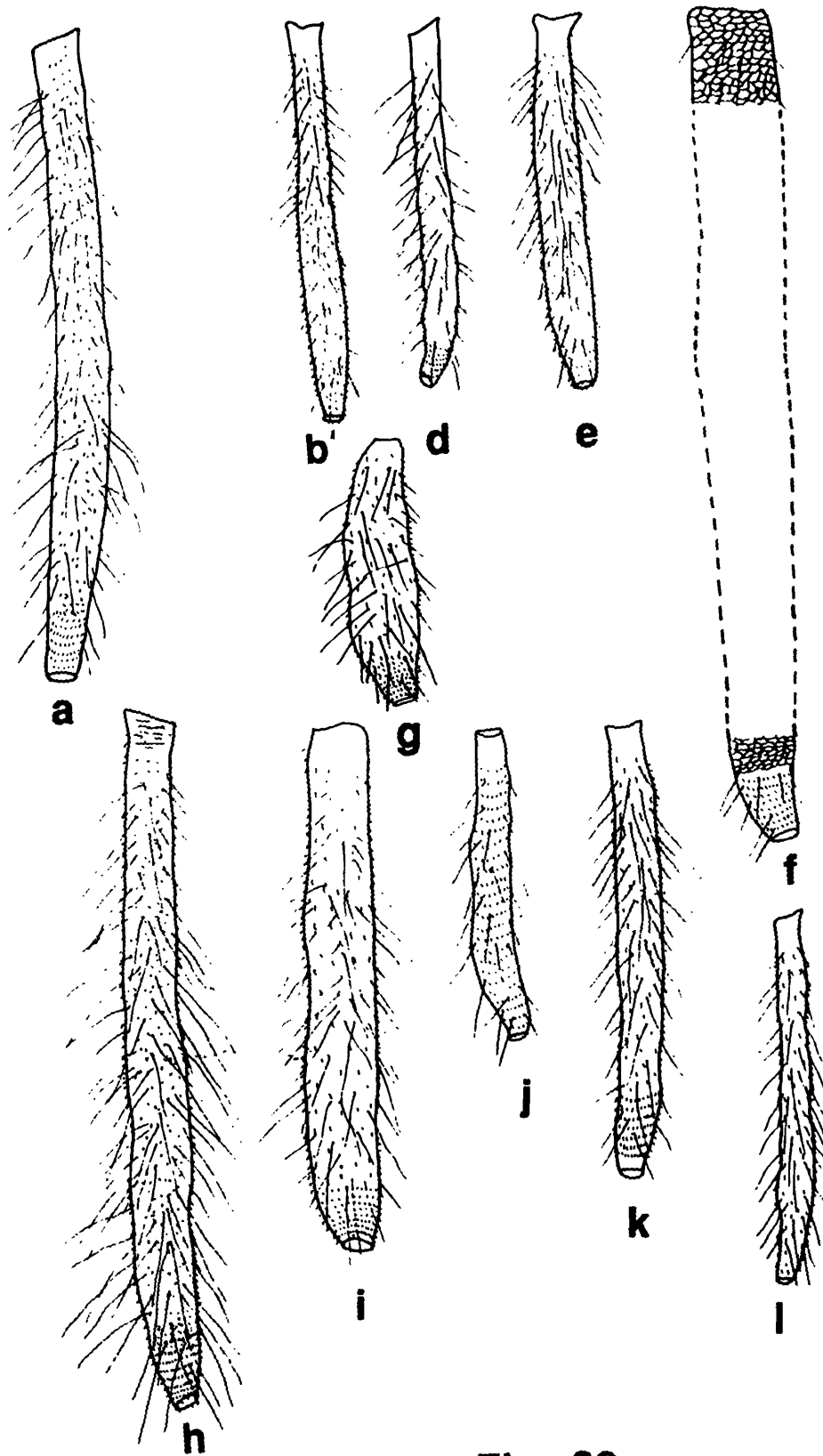


Fig. 32

Figs. 32a-l : Species of *Eutrichosiphum*, alate viviparous female morph : siphunculi. a *alnicola*, b *arunachali*, d *khasyanum*, e *makii*, f - *pseudopasaniae*, g *raychaudhurii*, h *russellae*, i *sankari*, j - *sensoriatum*, k *subinovi*, l *tattakanum*.

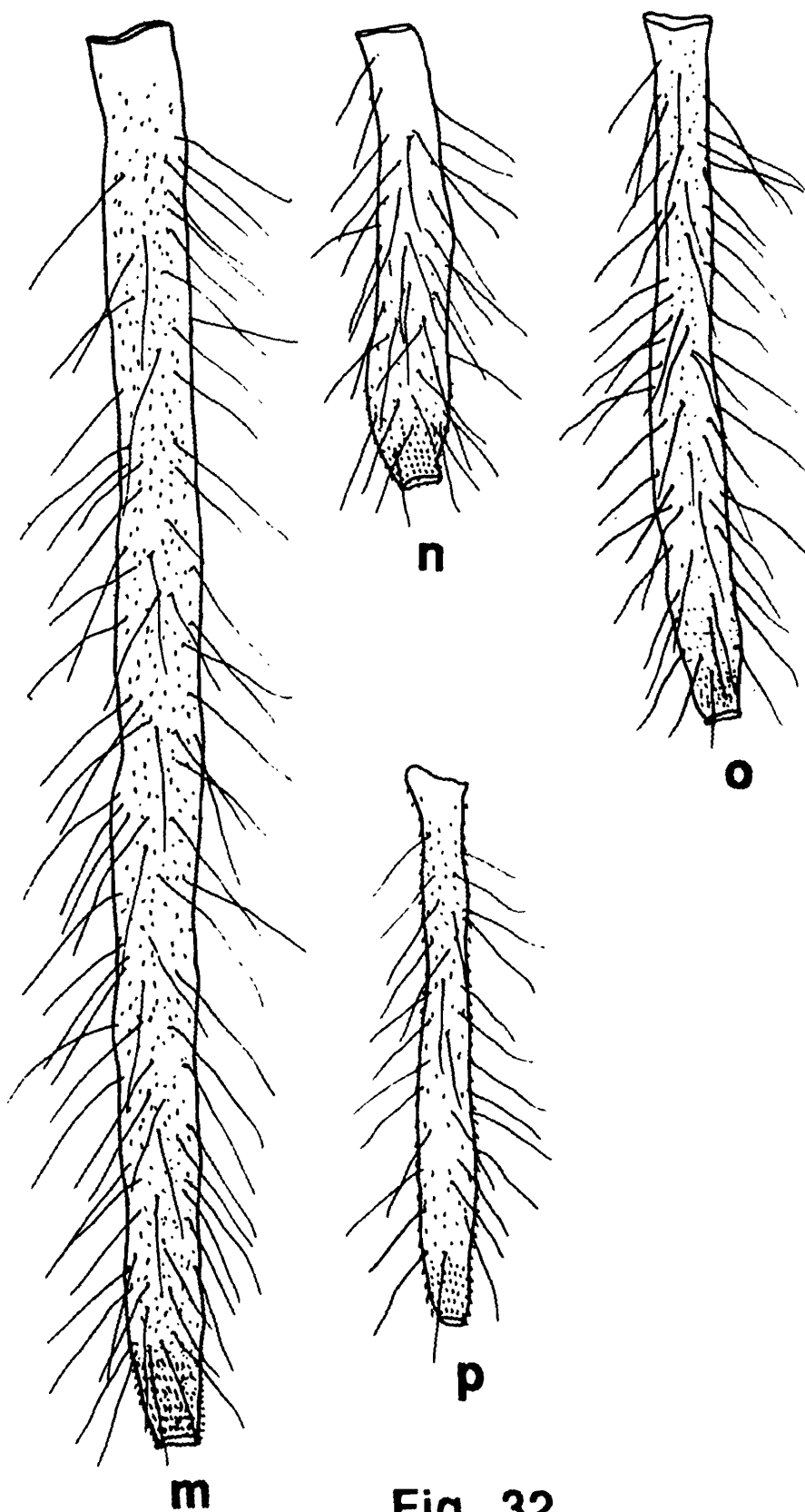


Fig. 32

Figs. 32m-p : Species of *Eutrichosiphum*, alate oviparous female and male morph :  
 siphunculi. m *alnicola*, n - *flavum*, o *tattakanum*, p sp. I.

Genus 8. *Greenidea* Schouteden, 1905

1890. *Siphonophora* Koch : Westwood, J.O., *Trans. Ent. Soc. London*, pt. 4, 649 (Partim).
1905. *Greenidea* Schouteden, H., *Spolia Zeylan.*, 2 : 181 (Type-generis : *Siphonophora artocarpi* Westwood., 1890).
1906. *Trichosiphum* Pergande, Th., *Ent. News. Philad.*, 17 : 207 (Typus-generis : *anonae* Pergande, 1906).
1931. *Greenidea* Schouteden, H. : Takashashi, R., *Aph. of Formosa*, pt. 6 : 30 (Partim).

**Morphology** : Body broadly oval or pear-shaped. Frontal tubercles absent, frons straight or slightly convex. Head smooth ; dorsal cephalic hairs few to many, usually long, with acuminate, fine or branched apices. Antennae 6-segmented, shorter to longer than body, flagellum imbricated in most of the species, some species with reticulations on segment III or beyond (species of subgenus *Neogreenidea*), and some species with segment III smooth at least on basal 0.50 portion ; flagellar hairs short and long, stiff or fine, with acute, acuminate or branched apices ; apterae viviparae without secondary rhinarium, alatae with round to transversely oval, few to many secondary rhinaria distributed on segment III and sometimes beyond ; primary rhinaria ciliated. Rostrum usually reaching little beyond hindcoxae, segments 4 and 5 distinctly separated ; ultimate rostral segments 1.40-3.14 x as long as second segment of hindtarsus in apterae. Dorsum of abdomen pale, brown to dark brown, variably sclerotised, smooth or wrinkled or corrugated and sometimes with muscle-plate-like structure on spinal or pleural or marginal regions ; spinules usually present anteriorly, sometimes entirely; dorsal hairs variable in lengths and apices, stiff; in alatae hairs mostly fine, sometimes with acuminate apices. Siphunculi usually cylindrical, elongated, 0.14-0.87 x as long as body in apterae, in alatae always longer than in apterae, curved outwards ; covered with many long and some short hairs having acute, acuminate or branched apices ; in apterae reticulated pattern of transversely hexagonal cells either on both surfaces or only one surface restricted near the base or extending faintly beyond excepting the apical portion which is covered with transverse rows of spinules, in alatae siphunculi always reticulated over the entire length. Cauda rounded or transversely oval, with a median stylus. Subanal plate broadly oval or semi-circular. Femora and tibiae smooth or with spinular imbrications, in the subgenus *Paragreenidea* hindtibiae with variable number of stridulatory ridges in the form of transverse cuts ; first tarsal joints with 7 ventral hairs. Wing venation normal.

**Discussion** : Schouteden (1905) erected the genus for *Siphonophora*

*artocarpi* Westwood and characterized it by the presence of stiff hairs on body and siphunculi which is elongated. v. d. Goot (1917) and later Takahashi (1931) broadened the concept of the genus by the diagnosis of cauda with a conical processus.

*Trichosiphum* Pergande, 1906 with *T. anonae* Pergande as the typus generis was considered to be synonym of *Greenidea* by Takahashi (1931). Raychaudhuri (1956) treated *Trichosiphum* Pergande “as a subgenus to *Greenidea* because of the different sculpture of the siphunculi in apterae and larvae” He (op. cit.) also erected another subgenus *Paragreenidea* to accommodate *G. viticola* Takahashi which possessed stritulatory ridges on the hindtibiae. Raychaudhuri and Chatterjee (1980) considered another subgenus *Neogreenidea* to the *Greenidea* for those species which exhibited reticulations on their flagellum.

We have examined the representative materials of almost all the species recorded in India and adjacent countries. We have found that the subgeneric division of the genus *Greenidea*, as followed by Raychaudhuri and Chatterjee (1980), is well-judged and, therefore, retained in this study.

**Biology :** Species of *Greenidea* live on a number of trees belonging to plant orders Hammamelidae, Magnolidae, Rosidae, Dillenidae and Asteridae but members of Hamamelidae (Betulaceae, Fagaceae, Juglandaceae, Moraceae, Ulmaceae, Urticaceae) and Magnolidae (Anonaceae, Lauraceae, Meliosomaceae) are preferred. The recorded species from north-east India and also elsewhere in this region mainly reproduce parthenogenetically although both the sexual morphs are on record for six species (Ghosh, A. K. 1987).

**Distribution :** Australia, Bangladesh, China, India, Indonesia, Japan, Korea, Malaysia, Nepal, Pakistan, Sri Lanka, Taiwan, Thailand, U.S.S.R.

**Type-species :** *Siphonophora artocarpi* Westwood, 1890.

**Key to the identification of subgenera of genus *Greenidea***

1. Hindtibiae of both apterae and alatae viviparae with a variable number of transverse cuts ..... ***Paragreenidea***  
 Hindtibiae of apterae and alatae viviparae without any transverse cut ..... 2
2. Flagellum with distinct reticulations on segment III or beyond in both apterae and alatae viviparae, besides normal imbrications ..... ***Neogreenidea***

Flagellum without reticulation but with normal imbrications ..... 3

3. Siphunculi in apterae viviparae distinctly reiculated near the base on one surface ..... *Trichosiphum*  
 Siphunculi in apterae viviparae distinctly reticulated on both surfaces throughout the length ..... *Greenidea* S. S.

Key to the identification of species of subgenus *Greenidea*

*Apterous Viviparous Females*

1. None of the hairs on siphunculi with furcated apices , antennae shorter than the body ..... *decaspermi*  
 Atleast some of the hairs on siphunculi with furcated apices ; antennae shorter to longer or longer than body ..... 2
2. Siphunculi upto about 0.40 x as long as body ..... 3  
 Siphunculi 0.42-0.87 x as long as body .....4
3. Siphunculi distinctly spinulose throughout its length ..... *aborensis*  
 Siphunculi sparsely spinulose except near the apical region which is densely spinulose ..... *ficicola*
4. Siphunculi long, 0.71-0.87 x as long as body, segment 4 of u.r.s. with less than 10 accessory hairs .....*longicornis*  
 Siphunculi 0.42-0.57 x as long as body ; segment 4 of u.r.s. with more than 10 accessory hairs .....5
5. Dorsum of abdomen wrinkled, finely granulated, with a broad median area covering almost the first two tergites ; cauda with 6 hairs ..... *photiniphaga*  
 Dorsum of abdomen smooth, locally sclerotized , cauda with 8 or more hairs .....6
6. U.r.s. 0.26-0.33 mm long, upto about 2.75 x as long as h.t.2 , dorsum of abdomen yellowish brown ..... *longirostris*  
 U.r.s. about 0.23 mm long, upto about 2.30 x as long as h.t.2 ; dorsum of abdomen pale brown ..... *schimae*

*Alate Viviparous Females*

1. Siphunculi 2.90 mm long, longer than body ..... *longicornis*

- Siphunculi shorter than body ..... 2
2. Venter of abdomen densely and evenly spinulose ..... *decaspermi*  
 Venter of abdomen medially smooth, rest variably spinulose  
 .....3
3. 7th tergite with 6 spino-pleural hairs besides marginal ones  
 ..... *himansui*  
 7th tergite with 2 spinal hairs ..... 4
4. Siphunculi short, about 0.76 mm long and 0.31 x as long as body ;  
 antennal segment III with 35 secondary rhinaria .....*artocarpi*  
 Siphunculi short to long, usually long (1.01-1.96 mm), seldom short,  
 0.33-0.81 x as long as body , antennal segment III with less than 35  
 secondary rhinaria ..... 5
5. U.r.s. 0.29-0.41 mm long ; longest hair on anterior tergites 1.10-1.30  
 x as long as b.d. III ..... *longirostris*  
 U.r.s. upto 0.27 mm long , longest hair on anterior tergites 1.60-1.90  
 mm long .....6
6. Siphunculi 1.38-1.96 mm long and antennae 2.60-3.72 mm long  
 ..... *schimae*  
 Siphunculi 0.66-1.40 mm long ; antennae 1.55-2.60 mm long  
 ..... *ficicola*

Key to the identification of species of subgenus *Neogreenidea*

*Apterous Viviparous Females*

1. U.r.s. 2.70-3.14 x as long as h.t.2 ; siphunculi 0.38-0.42 x as long as  
 body ; cauda with 4 hairs ..... *querciphaga*  
 U.r.s. upto 1.90 x as long as h.t.2 ; siphunculi upto 0.29 x as long as  
 body ; cauda bearing upto 6 hairs .....2
2. Longest hairs on antennal segment III 6.0-6.67 x as long as b.d.III ;  
 cauda with a short median processus ..... *longisetosa*  
 Longest hairs on antennal segment III 3.0-4.30 x as long as b.d.III ,  
 cauda with a long median processus ..... *ayyari*

*Alate Viviparous Females*

- Siphunculi 1.80-1.81 mm long and 0.75-0.76 x as long as body ;  
 u.r.s. 0.38-0.41 mm long and 2.91-3.20 x as long as h.t.2 .....  
 ..... *querciphaga*

Siphunculi 0.87-0.88 mm long and about 0.30 x as long as body ;  
u.r.s. 0.24-0.27 mm long and 1.50-1.70 x as long as h.t.2..... *ayyari*

Key to the species of subgenus *Paragreenidea*

*Apterous Viviparous Females*

1. P.t. 2.37-3.33 x as long as base of the last antennal segment, and 0.66-0.86 x as long as antennal segment III ; hindtibiae with 28-38 transverse cuts ..... *parthenocissi*  
P.t. 1.6-1.7 x as long as base of the last antennal segment and upto 0.50 x as long as antennal segment III ; hindtibiae with 70 or more transverse cuts .....2
2. Longest hair on antennal segment III 2.8-3.0 x as long as b.d. III ; hindtibiae with 90-128 transverse cuts ..... *symplocosis*  
Longest hair on antennal segment III 3.8-4.0 x as long as b.d. III ; hindtibiae with 70-85 transverse cuts ..... *viticola\**

Key to the species of subgenus *Trichosiphum*

Note: The key does not include *T. carpinicolda* Banerjee & Chakrabarti due to lack of material. However, a description is provided as Addendum at the end of book.

*Apterous Viviparous Females*

1. Hindtibiae with spiny or peg-like hairs on the outer margin ; dorsal hairs of abdomen few, long and thin ..... *spinotibium*  
Hindtibiae without spiny or peg-like hairs .....2
2. Antennal segment III and tibiae partly or entirely smooth .....3  
Antennal segment III and tibiae imbricated .....7
3. Siphunculi long, 0.80-0.94 mm long .....4  
Siphunculi short, less than 0.50 mm long .....5
4. Abdominal dorsum with a median solid brown patch extending on 2nd-6th tergites ..... *gigantea*  
Dorsum of abdomen without such a patch ; p.t. 1.73-2.21 x as long as base of last antennal segment ..... *brachyunguis*
5. Mid-ventral area smooth, rest variably spinulose ; cauda with 6-8 hairs .....6  
Mid-ventral area spinulose ; cauda with 4 hairs ..... *sikkimensis*

\* not distributed in the Indian subcontinent.

6. P.t. 1.62-2.0 x as long as base of last antennal segment ; segment III entirely smooth ..... *haldari*  
 P.t. 2.40 x as long as base of last antennal segment , segment III smooth near the base ..... *kumaoni*
7. U.r.s. upto 3.0 x as long as h.t.2 ..... *quercicola*  
 U.r.s. less than 2.40 x as long as as h.t.2 ..... 8
8. Abdominal venter with a dark spino-pleural sclerotic patch, evenly spinulose ..... *prunicola*  
 Abdominal venter with median region smooth, laterally variably spinulose ..... 9
9. P.t. longer than antennal segment III .....10  
 P.t. shorter to subequal of antennal segment III .....12
10. Longest hair on antennal segment III 4.20-4.35 x as long as b.d. III , u.r.s. with 8 short accessory hairs ..... *camelliae*  
 Longest hair on antennal segment III less than 4.0 x as long as b.d. III ; u.r.s. with 10 or more accessory hairs .....11
11. Siphunculi 0.30-0.34 mm long and 0.19-0.24 x as long as body , caudal process not distinct ..... *anonae*  
 Siphunculi more than 0.40 mm long ; cauda with a distinct median process .....12
12. U.r.s. 0.21-0.25 mm long and 1.91-2.27 x as long as h.t.2 ..... *formosana formosana*  
 U.r.s. 0.15-0.19 mm long and 1.20-1.72 x as long as h.t.2 ..... *formosana heeri*
13. Siphunculi black or dark brown, 0.20-0.29 x as long as body ; dorsum of abdomen brown, sclerotic and wrinkled ..... *bucktonis*  
 Siphunculi light brown, 0.34-0.42 x as long as body ; dorsum of abdomen dark, with a large spino-pleural sclerotic patch ..... *heterotricha*

*Alate viviparous female*

1. Antennae black, segment III with 4-9 secondary rhinaria ; u.r.s. 0.14 mm long ..... *anonae*  
 Antennae pale brown to dark brown, segment III with 12 or more secondary rhinaria ; 0.19 mm or longer .....2

2. Ultimate rostral segments 0.33-0.34 mm long and 3.0-3.33 x as long as second segments of hindtarsi , antennal segment III with 12-14 secondary rhinaria ..... *quercicola*  
 Ultimate rostral segments 0.19-0.28 mm long. 1.69-2.3 x as long as second segment of hindtarsi , antennal segment III with 14 or more secondary rhinaria.....3
3. Cauda with median stylus short, indistinct , siphunculi about 0.4 x as long as body ..... *sikkimensis*  
 Cauda with median stylus distinct ; siphunculi 0.5-0.77 x as long as body ..... 4
4. Longest hairs on anterior abdominal tergites 0.57-0.6 x as long as diameter of antennal segment III ..... *bucktonis*  
 Longest hairs on anterior abdominal tergites longer than the basal diameter of antennal segment III .....5
5. Ultimate rostral segments 0.23-0.25 mm long and 1.92-2.77 x as long as second segments of hindtarsi, longest hairs on anterior abdominal tergites 1.1-1.3 x as long as basal diameter of antennal segment III ..... *formosana formosana*  
 Ultimate rostral segments 0.19-0.23 mm long and 1.69-1.77 x as long as second segments of hindtarsi ; longest hairs on anterior abdominal tergites 1.7-1.8 x as long as basal diameter of antennal segment III ..... *formosana heeri*

43. *Greenidea (Greenidea) aborensis* (Ghosh, A. K.)  
 (Figs. 33a, 34b, 35a-36a)

1974. *Greenidea aborensis*, Ghosh, A. K., *Oriental Ins.*, 8 : 162.
1980. *Greenidea (Greenidea) aborensis*, Raychaudhuri, D. N. and Chatterjee M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D. N., 341.

*Apterous viviparous female* : Body elongated, deep brown, 3.04- 3.50 mm long and 1.30-1.60 mm as maximum width. Head with many long dorsal hairs, mostly with acute apices, a few with furcated apices. Antennae 6-segmented, dark brown on basal segments, apices of segment V and apical 0.88 portion of segment VI, rest pale, 2.81-3.10 mm long and 0.89-1.11 x as long as body ; flagellum imbricated, segment III slightly shorter than or equal to processus terminalis ; hairs on flagellum with acute or acuminate apices, longest hair on antennal segment III 3.30-3.50 x as long as basal diameter of the segment.

Rostrum reaching upto 1st abdominal segment , ultimate rostral segment slender and acuminate, 0.24-0.27 mm long and 1.60-2.0 x as long as second joint of hindtarsus ; segment 4 with 14-16 fine accessory hairs. Dorsum of abdomen dark with a longitudinal pale area in the mid- dorsum extending upto 3rd tergite ; dorsal hairs with acute, acuminate and furcated apices, longest one on anterior tergites 2.50-3.0 x as long as basal diameter of 3rd antennal segment, 7th tergite with two thick hairs, with acute apices, these being 2.70- 3.0 x as long as the mentioned diameter ; 8th tergite with two thin hairs with similar apices, 2.50-2.70 x as long as the mentioned diameter. Siphunculi completely pale, 1.0-1.11 mm long, 0.31-0.36 x as long as body and about 9.0-10.5 x as long as maximum width ; hairs on siphunculi numerous, with acute or acuminate apices, a very few near base with furcated apices ; spinules occur over entire surface along the distinct reticulation. Cauda black, with a distinct median process. Legs pale, femora nearly smooth ; tibiae striate - imbricated ; hairs on femora and tibiae thick and erect, with acute apices ; first tarsal segments with 7, 7, 7 hairs ; tarsi blackish.

*Measurements in mm :*

	Length	Width	Antenna
1.	3.04	1.50	2.88
2.	3.12	1.54	2.87
3.	3.27	1.52	2.96
4.	3.15	1.58	2.77
5.	3.07	1.51	2.85

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.80	0.40	0.42	0.29 + 0.80	0.26	0.14	1.00
0.77	0.40	0.41	0.29 + 0.82	0.25	0.15	1.01
0.80	0.43	0.43	0.30 + 0.80	0.24	0.14	broken
0.77	0.39	0.40	0.27 + 0.80	0.24	0.15	1.00
0.80	0.41	0.42	0.28 + 0.77	0.25	0.15	1.00

(1-5, an indet. host of Meliaceae, 10 Km. from Basar, Siang, Arunachal Pradesh, 14.ii.1973, Z.S.I.Colls.).

*Other morphs* : Not known.

*Materials examined* : 6 apterous viviparous females and 8 nymphs from an indet. host (Meliaceae), 10 km. from Basar, Siang (c 1000 m), Arunachal Pradesh, 14.ii.1973, Coll. A. K. Ghosh.

*Discussion* This species differs from all the known species under the genus by its large size, characteristic pigmentation of abdomen, completely pale siphunculi besides the morphometrical differences.

*Biology* : In life this species looks shining black with pale area on the dorsum. The species infests tender shoots or undersurface of young leaves of the host.

*Distribution* India Arunachal Pradesh.

*Types* : In the collection of Zoological Survey of India, Calcutta, India.

#### 44. *Greenidea* (*Greenidea*) *artocarpi* (Westwood)

1890. *Siphonophora artocarpi*, Westwood, J. O., *Trans. Ent. Soc. Lond.*, pt. 4 : 649.  
 1905. *Greenidea artocarpi*, partim, Schouteden, H., *Spolia Zeylan.*, 2 : 181.  
 1927. *Greenidea artocarpi*, George, C. J., *Proc. Asiat. Soc. Bengal*, 23 : 7.  
 1931. *Greenidea artocarpi*, Takahashi, R., *Aph. of Formosa*, pt. 6 : 29.  
 1956. *Greenidea artocarpi*, David, S. K., *Madras Agric. Jour.*, 43 : 104.  
 1956. *Greenidea* (*Greenidea*) *artocarpi*, Raychaudhuri, D. N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D. N., 341

*Apterous viviparous female* : Body elongated, brown, 2.20-2.26 mm long and 1.16-1.25 mm as maximum width. Head flat and brown. Antennae 6-segmented, brown, gradually becoming considerably darker towards the apex, 2.30-2.44 mm long and 1.03-1.10 x as long as body ; flagellum distinctly imbricated from base to apex ; flagellar hairs large, thick, with branched apices, longest hair on segment III 2.50-2.70 x as long as basal diameter of the segment ; procesus terminalis 0.62-0.70 mm long and 2.38-2.50 x as long as base of last antennal segment. Rostrum reaching almost the middle of the body; ultimate rostral segments slender and acute, 0.20-0.21 mm long and 1.70-2.10 x as long as second joint of hindtarsus ; segment 4 with 12 very fine and rather long accessory hairs. Dorsum of abdomen sclerotized, unevenly pale brownish to dark, smooth ; dorsal hairs placed irregularly, thick and stiff, always with branched apices, anterior tergites (1-3) with a few small and thinner hairs between the large hairs also with branched apices, longest hairs on anterior tergites 2.90-3.0 x as long as basal diameter of 3rd antennal segment ; 7th tergite with two thick hairs

with branched apices, 2.20-2.80 x as long as the mentioned diameter ; 8th tergite with two finer and thinner hairs with acute apices, 2.90 x as long as the mentioned diameter. Siphunculi blackish brown, with the very base more transparent and paler, 1.07-1.07 mm long and 0.48-0.55 x as long as body ; hairs on siphunculi many, the hairs near the base mostly furcated, those on the distal half mostly with acute apices ; spinules present in distinct transverse rows near the apex, but more basad these are extremely scarce and only present along the lines of strongly transverse reticulations. Cauda with a distinct median process, with about 8 very fine and long hairs. Legs coloured like the head, but tibiae rather darker on basal half ; femora sparsely imbricated, more strongly towards the apex; tibiae striate - imbricated.

*Measurements in mm :*

	Length	Width	Antenna
*1.	2.22	1.23	2.37
2.	2.22	1.25	2.30

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.66	0.29	0.34	0.28 + 0.68	0.21	0.10	1.08
0.66	0.28	0.35	0.26 + 0.62	0.20	0.10	1.07

\*Neotype

(1-2, *Artocarpus heterophyllus*, Coimbatore, Tamil Nadu, 27.i.1955, B.M. Colls.)

*Alate viviparous female* : Body elongated, 2.32-2.39 mm long and 0.86-0.94 mm as maximum width. Head and thorax dark. Antennae 6-segmented, 2.55-2.72 mm long and 1.06-1.29 x as long as body ; segment III with 35 transversely oval rhinaria, placed irregularly along one side ; processus terminalis 0.66-0.72 mm long and 2.35-2.57 x as long as base of last antennal segment. Dorsum of abdomen sclerotized ; hairs on dorsum much less than in apterae, with acute apices, longest hair on the anterior tergites 1.6 x as long as basal diameter of 3rd antennal segment ; two hairs on 7th tergite 1.5 x as long as the mentioned diameter. Siphunculi black, 0.76 mm long and 0.31 x as long as body ; more or less cylindrical, slightly curved outwards near apex, slightly thinner at base and at the very apex ; hairs on siphunculi with acute apices. Femora coloured like the head, with slightly darker apices ; tibiae much darker than femora, evenly pigmented. Wing venation normal.

*Measurements in mm*

	Length	Width	Antenna
1.	2.27	1.00	2.81
2.	2.39	0.86	2.55

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.90	0.33	0.39	0.30 + 0.71	0.20	0.11	1.84
0.83	0.31	0.34	0.28 + 0.66	0.20	0.07	0.76

(1, *Artocarpus heterophyllus*, Coimbatore, Tamil Nadu, 22.i.1956, C.U.Colls. ,  
2, *A. heterophyllus*, Coimbatore, Tamil Nadu, 21.i.1955, B.M.Colls.).

*Materials examined* : 2 apterous viviparous females from *Artocarpus heterophyllus*, Coimbatore, Tamil Nadu, 21.i.1955, Colls. S. K. David ; 2 apterous viviparous females and 2 alate viviparous females from *A. heterophyllus*, Coimbatore, Tamil Nadu, Coll. S. K. David ; 1 alate viviparous female from *A. heterophyllus*. Coimbatore, Tamil Nadu, 22.i.1956, Coll. S. K. David.

*Discussion* : Type material designated by Westwood (1890) was lost. Raychaudhuri (1956) designated a neotype from the collections of S. K. David from South India. The species is distinguishable from its conspecifics under the nominate subgenus by siphunculi darker, processus terminalis longer than 3rd antennal segment, antennae longer than body, venter of abdomen locally spinulose and dorsum smooth.

*Biology* Brownish aphids live on the undersurface of tender leaves of the host plants.

*Distribution* India Meghalaya, South India ; China, Sri Lanka.

*Type* Neotype is in the collections of the Natural History Museum, London.

45. *Greenidea (Greenidea) decaspermi* Takahashi  
(Figs. 33b, 34c, 35b-38b, 39a, 40b)

1933. *Greenidea decaspermi*, Takahashi, R., *Philipp. Jour. Sci.*, 52 : 294.  
1956. *Greenidea decaspermi*, Raychaudhuri, D. N., *Zool Verh. Leiden*, 31 : 33.  
1980. *Greenidea (Greenidea) decaspermi*, Raychaudhuri, D. N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D. N., 341.

*Apterous viviparous female* : Body pear-shaped, 1.70-3.04 mm long and 0.95-1.27 mm as maximum width. Head brown, smooth. Antennae 6-segmented, brown, with segments IV to VI darker, 1.56-2.56 mm long and 0.83-1.0 x as long as body ; flagellum distinctly imbricated from base to apex, large hairs on flagellum thick and stiff, with branched, furcated or acuminate apices ; longest hair on segment III about 3.3 x as long as basal diameter of the segment , processus terminalis 0.39-0.62 mm long and 1.80-2.20 x as long as base of last antennal segment. Rostrum reaching just past the hindcoxae , ultimate rostral segments short, acute, 0.19-0.23 mm long and 1.40-1.81 x as long as second joint of hindtarsus, with 12-14 rather short and fine hairs. Dorsum of abdomen sclerotized pale, brown to blackish brown, smooth, ventrally evenly spinulose; dorsal hairs large, thick and stiff with branched, furcated or acuminate apices ; longest hair on anterior tergites 0.11-0.15 mm long and 3.40-4.30 x as long as basal diameter of 3rd antennal segment, a few shorter hairs with slightly furcated or acuminate apices occur on the anterior half of abdomen ; 7th tergite with two hairs, with acute apices, 3.10- 4.0 x as long as the mentioned diameter ; 8th tergite with two rather thinner and shorter hairs, with acute apices, and 2.0-2.1 x as long as the mentioned diameter Siphunculi brownish black with paler apex, 0.74-1.30 mm long. 0.39-0.57 x as long as body and about 6.5-8.4 x as long as their maximum width ; reticulated almost over the entire length, but distinctly so near the bases, slightly curved outwards ; hairs on the siphunculi numerous, mostly long with acute or subacute apices, a few near the base shorter with acuminate apices , spinules present in distinct transverse rows over a large part distally, gradually diminishing in number towards the base. Cauda with a distinct, fairly slender median process, with about 6-8 long and fine hairs. Femora pigmented like the head, superficially imbricated, with a number of striae ; tibiae slightly darker than the femora, striate-imbricated.

*Measurements in mm*

	Length	Width	Antenna
1.	2.54	1.26	2.54
2.	2.53	1.26	2.36
3.	3.04	1.31	?
4.	2.87	1.27	?
5.	2.52	1.23	2.59

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.65	0.34	0.40	0.34 + 0.62	0.20	0.11	1.30
0.61	0.31	0.36	0.30 + 0.60	0.19	0.11	1.17
broken	—	—	—	0.21	0.15	1.25
broken	—	—	—	0.23	0.15	—
0.63	0.36	0.39	0.34 + 0.69	0.21	0.13	1.29

(1-2, *Quercus* sp., Gangtok, Sikkim, date ?, C.U. Colls. ; 3-4, an indet. host, Jawai to Jarian, Meghalaya, 22.i.1975, Z.S.I.Colls. ; 5, indet. host, Gangtok, Sikkim, 30.ix.1983, T.U.Colls.).

*Alate viviparous female* : Body elongated, 2.10-2.53 mm long, with 0.84-1.12 mm as maximum width. Frons with poorly developed frontal tubercles. Antennae blackish-brown with slightly paler basal segments, 2.16-2.98 mm long and about 1.04-1.17 x as long as body, processus terminalis about 2.02 x as long as base of last antennal segment ; segment III with 17-22 circular to transversely oval, small to rather large rhinaria not in a row, over almost the entire length of the segment ; flagellar hairs large and thick, with acuminate or sub-acute apices ; longest hair on segment III about 4.6 x as long as basal diameter of the segment ; ultimate rostral segments about 0.22 mm long and about 1.83 x as long as second joint of hindtarsus. Abdominal tergum sclerotized ; dorsal hairs long and short, occur intermingled, with acute apices ; longest hair on anterior tergites about 2.3 x as long as basal diameter of 3rd antennal segment ; each of 7th and 8th abdominal tergites with two hairs with acute apices, upto about 1.4 and 2.9 x as long as the mentioned diameter, respectively. Siphunculi brownish-black, slightly paler apicad, about 1.73 mm long and about 0.75 x as long as body, reticulated- imbricated, almost cylindrical, slightly curved outwards near the apex, about 19.6 x as long as their maximum width, at the middle about 2.9 x as thick as the middle of the hindtibiae ; hairs on the siphunculi with acute apices ; longest hair about 3.8 x as long as diameter of the siphunculi near their base ; spinules in transverse rows present only near the apex. Femora brownish yellow with the apices slightly darker, superficially imbricated, with a number of spinulose striae, bases and apices of the tibiae considerably darker than the femora, rest as darker as or a little darker than femora, striate-imbricated. Wing veins dark ; pterostigma extending upto a little more than 1/3rd the radial sector.

*Measurements in mm :*

	Length	Width	Antenna
1.	2.10	0.84	2.16
2.	2.53	1.12	2.98

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.59	0.32	0.32	0.26 + 0.53	—	—	1.73
0.82	0.43	0.45	0.36 + 0.73	0.22	0.12	broken

(1, *Decaspermum fruticosum*, Taihoku, Taiwan, B.M. Colls. ; 2, an indet. host, Gangtok, Sikkim, 30.ix.1983, T.U.Colls.).

*Other morphs* : Not known.

*Materials examined* : 2 apterous viviparous females and 8 nymphs from an indet. host of Myrsinaceae, Jowai to Jarain, Meghalaya, 22.i.1975, Coll. A. K. Ghosh ; 2 apterous viviparous females and 2 nymphs from *Quercus* sp. (Fagaceae), Gangtok, Sikkim, date ?, Coll. ? (Slide No. S-598 of Calcutta University) ; 1 apterous viviparous female and 1 alate viviparous female from an indet. host, Gangtok, Sikkim, 30.ix.1983, Coll. S. Mahapatra.

*Discussion* : This species is distinguishable from its conspecifics under the nominative subgenus in having siphunculi longer than hindtibiae and venter of abdomen evenly spinulose throughout.

*Biology* : Not known.

*Distribution* : India Karnataka, Meghalaya, Sikkim; Nepal, Taiwan.

*Types* : In Taiwan Agricultural Research Institute, Taipeh (Taihoku), Taiwan.

**46. *Greenidea (Greenidea) ficicola* Takahashi**  
(Figs. 33c, 34d, 35c-38c, 39b, 40c)

1916. *Trichosiphum formosanum*, Maki, M., *Essays for Nawa, Gifu*, p. 13 (Partim).  
 1917. *Greenidea artocarpi*, Goot, P. van der, *Contrib. Faune Indes Neerl.*, 1 : 131 (Partim).  
 1921. *Greenidea ficicola*, Takahashi, R., *Aph. of Formosa*, 1 : 66.  
 1927. *Greenidea ficicola*, Mason, P. W., *Suppl. Ent.*, 15 : 87.  
 1936. *Greenidea ficicola*, Takahashi, R., *Lign. Sci. Jour.*, 15 : 596.  
 1950. *Greenidea ficicola*, Takahashi, R., *Ann. Ent. Soc. Amer.*, 43 : 588.  
 1956. *Greenidea ficicola*, Raychaudhuri, D. N., *Zool. verh. Leiden*, 31 : 35.  
 1970. *Greenidea neoficicola*, Ghosh, A. K., Ghosh, M. R. and Raychaudhuri, D. N., *Oriental Ins.*, 4 : 197 (New Syn.).

1980. *Greenidea (Greenidea) ficicola*, Raychaudhuri, D. N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D. N., 341.

*Apterous viviparous female* Body brown, pear-shaped, 1.70-2.81 mm long and 0.89-1.51 mm as maximum width. Head brown, dorsum smooth with large thick hairs. Antennae 6-segmented, gradually slightly darker towards the apex, 1.88-2.46 mm long and 0.71-1.03 x as long as body; flagellum gradually more distinctly imbricated from base towards apex; processus terminalis 0.45-0.83 mm long and 2.26-2.72 x as long as base of last antennal segment, flagellar hairs large, thick, similar to those on dorsum of head; longest hair on segment III about 2.0-3.4 x as long as basal diameter of the segment. Rostrum reaching the middle of the body; ultimate rostral segments very long and acute, 0.17-0.28 mm long and 1.84-2.42 x as long as second joint of hindtarsus, 4th segment 4.0-5.40 x as long as the 5th segment, with 12-14 fine accessory hairs. Dorsum of abdomen sclerotised, brown to brownish black, with almost circular, well-defined, paler zones round the bases of each of the large hairs, smooth, dorsal hairs large, thick, stiff, always with branched or multifid apices, longest hair on the anterior tergites 0.06-0.12 mm long and 2.90-4.02 x as long as basal diameter of 3rd antennal segment; 7th tergite with two thick hairs, 8th tergite with two thin and fine ones, these 2.9-4.20 x and 1.60-2.80 x as long as the mentioned diameter respectively. Siphunculi with the base brown and the rest towards the apex gradually darker, 0.63-1.03 mm long, 0.31-0.41 x as long as body, curved outwards; hairs on siphunculi numerous, the apices of the hairs acute but sometimes furcated, in Indian specimens siphuncular hairs on basal half markedly furcated but in the specimens of Java very rarely furcated; longest hair 2.50-4.30 x as long as basal diameter of the siphunculi, spinules in distinct transverse rows near the apex, spinules on the rest of the siphunculi very scarce and, where present, placed on the line of a network of transverse reticulations, which extend from base to at least basal 0.80 portion. Cauda with a distinct median conical process, with 8 very fine long hairs. Legs pigmented like the head; femora rather dispersally and superficially imbricated, tibiae striate-imbricated.

*Measurements in mm*

	Length	Width	Antenna
1.	1.96	1.17	1.55
2.	2.71	1.43	1.94
3.	2.81	1.51	2.03
4.	2.62	1.46	1.97
5.	2.22	1.29	?
6.	2.10	1.14	1.88

7.	2.37		1.30		2.46		
8.	2.17		1.17		2.15		
9.	1.99		1.18		?		
10.	2.28		1.23		?		
11.	2.22		1.23		2.08		
12.	2.20		1.42		2.01		
13.	2.34		1.38		?		
14.	2.17		1.12		1.96		
15.	2.08		1.17		?		
	Antennal segments			urs	ht2	Siph.	
	III	IV	V	VI			
	0.34	0.22	0.27	0.17 + 0.45	0.17	0.07	0.66
	0.64	0.35	0.40	0.33 + 0.81	0.24	0.13	1.03
	0.72	0.35	0.43	0.33 + 0.82	0.25	0.13	broken
	0.69	0.35	0.38	0.32 + 0.83	0.24	0.13	broken
	0.45	0.23	0.29	broken	0.19	0.09	0.70
	0.43	0.26	0.28	0.21 + 0.57	0.20	0.10	0.67
	0.55	0.34	0.40	0.30 + 0.69	0.27	0.11	0.96
	0.45	0.26	0.33	0.29 + 0.70	0.24	0.11	0.74
	0.45	0.46	0.29	0.22 broken	0.20	0.09	0.82
	0.46	0.27	0.30	0.24 broken	0.19	0.10	0.73
	0.49	0.28	0.33	0.24 + 0.58	0.27	0.12	0.72
	0.48	0.28	0.33	0.22 + 0.54	0.24	0.12	0.64
	0.51	0.30	0.33	0.22 broken	0.18	0.10	0.63
	0.45	0.25	0.28	0.22 + 0.60	0.28	0.12	0.63
	0.52	broken	broken	broken	0.24	0.10	0.72

(1, *Ficus tsiela*, Walayar, South India, 14.xii.1952, B.M.Colls. ; 2-4, *Duabanaga sonneratioides*, Monobar Forest, West Bengal, date ?, C.U. Colls. , 5, *Ficus* sp., I.A.R.S. Farm, New Delhi, 8.xi.1965, B.M.Colls. ; 6, *Psidium guajava*, Kalimpong, West Bengal, 16.xi.1965, B.M.Colls. ; 7-8, an indet. host, Kalimpong, West Bengal, 27.i.1970, C.U.Colls., 9, *Ficus bengalensis*, Chittagong, Bangladesh, 19.ii.1982, B.M.Colls. ; 10-11 *Nephelium litchi*, Kalimpong, West Bengal,

18.xi.1984, T.U.Colls. ; 12-14, *Ficus* sp., Kalimpong, West Bengal, 19.ix.1984, T.U.Colls. ; 15, *Ficus* sp., Gangtok, Sikkim, 21.xi.1984, T.U.Colls.).

*Alate viviparous female* : Body elongated, brown, 1.66-2.32 mm long and 0.60-1.19 mm as maximum width. Antennae black except paler basal segments, 1.55-2.60 mm long and 0.79-1.15 x as long as body ; flagellum distinctly imbricated from base to apex ; segment III with 10-23 circular to transversely oval accessory rhinaria over almost its entire length, nearly in a row, sometimes a few very small rhinaria present ; flagellar hairs large, similar to those on the dorsum of head with more or less blunt apices ; processus terminalis 0.45-0.61 mm long and 2.26- 2.64 x as long as base of last antennal segment. Ultimate rostral segments 0.17-0.27 mm long and 1.92-2.74 x as long as second joint of hindtarsus. Dorsum of abdomen sclerotised, brown, smooth ; dorsal hairs of two types, long and short with acute apices, hairs on the anterior tergites 0.03-0.09 mm long, longest hair about 1.9 x as long as basal diameter of 3rd antennal segment , 7th tergite with two hairs, with acute apices ; 8th tergite with two similar hairs. Siphunculi compressed, blackish brown, cylindrical, slightly curved outwards at apices, 0.66-1.40 mm long and 0.33-0.65 x as long as body , hairs on the siphunculi with acute apices. Femora brown ; tibiae blackish brown, with darker bases, more distinctly striate-imbricated than the femora. Pterostigma extending upto 0.33 portion of the radial sector, Media twice-branched ; hindwings with two oblique veins.

*Measurements in mm*

	Length	Width	Antenna				
1.	1.96	1.17	1.55				
2.	1.72	0.60	?				
3.	1.86	0.88	?				
4.	2.25	0.94	2.19				
5.	2.32	1.19	2.46				
6.	2.05	0.96	1.99				
7.	2.13	0.86	2.46				
	Antennal segments			urs	ht2	Siph.	
	III	IV	V	VI			
	0.34	0.22	0.27	0.17 + 0.45	0.17	0.07	0.66
	0.38	0.15	0.17	0.14 broken	0.22	0.09	0.86
	0.62	broken	—	—	0.26	0.11	0.88

0.57	0.31	0.34	0.23 + 0.57	0.19	0.07	1.25
0.61	0.31	0.30	0.26 + 0.59	0.25	0.13	broken
0.53	0.28	0.30	0.22 + 0.53	0.22	0.09	1.23
0.69	0.34	0.38	0.26 + 0.61	0.27	0.11	1.40

(1, *Ficus* sp., Calcutta, West Bengal, 21.i.1957, B.M. Colls. , 2- 3 *Artemisia vulgaris*, Chamba, Himachal Pradesh, 13.ii.1986, B.M. Colls. ; 4, *Psidium guajava*, 16.xi.1965, Kalimpong, West Bengal, B.M.Colls. ; 5, Y P T, Kathmandu, Nepal, 22.ii.1966, B.M.Colls. ; 6, *Ficus bengalensis*, Chittagong Bangladesh, 19.ii.1982, B.M.Colls. ; 7, *Ficus* sp., Kalimpong, West Bengal, 12.ii.1970, C.U. Colls.).

*Other morphs* : Not known.

*Materials examined* : 1 apterous viviparous female from *Ficus tsiela*, Walayar, South India, 14.xii.1952, Coll. S. D. David , 4 apterous viviparous females from *Ficus* sp., Calcutta, West Bengal, 21.i.1957, Coll. A. N. Basu ; 3 apterous viviparous females and a nymph from *Duabanga sonneratioides*, Monobar Forest, West Bengal, date ?, Coll. M. R. Ghosh ; 2 apterous viviparous females from *Ficus* sp., I.A.R.I. Farm, New Delhi, Coll. R. Menon; 8 apterous and 3 alate viviparous females and 4 nymphs from *Psidium guajava*, 16.xi.1965, Kalimpong, West Bengal, Coll. C.I.B.C., Bangalore; 1 alate viviparous female from Y P T , Kathmandu, Nepal, 26.ii.1966, Coll. K.C. Sharma; 2 apterous and 1 alate viviparous females from an indet. host, Kalimpong, West Bengal, 21.i.1970, C. U. Colls; 2 apterous and 2 alate viviparous female from *Ficus bengalensis*, Chittagong, Bangladesh, 19.ii.1982, Coll. C.I.E.A.; 1 alate viviparous female from *Ficus* sp., Kalimpong., West Bengal, 12.ii.1970, Coll. M.R. Ghosh, 2 apterous viviparous females from *Nephelium litchi*, Kalimpong, West Bengal, 18.xi.1984, Coll. S.K. Mahapatra; 2 apterous viviparous females from *Ficus* sp., Kalimpong, West Bengal, 19.ix.1984, Coll. S.K. Mahapatra; 1 apterous viviparous female from *Ficus* sp., Gangtok, Sikkim, 21.xi.1984, Coll. S.K. Mahapatra; 5 alate viviparous females and 1 alatoid nymph from *Artemisia vulgaris*, Chamba, Himachal Pradesh, 13.ii.1986, Coll. C.I.E.A.

*Discussion* : van der Goot (1917) described this species from Java as *Greenidea artocarpi* infesting *Ficus benjamina*. Takahashi (1921) distinguished *G. ficicola* from *G. artocarpi*. Since then this species has been repeatedly collected chiefly from species of *Ficus* and *Psidium guajava* in its distribution range of East and South-east Asia and Australia. This species has frequently been confused with *G. (Trichosiphum) formosana* which also infests the same hosts.

Here *neoficicola* is considered to be the synonym of *ficicola* as the distinguishable characters of *neoficicola*, as provided by Ghosh *et al.* (1970), have proved to be inadequate after examining a series of materials of *ficicola* and *neoficicola*.

*Biology* : This species infests undersurface of leaves, apical twigs and even young fruits. In life, the insect looks dark brown and make gregarious colony.

*Distribution* : India : Delhi, Himachal Pradesh, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal; Australia, Bangladesh, East China, Indonesia. Malaysia, Nepal, Russia, Taiwan.

*Types* : In Taiwan Agricultural Research Institute, Taipeh (Taihoki). Taiwan.

47. *Greenidea* (*Greenidea*) *himansui* Raychaudhuri, Ghosh Banerjee and Ghosh (Figs. 37d, 38d, 39c, 40d)

1973. *Greenidea* (*Greenidea*) *himansui* Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M. and Ghosh, A.K., *Kontyu*, 41 : 60
1980. *Greenidea* (*Greenidea*) *himansui*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan", (ed) Raychaudhuri, D. N., 342.

*Apterous viviparous female* : Body elongated, shrunken posteriorly. 1.89-2.04 mm long and 0.78-0.79 mm as maximum width. Head brown, smooth, with long hairs. Antennae dark brown, with basal two segments and the very base of segment III slightly paler, 1.74-2.21 mm long and 1.06-1.10 x as long as body; flagellum distinctly imbricated and minutely granulated, segment III with 16-25 rather small to large accessory rhinaria in a row distributed nearly over its entire length; long hairs on segment III mostly with acuminate apices, a few with bluntish or slightly swollen apices; processus terminalis about 0.58 mm long and 2.30- 2.41 x as long as base of last antennal segment. Rostrum reaches slightly beyond the midcoxae; ultimate rostral segments slender, acute, 0.14-0.15 mm long and 1.20-1.40 x as long as second segment of hindtarsus, with 8-10 accessory hairs. Dorsum of abdomen sclerotized, mostly brown with minute granules; long and short hairs with acute to slightly acuminate apices occur intermingled, longest hair on anterior tergites 0.5 mm long and 1.40-1.90 x as long as basal diameter of 3rd antennal segment; 7th tergite with 6 hairs besides the usual marginal ones, longest one 1.80 x as long as the mentioned diameter; hairs on the 8th tergite with acute apices, 2.30 x as long as the mentioned diameter. Siphunculi long, slightly paler than the antennae, with indistinct reticulations; 1.15-1.68 mm long and 0.88 x as long as body and 13.0-13.60 x as long as its maximum width; hairs on siphunculi mostly long and with acute apices, a few much shorter hairs near the base,

longest hair 1.40 x as long as the basal diameter of the siphunculi. Cauda with a very short stylus and with 7-8 hairs. Femora pale brown, imbricated superficially; tibiae coloured like antennae, striate -imbricated.

*Measurements in mm:*

	Length	Width	Antenna			
1.	1.89	0.79	2.02			
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.54	0.27	0.24	0.24 + 0.58	0.14	0.10	1.68

(1, *Randia* sp., Dawki, Meghalaya, 3.v.1970, C.U. Colls.).

*Other morphs:* Not known.

*Materials examined :* 1 alate viviparous female form *Randia* sp. (Rubiaceae), Dawki, Meghalaya, 3.v.1970, Coll. H. Banerjee.

*Discussion :* This species was described by distinguishing it from *schimae* by the smaller siphunchuli in *himansui*. The other distinguishing feature of the species is in the 7th tergite possessing 6 hairs besides the usual marginal hairs. The species is so far known by its type-specimens.

*Biology :* Not known.

*Distribution :* India : Meghalaya.

*Types :* In the collections of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

48. *Greenidea (Greenidea) longicornis* (Ghosh, Ghosh and Raychaudhuri)  
(Figs. 33d, 34e, 34c, 35d-36d)

1970. *Greenidea longicornis*, Ghosh, M.R., Ghosh, A.K. and Raychaudhuri, D.N., *Oriental Ins*, 4 : 380.

1980. *Greenidea (Greenidea) longicornis*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N., 342.

*Apterous viviparous female :* Body pale yellow, elongate, 2.56- 2.92 mm long and 1.15-1.18 mm as maximum width. Head concolorous with the body. Antennae 6-segmented, 3.09 mm long and 1.06 x as long as body; flagellum distinctly imbricated, pale into basal half of segment V, rest dark brown to almost black; flagellar hairs thick, stiff, with acuminate to slightly incrassate apices; longest hair on segment III 0.08-0.10 mm long and 3.50 x as long as

the basal diameter of the segment; processus terminalis 0.36 mm long and 1.20 x as long as the base of last antennal segment. Rostrum reaches 2nd abdominal segment; ultimate rostral segment long and slender, 0.23-0.25 mm long and 1.70-1.92 x as long as second joint of hind tarsus and bears 8-9 fine accessory hairs. Dorsum of abdomen pale, smooth, venter almost smooth or very sparsely spinulose; dorsal hairs thick and stiff, with furcated or acuminate apices, longer ones on anterior tergites 3.33-4.0 x and short hairs 2.0-2.25 x as long as the basal diameter of 3rd antennal segment respectively; 8th tergite with two long fine hairs which are 1.80-2.0 x as long as the mentioned diameter. Siphunculi curved outwards, pale except at apical 0.07 portion which are blackish, 0.71-0.87 x as long as body, reticulated over entire length except near the spinulose apices; hairs on siphunculi fine, longer ones 4.0-6.0 x as long as the basal diameter of 3rd antennal segment and a few shorter ones are 2.0-2.5 x as long as the mentioned diameter. Cauda with a distinct median process and some long hairs. Legs pale; femora distinctly imbricated, especially on venter, and many of these imbrications are spinulose; tibiae sparsely imbricated on basal 0.66 portion, apically with some spinulose imbrications.

*Measurements in mm*

	Length	Width	Antenna			
1.	2.92	1.15	3.09			
2.	2.78	1.17	?			

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
1.04	0.58	0.61	0.30 + 0.36	0.25	0.13	1.89
0.80	0.50	0.51	broken	0.24	0.15	2.10

(1. *Engelhardia* sp. Darjeeling, West Bengal, 16.iv.1971, C.U.Colls., 2, *Cassia* sp., Cherrapunji, Meghalaya, 14.iii.1971, C.U.Colls.).

*Alate viviparous female* This morph was not available for our study. Therefore the description of the morph has been reproduced from Ghosh *et al.* (1970); "Body 2.60-2.80 mm long and 1.0 mm as maximum width. Antennae pale to dusky, 6-segmented, 3.8 mm long and 1.50 x as long as body, longest hair on segment III 3.0 x as long as the basal diameter of the segment; segment III with 16-20 accessory rhinaria, mostly restricted on basal 0.66 portion; processus terminalis 1.10 mm long and 2.50 x as long as base of the last antennal segment. Dorsum of abdomen with diffused brown transverse sclerotic bands; hairs on tergites with acute apices and the longest one on anterior tergites 1.5 x as long as the basal diameter of 3rd antennal segment, the shorter ones may be half the length of long hairs.

Siphunculus 2.90 mm long, 1.11 x as long as the body and 2.90 x as long as its maximum width. Legs pale, darker at the joints of femora and tibiae and at the very apices of tibiae and whole of tarsi. Wing venation normal. Other characters as in apterae viviparae."

*Measurements in mm :*

	Length	Width	Antenna				
1.	2.6	1.0	3.8				
	Antennal segments			urs	ht2	Siph.	
	III	IV	V	VI			
	0.96	0.05	0.55	0.40 + 0.11	0.23	0.14	2.90

(1, from an indet. host, Gangtok, Sikkim, 26.iii.1970, C.U. Colls.).

*Other morphs :* Not known.

*Materials examined :* 1 apterous viviparous female from *Englehardia* sp., Kurseong, West Bengal, 16.iv.1971, Coll. S.D. Chakraborty; 1 apterous viviparous female and 3 nymphs from *Cassia* sp., Chcerapunji, Maghalaya, 14.iii.1971, Coll. S. Sarkar.

*Discussion :* This species is characterised by the possession of very long and slender siphunculi and upto 0.87 x as long as body. In these characters the species is distinguishable from other species under the nominate sub-genus.

*Biology :* Not known.

*Distribution :* India : Meghalaya, Sikkim.

*Types :* In the collections of Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

49. *Greenidea (Greenidea) longirostris*, Basu, A.N.  
(Figs. 33 e, 34f, 35e-38e, 39d, 40e)

1969. *Greenidea longirostris*, Basu, A.N., *Oriental Ins.*, 3 : 358.

1980. *Greenidea (Greenidea) longirostris*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N., 342.

*Apterous viviparous female :* Body pear-shaped, brown, 2.25-2.78 mm long and 1.10-1.46 mm as maximum width. Head brown and smooth. Antennae 6-segmented, pale brown, with apical portion of segment V, distal half of base of VI and the basal half of processus terminalis darker, 2.27-2.97 mm long and

0.97-1.14 x as long as body; flagellar hairs mostly with normal apices, longest hair on segment III 0.12-0.13 mm long and 2.30-2.80 x as long as the basal diameter of the segment; processus terminalis 0.66-0.83 mm long and 1.70-2.26 x as long as base of the last segment. Rostrum extends well beyond the middle of the body; ultimate rostral segments slender and acute, 0.26-0.33 mm long and 2.0-2.75 x as long as second joint of hindtarsus and bearing 12-18 very fine and inconspicuous hairs. Dorsum of abdomen yellowish brown, smooth; dorsal hairs thick and branched except a few having normal apices; longest hair on anterior tergites 2.3-3.3 x as long as basal diameter of 3rd antennal segment; 7th tergite with 2 thick branched hairs, about 1.3-2.9 x as long as the mentioned diameter, 8th tergite with 2 thin hairs, about 1.3 x as long as the mentioned diameter. Siphunculi pale brown, 1.01-1.55 mm long and 0.42-0.56 x as long as body; siphuncular hairs numerous, mostly long but few very short; partly with furcated apices on basal half but distally the hairs with acute apices. Cauda with a distinct median process, bearing 8-9 hairs. Legs pale brown; femora faintly imbricated; tibiae nearly smooth on the basal 0.66 portion, distally with minute spinular striae.

*Measurements in mm :*

	Length	Width	Antenna
1.	2.73	1.46	?
2.	2.78	1.48	2.71
3.	2.67	1.41	2.69
4.	2.60	1.34	2.97

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.69	0.38	0.42	0.34 broken	0.32	0.12	1.17
0.64	0.38	0.41	0.34 + 0.77	0.29	0.13	1.35
0.64	0.36	0.40	0.32 + 0.69	0.28	0.13	1.35
0.74	0.45	0.53	0.38 + 0.66	0.33	0.12	1.45

(1, *Schima wallichii*, Kanglatombi, Manipur, 1.xii.1971, C.U. Colls.; 2-3, *S. wallichii*, Keithelmanbi, Manipur, 14.i.1976, Z.S.I. Colls.; 4, *S. wallichii*, T.M. Kasom Village, Manipur, 21.i.1977, Z.S.I. Colls.).

*Alate viviparous female* : Body rather narrow, brown and dusky green, 2.57-3.18 mm long and about 1.30 mm as maximum width. Head and thorax brown. Antennae 6-segmented, 2.93-3.78 mm long and 1.10-1.18 x as long as body; flagellum dark brown, darker than the two basal segments, imbricated, segment III with 19-33 rather small, roundish to transversely oval,

accessory rhinaria almost in a line along nearly its entire length; longest hair on segment III 0.16 mm long and 2.30-3.30 x as long as basal diameter of the segment. Rostrum long; ultimate rostral segments 0.29-0.41 mm long and 2.0-2.92 x as long as second joint of hindtarsus and with 15- 20 fine hairs. Dorsum of abdomen with pale brownish transverse bands on the six anterior tergites, more or less fused with the marginal sclerites; dorsal hairs thinner and shorter than in apterae viviparae; longest hair on anterior tergites about 0.16 mm long and 1.10-1.30 x as long as basal diameter of 3rd antennal segment; 7th tergite with 2 hairs, 1.70-2.30 x as long as the mentioned diameter. Siphunculi pale brown to brown, 1.92-2.46 mm long and 0.60-0.77 x as long as body; siphuncular hairs all with acute apices, the longest one 4.70-5.30 x as long as the basal diameter of 3rd antennal segment. Legs brown, rather slender; tibiae striate-imbricated. Wings normal; pterostigma hardly extends beyond 0.33 portion of the Radial Sector. Otherwise as in apterae viviparae.

*Measurements in mm :*

1.	Length		Width	Antenna		
	3.18		1.30	3.78		
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.96	0.57	0.60	0.40 + 1.03	0.41	0.14	2.46

(1, *Quercus* sp., Kurseong, West Bengal, 19.vi.1971, C.U.Colls.).

*Other morphs* : Not known.

*Materials examined* : 1 Alate viviparous female from *Quercus* sp., Kurseong, West Bengal, 19.vi.1971, Coll.?, Slide No. D-551; 1 apterous viviparous female and 1 nymph from *Schima wallachii*, Kanglatombi, Manipur, 1.xii.1971, Coll. T.K. Singh; 4 apterous viviparous females and 1 nymph from *S. wallichii*, Keithelmanbi, Manipur, 14.i.1976, Coll. A.K. Ghosh; 2 apterous viviparous females from *S. wallichii*, T.M. Kasom, village, Manipur 21.i.1977, Coll. S.G. Patil; 8 nymphs from *S. wallichii*, Cherrapunji, Meghalaya, 18.i.1975, Coll. A.K.Ghosh.

*Discussion* : The species resembles *G. schimae* and *G. sinensis* under the genus. From *schimae*, this species is distinguishable in having longer rostrum and from *sinensis* in having much longer hairs on 7th tergite in apterae viviparae. The alate viviparae of *G. longirostris* differ from both *schimae* and *sinensis* in having larger number of accessory rhinaria on antennal segment III.

*Biology* : Whitish brown or yellowish brown insects infest leaves and tender twigs of *Schima wallichii* without visible injury to the host. The apterae have been reported to be very active and run away at the slightest disturbance (Basu, A.N., 1969).

*Distribution* : India : Arunachal Pradesh, Manipur, Meghalaya, Sikkim, West Bengal; Nepal.

*Types* : In the collections of Indian Agricultural Research Institute, Kalimpong, West Bengal, India.

50. *Greenidea* (*Greenidea*) *photiniphaga* Raychaudhuri, Ghosh, Banerjee and Ghosh  
(Figs. 33g, 34a, 35g - 36g)

1973. *Greenidea* (*Greenidea*) *photiniphaga* Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M., and Ghosh, A.K., *Kontyu*, 41 : 61.
1980. *Greenidea* (*Greenidea*) *photiniphaga*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan"(ed) Raychaudhuri, D.N., 343.
1983. *Greenidea* (*Greenidea*) *photiniphaga*, Das, B.C. and Raychaudhuri, D.N., *Rec. zool. Surv. India*, Occasional Paper No. 51 : 47

*Apterous viviparous female* : Body pear-shaped, 2.46-2.52 mm long and 1.12-1.25 mm as maximum width. Head pale and smooth. Antennae nearly pale except segment I, very apices of segments III and IV, the very bases of segments IV and V, nearly distal half of segment V and the whole of segment VI which are darker; 2.85-2.90 mm long and 1.10-1.15 x as long as body; flagellum distinctly and gradually imbricated from base towards apex, long and short hairs with acuminate to furcated apices occur intermingled, longest hair on segments III 0.11 mm long and 2.30-3.30 x as long as basal diameter of segment; processus terminalis about 0.87 mm long and 2.10-2.90 x as long as base of the last antennal segment. Rostrum reaching 2nd tergite; ultimate rostral segments 0.23-0.26 mm long and 1.70-1.76 x as long as a second joint of hindtarsus, segment 4 with 12-14 fine accessory hairs. Dorsum of abdomen sclerotized, wrinkled, finely granulated, with a broad median area covering almost the first two tergites and pleural areas from 2nd-5th tergites dark brown, rest pale brown; dorsal hairs long and short, occur intermingled, with acuminate, acute or furcated (bi- or multi-) apices; longest hair on anterior tergites about 3.3-3.4 x as long as the basal diameter of 3rd antennal segment; each of the 7th and 8th tergites with 2 median hairs of which the former ones with furcated apices and the latter with finely drawn out acute apices, longest hair on 7th tergite about 3.2-4.2 x, and that on 8th tergite about 1.6-2.5 x as long as the mentioned diameter. Siphunculi pale with apical 0.20 portion darker, distinctly reticulated on the

paler area, 1.41 mm long and 0.49-0.56 x as long as body; hairs on the siphunculi mostly long with acute, acuminate to furcated apices and a few shorter ones with acuminate apices; spinules on the reticulations sparse. Cauda with a prominent stylus which is nearly as long as its basal width, with 6 hairs. Legs pale, with the very bases and apices of tibiae and tarsi darker; femora and tibiae imbricated; tibiae with spinules over almost entire length but those near apices appear prominent.

*Measurements in mm :*

1.	Antennal segments			urs	ht <sub>2</sub>	Siph.	
	Length	Width	Antenna				
	2.52	1.17	2.90				
	III	IV	V	VI			
	0.63	0.38	0.44	0.30 + 0.87	0.23	0.13	broken

(1, *Photinia* sp., Darjeeling, West Bengal, 14.1.1971, C.U. Colls.).

*Other morphs* : Das and Raychaudhuri (1983) reported alate viviparous female morph from Nepal. We could not examine this morph which seemingly is undescribed so far.

*Materials examined* : 1 apterous viviparous female form *Photinia* sp., Darjeeling, West Bengal, 14.i.1971, Coll. S.D. Chakraborty.

*Discussion* : This species approaches *rappardi* and *longisetosa* under the genus but is distinguishable in having wrinkled and granulose abdominal dorsum, more slender siphunculi, larger 4th rostral segment and much longer hairs on the 7th and 8th abdominal tergites.

*Biology* : Pale greenish insects infest leaves and petioles of the host plants which may be *Quercus* sp. (Fagaceae) or *Photinia* sp. (Rosaceae).

*Distribution* : India, West Bengal; Nepal.

*Types* : In the collections of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

51. *Greenidea* (*Greenidea*) *schimae*, Takahashi  
(Figs. 33h-36h, 37f- 38f, 39e, 40f)

1929. *Greenidea schimae*, Takahashi, R., *Trans. Nat. Hist. Soc. Formosa*, 19 : 528

1956. *Greenidea schimae*, Raychaudhuri, D.N., *Zool. Verh. Leiden*, 31 : 42

*Apterous viviparous female* : Body elongated, pear-shaped 2.30-3.48 mm long and 1.17-1.70 mm as maximum width. Head brown and smooth. Antennae

concolorous with head, 6-segmented, 2.23 mm long and 0.90-1.10 x as long as body; flagellum distinctly imbricated from base to apex; flagellar hairs thick and stiff, always with branched apices, and some with deeply incised apices, longest hair of segment III 2.50-3.0 x as long as basal diameter of the segment; processus terminalis about 1.11 mm long and 2.30-2.50 x as long as base of last antennal segment. Rostrum reaching the middle of the body; ultimate rostral segments slender and acute, 1.70- 2.30 x as long as second joint of hindtarsus and with 10-12 rather long smooth, and fine accessory hairs. Dorsum of abdomen pale yellow, locally sclerotized; dorsal hairs placed irregularly, thick and stiff, always with branched apices, the longest hair on the anterior tergites about 0.12 mm long and 2.50-3.40 x as long as basal diameter of 3rd antennal segment; 7th tergite with two long and thick spinal hairs with branched apices, 2.30 x as long as the mentioned diameter; 8th tergite with two hairs with normal apices, 1.90 x as long as the mentioned diameter. Siphunculi 1.27-1.33 mm long and 0.46-0.56 x as long as body, curved outwards, pale like the margin of the abdomen; hairs on the siphunculi numerous, the hairs from base almost to the middle of the siphunculi mostly with furcated apices but those on the distal half with normal acute apices, longest hairs 2.50-2.60 x as long as basal diameter of siphunculi. Cauda with a distinct median process, with 8-11 very fine and long hairs. Legs pale like the head; femora rather dispersally and superficially imbricated; tibiae striate- imbricated.

*Measurements in mm*

	Length	Width	Antenna	urs	ht <sub>2</sub>	Siph.
1.	2.75	1.44	broken	0.23	0.13	1.27

(1, *Schima wallichii*, Dieng, Indonesia, 21.vii.1976, B.M.Colls.)

*Alate viviparous female* Body elongated, 2.04-3.18 mm long and 0.88-1.10 mm as maximum width. Head with a well-developed median process and divergent frontal tubercles. Antennae 6-segmented, black with brown basal segments, 2.60-3.72 mm long and 1.27-1.30 x as long as body; segment III with 17-20 transversely oval rhinaria almost in a row over the entire length of the segment; flagellar hairs with fine and acute apices, a few partly acuminate or bluntish apices. Ultimate rostral segments 0.23-0.24 mm long, 2.09-2.40 x as long as second joint of hindtarsus; with 17- 18 long and fine hairs. Dorsum of abdomen locally sclerotized, brown; large dorsal hairs with fine and acute apices; longest hair on anterior tergites 0.08-0.11 mm long and 1.60 x as long as basal diameter of 3rd antennal segment; 7th tergite with two thick and long hairs, also with acute apices. Siphunculi blackish brown with very base and apex slightly paler, 1.38-2.34 mm long and 0.67-0.81 x as long as body; reticulated-imbricated, more or less cylindrical, with the apex slightly curved

outwards; hairs on the siphunculi numerous, all with acute apices; spinules present, densely so near the apex. Femora brown with slightly darker apices, striate-imbricate; tibiae blackish brown, more distinctly striate-imbricated than femora. Pterostigma extending up to 0.50 portion of the Radial Sector.

*Measurements in mm :*

	Length	Width	Antenna
1.	2.04	1.03	2.60
2.	2.39	0.88	?

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.65	0.34	0.40	0.23 + 0.67	0.24	0.10	1.38
broken	—	—	—	0.23	0.11	1.96

(1, an indet. host, Mercara, Karnataka, India, 24.xi.1967, B.M Colls.; 2, *Schima wallichii*, Dieng, Indonesia, 21.vii.1976, B.M. Colls.).

*Other morphs* : Not known.

*Materials examined* 1 apterous viviparous female and 1 alate viviparous female from *Schima wallichii*, Dieng, Indonesia, 21.vii.1976, Coll. D.Noordam; 1 alate viviparous female from an indet. host, Mercara, Karnataka, 24.xi.1967, Coll. K. Narayanan.

*Discussion* : This species is distinguishable from congenics under the nominate subgenus by its integument and appendages in apterous viviparae pale. From India, this species is recorded by a single alate vivipara collected in a locality of Karnataka State.

*Biology* This species attacks the young leaves of the host plant.

*Distribution* : India Karnataka; China, Indonesia, Taiwan.

*Types* : In Taiwan Agricultural Research Institute, Taipeh (Taihoku) Taiwan.

52. *Greenidea (Neogreenidea) ayyari* Raychaudhuri, Ghosh, Banerjee and Ghosh (Figs. 33i 36i, 37g, 38m, 39f, 40g)

1973. *Greenidea (Neogreenidea) ayyari* Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M. and Ghosh, A.K., Kontyu, 41 : 63.

1980. *Greenidea (Neogreenidea) ayyari*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan"(ed), Raychaudhuri, D.N., 343.

1980. *Greenidea (Neogreenidea) ayyari*, Singh, T.K., Raychaudhuri, D., Raha, S.K. and Raychaudhuri, D.N., *Entomon*, 5 : 147.

*Apterous viviparous female* Body pear-shaped, brown, 2.94-3.18 mm long and 1.57-1.70 mm as maximum width. Head light brown to brown marginally. Antennae 6-segmented, 2.14-2.26 mm long and 0.70-0.80 x as long as body, antennal segments I and II brown, flagellum pale excepting the distal part of segment V and the distal half of the base of segment VI and processus terminalis dark brown; flagellum gradually more distinctly imbricated from base towards apex, distinct reticulations also present; processus terminalis 0.53-0.54 mm long and 2.03-2.20 x as long as base of last antennal segment; flagellar hairs long and short, with acuminate apices, occur intermingled; longest hair on segment III 3.0-4.30 x as long as the basal diameter of the segment. Rostrum reaching the hindcoxae; ultimate rostral segments stout and acute, 0.24-0.27 mm long and 1.50-1.70 x as long as second joint of hindtarsus, with 12-13 long and fine accessory hairs. Dorsum of abdomen deep brown with fine granules and ill-differentiated warty structure; long hairs on tergites thick and stiff, with acuminate to furcated apices, a few short hairs with acuminate or furcated apices occur intermingled. Siphunculi pale with darker apex, distinctly reticulated over the entire length; 0.87-0.88 mm long and 0.29 x as long as body and 6.3 x as long as its maximum width; hairs on siphunculi long and short, with acute to slightly acuminate apices; spinular reticulation in transverse rows, densest towards the apex where reticulation absent. Cauda with a distinct median stylus and with 6 hairs. Femora pale, with a few transverse striae ventrally; tibiae smooth, slightly darker than femora, with fine granules near apices; tarsi darker than tibiae.

*Measurements in mm:*

	Length		Width	Antenna			
1.	3.04		1.57	2.14			
	Antennal segments				urs	ht2	Siph.
	III	IV	V	VI			
	0.61	0.36	0.38	0.26 + 0.53	0.24	0.14	0.88

(1, *Quercus* sp., Ukhrul, Manipur, date - ?, C.U. Colls.).

*Alate viviparous female* : Body elongated, 2.51-2.93 mm long and 1.27 mm as maximum width. Antennae 6-segmented, 2.87-3.25 mm long and 1.10-1.14 x as long as body; flagellum imbricated and faintly reticulated on segments IV and V, segment III with 17-19 round accessory rhinaria distributed over its entire length; processus terminalis 0.69-0.83 mm long and 2.55-2.60 x as long as base of last antennal segment; flagellar hairs long and

short, with acuminate to fine apices, longest one on segment III 5.44 x as long as basal diameter of the segment. Rostrum reaching little beyond 1st abdominal tergite; ultimate rostral segments 2.0-2.67 x as long as second joint of hindtarsus, with 12 accessory hairs. Dorsum of abdomen with a brownish patch on 3-5th tergites besides similar patches on 1st and 2nd tergites; 6th and 7th tergites each with separate transverse brownish bands; dorsal hairs long, with acute apices, longest hair on anterior tergites about 1.78 x as long as basal diameter of 3rd antennal segment; 7th and 8th tergites each with 2 hairs. Siphunculi long, reticulated over its entire length, apically dark, 1.77-2.26 mm long and 0.70-0.76 x as long as body; hairs on siphunculi mostly long and fine, a few shorter ones with similar apices. Cauda semi-oval and bears 6 hairs.

*Measurements in mm :*

	Length		Width	Antenna			
1.	2.51		1.27	2.87			
	Antennal segments				urs	ht2	Siph.
	III	IV	V	VI			
	0.86	0.46	0.42	0.27 + 0.69	0.26	0.13	1.17

(1, *Lyonia* sp., Mao, Manipur, 15.iv.1974, C.U. Colls.).

*Alate oviparous female* This morph, described by Singh *et al.* (1980), was not available for our examination. Therefore, the original description is reproduced here :

“Body about 2.55 mm long with about 1.27 mm as its maximum width. Antennae brown, 6-segmented, about 1.17 x body; flagellum imbricated and reticulated faintly on segments III and IV ; segment III with 18 round secondary rhinaria distributed on basal 0.66 portion; p.t. about 2.47 x base of segment VI. Rostrum reaching hindcoxae; rostral segments 4 + 5 about 1.97 x h.t.2, segment 4 about 4.31 x segment 5 and bears 12 secondary hairs. Longest hair on anterior tergites about 2.16 x b.d. III. Siphunculi about 0.90 x body, about 23.0 x its maximum width; longest hair on siphunculi about 4.0 x b.d. III. Cauda broadly rounded. Other characters as in alate viviparous female”

*Measurements in mm :*

	Length	Width	Antenna
1.	2.55	1.27	2.18

Antennal segments				urs	ht <sub>2</sub>	Siph.
III	IV	V	VI			
0.90	0.48	0.43	0.29 + 0.72	0.26	0.13	2.30

(1, *Lyonia* sp., Mao, Manipur, 15.iv.1970, C.U. Colls.).

*Other morphs* : Not known.

*Materials examined* 1 apterous viviparous female and 2 nymphs from *Quercus* sp., Ukhrul, Manipur, date, place and collector's name unknown, slide No. M-595; 1 alate viviparous female from *Lyonia* sp., Mao, Manipur, 15.iv.1974, Coll. T.K. Singh.

*Discussion* This species resembles *longisetosa* and *querciphaga* under the subgenus in general morphology but is distinguishable from the former in having hairs on body and flagellum much shorter and from the later in having shorter u.r.s. and siphunculi.

*Biology* : The species is known by its viviparous morphs from *Quercus* sp. (Fagaceae) and its oviparous female morph from *Lyonia* sp. (Ericaceae). It is difficult to assume if both the recorded plants are its natural hosts for want of adequate data.

*Distribution* : India : Manipur, West Bengal.

*Types* In the collections of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

53. *Greenidea* (*Neogreenidea*) *longisetosa* Raychaudhuri,  
Ghosh, Banerjee, and Ghosh.  
(Figs. 33j 36j)

1973. *Greenidea* (*Neogreenidea*) *longisetosa* Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M. and Ghosh, A.K., *Kontyu*, 41 : 63.

1980. *Greenidea* (*Neogreenidea*) *longisetosa* Raychaudhuri, D.N. and Banerjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N., 344.

*Apterous viviparous female* Body pear-shaped, brown, 1.80-2.07 mm long with 0.96-1.14 mm as maximum width. Head brown on anterior half and deep brown on posterior part. Antennae 6-segmented, 1.62-1.84 mm long and 0.74-0.88 x as long as body; segments I and II nearly concolorous with the anterior half of head; flagellum pale with distal half of segment V and whole of segment VI darker; reticulated-imbricated upto the base of segment VI; processus terminalis 0.46-0.49 mm long and 2.0-2.42 x as long as base of the last antennal segment; flagellar hairs

long and short, occur intermingled, with acuminate apices, longest hair on segment III 0.12 mm long and 6.0-6.67 as long as the basal diameter of the segment. Rostrum reaches the hindcoxae; ultimate rostral segment 2.20-0.23 mm long and 1.60-1.90 x as long as second joint of hindtarsus, with 6-8 fine accessory hairs. Dorsum of abdomen without spinules but faintly wrinkled on the pleural area, venter also with such wrinkles but without spinules; dorsal hairs long and short, rather sparse, so that on each of the segment upto 6th there are 6-8 long hairs and 4-5 short hairs, long hairs with slightly furcated apices and the very short ones with acute apices; 7th tergites with two long median hairs having furcated apices and 8th tergite with two thin and fine hairs. Siphunculi dark brown to black excepting the very apex which is pale, reticulated all over excepting the densely spinulose apex, 0.48-0.55 mm long, 0.23-0.26 x as long as body and 4.1-4.4 x as long as its maximum width; hairs on siphunculi very long and thick, with acuminate apices, a few shorter ones with similar apices occur near the base, longest hair 3.5-5.10 x as long as the basal diameter of the siphunculi. Cauda with a very short median stylus, with 4-6 hairs. Femora pale to dark brown at least on proximal 0.75 portion, smooth; tibiae pale to light brown and also smooth.

*Measurements in mm :*

	Length	Width	Antenna				
1.	2.07	1.09	1.84				
	Antennal segments			urs	ht2	Siph.	
	III	IV	V	VI			
	0.58	0.22	0.23	0.19 + 0.46	0.20	0.11	0.55

(1, an indet. host, Darjeeling, West Bengal, 3.v.1970, C.U. Colls.).

*Other morphs* Not known

*Material examined* 1 apterous viviparous female from an indet. host, Lamahat, Darjeeling, West Bengal, 3.v.1970, Coll. S.D. Chakraborty.

*Discussion* : This species is easily distinguishable from other two known speceis, *ayyari* and *querciphaga*, under the subgenus by the black siphunculi and very long antennal and body hairs.

*Biology* So far this species is known by its type materials from the type-locality in West Bengal, India.

*Distribution* : India : West Bengal.

*Types* : In the collections of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

54. *Greenidea* (*Neogreenidea*) *querciphaga* Raychaudhuri, Ghosh,  
Banerjee and Ghosh.

(Figs. 33k-36k,37h,38g-39g,40h)

1973. *Greenidea* (*Neogreenidea*) *querciphaga* Raychaudhuri, D.N., Ghosh, M.R.,  
Banerjee, M. and Ghosh, A.K., Kontyu, 41 : 64.
- 1980 *Greenidea* (*Neogreenidea*) *querciphaga*, Raychaudhuri, D.N. and Chatterjee,  
M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed)  
Raychaudhuri, D.N., 344.

*Apterous viviparous female* : Body pear-shaped, brown 3.66-3.81 mm long and 1.90-1.92 mm as maximum width. Head smooth, brown with long hairs. Antennae partly broken; brown to dark brown excepting basal 0.75 portion of segment III which is pale; segment III distinctly imbricated apicad and also prominently reticulated excepting the very base; long and short hairs on flagellum stiff with acuminate to bi- or multifid apices, longer hairs on segment III 0.15 mm long and 2.30 x as long as basal diameter of the segment. Rostrum long and stout, slightly extending beyond the first abdominal segment; ultimate rostral segments 0.41-0.44 mm long and 2.70-3.14 x as long as second joint of hindtarsus, segment 4 with 16 very fine long accessory hairs. Dorsum of abdomen finely granulated, somewhat wrinkled, pale with some irregularly arranged pale brown to brown patches, those forming a median longitudinal blotch extending from nearly the middle of abdomen to 7th tergite; dorsal hairs on abdomen mostly long, stiff with acuminate to bi- or multifid apices and a few shorter ones restricted towards the anterior portion; longer hairs on the anterior tergites 0.15 mm long and 3.60 x as long as basal diameter of 3rd antennal segment; 7th and 8th tergites each with two long, stiff, spinal hairs with furcated apices. Siphunculi 1.46-1.80 mm long and 0.38-0.42 x as long as body, pale to darker, distinctly reticulated excepting the darker apical area; long and short hairs on siphunculi with nearly acute to acuminate apices, shorter hairs more frequent near the base, longest hair 2.0-2.22 x as long as basal diameter of siphunculi. Cauda with a prominent stylus with 4 long hairs. Femora pale to pale-brown, smooth with some very faint spinulose striae on the upper surface; tibiae brown with the very apex darker, almost smooth, the distal portion being somewhat imbricated, tarsi darker.

*Measurements in mm* :

	Length	Width	Antenna
1.	3.81	1.90	broken

Antennal segments				urs	ht <sub>2</sub>	Siph.
III	IV	V	VI			
?	?	?	?	0.44	0.14	1.46

(1, *Quercus* sp., Kamesi Forest, Kalimpong, West Bengal, 14.xii.1970, C.U. Colls.).

*Alate viviparous female* : Body elongated, 2.34-2.41 mm long and 0.93-0.99 mm as maximum width. Head smooth, brown. Antennae 6-segmented, 2.77-2.91 mm long and about 1.20 x as long as body; segments I and II concolorous with the head, basal 0.66 portion of segment III, 0.50 portion of segment IV and 0.33 portion of segment V slightly paler than the basal two segments and rest of the flagellum; flagellar hairs mostly with furcated apices; processus terminalis 0.81-0.84 mm long and 2.80-3.0 x as long as base of the last antennal segment. Ultimate rostral segments 0.38-0.41 mm long and 2.92-3.20 x as long as second joint of hindtarsus. Dorsum of abdomen sclerotized with scattered brown patches, some of those from transverse bands on tergites 2- 6, those on tergites 2-5 form more or less a continuous blotch on the spino-pleural area; dorsal hairs on 1-5th tergites much shorter than those in apterae and with acute apices, longest 7 hairs on anterior tergites about 1.0 x as long as the basal diameter of 3rd antennal segment; 6th tergite with one long hair; 7th and 8th tergites each with 2 long hairs, these about 2.80 2.60 x and 2.10-2.40 x as long as the mentioned diameter, respectively. Siphunculi long, pale with apical 0.15 portion dark brown, curved outwards, 1.80-1.81 mm long and 0.75-0.76 x as long as body. Legs pale brown excepting very base and apical 0.25 portion of tibiae; tarsi darker: femora nearly smooth with some spinulose striae on both surfaces: tibiae striate-imbricated.

*Measurements in mm* :

	Length	Width	Antenna			
1.	2.41	0.93	2.91	Antennal segments		
III	IV	V	VI	urs	ht <sub>2</sub>	Siph.
0.77	0.42	0.44	0.28 + 0.84	0.38	0.13	1.81

(1, *Quercus* sp., Kamesi Forest, Kalimpong, West Bengal, 14.xii.1970, C.U. Colls.).

*Other morphs* Not known.

*Materials examined* : 1 apterous viviparous female and 1 alate viviparous female from *Quercus* sp., Kamesi Forest, Kalimpong, West Bengal, 14.xii.1970, Coll. M.R. Ghosh.

*Discussion* This species is distinguishable from its close relatives *longisetosa* and *ayyari* under the subgenus in having flagellar hairs shorter, u.r.s. longer and siphunculi longer in relation to body.

*Biology* : So far this species is known by its type materials from the type-locality in West Bengal, India. Beside, the light brown insects of this species have also been recorded from Nepal (Das and Raychaudhuri, 1983).

*Distribution* India : West Bengal; Nepal.

*Types* In the collections of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

55. *Greenidea (Paragreenidea) parthenocissi* Saha and Chakrabarti

(Figs. Viv.female:33Z<sub>1</sub>, 34Z,35Z<sub>1</sub>,36Z, 37 o,38 n, 39 o-40 o ,  
Alate male 37 p, 38 o, 39 p-40 p)

1988. *Greenidea (Paragreenidea) parthenocissi* Saha, S. and Chakrabarti, S., *Proc. Zool. Soc. Calcutta*, 37 : 49.

*Apterous viviparous female* Body 2.10-2.67 mm long and about 0.93-1.02 mm as maximum width. Head pale brown, dorsum smooth, with 10-12 hairs having acuminate apices. Antennae pale except dusky on apex of segment V and whole of segment VI, about 2.08- 2.30 mm long and 0.97-1.04 x as long as body; segment III smooth on basal half, rest of the flagellum gradually and distinctly imbricated apicad; processus terminalis 2.37-3.33 x as long as the base of the last segment; flagellar hairs both long and short intermingled, with acute to acuminate apices, longest hair on segment III 5.5-7.6 x as long as basal diameter of the segment. Rostrum reaches hindcoxae; ultimate rostral segments 1.0-1.1 x as long as the second joint of hindtarsus, 4th segment 3.7-4.16 x as long as 5th segment; segment 4 bears 8 secondary hairs. Dorsum of abdomen smooth, pale to pale brown; hairs long and short, with acute to acuminate apices, longest hair on anterior tergites 3.69- 6.13 x as long as basal diameter of 3rd antennal segment; 7th and 8th tergites each with 2 hairs, 0.65-0.89 x and 1.39-1.90 x as long as the mentioned diameter respectively; ventrum spinulose throughout. Siphunculi pale brown with apices slightly darker, slightly curved outwards, indistinctly reticulated, about 1.60- 1.66 mm long, 0.48-0.67 x as long as body and 10.21-16.09 x as long as its maximum width. Cauda semi-oval, with a distinct median stylus and bears 8 hairs. Legs pale brown, femora smooth; tibiae with 28-38 transverse cuts.

*Measurements in mm :*

	Length	Width	Antenna			
1.	2.52	0.93	2.08			
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.67	0.24	0.24	0.19 + 0.58	0.16	0.15	1.60

(11, *Parthenocissus semicordata*, Osla, Hari-ki-Dun, Uttar Pradesh, 3.ix.1984, K.U. Colls.).

*Alate oviparous female* : Differs from apterous vivipara in the following characters : Body 2.60-2.95 mm long and 0.85-1.25 mm wide. Dorsum of head with 12-14 hairs. Antennae brown, 6- segmented, about 0.81 x as long as body; segment III with 8-10 small round accessory rhinaria distributed along outer margin over about 0.50 portion; longest hair on this segment about 6.20- 7.70 x as long as basal diameter of the segment; processus terminalis 0.50-0.65 x as long as 3rd antennal segment. Ultimate rostral segments 1.2-1.4 x as long as the second joint of hindtarsus, bears 10 accessory hairs, 4th segment 3.3-3.50 x as long as 5th segment. Dorsum of abdomen with transverse sclerotic bands; longest hair on anterior tergites 4.40-5.60 x as long as basal diameter of 3rd antennal segment; longest hairs on 7th and 8th tergites 4.2-5.9 x and 2.2-2.9 x as long as the mentioned diameter respectively. Siphunculi densely spinulose on apical 0.08-0.10 portion, rest with discontinuous ridges, 0.80-0.80 x as long as body and 16.2-19.7 x as long as its maximum width. Cauda distinctly oval, without any stylus, bears numerous hairs. Female genitalia well-developed. Wing venation normal, brown.

*Measurements in mm :*

	Length	Width	Antenna			
1.	2.76	0.99	2.25			
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.85	0.25	0.27	0.18 + 0.52	0.15	0.15	2.32

(1, *P semicordata*, Hanumanchalli, Uttar Pradesh, 17.x.1981, K.U. Colls.).

*Alate male* : Body 2.19-2.60 mm long and 0.67-0.74 mm wide. Dorsum of head with 12-13 long and fine hairs, longest hair 4.61-5.18 x as long as the basal diameter of 3rd antennal segment. Antennae pale throughout,

0.93-1.05 x as long as body; longest hair on segment III 6.3-7.1 x as long as basal diameter of the segment; processus terminalis 2.9-3.4 x as long as base of last antennal segment. Ultimate rostral segments 1.23-1.25 x as long as second joint of hindtarsus; 4th segment 3.8-4.1 x as long as 5th segment. Dorsum of abdomen pale, small sclerites occurring on anterior tergites, longest hair on anterior tergites 4.47-5.31 x as long as basal diameter of 3rd antennal segment, longest hair on 7th and 8th tergites 1.1-1.4 x and 2.6-3.3 x as long as the mentioned diameter respectively. Siphunculi 0.78-0.90 x as long as body and 19.3-19.8 x as long as its maximum width. Clasper bifurcated, each bears 18-22 hairs. Hindtibiae with 30-42 transverse cuts. Otherwise as in apterous vivipara.

*Measurements in mm*

	Length	Width	Antenna			
1.	2.19	0.67	2.28			
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.79	0.28	0.28	0.19 + 0.60	0.16	0.13	1.98

(1, *P. semicordata*, Osla, Har-Ki-Dun, Uttar Pradesh, 17.x.1984, K.U. Colls.).

*Other morphs* Not known.

*Materials examined* : 1 apterous viviparous female and 1 alate male from *Parthenocissus semicordata*, Osla, Har-ki-Dun, Uttar Pradesh, 3.ix.1984, Coll. S. Saha, 1 alate oviparous female from *P. semicordata*, Hanumanchalli, Uttar Pradesh, 17.x.1981, Coll. S. Saha.

*Discussion* By the presence of transverse cuts on hindtibiae, this species comes under the subgenus *Parageenidea*. *G. parthenocissi* is distinguishable from the other two species known under the subgenus chiefly in having processus terminalis longer in relation to both base of segment VI and segment III and longer hairs on antennal segment III besides other differences in the morphometry.

*Biology* The greenish aphids of this species infest the undersurface of leaves. A chrysopid predator, *Italo-chrysa aequalis* (Walker) is reported to prey on this aphid (Saha and Chakrabarti, 1988).

*Distribution* India : Uttar Pradesh.

*Types* In the collections of Biosystematics Research Unit, Department of Zoology, University of Kalyani, Kalyani, West Bengal.

56. *Greenidea (Paragreenidea) symplocosis* Ghosh, Basu and Raychaudhuri  
(Figs. 33 l 36 l, 37i, 38h - 39h, 40i)

1969. *Greenidea symplocosis* Ghosh, A.K., Basu, R.C. and Raychaudhuri, D.N., *Oriental Ins.*, 3 : 248.
1971. *Greenidea (Paragreenidea) symplocosis*, Ghosh, A.K., Banerjee, H. and Raychaudhuri, D.N., *Proc. Zool. Soc. Calcutta*, 26 : 105.
1978. *Greenidea (Paragreenidea) symplocosis*, Ghosh, A.K., Basu, R.C. and Raychaudhuri, D.N., *Oriental Ins.*, 12 : 98.
1980. *Greenidea (Paragreenidea) symplocosis*, Raychaudhuri, D.N. and Chatterjee, M., *In "Taxonomy of the aphids of north-east India and Bhutan"* (ed) Raychaudhuri, D.N., 344.

*Apterous viviparous female* : Body pale, elongated, 2.09-3.30 mm long and 1.02-1.33 mm as maximum width. Head brown, smooth with long hairs. Antennae 6-segmented, 1.37-2.13 mm long and 0.62-0.75 x as long as body; flagellum imbricated; hairs on antennae short and long, fine with acute apices, longer hairs on segment III 3.0 x as long as the basal diameter of the segment; processus terminalis 0.29-0.45 mm long and 1.81-2.50 x as long as the base of last antennal segment. Rostrum reaching just about the hindcoxae; ultimate rostral segments 0.20-0.24 mm long and 1.50-2.0 x as long as second joint of hindtarsus. Dorsum of abdomen smooth, dorsal hairs with acute or furcated apices, longest hair on anterior tergites 3.0-3.5 x as long as the basal diameter of 3rd antennal segment; 7th and 8th tergites each with two fine hairs of same length as the dorsal hairs on the anterior tergites. Siphunculi pale, slender, curved outwards, 0.69-2.50 mm long and 0.31-0.75 x as long as body, reticulated atleast on basal half, rest densely spinulose but more so near the apex, long hairs on siphunculi with acute apices and may be up to twice the basal diameter of siphunculi; a few shorter ones occur rather scattered. Cauda with a distinct median process, with 8-9 hairs. Femora pale, tibiae yellowish and distinctly imbricated, more so in hindtibiae.

*Measurements in mm* :

	Length	Width	Antenna
1.	3.00	1.12	2.13
2.	2.09	1.02	1.51
3.	2.55	1.08	1.84
4.	2.19	1.13	1.37
5.	2.31	1.16	1.46
6.	2.59	1.26	1.89
7.	2.23	1.10	1.53
8.	2.61	1.23	1.96

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.72	0.27	0.30	0.22 + 0.45	0.24	0.13	1.72
0.46	0.17	0.19	0.18 + 0.37	0.22	0.11	0.96
0.57	0.21	0.27	0.21 + 0.40	0.24	0.13	1.32
0.42	0.15	0.19	0.15 + 0.32	0.22	0.12	1.96
0.46	0.18	0.20	0.16 + 0.29	0.22	0.12	0.79
0.65	0.24	0.23	0.21 + 0.40	0.22	0.13	1.29
0.45	0.19	0.20	0.18 + 0.36	0.20	0.13	0.96
0.63	0.24	0.27	0.21 + 0.43	0.22	0.13	1.44

(1, *Symplocos spicata*, Shillong, Meghalaya, 13.iv.1968, C.U. Colls; 2, *Prunus cerasoides*, Shillong, Meghalaya, 6.vii.1969, C.U. Colls; 3, *Eurya* sp., Shillong, Meghalaya, 23.vii.1970, C.U. Colls., 4-7, *S. spicata*, Shillong, Meghalaya, 17.vii.1976, Z.S.I.Colls.; 8, *S. spicata*, Fruit Gardens, Shillong, Meghalaya, 30.vii.1976, Z.S.I.Colls.).

*Alate viviparous female* : Body elongated, 2.20-2.66 mm long and 0.80-1.06 mm as maximum width. Head brownish yellow, with long fine dorsal hairs. Antennae dark brown, 6-segmented, 1.87-2.39 mm long and 0.83-0.89 x as long as body; segment III thick and stout than other segments of the flagellum, bearing 22-32 accessory rhinaria distributed in a row over its entire length; flagellum gradually more distinctly imbricated from base of segment III; processus terminalis 0.41-0.55 mm long and 2.10-2.39 x as long as base of last antennal segment; flagellar hairs thick, with acute apices, longer ones 2.0-2.10 x as long as the basal diameter of 3rd antennal segment. Ultimate rostral segments 0.20-0.24 mm long and 2.0-2.40 x as long as second joint of hindtarsus. Dorsum of abdomen smooth with segmented dark brown sclerites, which form a patch on 1st-6th tergites; venter rather evenly spinulose; dorsal hairs short, with acute apices, 0.75 x as long as basal diameter of 3rd antennal segment. Cauda with a distinct median process. Legs yellowish brown, darker near apices of femora, bases and apices of tibiae and whole of tarsi; femora imbricated near apical 0.20 portion; hindtibiae with 85- 100 stridulatory ridges over entire length except at apical 0.28 portion which show clusters of thorny spines. Wing venation normal.

*Measurements in mm :*

	Length	Width	Antenna
1.	2.27	0.92	?
2.	2.66	1.06	2.39

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.81	broken			0.23	0.12	1.77
0.82	0.32	0.31	0.23 + 0.55	0.24	0.10	2.09

(1-2, *Symplocos* sp., Shillong, Meghalaya, 12.vi.1969, C.U. Colls.).

*Other morphs* : Not known.

*Materials examined* : 1 apterous viviparous female from *Symplocos spicata*, Shillong, Meghalaya, 13.iv.1968, Coll. S. Biswas, 1 apterous viviparous female and 1 alate viviparous female from *Symplocos* sp., Nongrim hill, Shillong, Meghalaya, 12.vi.1969, Coll. R. Basu; 1 apterous viviparous female and 1 nymph from *S. spicata*, Umpling, Meghalaya, 17.ix.1969, Coll. R. Basu; 1 apterous viviparous female from *Eurya* sp., Shillong, Meghalaya, 23.vii.1970, Coll. H. Banerjee; 12 apterous viviparous females, 1 alate viviparous female and 8 nymphs from *S. spicata*, Shillong, Meghalaya, 17.vii.1976, Coll. Unknown; 16 apterous viviparous females from *S. spicata*, Shillong, Meghalaya, 30.vii.1976, Coll. M.S. Jyrua.

*Discussion* : This species is placed under the subgenus *Paragreenidea* because of possessing stridulatory ridges on hindtibiae. The species is distinguishable from *G. viticola* (Takahashi, 1921), another species under the subgenus, in the ratio of rostral segments 4 to 5, ratio of u.r.s. (4+5) to h.t.2, in the nature and length of hairs on 7th abdominal tergite besides other characters. Ghosh, A.K. *et al.* (1971) and Ghosh, A.K. (1978) provided the variations in the morphometry of the species in the area of its distribution.

*Biology* : The species has been recorded to infest chiefly *Symplocos* species (Styraceae) in the North-eastern hills of India. Occasional records of this species from hosts of Rosaceae and Ternstroemiaceae have also been made.

*Distribution* : India : Meghalaya, Sikkim, West Bengal.

*Types* : In the collections of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

57. *Greenidea (Trichosiphum) anonae* Pergande  
(Figs. 33 m - 36 m)

1906. *Trichosiphum anonae* Pergande, Th., *Ent. News, Philad.*, 17 : 208.  
 1917. *Greenidea artocarpi*, Goot, P. van der, *Contrib. Faune Indes Neerl*, 3 : 131 (Partim).  
 1931. *Greenidea anonae*, Takahashi, R., *Aph. of Formosa*, pt. 6 : 29.

1956. *Greenidea (Trichosiphum) anonae*, Raychaudhuri, D.N., *Zool. Verh. Leiden*, 31 : 47.
1980. *Greenidea (Trichosiphum) anonae*, Raychaudhuri, D.N., and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) D.N. Raychaudhuri, 345.

*Apterous viviparous female* Body pear-shaped, 1.27-1.67 mm long and 0.71-0.96 mm as maximum width. Head brown, dorsum with spinules. Antennae brown, gradually darker towards apex, 6-segmented, 0.88-0.97 mm long and 0.67-0.90 x as long as body; flagellum gradually more distinctly imbricated from base to apex; processus terminalis 0.27-0.30 mm long and 1.80-2.72 x as long as base of last antennal segment; flagellar hairs large, thick and stiff, with branched apices. Rostrum reaching the middle of the body; ultimate rostral segments slender and acute, about 0.15 mm long and 1.60-2.14 x as long as the second joint of hindtarsus, segment 4 with about 14 very fine and long accessory hairs. Dorsum of abdomen brown and sclerotized, smooth; dorsal hairs many, large and short, the large hairs seemingly placed irregularly, very thick and stiff, either branched or with multifid apices; 6th tergite with small thorny hairs; 7th and 8th tergites each with two thin spinal hairs, these 1.10-1.50 and 1.0-1.90 x as long as the basal diameter of 3rd antennal segment respectively. Siphunculi 0.30-0.34 mm long and 0.19-0.24 x as long as body, with the base brown and the rest towards the apex gradually darker to black, curved outwards; hairs on the siphunculi numerous, basal hairs with less deeply incised than those on dorsum; spinules in distinct transverse rows, densely so near the apex, only on basal 0.16 part strongly transverse reticulations present. Cauda without a distinct median process, but drawn out into a small point with 6-10 very fine and long hairs. Legs pigmented like the head; femora with sparse imbrications; tibiae striate-imbricated.

*Measurements in mm*

	Length	Width	Antenna			
1.	1.44	0.83	0.97			
2.	1.27	0.71	0.88			
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.20	0.08	0.15	0.11 + 0.03	0.15	0.08	0.34
0.16	0.08	0.13	0.12 + 0.27	0.15	0.07	0.30

[1, *Artabotrys* sp. (Anonaceae), NEFA, Arunachal Pradesh, 1.xii.1969, C.U. Colls., 2, *Antidesma* sp. (Euphorbiaceae), Miao, NEFA, Arunachal Pradesh, 19.xi.1970, C.U. Colls.].

*Alate viviparous female* Body elongated, dark brown, 1.42-2.0 mm long and 0.62-0.86 mm as maximum width. Frons slightly wavy, without distinguishable frontal tubercles. Antennae 6-segmented, blackish, with basal segments and the very base of segment III somewhat paler, 1.33-1.40 mm long and 0.82-0.98 x as long as body; flagellum evenly imbricated from base to apex; segment III with 4-9 small, nearly circular accessory rhinaria on basal 0.33- 0.66 part, arranged in a row, the rhinaria often grouped very irregularly; flagellar hairs large, with fine apices, longest hairs on segment III 3.30-4.50 x as long as basal diameter of the segment; processus terminalis 0.27-0.32 mm long and 1.08 x as long as base of last antennal segment; Rostrum reaching a little beyond the hindcoxae; ultimate rostral segments 0.14 mm long and 2.33 x as long as second joint of hindtarsus, segment 4 with 10- 12 long and fine accessory hairs. Dorsum of abdomen sclerotised, brown; dorsal hairs with fine apices, longest hair on anterior tergites 2.30-3.50 x as long as basal diameter of 3rd antennal segment; 7th and 8th tergites each with two fine long hairs. Siphunculi black, nearly cylindrical, apical portion slightly curved outwards, 0.60-0.80 mm long and 0.42-0.47 x as long as body; reticulated and imbricated; hairs on the siphunculi numerous, with acute apices; spinules present in distinct transverse rows near the apex but few near the base. Femora pale near the base but darker distally; tibiae dark, striate-imbricated. Pterostigma extending upto even less than 0.33 portion of the Radial Sector. Media once or twice branched and hindwings with two veins.

*Measurements in mm :*

	Length	Width	Antenna			
1	1.84	0.69	2.55			
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
1.11	0.28	0.33	0.28 + 0.43	0.17	0.10	1.19

(1, *Annona* sp., Java, Indonesia, 10 x.1948, B.M. Colls.).

*Alate male* : Body elongated, 1.84-2.22 mm long and 0.69-0.84 mm as maximum width. Head dark brown. Antennae 6-segmented, 2.58-2.55 mm long and 1.10-1.38 x as long as body; segment III with 2-5 circular to slightly transversely oval accessory rhinaria at basal 0.33-0.40 portion of the segment; processus terminalis 0.43-0.69 mm long and 1.53 x as long as the base of the last antennal segment. Ultimate rostral segments 0.17 mm long and 1.70 x as long as second joint of hindtarsus, 4th segment 4.10-

4.30 x as long as segment 5. Dorsal hairs of anterior tergites 1.80-2.0 x as long as basal diameter of 3rd antennal segment. Siphunculi dark with the very apex faintly paler, 1.19-1.42 mm long 0.63-0.64 x as long as body. Cauda somewhat triangular with a distinct median process; claspers with a processus at their bases. Legs pale brownish with darker tibiae. Media twice-branched and hindwings with two veins.

*Measurements in mm*

	Length	Width	Antenna			
1.	1.42	0.68	1.33			
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.35	0.17	0.19	0.05 + 0.27	0.14	0.06	0.60

(1, 'Tobacco', Pusa, Central India, ?ii.1934, B.M. Colls.).

*Other morphs* : Not known. Alate viviparous female morph of this species described above was examined in the collections of the Natural History Museum, London.

*Materials examined* 1 apterous viviparous female and 7 nymphs from *Artabotrys* sp., Bhalukpong, NEFA, Arunachal Pradesh, 1.xii.1969, Coll. H. Banerjee; 1 apterous viviparous female and 2 nymphs from *Antidesma* sp., Miao, NEFA, Arunachal Pradesh, 19.xi.1970, Coll. H. Banerjee; 6 alate males from 'tobacco', Pusa, Central India, ?ii.1934, Coll. C.K. Samuel; 1 alate viviparous female from *Annona* sp., Banjoewangi, Java, Indonesia, 10.x.1948, Coll. F.W Rappard.

*Discussion* : This species is distinguishable from its congeners under the subgenus in having many dorsal hairs on abdomen, siphunculi shorter and processus terminalis longer than antennal segment III.

*Biology* This species attacks the lower side of young leaves of its hosts (Raychaudhuri, 1956).

*Distribution* India Arunachal Pradesh, Central India, West Bengal; Indonesia, Japan, Malaysia.

*Types* : Probably in U.S. National Museum, Washington, (Raychaudhuri, 1956).

58. *Greenidea (Trichosiphum) brachyunguis* Chatterjee, Mondal and Raychaudhuri  
(Figs. 33n - 36n)

1981. *Greenidea (Trichosiphum) brachyunguis* Chatterjee, M., Mondal, P.K. and Raychaudhuri, D.N., *Entomon*, 6 : 364.

*Apterous viviparous female* : Body long oval, dark brown, 2.52-3.40 mm long and 1.44-1.88 mm as maximum width. Head brown, smooth, bearing 8-10 hairs with fine to acuminate apices. Antennae 6-segmented, concolorous with head excepting segments III and IV which are somewhat paler, 1.80-2.00 mm long and 0.64-0.75 x as long as body; flagellum gradually more distinctly imbricated apicad; processus terminalis 0.36-0.42 mm long and 1.73-2.21 x as long as base of last antennal segment; longer hairs on flagellum with fine apices, shorter ones with acuminate apices, longest hair on segment III 0.19-0.20 mm and 3.76-4.53 x as long as basal diameter of the segment. Rostrum reaching midcoxae; ultimate rostral segments 0.24-0.26 mm long and 1.29-1.73 x as long as second joint of hindtarsus, with 11-12 fine accessory hairs. Dorsum of abdomen sclerotized, dark brown, smooth, bearing many long hairs with fine apices and a few with acuminate apices; 7th tergite with 7 hairs and 8th tergite with 2 long fine hairs; longest hairs on anterior tergites 0.07-0.10 mm long and 3.11- 3.66 x as long as basal diameter of 3rd antennal segment; abdominal venter medially spinulose and with a dark spino- pleural sclerotic patch. Siphunculi dark brown with apex paler, curved outwards, basally prominently reticulated, 0.83-0.94 mm long and 0.28-0.36 x as long as body; hairs on siphunculi numerous and flagellate; spinules present in distinct transvers rows, these being denser apically. Cauda with a distinct median process. Legs concolorous with the head; fomora with spinules arranged in rows dorsally, tibiae smooth, without any imbrication.

*Measurements in mm* :

	Length	Width	Antenna			
1.	3.04	1.86	2.0			
2.	2.77	1.65	1.80			

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.73	0.22	0.26	0.19 + 0.42	0.26	0.15	0.88
0.65	0.21	0.22	0.19 + 0.40	0.25	0.15	0.83

(1-2, *Quercus* sp., Gangtok, Sikkim, 27.xi.1971, C.U. Colls.).

*Other morphs* : Not known.

*Materials examined* : 3 apterous viviparous females and 3 nymphs from *Quercus* sp., Gangtok, Sikkim, 27.xi.1971, Coll. M.R. Ghosh.

*Discussion* : This species shows similarity with *G. kuwanai*, *G. prunicola* and *G. carpini* in general morphology specially in possessing spinules on the venter of abdomen but can be distinguished in having shorter processus terminalis in comparison to the base of last antennal segment. From other species, *brachyunguis* can be separated by the presence of long fine hairs on abdominal dorsum and on flagellum, by smooth tibiae and nearly smooth antennal segment III.

*Biology* Not known.

*Distribution* : India Sikkim.

*Types* : In the collections of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

59. *Greenidea (Trichosiphum) bucktonis*, Ghosh, Basu and Raychaudhuri  
(Figs. 33 o 36 o)

1970. *Greenidea (Trichosiphum) bucktonis* Ghosh, A.K., Basu R.C. and Raychaudhuri, D.N., *Oriental Ins.*, 4 : 69.
1973. *Greenidea (Trichosiphum) schoutedeni*, Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M. and Ghosh, A.K., *Kontyu*, 41 : 67, (New syn.)
1980. *Greenidea (Trichosiphum) bucktonis* and *G. (T.) schoutedeni*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan", (ed) D.N. Raychaudhuri, 345, 347.

*Apterous viviparous female* : Body pear-shaped, 1.61-2.46 mm long and 0.93-1.57 mm as maximum width. Head brown, smooth, dorsal cephalic hairs 12-13 on each side, long and short with acuminate apices. Antennae 1.20-1.73 mm long and 0.64-0.85 x as long as body, basal segments brown, rest paler; flagellum gradually more distinctly imbricated from base to apex, flagellar hairs long, mostly with acuminate apices and shorter ones thick and stiff, longest hair on segment III 2.2-4.10 x as long as basal diameter of the segment; processus terminalis 1.26-2.04 x as long as base of the last antennal segment. Ultimate rostral segments 0.16-0.26 mm long and 1.84-2.36 x as long as second joint of hindtarsus, segment 4 bearing 12-14 fine accessory hairs. Dorsum of abdomen brown, sclerotic and wrinkled, mid-ventral area smooth; dorsal hairs long and short, mostly with furcated apices, longest hairs on anterior tergites 2.3-4.3 x as long as basal diameter of 3rd antennal segment; 7th tergite with 2 thick hairs with furcated apices, 2.0-3.4 x as long as the mentioned diameter; 8th tergite with 2 thin hairs, 1.6-3.0 x as long as the mentioned diameter. Siphunculi darker than body, short and stout, slightly curved outwards, 0.37-0.58 mm long, about 0.20-0.29 x as long as body, 0.8-1.10 x as long as the width of head including outer margins of eyes and 3.5-4.5 x as long as its maximum width; hairs on siphunculi numerous, with

acuninate or furcated apices. Cauda with a distinct stylus, bears 6-8 hairs. Legs concolorous with body; femora and tibiae sparsely imbricated, tibiae with spinulose striae all over.

*Mesurements in mm :*

	Length	Width	Antenna
1.	1.81	1.12	?
2.	1.48	0.90	1.01
3.	1.69	0.96	1.15
4.	1.39	0.91	0.99
5.	2.18	1.35	1.74
6.	2.14	1.45	1.69
7.	2.02	0.96	1.54
8.	2.03	1.06	1.35
9.	1.71	0.93	1.35
10.	1.78	1.05	1.36
11.	1.75	1.03	1.73
12.	2.12	1.19	?
13.	2.04	1.13	1.60
14.	1.80	1.01	1.54
15.	1.61	0.98	1.33
16.	1.85	1.12	1.48
17.	1.95	1.11	1.25

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.35	0.17	0.21	0.17+broken	0.23	0.09	0.46
0.24	0.11	0.15	0.15 + 0.25	0.18	0.09	0.32
0.30	0.14	0.17	0.16 + 0.29	0.16	0.10	0.39
0.39	0.17	0.15	0.17 + 0.22	0.15	0.08	0.39
0.46	0.23	0.26	0.21 + 0.42	0.25	0.12	0.58
0.46	0.23	0.27	0.22 + 0.45	0.24	0.12	0.58
0.39	0.19	0.20	0.18 + 0.32	0.23	0.10	0.42
0.42	0.22	0.23	0.20 + 0.35	0.24	0.12	0.46
0.36	0.18	0.20	0.19 + 0.32	0.21	0.10	0.43

0.36	0.17	0.20	0.19 + 0.34	0.21	0.10	0.40
0.40	0.21	0.23	0.24 + 0.49	0.16	0.10	0.37
0.46	0.23	0.21	broken	0.23	0.10	0.53
0.36	0.26	0.23	0.21 + 0.36	0.21	0.10	0.50
0.40	0.21	0.24	0.23 + 0.29	0.21	0.10	0.46
0.34	0.15	0.19	0.16 + 0.31	0.21	0.10	0.47
0.39	0.21	0.23	0.21 + 0.33	0.26	0.11	0.39
0.39	0.19	0.22	0.19 + 0.31	0.25	0.11	0.50

(1-2, *Villebrunea integrifolia*, unknown locality, 29.vi.1969, C.U. Colls., 3-4, an indet, host, Ranikhet, Uttar Pradesh, 12.vi.1970, C.U. Colls., 5-6, *Syzgium* sp., Cherrapunji, Meghalaya, 17.iv.1973, Z.S.I. Colls., 7-8, an indet host, Kurseong, West Bengal, 1.v.1970, C.U. Colls.; 9-10, an indet host, Malki, Shillong, Meghalaya, 8.vii.1974, Z.S.I. colls.; 11, *Sapindus*, sp., Anogjri, Garo Hills, Meghalaya, 21.ii.1975, Z.S.I. Colls., 12-13, *Eugenia* sp., Botanical Garden, Shillong, 20.iv.1977, Z.S.I. Colls.; 14-15, *Syzgium* sp., Shillong, 16.vi.1977, Z.S.I. Colls., 16-17, *Prunus* sp., Shillong, Meghalaya, 10.viii.1977, Z.S.I. Colls.).

*Alate viviparous female* Body 1.69-2.88 mm long and 0.77-0.88 mm as maximum width. Head brown, smooth, with 6-7 long hairs on each side having acuminate apices. Antennae darker upto segments 4, rest paler; 1.87-2.11 mm long and 0.73-1.10 x as long as body; flagellum distinctly imbricated; segment III with 18-20 transversely oval accessory rhinaria distributed on 4/5 portion of the segment; flagellar hairs long, about 3.25-3.35 x as long as basal diameter of the segment; processus terminalis 1.65-1.73 x as long as base of the last antennal segment. Rostrum reaching upto hindcoxae; ultimate rostral segments 0.23-0.28 mm long and 1.76- 2.54 x as long as second joint of hindtarsus; segment 4 bearing 7 long and fine accessory hairs. Dorsum of abdomen pale brown, smooth, with spino-pleural transverse sclerotic bands upto 6th tergites, these somewhat paler on anterior 1-3rd tergites; dorsal hairs 15-18 on each of the 1-6th tergites, with acute or acuminate apices, longest hair on anterior tergites 0.57-0.66 x as long as the basal diameter of 3rd antennal segment; siphunculi brown, darker near the base, reticulated on both surfaces throughout the length, 1.19-1.45 mm long, 0.50 - 0.70 x as long as body and 3.50 - 4.0 x as long as its maximum width; hairs on siphunculi numerous, long, with acuminate apices. Cauda with median stylus distinct. Femora imbricated with few spinule near the apex, tibiae striate-imbricated. Wing venation normal.

*Mesurements in mm :*

	Length	Width	Antenna			
1.	1.69	0.77	1.87			
2.	2.06	0.81	2.00			
3.	2.88	0.88	2.11			
Antennal segments				urs	ht <sub>2</sub>	Siph.
III	IV	V	VI			
0.57	0.26	0.28	0.23 + 0.38	0.23	0.13	1.19
0.58	0.30	0.34	0.23 + 0.40	0.28	0.11	1.39
0.65	0.30	0.30	0.26 + 0.44	0.23	0.11	1.45

(1-2, *Syzigium* sp., Shillong, Meghalaya, 16.vi.1977, Z.S.I. Colls.; 3, *Eugenia* sp., Botanical Gardens, Shillong, Meghalaya, 20.iv.1977, Z.S.I.Colls.).

*Other morphs* : Not known.

*Materials examined* 2 apterous viviparous females and 1 nymph from *Villebrunea integrifolia*, locality unknown, 29.vi.1969, Coll. unknown; 2 apterous viviparous female from an indet. host, Ranikhet, Uttar Pradesh, 12.iv.1970, Coll. S.D. Chakraborty; 2 apterous viviparous females and 1 nymph from an indet. host, Kurseong, West Bengal, 1.v.1970, Coll. S.D. Chakraborty; 3 apterous viviparous females and 2 nymphs from *Syzigium* sp., Mawblang, Cherrapunji, Meghalaya, 17.v.1977, Coll. H. Khajuria; 4 apterous viviparous females and 3 nymphs from an indet. host, Malki, Shillong, Meghalaya, 8.vii.1976, Coll. K. Deb; 4 apterous viviparous females and many nymphs from *Sapindus* sp., Anogiri, Garo Hills, Meghalaya, 21.ii.1975, Coll. S. Biswas; 6 apterous and 1 alate viviparous females and many nymphs from *Eugenia* sp., Botanical Garden, Shillong, Meghalaya, 20.iv.1977, Coll. A.C. Sukla; 4 apterous and 5 alate viviparous females and 7 nymphs from *Syzigium* sp., 16.vi.1977, Coll. K. Deb; 4 apterous viviparous females and 8 nymphs from *Prunus* sp., 10.viii.1977, Coll. K. Deb.

*Discussion* : Ghosh *et al.* (1970) described *bucktonis* from Assam and Raychaudhuri *et al.* (1973) described *schoutedeni* from Meghalaya. Since then several collections representing the two designated species have been made. Raychaudhuri and Chatterjee (1980) separated the two species on the basis of siphunculi longer than (in *schoutedeni*) or shorter than (in *bucktonis*) the width of head including outer margins of eyes. Examination of a series of specimens of the two species, however, does not show any consistency in this and other characters worthy of their possible separation. In fact, Raychaudhuri and

Chatterjee (1980) seem to have overlooked the earlier finding of Raychaudhuri *et al.* (1973) where it is mentioned that siphunculi is "0.8-0.10 x the width of head including the outer margin of the eyes" while describing *schoutedeni*. In view of absence of any consistent difference in the two designated species, as aforesaid, *schoutedeni* is considered to be a synonym of *bucktonis* following the law of priority.

*Biology* : Now known.

*Distribution* : India Meghalaya, Sikkim, Uttar Pradesh and West Bengal.

*Types* : In the collections of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

60. *Greenidea (Trichosiphum) camelliae* Agarwala and Ghosh n.sp.  
(Figs. 33 p-36 p)

*Apterous viviparous female* : Body pear-shaped, 1.23-1.49 mm long and 0.80-0.94 mm as maximum width. Head yellowish, smooth; dorsal hair long, 5 on each side, mostly with furcated apices. Antennae 6-segmented, concolorous with head, 0.96-1.17 mm long and 0.75-0.84 x as long as body; flagellum gradually distinctly imbricated apicad; flagellar hairs long and short, longest one on segment III about 4.20-4.35 x as long as basal diameter of the segment, processus terminalis 1.5-1.75 x as long as base of the last segment and 1.02-1.12 x as long as 3rd antennal segment. Rostrum reaching 1st abdominal segment, ultimate rostral segments 0.18-0.19 mm long and 1.91-1.08 x as long as second joint of hindtarsus, segment 4 bearing about 8 short and fine accessory hairs. Dorsum of abdomen brown, darker so in the spino-pleural regions, sclerotic, smooth; dorsal hairs mostly large, thick and stiff, with multibranching apices, a few shorter ones with acuminate apices occur in between, longer hairs on anterior tergites about 4.20-4.35 x as long as the basal diameter of 3rd antennal segment; 7th tergite with 2 thick and large hairs, about 3.33 x as long as the mentioned diameter, 8th tergite with 2 thin and small hairs, about 2.33 x as long as the mentioned diameter. Siphunculi dark brown except near the base and apex which are paler, 0.38-0.46 mm long, 0.26-0.31 x as long as body and 3.62- 3.43 x as long as its maximum width; spinulose throughout, hairs on siphunculi numerous, with acute, acuminate and furcated apices. Cauda with a distinct median stylus, bearing 4-6 hairs. Legs pale brown; femora feebly spinulose; tibiae striate- imbricated.

*Measurements in mm*

	Length	Width	Antenna
1.	1.49	0.94	1.17
2.	1.39	0.85	1.17

3.	1.46	0.88	1.13
4.	1.46	0.87	1.09
5.	1.43	0.81	1.13
6.	1.23	0.80	0.96

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.27	0.15	0.19	0.21 + 0.29	0.18	0.09	0.43
0.27	0.13	0.19	0.17 + 0.29	0.19	0.09	0.42
0.26	0.15	0.18	0.16 + 0.27	0.17	0.08	0.46
0.24	0.13	0.17	0.15 + 0.26	0.18	0.07	0.38
0.25	0.13	0.18	0.16 + 0.28	0.19	0.08	0.40
0.23	0.15	0.15	0.11 + 0.24	0.19	0.07	0.36

(1-6, *Camellia* sp., Botanical Garden, Shillong, Meghalaya, 12.ix.1974, Z.S.I. Colls.).

*Other morphs* : Not known.

*Materials examined* : Holotype : 1 apterous viviparous female from *Camellia* sp. (Theaceae), Botanical Garden, Shillong, Meghalaya, 12.iv.1974, Coll. A.C. Sukla; Paratype : 5 apterous viviparous females and 1 nymph, collection data similar to the holotype.

*Discussion* : The new species closely resembles *G. bucktonis* in most of the characters but can be distinguished from it and other congenics in having smaller size of the body, longer hairs on antennal segment III (4.20-4.35 x b.d. III against 2.2-4.10 x in *bucktonis*), processus terminalis longer than segment III (smaller in *bucktonis*) and ultimate rostral segments bearing 8 accessory hairs (12-14 hair in *bucktonis*).

*Biology* : Specimens of the new species were collected from *Camellia* sp. from which no other species of the subfamily Greenideinae is recorded.

*Distribution* : India : Meghalaya.

*Types* : In the collection of the Zoological Survey of India, Calcutta.

61. *Greenidea (Trichosiphum) formosana formosana* (Maki)

(Figs. 33 q-36 q, 37 k, 39 j, 40 l)

1916. *Trichosiphum formosanum*, Maki, M., *Coll. Essays for Nawa, Gifu*, 13 (Partim).

1921. *Greenidea formosana*, Takahashi, R., *Aph. of Formosa*, pt. 1 : 65.  
 1924. *Greenidea formosana*, Takahashi, R., *Aph. of Formosa*, pt. 3 : 55.  
 1956. *Greenidea (Trichosiphum) formosana*, Raychaudhuri, D.N., *Zool. Verh., Leiden*, 31 : 53.

*Apterous viviparous female* : Body 1.86-2.61 mm long and 1.0-1.33 mm as maximum width. Frons slightly convex. Head brown, smooth, with many long hairs. Antennae concolorous with head, more darker towards the apex, about 1.06-2.0 mm long and 0.87-0.96 x as long as body; flagellum gradually more distinctly imbricated from base to apex; flagellar hairs long, a few short, with multifid apices, longest hair on segment III about 2.0-3.8 x as long as basal diameter of the segment; processus terminalis about 0.50-0.58 mm long and 2.03-2.48 x as long as base of the last antennal segment. Rostrum reaching upto or little beyond middle of the body; ultimate rostral segments 0.23-0.25 mm long; 1.91-2.27 x as long as second joint of hindtarsi, segment 4 bearing 10-14 short and fine accessory hairs. Dorsum of abdomen brown to dark brown, sclerotized, smooth; dorsal hairs large and short, longer ones thick and stiff and shorter ones thinner, all with multifid apices, longest hair on anterior tergites about 3.0-3.8 x as long as basal diameter of 3rd antennal segment; 7th tergite with two thick spinal hairs; 8th tergite with two thin and fine spinal hairs, these about 2.6-3.0 and 1.6-2.25 x as long as the mentioned diameter respectively. Siphunculi pale brown with the base and apex darker, 0.57-0.65 mm long, 0.26-0.33 x as long as body and 5.2-6.8 x as long as their maximum width; curved outwards; with many hairs, these mostly furcated near the base and acute towards the apex; spinules in transverse rows near the apex but sparsely distributed on rest of the siphunculi. Cauda transversely oval, with a distinct median process, with 6-8 long and fine hairs. Legs pigmented like head; femora sparsely imbricated; tibiae striate-imbricated.

*Measurements in mm :*

	Length	Width	Antenna
1.	2.33	1.32	broken
2.	1.86	1.00	1.66
3.	1.90	1.09	1.83
4.	2.15	1.25	1.87
5.	2.20	1.24	1.97
6.	2.22	1.21	2.00
7.	2.61	1.33	?
8.	2.10	1.25	1.84

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
broken	broken	broken	broken	0.25	0.11	0.61
0.38	0.19	0.23	0.23 + 0.50	0.23	0.11	0.61
0.38	0.21	0.26	0.23 + 0.57	0.23	0.11	0.63
0.42	0.23	0.26	0.26 + 0.53	0.24	0.11	0.57
0.46	0.23	0.30	0.26 + 0.56	0.23	0.11	1.61
0.47	0.24	0.29	0.27 + 0.58	0.23	0.11	0.61
0.55	0.30	0.29	0.23 broken	0.23	0.12	0.65
0.45	0.23	0.27	0.25 + 0.52	0.21	0.10	0.62

(1, 'Guava'; Janakpur, Nepal, 2.ii.1965, B.M. Colls.; 2, *Psidium guajava*, Shillong, Meghalaya, 23.xii.1966, Z.S.I. Colls.; 3, *P. guajava*, Shillong, Meghalaya, 4.vii.1975, Z.S.I. Colls.; 4, 'Guava', Risa Colony, Shillong, Meghalaya, 27.x.1975, Z.S.I. Colls.; 5-6, *P. guajava*, Morch, Manipur, 20.i.1976, Z.S.I. Colls.; 7, *Rhamnus nepalensis*, Darjeeling, West Bengal, 8.xii.1978, C.U. Colls.; 8, Unknown host, Dacca, Bangladesh, 3.iii.1981, B.M. Colls.).

*Alate viviparous female* : Body elongated, 1.36-2.77 mm long and 0.74-1.26 mm as maximum width. Head deep brown, smooth dorsal cephalic hairs long with acute or fine apices. Antennae 6-segmented, basal segments pale brown, rest dark, 2.22-2.62 mm long and 0.86-1.20 x as long as body; flagellar hairs long, thick and stout; processus terminalis 0.62-0.83 mm long and 2.25-2.50 x as long as base of last antennal segment. Rostrum reaching nearly the middle of body; ultimate rostral segments about 0.23-0.25 mm long and 1.92-2.77 x as long as second joint of hindtarsus; segment 4 with about 10-12 long and fine hairs. Dorsum of abdomen brown, locally sclerotized; dorsal hairs long and short, thick and rather stiff, longer ones on anterior tergites about 1.1-1.3 x as long as basal diameter of 3rd antennal segment; each of 7th and 8th tergites with 2 long and fine hairs, longest hairs on 7th tergite 0.88-1.12 x as long as the mentioned diameter. Siphunculi black, 1.36-2.14 mm long, 0.62-0.77 x as long as body and about 23.0-25.0 x as long as their maximum width; cylindrical, reticulated-imbricated over entire length; hairs on siphunculi numerous, with acute apices. Pterostigma extending upto about 1/3 of the Radial Sector. Otherwise as in apterous viviparous female morph.

*Measurements in mm :*

	Length	Width	Antenna
1.	1.89	0.76	2.23

2.	2.77	1.10	2.39
3.	2.17	0.97	2.22
4.	2.16	0.89	?

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.59	0.28	0.35	0.26 + 0.61	0.25	0.09	1.36
0.87	0.46	0.50	0.34 + 0.83	0.25	0.13	2.14
0.57	0.28	0.30	0.28 + 0.63	0.23	0.11	1.37
0.57	0.29	0.32	0.25+broken	0.24	0.11	1.35

(1, Y P T, Kakani, Nepal, ?.iii.1966, B.M. Colls., 2, an indet. host, Lebong, Darjeeling, West Bengal, 25.xi.1970, C.U. Colls., 3-4, *Psidium guajava*, Morch, Manipur, 20.i.1976, Z.S.I. Colls.).

*Other morphs* : Not known.

*Materials examined* 1 apterous viviparous female from "Guava" Janakpur, Nepal, 2.ii.1965, Coll. K.C. Sharma; 1 alate viviparous female from YPT, Kakani, Nepal, ?.iii.1966, K.C. Sharma; 4 apterous viviparous females and 3 nymphs from *Psidium guajava*, Shillong, Meghalaya, 23.xii.1966, Coll. S. Biswas; 1 alate viviparous female and 2 nymphs from an indet. host Lebong, Darjeeling, 25.xi.1970, Coll. Unknown; 1 apterous viviparous female and 3 nymphs from *P. guajava*, Risa Colony, Shillong, Meghalaya, 4.vii.1975, Coll. R. Mathew; 7 apterous and 1 alate viviparous females from *P. guajava*, Morch, 20.i.1976, Coll. A.K. Ghosh; 1 apterous viviparous female and 2 nymphs from *Rhamnus nepalensis*, Lloyd's Botanical Garden, Darjeeling, West Bengal, 8.xii.1978, Coll. unknown; 1 apterous viviparous female from an unknown host, Dacca, Bangladesh, 3.iii.1981, Coll. van Harten.

*Discussion* Raychaudhuri (1956) provided a detail description of the species based on materials collected from a number of locations in South and East Asia. Since then a large number of specimens showing resemblance to *formosana* have been recorded from India and considered as its subspecies *formosana heeri*. Having examined the extensive collections of the Natural History Museum (London) and the Indian materials, we have found that *formosana s. sr.* is also represented in India, Bangladesh and Nepal besides its subspecies *formosana heeri*.

*Biology* : This subspecies chiefly infests tender shoots and under- surface of young leaves of *P. guajava*. Ant attendance is commonly noticed.

*Distribution* India Manipur, Meghalaya, West Bengal; Bangladesh,

China, Indonesia, Japan, Nepal, Taiwan.

*Types* : Probably in Taiwan Agricultural Institute, Taipeh (Taihoku), Taiwan.

62. *Greenidea (Trichosiphum) formosana heeri* Raychaudhuri, Ghosh, Banerjee and Ghosh

(Figs. 33x, 34w, 35x, 36w, 37n, 38j, 39m-40m)

1973. *Greenidea (Trichosiphum) heeri* Raychaudhuri, D.N. Ghosh, M.R. Banerjee, M. and Ghosh, A.K., *Knotyu*, 41 : 66.
1980. *Greenidea (Trichosiphum) formosana heeri*, Raychaudhuri, D.N. and Banerjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N., 345.

*Apterous viviparous female* : Body 1.8-2.6 mm long and 0.84-1.35 mm as maximum width. Head light brown to brown. Antennae 6- segmented, gradually becoming darker towards the apex; 1.48-2.16 mm long and 0.79-0.93 x as long as body; flagellum distinctly imbricated, flagellar hairs long and short, with acuminate to furcated apices, longest hair on segment III about 1.8-3.8 x as long as the basal diameter of the segment; processus terminalis 0.44-0.56 mm long and 1.7-2.2 x as long as the basal length of the last antennal segment. Rostrum extending little beyond hindcoxae; ultimate rostral segments 0.15-0.20 mm long and about 1.2-1.9 x as long as second joint of hindtarsus; segment 4 about 3.3-4.4 x as long as segment 5 and bears about 10 fine hairs. Dorsum of abdomen pale brown to deep brown, sclerotized, wrinkled, prominently so cephalad, laterad and caudad; dorsal hairs long and short, occur intermingled, mostly with bi-or multifid apices, a few shorter ones with acuminate apices, longest hair on anterior tergites about 3.0-3.9 x as long as basal diameter of 3rd antennal segment; 7th and 8th tergites each with 2 long hairs of furcated apices, these 1.9-3.9 x and 1.8-3.0 x as long as the mentioned diameter. Siphunculi brown to dark, near the base and apical 1/3rd portion darker, reticulated near the base, 0.42-0.70 mm long, 0.21-0.30 x as long as body and about 4.2-6.2 x as long as their maximum width; siphuncular hairs mostly long, some shorter ones present upto about the middle of the siphunculi. Cauda with a distinct median stylus, with 6 fine hairs. Legs light brown with tarsi darker; femora nearly smooth, spinulose on both surfaces; tibiae gradually imbricated from base towards apex.

*Measurements in mm* :

	Length	Width	Antenna
1.	2.37	1.31	1.93
2.	2.15	1.19	1.72
3.	2.0	1.06	?

4.	1.97	0.92	1.68
5.	2.07	1.09	?
6.	2.48	1.30	2.16
7.	2.07	1.17	1.81
8.	1.90	1.07	?
9.	1.86	1.07	1.75
10.	1.60	0.84	1.48
11.	2.11	1.13	1.77
12.	2.07	1.23	1.82

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.47	0.25	0.29	0.23 + 0.54	0.20	0.12	0.70
0.42	0.23	0.25	0.20 + 0.46	0.19	0.11	broken
0.34	0.19	0.21	0.23+broken	0.15	0.11	0.42
0.38	0.20	0.24	0.23 + 0.50	0.15	0.11	0.51
0.42	0.23	0.27	0.23+broken	0.20	0.11	broken
0.53	0.28	0.31	0.25 + 0.67	0.20	0.12	broken
0.42	0.23	0.23	0.23 + 0.56	0.16	0.11	0.63
0.38	0.21	0.16	broken	0.16	0.11	0.57
0.38	0.21	0.25	0.23 + 0.53	0.18	0.11	0.51
0.30	0.16	0.21	0.20 + 0.47	0.15	0.10	0.40
0.44	0.23	0.26	0.23 + 0.48	0.16	0.11	0.53
0.47	0.25	0.29	0.23 + 0.44	0.16	0.11	broken

(1-2, *Engelhardia spicata*, Kalimpong, West Bengal, 2.xi.1970, C.U. Colls., 3-4, *Eugenia jambolana*, Kalimpong, West Bengal, 5.i.1971, C.U. Colls., 5-6, *E. spicata*, Kalimpong, West Bengal, 15.i.1971, C.U. Colls., 8-9, *Eugenia* sp., Old Barapani, Meghalaya, 2.ii.1974, Z.S.I. Colls., 10-11, *Eugenia* sp., Garampani, Jaintia Hill, Meghalaya, 24.i.1975, Z.S.I. Colls., 12, an indet. host, Siang, Arunachal Pradesh, 14.ii.1973, Z.S.I. Colls.).

*Alate viviparous females* Body 2.46-2.64 mm long and 0.90-1.01 mm as maximum width. Frons dark brown. Antennae 2.23-2.87 mm long, about 0.97-1.10 x as long as body; flagellum distinctly imbricated, segment III with 14-20 small to large circular secondary rhinaria in a row along its entire length;

flagellar hairs mostly long, with acuminate apices; processus terminalis about 1.5-2.5 x as long as base of last antennal segment. Ultimate rostral segments 0.19-0.23 mm long and 1.69-1.77 x as long as second joint of hindtarsus. Dorsum of abdomen with sparse sclerotic patches, these coalescing to form transverse bands on 5th and 6th tergites; dorsal hairs mostly short, with acute apices, a few longer ones with similar apices, longest hair on anterior tergites about 1.7-1.8 x as long as the basal diameter of 3rd antennal segment; 7th and 8th tergites each with 2 fine hairs, longest hair on 7th tergite 1.0-1.4 x as long as the mentioned diameter. Siphunculi long, reticulated throughout except near the apex, pale brown, 1.38-1.77 mm long, about 0.66- 0.72 x as long as their maximum width; siphuncular hairs mostly long and stout, with subacute apices. Otherwise as in apterous viviparous female.

*Measurements in mm :*

	Length	Width	Antenna
1.	2.23	0.97	2.17
2.	2.34	0.92	2.40

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.62	0.30	0.32	0.30 + 0.46	0.19	0.11	1.38
0.68	0.36	0.36	0.34 + 0.53	0.22	0.13	1.69

(1, *Eugenia jambolana*, Kalimpong, West Bengal, 5.i.1971, C.U. Colls.; 2, *Engelhardia spicata*, Kalimpong, West Bengal, 15.i.1971, C.U. Coll.).

*Other morphs* : Not known.

*Materials examined* : 2 apterous viviparous and 1 alate viviparous females from *Eugenia jambolana*, Kamshi, Kalimpong, West Bengal, 5.i.1971, Coll. not known; 1 apterous viviparous, 1 alate viviparous females and 3 nymphs from *Engelhardia spicata*, Kalimpong, West Bengal, 15.i.1971, Coll. not known; 2 apterous viviparous females and 2 nymphs from *E. spicata*, 2.xi.1970, Coll. M.R. Ghosh; 1 apterous viviparous female from an indet. host, Siang, Arunachal Pradesh, 14.ii.1973, Coll. A.K. Ghosh; 2 apterous viviparous females from *Eugenia* sp., Old Barapani, Meghalaya, 2.ii.1974, Coll. M. Vasanth; 2 apterous viviparous females and 1 nymph from *Eugenia* sp., Garampani, Meghalaya, 24.i.1975, Coll. A.K. Ghosh; 2 apterous viviparous females from *Syzygium jambos*, Agartala, Tripura, 19.ii.1982, Coll. B.K. Agarwala.

*Discussion* : Raychaudhuri, *et al.* (1973) considered *G. heeri* as the distinct species distinguishable from *G. formosana* in the ratio of u.r.s. and h.t.2, and segments 4 and 5 of the u.r.s. Subsequently, Raychaudhuri and

Chatterjee (1980) considered *heeri* as the subspecies of *formosana*.

The occurrence of the populations of the *formosana* and *formosana heeri* in the same locality or geographical area is somewhat intriguing. However, in view of the fact that the differences in the lengths of u.r.s. and its ratio with h.t.2 are rather consistent in the members of the two population, it seems likely that *formosana* was introduced to this part of world from its original habitat in Far East Asia and a part of its population has evolved new adaptive features in the new habitat in course of time which is recognised here as *formosana heeri*. Since the sexual forms are not known so far, it is difficult to assume if the two populations have any genetic exchange.

*Biology* Brownish insects colonise younger leaves and tender parts of stem. This species is commonly noticed in the autumn, early winter and summer in the hills and during winter in the parts of North-east India.

*Distribution* India : Manipur, Meghalaya, Nagaland, Sikkim, South India, Uttar Pradesh, West Bengal; Nepal.

*Types* In the collections of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

63. *Greenidea (Trichosiphum) gigantea* Ghosh and Raychaudhuri  
(Figs. 33 r-36 r)

1972. *Greenidea (Trichosiphum) gigantea* Ghosh, A.K., and Raychaudhuri, D.N., *Proc. Zool. Soc. Calcutta*, 26 : 97.
1980. *Greenidea (Trichosiphum) gigantea*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed), Raychaudhuri, D.N., 346.

*Apterous viviparous female* Body elongated, dark brown, 3.18- 3.65 mm long and 1.95-2.20 mm as maximum width. Head brown, smooth with long hairs. Antennae 6-segmented, 2.36-2.43 mm long and 0.66-0.71 x as long as body, pale yellowish; flagellum nearly smooth on segment III, rest gradually more distinctly imbricated apicad; processus terminalis 0.53 mm long and 2.20-2.30 x as long as base of the last antennal segment; flagellar hairs with acute apices and shorter ones with acuminate apices, longest hair on segment III 0.19 mm long and 3.50-4.25 x as long as basal diameter of the segment. Rostrum reaches upto about hindcoxae; ultimate rostral segments 0.27-0.29 mm long and 1.50-1.60 x as long as second joint of hindtarsus, segment 4 bears 10-11 fine accessory hairs. Dorsum of abdomen pale marginally, with a large dark brown spino-pleural solid patch extending upto 6th tergite, nearly smooth; tergal hairs both long and short, longer ones with acute apices and shorter ones with acuminate to acute apices, longest hair on anterior tergites 0.12-0.20 mm

long and 2.75-4.30 x as long as basal diameter of 3rd antennal segment; 7th tergite with two thick hairs and 8th tergite with two fine hairs. Siphunculi dark brown, paler apicad, with a few rows of reticulations near basal 0.12 portion; 0.88-0.90 mm long, 0.25- 0.27 x as long as body and 3.25-3.40 x as long as their maximum width; hairs on siphunculi long and short, with acuminate to acute apices; densely spinulose on apical 1/3rd portion, rest sparsely spinulose. Cauda with a short process and bears 8 hairs. Legs concolorous with antennae; femora nearly smooth, often with a group of wax gland-like structure placed ventrally apicad; tibiae smooth and bears both thick and fine hairs.

*Measurements in mm :*

	Length	Width	Antenna			
1.	3.48	2.20	2.43			
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.84	0.30	0.30	0.23 + 0.53	0.29	0.19	0.88

(1, an indet. host, Darjeeling, West Bengal, 8.v.1971, C.U. Colls.).

*Other morphs* : Not known.

*Materials examined* : 1 apterous viviparous female and 1 nymph from an indet. host, Jorebunglow, Darjeeling, West Bengal, 8.v.1971, Coll. S.D. Chakraborty.

*Discussion* : This species is so far known by its type-specimens. The dark-colored large aphids are distinguishable from its closest relative *G. nigra* (Maki) in the smooth antennal segment III, shape of siphunculi, ratio of siphunculi to body (0.38 x as long as in *nigra*) and length of siphunculi to its maximum width (6.2 x as long as in *nigra*).

*Biology* The large dark apterae viviparae were collected from apical shoots of the host plant.

*Distribution* : India : West Bengal.

*Types* : In the collections of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

#### 64. *Greenidea (Trichosiphum) haldari* Maity and Chakrabarti

(Figs. 33y, 34x, 35y, 36x)

1980. *Greenidea (Trichosiphum) haldari* Maity, S. P. and Chakrabarti, S., *Annales Zoology*, 35 : 310.

*Apterous viviparous female* Body pear-shaped, 1.96-2.42 mm long and 1.19-1.47 mm as maximum width. Head brown, smooth ; dorsal cephalic hairs 12-14 on each side, with acute or furcated apices. Antennae 0.96-1.31 mm long. 0.46-0.54 x as long as body, basal segments dark brown, rest somewhat paler ; segment III smooth, rest of the flagellum imbricated ; flagellar hairs long and short, intermingled, with acute or acuminate apices, longest hair on segment III 2.10-2.30 x as long as basal diameter of the segment ; processus terminalis 1.62-2.0 x as long as base of the last antennal segment. Rostrum reaching upto second abdominal segment ; ultimate rostral segments 0.23-0.25 mm long and 2.18- 2.25 x as long as second joint of hindtarsus, segment 4 bearing about 10 accessory hairs. Dorsum of abdomen dark brown, wrinkled, apparently smooth , dorsal hairs long and short, intermingled, longer hairs with furcated apices and shorter hairs with acute apices, longest hair on anterior tergites 2.0-2.20 x as long as the basal diameter of 3rd antennal segment , 7th and 8th tergites each with 2 long hairs, with pointed apices, 1.60-1.70 and 2.20- 2.30 x as long as the mentioned diameter respectively ; Venter of abdomen smooth medially, rest variably spinulose. Siphunculi pale brown, somewhat reticulated near base and slightly curved outwards , 0.33-0.39 mm long, 0.14-0.16 x as long as body and 2.50-2.60 x as long as its maximum width. Cauda with a distinct median stylus, bearing 6-8 hairs. Legs brown ; femora and tibiae smooth.

*Measurement in mm :*

	Length	Width	Antenna
1.	2.06	1.27	1.12
2.	1.96	1.23	0.98
3.	1.99	1.39	0.95
4.	1.96	1.31	0.96

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.35	0.11	0.13	0.15 + 0.25	0.25	0.11	0.39
0.32	0.11	0.15	0.13 + 0.23	0.25	0.11	0.37
0.35	0.11	0.13	0.13 + 0.17	0.25	0.11	0.39
0.31	0.11	0.11	0.13 + 0.18	0.23	0.11	0.35

(1-4, *Quercus* sp., Mussoorie, Uttar Pradesh, 1.xi.1977, K. U. Colls.).

*Other morphs* Not known.

*Materials examined* 5 apterous viviparous females and 1 nymph from

*Quercus* sp., Mussoorie, Uttar Pradesh, 1.xi.1977, Coll. S. P. Maity.

*Discussion* : In having mid-venter of abdomen and tibiae smooth, this species approximates to *G. kumaoni* Chakrabarty and Raychaudhuri, 1978, but differs in having processus terminalis distinctly shorter than the 3rd antennal segment. In general morphology, this species also resembles *sikkimensis* Raychaudhuri, *et al.*, 1973, *anonae* (Pergande, 1906) and *carpini* Takahashi, 1963, but differs from all these in the aforesaid combination of characters.

*Biology* : Not known.

*Distribution* : India : Uttar Pradesh.

*Types* : In the collections of Biosystematics Research laboratory, Department of Zoology, University of Kalyani, West Bengal, India.

65. *Greenidea (Trichosiphum) heterotricha* Ghosh  
(Figs. 33 a-36 a)

1976. *Greenidea (Trichosiphum) heterotricha* Ghosh, A. K., *Oriental Ins.*, 10 : 41.

*Apterous viviparous female* : Body elongated, 1.15-1.38 mm long and 0.59-0.72 mm as maximum width. Head light brown. Antennae 6-segmented, light brown, 0.97-1.19 mm long and 0.80-0.95 x as long as body ; flagellum imbricated, segment III with 11-14 accessory rhinaria in a few specimens ; processus terminalis 0.25-0.34 mm long and 2.20-3.10 x as long as base of last antennal segment ; hairs on flagellum with furcated, acute or acuminate apices, the longest hair on antennal segment III 0.07-0.08 mm long and 2.90-3.0 x as long as basal diameter of the segment. Rostrum reaches third abdominal segment ; ultimate rostral segments 0.11- 0.15 mm long and 1.40-1.66 x as long as second joint of hindtarsus, 4th segment bears 10 accessory hairs. Dorsum of abdomen dark, sclerotic, with a large spino-pleural patch extending over 2nd-7th tergites, paired marginal sclerites little separated from the patch by a pale region ; dorsal hairs thick, with acuminate or furcated apices, longest hair on anterior tergites 0.06-0.08 mm long ; 7th and 8th tergites each with two hairs. Siphunculi slender, curved outward, light brown, 0.38-0.50 mm long and 0.34-0.42 x as long as body ; reticulated near the base, rest spinulose ; siphuncular hairs long, numerous with acute, acuminate and a few with furcated apices. Cauda dark with a distinct median process and bearing 5-6 hairs. Legs light brown, femora with spinulose striae ; hindtibiae feebly spinulose at the apices.

*Measurements in mm* :

	Length	Width	Antenna
1.	1.17	0.65	1.12
2.	1.15	0.66	0.97

3.	1.29	0.72	1.19
4.	1.27	0.69	1.18
5.	1.24	0.65	1.10
6.	1.36	0.66	1.12
7.	1.21	0.67	1.07
8.	1.19	0.66	1.03
Antennal segments			
III	IV	V	VI
0.34	0.14	0.14	0.13 + 0.30
0.30	0.11	0.13	0.09 + 0.25
0.36	0.13	0.17	0.09 - 0.33
0.35	0.15	0.16	0.11 + 0.30
0.33	0.12	0.13	0.10 + 0.30
0.36	0.15	0.16	0.10 + 0.34
0.33	0.13	0.15	0.09 + 0.26
0.30	0.12	0.14	0.10 + 0.28
			urs
			ht2
			Siph.

(1-8, *Eugenia* sp, Manas Sanctuary, Assam, 15.i.1974, Z.S.I. Colls.).

*Other morphs* : Not known.

*Materials examined* : 14 apterous viviparous females and 4 nymphs from *Eugenia* sp., Manas Wildlife Sanctuary, Assam, 15.i.1974, Coll. A. K. Ghosh.

*Discussion* : This species comes close to *G. formosana heeri* but differs in having furcated hairs on antennae, smaller size of body and short and thin siphunculi.

*Biology* The specimens of this species, so far known from its type-locality, were collected from undersurface of young leaves of the host. No ant association was recorded.

*Distribution* : India : Assam.

*Types* : In the collections of the Zoological Survey of India, Calcutta, India.

66. *Greenidea (Trichosiphum) kumaoni* Chakrabarti and Raychaudhuri  
(Figs. 33z, 34y, 35z, 36y)

1978. *Greenidea (Trichosiphum) kumaoni* Chakarbarti, S. and Raychaudhuri, D. N., *Entomon*, 3 : 95.

*Apterous viviparous female* Body 1.55-1.92 mm long and 0.90-1.7 mm as maximum width. Head pale brown, smooth, dorsal cephalic hairs long, with acute and furcated apices, 12-14 in number arranged spinally and pleurally. Antennae

about 1.60 mm long, 0.83 x as long as body ; basal segments brown, rest pale brown , flagellum gradually more distinctly imbricated from basal half of segment III ; flagellar hairs long and short, with acuminate and blunt apices, longest hair on segment III about 3.8 x as long as basal diameter of the segment ; processus terminalis about 2.40 x as long as base of the last antennal segment. Rostrum reaching almost 3rd abdominal segment ; ultimate rostral segments 0.20- 0.21 mm long and 1.6-1.85 x as long as second joint of hindtarsus, bearing about 10 accessory hairs. Dorsum of abdomen brown, mid-area somewhat darker, smooth except spinulose pleurally, mid-ventral area without spinules ; dorsal hairs long, placed sparsely, 10-12 hair on each tergite, with acute or furcated apices, longest hairs on anterior tergites about 4.8 x as long as the basal diameter of 3rd antennal segments ; 7th tergite with 2 hairs, about 3.6 x as long as the mentioned diameter, 8th tergite with 2 fine hairs, about 2.6 x as long as the mentioned diameter. Siphunculi dark brown, slightly reticulated at base, 0.34-0.44 mm long, 0.22 x as long as body and about 3.8 x as long as its maximum width ; siphuncular hairs mostly with acuminate and a few with furcated apices. Cauda semi-oval, with a distinct median stylus, bearing about 8 hairs. Femora and tibiae concolorous with head ; femora faintly imbricated ; tibiae smooth.

*Measurements in mm :*

1.	Length		Width	Antenna		
	1.55		0.90	?		
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.24	0.15	0.16	0.15+broken	0.20	0.10	0.34

(1, *Quercus* sp., Jhopra, Sikhar, Uttar Pradesh, 23.vi.1983, K.U. Colls.).

*Other morphs* Not known.

*Material examined* : 1 apterous viviparous female from *Quercus* sp., Jhopra, Sikhar, Uttar Pradesh, 23.vi.1983, Coll. S. Saha.

*Discussion* : In general description this species approaches *sikkimensis* Chakrabarti and Raychaudhuri, 1973, but is distinguishable in having mid-ventral area without any spinule, processus terminalis longer than 3rd antennal segment and a fewer number of dorsal hairs on abdomen.

*Biology* Not known.

*Distribution* : India : Uttar Pradesh.

*Type* : In the collections of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

67. *Greenidea (Trichosiphum) prunicola* Ghosh, Banerjee and Raychaudhuri  
(Figs. 33 t-36 t)

1971. *Greenidea (Trichosiphum) prunicola* Ghosh, A. K., Banerjee, H. and Raychaudhuri, D. N., *Proc. Zool. Soc. Calcutta*, 26 : 104.
1980. *Greenidea (Trichosiphum) prunicola*, Raychaudhuri, D. N. and Chatterjee, M., In "Taxonomy of aphids of north-east India and Bhutan" (ed), Raychaudhuri, D. N., 346.

*Apterous viviparous female* Body elongated, light yellow or brown, 1.50-2.20 mm long and 0.69-1.10 mm as maximum width. Head dark brown, smooth. Antennae 6-segmented, 1.32-1.58 mm long and 0.66-0.75 x as long as body ; flagellum gradually more distinctly imbricated from base of segment III; flagellar hairs long and short, with acuminate apices, longest hair of antennal segment III about 0.11 mm long and 2.50-3.70 x as long as the basal diameter of the segment ; processus terminalis 0.34-0.43 mm long and 2.26-2.38 x as long as base of the last antennal segment. Rostrum extending upto middle of body ; ultimate rostral segments 0.18-0.23 mm long and 1.63-1.91 x as long as second joint of hindtarsus, with 11-12 fine accessory hairs. Dorsum of abdomen smooth, bearing many rather thick and long hairs with furcated apices, a few thinner and shorter ones with acuminate apices, longest hair on anterior tergites 0.11 mm long and 3.30-3.50 x as long as the basal diameter of antennal segment III, 7th tergite with two thick, furcated hairs and 8th tergite with two fine hairs ; abdominal venter with a dark spino-pleural sclerotic patch extending upto bases to siphunculi, evenly spinulose. Siphunculi 0.55-0.86 mm long, 0.20-0.43 x as long as body and 5.0-6.65 x as long as their maximum width , curved outwards, brown to dark brown, with apical 0.18 portion usually paler ; hairs on siphunculi numerous, thick and stout, with acuminate to acute apices, occasionally a few with apices branched; surfaces of siphunculi distinctly reticulated near base but reticulation becomes indistinct apicad, spinules present in distinct transverse rows over a large part distally, diminish in number towards base. Cauda with a distinct but short median process. Legs concolorous with the head, only tarsi somewhat darker ; femora and tibiae imbricated and imbrication often with minute spinules.

*Measurements in mm*

	Length		Width	Antenna			
1.	2.0		0.87	1.32			
	Antennal segments				urs	ht2	Siph.
	III	IV	V	VI			
	0.34	0.15	0.17	0.15 + 0.34	0.18	0.11	0.86

(1, *Prunus* sp., Shillong, Meghalaya, 8.vii.1970, C.U. Colls.).

*Other morphs* : Not known.

*Material examined* : 1 apterous viviparous female from *Purnus* sp., Shillong, Meghalaya, 8.vii.1970, Coll. H. Banerjee.

*Discussion* : This species, known by its type-specimens so far, resembles *G. decaspermi* and *G. kuwanai* in having abdominal venter spinulose, but is distinguishable from both the species in the ratio of ultimate rostral segment to second joint of hindtarsi, length of siphunculi to their maximum width and also in the type of hairs on 7th tergites.

*Biology* : The species was found infesting leaf-bases and apical stem of a *Prunus* host.

*Distribution* : India : Meghalaya, Sikkim.

*Types* : In the collection of Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

68. *Greenidea (Trichosiphum) quercicola* Basu, Ghosh and Raychaudhuri  
(Figs. 33u-35u, 36 l, 37g, 39k, 40j)

1973. *Greenidea (Trichosiphum) quercicola* Basu, R. C., Ghosh, A. K. and Raychaudhuri, D. N., *Proc. Zool. Soc., Calcutta*, 26 : 96.
1980. *Greenidea (Trichosiphum) quercicola*, Singh, T. K., Raychaudhuri D., Raha, S. K. and Raychaudhuri, D. N., *Entomon*, 5 : 148.
1980. *Greenidea (Trichosiphum) quercicola*, Raychaudhuri, D. N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D. N., 347.

*Apterous viviparous female* : Body pear-shaped, 1.87-1.90 mm long and 1.0-1.10 mm as maximum width. Head pale, smooth ; frons nearly flat. Antennae 6-segmented, 0.78-0.88 mm long and 0.78- 0.80 x as long as body, pale brown upto basal half of segment VI, rest brown ; flagellum distinctly imbricated from base towards apex ; flagellar hairs long and short, occur intermingled, longer ones mostly with slightly furcated apices, while shorter ones with acuminate to distinctly furcated apices ; processus terminalis 0.25 x as long as base of last antennal segment. Rostrum extends slightly beyond hindcoxae ; ultimate rostral segments 2.4-3.0 x as long as second joint of hindtarsus, with 4-5 pairs of accessory hairs. Dorsum of abdomen sclerotic, variegated with pale to dark brown, laterally 2-3 pairs of muscle-platten-like structure present; dorsal hairs long and short with acuminate to furcated apices, very few thorny hairs present on first two tergites ; longest hair on anterior tergites 3.50-4.2 x as long as basal diameter of 3rd antennal segment; 7th and 8th tergites each with two long hairs with bi-or multifurcated apices. Siphunculi pale brown, 0.44 mm long,

about 0.23 x as long as body; siphuncular hairs long, sparsely distributed, with acuminate apices, spinules present throughout in transverse rows near the apex and parsely distributed on rest of the surface. Cauda with a distinct median stylus, with 8 long hairs, legs concolorous with the head; striate-imbrications present, more so near the apices.

*Measurements in mm*

	Length	Width	Antenna			
1.	1.89	1.05	?			
Antennal segments				urs	ht <sub>2</sub>	Siph.
III	IV	V	VI			
0.38	broken	broken	broken	0.27	0.10	0.44

(1, *Quercus dealbata*, Umpling, Shillong Meghalaya, 22.viii.1969, C.U. Colls.).

*Alate, viviparous female* Body elongated, yellowish brown, 2.54- 2.63 mm long and 1.13-1.17 mm as maximum width. Head brown, smooth. Antennae 6-segmented, 2.44-2.70 mm long and 0.93-1.04 x as long as body; segment III 12-14 transversely oval accessory rhinaria arranged in a row; flagellar hairs short to long, with acuminate apices, longest hairs on segment III 3.15-3.25 x as long as basal diameter of the segment; processus terminalis 0.61- 0.72 mm long, and 2.17-2.60 x as long as base of last antennal segment. Rostrum extending upto 2nd tergite; ultimate rostral segments 0.33-0.34 mm long and 3.0-3.33 x as long as second joint of hindtarsus, with 10 accessory hairs. Dorsum of abdomen with brownish transverse bands on tergites 2-6, hairs with acute to acuminate apices, longest hair on anterior tergites 1.70-1.85 x as long as basal diameter of 3rd antennal segment; 7th and 8th tergites each with 2 fine hairs, 1.80-2.10 x and 2.0-2.16 x as long as the mentioned diameter respectively. Siphunculi pale with apical portion dusky, 1.62-1.6 mm long and 0.62-0.63 x as long as body; hairs on siphunculi numerous, mostly long with acute to acuminate apices. Cauda with a median stylus and bears 8 hairs, tibiae with striate-imbrications. Wing-venation normal.

*Measurements in mm :*

	Length	Width	Antenna			
1.	2.61	1.77	2.44			
Antennal segments				urs	ht <sub>2</sub>	Siph.
III	IV	V	VI			
0.61	0.39	0.39	0.28 + 0.61	0.33	0.11	1.66

(1, *Quercus* sp., Tuyandwaichong, Manipur, 19.iv.1974, C.U. Colls.).

*Other morphs* : Not known.

*Materials examined* : 1 apterous viviparous female from *Quercus dealbatae*, Umpling, Shillong, Meghalaya, 22.viii.1969, Coll. R.Basu, 1 alate viviparous female from *Quercus* sp., Tuyandwaichong, Manipur, 19.iv.1974, Coll. T.K. Singh.

*Discussion* : This species, in possessing mid-ventral area of abdomen smooth and tibiae and antennal segment III imbricated entirely, approaches *G. schoutedeni*, *G. bucktonis* and *G. formosana* but can be distinguished from these in having shorter siphunculi and longer ultimate rostral segments which are about 3.0 x as long as second joint of hindtarsus.

*Biology* : Not known.

*Distribution* India Meghalaya, Manipur.

*Types* In the collection of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

69. *Greenidea (Trichosiphum) sikkimensis* Raychaudhuri, Ghosh,  
Banerjee and Ghosh  
(Figs. 33v, 34u, 35v, 36u, 37m, 38 l-39 l, 40 n)

1973. *Greenidea (Trichosiphum) sikkimensis* Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M. and Ghosh, A.K., *Kontyu*, 41 : 69.
1980. *Greenidea (Trichosiphum) sikkimensis*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N., 347.

*Apterous viviparous female* Body pear-shaped, dark brown, 1.55- 2.09 mm long and 0.87-1.47 mm as maximum width. Head brown, smooth, bearing 10-12 long hairs. Antennae 0.95-1.69 mm long and 0.47-0.68 x as long as body, nearly concolorous with the head; flagellum gradually more distinctly imbricated excepting basal half of segment III on its outer margin which is smooth, flagellar hairs long and longest hair on the segment III about 2.20-2.60 x as long as the basal diameter of the segment; processus terminalis 0.17-0.32 mm long and 1.22-1.93 x as long as base of the last antennal segment. Rostrum extending slightly beyond hindcoxae; ultimate rostral segment 0.20-0.28 mm long and 1.85- 2.50 x as long as second joint of hindtarsus, with 14 accessory hairs. Dorsum of abdomen deep brown, wrinkled, granulated, with some muskelplatten-like-structure on 1st and 6th tergites; venter uniformly spinulose but the spinules on mid-ventral region

shorter than those cephalad, laterad and caudad; dorsal hairs long and short, occur intermingled on tergum, with acuminate to furcated apices, longest hair on anterior tergites 0.07-0.15 mm long and 2.80-3.60 x as long as the basal diameter of 3rd antennal segment; 7th tergite with two stout spinal hairs with acuminate apices, 1.7-2.3 x as long as the mentioned diameter, 8th tergite with two thin hairs, about 2.2-2.8 x as long as the mentioned diameter. Siphunculi darker than the frons, short and stumpy, 0.34-0.47 mm long, 0.15-0.25 x as long as body and 2.5 -3.0 x as long as its maximum width, hairs on siphunculi mostly long, some short hairs present upto the middle of siphunculi, mostly with acuminate apices and a few near the base with furcated apices. Cauda with very short median stylus, with 4 fine hairs. Mid-and hindfemora coloured like dorsum of abdomen; forefemora paler, all femora faintly imbricated on the outer margin; tibiae brown, smooth, with some granulations near the apices.

*Measurements in mm*

	Length	Width	Antenna
1.	2.57	1.17	1.62
2.	1.96	1.29	1.02
3.	1.98	1.29	1.12
4.	2.09	1.42	broken
5.	2.05	1.35	1.12
6.	1.89	0.96	1.05
7.	2.06	1.42	1.22

Antennal segments				urs	ht <sub>2</sub>	Siph.
III	IV	V	VI			
0.56	0.23	0.23	0.19 + 0.32	0.28	0.12	broken
0.32	0.11	0.15	0.11 + 0.22	0.24	0.11	0.35
0.35	0.14	0.15	0.13 + 0.23	0.23	0.11	0.36
broken	broken	broken	broken	0.25	0.11	0.36
0.35	0.14	0.13	0.22 + 0.25	0.25	0.11	0.37
0.31	0.11	0.15	0.15 + 0.23	0.25	0.11	0.39
0.42	0.15	0.13	0.13 + 0.23	0.24	0.10	broken

(1, *Quercus* sp., Gangtok, Sikkim, 29.xii.1972, C.U. Colls.; 2-7, *Castanopsis* sp., Pynursha, Meghalaya, 29.vii.1973, Z.S.I. Colls.).

*Alate viviparous female* : Body 2.1-2.51 mm long and 0.96-1.15 mm as

maximum width. Head brown; antennae darker than the head, with the very base of segment III pale, 1.48 mm long and 0.70 x as long as body, processus terminalis about 0.30 mm long and 0.54-0.58 x as long as the segment III which bears 19-21 oval to transversely oval accessory rhinaria in a row on the entire length excepting the very base; flagellar hairs long and short, with acute and acuminate apices respectively, occur intermingled, longest hair on segment III about 1.8 x as long as the basal diameter of the segment. Rostrum reaches the hindcoxae. Dorsum of abdomen slightly wrinkled, variegated with brownish to brown patches which form more or less a continuous blotch over the spino-pleural area extending upto 6th tergite, muskelplatten - like structure present on the pleural and marginal area upto 5th segment; dorsal hairs long and short, with fine apices, occur intermingled, longest hair on anterior tergites about 1.8 x as long as basal diameter of 3rd antennal segment, hairs on 8th tergite somewhat longer than those on the 7th. Siphunculi nearly cylindrical, slightly tapering towards the apex, dark brown, with paler bases and apices, about 0.40 x as long as the length of body, about 0.5 x as long as its maximum width, indistinctly reticulated all over; hairs on the siphunculi long and fine, a very few near the base slightly shorter, longest hair about 2.7 x as the basal diameter of the siphunculi. Cauda with a very short and indistinct stylus, with 6 hairs.

*Measurements in mm :*

	Length	Width	Antenna			
1.	2.51	1.15	1.63			
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.55	0.22	0.23	0.19 + 0.30	0.27	0.12	broken

(1, *Quercus* sp., Gangtok, Sikkim, 22.xii.1970, C.U. Colls.).

*Other morphs* : Not known.

*Materials examined* : 1 apterous and 1 alate viviparous females from *Quercus* sp., Gangtok, Sikkim, 22.xii.1972, Colls. M.R. Ghosh; 6 apterous viviparous females and 1 nymph from *Castanopsis* sp., Pynursha, Meghalaya, 29.vii.1973, Coll. S.K. Chakraborty.

*Discussion* : This species is distinguishable from its close relatives *carpini* Takahshi, 1963, *kuwanai* (Perdange, 1906) and *nipponicua* Suenage, 1934 under the genus in having abdominal hairs with furcated apices and mid-ventral area of abdomen spinulose.

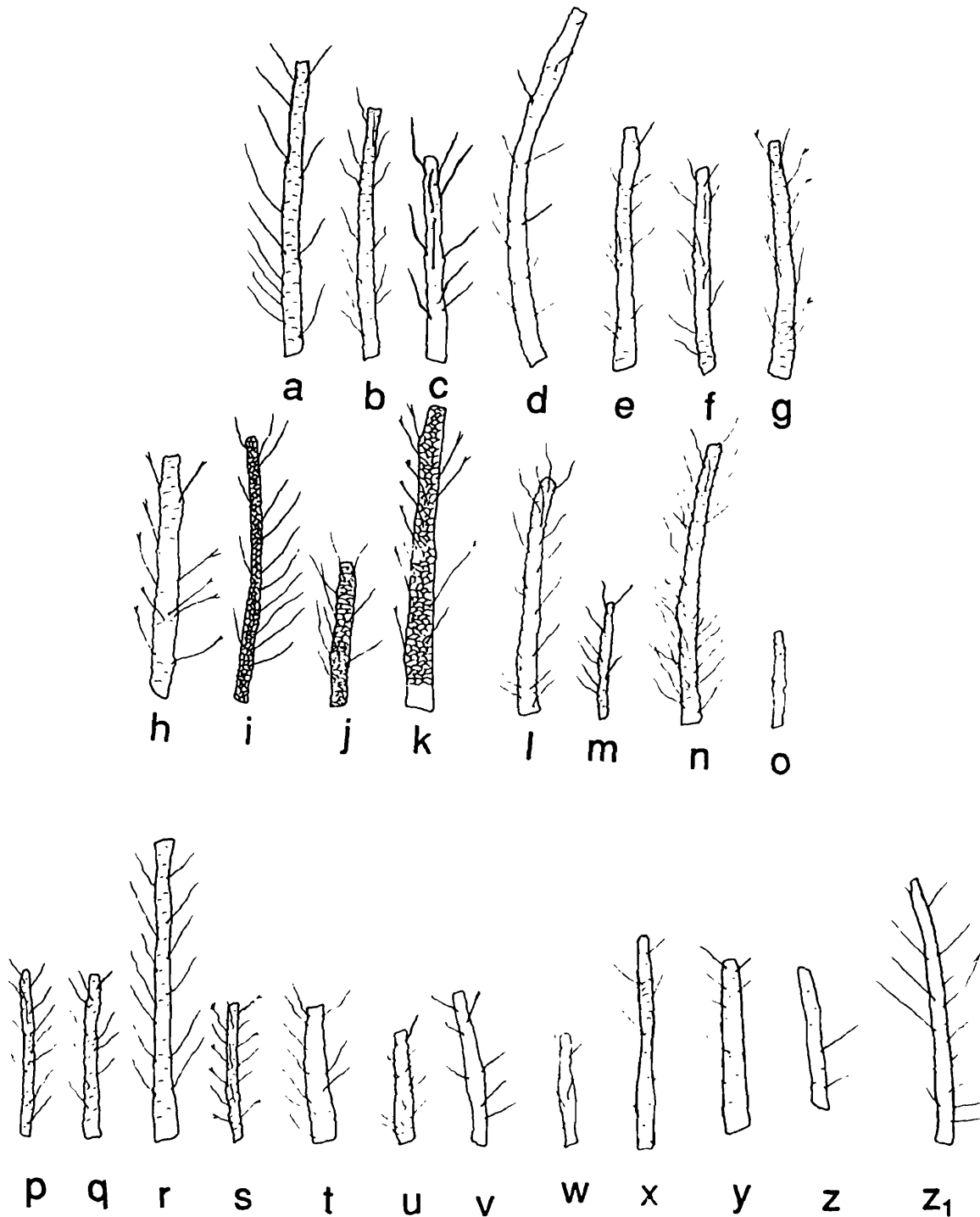
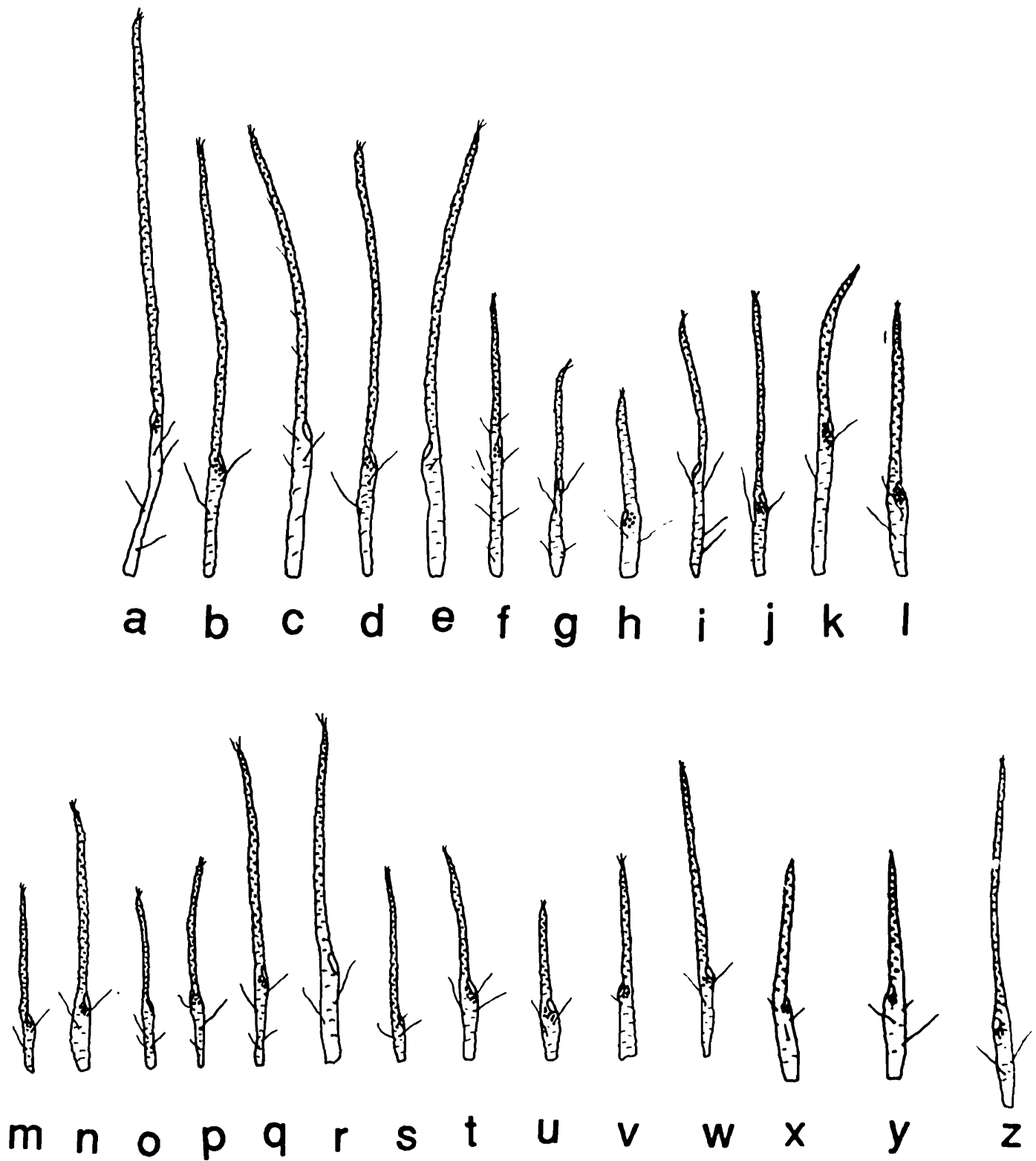


Fig. 33

Figs. 33 a-z<sub>1</sub> : Species of *Greenidea*, apterous viviparous female : antennal segment III.  
 a *aborensis*, b *decaspermi*, c *ficicola*, d *longicornis*, e *longirostris*, f *neoficicola*, g *photiniphaga*, h *schimae*, i *ayyari*, j *longisetosa*, k *querciphaga*, l *symplocosis*, m *anoniae*, n *brachyunguis*, o *bucktonis*, p *camelliae*, q *formosana formosana*, r *gigantea*, s *heterotricha*, t *prunicola*, u *quercicola*, v *sikkimensis*, w *spinotibium*, x *formosana heeri*, y *haldari*, z *kumaoni*, z<sub>1</sub> *parthenocissi*



**Fig. 34**

Figs. 34 a-z : Species of *Greenidea*, apterous viviparous female morph : processus terminals. a *photiniphaga*, b *aborensis*, c *decaspermi*, d *ficicola*, e *longicornis*, f *longirostris*, g *neoficicola*, h *schimae*, i *ayyari*, j *longisetosa*, k *querciphaga*, l *symplocosis*, m *anonae*, n *brachyunguis*, o *bucktonis*, p *camelliae*, q - *formosana formosana*, r *gigantea*, s *heterotricha*, t *prunicola*, u *sikkimensis*, v *spinotibium*, w - *formosana heeri*, x *haldari*, y - *kumaoni*, z - *parthenocissi*

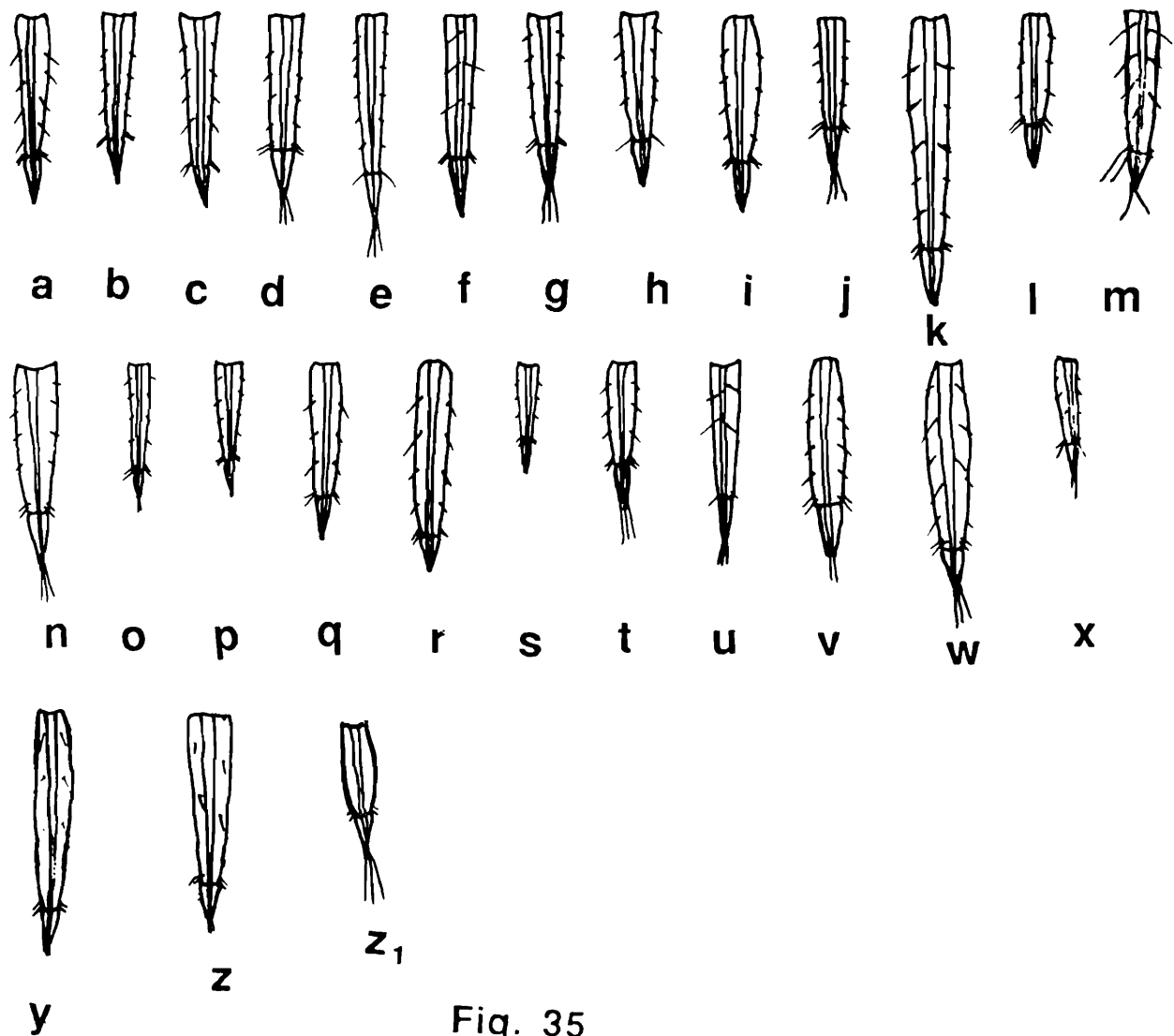


Fig. 35

Figs. 35 a-z<sub>1</sub> : Species of *Greenidea*, apterous viviparous female morph : ultimate rostral segments. a *aborensis*, b *decaspermi*, c *ficicola*, d *longicornis*, e *longirostris*, f *neoficicola*, g *photiniphaga*, h *schimae*, i *ayyari*, j *longisetosa*, k *querciphaga*, l *symplocosis*, m *anonae*, n *brachyunguis*, o *bucktonis*, p *camelliae*, q - *formosana formosana*, r *gigantea*, s *heterotricha*, t *prunicola*, u *quercicola*, v *sikkimensis*, w *spinotibium*, x - *formosana heeri*, y *haldari*, z *kumaoni*, z<sub>1</sub> *parthenocissi*.

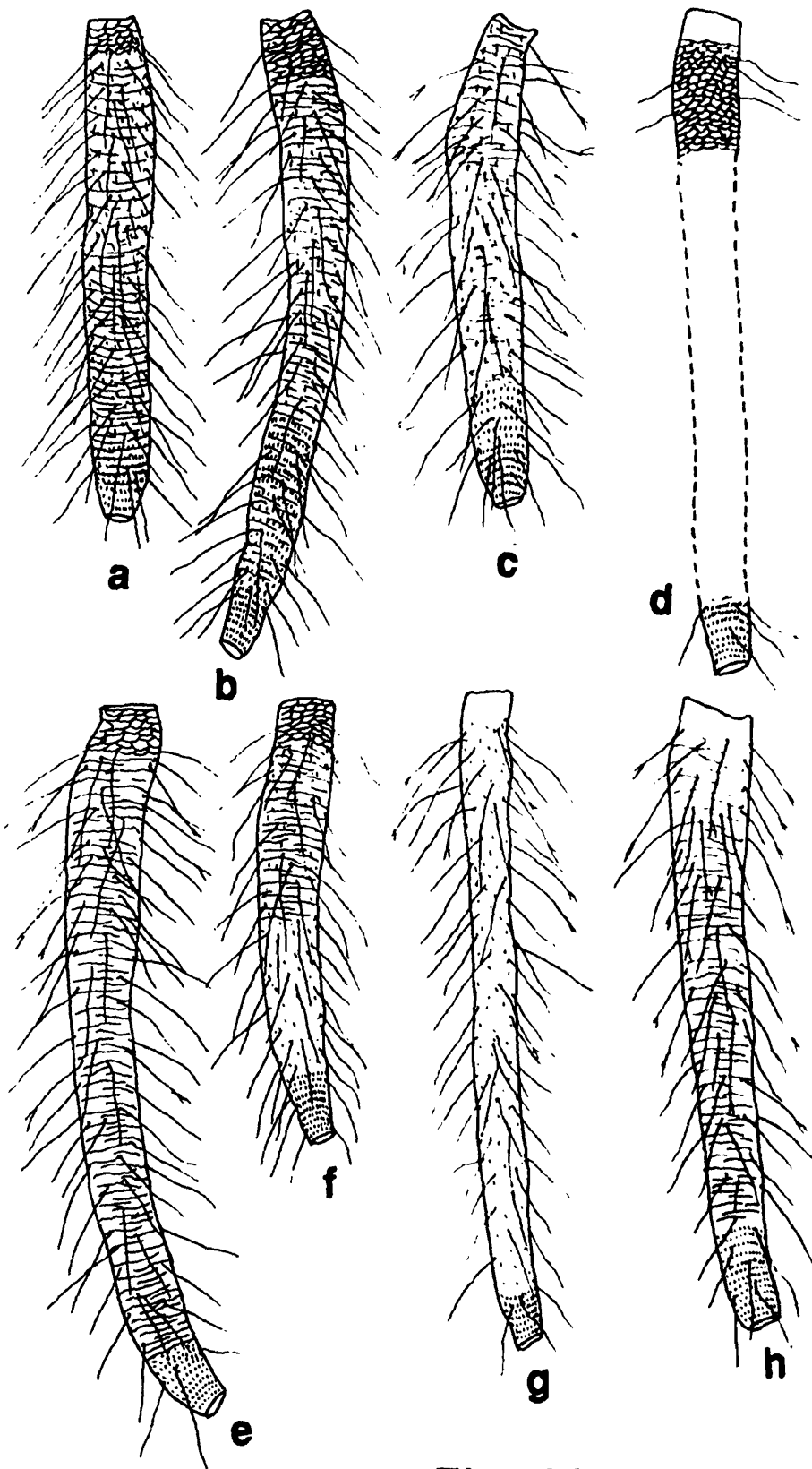


Fig. 36

Figs. 36 a-h : Species of *Greenidea*, apterous viviparous female morph : Siphunculi.  
 a *aborensis*, b - *decaspermi*, c - *ficicola*, d *longicornis*, e *longirostris*,  
 f - *neoficicola*, g - *photiniphaga*, h *schimae*.

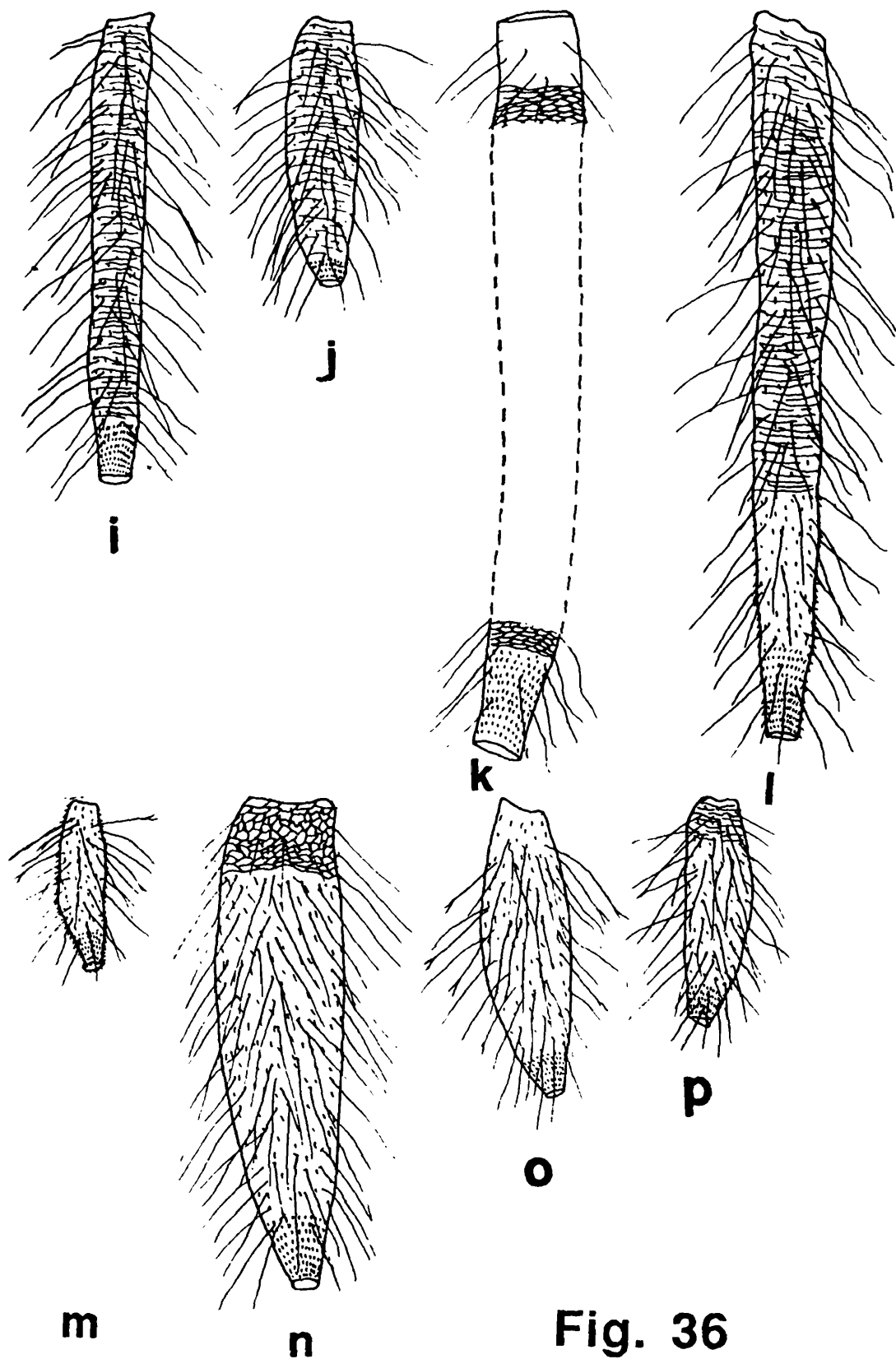


Fig. 36

Figs. 36 i-p : Species of *Greenidea*, apterous viviparous female morph : Siphunculi. i *ayyari*, j *longisetosa*, k *querciphaga*, l *symplocosis*, m *anoniae*, n *brachyunguis*, o *bucktonis*, p *camelliae*,

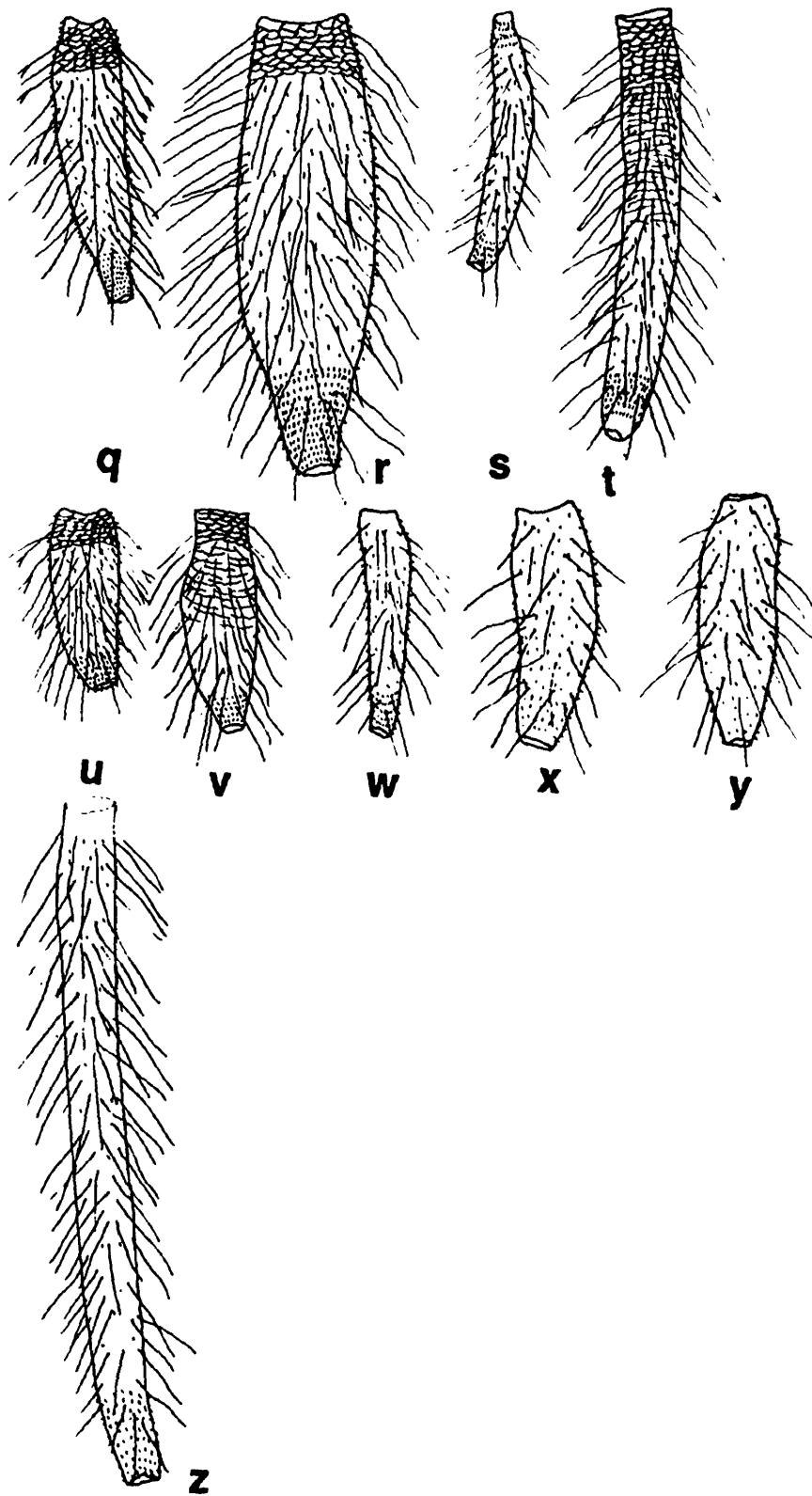


Fig. 36

Figs. 36 q-z, : Species of *Greenidea*, apterous viviparous female morph : Siphunculi. q *formosana formosana*, r *gigantea*, s *heterotricha*, t *prunicola*, u *sikkimensis*, v *spinotibium*, w - *formosana heeri*, x *haldari*, y *kumaoni*, z *parthenocissi*

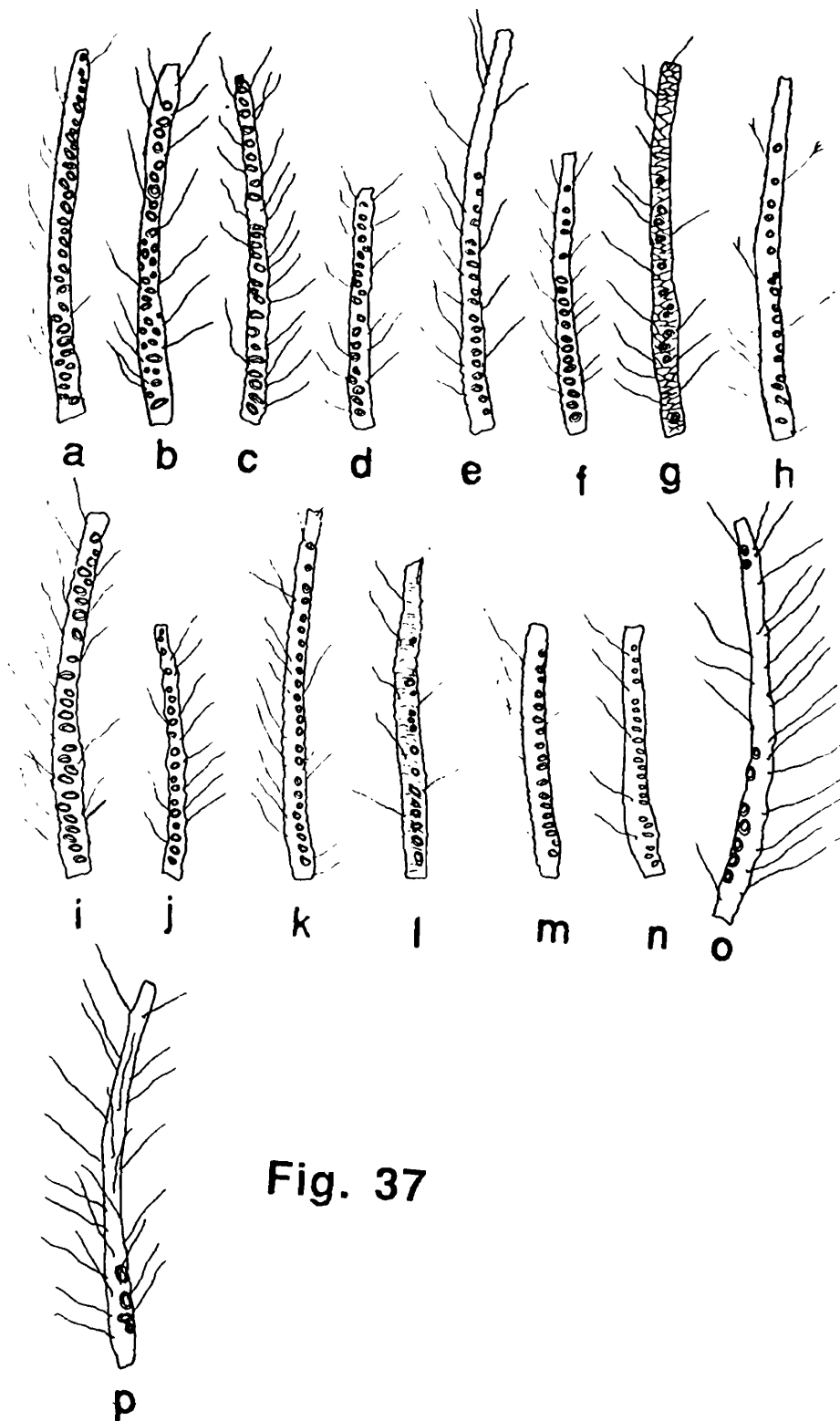


Fig. 37

Figs 37 a-p : Species of *Greenidea*, alate viviparous female morph : antennal segment III. a *artocarpi*, b *decaspermi*, c *ficicola*, d *himansui*, e *longirostris*, f *schimae*, g *ayyari*, h *querciphaga*, i *symplocosis*, j *schoutedeniae*, k *formosana formosana*, l *quercicola*, m *sikkimensis*, n *formosana heeri*, o *parthenocissi*, p *parthenocissi* (alate male).

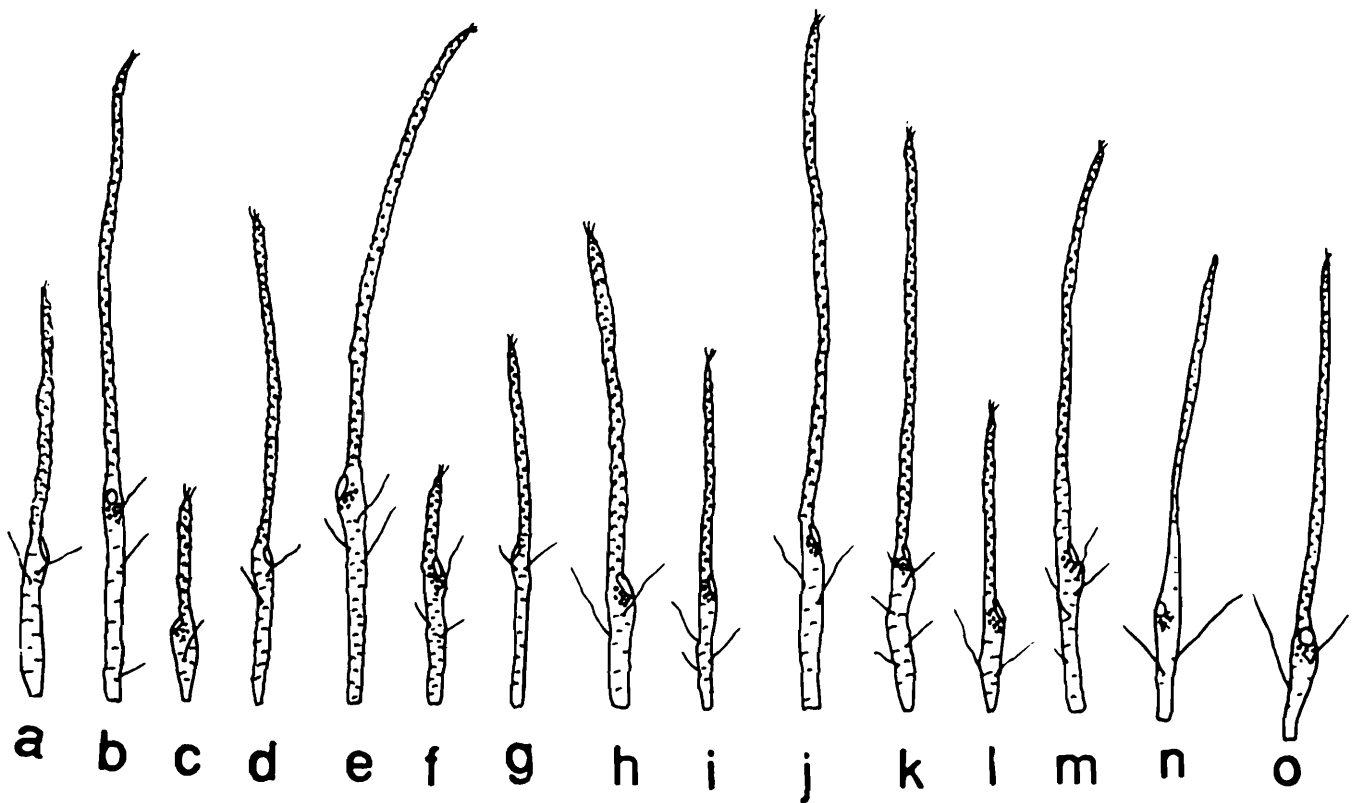


Fig. 38

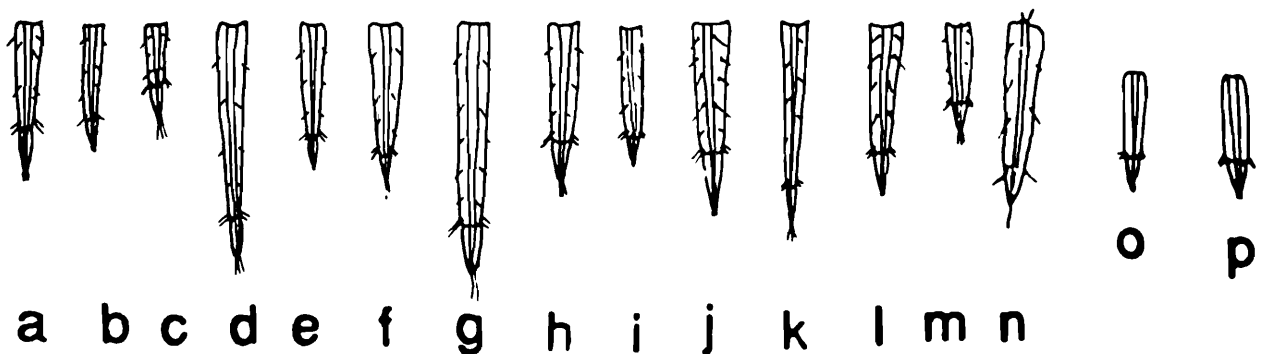


Fig. 39

Figs. 38 a-o : Species of *Greenidea*, alate viviparous female morph : processus terminalis. a *artocarpi*, b *decaspermi*, c *ficicola*, d *himansui*, e *longirostris*, f *schimae*, g *querciphaga*, h *symplocosis*, i *schoutedeniae*, j *formosana heeri*, k *quercicola*, l *sikkimensis*, m *ayyari*, n *parthenocissi*, o *parthenocissi* (alate male) Figs. 39a-p : Species of *Greenidea*, alate viviparous female morph : ultimate rostral segments. a *decaspermi*, b *ficicola*, c *himansui*, d *longirostris*, e *schimae*, f *ayyari*, g *querciphaga*, h *symplocosis*, i *schoutedeniae*, j *formosana formosana*, k *quercicola*, l *sikkimensis*, m *formosana heeri*, n *artocarpi*, o *parthenocissi*, p *parthenocissi* (alate male).

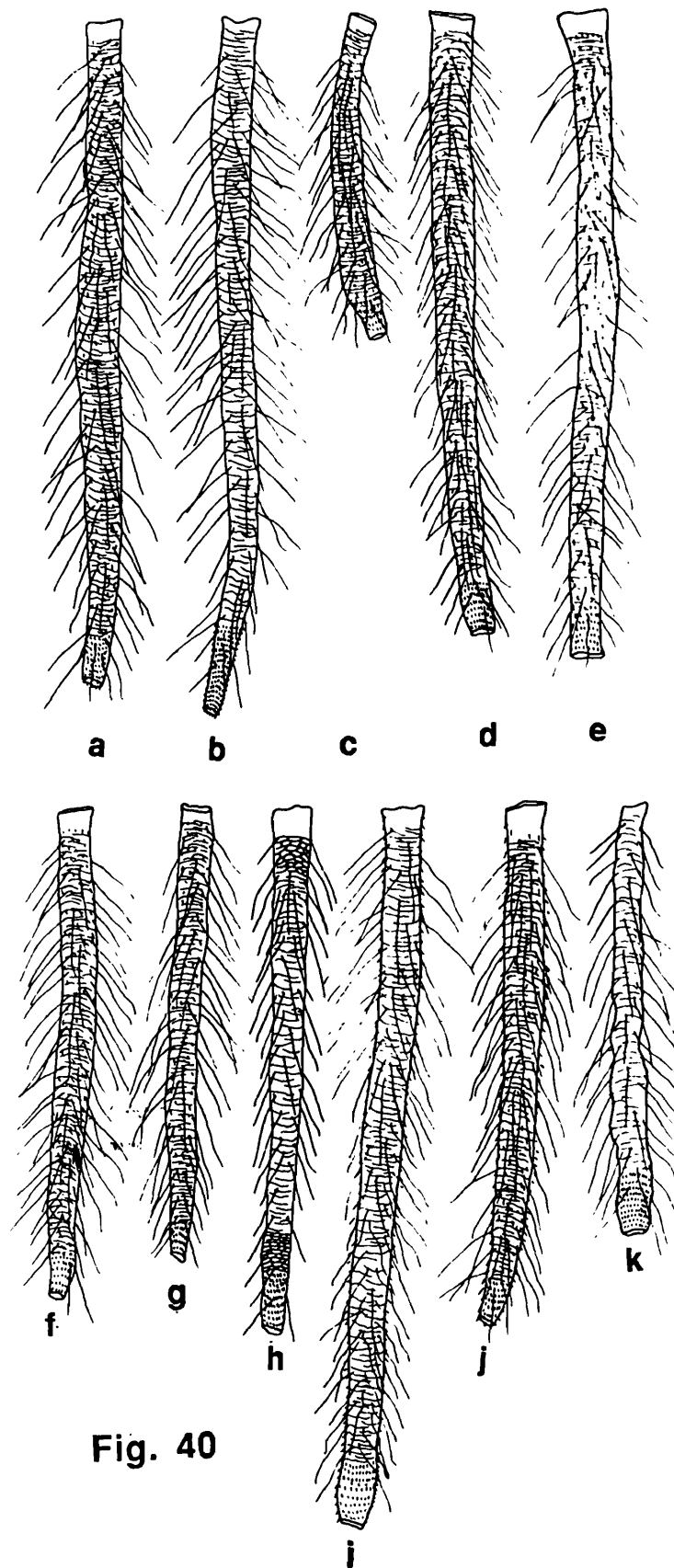
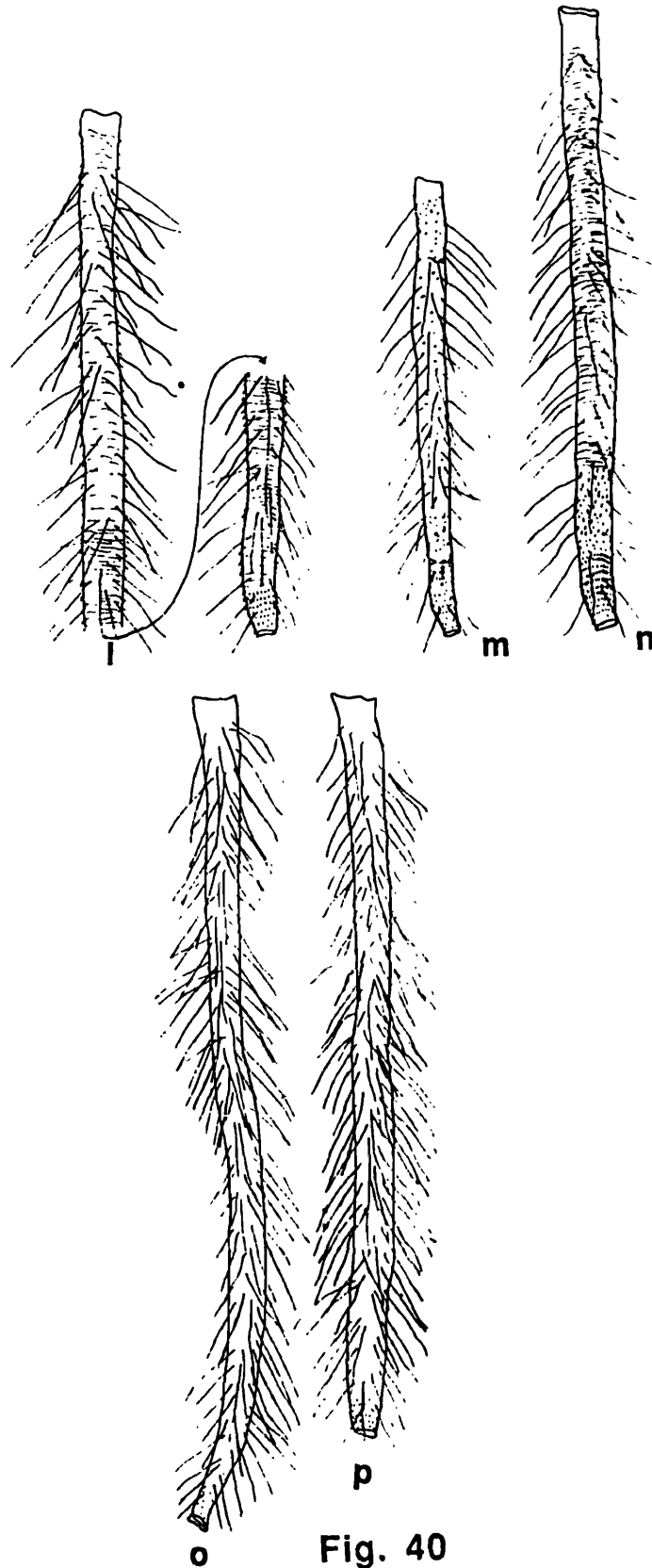


Fig. 40

Figs. 40 a-k : Species of *Greenidea*, alate viviparous female morph : siphunculi. a *artocarpi*, b *decaspermi*, c - *ficicola*, d *himansui*, e *longirostris*, f *schimae*, g *ayyari*, h *querciphaga*, i *symplocosis*, j *quercicola*, k *schoutedeniae*,



Figs. 40 1-p : Species of *Greenidea*, alate viviparous female morph : siphunculi. 1 - *formosana formosana*, m - *formosana heeri*, n - *sikkimensis*, o - *parthenocissi*, p - *parthenocissi* (alate male).

*Biology* Not known.

*Distribution* : India : Meghalaya, Sikkim.

*Types* : In the collections of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

70. *Greenidea (Trichosiphum) spinotibium* Raychaudhuri and Chatterjee  
(Figs. 33w, 34v,, 35w, 36v)

1977. *Greenidea (Trichosiphum) spinotibium* Raychaudhuri, D.N. and Chatterjee, M., *Oriental Ins.*, 11 : 263.
1980. *Greenidea (Trichosiphum) spinotibium*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan (ed) Raychaudhuri, D.N., 348.

*Apterous viviparous female* : Body pear-shaped, dark brown 2.43- 2.50 mm long and 1.50-1.54 mm as maximum width. Head smooth, brown anteriorly, with very low lateral frontal tubercles; dorsal cephalic hairs long with blunt apices. Antennae 6-segmented, 1.11-1.23 mm long and 0.44-0.49 x as long as body; basal two segments concolorous with the anterior portion of the head, flagellum pale with the apices of segments V and VI slightly darker; segment III smooth upto 0.75 portion, rest gradually distinctly imbricated apicad; processus terminalis 0.26-0.31 mm long and 1.85-2.0 x as long as the base of last antennal segment ; flagellar hairs long and short, the shorter hairs thorny with acuminate apices and the longer ones with blunt apices. Rostrum extending upto second tergite; ultimate rostral segments 0.33- 0.37 mm long and 2.84-3.40 x as long as second joint of hindtarsus, segment 4 with 15-17 accessory hairs. Dorsum of abdomen dark brown medially but paler marginally; dorsal hairs fewer, thinner and long, intermingled with shorter ones; the longest hair on anterior tergites 0.05 mm long and 1.25-1.66 x as long as the basal diameter of 3rd antennal segment; 7th and 8th tergites each with a pair of long, stout hairs. Siphunculi dark brown with the apex slightly paler, cigar-shaped, curved outwards, reticulated near the base; 0.37-0.45 mm long, 0.15-0.18 x as long as as body and 2.90-3.33 x as long as its maximum width; hairs on siphunculi mostly with acuminate and rarely a few furcated apices. Cauda with a short but distinct median stylus and bears 6 fine hairs. Legs brown; femora smooth on the outer margin and with spinular imbrications on the inner margin; tibiae smooth; tarsi with normal imbrications; tibial hairs on the outer margin stouter and thorny.

*Measurements in mm* :

	Length	Width	Antenna
1.	2.49	1.51	1.11
2.	2.43	1.54	?

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.31	0.12	0.15	0.14 + 0.26	0.34	0.12	0.39
0.31	0.19	0.14	broken	0.33	0.11	0.37

(1-2, an indet. host, Kalimpong, West Bengal, 11.xii.1970, C.U. Colls.).

*Other morphs* : Not known.

*Materials examined* : 2 apterous viviparous females from an indet. host, Peshoke, Kalimpong, West Bengal, 11.xii.1970, Coll. M.R. Ghosh.

*Discussion* : This species is characterised by the presence of spiny hairs on the outer margin of tibiae specially in the hind legs.

*Biology* : Not known.

*Distribution* : India : West Bengal.

*Types* : In the collection of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

#### Genus 9. *Greenideoida* van der Goot, 1917

1917. *Greenideoida* Goot, P. van der, *Contrib. Faune Indes Neerl.* 1 : 140 (typus-generis : *Greenideoida elongata* van der Goot, 1917).
1969. *Pentatrichosiphum* Basu, A.N., *Oriental Ins.*, 3 : 183 (typus-generis: *Pentatrichosiphum luteum* Basu, 1969, considered as subgenus to genus *Greenideoida*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N., 349.

*Morphology* : Head smooth. Lateral frontal tubercles absent. Antennae rarely 4, usually 5 or 6-segmented, shorter than body, basal two segments without imbrications, spinulose; flagellum gradually more distinctly imbricated apicad, flagellar hairs short to long, with acute, acuminate or blunt apices; in alatae segment III and sometimes segment IV with secondary rhinaria. Rostrum usually reaching upto 1st abdominal tergite; ultimate rostral segments 1.10-2.0 x as long as second joint of hindtarsus; segments 4 and 5 not distinctly separated; segment 4 with 7-12 fine accessory hairs. Dorsum of abdomen pale or brownish, sclerotic and spinulose; dorsal hairs fewer, short or long, thick and stiff, with acute, acuminate or blunt apices both in apterae and alatae viviparae; ventrum largely smooth. Siphunculi elongated, curved outwards in apterae, nearly cylindrical in alatae, about 0.23-0.75 x as long as body, without reticulation; siphuncular hairs mostly long, of similar lengths, with acute

apices; spinules present over the entire length but densely so in the apical region. Cauda round or semi-circular, without a median stylus, bearing 7-10 hairs. Subanal plate oval. Legs pale brown; femora with transverse rows of spinules, tibiae with normal imbrications; hindtibiae with transverse ridges in the subgenus *Paragreenideoida*; first tarsal joints with 5 or 7 ventral hairs. Media in the forewings once-branched in the members of subgenus *Paragreenideoida* and nominate subgenus *Greenideoida* (not found in India), and twice-branched in the subgenera *Neogreenideoida* and *Pentatrichosiphum*; hindwings with or without one or two ablique veins.

*Discussion* van der Goot (1917) described the genus with *Greenideoida elongata* v. d. Goot as the type-genesis. The other two species included under the genus at the time of its description are *G. hanna* v. d. Goot and *G. ceyloniae* v. d. Goot. The genus was conceived to represent species having antennae 5-segmented, segments 4 and 5 of ultimate rostral segments not separated, cauda rounded and without a median stylus and forewings with media once-branched and hindwings with only one longitudinal vein. Raychaudhuri (1956) broadened the concept of the genus by including a species *philippensis* under the subgenus *Neogreenideoida* which exhibits forewings with media twice-branched and hindwings with 2 longitudinal veins. Since then some more species have been described under the genus. Raychaudhuri and Chatterjee (1980) considered the genus to represent species which have apex of rostrum undivided, obtuse; cauda rounded, antennae 5 or 6-segmented, forewings with media once or twice-branched, hindwings with or without oblique veins and first tarsal joints with 5 or 7 hairs.

We have examined the specimens of all the species recorded from India and agree with the decisions of Raychaudhuri and Chatterjee (op. cit.).

*Biology* The species of this genus infest tender branches and leaves of woody plants of Fagaceae, Guttiferae, Lauraceae, Leguminosae, Moraceae and from other families. One or both the sexual morphs have been recorded for two species (Ghosh, A.K., 1987) which suggests that these and possibly some other species may be laying eggs. In the hot places of North-east India, the species of the genus make large colonies in winter and spring months whereas in cooler places species are more preponderant during summer and early monsoon months.

*Distribution* : India, Indonesia, Malaysia, the Philippines, Sri Lanka.

*Type species* : *Greenideoida elongata* v. d. Goot, 1917. Raychaudhuri (1956) reported the loss of the type-specimens. An alate viviparous female, designated as the neotype, is in the collection of the Natural History Museum, London.

Key to the subgenera of Genus *Greenideoida*

1. First tarsal segments with 5 ventral hairs; antennae 5- segmented .....2  
 First tarsal segments with 7 ventral hairs; antennae 6-segmented .....3
2. Media of forewings once-branched, hindwings without oblique vein .....*Greenideoida* (not found in India)  
 Media of forewings twice-branched, hindwings with 1 oblique vein ..... *Pentatrichosiphum*
3. Hindtibiae without transverse cuts; media of forewings twice-branched, hindwings with 2 oblique veins.....*Neogreenideoida*  
 Hindtibiae with transverse cuts; media of forewings once- branched, hindwings without oblique vein.....*Paragreenideoida*

Key to the species of subgenus *Paragreenideoida**Apterous Viviparous Females*

1. Siphunculi 0.43-0.93 mm long and 0.27-0.53 x as long as body.....*bhalukpongensis*  
 Siphunculi 1.32-2.08 mm long and 0.52-0.76 x as long as body.....*ceyloniae*

*Alate Viviparous Females*

1. Antennae about 1.82 mm long and 0.92 x as long as body.....*bhalukpongensis*  
 Antennae 1.94-2.39 mm long and 0.97-1.13 x as long as body.....*ceyloniae*

Key to the species of subgenus *Pentatrichosiphum**Apterous Viviparous Females*

1. Longest hair on antennal segment III 2.80-3.70 x as long as b. d. III; siphunculi 1.23-1.60 mm long; 7th tergite with 2 hairs.....*luteum*  
 Longest hair on antennal segment III 0.50-0.66 x as long as b. d. III; siphunculi 0.54-0.64 mm long; 7th tergite with 4

hairs.....*lambersi*

*Alate Viviparous Females*

1. Siphunculi 1.24-1.52 mm long and 0.55-0.65 x as long as body; longest hair on antennal segment III 3.50 x as long as b. d. III.....*luteum*
- Siphunculi about 0.67 mm long and 0.34 x as long as body; longest hair on antennal segment III about 1.71 x as long as b. d. III.....*lambersi*

71. *Greenideoida (Neogreenideoida) bengalensis* Raychaudhuri and Chatterjee  
(Figs. 41 a 44 a)

1977. *Greenideoida (Neogreenideoida) bengalensis* Raychaudhuri, D.N. and Chatterjee, M., *Oriental Ins*, 11 : 264.
1980. *Greenideoida (Neogreenideoida) bengalensis*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N., 350.

*Apterous viviparous female* Body pear-shaped, 2.21-2.37 mm long and 1.10-1.15 mm as maximum width. Head smooth, pale brown. Antennae 6-segmented, but sometimes segmentation between segments III and IV obsolete, 1.03-1.16 mm long and 0.43-0.45 x as long as body, basal two segments slightly darker than head; flagellum pale but last two segments slightly darker than head; flagellum pale but last two segments dusky, basal 0.50 portion of segment III smooth, rest of the flagellum gradually distinctly imbricated apicad; hairs on flagellum stout, mostly long with acute to acuminate apices, longest hair on antennal segment III 0.09 mm long and 2.40 - 3.50 x as long as basal diameter of the segment; processus terminalis 0.19-0.20 mm long and 1.28-1.46 x as long as base of the last antennal segment. Ultimate rostral segment 0.16-0.17 mm long and 1.19-1.50 x as long as second joint of hindtarsus, with 7-8 fine accessory hairs. Dorsum of abdomen pale medially and marginally on 2nd-4th tergites, rest dark brown; anterior tergites spinulose, rest smooth; dorsal hairs mostly long, with acute apices, a few shorter ones on the anterior tergites with acute to acuminate apices, longest hair on anterior tergites 3.0-3.90 x as long as basal diameter of 3rd antennal segment; each of tergites 7th and 8th with a pair of long fine hairs. Siphunculi elongated, curved outwards, brown with apical 0.25 portion darker, 0.62-0.64 mm long, 0.23-0.27 x as long as body and 4.0-4.88 x as long as its maximum width; hairs on siphunculi mostly long with fine apices, longest one being 2.50- 3.0 x as long as its basal diameter; spinules scattered throughout the length of the siphunculus. Legs pale brown with the femora and tarsi darker; femora faintly imbricated towards the inner margin and tibiae smooth, first tarsal joints with 7 hairs. Cauda oval, with 7 fine hairs.

*Measurements in mm :*

	Length	Width	Antenna		
1.	2.37	1.15	1.03		
Antennal segments			urs	ht <sub>2</sub>	Siph.
III	IV	V			
0.44	0.13	0.13 + 0.19	0.16	0.12	0.62

(1, an indet. host, Kurscong, West Bengal, 2.ii.1970, C.U. Colls.).

*Other morphs* : Not known

*Material examined* (Designated as paratype) : 1 apterous viviparous female from an indet. host, Kurscong, West Bengal, 2.ii.1970, Coll. S.D. Chakraborty.

*Discussion* : This is the only species represented under the subgenus *Neogreenideoida* from India so far. It differs from the only other species *philippensis* under the subgenus by longer hairs on flagellum and dorsum of abdomen, shorter siphunculi and segment 4 of rostrum shorter in comparison to segment 5.

*Biology* : Not known.

*Distribution* : India : Meghalaya, West Bengal.

*Types* : In the collection of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

72. *Greenideoida (Paragreenideoida) bhalukpongensis* Ghosh, Banerjee and Raychaudhuri  
(Figs. 41b-48b)

1971. *Greenideoida ceyloniae bhalukpongensis* Ghosh, A.K., Banerjee, H. and Raychaudhuri, D.N., *Oriental Ins.*, 5 : 105.

1980. *Greenideoida (Paragreenideoida) ceyloniae bhalukpongensis*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N., 350.

*Apterous viviparous female* : Body elongated, deep brown, 1.42- 2.11 mm long and 0.63-0.91 mm as maximum width. Head brown and smooth, dorsum with 3 pairs of anterior and 3 pairs of posterior long and thick hairs, with subacute to blunt apices. Antennae 5 or 6-segmented, 0.90-1.72 mm long and 0.60-0.94 x as long as body, concolorous with head except the apical segments (V and VI) somewhat paler; flagellum distinctly imbricated throughout, flagellar hairs short and long, stiff, with subacute or blunt apices, longest hair on

segment III almost subequal to as long as the basal diameter of the segment; processus terminalis 1.36-2.54 x as long as base of last antennal segment. Rostrum reaching 1st abdominal tergite; ultimate rostral segments 0.12-0.15 mm long and 1.30-1.50 x as long as second joint of hindtarsus, segment 4 bearing 4 long and fine accessory hairs. Dorsum of abdomen deep brown (sclerotic) except at the very margins and in a spindle-shaped median area which are paler, spinulose; dorsal hairs long, 12-14 on each of 1st-6th tergites, 7th and 8th tergites each with 2 long and stiff hairs, all hairs with subacute to blunt apices, longest hair on anterior tergites 0.72-0.85 x as long as the basal diameter of 3rd antennal segment. Siphunculi dark brown except at the apices which are brown, curved outwards, 0.43-0.92 mm long, 0.32-0.53 x as long as body and 8.0-12.0 x as long as their maximum width. Siphuncular hairs mostly long and fine. Femora pale brown to brown; hindtibiae with numerous stridulatory ridges over its entire length. Cauda transversely oval, with 7-8 hairs.

*Measurements in mm*

	Length	Width	Antenna
1.	2.11	0.84	1.72
2.	1.56	0.66	1.31
3.	2.00	0.89	1.46
4.	1.90	0.84	1.47
5.	1.72	0.85	1.41
6.	1.80	0.84	1.36
7.	1.80	0.88	1.30
8.	1.87	0.88	1.41
9.	1.86	0.81	1.42
10.	1.59	0.78	1.37
11.	1.64	0.74	1.12
12.	1.67	0.79	?
13.	1.92	0.85	1.54
14.	1.42	0.66	0.90
15.	1.57	0.63	0.95
16.	1.39	0.58	1.31
17.	1.75	0.68	1.44
18.	1.74	0.66	1.43
19.	1.80	0.76	1.32
20.	1.60	0.87	1.08
21.	1.87	0.72	1.32

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.60	0.15	0.21	0.19 + 0.26	0.15	0.10	0.93
0.50	0.09	0.14	0.12 + 0.28	0.13	0.09	0.84
0.52	0.14	0.19	0.16 + 0.30	0.13	0.10	0.65
0.50	0.13	0.19	0.15 + 0.34	0.13	0.10	0.66
0.41	0.12	0.15	0.13 + 0.27	0.13	0.09	0.52
0.46	0.13	0.18	0.13 + 0.31	0.13	0.09	0.70
0.45	0.12	0.16	0.13 + 0.30	0.13	0.09	0.49
0.49	0.13	0.18	0.15 + 0.30	0.13	0.10	0.61
0.49	0.13	0.18	0.15 + 0.34	0.13	0.09	0.54
0.37	0.09	0.15	0.12 + 0.28	0.13	0.09	0.48
0.38	0.10	0.13	0.11 + 0.28	0.13	0.10	0.56
0.36	0.11	0.20	0.13+broken	0.12	0.09	0.60
0.60	0.16	0.20	0.16 + 0.31	0.13	0.10	0.77
0.26	0.09	0.11	0.10 + 0.23	0.13	0.09	0.46
0.30	0.07	0.12	0.10 + 0.23	0.14	0.10	0.43
0.53	0.16	—	0.13 + 0.29	0.13	0.09	0.69
0.54	0.11	0.19	0.15 + 0.32	0.13	0.10	0.69
0.51	0.13	0.19	0.15 + 0.32	0.13	0.10	0.77
0.57	0.16	0.21	0.16 + 0.37	0.13	0.10	broken
0.42	0.16	—	0.13 + 0.27	0.13	0.09	0.51
0.59	0.29	—	0.14 + 0.30	0.14	0.09	0.72

(1, indet. host, Bhalukpong, Arunachal Pradesh, 31.xi.1969, C.U. Colls., 2, *Uvaria* sp., Bhaulkpong, Arunachal Pradesh, 2.xi.1969, C.U. Colls., 3-10, indet. host, Kaziranga Sanctuary, Assam, 18.xii.1972, Z.S.I. Colls.; 11, *M. ferrea*, Agartala, Tripura, 6.ii.1983, T.U. Colls.; 12, *M. ferrea*, Agartala, Tripura, 12.xii.1983, T.U. Colls.; 13, *M. ferrea*, Agartala, Tripura, 4.ii.1983, T.U. Colls.; 14-15, *M. fereaa*, Agartala, Tripura, 14.i.1984, T.U. Colls.; 16-18, *M. ferrea*, Agartala, Tripura, 2.i.1984, T.U. Colls.; 19, *M. ferrea*, Agartala, Tripura, 12.xii.1984, T.U. Colls.; 20-21, *M. ferrea*, Agartala, Tripura, 6.xii.1981, T.U. Colls.).

*Alate viviparous female* Body 1.97 mm long and 0.77 mm as the maximum width. Antennae 6-segmented, 1.82 mm long and 0.92 x as long as body; segment III with 24 and segment IV with 4 circular to slightly transversely oval secondary rhinaria; flagellum distinctly imbricated, flagellar hairs long and short, longer ones on the inner margin, longest hairs on segment III about 0.87 x as long as basal diameter of the segment; processus terminalis 1.76 x as long as the base of the last antennal segment. Ultimate rostral segment 0.14 mm long and 1.40 x as long as second joint of hindtarsus. Dorsum of abdomen locally sclerotised, yellowish brown, sparsely spinulose; dorsal hairs long, stiff, with subacute or acute apices, longer hair on anterior tergites of similar length as in the 3rd antennal segment; 7th and 8th tergites each with 2 long hairs. Siphunculi brown throughout except tip of the apex which is pale, cylindrical, with faint transverse striae; 1.21 mm long, 0.61 x as long as body and 16.0 x as long as its maximum width. Forewings with media once-branched, hind wings without a oblique vein. Otherwise as in apterous viviparous female.

*Measurements in mm :*

	Length	Width	Antenna			
1.	1.97	0.77	1.82			
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.73	0.21	0.23	0.17 + 0.30	0.14	0.10	1.21

(1, indet. host, Kaziranga Sanctuary, Assam, 18.xii.1972, Z.S.I. Colls.).

*Materials examined* : 1 apterous viviparous female from an indet. host, Bhalukpong, Arunachal Pradesh, 31.xi.1969, Coll. H. Banerjee; 1 aptera vivipara from *Uvaria* sp., Bhalukpong, NEFA, 2.xii.1969, Coll. H. Banerjee; 8 apterae viviparae and 1 alate vivipara from an indet. host, Kaziranga Sanctuary, Assam, 18.xii.1972, Coll. A.K. Ghosh; 11 apterae viviparae from *M. ferrea*, Agartala, Tripura, on various dates during 1981-1984, Coll. B.K. Agarwala.

*Other morphs* : Not known.

*Discussion* : Ghosh *et al.* (1971) considered *bhalukpongensis* to be the subspecies of *G. ceyloniae* v.d. Goot due to differences in morphometry and host association. Since then many specimens resembling this subspecies have been collected from *M. ferrea* which is also the host of *G. ceyloniae*. After examination of a series of specimens of several

collections, it is found that *bhalukpongensis* indeed infests the same host as by *G. ceyloniae* but show distinct and strong differences from the latter species (Table 13). The two populations are remarkably different and are considered to be the different species. The specimen reported as fundatrix of *G. ceyloniae* by Raychaudhuri (1956) seems to be a specimen of *bhalukpongensis*.

Table 13. Morphometry (mm) of body parts of apterae viviparae of *G. ceyloniae* and *G. bhalukpongensis*.

Body parts	<i>G. (P.) ceyloniae</i>		<i>G. (P.) bhalukpongensis</i>	
	Min.	Max.	Min.	Max.
L. Ant.	1.40	2.77	0.90	1.42
ant. III	0.69	1.26	0.26	0.60
base	0.16	0.23	0.10	0.19
p.t.	0.25	0.56	0.26	0.34
Siph.	1.32	2.08	0.43	0.93
Siph./body	0.52	0.76	0.27	0.53
Life Colour	Yellowish green		deep brown	

**Biology :** This species infests young sprouting, leaf buds and tender leaves and makes gregarious colony.

**Distribution :** India : Arunachal Pradesh, Assam, Tripura.

**Types :** The types of the subspecies have become the types of the species which are deposited in the collection of the Zoological Survey of India, Calcutta, India.

**73. *Greenideoida (Paragreenideoida) ceyloniae* van der Goot**  
(Figs. 41c-48c)

1905. *Greenidea artocarpi*, Schouteden, H. *Spolia Zeylan.*, 2 : 181 ((Partim).
1917. *Greenideoida ceyloniae* van der Goot, P., *Contrib. Faune Indes, Neerl.*, 1 : 141 (nomen nudum).
1918. *Greenideoida ceyloniae*, van der Goot, P., *Spolia Zeylan.*, 11 : 73.
1950. *Greenideoida mesuae*, Takahashi, R., *Ann. Ent. Soc. Amer.*, 43 : 590.

1956. *Greenideoida ceyloniae*, Raychaudhuri, D.N., *Zool. Verh. Leiden*, 31 : 67.
1976. *Greenideoida ceyloniae*, Ghosh, A.K., *Oriental Ins.*, 10 : 43.
1986. *Greenideoida ceyloniae*, Agarwala, B.K., Pal, M.K. and Mahapatra, S.K., *Rec. Zool. Surv. India*, 83 : 165. (Partim).
1989. *Greenideoida ceyloniae*, Agarwala, B.K., Pal, M.K. and Ghosh, A.K., *Rec. Zool. Surv. India*, 85 : 481. (Partim).

*Apterous viviparous female* Body elongated, 1.82-3.12 mm long and 0.82-1.20 mm as maximum width. Head slightly concave, convex in the middle, with poorly-developed frontal tubercles. Antennae 6-segmented and pale except the tip of the processus terminalis slightly darker, 1.40-2.77 mm long and 0.51-1.15 x as long as body; flagellum distinctly imbricated from base to apex, processus terminalis 0.25-0.56 mm long and 1.56-2.80 x long as the base of last antennal segment; large flagellar hairs mostly directed inwards, longest hair on segment III 1.20-1.30 x as long as basal diameter of the segment. Apex of rostrum reaching a little beyond the hindcoxae; ultimate rostral segments short and obtuse, 0.10-0.15 mm long and 1.0-1.4 x as long as second joint of hindtarsus; with 8-10 fine and rather long accessory hairs. Dorsum of abdomen sclerotic, and pale, laterally somewhat brownish; spinulose throughout but spinules much less distinct in the centre; dorsal hairs thorny and acute, each tergite with 2-4 spinal, 2 pleural and 10 marginal hairs; hairs on 7th and 8th tergites hardly different from the long dorsal hairs on anterior abdominal tergites. Siphunculi pale brownish to brown, with the very base and apex paler, tapering towards base and apex, curved outwards, 1.38-2.08 mm long and 0.52-0.76 x as long as body; hairs on the siphunculi numerous, with acute apices, longest hair 1.1-1.20 x as long as basal diameter of the siphunculus; spinules present in distinct transverse rows on the apical 0.12 portion. Cauda rounded-triangular, with 6-8 fine and long hairs. Legs evenly pale; femora with distinct spinular imbrications; hindtibiae imbricated on basal 0.33 portion.

*Measurements in mm*

	Length	Width	Antenna
1.	2.39	0.95	2.77
2.	2.06	0.92	?
3.	2.84	1.09	2.45
4.	2.96	1.19	2.39
5.	2.11	0.82	1.62
6.	2.50	1.06	1.40
7.	3.12	1.20	1.60

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
1.26	0.26	0.29	0.20 + 0.56	0.15	0.11	
0.74	0.26	0.28	broken	0.14	0.10	1.38
1.04	0.25	0.27	0.23 + 0.48	0.14	0.10	1.92
1.01	0.27	0.30	0.20 + 0.42	0.14	0.11	1.84
0.66	0.16	0.21	0.16 + 0.25	0.13	0.10	1.40
0.61	0.18	0.20	0.16 + 0.28	0.10	0.10	1.90
0.78	0.26	0.26	0.18 + 0.37	0.10	0.10	2.08

(1, *Mesua ferrea*, Jorhat, Assam, 20.iii.1974, Z.S.I. Colls., 3-4 *M. ferrea*, Agartala, Tripura, 6.ii.1983, T.U. Coll.; 5, *M. feerea*, Agartala, Tripura, 21.i.1984. T.U. Colls.; 6-7, *M. ferrea*, Agartala, 20.ii.1983, T.U. Colls.).

*Alate viviparous female* : Body elongated, 1.96-2.51 mm long and 0.50-0.92 mm as maximum width. Head flat with well-developed divergent frontal tubercles. Antennae 6-segmented, brown with basal segments darker, 1.94-2.39 mm long and 0.97-1.13 x as long as body; segment III with 22-23 small to medium-sized semi-circular rhinaria present over the entire length of the segment; flagellar hairs long, those on segment III 1.2-1.4 x as long as basal diameter of the segment; processus terminalis 2.22-3.6 x as long as base of the last antennal segment. Ultimate rostral segments 0.11-0.15 mm long and 1.10-1.50 x as long as the second joint of hind tarsus. Dorsum of abdomen almost smooth; dorsal hairs thorny and acute, those on anterior tergites 0.83 x as long as basal diameter of 3rd antennal segment, 7th tergite with slightly longer hairs, as long as the mentioned diameter; the hairs on 8th tergite much longer, up to 2.8 x as long as the basal diameter of 3rd antennal segment. Siphunculi brown on basal half or at most up to 0.66 portion from the base, rest paler, 1.38-1.94 mm long, 0.69-0.82 x as long as body and 27.6 x as long as its maximum width, more or less cylindrical, slightly curved outwards especially near the apex, with faint transverse striae on basal half; hairs on the siphunculi numerous, long, mostly with bluntish or subacute apices, basally a few slightly shorter hairs. Cauda transversely semi-oval. Femora pale yellowish; tibiae pigmented like the femora, with darker apices, striate- imbricated. Pterostigma extending upto 0.33 portion of radius, media once-branched.

*Measurements in mm* :

	Length	Width	Antenna
1.	2.41	0.87	2.39

2.	2.44	0.92	2.34
3.	2.15	0.83	2.22
4.	1.98	0.70	1.94
5.	2.18	0.83	2.13
6.	2.51	0.81	2.07

Antennal segments				urs	ht <sub>2</sub>	Siph.
III	IV	V	VI			
0.93	0.26	0.29	0.21 + 0.53	0.13	0.10	1.88
1.00	0.20	0.28	0.19 + 0.50	0.15	0.10	1.94
0.86	0.23	0.26	0.18 + 0.44	0.11	0.10	1.60
0.73	0.19	0.24	0.15 + 0.46	0.14	0.10	1.38
0.93	0.23	0.23	0.18 + 0.46	?	0.10	1.80
0.87	0.20	0.24	0.18 + 0.40	0.15	0.10	1.80

♂(1-6, *M. ferrea*, Agartala, Tripura, on following dates : 1, 4.iii.1985; 2, 16.ii.1982; 3, 5.i.1983; 4-5, 20.x.1983; 6, 10.xii.1984, T.U., Colls.).

*Alate oviparous female* Body 2.40-2.60 mm long. Head and thorax yellowish brown. Antennae darker than head, 6-segmented, 0.82- 0.90 x as long as the body; flagellum imbricated throughout, segment III with 11-15 circular to oval secondary rhinaria distributed over basal 0.80 portion; processus terminalis 1.10- 1.25 x as long as base of last antennal segment; flagellar hairs fine, with acute apices, longest one on segment III 2.40-2.25 x as long as the basal diameter of the segment. Ultimate rostral segment 1.30 x as long as the second joint of hindtarsus, segment 4 about 4.0 x as long as segment 5. Abdominal dorsum smooth, with small paired brownish marginal sclerites on 1st-6th tergites, narrow transverse sclerotic transverse bands on 1st-2nd tergites, and broad transverse bands on 3rd-6th tergites which may become confluent with one another and appear as solid patch, besides irregular pleural sclerites also occur on 1st-6th tergites, 7th and 8th tergites each with a narrow, transverse spinal sclerotic band; dorsal hairs many, longest ones on anterior tergites 1.10- 1.20 x as long as the basal diameter of 3rd antennal segment. Siphunculi slender, dark brown, paler apicad, 0.75 x as long as the body and 2.40-2.60 x as long as their maximum width; siphuncular hairs with acute apices. Subanal plate large, with many fine hairs; median gonapophyses enlarged and cleft; subgenital plate densely covered with fine hairs. Femora and tibiae covered with spinular im-

brications. Otherwise as in *alatae viviparae*.

*Measurements in mm :*

	Length	Width	Antenna
1.	2.75	1.00	2.25
2.	2.57	1.00	2.23

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.83	0.34	0.33	0.26 + 0.29	0.16	0.12	1.88
0.82	0.34	0.36	0.24 + 0.21	0.16	0.12	1.86

(1-2, *M. ferrea*, Agriculture University Farm, Jorhat, Assam, 20.iii.1974, Z.S.I. Colls.).

*Alate male* : Body 1.7-2.0 mm long. Head and thorax pale brown. Antennae 6-segmented, as long as the body; segment III with 11-12 secondary rhinaria on basal 0.45 portion; flagellum imbricated, flagellar hairs shorter than in oviparae; longest one on segment III 1.30-1.40 x as long as the basal diameter of the segment. Ultimate rostral segment (4+5) 1.36 x as long as second joint of hindtarsus ; segment 4 nearly 4.0 x as long as as segment 5. Abdominal dorsum pale, smooth, without any sclerotic patch except a pair of ante-siphuncular sclerites ; dorsal hairs sparse and few as in apterae viviparae, longest ones on anterior tergites 1.0-1.1 x as long as basal diameter of the 3rd antennal segment ; hairs on 7th and 8th tergites 1.5-2.0 and 1.7-2.10 x as long as the mentioned diameter respectively. Siphunculi broken in the available two specimens. Subanal plate rectangular, projecting beyond cauda ; claspers distinct, sclerotic. Femora and tibiae with spinulose imbrications. Otherwise as in the *alate viviparae*.

*Measurements in mm :*

	Length	Width	Antenna
1.	2.0	0.55	2.0
2.	1.80	0.62	2.4

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.93	0.27	0.35	0.26 + 0.52	0.15	0.11	broken
0.84	0.24	0.31	0.22 + 0.45	0.13	0.10	broken

(1—2, *M. ferrea*, Jorhat, Assam, 20.iii.1974, Z.S.I. Colls.).

*Other morphs* : Not known.

*Materials examined* : Six apterous viviparous females, 4 alate oviparous females, 2 alate males and 6 alatoid nymphs from *Mesua ferrea*, Jorhat, Assam, 20.iii.1974, Coll. D. Saharia ; 2 apterous viviparous females from *M. ferrea*, Agartala, Tripura, 6.ii.1983, Coll. B. K. Agarwala ; 2 apterous viviparous females from *M. ferrea*, Agartala, Tripura, 20.iii.1983, Coll. B. K. Agarwala , 1 apterous viviparous female from *M. ferrea*, Agartala, Tripura, 21.i.1984, Coll. B. K. Agarwala, 6 alate viviparous females from *M. ferrea*, Agartala, 16.ii.1982 to 4.iii.1985, Coll. B. K. Agarwala.

*Discussion* Raychaudhuri (1956) provided the description and historical perspective of the species. Since then many more specimens of this species from new localities have been collected in India. Based on new specimens and earlier description, the species has been redescribed above. The fundatrix morph described by Raychaudhuri (1956) with a suspicion seem to represent the specimen of *G. ceyloniae bhalukpongensis* which is considered here as a distinct species.

*Biology* : This species is known to colonise *M. ferrea*, a member of Guttifercae, exclusively. Alate viviparae appear towards the middle of November in the early winter and exclusively infest the young leaves. Apterous viviparous morph appear in next 12-20 days. Hereafter, species gradually develops infestation and colonise the available tender leaves and branches. With the onset of spring in March, most of the apterous specimens begin to produce alatoid offspring and the emigrant alatae viviparae leaves the tree and the locality in next 12-22 days. However, sexual morphs did not occur on the same tree in Agartala, but they have been recorded on the tree of the same species in Jorhat, Assam. The reason of absence of sexual morph in this part (Agartala and adjoining areas) is not known.

*Distribution* India : Assam, Meghalaya, South India, Tripura ; Malaysia, the Philippines, Sri Lanka.

*Types* : According to Raychaudhuri (1956), van der Goot's original materials are lost. The neotype of the species, designated by Raychaudhuri (1956), is in the collection of the Natural History Museum, London.

74. *Greenideoida (Pentatrichosiphum) lambersi* Basu, A. N.

(Figs. 45 a-48 a)

1964. *Greenideoida lambersi* Basu, A. N., *J. Linn. Soc. (Zool)*, 45 : 232.

1977. *Greenideoida (Pentatrichosiphum) lambersi*, Raychaudhuri, D. N. and Chat-

terjee, M., *Oriental Ins.* 11 : 263-267.

1980. *Greenideoida (Pentatrichosiphum) ? lambersi*, Raychaudhuri, D. N., and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D. N., 351.

*Apterous viviparous female* : Body elongated, 2.01-2.50 mm long and 0.93-1.15 mm as maximum width. Head slightly convex, without any apparent frontal tubercles. Antennae concolorous with the body, 5-segmented, 0.79-1.0 mm long and 0.36-0.41 x as long as body, segment III smooth near the base, conspicuously imbricated distally like the rest of the flagellum ; flagellar hairs short, thorn-like, with acute apices, longest one on segment III 0.50- 0.66 x as long as basal diameter of the segment; processus terminalis 0.09-0.10 mm long and 0.54—0.68 x as long as base of the last antennal segment. Rostrum reaches the hindcoxae; ultimate rostral segments 0.14-0.18 mm long and 1.10-1.40 x as long as second joint of hindtarsus, segment 4 with about 8-11 short accessory hairs. Dorsum of abdomen pale, smooth, spinally with diffused pigmentation area; dorsal hairs thick, thorn-like, more or less acute, sparsely placed spinally and pleurally but the marginal ones conspicuously longer, longest hair on the anterior tergites 1.30-2.20 x as long as basal diameter of the 3rd antennal segment, shortest hairs on the anterior tergites 0.16-0.25 x as long as the mentioned diameter; 7th and 8th tergites each with 2 hairs, 1.10-1.80 x and 1.40-2.2 x as long as the mentioned diameter respectively. Siphunculi brown, broadest at the very base, narrowest at the tip, more or less cylindrical, 0.54-0.64 mm long, 0.24-0.30 x as long as body and 7.5-10.0 x as long as its maximum width; spinules in distinct transverse rows covering the entire width on the distal half but restricted to the inner side only on the basal half; longest hair on siphunculi 2.50-3.40 x as long as basal diameter of the 3rd antennal segment. Cauda without a median process, with 7-12 hairs. Legs pale brown, with bases of the tibiae slightly darker; femora distally spinulose; tibiae smooth; first tarsal joints with 5 hairs.

*Measurements in mm :*

	Length	Width	Antenna		
1.	2.37	1.08	0.84		
	Antennal segments		urs	ht <sub>2</sub>	Siph.
III	IV	V			
0.34	0.13	0.15 + 0.10	0.15	0.12	0.58

(1, *Hymenodictyon* sp., Darjeeling, West Bengal, 26.v.1958, B. M. Colls.).

*Alate viviparous female* Body elongated, 1.98 mm long. Head brown, frons smooth. Antennae 5-segmented, 1.17 mm long and 0.63 x as long as body; flagellum more distinctly imbricated apicad, segment III with 24-25 transversely oval accessory rhinaria; flagellar hairs sparse, fine and short, longest one on segment III about 1.71 x as long as basal diameter of the segment; processus terminalis 0.50 x as long as base of last segment. Rostrum extending upto mesothorax, ultimate rostral segments about 1.46 x as long as second joint of hindtarsus, segment 4 bearing 6 fine accessory hairs. Dorsum of abdomen pale, with pale brown transverse patches on posterior tergites and with sparse spinules, dorsal hairs few, short with acute apices, longest ones on anterior tergites about 2.0 x as long as basal diameter of 3rd antennal segment; 7th and 8th tergites each with 2 long and fine hairs, about 4.30 x as long as the mentioned diameter respectively. Siphunculi broader at base, narrowest at apex, 0.67 mm long, 0.34 x as long as body and 5.62 x as long as the maximum width; siphuncular hairs fine, mostly of similar lengths, apical portion covered with dense spinules and these are covered with short and fine hairs. Cauda obtusely conical, with about 8 fine hairs. Legs light brown, femora with spinulose striae on both of dorsal and ventral surfaces, tibiae smooth. Wing venation normal.

*Measurements in mm*

	Length	Width	Antenna		
1.	1.98	0.73	1.17		
	Antennal segments		urs	ht2	Siph.
	III	IV	V		
	0.60	0.17	0.17 + 0.09	0.15	0.10
					0.67

(1, *Premna* sp., Kalimpong, West Bengal, 30.vi.1969, C.U. Colls.).

*Other morphs* : Not known.

*Materials examined* 1 apterous viviparous female from *Hymenodictyon* sp., Darjeeling, 26.v.1958, Coll. S. Das., 1 alate viviparous female from *Premna* sp., Kalimpong, West Bengal, 30.vi.1969, Coll. M. R. Ghosh.

*Discussion* : This species was distinguished from its congeneric, namely *elongata* v.d. Goot in having very short processus terminalis and much shorter antennae, siphunculi and antennal hairs. Raychaudhuri and Chatterjee (1980) distinguished the species from *luteum* Basu, A. N. in having siphunculi and antennal hairs shorter.

*Biology* Pale glassy white aphids were reported to infest the lower

surface of the leaves of its host along both sides of the mid-rib. No attendant ant was noted.

*Distribution* : India : West Bengal.

*Types* : Holotype and paratypes are deposited in the collection of the Section of Entomology, State Agricultural Research Institute, Calcutta, India. Co-types are deposited in the Natural History Museum, London.

75. *Greenideoida (Pentatrichosiphum) luteum* (Basu, A.N.)  
(Figs. 41d 44d)

1969. *Pentatrichosiphum luteum* Basu, A.N., *Oriental Ins.*, 3 : 183.

1980. *Greenideoida (Pentatrichosiphum) luteum*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N., 351.

*Apterous viviparous female* : Body elongated, 2.71-3.21 mm long and 1.12-1.41 mm as maximum width. Head smooth, vertex with 6-8 very long hairs besides some smaller ones posteriorly. Antennae 5-segmented, 1.17-1.33 mm long and 0.40-0.46 x as long as body; segment III weakly imbricated, gradually more distinctly imbricated apicad; flagellar hairs many, mostly long and few short hairs, all with acute apices, the longest hair on segment III 2.80-3.70 x as long as basal diameter of the segment; processus terminalis 0.23-0.29 mm long and 1.21-1.93 x as long as base of last antennal segment. Rostrum extends upto the 1st tergite; ultimate rostral segments 0.15-0.21 mm long and 1.41-2.0 x as long as hindtarsus. Dorsum of abdomen pale, membranous, smooth; dorsal hairs numerous, mostly stout and short, with furcated apices, longer hairs with acute to acuminate apices; 7th tergite with 4 hairs, the 2 inner ones much stouter and longer than the others, with acute apices, 2.80-2.70 x as long as the basal diameter of 3rd antennal segment; 8th tergite with 2 thinner hairs, with acute to acuminate apices, 2.30-3.30 x as long as the mentioned diameter. Siphunculi pale brown, with the apices darker, 1.14-1.60 mm long and 0.44-0.57 x as long as body; slightly curved outwards, broadest at base, gradually tapering with a small but distinct flange; siphuncular hairs short to quite long, 0.23-1.40 x as long as the basal width of siphunculi. Cauda pale, semilunar; without a median process. Legs pale brown, middle and hindtibiae with rather faint minute spinular striae; first tarsal joint with 5 hairs.

*Measurements in mm*

	Length	Width	Antenna
1.	2.50	1.14	1.06
2.	3.01	1.27	1.30
3.	2.71	1.12	1.26
4.	2.94	1.20	1.28
5.	2.81	1.17	1.17
6.	2.90	1.27	1.33

Antennal segments			urs	ht2	Siph.
III	IV	V			
0.41	0.17	0.12 + 0.25	0.15	0.09	1.14
0.57	0.16	0.19 + 0.23	0.17	0.12	1.52
0.50	0.17	0.15 + 0.26	0.17	0.11	1.42
0.52	0.19	0.17 + 0.23	0.18	0.11	1.47
0.42	0.17	0.15 + 0.23	0.17	0.11	1.40
0.55	0.18	0.15 + 0.29	0.20	0.12	1.50

(1, *Litsea amara*, Sindanglaya, Indonesia, 28.ii.1978, B.M. Colls.; 2-5, *L. polyantha*, Mongbul, Darjeeling dist., West Bengal, 13.ix.1971, C.U. Colls.; 6, *Buddleia* sp., Shillong, Meghalaya, 18.vii.1970, C.U. Colls.).

*Alate viviparous female* Body 1.91-2.78 mm long. Dorsum of head with 4 pairs of long hairs in two longitudinal rows and a few shorter and thinner ones posteriorly. Antennae 5-segmented, 1.17 mm long and 1.63 x as long as body; segment III with 17-19 transversely oval accessory rhinaria arranged along the entire length of the segment; such rhinaria absent on other segments; longest hair on segment III about 3.5 x as long as basal diameter of the segment. Ultimate rostral segments about 0.17 mm long. Dorsum of abdomen with a dark solid sclerotic patch in the spino-pleural area of 3rd-5th tergites; dorsal hairs much shorter and thinner than in apterae, longest hair on anterior tergites about 2.5 x as long as the basal diameter of 3rd antennal segment and those on 7th and 8th tergites about 4.0 x as long as the mentioned diameter. Siphunculi dark brown, a little curved outwards, 1.24-1.52 mm long and 0.55-0.65 x as long as body; siphuncular hairs long, fine and sharp. Cauda brown, with about 7 hairs. Tibiae sparsely spinulose near the apices. Forewings with Radial Sector slightly curved and Media twice-branched; hindwings with one oblique vein.

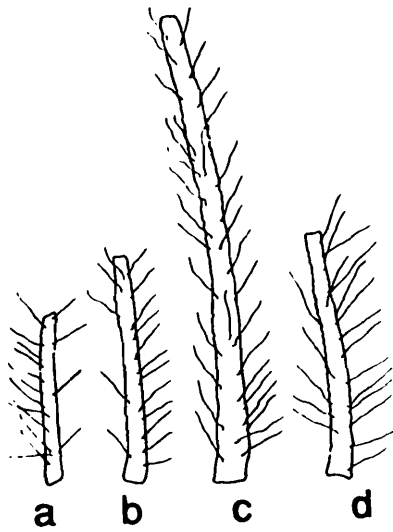


Fig. 41

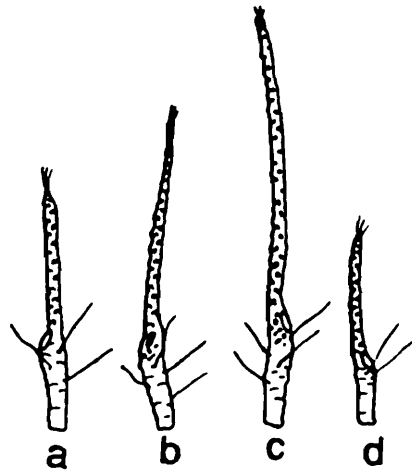


Fig. 42

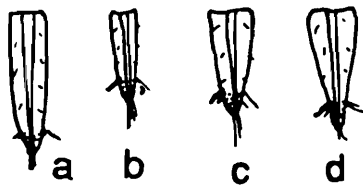


Fig. 43

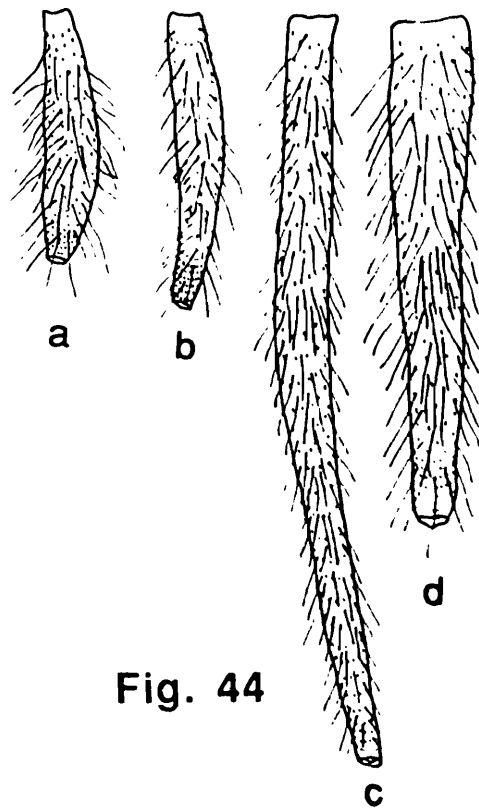


Fig. 44

Figs. 41a-d : Species of *Greenideoida*, apterous viviparous female morph : antennal segment III. a *bengalensis*, b *bhalukpongensis*, c *ceyloniae*, d *luteum*. Figs. 42a-d : Species of *Greenideoida*, apterous viviparous female morph : processus terminalis. a *bengalensis*, b *bhalukpongensis*, c *ceyloniae*, d *luteum*. Figs. 43a-d : Species of *Greenideoida*, apterous viviparous female morph : ultimate rostral segments. a *bengalensis*, b *bhalukpongensis*, c *ceyloniae*, d *luteum*. Figs. 44a-d : Species of *Greenideoida*, apterous viviparous female morph : Siphunculi. a *bengalensis*, b *bhalukpongensis*, c *ceyloniae*, d *luteum*

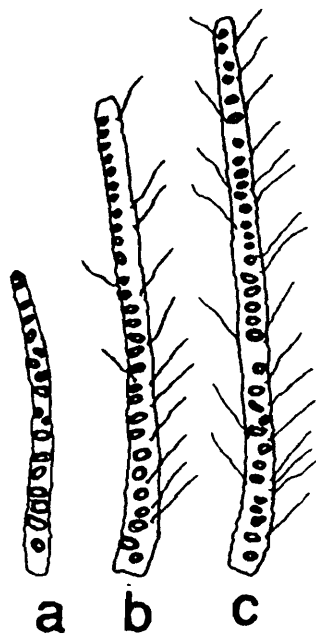


Fig. 45

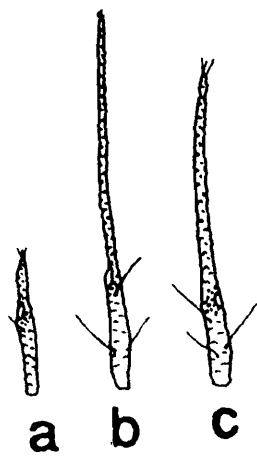


Fig. 46

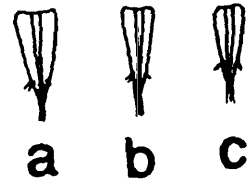


Fig. 47

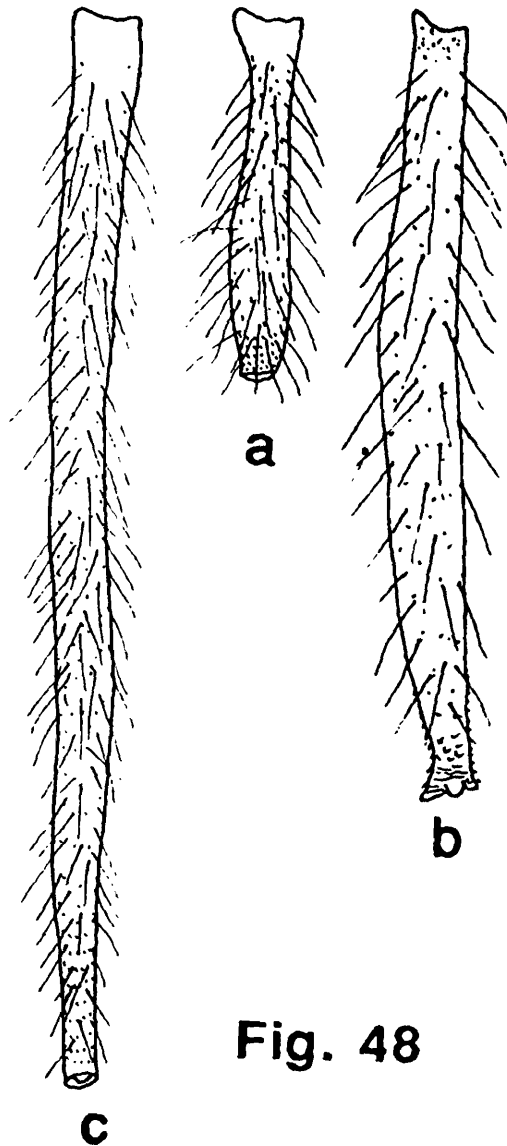


Fig. 48

Figs. 45a-c : Species of *Greenideoida*, alate viviparous female morph : antennal segment III. a *lambersi*, b *bhalukpongensis*, c *ceyloniae*. Figs. 46a-c : Species of *Greenideoida*, alate viviparous female morph : ultimate rostral segments. a *lambersi*, b *bhalukpongensis*, c *ceyloniae*. Figs. 47a-c : Species of *Greenideoida*, alate viviparous female morph : ultimate rostral segments. a *lambersi*, b *bhalukpongensis*, c *ceyloniae*. Figs. 48a-c : Species of *Greenideoida*, apterous viviparous female morph : Siphunculi. a *lambersi*, b *bhalukpongensis*, c *ceyloniae*.

*Measurements in mm :*

	Length	Width	Antenna			
1.	1.92	0.55	1.17			
	Antennal segments		urs	ht2	Siph.	
	III	IV	V			
	0.57	0.13	0.14 + 0.21	0.17	0.09	1.24

*Materials examined* : 1 apterous viviparous female and 2 nymphs from *Buddleia* sp., Shillong, Meghalaya, 18.vii.1970, Coll. H. Banerjee, 4 apterous viviparous females and 2 nymphs from *Litsea polyantha*, Mongbul, West Bengal, 13.ix.1971, Coll. unknown; many nymphs from *Litsea* sp., Manas Sanctuary, Bhutan, 16.i.1974, Coll. A. K. Ghosh; 1 apterous and 1 alate viviparous females from *L. amara*, Sindanglaya, Indonesia, 28.ii.1978, Coll. D. Noordam.

*Discussion* : Basu, A.N. (1969) described the species as typus generis of *Pentatrichosiphum*. Raychaudhuri and Chatterjee (1980) transferred the species under the genus *Greenideoida* because of bluntish ultimate rostral segment and indistinct division of segments 4 and 5 of the rostrum. This species is distinguishable from other species in the genus chiefly in having 5-segmented antennae, first tarsal joints with 7 hairs, forewings with Media twice-branched and hindwings with one oblique vein.

*Biology* : The species infests the undersurface of the leaves of *Litsea* trees without causing visible injury. No ant association has been recorded.

*Distribution* : India: Arunachal Pradesh, Meghalaya, Sikkim, West Bengal; Bhutan.

*Types* : Deposited in the Plant Virus Research Substation, Indian Agricultural Research Institute, Kalimpong, West Bengal, India; Cotypes are in the collections of the Natural History Museum, London.

Genus 10. *Mollitrichosiphum* Suenaga, 1934

1908. *Trichosiphum* Pergande : Okajima, G., *Bull. Coll. Agric. Tokyo Imp. Univ.*, 8: 22 (*Partim*).
1921. *Greenidea* Schouteden : Takahashi, R., *Aph. of Formosa*, pt. 1 : 65 (*Partim*).
1931. *Paratrichosiphum* Takahashi, R., *Aph. of Formosa*, pt. 6 : 31 (*Partim*).
1934. *Mollitrichosiphum* Suenaga, *Bull. Kagoshima Imp. Coll. Agric. For.*, 1 : 798

- (*Typus-generis* : *Trichosiphum tenuicorpus* Okajima, 1908).
1956. *Metatrichosiphon*, Raychaudhuri, D.N., *Zool. Verh. Leiden*, 31 : 79 (described as genus with *Trichosiphum nigrofasciatum*, Maki, 1916 as *typus-generis*; considered here as subgenus).
1956. *Neotrichosiphon* Raychaudhuri, D.N., *Zool. Verh. Leiden*, 31 : 79 (described as subgenus of *Metatrichosiphon*, with the *typus-generis* : *Trichosiphum tenuicorpus* Okajima ).
1980. *Mollitrichosiphum*, Raychaudhuri, D.N., and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N., 353.

**Morphology** : Body elongated or pear-shaped, pale to dark brown. Dorsum of head smooth, frons with lateral frontal tubercles weakly developed. Antennae 5 or 6-segmented, shorter than body; basal segments smooth or with some spinules; flagellum gradually more distinctly imbricated apicad; flagellar hairs mostly long, with fine apices, in the nominate subgenus hairs are of similar lengths and pointing in all directions, in the subgenera *Metatrichosiphon* and *Ditrichosiphon* long and short hairs occur, of which longer hairs mostly directed inwards; segment III with transversely oval secondary rhinaria in alatae. Rostrum with segments 4 and 5 distinctly divided; ultimate rostral segments about 1.16-2.75 x as long as second segment of hindtarsus, segment 4 with 10-16 fine accessory hairs. Dorsum of abdomen in apterae pale or sclerotic, smooth or spinulose anteriorly and laterally; dorsal hairs long with acute, acuminate or sometimes furcated apices in apterae, in alatae dorsal hairs with fine apices; ventrum of abdomen spinulose and forming two distinct elongated patches postero-laterally. Siphunculi long, in apterae slightly curved outwards, in alatae nearly cylindrical, without any reticulation in apterae, with faint reticulation in subgenus *Metatrichosiphon*, about 0.28-0.83 x as long as body; siphuncular hairs many, long, mostly with fine apices; spinulose striae present throughout. Cauda semi-oval, with 6-8 fine hairs. Subanal plate round and with many long hairs. Legs paler than body; femora spinulose on ventral surface, fore- and midtibiae smooth or faintly imbricated, hindtibiae curved outwards; with many stridulatory ridges in the form of transverse cuts; first tarsal segments with 7 hairs each. Wing venation normal, Radial Sector straight in the nominate subgenus but slightly curved in the subgenera *Metatrichosiphon* and *Ditrichosiphon*.

**Discussion** : Suenaga (1934) described the genus with *Trichosiphum tenuicorpus* Okajima, 1908 as the type-species. Raychaudhuri (1956), unaware of the publication of Suenaga (1934), erected the genus *Metatrichosiphon* with *Trichosiphum nigrofasciatum*, Maki, 1916 as the type-species. Raychaudhuri and Chatterjee (1980) understood the genus by the following set of characters :- long and pointed ultimate rostral segments, 5 or 6-segmented antennae, cauda

transversely oval, hindtibiae always with stridulatory ridges and body hairs long, numerous and mostly with fine apices. They (op. cit.) considered the genus with two subgenera *Metatrichosiphon* Raychaudhuri (1956) and *Ditrichosiphon* Raychaudhuri, 1956. We have examined the representative materials of all the species recorded from India and agree with the arrangement of Raychaudhuri and Chatterjee (1980) except that the criterion of separating the subgenus *Ditrichosiphon* being antennae 5-segmented, which character may not be reliable and constant if adequate size and range of samples are examined. Since the species under this subgenus is not recorded in India, we do not intend to disturb the arrangement of Raychaudhuri and Chatterjee (1980).

*Biology* : The recorded species of the genus colonise young leaves and branches of plants belonging to families Betulaceae, Buddleiaceae, Fagaceae, Lauraceae, Juglandaceae, Myrsinaceae and rarely of Anacardiaceae and Rosidae. Sexual morphs have been recorded for two species from elsewhere, but most of the species seem to reproduce anholocyclicly.

*Distribution* : China, India, Indonesia, Japan, Nepal, and Taiwan.

*Type-species* *Trichosiphum tenuicorpus* Okajima, 1908.

#### Key to the subgenera of Genus *Mollitrichosiphum*

1. Antennae 5-segmented.....*Ditrichosiphum*(not found in India)  
Antennae 6-segmented..... 2
2. Flagellum with long and short hairs occurring together, longer hairs mainly directed inwards; radial sector curved .....  
..... *Metatrichosiphon*  
Flagellum with hairs of nearly similar lengths and pointed in all directions; radial sector nearly straight.....  
..... *Mollitrichosiphum*

#### Key to the species of subgenus *Mollitrichosiphum*

##### *Apterous viviparous females*

1. Dorsum of abdomen with a solid brown or dark brown patch extending spino-pleurally on 2nd-6th tergites..... 2  
Dorsum of abdomen sclerotic, pale or yellowish brown but never with a solid patch as above .....3
2. Antennae 1.73-2.25 mm long; siphunculi 1.60-1.92 mm long and 0.58-0.63 x as long as body.....*trilokum*

- Antennae 1.57-1.70 mm long; siphunculi 1.02-1.17 mm long and 0.46-0.57 x as long as body..... *nigriabdominalis*
3. Segment 4 of rostrum 7.50-8.00 x as long as segment 5; siphunculi about 10.60-11.10 x as long as maximum width .....  
..... *godavariense*
- Segment 4 of rostrum 4.20-4.50 x as long as segment 5; siphunculi 8.20-10.30 x as long as maximum width..... *tenuicorpus*

Key to the species of subgenus *Metatrichosiphon*

*Apterous viviparous females*

1. Longest hair on antennal segment III 5.50-6.50 x as long as b.d.III.  
..... *montanum*
- Longest hair on antennal segment III 2.30-4.70 x as long as b.d. III.....2
2. Abdominal dorsum locally spinulose ..... 3  
Abdominal dorsum never spinulose ..... 4
3. Siphunculi 6.40-7.0 as long as their maximum width; 7th tergite with 2 hairs ..... *kazirangi*  
Siphunculi 9.0-12.8 x as long as their maximum width; 7th tergite with 9-12 hairs ..... *nandii*
4. U.r.s. 0.15-0.17 mm long and 1.16-1.73 x as long as h.t.2, hind tibiae with 18-22 ridges all over their length ..... *buddleiae*  
U.r.s. 0.29-0.33 mm long and 2.30-2.75 as long as h.t.2; hind tibiae with 27-32 ridges on basal 0.6-0.7 portion.....  
..... *rhusae*

*Alate viviparous females*

1. 7th tergite with 10-14 hairs .....*nandii*  
7th tergite with 2 hairs ..... 2
2. Siphunculi about 6.40 x as long as u.r.s. .... *rhusae*  
Siphunculi about 7.70-18.00 x as long as u.r.s. .... 3
3. Longest hair on anterior abdominal tergites about 4.0-5.20 x as long as b.d. III ..... *montanum*  
Longest hair on anterior abdominal tergites 2.90-4.10 x as long as b.d. III ..... 4

4. Siphunculi about 21.00 x as long as their maximum width; longest hair on antennal segment III 5.20-5.80 x as long as b.d. III ..... *buddleieae*
- Siphunculi about 13.0-15.0 x as long as their maximum width; longest hair on antennal segment III 4.0-5.0 x as long as b.d. III ..... *kazirangi*

**76. *Mollitrichosiphum (Mollitrichosiphum) godavariense* Das and Raychaudhuri**

1983. *Mollitrichosiphum (Mollitrichosiphum) godavariense*, Das, B.C. and Raychaudhuri, D.N., *Rec. Zool. Surv. India*, Occ. Paper No. 51 : 49.

The specimens of this species were not available for examination. Therefore, the original description (Das and Raychaudhuri, 1983) is reproduced below:-

*“Apterous viviparous female* : Body elongate, pale, about 2.56- 2.83 mm long with 0.97-1.11 mm as maximum width. Head smooth, frons slightly convex; dorsal cephalic hairs long, about 3.66- 3.84 x b.d. III and with fine apices. Antennae 6-segmented, shorter, about 0.69-0.76 x body; flagellum imbricated; flagellar hairs long and fine and pointed in all directions, longest hair on segment III about 4.56-5.00 x basal diameter of segment III; primary rhinaria ciliated; p.t. 1.42-1.50 base of segment VI. Mesothoracic furca with a stalk. Rostrum extending beyond midcoxae, rostral segments 4+5 about 2.25 x h.t.2; segment 4 about 8.0-8.50 x segment 5 and with 15 secondary hairs. Abdomen pale and smooth, hairs on tergum like dorsal cephalic hairs, longest hair on anterior tergites about 3.43-3.86 x b.d. III, 8th tergite with two long acute hairs; these about 3.12-3.33 x b.d. III. Venter of abdomen spinulose. Siphunculi pale, cylindrical, spinulose, about 0.56-0.59 x body, hairs on siphunculi long with fine apices, longest hair about 1.40 x basal diameter of the siphunculi. Cauda semioval, with 8 hairs. Legs pale, femora imbricated and about 14-18 stridulatory ridges present on hind tibiae : F.T.C. 7,7,7.

*Measurements of the Holotype* : Length of body 2.56, width 0.97; antenna 1.95, antennal segments III : IV : V : VI 0.83 : 0.20 : 0.27 (0.19+0.29); rostral segments (4+5) 0.28 : h.t.2 : 0.072 : Siphunculi 1.47.

*Alate oviparous female* : Body elongate, about 3.10-3.12 mm long. Dorsal cephalic hairs about 3.66-3.94 x b.d. III. Antennae shorter than body; semicircular protuberant secondary rhinaria present on segment III. Abdominal dorsum smooth, with a diffused pigmented patch medially and a pair of dark isolated marginal patches on each of segments 1-6, longest hair on anterior tergites about 2.00-2.70 x b.d. III; tergite 8 with 2 long hairs, these about 1.79-2.00 x b.d. III. Siphunculi dark, about 0.75- 0.80 x body; hairs on siphunculi long with fine apices, longest hair about 2.00 x basal

diameter of siphunculi. Wing venation normal with the radial sector nearly substraight.

*Measurements of an alate oviparous female* : Length of body 3.11, width 1.15 antenna 2.66, antennal segments III : IV : V : VI 1.04 : 0.27 : 0.30 : (0.22+0.30); rostral segments (4+5) 0.60 (?); h.t.2 0.11; Siphunculi 2.50; Cauda 0.04."

*Materials examined at the time of original description* : Holotype : One apterous viviparous female, Nepal : Godavari, 15.x.76, on *Quercus* sp.; Paratypes:12 apterae and 15 alate oviparous females with the same collection data as is holotype.

*Biological notes* : Pale to dark brown insects were collected from the undersurface of tender leaves. Infestation moderate, no damage symptom to the host plant was noticed.

*Remarks* : This species comes close to *Mollitrichosiphum* (*Mollitrichosiphum*) *tenuicarpus* Okajima but differs in the following characters :- Segment 4 of rostrum about 7.50-8.00 x segment 5 (vs. 4.20-4.50 x); hairs on 8th tergite about 3.12-3.33 (vs. 2.60 x b.d. III ); longest hair on anterior abdominal tergites 4.56-5.00 x b.d. III (vs. 4.10 x); siphunculi about 10.6-11.10 x maximum width (vs. 8.60 x).

*Distribution* : Nepal.

*Types* . Zoological Survey of India, Calcutta.

77. *Mollitrichosiphum* (*Mollitrichosiphum*) *nigriabdominalis* Agarwala,  
Mondal and Raychaudhuri  
(Figs. 49 e - 52 e )

1982. *Mollitrichosiphum nigriabdominalis*, Agarwala, B.K., Mondal, P.K. and Raychaudhuri, D.N., *Entomon*, 7 : 41.

*Apterous viviparous female* : Body elongated, 2.16-2.29 mm long and 0.87-1.06 mm as maximum width. Head smooth, flat; dorsum with many long and fine hairs. Antennae 6-segmented, 1.57-1.70 mm long and 0.70-0.78 x as long as body ; pale upto base of 5th segment and rest darker; prominently imbricated; flagellum with many long hairs having pointed apices and these pointed on all sides; processus terminalis 0.24-0.28 mm long and 1.50-1.75 x as long as base of the last antennal segment. Rostrum elongated, extending beyond hindcoxae; ultimate rostral segments 0.23-0.27 mm long and 1.74-2.27 x as long as second joint of hindtarsus, bearing 14 accessory hairs. Dorsum of abdomen sclerotised, smooth, with a central median dark patch extending over 1st-5th tergites; dorsal hairs 9-12 on each tergite, long and

fine; longest hair on anterior tergites about 3.0 x as long as the basal diameter of 3rd antennal segment. Siphunculi pale, cylindrical, with sipunles near the apical region besides long and fine hairs which are distributed over the entire length, 1.02-1.17 mm long, 0.46-0.57 x as long as body and 7.06-8.36 x as long as its basal diameter. Cauda rounded, bearing 6 hairs. Femora coloured like body; hindtibiae pale brown with nearly 14 transverse cuts restricated on basal half.

*Measurements in mm :*

	Length	Width	Antenna
1.	2.20	1.06	1.58
2.	2.24	1.01	1.59
3.	2.16	1.03	1.57
4.	2.27	1.00	1.70

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.57	0.16	0.23	0.16 + 0.28	0.25	0.11	1.02
0.56	0.19	0.23	0.17 + 0.27	0.26	0.12	1.17
0.57	0.19	0.23	0.16 + 0.24	0.27	0.12	1.15
0.56	0.23	0.26	0.17 + 0.27	0.23	0.12	1.15

*Materials examined :* 4 apterous viviparous females from *Quercus rubra*, Sanklang, Sikkim, 3.xi.1974, Coll. P.K. Mondal.

*Discussion :* This species is distinguishable from its closest relative *M. tenuicarpus* in having a distinct median brown patch on abdominal dorsum besides other differences in their morphometry.

*Biology :* Insects of this species infested mainly the stem of oak tree and made big colonies. No ant association was recorded (Agarwala *et al.* 1982).

*Distribution :* India : Sikkim.

*Types :* In the collections of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

**78. *Mollitrichosiphum (Mollitrichosiphum) tenuicarpus* Okajima**  
(Figs. 49g - 52g, 53f - 56f)

1908. *Trichosiphum tenuicarpus* Okajima, G., *Bull. Coll. Agric. Kotyo Imp. Unit.*, 8 : 22.
1919. *Trichosiphum tenuicarpus*, Takahashi, R., *Proc. Ent. Soc. Washington*, 21 : 174.

1924. *Greenidea tenuicorpus*, Takahashi, R., *Aph. of Formosa*, 3 : 55.
1940. *Paratrichosiphum tenuicorpus*, Takahashi, R., *Philipp. Jour. Sc.*, 72 : 386.
1973. *Mollitrichosiphum (Mollitrichosiphum) shinjii*, Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M. and Ghosh, A.K., *Kontyu*, 41 : 70 (New syn.)
1980. *Mollitrichosiphum (Mollitrichosiphum) tenuicorpus*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N., 355.

*Apterous viviparous female* : Body elongated, 1.88-3.10 mm long and 0.79-1.27 mm as maximum width. Head brown, with long hairs. Antennae 6-segmented, 1.99-2.34 mm long and 0.63-0.79 x as long as body, pale to brown with the flagellum darker towards the apex, segment III on the outer side spinulose or with spinulose imbrications, inner side of the flagellum almost smooth upto the segment V; flagellar hairs very long and fine, equally numerous on all sides, longest hair on segment III about 0.18-0.23 mm long and 4.70-5.80 x as long as basal diameter of the segment; processus terminalis 0.30-0.33 mm long and 1.42-1.76 x as long as base of last antennal segment. Rostrum reaching almost the middle of the body, ultimate rostral segments slender, acute, 0.26-0.30 mm long and 1.90-2.50 x as long as second joint of hindtarsus, segment 4 bearing about 16 long and fine hairs. Dorsum of abdomen sclerotised, pale brownish yellow, smooth, ventrally with two large fields of irregularly arranged spinules or nodules which leave a median area almost free; dorsal hairs long and thick, longest hairs on anterior tergites 3.70-4.70 x as long as basal diameter of 3rd antennal segment; hairs of 7th and 8th tergites not clearly visible, it may be 5 hairs on 7th tergite and 2 hairs on 8th tergite. Siphunculi pale yellow to brownish black; with basal half paler, 1.61-2.23 mm long, 0.64-0.83 x as long as body, and 8.2-10.3 x as long as their maximum width; curved outward, very faintly imbricated on their distal halves, siphuncular hairs numerous with acute apices; spinules in distinct rows present on both surfaces throughout the length but densest near the apex and base. Cauda without a median process. Femora pale brownish yellow, dorsally smooth, ventro-laterally with spinules; tibiae darker than femora, the fore and middle ones almost smooth with the very apices faintly imbricated, hindtibiae bent outwardly, bearing 14-17 stridulatory ridges; spinules present, apices of the tibiae provided with 4 thorny hairs.

*Measurements in mm :*

	Length	Width	Antenna
1.	2.77	1.27	2.14
2.	2.37	1.01	broken

3.	2.50	1.07	1.99
4.	2.85	1.07	2.25
5.	3.10	1.27	2.27
6.	3.00	1.23	2.34
7.	2.79	1.04	2.08

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.19	0.23	0.28	0.17 + 0.30	0.26	0.13	1.88
broken	broken	broken	broken	0.26	0.12	1.61
0.81	0.20	0.27	0.21 + 0.32	0.27	0.12	1.64
1.00	0.23	0.29	0.21 + 0.32	0.26	0.12	1.97
0.96	0.24	0.31	0.21 + 0.32	0.30	0.12	2.0
1.05	0.26	0.30	0.19 + 0.33	0.24	0.13	2.23
0.80	0.25	0.30	0.21 + 0.30	0.26	0.13	2.23

(1-2, *Quercus rubra*, Sanklang, Sikkim, 2.ix.1974, C.U.Colls.; 3-4, *Castanopsis* sp., Laitkor Forest, Shillong, Meghalaya, 3.xi.1976, Z.S.I. Colls.; 5, *Quercus* sp., Gangtok, Sikkim, 22.ix.1984, T.U. Colls.; 6-7, indet. host, Gangtok, Sikkim, 22.ix.1984, T.U. Colls.).

*Alate viviparous female* : Body very elongated, 2.17-3.56 mm long and 0.90-1.18 mm as maximum width. Head and thorax dark. Antennae 6-segmented, 2.14-2.83 mm long and 0.80-0.99 x as long as body, blackish, with basal segments slightly more transparent and the very base of the 3rd segment paler, flagellum imbricated only from 4th segment onwards; segment III with 14-25 nearly round rhinaria arranged in a row over almost its entire length, flagellar hairs numerous, long with fine apices, rather evenly spread in all directions, longest hairs on segment III 3.90-5.0 x as long as basal diameter of the segment; processus terminalis 0.30-0.36 mm long and 1.32-1.66 x as long as base of last antennal segment. Rostrum long and acute, hardly reaching the base of the hindcoxae, ultimate rostral segments 0.24-0.30 mm long and 2.0-2.72 x as long as second joint of hindtarsus and with 12 long and fine hairs. Dorsum of abdomen sclerotised, brownish; dorsal hairs blackish, thick and stiff, with acute apices; longest hair on the anterior tergites 2.40-2.90 x as long as basal diameter of 3rd antennal segment; 7th and 8th tergites each with two long and stiff hairs, with acute apices. Siphunculi jet-black excepting the slightly paler tips. 2.23-3.36 mm long, 0.80-0.96 x as long as body and

15.0-18.2 x as long as their maximum width; curved outward, very indistinctly reticulated, the reticulation extending from base to apex excepting the apical 0.12 portion; hairs on the siphunculi numerous, all with acute apices, long spinules present in distinct transverse rows on the apical 0.12 portion. Cauda obtusely conical, with about 6-8 rather long and fine hairs. Femora unevently yellowish brown, with darker apices, very indistinctly superficially imbricated on one side, and on the other side dorsally and ventrally spinulose on distal 0.60 portion of the forefemora; hindtibiae more distinctly imbricated than the fore- and the middle ones, which are superficially imbricated, 4 apical thorns on the tibiae hardly different from other hairs near the apex, hindtibiae with about 15 stridulatory ridges. Wing veins bordered brown, pterostigma prominent, Media twice-branched, hindwings with 2 oblique veins.

*Measurements in mm :*

	Length	Width	Antenna
1.	2.17	0.90	2.29
2.	2.92	0.97	?
3.	3.04	1.00	2.72
4.	3.02	1.11	2.83
5.	2.99	1.06	2.59
6.	2.57	0.81	2.14
7.	2.96	0.92	2.45
8.	3.19	1.18	2.59
9.	3.14	1.07	2.64
10.	3.06	1.09	2.44

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
1.05	0.27	0.32	0.21 + 0.35	0.24	0.12	2.23
1.17	0.29	0.35	0.21+broken	0.26	0.12	2.80
1.09	0.31	0.33	0.21 + 0.26	0.26	0.11	2.46
1.19	0.27	0.30	0.23 + 0.36	0.26	0.13	2.92
1.07	0.24	0.29	0.23 + 0.31	0.26	0.10	2.81
0.93	0.26	0.29	0.19 + 0.30	0.24	0.11	2.21
1.07	0.30	0.33	0.22 + 0.32	0.26	0.13	2.38
1.21	0.30	0.38	0.21 + 0.33	0.30	0.11	2.73

1.03	0.30	0.30	0.21 + 0.34	0.29	0.12	2.44
1.04	0.30	0.34	0.22 + 0.32	?	0.13	2.57

(1, *Castanopsis* sp., Gangtok, Sikkim, 28.x.1962, C.U. Colls.; 2- 3, *Quercus* sp., Reli, Kalimpong, West Bengal, 28.xi.1969, C.U. Colls 4-5, *Castanopsis* sp., Laitkor Forest, Shillong, Meghalaya, 3.ix.1976, Z.S.I. Colls.; 6, *Quercus* sp., Gangtok, Sikkim, 22.ix.1984, T.U. Colls.; 7-8, an indet. host, Gangtok Sikkim, 22.ix.1984, T.U. Colls.; 9-10, *Quercus* sp., Gangtok, Sikkim, 7.xii.1985, T.U. Colls.).

*Alate oviparous female* : Body elongated deep brown, 3.34 mm long and 1.11 mm as the maximum width. Dorsum of head smooth, with many long, thin and fine hairs. Antennae partly broken, basal segments and basal half of segment III brown, rest pale; segment III 0.96 mm long, with 16 small to big circular rhinaria distributed in a row upto about 0.70 portion of the segment, segment III weakly imbricated; flagellar hairs many, long and fine, longest one on segment III about 4.57 x as long as basal diameter of the segment; Ultimate rostral segments extending little beyond midcoxae, 0.27 mm long and 2.25 x as long as second joint of hindtarsus. Dorsum of abdomen sclerotic, pigmented evenly on 1st-6th tergites, smooth; dorsal hairs long, thin and fine, longest hair on anterior tergites about 3.0 x as long as the basal diameter of 3rd antennal segment; 8th tergite with 2 spinal hairs, about 1.43 x as long as the mentioned diameter. Siphunculi deep brown upto 0.70 portion from the base, rest pale, cylindrical, 2.50 mm long, 0.74 x as long as body and about 15.0 x as long as its maximum width. Genital plate with numerous hairs. Female genitalia well-developed. Otherwise as in alate viviparous female.

*Measurements in mm :*

	Length	Width	Antenna				
1.	3.34	1.11	?				
	Antennal segments			urs	ht2	Siph.	
	III	IV	V	VI			
	0.96	broken	broken	broken	0.27	0.12	2.50

(1, *Quercus* sp., Gangtok, Sikkim, 22.ix.1984, T.U. Colls.).

*Alata male* : Body elongated, paler than the oviparous female, 2.42 mm long and 0.77 mm as the maximum width. Dorsum of head smooth, with less number of long, thin and fine hairs compared to the oviparous female morph. Antennae partly broken, basal segments and basal 0.15-0.40 portion of segment III pale brown, rest pale, segment III nearly smooth on basal half, very weakly imbricated on distal half; flagellar hairs short and long, longest one on segment III about 3.30 x as long as basal diameter of the segment, with 13-14 small

round rhinaria distributed in a row upto about 0.70 portion from the base. Dorsum of abdomen sclerotic, smooth, with spino-pleural segmental transverse bands and corresponding marginal patches on 1st-6th tergites; dorsal hairs mostly longer, few shorter, longest hair on anterior tergites about 1.43 x as long as the basal diameter of 3rd antennal segment. Siphunculi 1.77 mm long and 0.73 x as long as body, deep brown except near the apex. Hindtibiae strongly bent outwardly. Claspers of male genitalia well-developed. Otherwise as in alate oviparous female and alate viviparous female.

This sexual morph was hitherto unknown.

*Measurements in mm*

	Length	Width	Antenna			
1.	2.42	0.77	?			
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.77	broken	broken	broken	0.24	0.11	1.77

(1, *Quercus* sp., Gangtok, Sikkim 22.ix.1984, T.U. Colls.).

*Other morphs* : Not known.

*Materials examined* 1 alate viviparous female from *Castanopsis* sp., Gangtok, Sikkim, 28.x.1962, Coll. A.K. Ghosh; 2 alate viviparous females, from *Quercus rubra*, Sanklang, Sikkim, 3.xi.1974, Coll. P.K. Mondal, 2 apterous and 2 alate viviparous females from *Castanopsis* sp., Laitkor, Shillong, Meghalaya, 3.xi.1976, Coll. M.S. Jyrwa, 1 apterous and 1 alate viviparous females, 1 alate male and 1 alate oviparous female from *Quercus* sp., Gangtok, Sikkim, 22.ix.1984, Coll. S.K. Mahapatra, 2 apterous and alate viviparous females from an indet. host, Gangtok, Sikkim, 22.ix.1984, Coll. S.K. Mahapatra, 2 alate viviparous females from *Quercus* sp., Gangtok, Sikkim, 7 xii.1985, Coll. S.K. Mahapatra.

*Discussion* : Raychaudhuri (1956) provided the description of this species based on specimens from Japan and Taiwan. Raychaudhuri and Chatterjee (1980) reported the species from parts of North-east India.

Raychaudhuri *et al.* (1973) described *M. shinjii* from *Quercus* sp., in north-east India and separated it from *M. tenuicarpus* by shorter antennae and siphunculi. We have examined the materials of both the designated species and found that the difference, mentioned for *M. shinjii* do not really occur (Table 14). *M. tenuicarpus* seem to be commonly occurring in north-east India as several unidentified specimens from Sikkim turned out to be the specimens of

this species. Alate male morph is described here for the first time.

*Biology* : This species has been reported to infest the young shoots of the host plants of Fagaceae. Find of both the sexual morphs along with the viviparous morphs is indicative of a possible holocyclic life cycle in the species at least in parts of north-east India.

*Distribution* : India : Meghalaya, Sikkim, West Bengal; Indonesia, Japan, Taiwan.

*Types* : According to Raychaudhuri (1956), location of types is unknown.

Table 14. Similarities in the morphometry (mm) of *Mollitrichosiphum shinjii* and *M. tenuicorpus* (apterous viviparous morph).

Characters	<i>M. Shinjii</i> *	<i>M. tenuicorpus</i>	<i>M. tenuicoirpus</i> (= <i>shinjii</i> )
L. body	2.37-3.0	1.88-2.54	1.88-3.00
ant.	2.14-2.20	1.99-2.25	1.99-2.25
ant.III	0.91-0.93	0.81-1.10	0.81-1.10
base	0.17-0.21	0.20-0.22	0.17-0.22
p.t.	0.30	0.30-0.38	0.30-0.38
u.r.s.	0.26	0.25-0.27	0.25-0.27
h.t.2	0.12-0.13	0.11-0.12	0.11-0.13
siph	1.61-1.88	1.64-1.97	1.61-1.97
ant./body	0.72-0.77	0.78-1.20	0.72-1.20
p.t./base	1.40-1.76	1.50-1.70	1.40-1.76
u.r.s./h.t.2	2.0-2.16	2.16-2.27	2.0-2.27
siph./body	0.60-0.67	0.65-0.83	0.60-0.83
N	3	10	13

\*described from the holotype only.

79. *Mollitrichosiphum* (*Mollitrichosiphum*) *trilokum* Agarwala  
and Ghosh n.sp.  
(Figs. 49h 52h)

*Apterous viviparous female* : Body pale with a dark median patch on abdomen, 2.72-3.01 mm long and 1.15-1.29 mm as maximum width. Head

pale, smooth; dorsal cephalic hairs long and fine, 5 pairs placed in the middle of anterior portion, other 5 pairs distributed posteriorly. Antennae pale except the apices of segments somewhat dusky, 1.73-2.25 mm long and 0.63-0.74 x as long as body; flagellum gradually more distinctly imbricated apicad, flagellar hairs mostly long and fine, few shorter ones on the outer margin of segment III near the basal half, longest hair on segment III about 4.0 x as long as basal diameter of the segment; processus terminalis 0.30 mm long and 1.50-1.57 x as long as the base of last antennal segment. Rostrum reaching little beyond hindcoxae, tapering; ultimate rostral segments 0.26-0.28 mm long and 2.15-2.36 x as long as second joint of hindtarsus, segment 4 bearing 14 long and fine accessory hairs. Dorsum of abdomen pale brown, smooth, with a dark median pigmented shield-like patch extending on 2nd-5th tergites leaving the marginal area free, anteriorly this patch extends in the 1st tergite in the spinal region only, pleurally the patch takes crystalline appearance; ventrum spinulose laterally; dorsal hairs long and fine, longest hair on anterior tergites 1.65 x as long as the basal diameter of 3rd antennal segment; 7th and 8th tergites each with 2 hairs, of almost similar lengths as on anterior tergites. Siphunculi pale throughout, cylindrical, 1.60-1.92 mm long, 0.58-0.63 x as long as body and about 13.0 x as long as their maximum width; siphuncular hairs many, all long and fine; spinulose in transverse rows near the apex. Cauda semilunar, with 7-8 hairs. Legs pale brown; hindtibiae with 12-14 stridulatory ridges on its inner margins, bent outwardly.

*Measurements in mm*

	Length	Width	Antenna
1.	2.72	1.15	1.73
2.	3.01	1.29	2.25
3.	2.84	1.23	?

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.73	0.21	0.28	0.19 + 0.30	0.26	0.11	1.60
1.00	0.20	0.30	0.20 + 0.30	0.28	0.13	1.92
0.83	broken	broken	broken	0.27	0.12	1.69

(1-3, *Quercus* sp., Gangtok, Sikkim, 22.ix.1984, T.U. Colls.).

*Other morphs* : Not known.

*Materials examined* Holotype apterous viviparous female from *Quercus* sp., Gangtok, Sikkim, 22.ix.1984, Coll. S.K. Mahapatra; Paratypes : 2 apterous

viviparous females, collection data same as for the holotype.

*Discussion* : The new species resembles *M. nigriabdominalis* in general morphology and in having a central brown patch on the dorsum of abdomen but differs in the following aspect :

1. central brown patch much darker and extending more pleurally,
2. antennae and siphunculi much longer,
3. flagellar hairs much longer.

*Biology* : Not known.

*Distribution* : India : Sikkim.

*Types* : In the collection of the Biosystematics Laboratory, Department of Life Science, Tripura University, Agartala, Tripura, India.

80. *Mollitrichosiphum (Metatrichosiphon) buddleiae* Ghosh, Banerjee and Raychaudhuri  
(Figs. 49 a 56 a)

1971. *Mollitrichosiphum (Metatrichosiphon) buddleiae* Ghosh, A.K., Banerjee, H., and Raychaudhuri, D.N., *Proc. Zool. Soc. Calcutta*, 26 : 107.
1980. *Mollitrichosiphum (Metatrichosiphon) buddleiae*, Raychaudhuri, D.N., and Chatterjee, M., In "taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N., 356.
1980. *Mollitrichosiphum (Metatrichosiphon) acutihirsutum* Maity, S.P. and Chakrabarty, S., *Annals Zoologici*, 35 : 312 (New syn.).
1986. *Mollitrichosiphum (Metatrichosiphon) acutihirsutum*, Saha, S. and Chakrabarty, S., *Entomon*, 11 : 199.

*Apterous viviparous female* : Body pale to dark brown, elongated, 1.90-2.44 mm long and 0.90-1.15 mm as maximum width. Head smooth, with many long and fine hairs. Antennae 6-segmented, 1.04-1.56 mm long and 0.47-0.64 x as long as body, concolorous with the head but darker on segments V and VI; flagellum smooth on basal 0.30 portion of segment III, rest gradually more distinctly imbricated, hairs on flagellum long and short with acute apices, much fewer on inner margin, hairs on anterior tergites 0.10-0.11 mm long and 2.30-4.10 x as long as the basal diameter of 3rd antennal segment; processus terminalis 0.16-0.22 mm long and 1.10-2.0 x as long as base of last antennal segment. Rostrum reaches 2nd abdominal tergite; ultimate rostral segments 0.15-0.17 mm long and 1.16-1.73 x as long as second segment of hindtarsus and with 10-12 accessory hairs. Dorsum of abdomen concolorous with the rest

of the body, smooth, bears many long and fine hairs, hairs on anterior tergites 0.10-0.11 mm long and 2.50-3.20 x as long as the basal diameter of 3rd antennal segment; 7th and 8th tergites each with 2 long and fine hairs, these 2.50 x and 2.60- 3.0 x as long as the mentioned diameter respectively; venter of abdomen evenly spinulose. Siphunculi yellowish brown to deep brown, always darker than colour of body, dusky on apical 0.20 portion, 0.69-1.37 mm long, 0.28-0.47 x as long as body and 8.50- 10.0 x as long as their maximum width; slightly curved outward, hairs on siphunculi with acute apices; surface of siphunculi with rows of spinules which are more dense apically. Cauda brown, rounded. Legs concolorous with the body but apices of tarsi darker; femora with some spinulose imbrications, fore- and midtibiae almost smooth, hindtibiae with 18-22 blunt ridges almost over the entire length.

*Measurements in mm :*

	Length	Width	Antenna
1.	2.44	1.15	?
2.	2.42	1.15	1.19
3.	2.15	0.97	broken
4.	1.94	0.96	1.08
5.	2.04	0.97	1.05
6.	2.04	1.00	1.17
7.	2.00	0.98	1.18
8.	1.90	0.95	1.08

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.48	0.14	0.18	broken	0.16	0.12	1.11
0.42	0.13	0.18	0.14 + 0.16	0.17	0.13	0.69
broken	broken	broken	broken	0.17	0.11	0.92
0.36	0.11	0.15	0.11 + 0.21	0.17	0.11	0.84
0.32	0.11	0.15	0.14 + 0.19	0.17	0.11	0.77
0.38	0.15	0.16	0.15 + 0.19	0.17	0.11	0.78
0.36	0.13	0.16	0.13 + 0.19	0.17	0.11	0.80
0.34	0.12	0.15	0.11 + 0.22	0.16	0.10	0.83

(1-3, *Buddleia* sp., Pelling, Sikkim, 14.iii.1970, C.U. Colls., 4- 7, *Alnus nepalensis*, Gourikund, Uttar Pradesh, 1.vi.1978, K.U. Colls.; 8, *A. nepalensis*,

Gourikund, Uttar Pradesh, 31.v.1978, K.U. Colls.).

*Alate viviparous female* : Body 1.92-2.37 mm long and 0.83-0.98 mm as maximum width. Head dark brown, dorsal hairs about 3.40-3.70 the basal diameter of antennal segment III. Antennae dark brown to blackish brown, 1.07-1.54 mm long and 0.67-0.78 x as long as body; segment III with 14-16 secondary rhinaria distributed over the entire segment, longest hair on segment III 0.12-0.14 mm long and 40-50 x as long as basal diameter to the segment. Abdominal tergites 2-6 with a brownish patch, 7th and 8th tergites each with a separate patch, longest hair on anterior tergites about 0.11 mm long and 3.30-3.70 x as long as basal diameter of antennal segment III; longest hairs on 7th and 8th tergites about 3.0-3.62 x and 2.88-3.12 x as long as the mentioned diameter respectively. Siphunculi long, cylindrical, black except the very basal 0.40 portion which is pale, 0.80- 1.51 mm long and 0.57-0.65 x as long as body, hairs on siphunculi long and short. Cauda with 4 hairs. Femora brown, tibiae and tarsi dark brown to blackish brown, with 20-26 stridulatory ridges. Wing venation normal. Other characters as in apterous viviparous female.

*Measurements in mm* :

	Length	Width	Antenna			
1.	2.37	0.91	broken			
2.	2.27	0.98	1.54			

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
broken.	broken	broken	broken	0.16	0.10	1.51
0.60	0.20	0.21	0.16 + 0.23	0.17	0.10	1.30

(1, *Buddleia* sp., Pelling, Sikkim, 14.iii.1970, C.U. Colls.; 2, *Alnus nepalensis* Gourikund, Uttar Pradesh, 31.v.1978, K.U. Colls.).

*Other morphs* : Not known.

*Materials examined* : 3 apterous and 2 alate viviparous females from *Buddleia* sp., Pelling, Sikkim, 14.iii.1970, Coll. H. Banerjee; 1 apterous and 1 alate viviparous females from *Alnus nepalensis*, Gourikund, Uttar Pradesh, 31.v.1978, Coll. S.P. Maity; 4 apterous viviparous females from *A. nepalensis*, Gourikund, Uttar Pradesh, 1.vi.1978, Coll. S.P. Maity.

*Discussion* : Ghosh *et al.* (1971) described this species from eastern Himalaya of Sikkim and distinguished it from its closest ally *M.alni* in having shorter and darker siphunculi besides other differences in the morphometry. Maity and Chakrabarti (1980) described *M. acutihirsutum* from western

Himalaya of Uttar Pradesh and distinguished this species from *M. buddleiae* in having longer antennae, longer processus terminalis and longer hairs on anterior tergites. After examining the paratypes of *buddleiae* and *acutihirsutum*, we did not find any such difference in the morphology and morphometry of the two designated species (Table 15) which may be considered to demarcate the two populations. Therefore, following the law of priority *M. acutihirsutum* is treated here as synonym of *M. buddleiae*.

*Biology* : Not known.

*Distribution* : India Sikkim, Uttar Pradesh.

*Types* : In the collection of the Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India.

Table 15. Similarities in the morphometry (mm) of *Mollitrichosiphum acutihirsutum* and *M. buddleiae* (apterous viviparous morph).

Characters	<i>M. acutihirsutum</i>	<i>M. buddleiae</i>	<i>M. buddleiae</i> (= <i>acutihirsutum</i> )
L. body	1.89-2.24	2.15-2.44	1.89-2.44
ant.	1.05-1.56	1.04-1.19	1.04-1.56
ant.III	0.34-0.58	0.42-0.48	0.34-0.58
base	0.11-0.16	0.12-0.16	0.11-0.16
p.t.	0.19-0.23	0.14-0.23	0.14-0.23
u.r.s.	0.15-0.17	0.16-0.17	0.15-0.17
h.t.2	0.10-0.11	0.11-0.13	0.10-0.13
siph	0.77-1.37	0.69-1.11	0.69-1.37
ant./body	0.51-0.64	0.47-0.55	0.47-0.64
p.t./base	1.26-2.0	1.14	1.14-2.0
u.r.s./h.t.2	1.16-1.73	1.33-1.54	1.16-1.73
siph./body	0.37-0.47	0.28-0.45	0.28-0.47
L. Siph./max. width	8.50-10.0	9.0-10.0	8.50-10.0
L.hair ant. terg.	3.0-4.0	2.50-4.25	2.50-4.25
No. stridulatory ridges on hindtibiae	18-25	18-22	18-25
N	12	4	16

81. *Mollitrichosiphum (Metatrichosiphon) kazirangi* Ghosh, A.K.  
(Figs 49b 56b)

1974. *Mollitrichosiphum (Metatrichosiphon) kazirangi* Ghosh, A.K., *Oriental Ins.*, 8 : 166.
1980. *Mollitrichosiphum (Metarichosiphon) kazirangi*, Raychaudhuri, D.N. and Chatterjee, M. In "Taxonomy of the aphids of north-east india and Bhutan" (ed) Raychaudhuri, D.N., 357.

*Apterous viviparous female* : Body dark brown, 1.96 - 2.67 mm long and 1.01 - 1.35 mm as maximum width. Head brown, antennae 5 or 6 segmented, basal segments dark brown, 0.97 - 1.70 mm long and 0.49 - 0.63 x as long as body; flagellum pale except on apical 0.50 portion of segment V and base of segment VI, imbricated, flagellar hairs long and acute, those on inner margins much shorter than the ones on outer margins, longest hair on segment III 3.70 - 4.70 x as long as basal diameter of the segment; processus terminalis 0.16 - 0.35 mm long and 1.60 - 1.70 x as long as base of the last antennal segments. Rostrum reaches 2nd segment of abdomen; ultimate rostral segments acute, 0.23 - 0.26 mm long and 1.76 - 2.16 x as long as second joint of hind tarsus, segment 4 with 12 - 14 accessory hairs. Dorsum of abdomen dark, sclerotic, spinulose, with an oval sclerotic patch on 2nd - 6th tergites; 7th and 8th tergites each with a separate patch leaving a pale area between them; hairs on dorsum long and short, with acute, acuminate and furcated apices, longest hair on anterior tergites 0.10 - 0.15 mm long and 3.40 - 4.20 x as long as the basal diameter of 3rd antennal segment, 7th and 8th tergites each with two hairs with acute apices. Siphunculi stout, dark brown, curved outwards, 0.70 - 1.34 mm long, 0.35 - 0.52 x as long as body and 6.4 - 7.0 x as long as their maximum width; sparsely spinulose on basal 0.30 portion and densely so on apical 0.20 portion, rest nearly smooth; siphuncular hairs with acute apices. Cauda dusk brown. Legs pale except the tarsi which are dusky; femora, fore- and mid-tibiae nearly smooth; hindtibiae with 20-32 stridulatory ridges on basal 0.75 - 0.80 portions.

*Measurements in mm :*

	Length	Width	Antenna
1.	2.67	1.39	1.70
2.	2.46	1.30	1.47
3.	2.57	1.35	1.59
4.	2.50	1.30	1.51

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.63	0.18	0.20	0.17 + 0.35	0.24	0.13	1.29
0.57	0.15	0.18	0.16 + 0.26	0.23	0.12	1.23
0.62	0.17	0.20	0.15 + 0.27	0.23	0.13	1.34
0.60	0.14	0.19	0.12 + 0.30	0.23	0.11	1.27

(1-4, indet. host, Kaziranga Sanctuary, Assam, 19.xii.1972, Z.S.I. Colls.).

*Alate viviparous female* : Body black, 2.30 - 2.54 mm long and 0.96 - 1.12 mm as maximum width. Head dark brown, bearing long and acute dorsal hairs as in apterae. Antennae black and 6 - segmented, 1.64 - 1.73 mm long and 0.69 - 0.75 x as long as body; segment III with 15 - 20 round to oval accessory rhinaria over its entire length, segments IV and V without any accessory rhinarium; flagellar hairs with acute apices, longest hair on segment III 5.20 - 5.80 x as long as the basal diameter of the segment. Rostrum reaching 2nd segment of abdomen; ultimate rostral segments 0.23 - 0.24 mm long and 2.0 - 2.09 x as long as second joint of hindtarsus. Dorsum of abdomen with broad segmental spino- pleural sclerotic bands on 1st - 8th tergites, margins of which touch one another and apparently appearing as a broad patch, areas between 1st and 2nd, 2nd and 3rd tergites remain pale, besides spino - pleural bands, paired marginal sclerotic patches present on 1st - 6th tergite, ante- siphuncular areas pale; dorsal hairs mostly with acute apices, longest one on anterior tergites 3.6 - 4.2 x as long as basal diameter of 3rd antennal segment. Siphunculi black, slender, 1.57 - 1.70 mm long, 0.65 - 0.73 x as long as body and 13.5 - 15.0 x as long as their maximum width; siphuncular hairs acute. Legs brown with apical 0.50 - 0.57 portion of femora, bases and apices of tibiae and whole of tarsi dark; hindtibiae with 28 - 32 stridulatory ridges, restricted on basal 0.52 - 0.75 portion. Wing veins conspicuous, forewings with stigma dark, as also bases of cubitus, anal and radius, radial sector gently curved.

*Measurements in mm* :

	Length	Width	Antenna
1.	2.30	0.96	1.73
2.	2.37	1.04	1.64

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.69	0.20	0.21	0.15 + 0.30	0.23	0.11	1.70
0.66	0.18	0.19	0.15 + 0.30	0.24	0.12	1.57

(1, 2, indet. host, Kaziranga Sanctuary, Assam, 17.xii.1972, Z.S.I. Colls.).

*Other morphs* : Not known.

*Distribution* : 6 apterous viviparous females from an indet. host, Kaziranga Sanctuary, Assam, 19.xii.1972, Coll. A.K. Ghosh; 2 alate viviparous females from an indet. host, Kaziranga Sanctuary, Assam, 21.xii.1972 Coll. A.K. Ghosh.

*Discussion* : Ghosh, A.K. (1974) distinguished *M. kazirangi* from its congeners under the genus in having dorsal abdominal hairs with mixed apices. In this character, *kazirangi* resembles *M. rhusae* (Ghosh, A.K.) but the two species differ in the length of ultimate rostral segments and its ratio with the length of body.

*Biology* : The species infested young leaves of the unidentified tree and was attended by red ants.

*Distribution* : India : Meghalaya.

*Type* : In the collection of the Zoological Survey of India, Calcutta, India.

82. *Mollitrichosiphum* (*Metatrichosiphon*) *montanum* (van der Goot)  
(Figs. 49c 56c)

1917. *Trichosiphum montanum* Goot, p., v.d., *Rec. Ind. mus.*, 13 : 179.
1930. *Greenidea montanum*, Takahashi, R., *Trans. Nat. Hist. Soc. Formosa*, 20 : 323.
1937. *Paratrichosiphum montanum*, Takahashi, R., *Philipp. Jour. Sci.*, 63 : 6.
1956. *Trichosiphum montanum* Raychaudhuri, D.N., *Zool. verh. Leiden*, 31 : 103.
1970. *Mollitrichosiphum* (*Metatrichosiphon*) *alni* Ghosh, A.K., Ghosh, M.R., and Raychaudhuri, D.N., *Oriental Ins.*, 4 : 200 (New Syn).
1978. *Mollitrichosiphum* (*Metatrichosiphon*) *alnifoliae* Chakrabarty, S. and Raychaudhuri, D.N., *Entomon*, 3 : 98 (New Syn.).
1980. *Mollitrichosiphum* (*Metatrichosiphon*) *alni*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N., 356.
1986. *Mollitrichosiphum* (*Metatrichosiphon*) *alnifoliae*, Saha, S. and Chakrabarti, S., *Entomon*, 11 : 200.

*Apterous viviparous female* : Body pale, elongate, 1.77 - 2.24 mm long and 0.70 - 0.89 mm as maximum width. Dorsum of head brown, with many long and fine hairs. Antennae 6-segmented, pale brown, 1.18 - 1.70 mm long and 0.56 - 0.69 x as long as body; flagellum imbricated, flagellar hairs long and short, with acute apices, longest one of segment III 0.14 - 0.19 mm long and 5.50 - 6.02 x as long as the basal diameter of the segment; processus terminalis 0.20 - 0.28 mm

long and 1.16 - 1.64 x as long as base of the last antennal segment. Rostrum reaches almost 2nd abdominal tergite; ultimate rostral segments 0.17 - 0.23 mm long and 1.72 - 2.30 x as long as second joint of hind tarsus and bears 10 accessory hairs. Dorsum of abdomen completely pale and smooth, bearing long and fine hairs, longest one on anterior tergites about 6.0 x as long as basal diameter of 3rd antennal segment; 7th and 8th tergites each with two hairs, which are 5.50 - 6.0 x and 4.0 - 4.25 x as long the mentioned diameter respectively. Siphunculi long, slender, pale yellowish, 1.20 - 1.80 mm long, 0.52 - 0.83 x as long as body and 10.38 - 20.50 x as long as their maximum width; longest hair on siphunculi 2.0 - 2.50 x as long as basal diameter of siphunculi; spinules scattered over the entire surface of siphunculi but these are dense more near the apical 0.10 portion. Cauda with 6 - 7 fine hairs. Legs of same colour as the siphunculi; hindtibiae with 30 - 40 distinct stridulatory ridges.

*Measurements in mm :*

	Length	Width	Antenna				
1.	2.17	0.89	1.23				
2.	2.24	0.87	1.38				
3.	1.77	0.70	1.18				
4.	1.14	0.83	1.26				
5.	2.15	0.86	?				
6.	1.94	0.75	1.33				
7.	2.15	0.86	1.44				
8.	2.11	0.80	1.46				
9.	2.04	0.80	1.28				
10.	2.04	0.80	1.41				
11.	2.06	0.80	1.40				
12.	2.06	0.82	1.26				
13.	1.96	0.75	1.25				
14.	1.90	0.73	?				
	Antennal segments			urs	ht2	Siph.	
	III	IV	V	VI			
	0.36	0.14	0.19	0.16 + 0.21	0.19	0.10	1.20
	0.43	0.16	0.21	0.17 + 0.27	0.21	0.10	1.77
	0.38	0.15	0.17	0.15 + 0.20	0.18	0.10	1.30
	0.42	0.14	0.19	0.16 + 0.23	0.20	0.11	1.35
	0.43	0.18	0.20	0.17+broken	0.20	0.11	1.60

0.42	0.16	0.20	0.18 + 0.23	0.20	0.11	1.61
0.45	0.19	0.23	0.19 + 0.26	0.23	0.11	1.63
0.42	0.19	0.23	0.17 + 0.28	0.23	0.10	1.62
0.45	0.15	0.19	0.15 + 0.21	0.22	0.11	1.54
0.43	0.16	0.22	0.18 + 0.26	0.23	0.11	1.70
0.52	0.14	0.20	0.17 + 0.23	0.19	0.11	1.67
0.41	0.15	0.19	0.16 + 0.21	0.19	0.10	1.45
0.42	0.15	0.17	0.15 + 0.23	0.19	0.10	1.54
0.36	broken	broken	broken	0.17	0.09	1.42

(1, indet. host, Darjeeling, West Bengal, 1956, B.M.Colls.; 2, indet. host, Ranikhet, Uttar Pradesh, 25.v.1968, Z.S.I. Colls.; 3, *Alnus* sp., Shillong, Meghalaya, 31.vii.1969, C.U.Colls.; 4, *Alnus nepalensis*, Kausani, Uttar Pradesh, 27.v.1969, K.U.Colls., 5, indet. host, Darjeeling, West Bengal, 14.xi.1969, Z.S.I.Colls.; 6, *Alnus nepalensis*, Durbin, West bengal, 18.vi.1974, C.U. Colls.; 7 - 10, indet. host, Shillong, Meghalaya, 14.ix.1977, Z.S.I. Colls., 11 - 12, *Alnus* sp., Gangtok, Sikkim, 22.ix.1984., T.U. Colls.; 13 - 14, *Alnus* sp., Kalimpong, West Bengal, 18.ix.1984, T.U. Colls.).

*Alate viviparous female* : Body elongated, 2.04 - 2.44 mm long and 0.78 - 0.87 mm as maximum width. Head brownish. Antennae darker than head, 1.45 - 1.70 mm long and 0.68 - 0.73 x as long as body, flagellum imbricated, hairs on flagellum long and short with acute apices, longest one on segment III about 7.0 x as long as basal diameter of the segment, segment III with 10 - 18 oval accessory rhinaria in a row extending almost over the entire length; processus terminalis 0.21 mm long and 1.21 - 1.31 x as long as the base of last antennal segment. Dorsum of abdomen pale, bearing marginal sclerites on 1st - 5th tergites and a 'V' shaped sclerotic area, leaving the spinal region free between 3rd - 6th tergites, separate transverse sclerites occur on 1st, 2nd and 8th tergites; abdominal venter spinulose. Siphunculi dark brown with base pale. 1.61 - 2.0 mm long and 0.79 - 0.88 x as long as body and 25.0 - 30.0 x as long as their maximum width. Legs pale but tibiae and tarsi brown; hindtibiae with 40 - 45 stridulatory ridges. Forewings with radial sector somewhat curved. Otherwise as in apterous viviparous morph.

*Measurements in mm* :

	Length	Width	Antenna
1.	2.19	0.86	1.50
2.	2.04	0.78	1.45
3.	2.17	0.82	1.56

4.	2.19	0.77	?
5.	2.44	0.87	1.56

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.53	0.19	0.21	0.19 + 0.23	0.17	0.10	1.94
0.42	0.19	0.22	0.17 + 0.21	0.19	0.10	1.61
0.53	0.21	0.24	0.19 + 0.25	0.19	0.10	1.92
0.58	0.19	0.21	0.15+broken	0.19	0.10	1.84
0.58	0.20	0.23	0.18+broken	0.19	0.10	2.06

(1, indet. host, Darjeeling, West Bengal, 1956, B.M. Colls.; 2, *Alnus nepalensis*, Kausani, Uttar Pradesh, 27.v.1969, K.U.Colls.; 3, *A.nepalensis*, Durbin, West Bengal, 18.v.1974, C.U. Colls., 4, *Alnus* sp., Gangtok, Sikkim, 22.ix.1984, T.U. Colls.; 5, *Alnus* sp., Kalimpong, West Bengal, 18.ix.1984, T.U. Colls.).

*Other morphs* Not known.

*Materials examined* 1 apterous and 1 alate viviparous females from an indet. host, Darjeeling, West Bengal, ? 1956, Coll. A.N. Basu; 1 apterous viviparous female from an indet. host, Ranikhet, Uttar Pradesh, 25.v.1968, Coll. S.G. Rajasingh; 1 apterous viviparous female from *Alnus* sp., Shillong, Meghalaya, 31.vii.1968. Coll. R. Basu; 1 apterous and 1 alate viviparous females from *A. nepalensis*, Kausani, Uttar Pradesh, 27.v.1968, Coll. S. Chakrabarti; 1 apterous viviparous female from an indet. host, Darjeeling, West Bengal, 14.xi.1969, Colls S.G. Rajasingh; 1 apterous and 1 alate viviparous females from *A. nepalensis*, Durbin, West Bengal, 18.v.1974, Coll. M.R. Ghosh; 4 apterous viviparous females from an indet. host, Shillong, Meghalaya, 14.ix.1977, Coll. A.C. Sukla; 2 apterous and 1 alate viviparous females from *Alnus* sp., Gangtok, Sikkim, 22.ix.1984, Coll. S.K. Mahapatra, 2 apterous and 1 alate viviparous females from *Alnus* sp., Kalimpong, West Bengal, 18.ix.1984, Coll. S.K. Mahapatra.

*Discussion* van der Got (1917) described the species as *Trichosiphum montanum* based on materials collected in north - east India. Raychaudhuri (1956) reported the loss of the type materials and reproduced the brief description of alate viviparous female morph from the literature.

We have examined specimens in the collection of the Natural History Museum, London (Slide No. B.M. 1956-697 No.5; 198/56) which are desig-

nated as *Metatrichosiphum montanum* and collected from north east India by A.N. Basu. Eastop and Lambers (1976) considered *Trichosiphum montanum* to be a species of *Mollitrichosiphum* (*Metatrichosiphon*).

Ghosh *et al.* (1970) described *Mollitrichosiphum* (*Metatrichosiphon*) *alni* from the same area and distinguished it from many other species under the genus but without any regard to *montanum*. Apparently, they (op. cit.) were unaware of this species. Chakrabarti and Raychaudhuri (1978) described another species *alnifoliae* under the subgenus *Metatrichosiphon* and distinguished it from *alni* chiefly by the difference in the thickness of the siphunculi in the two species. We have examined the authentic materials of *montanum*, *alni*, *alnifoliae* and two slides containing specimens designated as *M. alnivorum* (nomen nudum) and have found strong similarities in their general morphology, host association and morphometry (Table - 16). Some of the differences evident in the morphometry may be attributable as 'local variations' in the distribution range of the species along the Himalaya.

**Biology :** The species chiefly infests young and tender shoots of *Alnus* species and is attended by ants. Find of both the sexual morphs in the same host is suggestive of a possible holocyclic life cycle at least in the part of its distribution range.

**Distribution :** India : Meghalaya, Sikkim, Uttar Pradesh, West Bengal; Nepal.

**Types :** Since the original type materials of *Trichosiphum montanum* is reported to be lost (Raychaudhuri, 1956), the specimens collected in Darjeeling from North East India, now in the deposition of the Natural History Museum, London, is designated as the *Neotype*.

Table 16. Similarities in the morphometry (mm) of four species of *Mollitrichosiphum* (apterous viviparous morph)

Characters	Species of <i>Mollitrichosiphum</i>				
	<i>montanum</i>	<i>alni</i>	<i>alnifoliae</i>	<i>alnivorum</i> *	<i>montanum</i> ** (revised)
L. body	2.17	1.94 - 2.24	2.04 - 2.44	1.77-2.15	1.77 - 2.24
ant.	1.23	1.28 - 1.56	1.26 1.20	1.18	1.18-1.56
ant.III	0.36	0.46 0.53	0.42 0.54	0.38-0.43	0.36-0.53
base	0.16	0.15 0.19	0.16	0.15-0.17	0.15-0.19
p.t.	0.21	0.21 0.30	0.21 0.23	0.20	0.20 0.30
u.r.s.	0.19	0.19 0.23	0.20 0.21	0.18 + 0.20	0.18 + 0.23

h.t.2	0.10	0.10 - 0.11	0.11	0.10 - 0.11	0.10	0.11		
siph.	1.20	1.54	1.77	1.30 - 1.35	1.30	1.60	1.20 - 1.77	
ant./body	0.56	0.62 - 0.69	0.50 - 0.64	0.60	0.50 - 0.69			
p.t/base	1.31	1.23	1.64	1.27 - 1.43	1.33	1.23	1.64	
u.r.s./h.t.2	1.90	1.81	2.30	1.68 - 2.0	1.80	1.68 - 2.30		
siph./body	0.55	0.75	0.83	0.52	0.65	0.73	0.52	0.83
siph/W.head	3.0	3.75 - 4.31	2.70	3.50	3.17	2.70	4.31	
N	1	8	6	2	17			

\*Nomen dubium

\*\* *M.montaum*= *alni*= *alnifoliae*= *alnivorum n. d.*83. *Mollitrichosiphum (Metatrichosiphon) nandii* Basu, A.N.

(Figs. 49d - 56d)

1964. *Mollitrichosiphum (Metatrichosiphon) nandii* Basu, A.N., *J. Linn. Soc. (Zool.)*, 45 : 233.
1980. *Mollitrichosiphum (Metatrichosiphon) nandii*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N. 357.

*Apterous viviparous female* : Body elongated, 2.29 - 2.94 mm long and 1.07 - 1.36 mm as maximum width. Head smooth. Antennae brownish, 1.26 - 1.53 mm long and 0.52 - 0.55 x as long as body, with the apices of segments darker; flagellar hairs mainly directed inwards, with acute to subacute apices, the longest one on segment III 3.60 - 4.40 x as long as the basal diameter of the segment; processus terminalis 0.21 - 0.28 mm long and 1.30 - 1.70 x as long as base of last antennal segment. Rostrum reaching nearly to the middle of the body; ultimate rostral segments 0.17 - 0.22 mm long, 1.20 - 1.46 as long as second joint of hindtarsus and with 11 - 14 short and fine accessory hairs. Dorsum of abdomen pale brownish, sclerotic, anterior tergites locally spinulose; dorsal hairs long, with acute apices, longest hair on anterior tergites about 3.40 - 4.40 x as long as the basal diameter of 3rd antennal segment; 7th tergite with 9 - 12 hairs, 2.8 - 4.0 x as long as the mentioned diameter; 8th tergite with 2 hairs, 2.4 - 3.2 x as long as the mentioned diameter. Siphunculi brown, distally curved outwards, 1.09 - 1.28 mm long 0.43 - 0.51 x as long as body and 9.0 - 12.8 x as long as their maximum width; hairs on siphunculi mostly long, all with fine apices, longest hair 2.20 - 3.0 x as long as the basal diameter of siphunculi; spinules present throughout the length in distinct

transverse rows near the apices. Cauda broadly semi-oval to obtusely conical, with 6 - 8 moderately long and stout hairs. Legs brown; femora with sipnulose striae ventrally; fore- and middle tibiae smooth, hindtibiae with 20 - 35 stridulatory ridges.

*Measurements in mm :*

	Length	Width	Antenna			
1.	2.94	1.36	1.53			
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.54	0.19	0.21	0.17 + 0.26	0.19	0.13	1.28

(1, *Alnus nepalensis*, Kamshi forest, Kalimpong, West Bengal, date unknown, Slide No. PLK - 2954, C.U.Colls.).

*Alate viviparous female* : Body elongated, 2.33 - 2.96 mm long and 0.96 - 1.21 mm as maximum width. Frontal tubercles poorly developed. Antennae blackish brown with the very bases of segments III, IV and V conspicuously paler; segment III almost smooth, the rest of the flagellum distinctly imbricated, segment III with 13 - 17 small roundish to transversely oval rhinaria in a row along the entire length of the segment, longest hairs on segment III 4.40 x as long as the basal diameter of the segment. Apex of rostrum reaching the hindcoxae. Siphunculi blackish brown, pale at the base, slightly curved outwards near the apex, 1.61 - 1.84 mm long, 0.58 - 0.75 x as long as body and 17.1 - 23.0 x as long as their maximum width; longest hair 6.60 - 7.20 x as long as the basal diameter of the 3rd antennal segment; spinules present in regular transverse rows near the apex, these are sparse near the base. Cauda transversely oval to obtusely conical with 6 - 10 hairs. Legs with femora pale, darker near the apices; tibiae darker than femora, hindtibiae with 23 - 40 stridulatory ridges. Wings with radial sector curved, pterostigma brown to blackish brown, subscosta brownish.

*Measurements in mm :*

	Length	Width	Antenna			
1.	2.96	1.21	1.85			
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.77	0.23	0.26	0.17 + 0.25	0.20	0.12	1.73

(1, *A. nepalensis*, Kamshi forest, Kalimpong, West Bengal, date unknown, C.U.Colls.).

*Other morphs* Not known.

*Materials examined* : 1 apterous and 1 alate viviparous females and 3 nymphs from *Alnus nepalensis*, Kamshi forest, Kalimpong, West Bengal, date and collector's name unknown (Slide No. PLK 2954).

*Discussion* : Basu, A.N. (1964) distinguished *M. nandii* from *M. nitakaensis* (Takahashi) by the presence of spinules on the anterior tergites of abdomen and more number of hairs on 7th tergite. Since then another species *M. kazirangi* (Ghosh) has been described which resembles *M. nandii* (Basu, A.N.) in having abdominal dorsum locally spinulose but differs in having only 2 hair on the 7th tergite.

*Biology* : This species has been reported to attack the tender portion of shoots, particularly the leaf axils of its host and made heavy infestations. The species is attended by ants.

*Distribution* : India : West Bengal, Sikkim.

*Types* : Deposited in the Section of Entomology, State Agricultural Research Institute, Calcutta, India.

#### 84. *Mollitrchosiphum* (*Metarichosiphon*) *rhusae*, Ghosh, A.K.

(Figs. 49f - 52f, 53e - 56e)

1974. *Mollitrchosiphum* (*Metarichosiphon*) *rhusae* Ghosh, A.K., *Oriental Ins.*, 8 : 168.
1976. *Mollitrchosiphum* (*Metarichosiphon*) *rhusae*, Ghosh, A.K., *Oriental Ins.*, 10 : 44.
1980. *Mollitrchosiphum* (*Metarichosiphon*) *rhusae*, Raychaudhuri, D.N. and Chatterjee, M., In "Taxonomy of the aphids of north-east India and Bhutan" (ed) Raychaudhuri, D.N., 357.

*Apterous viviparous female* Body pale, 2.16 - 2.50 mm long and 1.18 - 4.36 mm as maximum width. Head pale, dorsal cephalic hairs with actual apices. Antennae pale, 6-segmented, 1.26 - 1.65 mm long and 0.58 - 0.66 x as long as body; flagellum gradually more distinctly imbricated from apical 0.60 portion of segment III to apical, rest nearly smooth; flagellar hairs many, with acute apices, more numerous on outer margins, longer hair on segment III 3.70 - 4.10 x as long as basal diameter of the segment; processus terminalis 0.23 - 0.29 mm long and 1.60 - 2.09 x as long as base of the last antennal segment. Rostrum pale, reaches second abdominal segment; ultimate rostral segment slender, acute, 0.29 - 0.33 mm long and 2.30 - 2.75 x as long as second joint of hind tarsus. Dorsum of abdomen pale, nearly smooth, anterior half of abdominal venter spinulose; dorsal hairs short and thick, with acute or acuminate

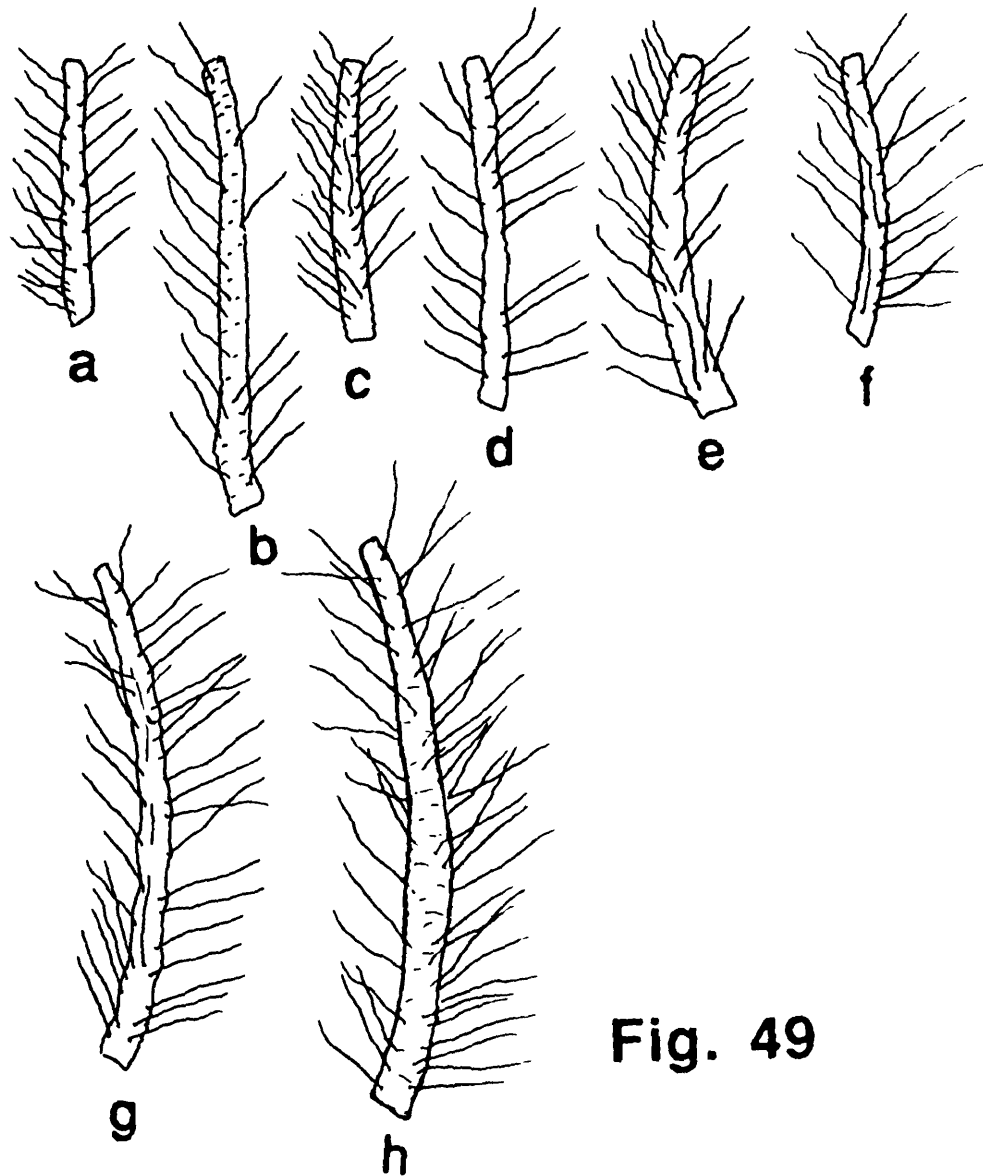


Fig. 49

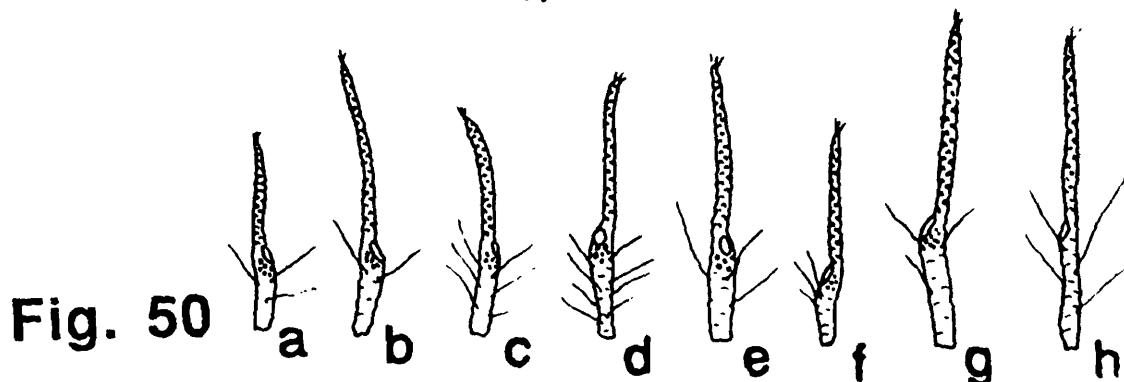


Fig. 50

Figs. 49a-h : Species of *Mollitrichosiphum*, apterous viviparous female morph : antennal segment III. a *buddleiae*, b *kazirangi*, c *montanum*, d *nandii*, e *nigriabdominalis*, f *rhusae*, g *tenuicorpus*, h *trilokum*. Figs. 50a-h : Species of *Mollitrichosiphum*, apterous viviparous female morph : processus terminalis. a *buddleiae*, b *kazirangi*, c *montanum*, d *nandii*, e *nigriabdominalis*, f *rhusae*, g *tenuicorpus*, h *trilokum*

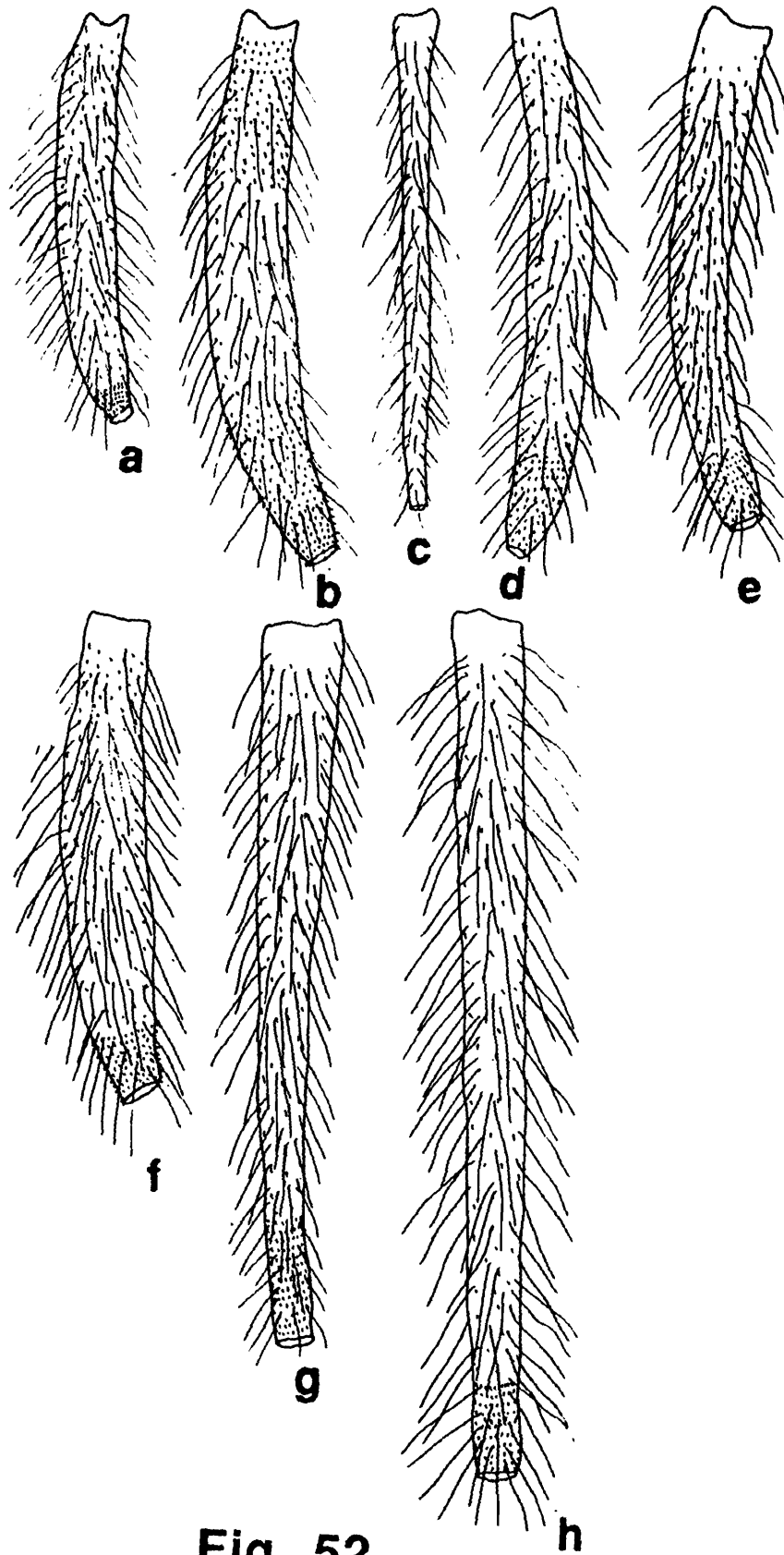


Fig. 52

Figs. 52 a-h : Species of *Mollitrichosiphum*, apterous viviparous female morph : Siphunculi. a *buddleiae*, b *kazirangi*, c - *montanum*, d *nandii*, e *nigriabdominalis*, f - *rhusae*, g *tenuicorpus*, h *trilokum*.

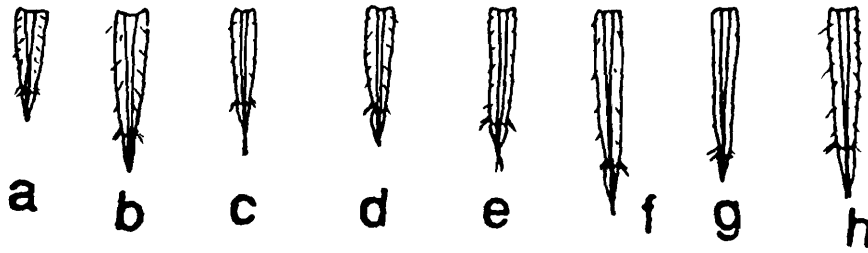


Fig. 51

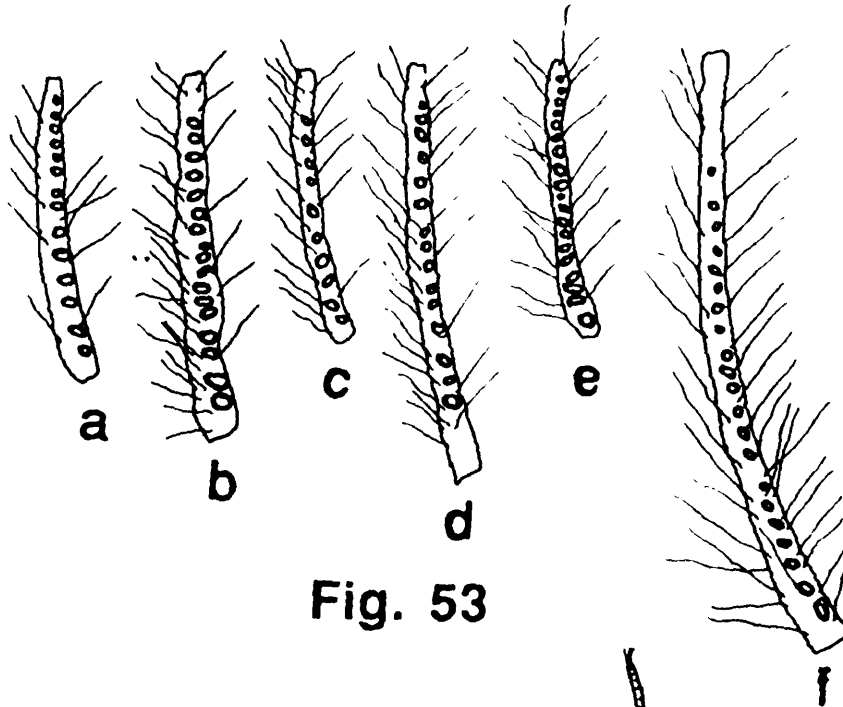


Fig. 53

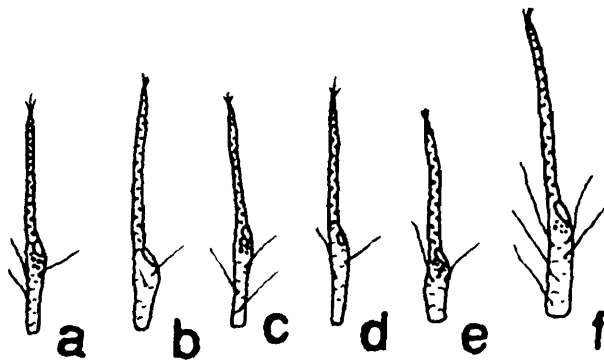


Fig. 54

Figs. 51a-h : Species of *Mollitrichosiphum*, apterous viviparous female morph : ultimate rostral segments. a *buddleiae*, b *kazirangi*, c *montanum*, d *nandii*, e *nigriabdominalis*, f *rhusae*, g *tenuicarpus*, h *trilokum*. Figs 53a-f : Species of *Mollitrichosiphum*, apterous viviparous female morph : antennal segment III. a-*buddleiae*, b *kazirangi*, c *montanum*, d *nandii*, e *rhusae*, f *tenuicarpus*. Figs. 54a-e : Species of *Mollitrichosiphum*, alate viviparous female morph : processus terminalis. a *buddleiae*, b *kazirangi*, c *montanum*, d *nandii*, e *rhusae*.

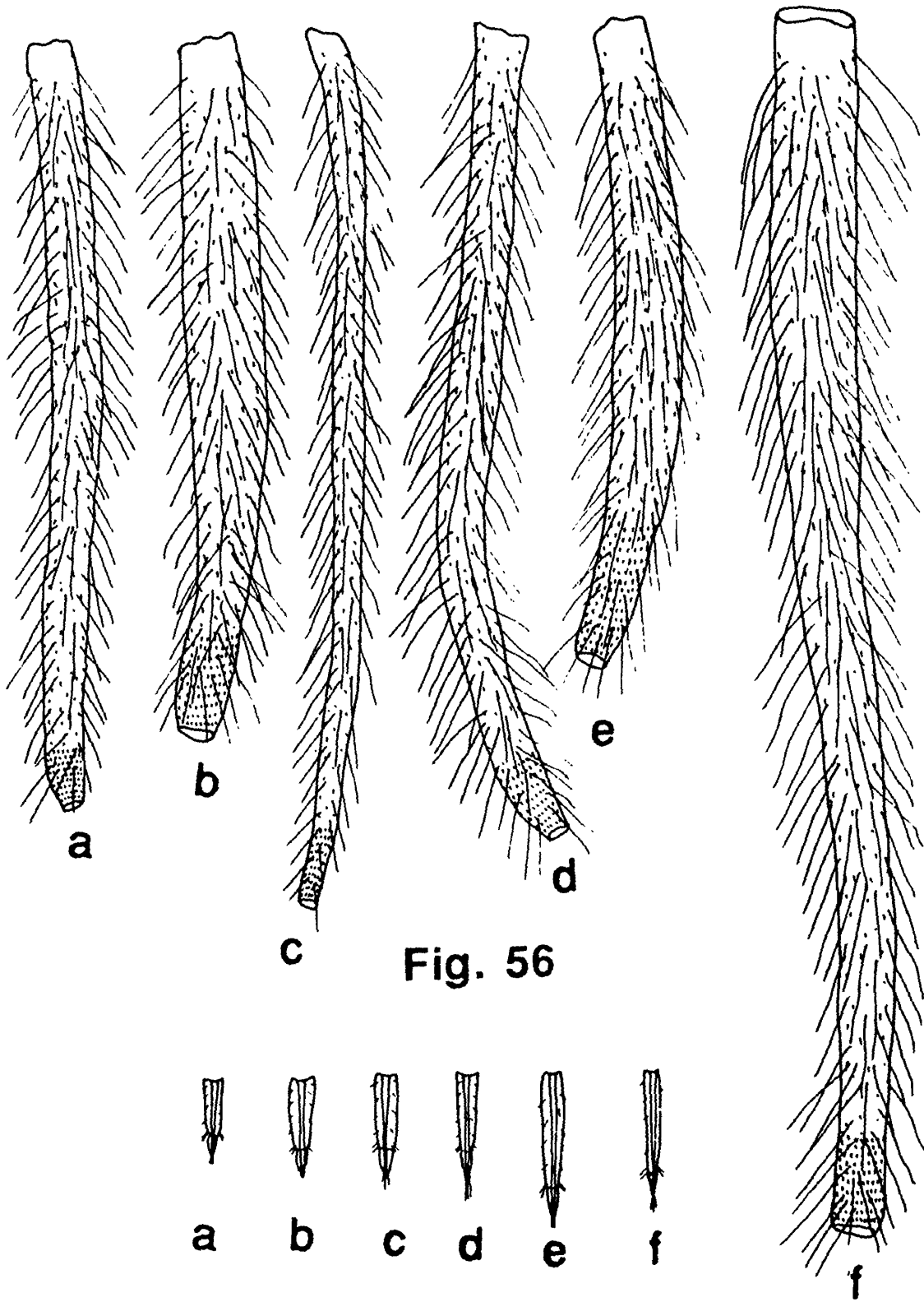


Fig. 56

Fig. 55

Figs. 55a-f : Species of *Mollitrichosiphum*, alate viviparous female morph : ultimate rostral segments. a *buddleiae*, b *kazirangi*, c *montanum*, d *nandii*, e *rhusae*, f *tenuicorpus*. Figs. 56a-f : Species of *Mollitrichosiphum*, alate viviparous female morph : Siphunculi. a *buddleiae*, b *kazirangi*, c *montanum*, d *nandii*, e *rhusae*, f - *tenuicorpus*.

apices, a few short hairs with furcated apices, longest hair on anterior tergites 0.12 - 0.16 mm long and 3.50 - 3.75 x as long as basal diameter of 3rd antennal segment; 7th and 8th tergites each with two long and acute hairs. Siphunculi short, little curved outward, dark brown, 1.06 - 1.40 mm long, 0.49 - 0.53 x as long as body and 5.50 - 6.70 x as long as their maximum width; siphuncular surface sparsely spinulose, densely so on apical dark portion; siphuncular hairs long and fine. Legs pale, femora, fore- and mid-tibiae nearly smooth, hindtibiae with 27 - 31 stridulatory ridges on basal 0.60 - 0.70 portion.

*Measurements in mm :*

	Length	Width	Antenna
1.	2.16	1.23	1.36
2.	2.41	1.30	1.55
3.	2.49	1.36	1.60
4.	2.17	1.19	1.26

Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.50	0.16	0.17	0.14 + 0.24	0.30	0.11	1.06
0.58	0.17	0.21	0.16 + 0.27	0.33	0.12	1.27
0.61	0.19	0.21	0.16 + 0.27	0.32	0.13	1.33
0.46	0.15	0.16	0.11 + 0.23	0.29	0.12	1.08

(1 - 3, *Rhus* sp., Old Barapani, Meghalaya, 6.vi.1973, Z.S.I. Colls.; 4, *Rhus* sp., Shillong, Meghalaya, 17.viii.1974, Z.S.I. Colls.).

*Alate viviparous female* : Body dark, 1.71 - 2.0 mm long and 0.75 - 0.90 mm as maximum width. Antennae dark brown except basal half of segments IV, V and VI which are paler, 1.37 - 1.41 mm long and 0.72 - 0.80 x as long as body; flagellum more distinctly imbricated from apices of segment III, rest nearly smooth, segment III with 20 - 23 round to oval accessory rhinaria distributed over the entire length; flagellar hairs long and acute, more on inner margin than on outer, longest hair on segment III 3.90 - 4.0 x as long as the basal diameter of the segment; processus terminalis 0.23 - 0.27 mm long and 1.60 - 1.71 x as long as base of the last antennal segment. Ultimate rostral segments slender, 0.29 - 0.31 mm long and 2.60 - 2.90 x as long as second joint of hindtarsus. Dorsum of abdomen with broad transverse spino - pleural sclerotic bands on 2nd - 6th tergites which appear confluent with one another and a narrow band on 1st tergite; 7th and 8th tergites each with a broad spino-pleural sclerotic patch, besides paired marginal sclerites on 1st 6th

tergites also present; dorsal hairs with acutè apices, longest hair on anterior tergites 0.08 - 0.11 mm long and 2.90 - 3.50 x as long as the basal diameter of 3rd antennal segment; hairs on 7th and 8th tergites not clearly discernible. Siphunculi dark brown to black, 1.42 - 1.70 mm long and 0.70 - 0.73 x as long as the body; siphuncular hairs numerous, with acute apices, longest ones 0.23 - 0.24 mm long. Legs with apical 0.50 portion of femora, very base and apices of tibiae and whole of tarsi dark, rest much paler, hindtibiae with 40 - 43 stridulatory ridges on basal 0.70 portion. Wing venation normal. Otherwise as in apterous viviparae.

*Measurements in mm :*

	Length	Width	Antenna			
1.	1.71	0.75	1.73			
Antennal segments				urs	ht2	Siph.
III	IV	V	VI			
0.53	0.14	0.17	0.14 + 0.24	0.29	0.10	1.42

(1, *Rhus* sp., Shillong, Meghalaya, 17.viii.1974, Z.S.I. Colls.).

*Other morphs* : Not known.

*Materials examined* : 3 apterous viviparous females from *Rhus* sp., Old Barapani, Meghalaya, 6.vi.Coll. A.K. Ghosh; 3 apterous and 1 viviparous females from *Rhus* sp., Shillong, Meghalaya, 17.viii.1974, Coll. A.C. Sukla.

*Discussion* : Ghosh, A.K. (1974) distinguished *M. rhusae* from its congenics under the genus in having dorsal hairs on abdomen short, stout and with mixed apices and ultimate rostral segments 2.30 - 2.60 x as long as second joint of hindtarsus.

*Biology* : The species was collected from undersurfaces of young leaves of the host plant. The aphids were greenish to light brown in life with black siphunculi. No ant was noticed in association.

*Distribution* : India : Meghalaya.

*Types* : In the collection of Zoological Survey of India, Calcutta, India.

#### LIST OF PREDATORS AND PARASITES OF GREENIDEINAE FROM INDIAN REGION

##### 1. *Cevaphis schouteniae* v. d. Goot

Predator : *Menochilus sexmaculatus* (Fab.), *Pseudoscymnus* sp., *Scymnus* sp. (Coccinellidae : Coleoptera)

- Parasitoid : *Trioxys paniculatus* Agarwala, Saha and Mahapatra  
Reference : Agarwala *et al.* (1985), Agarwala and Ghosh (1988)
2. *Eutrichosiphum flavum* Takahashi  
Predator : None  
Parasitoid : *Ephedrus* sp.  
Reference : Sary and Ghosh (1983)
3. *Eutrichosiphum pyri* Chakrabarti, Ghosh and Raychaudhuri  
Predator : None  
Parasitoid : *Trioxys eutrichosiphi* (Sary),  
*T. shillongensis* (Sary)  
Reference : Sary and Ghosh (1983)
4. *Eutrichosiphum assamense* Ghosh, Basu and Raychaudhuri  
Predator : *Micraspis* spp. (Coccinellidae : Coleoptera)  
Parasitoid : None.  
Reference : Agarwala and Ghosh (1988)
5. *Eutrichosiphum* sp.  
Predator : None  
Parasitoid : *Trioxys eutrichosiphi* (Sary)  
Reference : Sary and Ghosh (1983)
6. *Greenidea formosana formosana* Maki  
Predator : None  
Parasitoid : *Lipolexis scutellaris* (Mackauer)  
Reference : Sary and Ghosh (1983)
7. *Greenidea formosana heeri* Raychaudhuri, Ghosh, Banerjee and Ghosh  
Predator : *Anisochrysa boninensis* (Okamoto),

- Cunctochrysa jubingensis* (Holzel) (Neuroptera);  
*Coccinella septempunctata* (L.), *Menochilus sexmaculatus* (Fab.). (Coccinellidae : Coleoptera)
- Parasitoid      *Lipolexis scutellaris* (Mackauer)
- Reference      Debnath *et al.* (1988), Stary and Ghosh (1983)
8. *Greenidea* spp.
- Predator      None
- Parasitoid      *Archaphidus greenideae* (Stary and Schlinger),  
*Trioxys androensis* (Singh and Singh),  
*T. nungbaensis* (Singh and Singh), *T. kumaonensis* (Stary and Raychaudhuri)
- Reference :      Singh and Singh (1988), Singh and Singh (1986)
9. *Greenideoida ceyloniae* v.d. Goot
- Predator :      *Allograpta javana* (Wiedmann), *Ischiodon scutellaris* (Fab.), *Macrosyrphus confrator* (Wiedmann), *Macrosyrphus sexmaculatus* (Wiedmann) (Syrphidae Diptera);  
*Menochilus sexmaculatus* (F.) (Coccinellidae : Coleoptera), *Micromus timidus* (Hagen) (Hemerobiidae : Neuroptera).
- Parasitoid :      None
- Reference :      Agarwala *et al.* (1983), Agarwala *et al.* (1987).
10. *Mollitrichosiphum nandii* Basu
- Predator      *Sphaerophoria scripta* (L.), (Syrphidae Diptera)
- Parasitoid :      *Indophidius curvicaudatus* (Stary)
- Reference      Agarwala *et al.* (1984).
11. *Mollitrichosiphum tenuicorpus* Okajima
- Predator :      None
- Parasitoid :      *Praon mollitrichosiphi* Agarwala, Saha and Mahapatra
- Reference :      Agarwala *et al.* (1987)

12. *Mollitrichosiphum* sp.

Predator : *Cunctochrysa jubingensis* (Holzel) (Neuroptera)

Parasitoid : None

Reference : Debnath *et al.* (1988).

All the parasitoids belong to Aphidiidae, Hymenoptera.

## THE CHROMOSOMES OF GREENIDEINAE

Out of 128 species recorded in the Subfamily Greenideinae, karyotypes of 17 species are known which include 11 species recorded from India. Species show considerable variations in chromosome numbers within a genus (Table 17). However, one species each of *Anomalosiphum* and *Schoutedenia* studied so far show a fixed number of chromosomes. It is a pity that many species of Greenideinae are yet to be examined for their karyotypes which could potentially be a useful taxonomic character.

Karyotypes of the 17 species along with their sources of reference are provided in Table 18.

Table 17. Records of chromosome numbers (2n) in Greenideinae

Genus	No. of species	Chromosome Number
<i>Anomalosiphum</i>	1	18
<i>Cervaphis</i>	2	08-14
<i>Eutrichosiphum</i>	2	20-26
<i>Greenidea</i>	7	08-26
<i>Greenideoida</i>	2	12-20
<i>Mollitrichosiphum</i>	2	14-16
<i>Schoutedenia</i>	1	14

Table 18. Diploid number of mitotic chromosomes in the viviparous female morphs of species of Greenideinae

Species	Chromosomes (2n)	Reference
<i>Anomalosiphum murphyi</i>	18	Blackman (1980)
<i>Cervaphis quercus</i>	08	Kurl (1980), Blackman (1986)
<i>C. schouteniae</i>	14(?)	Blackman (Unpublished)
<i>Eutrichosiphum dubium</i>	20	Blackman (1986)

<i>E. minutum</i>	26	Blackman (Unpublished)
<i>Greenidea ficicola</i>	22	Blackman (1980)
<i>G. formosana formosana</i>	18	Kulkarni and Kacker (1979)
<i>G. formosana heeri</i>	7, 8, 9	Kurl (1985)
<i>G. kuwanai</i>	20	Blackman (1980, 1986)
<i>G. mangifera</i>	20	Chen and Zhang (1985)
<i>G. nipponica</i>	18	Blackman (1986)
<i>G. sikkimensis</i>	20	Chen and Zhang (1985)
<i>Greenideoida ceyloniae</i>	18, 20	Blackman (Unpublished)
<i>G. elongata</i>	12(?)	Blackman (Unpublished)
<i>Mollitrichosiphum buddleiae</i>	16	Blackman (Unpublished)
<i>Schoutedenia ralumensis</i>	14,16	Blackman (1980)

(?) indicate uncertain karyotype determination

LIST OF RECORDED HOSTS OF SUBFAMILY GREENIDEINAE  
FROM THE INDIAN REGION

Aphid species	Host species
<i>Tribe CERVAPHIDINI</i>	
1. <i>Anomolosiphum indigoferae</i>	(i) <i>Indigofera</i> sp. (ii) <i>Mimosu</i> sp. (iii) <i>Phyllanthus</i> sp. (iv) <i>Vigna</i> sp. (v) indet. species of Leguminosae
2. <i>Cervaphis quercus</i>	(i) <i>Quercus griffithii</i> (ii) <i>Quercus</i> sp. (iii) indet. species
3. <i>C. rappardi indica</i>	(i) <i>Cajanus cajan</i> (ii) <i>Cajanus indicus</i>

- |                                   |        |  |
|-----------------------------------|--------|--|
|                                   | (iii)  | <i>Ficus</i> sp.                             |
| 4. <i>C. rappardi rappardi</i>    | (i)    | <i>Cajanus indicus</i>                       |
| 5. <i>C. schouteniae</i>          | (i)    | <i>Cajanus cajan</i>                         |
|                                   | (ii)   | <i>Microcos peniculatus</i>                  |
|                                   | (iii)  | <i>Pterospermum</i> sp.                      |
|                                   | (iv)   | <i>Trifolium</i> sp. (= <i>Amooria</i> sp.)  |
|                                   | (v)    | indet. species                               |
| 6. <i>Schoutedenia emblica</i>    | (i)    | <i>Boehemeria polystachia</i>                |
|                                   | (ii)   | <i>Breynia rhamnoides</i>                    |
|                                   | (iii)  | <i>Engelhardia</i> sp.                       |
|                                   | (iv)   | <i>Flueggia macrophylla</i>                  |
|                                   | (v)    | <i>Flueggia virosa</i>                       |
|                                   | (vi)   | <i>Flueggia</i> sp.                          |
|                                   | (vii)  | <i>Glochidion</i> sp.                        |
|                                   | (viii) | <i>Musa paradisica</i>                       |
|                                   | (ix)   | <i>Phyllanthus emblica</i>                   |
|                                   | (x)    | <i>Phyllanthus reticulatus</i>               |
|                                   | (xi)   | <i>Prunus cerasus</i>                        |
|                                   | (xii)  | <i>Prunus nepalensis</i>                     |
|                                   | (xiii) | <i>Spiraea corymbosa</i>                     |
|                                   | (xiv)  | indet. species of Euphorbiaceae and Rosaceae |
| 7. <i>Schoutedenia ralumensis</i> | (i)    | <i>Flueggia macrocarpa</i>                   |
|                                   | (ii)   | <i>Phyllanthus hamiltonicus</i>              |
|                                   | (iii)  | indet. species                               |
| 8. <i>Sumatraphis celti</i>       | (i)    | <i>Celtis tetrandra</i>                      |
|                                   | (ii)   | <i>Mallotus</i> sp.                          |
|                                   | (iii)  | <i>Quercus</i> sp.                           |
|                                   | (iv)   | <i>Sida</i> sp.                              |

*Tribe GREENIDEINI*

- |     |                                   |       |                             |
|-----|-----------------------------------|-------|-----------------------------|
| 9.  | <i>Allotrichosiphum assamense</i> | (i)   | <i>Quercus dealbata</i>     |
| 10. | <i>Brevitrichosiphon mukerjii</i> | (i)   | <i>Quercus</i> sp.          |
|     |                                   | (ii)  | indet. species              |
| 11. | <i>Eutrichosiphum alnicola</i>    | (i)   | <i>Alnus nepalensis</i>     |
|     |                                   | (ii)  | <i>Betula</i> sp.           |
|     |                                   | (ii)  | <i>Dryopteris placea</i>    |
|     |                                   | (iv)  | <i>Launaea pinnatifida</i>  |
|     |                                   | (v)   | <i>Quercus incana</i>       |
|     |                                   | (vi)  | <i>Quercus</i> sp.          |
| 12. | <i>E. arunachali</i>              | (i)   | <i>Quercus</i> sp.          |
| 13. | <i>E. assamense</i>               | (i)   | <i>Castanopsis</i> sp.      |
|     |                                   | (ii)  | <i>Petunia violacea</i>     |
|     |                                   | (iii) | <i>Quercus fenestrata</i>   |
|     |                                   | (iv)  | <i>Quercus dealbata</i>     |
|     |                                   | (v)   | <i>Quercus incana</i>       |
|     |                                   | (vi)  | <i>Quercus</i> sp.          |
|     |                                   | (vii) | <i>Rhus wallichii</i>       |
| 14. | <i>E. atini</i>                   | (i)   | indet. species              |
| 15. | <i>E. betulae</i>                 | (i)   | <i>Betula</i> sp.           |
| 16. | <i>E. blackmanum</i>              | (i)   | <i>Quercus</i> sp.          |
|     |                                   | (ii)  | indet. species              |
| 17. | <i>E. davidi</i>                  | (i)   | <i>Quercus rubra</i>        |
|     |                                   | (ii)  | <i>Quercus serrata</i>      |
|     |                                   | (iii) | <i>Quercus</i> sp.          |
| 18. | <i>E. dubium</i>                  | (i)   | <i>Castanopsis</i> sp.      |
|     |                                   | (ii)  | <i>Lithocarpus glabra</i> * |

\* From Hongkong

- (iii) *Litsea sebifera*  
 (iv) *Lithocarpus* sp.  
 (v) *Quercus dealbata*  
 (vi) *Quercus* sp.  
 (vii) *Quercus dubius*  
 (viii) *Quercus glauca*
19. *E. flavum* (i) *Castanopsis* sp.  
 (ii) ? *Cynoglossum* sp.  
 (iii) *Litsea khasiana*  
 (iv) *Quercus dealbata*  
 (v) *Quercus* sp.
20. *E. jugeshwari* (i) *Lithocarpus grifithii* (= *Pas-  
 sania grifithii*)  
 (ii) *Litsea sebifera*  
 (iii) *Quercus* sp.
21. *E. khasyanum* (i) *Quercus* sp.  
 (ii) *indet. species*
22. *E. litseae* (i) *Litsea sebifera*
23. *E. makii* (i) *Glochidion* sp.  
 (ii) *Litsea* sp.
24. *E. manaliensis* (i) *Betula utilis*
25. *E. manipurensense* (i) *Lithocarpus grifithii*  
 (ii) *Quercus* sp.
26. *E. minutum* (i) *indet. species*
27. *E. neoalnicola* (i) *Quercus* sp.
28. *E. neotattakanum* (i) *Castanopsis* sp.  
 (ii) *Quercus dealbata*  
 (iii) *Quercus* sp.

- |                              |        |                                 |
|------------------------------|--------|---------------------------------|
|                              | (iv)   | <i>indet. species</i>           |
| 29. <i>E. nepalensis</i>     | (i)    | <i>Alnus nepalensis</i>         |
| 30. <i>E. pseudopasaniae</i> | (i)    | <i>Castanopsis tribuloides</i>  |
|                              | (ii)   | <i>Castanopsis</i> sp.          |
|                              | (iii)  | <i>Erigeron</i> sp.             |
|                              | (iv)   | <i>Eucalyptus</i> sp.           |
|                              | (v)    | <i>Ficus</i> sp.                |
|                              | (vi)   | <i>Glochidion</i> sp.           |
|                              | (vii)  | <i>Hibiscus rosa-sinensis</i>   |
|                              | (viii) | <i>Maesa indica</i>             |
|                              | (ix)   | ? <i>Nicotiana tabacum</i>      |
|                              | (x)    | <i>Primula</i> sp.              |
|                              | (xi)   | <i>Quercus dealbata</i>         |
|                              | (xii)  | <i>Quercus serrata</i>          |
|                              | (xiii) | <i>Schima wallichii</i>         |
|                              | (xiv)  | indet. species of Euphorbiaceae |
| 31. <i>E. pyri</i>           | (i)    | <i>Pyrus communis</i>           |
|                              | (ii)   | <i>Symplocos</i> sp.            |
|                              | (iii)  | indet. species                  |
| 32. <i>E. quercifoliae</i>   | (i)    | <i>Quercus</i> sp.              |
| 33. <i>E. querciphaga</i>    | (i)    | <i>Quercus</i> sp.              |
| 34. <i>E. rameshi</i>        | (i)    | <i>Quercus dealbata</i>         |
| 35. <i>E. raychaudhurii</i>  | (i)    | <i>Alnus nepalensis</i>         |
|                              | (ii)   | <i>Alnus</i> sp.                |
|                              | (iii)  | <i>Betula</i> sp.               |
|                              | (iv)   | <i>Eugenia</i> sp.              |
|                              | (v)    | <i>Quercus</i> sp.              |

36. *E. russellae* (i) *Quercus dealbata*  
(ii) *Quercus* sp.
37. *E. sankari* (i) *Litsea cubeba*  
(ii) indet. species
38. *E. sensoriatum* (i) indet. species
39. *E. sikkimense* (i) *Duabanga sonneratioides*
40. *E. subinoyi* (i) *Pterospermum* sp.  
(ii) *Randia* sp.
41. *E. tapatii* (i) *Eugenia* sp.  
(ii) *Maesa* sp.  
(iii) *Quercus serrata*  
(iv) *Quercus* sp.  
(v) indet. host
42. *E. tattakanum* (i) *Alnus nepalensis*  
(ii) *Quercus acutissima*  
(iii) *Quercus coccinea*  
(iv) *Quercus dealbata*  
(v) *Quercus dilatata*  
(vi) *Quercus incana*  
(vii) *Quercus leucotrichophora*  
(viii) *Quercus semicaprifolia*  
(ix) *Quercus* sp.
43. *Eutrichosiphum* Sp. I (i) ? *Solanum lycopersicum*
44. *Eutrichosiphum* Sp. II (i) ? *Leucosceptum canum*
45. *Greenidea aborensis* (i) indet. species of Meliaceae
46. *G. anonae\** (i) *Antidesma* sp.  
(ii) *Artabotrys suarclonum*  
(iii) *Callistemon linearis*

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\*On *Annona* sp. from Java

- (iv) *Eugenia* sp.  
(v) ? *Nicotiana tabacum*  
(vi) *Quercus* sp.  
(vii) *Salvia leucantha*  
(viii) *Symplocos thisifolia*
47. *G. artocarpi* (i) *Artocarpus heterophyllus*  
(ii) *Artocarpus communis*  
(iii) *Artocarpus integrifolia*  
(iv) *Artocarpus vulgaris*
48. *G. ayyari* (i) *Lyonia* sp.  
(ii) *Quercus* sp.
49. *G. brachyunguis* (i) *Quercus* sp.
50. *G. buktonis* (i) *Duabanga sonneratioides*  
(ii) *Eugenia* sp.  
(iii) ? *Polygonum chinense*  
(iv) *Quercus* sp.  
(v) *Sapindus* sp.  
(vi) *Syzygium* sp.  
(vii) *Villebrunea integrifolia*
51. *G. camelliae* (i) *Camellia* sp.
52. *G. decaspermi* (i) *Psidium guajava*  
(ii) *Quercus* sp.  
(iii) indet. species of Myrsinaceae and Leguminosae
53. *G. ficicola* (i) *Alternanthera philoxeroides*  
(ii) ? *Artemisia vulgaris*  
(iii) *Artocarpus integrifolia*  
(iv) *Duabanga sonneratioides*  
(v) *Engelhardia spicata*

- (vi) *Ficus bengalensis*
  - (vii) *Ficus carica*
  - (viii) *Ficus cruneata*
  - (ix) *Ficus cunia*
  - (x) *Ficus stipulata*
  - (xi) *Ficus tsiela*
  - (xii) *Ficus* sp.
  - (xiii) *Glycosmis pentaphylla*
  - (xiv) *Ipomoea* sp.
  - (xv) *Litchi chinensis*  
(= *Nephelium litchi*)
  - (xvi) *Litsea polyantha*
  - (xvii) *Maesa* sp.
  - (xviii) *Pothos scandens*
  - (xix) *Psidium guajava*
  - (xx) *Quercus* sp.
54. *G. formosana formosana*
- (i) *Engelhardia spicata*
  - (ii) *Ficus* sp.
  - (iii) *Psidium guajava*
  - (iv) ? *Rhamnus nepalensis*
55. *G. formosana heeri*
- (i) *Duabanga sonneratioides*
  - (ii) *Engelhardia spicata*
  - (iii) *Eugenia* sp.
  - (iv) *Ficus* sp.
  - (v) *Syzygium jambos*
56. *G. gigantea*
- (i) indet. species
57. *G. haldari*
- (i) *Quercus* sp.
58. *G. heterotricha*
- (i) *Eugenia* sp.
59. *G. himansui*
- (i) *Randia* sp.

- |     |                         |       |                                   |
|-----|-------------------------|-------|-----------------------------------|
| 60. | <i>G. kumaoni</i>       | (i)   | <i>Quercus</i> sp.                |
| 61. | <i>G. longicornis</i>   | (i)   | <i>Cassia</i> sp.                 |
|     |                         | (ii)  | <i>Engelhardia spicata</i>        |
|     |                         | (iii) | <i>Prunus domestica</i>           |
|     |                         | (iv)  | <i>Schima wallichii</i>           |
|     |                         | (v)   | <i>Senecio scandens</i>           |
|     |                         | (vi)  | indet. species of Meliaceae       |
| 62. | <i>G. longirostris</i>  | (i)   | <i>Quercus</i> sp.                |
|     |                         | (ii)  | <i>Schima wallichii</i>           |
|     |                         | (iii) | indet. species                    |
| 63. | <i>G. longisetosa</i>   | (i)   | indet. species                    |
| 64. | <i>G. parthenocissi</i> | (i)   | <i>Parthenocissus semicordata</i> |
| 65. | <i>G. photiniphaga</i>  | (i)   | <i>Photinia</i> sp.               |
| 66. | <i>G. prunicola</i>     | (i)   | <i>Prunus</i> sp.                 |
|     |                         | (ii)  | <i>Quercus dealbata</i>           |
| 67. | <i>G. quercicola</i>    | (i)   | <i>Glochidion</i> sp.             |
|     |                         | (ii)  | <i>Quercus dealbata</i>           |
|     |                         | (iii) | <i>Quercus</i> sp.                |
| 68. | <i>G. querciphaga</i>   | (i)   | <i>Quercus</i> sp.                |
| 69. | <i>G. schimae</i>       | (i)   | <i>Schima wallichii</i>           |
|     |                         | (ii)  | indet. species                    |
| 70. | <i>G. sikkimensis</i>   | (i)   | <i>Castanopsis</i> sp.            |
|     |                         | (ii)  | <i>Quercus</i> sp.                |
| 71. | <i>G. spinotibium</i>   | (i)   | <i>Quercus</i> sp.                |
|     |                         | (ii)  | indet. species                    |
| 72. | <i>G. symplocosis</i>   | (i)   | <i>Eurya</i> sp.                  |
|     |                         | (ii)  | <i>Prunus cerasoides</i>          |
|     |                         | (iii) | <i>Symplocos cratigeoides</i>     |

- (iv) *Symplocos laurina*  
(v) *Symplocos spicata*  
(vi) *Symplocos* sp.  
(vii) indet. species of *Rosaceae*  
and *Ternstroemiaceae*
73. *Greenideoida bengalensis* (i) indet. species
74. *G. bhalukpongensis* (i) *Maesua ferrea*  
(ii) ! *Uvaria* sp.
75. *G. ceyloniae* (i) *Maesua ferrea*
76. *G. lambersi* (i) ! *Premora* sp.  
(ii) ! *Premna* sp.  
(iii) *Hymenodictyon* sp.
77. *G. luteum* (i) *Buddleia* sp.  
(ii) *Cestrum fasciculatum*  
(iii) *Litsea amara*\*  
(iv) *Litsea polyantha*  
(v) *Lindera* sp.  
(vi) ? *Nicotiana* sp.  
(vii) *Quercus* sp.
78. *Mollitrichosiphum buddleiae* (i) *Buddleia* sp.
79. *M. godavariense* (i) *Quercus* sp.
80. *M. kazirangi* (i) indet. species
81. *M. montanum* (i) *Alnus nepalensis*  
(ii) *Alnus* sp.  
(iii) *Betula alnoides*  
(iv) *Betula* sp.  
(v) *Engelhardia* sp.
82. *M. nandii* (i) *Alnus nepalensis*

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\* from Indonesia

- |     |                            |                               |
|-----|----------------------------|-------------------------------|
|     | (ii)                       | <i>Betula alnoides</i>        |
|     | (iii)                      | <i>Betula</i> sp.             |
|     | (iv)                       | <i>Clerodendron serratum</i>  |
|     | (v)                        | <i>Engelhardia</i> sp.        |
|     | (vi)                       | <i>Prunus cerasoides</i>      |
| 83. | <i>M. nigriabdominalis</i> | (i) <i>Quercus rubra</i>      |
| 84. | <i>M. rhusae</i>           | (i) <i>Rhus</i> sp.           |
| 85. | <i>M. tenuicorpus</i>      | (i) <i>Castanospermum</i> sp. |
|     | (ii)                       | <i>Castanopsis</i> sp.        |
|     | (iii)                      | <i>Litsea cubeba</i>          |
|     | (iv)                       | <i>Litsea</i> sp.             |
|     | (v)                        | <i>Maesa indica</i>           |
|     | (vi)                       | <i>Maesa</i> sp.              |
|     | (vii)                      | <i>Quercus serrata</i>        |
|     | (viii)                     | <i>Quercus</i> sp.            |
| 86. | <i>M. trilokum</i>         | (i) <i>Quercus</i> sp.        |

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? denotes doubtful records

! identity and valid names could not be confirmed.

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## ADDENDUM

After the manuscript of this work was sent to the press, description of a new species of Greenideinae came to our notice. We reproduce here the original description following Banerjee and Chakrabarti (1991) :—

*Greenidea (Trichosiphum) carpinicola* Banerjee and Chakrabarti.

"*Apterous viviparous female* : Body elongated oval, 1.30-1.66 mm long and 0.75-0.94 mm wide. Head pale brown, smooth, dorsum with 8-10 hairs having acute, acuminate and furcated apices, longest hair on vertex 119 mm long and 3.0-4.6 times the basal diameter of antennal segment III (hence b.d.III); Antennae 6 segmented, 0.67-0.76 times the body; segments I and II brown, segments III, IV and basal half of segment V pale brown, rest concolourous with segment I; flagellum gradually and more distinctly imbricated apicad from basal half of segment III; processus terminalis (hence p.t.) 1.65-2.14 times the base of the segment and 1.30-1.43 times segment III; segments I, II and III with 6-7, 6 and 10-14 hairs respectively, flagellar hairs long and short, with acuminate to blunt apices, longest and shortest hairs on segment III 117 mm and 9 mm long and 3.1-4.5 and 0.36-0.50 times the b.d.III respectively. Rostrum long, reaches almost 3rd abdominal segment ultimate rostral segment (hence u.r.s.) 1.4-1.5 times the second joint of hind tarsus (hence h.t.2) and with 6-8 secondary hairs. Thorax brown, with spinules marginally. Legs concolorous with head, coxae and femur with some spinules, tibiae with long and short hairs, first tarsal segments with 7 hairs. Abdominal dorsum brown, smooth; dorsal hairs long and short with acute, acuminate and furcated apices, longest hair on anterior tergites 70-80 mm long and 2.0-3.5 times the b.d.III; 7th tergite with 4 hairs, 2 long medially and 2 short marginally; 8th

tergite with 2 long hairs; longest hairs on these tergites 120  $\mu$ m long, and 2.9-4.50 times its maximum width at middle and 0.73-0.84 times the width of head across the eyes, with 32-41 long and short hairs, mostly with acuminate apices and a few with furcated apices, longest one 5.1-6.7 times the b.d.III. Cauda semioval, with a distinct short median stylus at base and with 2 hairs, one on either side of stylus. Venter densely granulated medially and marginally leaving a smooth pleural area; ventral hairs thinner and shorter than dorsal hairs.

*Measurements of the holotype (in mm)* : Body length 1.34, width 0.75; antennal length 1.02; antennal segments III : IV : V : VI 0.20 : 0.12 : 0.14 : (0.15 + 0.29); u.r.s. 0.16; h.t. 0.11; siphunculus 0.31, cauda 0.05.

*Alate oviparous female* : Body elongated, 1.53 mm long and 0.75 mm wide. Head brown, dorsum with 10-12 hairs with acute apices. Antennae dark brown except the very base of segment III which is pale brown; 0.90-0.91 times the body; p.t. 1.9-2.1 times the base of the segment and 0.91-1.02 times segment III; segment III with 6-12 oval to transversely oval secondary rhinaria in a row. Rostrum reaches up to 3rd coxax; u.r.s. 1.5-1.6 times the second joint of hind tarsus. Abdominal segments 1 and 2 with spino-pleural and marginal bands on segment 3-6 spino-pleural bands fuse leaving some gaps in between and form a dorsal patch, separate marginal patches present on tergites 3-6; dorsal hairs with fine apices, longest one on anterior tergites 90-100  $\mu$ m long and 3.63-3.83 times the b.d.III; 7th and 8th tergites with 5 and 15-17 hairs respectively. Longest hair on these tergites 90-100  $\mu$ m and 100-110  $\mu$ m long and 3.6-3.8 and 3.9 times the b.d. III respectively. Siphunculi long, more or less cylindrical, 0.50-0.54 times the body, 15.3-16.6 times its maximum width and 2.12-2.34 times the width of head across the eyes, reticulated over the entire length and spinulose on apical part, with 62-66 long and short hairs, longest hair 8.0-8.8 times the b.d. III. Cauda without any distinct stylus. Two concave furrows representing the oviducts visible, anal plate and genital plate with many hairs. Other characters as in apterous viviparous female.

*Measurement of one specimen (in mm)* : Body length 1.70, width 0.75; antennal length 1.53, antennal segments III IV V : VI 0.38 0.20 : 0.20 (0.19 + 0.39); u.r.s. 0.16; h.t. 0.11; siphunculus 0.86.

*Alate male* : Body elongated, 1.50 mm long and 0.61 mm wide. Antennae 0.96 times the body; p.t. 1.61-1.70 times the base of the segment and 0.72-0.91 times the segment III; longest hair on segment III 70  $\mu$ m long and 2.60-2.70 times the b.d.II; segment III with 4-8 secondary rhinaria. Abdominal segments with pale brown bands, 7th and 8th tergites with 5-6 and 2 hairs respectively. Siphunculi 0.53-0.56 times the body, 14-14.8 times its maximum width and 2.02-2.04 times the width of head across the eyes, with 54-61 hairs. Genital

organ well-developed, with short and blunt penis. Other characters as in alate oviparous female.

*Measurements of one specimen (in mm)* : Body length 1.50, width 0.61; antennal length 1.50, antennal segments III : IV : V : VI 0.44 : 0.19 : 0.20 : (0.19 + 0.32); u.r.s. 0.16; h.t.2 0.11; siphunculus 0.83.

*Specimens examined* : Holotype : apterae, India : Uttar Pradesh, Garwal, Fulnagaon, *Carpinus viminea*, 28.v.1989, S. Chakrabarti, Coll. (Coll. No. 6382). *Paratypes* : 10 apterae, 4 alate oviparous females and 2 alate males with same data as for the holotype; 20 apterae, 6 alate oviparous females and 3 nymphs, collection data same as in holotype (Coll. No. 6383); 20 apterae and 4 nymphs, Garhwal, Salna, *Carpinus faginea*, 25.v.1989, S. Chakrabarti, Coll. (Coll. No. 6383); 4 apterae and 3 nymphs, Salna, *C. faginea*, 5.xi.1989, P.K. Banerjee, Coll. (Coll. No. 6506).

*Affinities* : This new species resembles in some respects *Greenidea (Trichosiphum) carpini* Takahashi (1963) in having smooth tergum, granulated mid-ventral area and also in host plant association. However, it can easily be separated from the latter species having shorter processus terminalis in relation to its base, shorter ultimate rostral segment in relation to second joint of hind tarsus and shorter siphunculi in relation to antennal segment VI and to width of head across the eyes. The new species is also close to *Greenidea (Trichosiphum) kumaoni* Chakrabarti and Raychaudhuri (1978) in relation to processus terminalis and antennal segment III, siphunculi to head across the eyes and to body, and ultimate rostral segment to second joint of hind tarsus but differs from *kumaoni* in having smaller body, granulated mid-ventral area, shorter processus terminalis in relation to its base and cauda with only 2 hairs."

*Types* : In the collection of Department of Zoology, University of Kalyani, Kalyani.

*Distribution* : India : Uttar Pradesh.

*Reference* : Banerjee, P.K. and Chakrabarti, S. (1991). A new species and notes on two other species of aphids (Homoptera) Aphididae) from Garhwal Range of western Himalaya. *Hexapoda*, 3 (1&2) : 15-20.

*Remarks* :

- (1) It is not clear from the above description whether the authors of *G. (T.) carpinicola* have actually compared the specimens of the new species with those of *G. (T.) carpini* Takahashi and *G. (T.) kumaoni* Chakrabarti and Raychaudhuri.
- (2) The description of different morphs mention hair lengths on anterior tergites and other parts of body in mm ( for instance, "longest hair on anterior tergites 70-80 mm long"). These are evidently wrong and possibly refers to microns.
- (3) The inclusion of the description is of reporting value.



## INDEX TO GENERA AND SPECIES OF GREENIDEINAE

Valid names of species, subgenera (in bracket) and genera are printed in Roman type; names (genus, subgenus and species) of synonymy, preoccupied or changed assignment are given in *Italic Type*. Numbers in bold indicate page containing detailed description.

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Aphidoidea forms one of the most important group of phytophagous insects because of their polymorphism, host alternating-heteroecious behaviour, reproductive habits and above all for their role as the largest group of insect vectors of plant viruses. The Fauna of India and the adjacent countries in this group, constitutes about 16% of the world fauna, including a large number of rare, endemic species. However, no consolidated account of Indian aphids was so far available and the present work was started in 1976 and has been so planned as to be published in several parts. The first part published in 1980 deals with an introductory chapter on Aphidoidea leading to subfamily Chaitophorinae. The second part deals with subfamily Lachninae, the third part deals with subfamily Pemphiginae, and fourth part deals with subfamilies Phloemyzinae, Anoeciinae and Hormaphidinae and the fifth part deals with subfamily Drepanosiphinae. The present sixth part deals with subfamily Greenideinae. The entire Superfamily is expected to be covered under seven separate parts. Besides taxonomic accounts, information on host plant association, association with ants, natural enemies of aphids, distribution, etc., are also provided in these parts.