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by
C. KANDASAMY

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C. KANDASAMY

Department of Entomology
Fredrick Institute of Plant Protection
and Toxicology, Padappai—601301 (T N.)

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CONTENTS

INTRODUCTION

The family Psyllidae of the sternorrhynchous Homoptera comprises small-sized phytophagous insects, characterised by two pairs of membranous wings-normally held in stegopterous manner—with simple and reduced venation ten-segmented antennae, three ocelli widely placed on the vertex, thickened hind femora and uniformly dimerous tarsi terminating in two equal claws with associated pulvilli (Fig. 1).

Psylla, derived from Greek, meaning a 'flea' or 'leaping plant louse', was first used by Geoffroy (1762) in the status of a genus. But he merely indicated nine species within it, not naming any of them. Based on Lamarck's description of *Chermes ficus*, Kirkaldy (1904) synoymised Psylla winh *Chermes* while Crawford (1914) contradicted this point in his monograph, and pointed out that Passerini (1865) had already designated an aphid species as *Chermes*.

Although different terms like Psyllidae, Psylloidea, and Chermidae for naming the family have been used by Latreille (1798), Flor (1861) and Kirkaldy (1904) respectively, recent workers like Loginova (1964) Klimaszewski (1963) and Dobreanu (1962) have distinguished five major families Liviidae, Aphalaridae, Psyllidae, Prinocnemidae (=Carsidaridae) and Triozidae in the superfamily psylloidea under the sub-order Psyllinea. However, Mathur (1975) has retained the subfamilies Pauropsyllinae and Aphalarinae along with Liviinae, Ciriacreminae, Psyllinae and Triozinae and this classification of Crawford (1914) is universally accepted and is convenient with regard to the Oriental species also.

Psyllids are phloem feeders, and more feeding damage to plant tissues is usually caused by nymphs rather than the adults. The damages which are due to their salivary injection, may range from necrosis to severe gall formation on plant organs, Psyllids also act as vectors os bacterial and viral plant diseases such as the "Greening disease" (by *Diaphorina citri*) in citrus, and "Pear decline condition" (by *Psylla pyricota*) in pears. *Apsylla cistellata* is responsible for heavy destruction of buds of madgo trees. Secretion of honey dew in the form of threads throgh specialised wax gland pores is characteristic of psyllids, particularly of developing nymphs. The total cessation of wax secretion occurs with the metamorphosis of the fifth nymphal instar to the adult (Yoshiowaku-1978)

The life cycle of psyllids generally involves five nymphal stages. Generations are continuous throughout the year which also include, in few species, the over wintering stage. It is however interesting to observe that some species of *Pachypsylla*, *Pachypsylla japonica* Miyatake in particular are known to form a protective cover of 'lerp' produced by their honey dew. Although quite a number of species of Diptera (*Endopsylla agilis on Psyllia forsterii, Lestondiplosis liviae on Livia juncorum, Bremia* sp. on *Psyllopsis fraxini*) and Hymenoptera (*Pachyneuron validium on Euphyllura arbuti, Prionomitus miratus on Psylla mali, Aprostocetus roseveari* on *phytolyma lata*, and *Platygaster* sp. on *Psylla perigrina)* are parasitic on adult and nymphal psyllids, the latter group seems to dominate as revealed by the available information, (K. B. Lal, (1934). Many other insects like Anthocoridae and Lygaeidae (Hemip-tera), Syrpidae (Diptera), Coleoptera and spiders predate on psyllids.

Our knowledge of Indian Psyllidae, after the early works by Lethierry (1890), Kieffer (1905), Lefroy (1909) and Crawford (1912), is mainly due to the outstanding contributions of Mathur (1946, 1949, 1950, 1952, 1975). It may be indicated that taxonomic studies on Indian psyllids were hitherto confined mostly to North India with the exception of the comparatively minor contribution by Ramakrishna Ayyar (1924). A total number of 112 species are known so far from India (Mathur, 1975, Biswas & Lahiri, 1979) and of which only 5 species viz;, *Pauropsylla longispiculata Mathur*, *P. verrucosa* Mathur, *Macrohomotoma maculata* Mathur, *Mycopsylla indica* Mathur, and *Psylla santali* Mathur have been described so far from S. India. Taking this into consideration, an attempt has been made to study the taxonomy of psyllids of the Southern region of peninsular India giving more information on the importance of the morphological characters like the shape of head, particularly genal cone, wing venation and the modifications of genitalia. A detailed description of all the species with a key to species is given to provide more information on this neglected group of insects.

Collection and preservation :

Sweeping net (26 cm wide) and aspirator (3cm × 9cm) were used in the collection of psyllids, and the collected psyllids were killed by placing them in a cyanide bottle and preserved in specimen tubes (1.5cm × 5cm) containing alcohol. The natural colour of the adults was noted before changing them into permanent preservation tubes with 70% ethyl alcohol. Mirror type camera lucida was used to draw the figures of dissected parts with desired magnifications.

The following specimens were compared with the type specimens at the Forest Research Institute, Dehra Dun (U. P.) to confirm their identity : *Trioza jambolanae* Craw., *Pauropsylla longispiculata* Mathur ; *Psylla oblonga* Mathur ; *P. hyalina* Mathur ; *Apsylla cistellata* Buckton ; *Diaphorina cardiae* Craw., *Pauropsylla depressa* Craw', *Ceropsylla ferruginae* Mathur ; *Phacopteron lentiginosum* Buckton ; *and Psausia indica* Mathur, Also the identity of the three species *viz. Euphalerus mrginalis* Mathur ; *Mycopsylla gardenenensis* (Bhanotar *et al,*) and *Trioza hirsuta* (Bhanotar *et al.*) was confirmed by David Hollis of British Museum, London. All the type materials are deposited in the Entomology Research Institute, Loyola College, Madras. Host plants were duly identified by the Botanical Survey of India, Coimbatore.

Area of study ;

Most of the specimen collection were made in different seasons during the years 1976—1979 in South Indian Forest regions, *viz.*, Coorg (1300m), Shevoroy hills (1750m), Yelagiri hills (650m), Jawad hills (750m), Nilgiris (2600m), Tirupathy hiils (800m), Dhoni forest and Walayar forest (Palghat Dist.), Amirthy forest (North Arcot Dist.) and Kiruvatty forest (Hubli Dist.). In addition to this seven species were collected from Madras city itself.

MORPHOLOGY

1. *Head (Fig. 1A)* : Globular or greatly elongated or horizontal or deflexed downward or triangular. The prolongation of genae in the form of genal cones and various shapes of vertex are the distinct features by which the family psyllidae could be distinguished from other homopteran familes. The clypeus occupies an inferior position and is not visible from above unlike that of other families where it occupies a prominent anterior position. The large dorsal sclerite covering most of the head is the vertex, which is divided by a prominent median suture and bears generally two foval impressions, and two basal, posterior, and lateral ocelli. Frons, the smallest sclerite of the head, is scarcely visible in some genera (*Trioza Psylla*) and very prominent in others (*Paurocephala, Livia* and *Aphalara*). It always bears the anterior ocellus in the centre. The relatively large clypeus, which is cordate in shape, usually covers the frons and is inferior in position, The rostrum consists of much reduced labrum and well developed labium which is sharply flexed between fore coxae and appears to rise

between forelegs in the typical sternorrhynchous condition. The eyes are hemispherical and project laterally from the side of the head.

2. *Antennae* (*Fig. IB*) : Usually ten segmented, attached to the genae near the anterior margin of vertex, with well developed 4 or 5 sensoria at the apices. The first two basal segments are larger and less hirsute than the rest of the segments, while the third is always longest. The thickened terminal segment bears two thick sease of unequal length.

3. *Thorax* (*Fig 1C*) : Generally large and strong, prothorax short when compared to meso and metathorax. The notum is of single sclerite and arched behind the head. Sometimes it extends only upto half the way towards the coxae (*Trioza* and *Psylla*), while in others it extends upto forecoxae (*Livia*). Mesothorax is the longest part consisting of prescutum (which is as long as pronotum), scutum (large sclerite), and scutellum (small and hemispherical). Metathorax includes the scutum which articulates with the wing process of hind wings and scutellum is generally smaller. The postscutellum is larger than mesothorax and produced into prominent ridges.

4. *Wings* (*Fig 1D*) : The General shape 'elongate-ovate to rhombiodal', four in number, anterior pair thicker than posterior and sometimes moculated ; venation simple and shows striking differences. The venation of forewings, unlike the hind wings, are used as a specific character. Basal vein branches into three principal veins viz., radius, median, and cubitus. It usually divided into two ("psylltne type"), or into three "Triozine type"). In the former, media and cubitus fuse forming a cubital petiole (leaving radius alone), a vein normally absent in Triozine forms. The radius branches into a short R1 and a long radial sector which joins the costal margin forming a narrow pterostigma. The median vein forks into M 1—2 and M3—4, the for former joining near the apex or at the apex ; the letter with the posterior margin, and the cell formed between these forks is the second marginal cell. The first marginal cell is formed by the forking of Cubitus into Cu1 and Cu2. A short basal vein is present. Sometimes cross veins may also occur connecting the above vein. Sometimes cross veins may also occur connecting the above vein. Usually the hind wings show no remarkable specific variations.

5. *Legs (Fig. I E)* : Among the 3 pairs of legs, the hind pair is distinctly modified and the structure varies from species to species; generally tibia is larger than fomur ; two short tarsal segments almost of equal lenth present, of which the apical segment bears two claw-like spines with pulvillus. The number of basal tibial spurs, comb of apical spines and thick large black spines in the apex of tibia vary from species to species. The apex of basal tarsal segment also possesses spines in varying numbers.

6. *Abdomen (Fig. 1F and G)* : The abdominal segments in psyllids are comparatively fewer than in the typical generalised insect. Out of a total of 11 segments, the abdomen shows only 5 segments. The first two are wanting, the third is reduced to a small sclerite ; 4th to 8th are distinctly visible. In female, the 9th and 10th are represented as ventral valve and ovipositor sheath of genitalia respectively while the 11th forms the dorsal valve. In male, the 9th segment is suppressed, the 10th is represented by hypandrium bearing a pair of forceps or parameres, and the 11th represents anal valve which bears the anal opening at its extremity.

SYSTEMATIC ACCOUNT

Key to the subfamilies of Psyllidae :

1. Frons covered by genae ; genae usually produced into conical processes ; anterior ocellus embedded between vertex and genae. 2

   Frons not covered by genae, visible as a small sclerite ; genal cones not produced into conical processes , front ocellus at extremity of frons — Pauropsyllinae Crawford

2. Forewings with more than usual two marginal cells, the additional cells being formed by branching of radial sector and cross veins, head deeply cleft in front between antennae. — Ciracreminae Enderlein

   Forewings with only usual two marginal cells formed by the bifurcation of media and cubitus , radial sector not branched and without any cross vein , head not cleft above. 3

3. Basal tarsel segment of hind legs with two black claw-like apical spines at apex , the three veins from basal vein not diverging at same point,

but media and cubitus with a common cubital petiole, wings rarely angulate at apex. Psyllinae Loew

Basal tarsal segment of hind legs without claw-like apical spines, radius, media, and cubitus usually diverging at the same point from basal vein, wings usually angulate at apex. Triozinae Loew

SYSTEMATIC ACCOUNT

Subfamily : PSYLLINAE Loew

Head vertical or deflexed, vertex quadrate ; genal cones always present ; frons visible only as a small sclerite with anterior ocellus as it is almost covered by genae ; antennae ten-segmented, terminal segment with two unequal spines ; thorax arched ; hind tibia with spines at apex ; apical tarsal segment of hind tarsus with two claw-like spines at apex ; forewings thick, transparent, mostly ovate, rounded at apex ; pterostigma and M—Cu present.

Psyllinae ferms one of the largest subfamilies of Psyllidae of the Indian subcontinent, which includes 35 species distributed among 7 genera. Out of these only 7 species are reported from South India. The present study includes 9 more species described as new to science from South India.

Genus *Psylla* Geoffroy (PLATE I)

1762. *Psylly* Geoffroy, *Historie Abreqea des Insects 1:* 482

Type : *Psylla alni* (Linne)

1975. *Psylla.* Mathur, *Psyllidae of the Indian subcontinent.* 224

Head as broad as or broader than thorax, deflexed, distinctly scparated from thorax ; vertex generally elevated at lateral posterior ocelli ; pronotum strongly arched ; genal cones more or less divergent, depressed from plane of vertex, curved downwards ; frons rarely visible as a small sclerite around anterior ocellus ; antenna slender, usually longer than head width. ten-segmented, hind tibia with basal spurs varying in number, apex with 4-10 spines ; apex of basal tarsal segment with two black curved spines ; forewings transparent, apex broadly rounded and never angulate ; cubital petiole usually shorter than basal vein ; pterostigma present.

Out of 14 species reported from Indian subcontinent under this genus only 2 are from Southern region. Five more new species collected from South India are included under this widely distributed genus.

Key to the South Indian Species

1. Wings ovate, apical half narrower than basal half ; radial sector and median vein straight, parallel to each other, pterostigma extending upto apical margin of wing ; antennae long and thick. 3

   Wings oblong, apical half as broad as or broader than basal half ; radial sector and median curved, not parallel, pterostigma not extending upto apical margin , antennae slender. ♀

2. Cubital petiole longer than cubitus , R1 shorter than radius , femur thick with a comb of long straight setae at its apex. *hyalina* Mathur

   Cubital petiole shorter than or as long as cubitus , R1 longer than or equal to radius , comb of apical setae in hind femur absent. 4

3. Genal cones shorter than vertex, large , hind tibia without basal spur , basal vein as long as radius , antenna more than four times as long as vertex. *ternstroemiae* n. sp.

   Genal cones longer than or as long as vertex , hind tibia with a basal spur , basal vein longer than radius , antenna about four times as long as vertex. 5

4. Cubitus three times as long as cubital petiole , first marginal cell almost as long as second, distance between first and second marginal cells shorter than length of first marginal cell. *longus* n. sp.

Cubitus almost as long as cubital petiole, first marginal cell four times as long as second, distance between first and second marginal cells greater than first. *cubicella* n. sp.

5. Pterostigma and anterior margin of forewings with long and thick developed setae, radius more than twice as long as Rl, cubitus shorter than Cul, first marginal cell broader than second. *alaspina* n. sp.

The above setae in pterostigma absent, radius nearly 1. 5 times as long as Rl, cubitus longer than Cul, first marginal cell narrower than second. *shevoroyensis* n. sp.

Psylla alaspina n. sp.

(Fig. 2)

Colouration : Head light brown ; tip of the antennal segments black ; wings yellow ; femur dark brown ; parameres, dorsal and ventral plates black.

Head : pubescent ; vertex twice as long as the width with long scattered setae, serrated, slightly elevated in the middle ; two foval impressions near posterior margin on both sides of median suture, posterior margin emarginate, posterior ocelli at the extreme lateral base of vertex, swollen ; frons covered by ganae, not visible with anterior ocellus ; genal cones as long as vertex, slightly longer than wide, deflexed downward at apex, hairy, divergent, inner margin serrate, base of outer margin distinctly bulging above the eyes ; antennal sockets large, lateral ; eyes hemispherical.

Antenna : slender, sparsely pubescent, shorter than the length of forewings ; basal segments robust, third longest, fifth and sixth equal, fourth longer than fifth, shorter than seventh, apical segments large ; terminal segment with two equal apical spines ; sensoria on segments 4, 6, 8 and 9.

Legs : sparsely pubescent ; femur shorter and wider than tibia beset with rows of minute points ; hind tibia broad at apex, narrow at base

bearing a stout, blunt, thick spur at base, four black long spines at apex besides a comb of setae ; length of apical and basal segments equal ; basal tarsal segment narrow at base and broad apically with two black curved spines ; apical segment with two claw-like spines at apex.

Forewings : pubescent ; about three times as long as wide, broadest subapically, broadly rounded at apex, beset with scattered minute points ; basal vein thick, longer than radius ; radial sector twice as long as R1 and curved upwards to costa subapically ; radius more than twice as long as R1 ; cubital petiole longer than R1, shorter than raius ; cubitus nearly 1.5 times as long as radius, shorter than Cu1 ; Cu2 curved at base before joining the fork M3–4 ; first marginal cell wider than second ; distance between fork M3—4 and Cu1 shorter than between M1—2 and M3—4 ; fork M1—2 and M3—4 joining below the middle of apex ; cells maculate ; costal margin characteristically lined with long pointed setae ; hind wings transparent with scattered minute dots ; base of costal margin with 7–10 long setae including a few hooked setae.

Genitalia : Male : smaller than abdomen, sparsely pubescent ; proctiger loner than hypandrium, but shorter than paramere ; outer margin of paramere straight, uniform, broad at base, apical region narrow bearing a short black thick spine ; inner margin lined with thin setae, including 3-4 distinctly long setae ; apex of fore arm of aedeagus ending with a spoon-like structure ; anal valve hirsute ; posterior margin deeply curved inside ; anterior margin slightly dark ; lateral margine uniform, basally broad and apically narrow.

Female : As long as abdomen ; dark black with setae of various lengths ; dorsal plate longer than ventral ; circum anal pore ring formed by two rows of circular pores, slightly elevated from the surface of the plate sloping posteriorly ; ovipositor long, curved downwards apically.

Measurements : Male (female) : Length of forewings 3212-3287 (3310-3414)* ; Width of vertex between eyes 540-551 (562-567)., Width of vertex with eyes 864-869 (873-881)., Length of antenna 2097-2121 (2135-2150)., Hind femur 594-599 (612-617)., Hind tibia 742-753 (755-761)., Proctiger 399-404., Paramere 443-450., Dorsal plate (1192-1203) Host plant ; *Toddalia asiatica* Lamk-var. *floribunda* (Rutaceae).

*All measurements are in microns unless otherwise mentioned.

Types : Holotype female ; allotype male ; paratypes 9 females and 8 males, Botanical gardens, Nilgiri hills (2400 m), 22.3.1978.

Psylla alaspina n. sp. is closely related to *P. viburns* Loew in shape of forewings, length of radius and shape of genitalia, but is distinct in having characteristically long setae on pterostigma and on the anterior margin of forewings, and four long black spines at apex of hind tibia.

Psylla cubicella n. sp.

(Fig. 3)

Colouration : general colour yellow ; vertex black ; basal antennal segments dark brown ; femur reddish brown ; pterostigma thick yellow.

Head : wider than thorax and antenna ; vertex broader than long, rugulose, sparsely pubescent, broad at base ; median suture prominent ; lateral ocelli at the corner of posterior margin, slightly elevate ; anterior ocellus at the juncture of genal cones ; frons covered by genae, not visible from above ; genal cones devergent, broadly rounded at apex, surface serrate ; antenal socket anterior, extending upto the base of genal cones.

Antenna : ten-segmented, 0.628 mm long, sparsely pubescent ; basal segments robust ; third longest, fourth and seventh equal, sixth smaller than fifth but longer than fourth, eighth longer than seventh ; apical segments equal, slightly larger than othar segments of flagellum, terminal segments with two unequal spines at apex, sensoria on segments 4,6,8 and 9.

Legs : hind tibia 1.5 times as long as femur, apically wide with 5-8 short, black, thick setae at apex ; two tarsal segments equal, basal tarsal segment with two black spines at apex of lateral margins, terminal segment with two claw-like spines at apex.

Wing : forewings ovate, transparent, hyaline, broadly rounded apically, broadest near base, narrow towards apex ; cubital petiole almost as long as basal vein ; cubitus as long as cubital petiole ; first marginal as long as second ; Cu1 about seven times as long as Cu2 ; fork M1—2 longer than M3—4 ; radial sector, median, and Cu1 almost parallel to each other ; R1 slightly longer than radius ; radial sector straight, meeting the apex of wing above midpoint ; hind wings 1.22mm long ; costal vein with 4-6 short setae.

Genitalia : Male : smaller than abdomen ; proctiger broad in middle ; narrow on both ends ; apical end with a pointed projection ; paramere slender, hirsute, longer than hypandrium, margins uniform and smoorh ; forearm of aedeagus 0.119 mm long ending with a spoon-like tip.

Female : smaller than abdomen ; dorsal plate longer than ventral, sparsely pubescent, sloping posteriorly, broad near base, apical half very narrow and pointed on both sides with two rows of brush-like setae which are pointed at base and broad at apex ; circum anal pore ring elongate, 0.119 mm long, formed by two rows of pores, outer row with circular pores, inner with rectangular pores.

Measurements : Male(female) : Length of forewings 1508-1566 (1520-1553)., width of vertex with eyes 669-682 (675-685)., Width of vertex between eyes 378-394 (380-395)., Length of antenna 628-647 (631-646)., Hind femur 194-211 (199-210)., Hind tibia 292-304 (291-300)., Proctiger 270-283., Paramere 205-217., Dorsal plate (540-549).

Host plant : unidentified.

Types : Holotype female, allotype male ; paratypes 25 males, 21 females., Ootacamund Nilgiri Hills (2600 m), 22.3.1798.

Psylla cubicella n. sp. is closely related to *Psylla longus* in the lengths of cubital petiole and R1, but is distinct in having a long first marginal cell, (about 4 times as long as second) and second marginal cell wider than first.

Psyila hyalina Mathur

1975. *Psylla hyalina* Mathur. *Psyllidae of the Indian subcontinent*, ICAR publication, New Delhi. 259.

general colour greenish yellow ; head wider than thorax, almost triangular ; vertex nearly 1.5 times as wide as long, deflexed ; postocellar region elevate ; genal cones about 0.065-0.069 mm long, 0.086-0.090 mm wide, convergent ; antenna nearly 1.5 times as long as head with eyes, femur slightly longer than tibia, about 1.5 times as long as wide ; apical region of hind tibia with 4 spines ; tarsal segments unequall apical tarsal segments (0.097-0.103 mm) 1.5 times as long as basal segment (0.061-0.065 mm) ; basal tarsal segment with 2 black spines apically ; forewings ovate, less than 3 times as long as wide ; pterostigma long and broad basally ; radius shorter than cubital petiole, longer than R1 ; radial sector, media, and Cu1 amost parallel for a distance towards apex ; first marginal cell narrower than second ;

cubitus longerthan Cu1 ; Cu2 longer than M1—2 ; proctiger and dorsal plate longer than parameres.

This species has been collected from *Cassia siamea* Lamk. (Leguminosae) on 24.11.1973 at Tambaram, Madras. 18 females and 13 males were examined.

This species collected from Madras during the present study and earlier from Dehra Dun by Mathur, show polymorphic variability depending on habitat of the species. The specimens reported on *Albizzia procera* could be recognised as macropterous forms (body 1.7 mm long) on the basis of the wing size (2.32 mm long), while specimens recorded on *Cassia siamea* are brachypterous form. Another remarkable variation is the shape of anal pore ring which confirms the identity of brachypterous froms. Macropterous insects possess almost triangular simple pore ring arranged with uniform rectangular cells, while brachypterous froms possess two rows of rings whice are broad sub-basalidy, narrowing gradually towards apex and almost pointed at anterior end. Brachypterous specimens were also collected from kolli hills, Salem.

Psylla longus n. sp.

(Fig. 4)

Colouration : genal cones, vertex, antennae and tibia black ; forewings light yellow ; dorsal plate dark brown ; tip of the paramere brown and other area yellow.

Head: as broad as thorax, sparsely pubescent ; genal cones black except tip, divergent, rugulose ; vertex nearly twice as wide as long, with two small foval impressions on both sides of median suture above posterior margin ; lateral ocelli elevated ; frons covered by genae and not visible ; margins of genal cones serrte, narrowly rounded at apex, almost in the same plane as vertex ; antennal sockets lateral ; eyes hemispherical.

Antenna : ten-segmented, sparsely pubescent ; basal segments robust ; third longest, sixth longer than fifth, but shorter than fourth, seventh sligntly longer than sixth, eighth equal to sixth ; terminal segment slightly longer than ninth with two unequal spines at apex ; sensoria on segments 4,6,8 and 9.

Legs : Yellow ; hind femur shorter and wider than tibia, broadest in middle ; hind tibia broad apically with 5-7 thick, black spines at tip ; basal tarsal segment shorter and slightly broader than apical with two

black stout spines at apex ; terminal segment with two claw-like spines at apex.

Wings : forewings ovate, transparent ; broadest subapically, narrow at base, broadly rounded at apex ; basal vein longest, about four times as long as cubitus slightly smaller than vein, three times as long as cubital petiole ; R1 about twice as long as radius ; rodial sector 1.066 mm long, meeting the apical margin above the centre ; fork M1—2 longer than M3—4 ; first marginal slightly wider than second ; length between first and second marginal cells shorter than length of first ; length between M3—4 and Cu1 about 2/3 the lenth of second marginal cell ; pterostigma broad and short ; hind wings 1.586 mm long ; costal margin thick with 5-8 thin setae.

Genitalia : Male : smaller than abdomen, pubescent ; proctiger longer than paramere, broadest near base, concave posteriorly, apical half narrow with parallel, serrate, black and hairy margins ; parameres black subapically ; outer margin straight, inner margin slightly projecting at middle, apex acutely pointed ; hypandrium longer than paramere but smaller than proctiger ; forearm of aedeagus 0.104 mm long with a spoon-like structure at apex.

Female : Smaller than abdomen, dorsal plate black, longer than ventral, sloping posteriorly and hirsute ; circum anal pore ring broadly ovate, formed by two rows of pores, outer one with small circular pores and inner one with elongate pores ; apex of ventral plate slightly curved upwards with a few short setae.

Measurements : Male (female) : Length of forewings 1924-2045 (1890-2013)., Width of head with eyes 599-621 (589-606)., Width of vertex between eyes 356-368 (355-370)., Length of antenna 881-897 (880-894)., Hind femur 389-404 (384-405)., Hind tibia 443-456 (443-460)., Proctiger 223-229., Paramere 184-191., Dorsal plate (540-551).

Host plant : *Bauhinia* sp. (Leguminosae)

Types : Holotype male, allotype female, paratypes 31 males, 14 females, Amirthy forest, North Arcot Dt., Tamilnadu. 28-12-1977.

Psylla longus n. sp. is closely related to *P. oblonga* Mathur in the shape of forewing, length of cubital petiole, width of pterostigma, and shape of head and genal cones, but is distinct in having first marginal cell slightly wider than second, cubitus three times as long as cubital petiole and a characteristic shape of genitalia (Fig 4 F & H).

Psylla shevoroyensis n. sp,

Colouration ; General body colour light green, vertex yellow ; 6 apical segments of antenna gradually brownish, other segments yellow, lateral margins of fore and mid tibia black, wings with greenish tinge ; tip of the forceps black.

Head: As wide as thorax, deflexed downward, sparsely pubescent, setae long and pointed ; posterior mirgin of vertex and eyes dark brown ; genal cones yellow ; vertex about twice as broad as long, slightly bent down in front, with minute spine-like projections ; post ocellar region elevated ; laterat ocelli at extreme lateral ; posterior margin of vertex projecting outward from margin ; median suture distinctly thick ; frons with front ocellus at anterior end of median suture ; genal cones broad basally, almost as long as vertex, diverged, gradually narrowing towards apex ; apical region broadly rounded, elevated and slightly curved at outer margin ; eyes dark brown and hemispherical ; antennal sockets antere-lateral.

Antenna : two basal segments and the third segment yellowish ; other segments of flagellum gradually brownish towards apex ; third segment with long (0.061—0.075 mm) setae, setae mostly absent in other segments except in one or two at apices ; third longest, fourth and seventh equal but shorter than fifth, sixth and eighth equal to fifth ; two apical segments slightly larger and shorter than the others ; terminal segment longer than ninth with two unequal spines at apex ; sensoria on segments 4, 6, 8 and 9.

Legs : generally yellow ; outer margins of fore and mid tibiae black unlike hind tibia ; hind femur longer and narrower than other femora with a bunch of setae at its apex ; tibia nearly twice as long as femur ; hind tibia with a short basal spur and six long, thick, black spines at its enlarged apex ; tarsal segments unequal ; apical tarsal segment slightly longer than basal ; terminal segment with a pointed base and broad apex ending with a claw-like apical spine and two long setae.

Wings : forewings ovate, transparent, clear, about 1.5 times as long as antenna, narrow at base, broad at the middle and broadly rounded at apex ; veins lined with thin long setae equidistant ; marginal cells unequal ; first cell narrower than second ; basal vein shorter than cubitus but longer than cubital petiole ; cubitus longer than Cul ; radius slightly shorter than basal vein but longer than Rl ; radial sector straight, parallel to pterostigma, and joining above the apex ; anterior median slightly longer than posterior

joining below apex ; length between Cul and M3+4 shorter than between M1+2 and M3+4; hind wings nearly 2/3 as long as forewings, transparent; costal margin thick with four straight setae at base and four hooked setae near middle of costal vein.

Genitalia : *Male :* smaller than abdomen, sparsely pubescent ; anal valve longer than hypandrium, broad in middle, gradually narrowing towards apex; outer margin straight and thick ; hypandrium simple with triangular parameres ; apices of forceps narrow, ending with thick, black, and blunt spinelike structure ; forearm of aedeagus with characteristic short, spine-like projection at the sub-basal region.

Female : Smaller than abdomen, sparsely pubescent ; setae 0.086mm long ; dorsal plate nearly twice as long as ventral, sloping down posteriorly, apical region hirsute, broad basally gradually narrowing towards apex with a small constriction at middle of both the lateral margins ; ventral plate flexed upwards near apex ; anal pore ring almost traingular with a flat apical region, ring formed by two rows of pores, outer one rounded and inner elongate, surrounded by scattered setae ; ovipositor blunt at apex.

Measurements : Male (female) :

Length of the forewings 1508-1571 (1553-1580)., Width of the head with eyes 531-563 (560-569)., Width of vertex between eyes 335-337 (340-342)., Length of antenna 446-456 (448-457)., Hind femur 335-340 (339-345)., Hind tibia 302-303 (301-307)., Dorsal plate (194-196).

Host plant : unidentified.

Types : holotype female, allotype male, paratypes 11 males and 13 females., Yercaud, Shevoroy hills, Tamilnadu (850m) 1-6-1976.

Psylla shevoroyensis n. sp. is closely related to *P. alaspina* in the length of genal cones and basal vein and the presence of a basal spur in hind tibia, but is distinct in having redius about 1.5 times as long as R1, Cubitus longer than Cul and first marginal cell narrower than second, and in not having long setae in pterostigma and in anterior region.

Psylla ternstroemiae n. sp.

(Fig. 6)

Colouratian : genae light green, vertex yellow ; antenna brown ; tarsal segments reddish brown ; tip of the forceps black.

Head : wider than thorax, deflexed downward ; posterior margin black, concave in middle ; vertex nearly twice as wide as long ; anterior margin not clear and merged with base of genal cones ; foval impressions absent ; median suture clear ; frons visible as a small sclerite with front ocellus ; lateral ocelli at extreme posterior margin of vertex ; genal cones large, divergent, shorter than vertex, broad at base, narrowing towards apex, sparsely pubescent ; antennal sockets anterior, eyes hemispherical.

Antenna : about 4 times as long as width of the head with eyes ; ten-segmented, setae almost absent, apices of segments 3-8 and two terminal segments dark brown, the rest light brown ; basal segments robust, third longest and about 1.5 times as long as fourth, fifth and sixth equal, eighth shorter than seventh ; terminal segment with two equally long apical setae ; sensoria on segments 4, 6, 8 and 9.

Legs : slender, pubescent ; femur shorter than tibia ; basal tibial spur absent in hind tibia, apex of tibia larger with 5-8 thick black spines ; tarsal segments unequal, basal tarsal segment smaller than apical with two black pointed spines projecting upwards on both sides of apex, apical tarsal segment with two claw-like spines at apex.

Wings : oblong, nearly 5 times as long as width of vertex ; broadly rounded at apex, broadest in middle ; apex of anal vein and base of radius dark brown, basal vein 1-5 times as long as cubital petiole ; radius as long as basal vein, slightiy bent in middle and joining above middle of anterior margin ; R1 shorter than M+Cu ; median vein long (0.702-0.744mm) ; fork M1+2 longer than fork M3+4 ; Cul short, curved backwards ; pterostigma short, norrow ; marginal cells subequal, first marginal cell slightly wider than second, distance between marginal cells shorter than between fork M1+2 and fork M3+4 ; hindwings nearly 2/3 as long as forewings.

Genitalia : Male : shorter than abdomen, anal valve folded inward, pubescent, apex deflexed downwards in front, slightly longer than forceps, but shorter than hypandrium ; parameres broad at base, apex prolonged with a hardened black spine-like structure ; hypandrium triangular ; forearm of aedeagus much longer than hind ending with spoon-like structure.

Female : shorter than abdomen ; apex sharply curved upwards ; dorsal plate nearly 1.5 times as long as ventral, sloping posteriorly, surface lined with short thick setae and long slender setae ; ventral plate with a small bulge near centre ; ovipositor with a blunt tip ; anal pore ring 0.280mm long, formed by two rows of pores, ovate, broadest subapically.

Measurements : Male (female) :

Length of the forewings 2340-2349 (2355-2363)., Width of the head with eyes 713-720 (723-730)., Width of vertex between eyes 443-454 (450-461)., Length of antenna 1712-1805 (1766-1816)., Hind femur 468-471 (472-479)., Hind tibia 546-555 (553-562)., Proctiger 270-274., Dorsal plate (1069-1102).

Host plant : *Ternstroemia japonica* Linn. (Ternstromiaceae)

Types : Holotype female, allotype male, paratypes 4 males and 2 females, Nilgiris (2200m), 23-3-1978.

Psylla ternstromiae n. sp. is closely related to *P. santali* Mathur, in size of wings and pterostigma, length of radius and in absence of basal spur on hind tibia, but is distinct in having basal vein as long as radius, antenna more than 4 times as long as vertex and anal pore rings acutely pointed at apical half.

Genus *Euphalerus* Schwarz.

1904 *Euphalerus* Schwarz. *Proc. ent. Soc. Wash 6 :* 234-245

Type *Euphalerus nidifex* Schwarz.

1975 *Euphalerus*, Mathur, *Psyllidae of the Indian subcontinent*, 224.

Head as wide as thorax, regulose ; vertex horizontal, pubescent, genal cones quardrate, in the same plane as vertex ; eyes recessive ; hind tibia usually with basal spur and 3-6 thick, black apical spines ; apical tarsal segment with two claw-like spines at apex ; forewing ovate, hyaline, membranous, apex rounded or angulate ; pterostigma present ; veins sometimes maculate, surface maculate ; first marginal cell usually larger than second ; radial sector long, touching apical margin.

This genus was originally described from the Neotropical region. Only one species *viz.*, *Euphalerus vittatus* Crawford was reported by Mathur representing this genus in India. Another species, *E. marginalis* Capener, was collected from South India during this study and this forms the first record of this species in the Oriental region. The revised and detailed description of this species is given below. The distribution is not clearly understood.

Euphalerus marginalis Capener.

(Fig. 7)

1973 *Euphalerus marginalis* Capener. *J. ent. Soc. Sth. Afr. 36(1) ;* 54-57.

Head : as wide as thorax ; foval impressions medially in two halves of vertex ; median suture clear ; genal cones 0.163mm wide, vertex pale yellow, wider than long ; vertex and genal cones in same plane, both sparsely pubescent ; frons not visible from above ; anterior ocellus light red, post ocellar region elevated, lateral ocelli swollen ; antennal sockets lateral, deep near eyes ; eyes large and hemispherical.

Antenna : Long (0.609), ten-segmented, slender, generally pale yellow ; basal segments and apex of ninth segment brown ; terminal segment black, third longest, seventh and eigth equally long, sixth slightly smaller than seventh, but nearly twice as long as fifth ; terminal segments almost equal ; two unequal spines on tenth ; sensoria on segments 4, 6, 8 and 9.

Legs : sparsely pubescent ; femur slightly shorter than tibia, more than twice as wide as tibia ; hind tibia with a short, triangular basal spur and four thick, black spines at apex, two of which longer than other two ; apical tarsal segment with two claw-like apical spines besides a distinct long terminal setae.

Wings : forewings with minute spots ; anal and apical margins black, more than twice as long as the width, broad subapically, upper and lower margins almost parallel in middle, broadly rounded at apex, surface of lower half maculate, lower margin thick brown below cubital fork and above median fork, small round brown patches all over the veins of wing ; median vein about 1.5 times as long as basal vein ; cubital petiole shorter than radius but longer than cubitus ; Cu1 longer than Cu2, Cu2 curved slightly backwards before joining the wing margin ; anterior median longer than posterior, joining almost in middle of apex ; R1 nearly three times as long as radius ; radial sector long, joining the upper margin of wing after a slight bend downwards ; pterostigma wide and short ; marginal cells sub-equal, second cell shorter and narrower than first ; hind wings clear, transparent, base of costal margin with scattered setae including 4-6 hooked setae.

Genitalia : Male : smaller than abdomen ; proctiger longer than hypandrium, broadest in middle ; lower margin concave, basal half of lateral margins uniform ; apical half serrate with thin setae ; parameres nearly half as long as proctiger ; outer margin hirsute and uniform, inner margin curved, meeting outer apex forming a rough brownish pointed spine-like structure ; forearm of aedeagus 0.514 mm long with a spine-like end at its apex.

Female : smaller than abdomen, lined with long setae in the middle surface of dorsal and ventral plates ; dorsal plate much longer than ventral, sloping posteriorly and curving upwards at the apex ; annal pore ring elongate, formed by two rows of pores, inner row is round shaped and outer almost rectangular ; ovipositor pointed at apex.

Measurements : Male (female) :

Length of forewings 1559-1908 (1578-1601)., Width of head with eyes 648-662 (643-649)., Width of vertex between eyes 320-329 (326-328)., Length of antenna 609-622 (612-620)., Hind femur 375-380 (377-381) , Hind tibia 401-412 (398-403)., Proctiger 245-247., Paramere 133-139., Dorsal plate (510-514).

Host plant : *Cassia marginata* Roxb. (Leguminosae)

30 male and 73 female specimens were collected from Loyola College Campus, Madras on 20-12-1976 and examined. The identity of this species was confirmed by David Hollis (personal communication, 1976).

Genus *Euphyllura* Foerster

1848. *Euphyllura* Foerster, *Verh. naturh. Ver. preuss Rheinl. 3 :* 93

Type *Euphyllura phillyrae* Foerster.

1975. *Euphyllura*, Mathur, *Psyllidae of the Indian Sub continent.* 228.

Head deflexed ; vertex flat, as wide as thorax ; genae developed into two transverse lobes, on the same plane as vertex ; anterior ocellus overlapping genal lobes ; eyes recessive ; basal spine of hind tibia absent, apical spines present ; apical tarsal segments with two claw-like spines at apex ; forewings strongly rhomboidal, thick, maculate, wing margin irregular ; R1 sometimes incomplete ; first marginal cell smaller than second.

Totally 4 species are recorded from Indian region and one more species reported here, which is new to science, is collected from South India during the present study.

KEY TO THE SOUTH INDIAN SPECIES

1. Forewing almost rhomboidal, coriaceous, much broader near base, apex near the anterior margin 2

   Forewing elongate, some what like a parallelogram, not broader near base ; apex is not closer to anterior margin. 3

2.	Second marginal cell small; R1 incomplete distally, not touching the costa ; radial sector, media and cubitus parallel to each other at the centre of wing.	*caudata* Mathur
	Second marginal cell large ; R1 complete distally, curved to costa ; radial sector, media, and cubitus not parallel to each other	*olivina* Mathur
3.	Genae present ; vertex about twice as broad as long ; hind tibia with five black tooth-like spines at apex	4
	Genae obsolete ; vertex about 2.5 times as broad as long ; hind tibia with seven spines at apex	*obsoleta* Mathur
4.	Genae dark black ; radial sector bending upward near anterior margin ; first marginal cell shorter than second ; cubital petiole half as long as cubitus	*nigrigenata* n. sp.
	Genae yellow ; R1 almost straight ; first marginal cell slightly longer than second ; cubital petiole and cubitus equally long	*concolour* Mathur

Euphyllura nigrigenata n. sp.

(Fig. 8)

Colouration : general body colour dark brown ; genae unusually dark a apices of the antennal segments brown, middle and base of some segments yellow ; forewings with dense dark spots ; hypandrium reddish brown, tip of the dorsal plate black.

Head : finely punctate, sparsely pubescent ; genae black ; width of head with eyes three times as long as length of vertex ; vertex about twice as broad as long ; foval impressions unclear ; lateral ocelli at extreme base of vertex, divergent from eyes, swollen ; anterior ocellus at the juncture of genal cones ; genal cones black, rugulose, deflexed downward, nearly as broad as the width of eyes ; eyes hemispherical.

Antenna : 0.682mm long, nine-segmented, apex of all segments distinctly dark brown ; rest of the regions yellow ; serrate and setae absent ; sensoria of fourth antennal segment unusually present at middle of the segment instead of usual apical position; surface of segments with rosette-like lines; basal segments robust ; third longest, fourth longer than sixth but

smaller than fifth, eighth longer than seventh ; apical segment smallest with two unequal spines at its tip ; sensoria on segments 4, 5, 7 and 8.

Legs : middle of femur, apex of tibia, apical half of basal tarsus and apex and base of apical tarsal segments black, rest of the regions yellowish brown ; sparsely pubescent ; femur shorter than tibia, apex with an ovate depression ; apex of hind tibia broader than base with 5-8 thick, black spines ; apical tarsal segment longer, but narrower than basal segment distinctly possessing a tarsal pad attached to apical depression ; the transparent pad with a narrow rounded apical margin and a broad concave posterior margin ; surface lined with short minute setae, the pad guarded on both lateral sides by two thick, black spines ; apical tarsal segment with two claw-like spines at apex.

Wings : forewings broad, about half as wide as long, maculae scattered; broadly rounded at apex ; basal vein longer than cubital petiole ; R1 2.5 times as long as radius, incomplete by not joining with dorsal margin ; pterostigma not clear ; radius long, with a middle and a subapical curve ; radial sector curved upwards meeting anterior margin ; fork M1+2 curved upwards from the median and joining above middle of apex, while fork M3+4 joining below centre ; cebitus nearly five times as long as Cu2 ; cubital petiole half as long as cubitus ; marginal cells subequal, second marginal cell longer and broader than first, the lower margin of second marginal cell slightly bulging from contour of lower line, distance between the two cells longer than between fork M1+2 and M3+4 ; marginal veins of wings with many patches absent in inner veins ; hind wings 2.265mm long, transparent, veins brownish, costal margin with 5-8 short setae.

Genitalia : Male : smaller than abdomen; lateral half of paramere dark black, other regions brown; hypandrium and proctiger square, pubescent; proctiger longer than hypandrium with dense setae at its apex ; parameres broadest in middle and pointed at tip ; forearm of aedeagus 0.25mm long with a spoon-like end at apex.

Female : smaller than abdomen ; upper surface of dorsal plate black ; tip of dorsal and ventral plates with a long bunch of hairs ; other surfaces sparsely pubescent ; upper margin of dorsal plate bent downward in front ; circumanal pore ring 'plus' (+) shaped with dense pores, the outer pores round and the inner rectangular ; ovipositor pointed.

Measurements : Male (female)

Length of forewings 2678-2701 (2690-2721)., Width of head with eyes 950-971 (962-980)., Width of vertex between eyes 670-689 (679-694)., Length of antenna 682-702 (690-711)., Hind femur 468-479 (476-485)., Hind tibia 560-578 (567-583)., Proctiger 248-259., Paramere 194-202., Dorsal Plate (680-697)., Ventral plate (302-311).

Host Plant : unidentified.

Types : Holotype female, allotype male, paratypes 57 males,87 females, Yercaud (1650m) shevoroy hills, Tamilnadu, 1-5-1978.

Euphallura nigrigenata n. sp. is closely related to *E. concolour* Mathur in the shape of forewing and genal cones, and length of R1, but is distinct in having characteristic transparent tarsal pad at apex of basal tarsal segment, curved radial sector, first marginal cell shorter than second, cubital petiole half as long as cubitus, apices of antennal segments black and the fourth antennal sensoria at middle of segment.

Genus *Diaphorina* Loew

1879 *Diaphorina* Loew,*Verh. zool. bot. Ges. Wien. 29:* 567

Type *Diaphorina putonii* Loew

1975 *Diaphorina*, Mathur, *Psyllidae of the Indian Subcontinent*, 189

Head narrower than thorax, rugulose, dark brown, pubescent; vertex horizontal; genal cones large, broadly rounded at apex, as long as or longer than wide, punctate; antenna short, ten segmented, almost all the apices of segments distinctly larger than base; legs densely hirsute; hind tibia with apical spines; apical tarsal segment with two claw-like spines at apex; forewings vary in shapes and thicknesses, always maculate; broad subapically, apex broadly rounded; pterostigma narrow and long; radial sector long, meeting apex above middle; first marginal cell shorter than second.

Out of 9 species known from Indian region, 4 species are reported from south India. Present study includes 3 species recorded as new to science and 2 already described species recorded first time from Southern region.

KEY TO THE SOUTH INDIAN SPECIES

1· Body smoky black or fuscous ; wings maculate intermingled with a few hyaline areas ; genal cones approximate and broadly rounded at apex

	Body yellowish brown, brown or orange with greenish tinge; wings partly maculate ; genal cones divergent, and apex triangular.	3
2.	Genal cones narrowly rounded at apex, slightly deflexed ; surface of the hind femur sparsely hirsute.	4
	Genal cones truncate at apex and directed forward ; margin of hind femur dark black, highly hirsute and serrate.	*truncata* Crawford
3.	Hind tibia with a black spines at apex ; proximal hind tarsal segment longer than distal with one spine ; proctiger triangular	*murrayi* n. sp.
	Hind tibia without spines at apex ; tarsal segment equally long and proximal segment with two claw-like spines at apex ; proctiger flask-shaped.	*citri* Kuwayama
4.	Maculae dense ; first marginal cell twice as long as wide ; six thick bands in wing margins ; lateral margings of parameres almost parallel to each other	*verbera* n. sp.
	Maculae not dense ; first marginal cell not as above, marginal bands of wings absent ; lateral margins of parameres nonparallel with a constriction above base.	*loyolae* n. sp.

Diaphorina loyolae n. sp.

(Fig. 9)

Colouration : general colour yellowish brown ; vertex black, antennal segments yellow except 3rd which is brown ; hind tibia with black spines ; wings greenish brown ; margins of dorsal plate black.

Head : smaller than thorax, punctate, highly pubescent ; vertex flat, nearly twice as wide as long, emarginate at posterior margin ; two foval impressions on each side of median suture near posterior margin ; post ocellar region elevated ; lateral ocelli at the juncture of posterior and lateral margins ; frons not visible ; front ocellus clear at anterior margin ; genal cones on same plane as vertex, hirsute, base of genal cone almost fused with anterior margin of vertex, as wide as the length of vertex, approximate, outer margin rough, dark, and serrate, apices of genal cones round with a distinct bulge from margin ; antennal sockets anterior in position.

Antenna : nearly 1.5 times as long as width of head with eyes ; basal segments, apical segments and apical half of third segment brown, rest yellow ; basal segments robust, third longest, fourth, fifth, and eighth equal, sixth longer than fifth, seventh shorter than fifth, apex of the eighth wider than the base of ninth ; terminal segments longest ; apical segment with two unequal spines at apex ; sensoria on segments 4,6,8 and 9.

Legs : sparsely pubescent ; femur, base of tibia, and distal segment of segment of tarsus brown, other regions yellow; femur shorter and larger than tibia ; hind tibia about 1.5 times as long as femur, narrow subbasally, with pointed setae ; apex large with 8-10 short thick, black spines basides a small basal spur; tarsal segments unequal, basal tarsal segment shorter than apical, with two short black and stout spines; terminal segment very narrow across basal joint, its apex having two claw-like spines.

Wings : four times as long as antenna, maculate ; juncture of radial sector and Rl, bases of median and cubital petiole, and Cul with brown patches; forewings broadest subapically ; veins lined with scattered, short, and pointed setae ; surface with short spines ; median vein twice as long as basal vein, longer than cubitus ; fork M1+2 longer than fork M3+4 with a slight upward curving at base ; second marginal cell longer and wider than first ; Cu2 shorter than cubital petiole, curved backwards before joining posterior margin of wing ; radial sector long, joining above center of broadly rounded apex ; radius parallel to median for a distance, pterostigma narrow and long ; hindwings 3/4 as long as forewings ; costa thick with five straight thin setae including a few hooked setae.

Genitalia : Male : smaller than abdomen, pubescent, dark brown ; proctiger 1. 5 times as long as wide, outer margin uniform, straight and thick, inner margin broadest near middle, apex and base narrow; parameres five times as long as wide ; lateral margins nonparallel, with a constriction above base ; apical margins with a black spot surrounded by numerous setae ; hypandrium triangular with a spur-like projection near tip of anterior margin ; forearm of aedeagus ending in a spoon-like structure.

Female : smaller than abdomen ; hirsute, brown ; dorsal plate nearly twice as long as ventral ; ovipositor slightly curved upwards ; anal pore ring nearly 1/3 as long as dorsal plate, formed by two rows of pores, the outer pores round and inner ones rectangular.

Measurements : Male (female) : Length of forewings 2080-2133 (2026-2070)., Width of the head with eyes 637-651 (620-629)., Width of vertex bet-

ween eyes 346-353 (340-347)., Length of antenna 521-529 (516-522)., Hind femur 364-366 (360-362)., Hind tibia 546-550 (545-548)., Proctiger 324-327., Dorsal plate (616-619).

Host plant : *cordia* sp. (Boraginaceae)

Types : Holotype female, allotype male, paratypes 22 males and 13 females, Coimbatore, Tamilnadu. 7-5-1977.

Diaphorina loyolae n. sp. is closely related to *D. verbera* in shape of genal cones and forewings and nature of hind femur, but is distinct in not having marginal bands of forewings, and in having the lateral margins of parameres nonparallel, outer margin with a constriction near base, and hypandrium with a triangular projection near the end of anterior margin.

Diaphorina citri Kuwayama

1907 *Diaphorina citri* Kuwayama, *Trans. Sapparo nat. Hist. soc. 2:* 160

1912 *Euphalerus citri* Crawford, *Rec. Indian Mus. 7:* 424-425

1975 *Diaphorina citri* Mathur, *Psyllidae of the Indian subcontinent,* 198

Vertex wider than long, lateral margins almost parallel to each other; frons concealed by genae ; genal cones 0.153-0.156mm long, antenna about thrice as long as genal cones ; apical segments black ; hind tibia nearly 1.5 times as long as femur ; femur more than twice the width of tibia ; apical tarsal segment longer and wider than basal tarsal segment with two black short spines at apex ; forewings partially maculate, maculae continuously occurring from apex of radial sector to marginal cells, length more than three times the width of head with eyes ; radial sector joining near centre of anterior margin ; radius 2.5 times as long as cubital petiole ; fork M1+2 longer than fork M3 +4 ; Cu1 more than twice as long as Cu2 ; hypandrium triangular ; forceps long; lateral margins parallel and uniform, inner margin with a comb of setae; proctiger broadest in middle ; ventral plate smaller than dorsal and curved upwards apically ; apex of dorsal plate hirsute : ovipositor with a blunt end apically.

Though this species was originally described under *Diaphorina* (Kuwayama 1907), Crawford (1912) placed it under *Euphalerus*. It possesses many characters of *Euphalerus* such as the forewings rounded at apex and large genal cones in same plane as vertex, but unlike in *Euphalerus*, head is narrower than thorax, a strong character distinguishing *Euphalerus* from *Diaphorina*. Considering this, Ayyar (1923) and Miyatake (1964) mentioned this species only under *Diaphorina*, the genus it originally belonged to. Besides,

the anal pore rings of this species are akin to those in *Diaphorina* which are ovate with two rows of pores, of which outer row consists of round pores while the inner one is of elongate pores.

This species has been reported from many high altitude regions of North India and from the Western ghats of South India. It has got a wide distribution in South India and during this study 62 females and 27 males were collected from *Citrus* sp. at Madras and Salem.

Diaphorina muraryi n. sp.

(Fig. 10)

Colouration : general body colour brown ; posterior margins of eyes and vertex black ; two apical segments of antenna black ; forewings yellow with scattered brown maculae ; legs pale brown ; hypandrium brown ; tip of the dorsal plate black.

Head : smaller than thorax, pubescent, rugulose ; vertex flat, twice as wide as long, two foval impressions on both sides of median suture almost touching the base of vertex ; posterior margin thick, emarginate ; post ocellor region on the same plane as vertex ; lateral ocelli small, elevated, situated at inner margin of eye ; anterior ocelli at the extreme front ; genal cones on the same plane as vertex, wide, 0.122mm at base, hirsute, broadly rounded at apex, not deflexed ; antennal sockets lateral.

Antenna : surface serrate, setae almost absent, 0·416mm long, ten-segmented ; terminal segments and apex of eighth segment black ; basal segments robust ; third longest, sixth slightly longer than fifth but shorter than seventh, foruth and seventh almost equal, ninth shorter than eighth, terminal segment smallest with two unequal apical spines ; sensoria on segments 4,6,8, and 9.

Legs : yellow, pubescent ; tibia about 1.5 times as long as femur ; hind femur broadest in the middle ; basal tibial spine absent ; apical half of hind tibia broader than basal half with three transparent pointed short setae besides five, black, stout, and long spurs at apex ; basal tarsal segment smaller than apical with two black spines at apex ; terminal segment with two claw-like spines at apex.

Forewings : nearly as long as body length, thrice as long as wide, broadest at apex gradually narrowing towards the base, maculae scattered ; junction of radius, R1, and radial sector, bases of anal and median veins with

black patches ; maculae occupying first marginal cell fully and running through apical half of second marginal cell towards radial sector ; basal vein 1.5 times as long as cubital petiole ; cubitus longest, more than three times as long as Cu2 ; anterior median longer than posterior, joining at middle of apex ; radius more than 3. 5 times as long as R1 ; radial sector long (1.07 mm), bending downward subapically, joining above the fork M1 + 2 at apex ; marginal cells subequal, first marginal cell smaller and narrower than second; distance between Cu1 and fork M3+4 shorter than between fork M1 +2 and M3+4 ; pterostigma narrow ; hind wings 1. 742mm long, transparent ; costal margin with 5-10 short transparent setae.

Genitalia : *Male* : smaller than abdomen, hirsute ; proctiger longer than paramere and hypandrium, almost triangular, broadest in middle ; lateral margins narrow towards apex and towards base from middle ; apical margin serrate ; parameres long, rectangulr, setae dense ; fore arm of aedeagus 0.173 mm long ending in a spoon-like tip.

Female : smaller than abdomen, black at apex ; dorsal plate almost triangular, basal margin broadly rounded, apical margin pointed with long thin setae intermixed with short dense setae ; ventral plate blunt at tip ; circum anal pore ring ovate formed by two rows of pores, the outer composed of round pores, the inner one of long rectangular pores, the whole structure bordered by uniform setae with thin base at regular intervals ; tip of ovipositor blunt.

Measurements : Male (female) : Length of forewings 2132-2149 (2155-2182)., Width of head with eyes 622-639 (620-643)., Width of vertex between eyes 337-351 (341-360)., Length of antenna 428-429 (435-450)., Hind femur 337-351 (340-362)., Hind tibia 469-478 (469-480)., Proctiger 286-299., Paramere 245 258., Dorsal plate (585-593).

Host plant : Murraya exotica Linn. (Rutaceae)

Types : Holotype male, allotype female, paratype 7 males and 4 females, Madras, 16-6-1977.

Diaphorina murrayi n. sp. is closely related to *D. citri* Kuwayama in shape of head with parrallel sides, size of genal cones and in presence of maculae of forewings continuously along margin from the apex of radial sector to first marginal cell, but is distinct in having long maculate at base of median, five black spines at the tip of hind tibia, and proximal tarsal segment longer than distal with spine.

Diaphorina truncata Crawford

1924 *Diaphorina truncata* Crowford, *Rec. Indian Mus. 26* (6) : 617

1975 *Diaphorina truncata* Mathur, *Psyllidae of the Indian subcontinent*, 218

Head narrower than thorax, slightly bent downward in front ; vertex 0.260-0.266 mm long, wider than long ; frons not visible from above ; genal cones characteristic with a bifurcation at apex ; 0.130-0.133 mm and 0.208-0.214 mm long, apex truncate ; antenna shorter than the width of vertex ; hind tibia with one stout, black apical spine besides 6-8 spines at margin ; apical and basal tarsal segments of hind legs 0.130-0.139 mm and 0.117-0.125 mm long respectively ; basal tarsel segments with two spines at apex ; forewings maculate, characteristically angular at anterior margin, widest apically, 1.274-1.291 mm wide ; junction of fork M1+2 with apical margin slightly projecting from wing margin ; radius 0.650-0.661 mm long ; first marginal cell slightly longer than second ; distance between Cu1 and fork M3+4 shorter than width of first marginal cell ; hind wings 2.288-2.97mm long and 0.806-0.811mm wide ; proctiger 0.416-0.421mm long and parameres 0.091-0.097mm long.

95 males and 88 females were collected from the host plat *Strychnos nux-vomica* on 5-5-1978 at Salem. The feeding of nymphs causes a crinkling appearance to the leaves.

D. truncata is distinct from other species of this genus in having truncate genal cones, a characteristic feature of the African species, thus indicating its close relationship with the Ethiopian species. Reports show that its distribution is restricted to South India (Walayar forests). The earlier collections from Salem and Calicut are available in the Forest Research Institute, Dehradun.

Diaphorina verbera n. sp.

(Fig. 11)

Colouration : general body colour reddish brown ; head black ; basal and apical two segments of antennae black ; forewing densely meculated with spots, apical margins with 5 or 6 black bands ; hind femur black, tibia yellow ; dorsal and ventral plates dark brown ; forceps yellow.

Head : punctate, smaller than thorax, deflexed in front, pubescent ; vertex twice as wide as long, two linear foval impressions on either side of median suture ; posterior margin black, deeply invaginated ; posterior ocelli

elevated at base of lateral margin facing eyes ; frons concealed by genal cones ; anterior ocellus visible from above ; anterior margin of vertex almost straight ; antennal sockets visible laterally with dark black rim ; genal cones thick, longer than wide, porrect, deflexed downward in front, ridges black and serrate, broad at base, narrow at apex ; eyes hemispherical.

Antenna : ten-segmented ; basal segments robust ; third longest, sixth longer than fifth but shorter than fourth, seventh and eighth almost equal ; apical segments and tip of eighth segment dark black ; terminal segment with two unequal claw-like spines ; sensoria on segments 4, 6, 8 and 9.

Legs : femur smaller than tibia, large, hirsute, three times as wide as tibia ; hind femur robust, black, setae short and thick, with two thick, black curved spines at apex ; tibia long, about twice as long as femur, basal spines absent, 10-14 black, blunt, apical spurs present ; basal tarsal segment longer and wider than apical, with two stout black spurs at tip ; apical segment narrow at base with two claw-like spines at apex.

Wings : forewings large, broad at apex, narrow at base ; maculate with brown or black patches ; maculate with rough minute points, three times as long as wide, round at apex ; six equal brownish stripes at apical margin besides three other such bands-one at the junction of radius and R1, another at base of anal vein, and the third at costal margin ; radius about three times as long as R1 ; R1 and cubital petiole almost equal ; radial sector long, extending to apex ; curved upwards to costa ; Cu2 bending back before joining posterior margin ; first marginal cell twice as long as wide ; distance between M1+2 and M3+4 longer than between M3+4 and Cu1 but shorter than between Cu1 and Cu2 ; hind wings three times as long as wide ; costal margin and basal vein thick, brown ; costal margin with a row of straight simple setae including some hooked setae ; four distinct round points at radius near its junction with media.

Genitalia : Male : smaller than abdomen, densely hirsute ; proctiger narrow at base, wide apical region folded in middle with dark ridges ; parameres longer than hypandrium but shorter than proctiger, pubescent, with blunt setae and a thick black spur at its apex ; outer margin with a slight bulge near base ; inner margin uniform ; hypandrium simple ; fore arm of aedeagus with a spoon-like tip.

Female : smaller than abdomen ; both plates subequal, dorsal plate slightly longer than ventral, sloping posteriorly, tip pointed, with many short spines ; anal pore ring about 1/3 the length of dorsal plate, inner ring with long

pores, outer with rounded pores, one more outer row of rounded pores with clear gap in between ; ovipositor long and pointed.

Measurements : Male (female) : Length of forewings 2681 (2673)., Width of head with eyes 659(648)., Lenght of vertex 160 (151)., Antenna 540 (524)., Hind femur 420 (416)., Hind tibia 735 (728)., Proctiger 338., Paramere 270., Dorsal plate (595).

Host plant : *Santalum album*, Linn. (Santalaceae)

Types : Holotype female, allotype male, Kodaikkanal (1450m), 28-6-1977.

Diaphorina verbera n. sp. is closely related to *D. communis* Mathur in the density of maculae with scattered spots on forewings, the colour of the body and shape of genal cones, but is distinct in having six thick bands on the margin of forewing and long marginal cell.

Subfamily : TRIOZINAE Loew

Head as long as, or shorter than thorax ; apex of prescutum rounded ; vertex flat ; frons not visible except a small sclerite sorrounding front ocellus; genal cones prominent, vertical ; eyes hemispherical ; pseudoveins absent ; forewings membranous, clear ; costal margin convex, angular at apex gradually narrowing towards apex ; pterostigma absent ; cubitus, media, and radius originating from basal vein at a point ; radius short and curved to costa ; hind tibia with three or four spines at apex, one of which may be present separately outside ; spines of proximal tarsal segment absent.

Many gall forming psyllid species belong to this subfamily. Out of 29 species recorded from India 14 are from Southern region. 14 species which are new to science, collected during this study from South India are included. A new genus is added to the already existing 4 genera of this subfamily.

KEY TO THE GENERA OF TRIOZINAE

1. Cubitus, media, and radius leaving the basal vein at the same point, i.e., strictly trichotomus ; radial sector curved upwards joining costal margin in the middle of forewing or extending up to the apex ; basal vein shorter than, if not as long as cubitus 2

   Branching of basal vein not strictly trichotomous ; radius and media or cubitus and media of forewing with short, prominent common base ; radial

sector rarely extending upto apex ; basal vein longer than cubitus. *Ceropsylla* Riley

2. Colour of the body yellowish brown ; setae thin and yellow ; surface of the genal cones and of antennae smooth and uniform *Trioza* Foerster

Colour of the body thick black ; setae thick, long and black ; surface of the genal cones and of antennae serrate and highly regulose. *Indotrioza* gen. nov.

Genus : *Ceropsylla* Riley

1893 *Ceropsylla* Riley. *Proc. biol. Soc. Wash. 2* : 76

Type : *Ceropsylla sideroxyli* Riley

1975 *Ceropsylla*, Mathur, *Psyllidae of the Indian subcontinent*, 301

Basal vein not showing strictly trichotomous branching ; on the other hand cubitus and media or some times radius and media of forewings branching separately from basal vein with a distinct short, common base ; radial sector usually short and curved to costa ; basal vein long, post ocellar region elevated ; hind tibia always with a comb of long thin basal setae.

Only 3 species are reported so far and all of them are from North India by Mathur. The present investigations added 3 more new species collected from Southern region.

KEY TO THE SOUTH INDIAN SPECIES

1. Fork M1+2 meeting above the apex of forewing, first marginal cell longer and wider than second 2

Fork M1+2 meeting exactly at the apex of forewing ; first marginal cell shorter and narrower than second. *parvus* n. sp.

2. Radial sector curved to costa, meeting anterior margin in the middle of wing between its apex and junction of R1 ; hind tibia with three thick short spurs at apical region ; inner margin of forceps with a round projection in the middle ; surface of thorax distinctly serrated *indica* n. sp.

Radial sector very long, extending upto the apex of anterior margin ; hind tibia with 3 short thick spurs at base and 4-6 short spurs at apex, the projection in the inner margin of forceps absent in parameres ; surface of thorax smooth. *longivenata* n. sp.

Ceropsylla indica n. sp.

(Fig. 12)

Colouration : general body colour yellow ; head yellowish brown : antenna generally yellow ; wings pale ; hind femur brown , apices of the parameres black.

Head : yellowish brown, narrower than thorax, surface serrated and puncate , vertex about 1.5 times as wide as long , flat ; posterior region emarginate, anterior margin broadly rounded with anterior ocellus in the middle ; post ocellar region elevated, lateral ocelli swollen , two long foval impressions in the middle and on both sides of median suture, genal cones in the same plane as vertex, about 1/3 as wide as vertex, divergent, curved upwards apically, broad basally, gradually narrowing towards apex , antennal sockets anterior in position , eyes hemispherical.

Antenna : except the two brownish apical segments, others yellow , as long as the width of head with eyes ; setae absent in all the segments except two unequal spines at terminal segment of flagellum ; basal segments robust , third longest, as long as the length of segments 4, 5, and 6 together, fourth slightly longer than fifth, fifth and eighth equal and each longer than seventh but smaller than sixth , terminal segments longer than the rest of flagellum, apical segment slightly larger than ninth, sensoria on segments 4, 6, 8, and 9.

Legs : all segments yellow except a brown hind femur ; sparsely pubesent, setae short ; hind tibia longer than femur with three thick, black, basal spines one of which is widely placed, and besides the others three short pointed spurs at base ; tarsal segments unequal ; basal tarsal segment about twice as wide as apical tarsal segment ; base narrow at its juncture with tibia, apical segment with two unequal clawlike spines at its tip ; meracanthus curved and pointed.

Wings : hyaline, transparent, ovate, broadly rounded subapically, and angulate at apex with thick margins ; basal vein longer than cubitus, about twice as long as radius ; radius nearly 2.5 times as long as R1 ; radial sector curved to costa and joining costal margin between costa and R1 juncture, and apex of the wing ; median twice as long as cubitus ; fork M1 +2 longer than fork M3 +4 joining above the apex of wing margin ; marginal cells subequal, first marginal cell wider but shorter than second ; apical half of Cu1, Cu2, and fork M3 +4 almost parallel joining the posterior margin of wing ; median and cubitus joining together and forming a short common cubital petiole ; hind wings about 2/3 as long as forewing and costa with four straight, pointed

setae and three hooked setae near the base besides a single hooked setae in the middle of anterior margin.

Genitalia : Male : shorter than abdomen, hirsute , proctiger longer than paramere with a broad, round projection at the centre of inner margin , outer margin straight ; parameres slightly longer than the height of hypandrium ; apex black and hard, broad subbasally and narrow at the tip ; hypandrium almost triangular ; fore arm of aedeagus shorter than hind arm with a spoon-like end.

Female : female specimens were not available during collection from the type locality.

Measurements : Male : length of the forewings 1845-1922., Width of head with eyes 581-588., Width of vertex between eyes 367-370., Length of antenna 586-612., Hind femur 416-426., Proctiger 227-229., Paramere 194-199.

Host plant : *Terminalia arjuna* W & A. (Combretaceae)

Types : Holotype male ; paratypes 6 males, Madras, 19-6-1977.

C. indica n. sp. is closely related to *C. ferruginea* Mathur (Mathur, 1975) in the shape of wing and parameres and presence of three short basal spurs at hind tibia but is distinct in having proctiger with a characteristic shape, short genal cones, fork M1+2 slightly longer than fork M3+4, and short antennae. This species is unique in forming galls on the flowers of *T arjuna*, while *C. ferruginea* was reported forming leaf galls on *Miliusa velutina*, collected from Dehra Dun.

Ceropsylla longivenata n. sp.

(Fig. 13)

Colouration : general body colour greenish brown ; head dark brown ; apical segments of antenna black ; wings white with a dark band on the ventral margin ; legs yellow ; hypandrium brown.

Head : shorter than thorax, pubescent, strongly rugulose ; vertex deflexed, about 1. 5 times as broad as long, flat, and horizontal ; two large foval impressions on both sides of median suture near lower margin of eyes ; posterior ocelli slightly elevated and attached to the margins of foval impressions, anterior margin of vertex elevated in the middle with posterior margin bending inward ; anterior ocellus clearly visible from above ; frons visible as a small sclerite around ocellus , genal cones as wide as long , about half as

long as vertex, flexed downward, broad basally and narrow apically with long slender setae , antennal sockets wider than the base of genal cones , eyes hemispherical.

Antenna : slender, longer than the width of head with eyes , tensegmented , basal segments robust , third longest, fourth longer than fifth but smaller than sixth, seventh and eighth equal , apical segments and apices of segments 4 and 6 dark black, terminal segment with two unequal spines at its apex, sensoria on segments 4, 6, 8, and 9.

Legs : large, pubescent, femur shorter than tibia , hind femur with four long thick slanting setae (0.095 mm long) at its apex , hind tibia about 1.5 times as long as femur with 6-8 thick spurs near the joint with femur, and 4-6 sharp, thick, black spines at apex besides a comb of pointed apical setae ; length of all tarsi equal, basal tarsal segment of hind leg longer than apical with a deep marginal constriction in basal half ; two claw-like terminal spines on the apical tarsal segment.

Wings : forewins long, hyaline, transparent, broadest in middle, about 3. 5 times as long as wide, acutely pointed with thin short scattered setae on the surface of veins , cubital petiole very short (0.011 mm) , cubitus and media with a tendency towards forming a petiole , basal vein bending near its middle , fork M1+2 twice as long as fork M3+4 joining above the apex , R1 shorter than radius ; radial sector very long extending upto the apex of anterior margin and joining above anterior median ; Cu2 shorter than cubitus but longer than radius , marginal cells subequal, second marginal cell shorter and narrower than first with a small brown patch at the junction of anal vein and posterior margin , hind wing half as long as forewing with a row of short setae at costal morgin, some of them hooked.

Genitalia : Male ; smaller than abdomen , anal valve longer than paramere , two unusually long anterior extensions giving the shape of 'W' with a bunch of long terminal setae and scattered short spines in the middle , paramere and hypandrium equally long, broad basally and narrow apically with a hard black tip , mesal surface of inner margin curved, outer margin unifrom , fore arm of aedeagus with a spoon-like end.

Female : smaller than abdomen , plates subequal, dorsal plate longer than ventral, sloping posteriorly with uniformly long setae intermixed with short simple setae, broad basally, narrow and thick apically , anal pore ring formed by two rows of pores, the outer one with long pores and the inner one with small rounded pores ; ovipositor acutely pointed.

Measurements : Male (female) : Length of forewings 3122-3145 (3140-3152)., Width of head with eyes 699-720 (713-716)., Width of vertex between eyes 340-357 (356-366)., Antenna 1095-1120 (1112-1120)., Hind femur 659-673 (670-676)., Hind tibia 1018-1047 (1040-1066)., Proctiger 494-498., Dorsal plate (839-844).

Host plant : unidentified.

Types : Holotype female, allotype male, paratypes 14 males, 3 females, Mercara (1300m) Coorg Dt. Karnataka. 1-1-1978.

Ceropsylla longivenata n. sp. is closely related to *C. ferruginea* Mathur in colour and shape of genal cones and shape of genitalia, but is distinct in having characteristic wing venation, a long radial sector extending upto apical margin of wing, and a characteristic shape of head.

Ceropsylla parvus n. sp.

(Fig. 14)

Colouration : general body colour dark brown , base of the genal cone black , antenna yellow , genitalia generally light brown.

Head : wider than thorax, slightly deflexed in front, sparsely pubescent , vertex about twice as wide as long bending downward in front , foval impressions absent , posterior ocelli in the lower margin of eyes, slightly elevated , anterior ocellus visible from above in the extreme front margin of head , genae moderately swollen along the margin of antennal sockets , genal cones wider than long with scattered simple setae , eyes hemispherical.

Antennae : long, slender, about twice as long as the width of head between eyes , ten-segmented , basal segments robust, third longest, sixth longer than fourth and wider than fifth, seventh longer than fifth, sixth and ninth equal, terminal segment smallest with two equal spines at its apex, last three segments of flagellum longer than the rest of segments, ninth segment club-shaped , sensoria on segments 4, 6, 8, and 9.

Legs : femur shorter than tibia , hind tibia with a strong basal spur and two thick apical spines , basal tarsal segment longer and wider than apical , apical tarsus with two claw-like spines at its apex , all segments with thin setae.

Wings : ovate, hyaline, transparent, nearly 4 times as long as wide, acute apically , besal vein longer than that of other species of *Ceropsylla* , radius as

long as R1 , longer than R+M , cubitus and fork M1 +2 almost equal, cubitus branching separately , Cu2 2. 5 times as long as Cul , second marginal cell wider than first , fork M1 +2 nearly twice as long as M3 +4 and meeting exactly at apex , hindwings small and transparent with scattered tiny costal setae.

Genitalia : Male : smaller than abdomen, sparsely pubescent , anal valve as long as wide with long simple setae, longer and wider than forceps, anterior margin pointed , parameres longer than hypandrium but shorter than proctiger, broad basally and narrow apically , apical region bending inward , outer arm of aedeagus as long as paramere with a spoon-like end.

Female : smaller than abdomen with scattered long setae intermixed with short simple setae ; plates subequal, ventral slightly shorter than dorsal , circum anal pore ring 3 times as long as wide formed by two rows of pores , ovipositor pointed.

Measurements : Male (female)

Length of forewings 1326-1422 (1358-1433)., Width of head with the eyes 378-396 (388-395)., Width of vertex between eyes 194-211 (198-210)., Antenna 425-441 (430-440)., Hind femur 286-299 (290-295)., Hind tibia 312-326 (320-328)., Proctiger 130-138., Dorsal plate (367-374).

Host plant : unidentified

Types : Holotype female, allotype male, paratypes 6 males and 6 females, wallayar, 12-4-1978

Ceropsylla parvus n. sp. is closely related to *Ceropsylla fulvida* Mathur (Mathur 1975) in many charactors, but is distinct in having fork M1 +2 meeting exactly at apex, second marginal cell longer and wider than first, and a characteristic shape of genitalia.

Genus : *Trioza* Foerster

1848 *Trioza* Foerster, *Verh. naturh. Ver preuss. Rheinl. 3 :* 67

Type *Trioza urticae* (Linn.)

1975 *Trioza*, Mathur, *Psyllidae of the Indian subcontinent*, 299

Head as wide as thorax , vertex flat, wider than long, deflexed in front , posterior margin emarginate , anterior ocellus not visible from above , lateral ocelli usually elevated , genal cones not in the plane of vertex, deflexed downward, broad at base, narrow towards apex, divergent , eyes hemispherical ,

antennae always long, slender, ten segmented, basal segments robust, apical segment with two unequal spines at apex , hind tibia with 1-3 short prominent spurs at the base and a comb of setae besides 5-10 thick, black spines apically, hind tibia always longer than femur. sometimes apex broader than base, branching subapically giving rise to a separate spine , apical spines of basal tarsal segment absent , distal tarsal segment of hind tibia with two claw-like spines at its tip , wings transparent, broadest in middle, acutely pointed or rounded at apex , basal vein branching into radius, median and cubitus from the same point , cubital petiole and pterostigma absent , parameres with uniform outer margin , dorsal plate sloping posteriorly , ovipositor pointed.

out of the 23 species reported under this genus from India, only 5 are from Southern region. The present study adds 9 more new species collected from various localities of South India. *Trioza jambolanae* and *T longiantennata* are included only in the key. The detailed description and other information are already available in the literature (Mathur, 1975), the same are not repeated here.

KEY TO THE SOUTH INDIA SPECIES

1.	Hind wings greatly aborted, reduced to small stubs, and represented by small membranous flaps ; dorsal plate of female genitalia strongly sloping post-eriorly.	2
	Hind wings not as above, normally developed and atleast half as long as forewings ; dorsal valve of female genitalia almost straight.	3
2.	Hind femur yellow ; second marginal cell longer than the first ; radius and R1 equally long ; forewings abourt 3.5 times as long as antenna.	*obsoleta* (Buckton)
	Hind femur distinctly dark black ; marginal cells equally long ; R1 longer than radius ; forewings about 2.5 times as long as antenna.	*subnigra* n. sp.
3.	Radial sector long, greatly deflexed with a slight curve in the middle ; genal cones very long, more than half as long as vertex and widely divergent.	*gigantea curta* Mathur
	Radial sector short, curved to costa and meeting the costal margin almost at the middle ; genal cones short, congeneric or divergent.	4

4.	Fork M3+4 longer than Cu2; second marginal cell as long as first and slightly wider; dorsal plate of female genitalia broadly rounded.	5
	Fork M3+4 almost as long as Cu2; second marginal cell longer than first; dorsal plate not as above, mostly pointed.	6
5.	Apex of the paramere terminating in black, anteriorly and posteriorly produced acute processes; head deflexed; anal valve densely hirsute.	*jambolanae* Crawford
	Apices of parameres without any such black processess; head sub-horizontal; anal valve scarsely pubescent.	7
6.	Vertex with a foval impression posterior to centre; antenna slightly longer than the width of head; first marginal cell wider than second.	*fletcheri minor* Crowford
	Vertex with two foval impressions at posterior region; antenna twice as long as the width of head; first marginal cell narrower than second.	8
7.	Vertex longer than wide; eyes longer than vertex; forewings about 4 times as long as the width of head with eyes; Cu1 forming a loop by its approximation with median giving a triangular shape.	9
	Vertex wider than long; eyes shorter than vertex; forewings about 5 times as long as width of the head with eyes; Cu1 running away from median with no triangular structure as indicated above.	10
8.	Hypandrium with two characteristically distinct slout spinelike subapical projections; middle and subapical regions of forewings equally wide.	*hypandriata* n. sp.
	Hypandrium almost rectangular with no subapical projections; forewings broad subapically gradually narrowing towards base	*magnus* n. sp.
9.	Third antennal segment 2.5 times as long as first, seventh longer than eighth; proctiger 3 times as long as wide; tip of paramere without any spine-like structure.	*laqueus* n. sp.

	Third antennal segment about 5 times as long as first, seventh shorter than eighthr ; tip of paramere with a spine-like thick process.	*laqueus minor* n. sp.
10.	Third antennal segment longest, a little longer than fourth, fifth and sixth together; all antennal segments yellow or yellowish brown.	*longiantennata* Mathur
	Third antennal segment as long as, if not longer than, fourth and fifth togethe ; antennal segments unusually black.	11
11.	Antennal segments 7, 8, 9, 10 and apical region of sixth segment unsually dark black ; first marginal cell narrower than second, apex of forewing broadly rounded with a small bulge near the joining of fork M1+2	*nigriantennata* n. sp.
	One half of third antennal segment distinctly black, other half yellow ; fiirst marginal cell as wide as second ; forewing acutely pointed at apex with no bulge near the joining of fork M1+2 as above	*anamalaiensis* n. sp.

Trioza anamalaiensis n. sp.

(Fig. 15)

Colouration : general body colour yellowish brown ; head dark brown, legs yellow, wings light green ; posterior abdomen black, base of the dorsal plate reddish brown.

Head : as wide as thorax, slightly deflexd downward in front, dark brown, pubescent ; vertex wider than long, two small round foval impressions near posterior margin of vertex on both sides of median suture; posterior ocelli clear at extreme base of eyes ; contour of antennal sockets and anterior margin of vertex in the same line ; genal cones yellow at base, apex bent downward, apical divergence giving the appearance of a deep cleft in anterior margin of head, broad at base, narrow apically, length and width almost equal ; front ocellus clearly visible from above ; eyes large, hemispherical.

Antenna : long, slender, sparsely hairy, ten-segmented ; segments 8, 9, 10, apical half of seventh, and apex of sixth segment dark black, the rest yellow ; first two segments robust, third longest, fourth longer than fifth but smaller than sixth, seventh and sixth almost equal, apical segments larger than the rest of flagellum, terminal segment with two unequal spines at its apex ; sensoria on segments 6, 8, and 9.

Legs : large, long, hairy, femur and tibial base yellowish black , rest of tarsal segments and tibia yellow ; femur shorter then tibia, hind femur with 6-8 long thick regular setae in apical margin ; hind tibia with uniform rows of setae with three thick short basal spurs and a comb of apical spines ; apical region also with three black distinct spurs and a separate large subapical spur ; basal tarsal segment longer than apical with a narrow base and broad apex, basal tarsal spine absent ; apical segment with two claw-like spines at its apex ; meracanthus thick.

Wings : forewings ovate, clear, transparent, 3 times as long as wide , veins armed with scattered simply setae, broad in the middle, acutely pointed at apex , radius, median, and cubitus branching from the same point, strictly trichotomous, basal vein bent down subbasally , cubitus smaller than basal vein , Rs curved to costa in the middle of wing , R1 smaller than radius , fork M1+2 joining with anterior margin above apex , distance between cubitus and M3+4 shorter than between Cu1 and Cu2 , second marginal cell smaller than first , hind wings about half as long as forewings, 3. 5 times as long as wide , costal margin with 2-6 hooked setae.

Genitalia : Female : smaller than abdomen , plates subequal, dorsal slightly longer than ventral , apex of genitalia light yellow, the rest yellowish black , circum anal pore ring ovate, 2. 5 times as long as with a dense row of long pores in the inner margin aud of scattered rounded pores in the outer margin , setae long and curved , ovipositor acutely pointed.

Male : specimens were not availabe.

Measurements : Female. Length of forewings 3172., width of head with eyes 648., Length of antenna 1809., Hind femur 442., Hind tibia 624.

Host Plant : unidentified.

Types : Holotype female, Kadambarai (1300m), Anamalai hills, Tamilnadu, 24-12-1978.

Trioza anamalaiensis n. sp. is closely related to *T urticae* Linnaeus in the position of genal cones and shape of forewings, but is distinct in having characteristic antennae, equal marginal cells, and radius shorter than R1.

Trioza fletcheri minor Crawford

1912 *Trioza fletcheri minor* Crawford, *Rec. Indian Mus.* 7(5) : 434-435

1975 *Trioza fletcheri minor* Craw. ,Mathur, *Psyllidae of the Indian subcontinent*, 363

Head narrower than thorax ; vertex about 1.5 times as long as wide ; genal cones in the same plane as vertex , antenna longer than the width of head with eyes , hind femur about 3/4 as long as tibia , apex of hind tibia with 3 long, thick, pointed, black spurs , forewings acutely angled, transparent, and clear , hindwings half as long as forewings , median vein about twice as long as basal vein , basal vein about 1.5 times as long as cubitus , cubitus longer than radial sector, short (O. 980-O. 988mm long), curved to costa , R1 about half as long as radius , pterostigma absent, fork M1+2 longer than fork M+4 , first marginal cell narrower and shorter than second , female genitalia smaller than abdomen , proctiger triangular, broad in the middle , apical margin of hypandrium with a small triangular spine-like projection near apex , inner margin of paramere hirsute, outer margin uniform and broad in the middle.

Measurements : Female. (Male)

Length of forewings 2.25-2.29., width of head with eyes 0.529-0.537., width of vertex between eyes 0.28-0.32., Length of antenna 0.62-0.69., Hind femur 364-370., Hind tibia 468-477., Proctiger (190-193)., Paramere (173-177).

Host plant : *Terminalia tomentosa* W&A. (Combretaceae)

Only 7 specimens were examined, Tambaram, Madras, 2-7-1978.

This species has been collected from the leaf galls of *T tomentosa.* Controversial views exist in establishing *Trioza fletcheri minor as a subspecies* of *T. fletcheri* Crawford. Though the length of body, forewings, and antenna of the subspecies are shorter than in *T. fletcheri,* the width of head with eyes and width of vertex between eyes are distinctly greater than in *T fletcheri.* The major character which supports the establishing of these small insects as a sub species is the size of marginal cells in forewings. The second marginal cell is characteristically longer than first. Besides, the genal cones are small and the antennal segments except apical do not have setae.

Trioza gigantea curta Mathur

1975 *Trioza gigantea curta* Mathur, *Psyllidae of the Indian subcontinent,* 375

1978 *Trioza* sp, leafgalls, Raman and Kandasamy, *Curr. Sci.,* 47(4):127

1980 *Trioza gigantea* Craw, leafgalls, Kandasamy, *Curr. Sci., 49* (19): 754

Head hirsute, setae scattered and long ; width of head with eyes nearly twice as long as the width of vertex between eyes , genal cones deflexed downward, broadly rounded and divergent, basal half of inner margin with short spine , antenna about twice as long as width of head with eyes , hind tibia with 3-5 short, thick, pointed spurs and 4-5 thick, black, blunt spines at apex besides comb of apical setae , forewings more than twice as long as antenna, acutely pointed , fiirst margenal cell long and large , veins armed with minute points , radial sector long, curving upwards before joining the anterior margin , cubitus nearly 3 times as long as radius , basal vein slightly shorter than cubitus , parameres of male genitalia with a square-shaped diverted projection subbasally , fore arm of aedeagus with a distinctly long spine tip instead of usual spoon-like structure , setae of proctiger as long as wide.

Measurements : The comparative measurements of *T. gigantea* and *T gigantea curta* are as follows :

Characters	T. *gigantea*	*T gigantea curta*
Length of forewings	5.51	3.38
Width of head with eyes	0.930	0.806
Width of vertex between eyes	0.530	0.439
Length of antenna	3.62	1.54

Host plant : *Symplocos spicata* Roxb. (Symplocaceae)

20 males and 56 females were examined , Yercaud, Shevoroy hills (1170 m), Tamilnadu. 31-5-1976

The characters of *Trioza gigantea curta* such as the length of radial sector, shape and size of genal cones, and the structure of female genitalia resemble those of *T gigantea* Crawford. But the size of this subspecies is comparatively small and it also shows a few minor distinct characters which differentiate *T gigantea curta* from *T gigantea.* They are presence of a square-shaped diverted projection in the subbasal region of paramere and an arrow-like apex in the fore arm of aedeagus, and the absence of long setae along veins of forewings. During the examination of specimens collected, forewings with variations like the presence of additional cross veins connecting (a) cubitus and median, (b) Cul and Cu2 and (c) median and the juncture of Cul and cubitus appeared.

Both *T gigantea* and *T gigantea curta* make leaf galls on *Vaccinium neilgherrense* (Kandasamy, 1980) and on *Symplocos spicata* respectively. The literature on the galls of *Symplocos spicata* (Raman and Kandasamy, 1978) indicates only the generic name of the gall maker viz., *Trioza*, and the species was confirmed later by the author as *Trioza gigantea curta*. Mathur's (1975) reference, however, does not contain any report as to whether this species is gall forming or free living.

Trioza hypandriata n. sp.

(Fig. 16)

Colouration : general body colour yellowish green , head reddish brown ; posterior region slightly dark , antenna light brown , wings green , dorsal and ventral plates red.

Head : shorter than thorax, pubescent, rugulose , vertex slightly longer than wide , two small round foval impressions in the submedian surface on both sides of median suture, two other foval impressions almost touching the posterior ocelli , posterior ocelli swollen well above the emarginate posterior region of vertex , anterior margin of vertex concave , front ocellus in the extreme front , genal cones about twice as wide as long , antennal sockets large and lateral.

Antenna : long, slender. sparsely pubescent ; first two segments robust, third longest, forth longer than fifth but smaller than sixth, sixth and seventh almost equal, eighth longer than sixth, ninth and tenth darker and larger than other segments of flagellum, terminal segment with two unequal apical setae, the base of setae slightly elevated with a bulge from the contour of lateral margin of antennal segments ; sensoria on segments 3, 5, 7, 9 and 10.

Wings : forewing ovate, large, long, clear, hyaline, membranous ; middle and subapical regions almost equally broad, anterior margin broadly bent downward meeting at apex ; basal vein longer than cubitus ; R1 slightly longer than radius , radial sector longer than media, bent upwards to join costa , second marginal cell wider and longer than first , veins with simple microscopic setae , distance between Cu1 and M3+4 shorter than between Cu1 and Cu2 , hind wings 1/3 as long as forewings with 4-5 straight simple basal setae besides a few short hooked setae on its costal margin.

Genitalia : Male : smaller than abdomen , proctiger broad apically, narrow basally, longer than forceps, hirsute, intermixed with short pointed spines on the inner surface, two round elevated projections on both sides, outer margins of sides with a dark epibasal projection surrounded by long setae, parameres broad above middle, apex of inner margin with a short thick spur facing that of opposite paramere , hypandrium characteristic with two stout subapical spines distinctly projecting and beset with minute points.

Female : shorter than abdomen ; plates subequal, dorsal longer than ventral, sloping posteriorly, broad basally and narrow apically , apex with a few short stout setae, surface with dense long setae , circum anal pore ring about 1/4th the length of dorsal plate, posterior margin of ventral plate uniform, anterior margin with a prominent arrow-like projection at the centre, apical half of the plate hirsute , ovipositor ending with a broad hook-like apex.

Measurements : Male (female)

Length of forewings 3341 (3421)., Width of head between eyes 594 (612)., width of vertex between the eyes 313 (315)., Antenna 742 (889)., Proctiger 227., Paramere I94., Dorsal plate (404)., Ventral plate (346).

Host plant : unidentified.

Types : holotype female, allotype male , Coimbatore, 1-7-1977

Trioza hypandriata n. sp. is closely related to T. *fletcheri* in the structure of genal cones of head and the length of veins, but distinct in having a characteristic hypandrial structure of male genitalia. The hypandrial spines of this species are absent in T. *fletcheri* and second marginal cell is much wider than first.

Trioza laqueus n. sp.

(Fig. 17)

Colouration : general body colour yellowish brown , posterior abdomen dark , head light brown ; wings yellowish green , femur brown , base of the ganitalia black.

Head : with eyes twice as wide as thorax, sparsely pubescent , vertex longer than wide, anterior margin emarginate, surface with minute dots , post-

ocellar region elevated, posterior ocelli light brown and lateral, anterior ocellus not visible , genal cones long, sparsely pubescent, with rows of small dots, broadly divergent , eyes large, hemispherical,

Antenna : about twice as long as the width of head with eyes, ten-segmented, with scattered setae , basal segments robust, third longest, all other segments slender and imbricate, fourth 2.5 times as long as fiftth, seventh longer than eighth but shorter than sixth, eighth slightly smaller than seventh, ninth and tenth almost equal, apical segment with two unequal spines at apex , sensoria on segments 4,6,8, and 9.

Legs : long, hirsute ; fore femur stout, wider than middle and hind femur, hind femur slightly longer than other two , tibiae longer and wider than femora with a comb of apical setae besides four long stout spurs , basal tarsal segment longer than apical, apical segment with two equal claw-like spines at apex.

Wings : long, ovate, about 5 times as long as wide, veins with minute hairs, acutely pointed at apex , median longest ; radius longer than R1 , Rs about 5 times as long as radius , basal vein about twice as long as cubitus , Cu shorter than Cu1 , Cu1 forming a loop with median giving a triangular structure ; first marginal cell larger and wider than second ; anterior median meeting above the tip of forewing, slightly longer than posterior median , distance between fork M3+4 and Cu1 greater than width of second marginal cell, about 2.5 times as long as the wide, transparent.

Genitalia : Male : smaller than abdomen, pubescent , anal valve longer than wide, longer than parameres and hypandrium , anterior margin of proctiger rounded, triangular, serrate, and lateral , posterior margin uniform, setae long, thin, and pointed , parameres broad subbasally, apex narrow with thick, black tip, apical margins facing each other on the inner side, with long setae , hypandrium simple , outer arm of aedeagus shorter than the inner, with a spoon-like end.

Female : smaller than abdomen, pubescent , dorsal plate longer than ventral, sloping posteriorly, broad at base, narrow at apex , circum anal pore ring with two rows of pores arranged in a circle , ventral plate sharply pointed at apex , ovipositor almost as long as dorsal plate and acutely pointed.

Measurements : Male (female)

Length of the forewings 3080 (3030-3090)., Width of head with eyes 770 (765-771)., Width of vertex between eyes 497 (488-503)., Length of antenna 1480 (1479-1490)., Hind femur 237 (235-238)., Hind tibia 306 (306-309)., Proctiger (306), Paramere (204), Dorsal plate 601-610., Ventral plate 525-529.

Host Plant : *Terminalia catappa* (Combretaceae)

Types : holotype female, allotype male, paratypes 5 females and 1 male, Virajpet (900m)., 3-12-1976.

Trioza laqueus n. sp. is closely related to *T tripuncata* in the deflexed head, the size of genal cones, length of R1, and the presence of apical spur in hind tibia, but is distinct in having Cul which forms a loop with median in a triangle in the middle of forewings, cubitus much shorter than Cul and distinct shape of genitalia.

T. laqueus was collected from the hypophyllous marginal leaf role galls on *T catappa*

Trioza laqueus minor n. sp.

(Fig. 18)

Colouration : general body colour brown ; abdomen dark brown ; vertex and posterior region of genae black, wings transparent, yellow , femur yellowish brown, dorsal plate balck.

Head : pubescent, deflexed downward in front , vertex 1. 5 times as wide as long with two foval impressions above the posterior margin between median suture and eyes , posterior margin acute , posterior ocelli at the base of eyes, swollen , anterior margin almost parallel to posterior , front ocellus and frons not clearly visible from above , genal cones facing ventral side with slender thin setae, as wide as long , antennal sockets dorsal, well above the genal cones, eyes hemispherical.

Antenna : long, slender, spersely pubescent , basal segments robust, third longest, twice as long as fifth, sixth longer than fifth but smaller than fourth, seventh and eighth almost equal, terminal segment slightly longer than nineth, apical segment with two unequal stout setae at apex , sensoria on segments 4, 6, 8, and 9.

Legs : long, pubescent , hind femur longer than tibia, 4 times as long as wide, apical half yellowish brown, the rest of the region yellow, hind femur with a short subapical spur, hind tibia broad apically and narrow basally with a broad basal spur and a comb of long apical setae, apex provided with a distinctly long, thick black spine and a group of 5-7 spines of same type , basal tarsal segment of hind leg slightly longer and wider than distal, narrow at base and broad at apex , terminal segment with two claw-like spines at apex.

Wings : forewings long, more than twice as long as wide, broadest in middle, ovate, transparent, hyaline , basal vein longer, strictly trichotomous , radius longer than R1 , radial sector short, curved to costa , cubitus much shorter , Cu2 about 4 times as long as cubitus , Cu1 parallel to Cu2, bending upwards near median forming a triangle with median vein , second marginal cell shorter and narrower than first , anterior median joining the anterior margin well above the apex , posterior median shorter than anterior , length between Cu1 and M3+4 longer than second marginal cell but shorter than first , round, brown maculae at posterior margin of the subapical region of the wing , hind wings 1. 5 times as long as wide.

Genitalia : Male : smaller than abdomen, hairy, proctiger wide near base, narrow at apex, slightly bent upwards,, hirsute , fore arm 0.228mm long, outer margin rough, inner margin thin , paramere hirsute with a dark black spine at apex, outer margin uniformly rounded, inner margin broad near base.

Female : smaller than abdomen, sparsely hirsute, dorsal plate about 1.5 times as long ag ventral, rounded at base, pointed at tip, black near middle of the two lateral margins, posterior margin of ventral plate uniform, anterior margin with minute points on the surface , ovipositor long and pointed , Circum anal pore ring ovate, formed by two rows of pores.

Measurements : Male (female)

Length of forewings 2028 (2130)., Width of head with eyes 551 (568)., Width of vertex between eyes 292 (323)., Length of antenna 1061 (1109)., Hind tibia 572 (580)., Proctiger 259., Dorsal plate (248)-

Host plant : *Cinnamomum* sp. (Lauraceae)

Types : holotype female, allotype male, Kadambarai (1350m), Anamalai hills, Tamilnadu. 24-12-1978

Trioza laqueus minor n. ssp. is closely related to *Trioza laqueus* in wing venation-formation of triangle like shape with media and cubitus-and the size and shape of head and genitalia, except for the smaller size of insect and some minor differences in the structure and arrangement of genital setae. The occurrence of this subspecies is observed throughout the Anamallai hills.

Trioza magnus n. sp.

(Fig. 19)

Colouration : general body colour greenish brown , head pale brown, antenna yellow ; femur dark brown ; wings transparent with a short band on the posterior margin , genitalia pale brown.

Head : smaller than thorax, sparsely pubescent, deflexed in front , vertex broader than long, two small foval impressions at posterior margin on both sides of median sutures , posterior margin emarginate , post ocellar region swollen, lateral ocelli elevated, visible from above, anterior ocellus at extreme front in the middle of anterior margin , frons covered by genae ; genal cones short, uniformly round at apex, bent downward , antennal sockets in anterior margin , eyes hemispherical.

Antenna : slender, longer than the width of head with eyes , basal segments robust, third longest, fourth longer than fifth but shorter than sixth, seventh and eighth equal, apical segments slightly larger than other segments of flagellum, terminal segment with two unequal spines at its apex, each segment with 1 or 2 distinct long thin spines rising from a slightly bulged antennal surface , sensoria on segments 4, 6, 8, and 9.

Legs : large, yellow , hind tibia about 1. 5 times as long as hind femur, large subapically, narrow at base with a distinctly pointed spur besides 3-4 small scattered spurs , apex of the hind tibia with a comb of setae and four blunt, thick, black spines , hind femur with three long distinct spines subapically , basal segment of hind tarsus shorter than apical, two claw-like spines at the tip of terminal segment.

Forewing : very long (2.76-2.82 mm), broad subapically, clear, transparent ; basal vein strictly trichotomous, median vein 1.5 times as long as basal vein ; anterior median slightly curved and longer than posterior joining at apex ; cubitus about 2.5 times as long as Cu1 ; marginal cells unequal,

second marginal cell longer and wider than first ; distance between fork M3+4 and Cu1 greater than the length of first marginal cell but shoter than second.

Genitalia : Male : shorter than abdomen, pubescent ; proctiger with a distinct club-shaped apex, broader in middle, narrow at base ; hypandrium rectangular with a broad, short, pointed spine-like structure at the anterior edge followed by a small elevated projection at the base of spine ; parameres longer than hypandrium, broad subapically, ending with a small, sharp brown point.

Female : smaller than abdomen ; dorsal plate longer than ventral, sloping posteriorly, hirsute, setae long and curved at apex ; circum anal pore ring ovate with two rows of rounded pores ; ovipositor long, acutely pointed.

Measurements : Male (female)

Length of forewings 2767 (2699)., width of head with eyes 571-590 (572)., width of vertex between eyes 275-288 (280)., Length of antenna 989-997 (975)., Hind femur 459-473 (449)., Hind tibia 683-693 (685)., Proctiger 248-251.. Dorsal plate (165).

Host Plant : unidentified.

Types : holotype male, allotype female, paratypes 5 males and 5 females, Kolli hills (850m) ; Yercaud (1300m) ; Tamilnadu, 3-6-1976, 7-6-1976.

Trioza magnus n. sq. is closely related to *Trioza fletcheri* Mathur in the presence of long second marginal cell, length of basal vein' and radial sector, but is distinct in having long posterior median, about twice as long as Cu2 and a characteristic shape of genitalia and head.

Trioza nigrianntennata n. sp,

(Fig. 20)

Colouration : general body colour yellow ; abdomen brown ; wings transparent ; legs yellow ; genitalia brown ; as the name indicates the apical three segments black.

Head : smaller than thorax, anterior part deflexed downward, setae scattered ; vertex 1.5 times as wide as long, flat, ovate, frons not visible ; anterior ocellus at extreme margin of vertex, median suture distinct, post ocellar region elevated, reddish in colour, posterior ocelli lateral in position, seemingly overlapping with inner margin of eyes ; genal cones large, bent downward, not in the same plane as vertex, with long thin scattered setae ; antennal sockets antero-lateral ; eyes hemispherical.

Antenna : long, slender, apex of segment six, apical half of seventh, and segments 8, 9, and 10 distinctly dark black, the rest yellow, third segment longest, fifth longer than sixth but smaller than fourth, eighth equal to fifth, seventh smaller than sixth, ninth slightly longer than tenth, terminal segment with two unequal setae at its apex ; sensoria on segments 4,6,8 and 9.

Legs : long, large, all femora and base of tibia brownish black, middle of hind femur thick black, other regions yellow ; hind femur more than 4 times as long as wide, sparsely pubescent, with 6-8 distinct long setae at apex ; base of hind tibia with short triangular spurs, apex with a comb of long setae, a distinct divergent thick, black spur subapically besides three such spurs at the apical region ; apical segment of hind tarsus slightly longer than basal with two claw-like spines at the tip.

Wings : forewings ovate, veins with minute points, clear, transparent, broadest in middle, three times as long as wide, apex broadly rounded with a small bulge below the joining of fork M1+2 ; median vein about 1.5 times as long as basal vein, strictly trichotomous ; cubitus longer than Cu2 but shorter than Cu1, 3 times as long as radius, slightly shorter than R1 ; radial sector short and curved to costa, marginal cells subequal ; second marginal cell longer than first ; distance between fork M3+4 and Cu1 greater than between M1+2 and M3+4 ; hind wings about 2mm long, with minute points on the surface ; costal margin with 5-8 short setae, with two unequal setae at its apex ; sensoria on segments 4,6,8 and 9.

Genetalia : Male : smaller than abdomen ; paramere smaller than hypandrium with a lateral projection at apex, broad basally gradually narrowing towards apex ; proctiger longer than paramere and hypandrium ; lateral margins smooth and uniform, forearm of aedeagus ending with a spoon-like structure.

Measurements Male : length of forewings 3016, width of head with eyes 594, width of vertex between eyes 335, Lenath of antenna 1357, Hind femur 442, Hind tibia 598, Proctiger 292, Paramere 183.

Host plant : unidentified.

Types : Holotype male, Anamalais (1350m), 24-10-1978.

Only one specimen (male) was available.

Trioza nigriantennata n. sp. is closely related to *Trioza longiantennata* Mathur in the subhorizontal head, long genal cone and shape of genitalia, but is distinct in having a characteristic colouration of segments, 7, 8, 9 and 10, second marginal cell smaller than first, and distance between Cul and M3+4 shorter than between Cu2 and Cul.

Trioza obsoleta (Buckton)

1900 *Trioza obsoleta* Buckton, *Indian Museum Notes 5(2) :* 35

1975 *Troiza obsoleta*, Mathur, *Psyllidae of the Indian subcontinent*. 394.

Head circular, with eyes nearly twice as wide as width of vertex between eyes, antenna about 1.5 times as long as forewings, apical segments large and brown, the rest yellow ; tibia about 1·5 times as long as femur, hind tibia with 5 short pointed basal spurs and 6 black, long, thick spurs at apex ; apex of hind femur with 4-6 long, slender, straight setae ; forewings ovate, broad subapically, acutely pointed at apex ; cubitus longer than basal vein ; radius slightly smaller than R1 ; radial sector long, bending upwards and joining costal margin near apex ; second marginal cell larger than first ; hind wings reduced to a very small stub ; parameres of male genitalia bifurcated at their apex with a rounded projection subbasally.

The detailed description of nymphs and distribution was given by Mathur (1975).

Measurements ; Male (famale) : length of forewings 3016 (3038)., Width of the head with eyes 562(570)., Width of the vertex between eyes 305 (315)., Length of antenna 5684 (5705) Hind femur 475 (479)., Hind tibia 832 (839)., Proctiger 227., Paramere 162.

Host plant : Diospyros melanoxylon Roxy. (Ebenaceae)

5 males and 8 females were examined, Madras. 19-6-1977.

This has been collected from the galls of *D. melanoxylon*. The epiphyllous leaf galls are greenish red in colour, unilocular, scattered throughout the leaf surface.

Trioza subnigra n. sp.

(Fig. 21)

Colouration : general body colour dark brown ; antenna pale yellow : hind femur black, tibia yellow, wings greenish yellow ; genitalia brown.

Head : head narrower than thorax, moderately deflexed, sparsely beset with small setae, also with minute points arranged in lines ; vertex about twich as broad as long, rounded in front, with two fovae posterior to centre ; posterior margin moderately emarginate, post-ocellar region swollen, separate, divergent, with long fine hairs and with minute points, narrowly rounded at apex, eyes large ; antennal sockets lateral ; clypeus long, visible from below, almost cylindrical, protruding forward.

Antennae : pale yellow, small, ten-segmented, about 1.5 times as long as head with eyes ; basal segments robust, black ; third longest, fifth and sixth almost equal, less than half as long as third, seventh smaller than eighth, tenth longer than ninth, terminal segment with two unequal apical spines ; sensoria on segments 4, 6, 8 and 9.

Legs ; pubescent, setae arranged linearly ; tibia about twice as long as femur, all tibia with apical comb of setae ; hind femur black, with three sensoria on ventral side and with four blunt dorsal setae subapically (length of apex and base of hind tarsus 0·143mm and 0·14 mm respectively), five long setae (0·061mm) at apical region of hind tibia ; apical tarsal segment with two claw-like spines at its tip.

Forewings : elongate, hyaline, transparent, more than twice as long as wide, narrowly rounded at apex ; R, M, and Cu arising from same point ; cubitus longer than basal vein ; Rs long, slightly arched near apex ; R1 longer than radius ; marginal cells subequal, second marginal cell sightly

longer and wider than first, fork M1+2 smaller than fork M3+4 and Cu1 greater than the width of first marginal cell, but almost equal to that of second.

Genitalia : Male : smaller than abdomen, pubescent, inner margin of paramere with a triangular projection in the middle ; base with a round depression ; apex with a small cut in the middle ; outer margin smooth, uniform ; p.octiger narrow at base, broadest subapically ; hypandrium brown, its base very hard.

Female : smaller than abdomen ; ventral plate smaller than dorsal, dorsal plate sloping posteriorly, triangular, apex pointed ; circum anal pore ring elongate, formed by two rows or round pores ; ovipositor pointed.

Measurements : Male (female) : length of forewings 2091-2099 (2097-2198)., width of head with eyes 618-630 (612-623)., Width of vertex between the eyes 381-390 (377-391)., Length of antenna 865-882 (857-871)., Hind femur 482-502 (479-489),, Hind tibia 855-863 (847-855)., Dorsal palte 544-561., Ventral plate 421-429.

Host plant : unidentified.

Types : holotype female. allotype male, paratypes 14 females and 22 males, Madras, 19-6-1977.

Trioza subniqra n. sp. is closely related to *Trioza obsoleta* (Buckton) in its hind wings atrophied to very small stubs and shape of genal cones, but is distinct in having R1 longer than radius, equally long marginal distinctly dark brown hind femur, and the presence of a triangular projection in paramere.

Trioza tibialis n. sp.

(Fig. 22)

Colouration : general colour of the body dark brown ; head black ; antenna pale brown ; wings light green ; hind femur and apex of tibia thick black ; parameres light brown ; female genitalia black.

Head : dorsal side black, rugulose, with minute points, sparsely pubescent, smaller than thorax, elevated in the middle of vertex ; genal cones yellow ; vertex broader than long, with two foval impressions on either side

of median suture near base, posterior margin emarginate ; post ocellar region swollen ; posterior ocelli lateral in position, anterior ocellus visible from above ; antennal sockets broader than the base of genal cones, lateral in positions.

Antenna : long, nearly 1/3 as long as forewings, ten-segmented, each segment with one or two long setae on lateral surface ; basal and apical segments dark brown, the rest yellow ; basal segments equally long, robust, third longest, fourth slightly longer than fifth, sixth and seventh equal, eighth longer than seveth, terminal segment with two unequal spines ; sensoria on segments 4, 6, 8, and 9.

Legs : all femora, base and apex of all tibiae distinctly blackish brown : setae dense at apex of tibia, sparse at other regions ; femur about half as long as tibia with a short spur at base ; basal tarsal segment longer than apical ; tibia with a comb of long setae at its tip ; no basal tarsal spines ; two claw-like spines at the terminal segments ; meracanthus long and blunt.

Wings : ovate, transparent, hyaline, long, with a small black patch at the base of posterior margin, acutely pointed, strictly trichotomous, about 3 times as long as wide, broadest in middle ; median vein smaller than radial sector, anterior median meeting at the tip of apex, posterior median smaller than anterior ; radius longer than R1 ; radial sector short, curved to costa ; Cu2 parallel to fork M3+4 ; marginal cells subequal, first marginal cell smaller than second, hind wings small, base black with minute points.

Genitalia : Male : smaller than abdomen, black except parameres which are yellowish brown ; hypandrium rectangular with a short triangular spur at apex of upper margin ; paramere longer than hypandrium, broadest subapically ; shape of proctiger distinct, two apical extensions narrow, broad in the middle, with very long setae, margins uniform.

Female : smaller than abdomen, black, with setae of various lengths ; dorsal plate about twice as long as ventral, sloping posteriorly; the tip of dorsal plat distinct with three short, stout, triangular spurs on the surface ; circum anal pore ring elongate, with two rows of pores, the inner margin with long rectangular pores, the outer with small elongate pores arranged vertical to the inner pores, ovipositor pointed.

Measurements : Male (female) : length of forewings 3246-3292 (3280)., Width of head with eyes 616-635 (630)., Width of vertex between eyes 313-329 (321).. Length of antenna 1079-1183 (1155)., Hind femur 399-418 (412)., Dorsal plate (464)., Ventral plate(238)

Host plant : Unidentified.

Types : holotype male, allotype female, paratypes 2 males, Kolli hills (1300m), 18-8-1978.

Trioza tibialis n. sp. is closely related to T. *lobata* Mathur in shape of genitalia and short radial sector, and size of genae, but is distinct in having an apically rounded genal cone, radial sector longer than media, a characteristic colour of tibial tip and three spurs at the tip of dorsal plate.

Indotrioza n. gen.

(Plate : I)

Body dark brown in colour, hirsute, setae long, thick, dark except tip of genal cone, basal antennal segments and hind tibia ; head wider than long, median suture prominent and clear ; front ocellus visible from above; genal cones very long (0.230 mm), divergent ; eyes hemispherical ; antenna 1.22—1.32 mm long, hirsute, rugulose, third segment longest ; femur shorter than tibia ; fore and mid tibia black, hind tibia with few thick spines ; forewings elongate, broad, posterior median longer than anterior median, Rs short and curved to costa, second marginal cell longer and wider than first ; both the genitalia smaller than abdomen, hypandrium longer than paramere, apex of proctiger pointed, dorsal plate of female genitalia longer than ventral sloping posteriorly, ovipositor pointed.

The new genus resembles the genus *Trioza* Forester in trichotomous branching of basal vein, acutely angled apical margin of forewings, presence of meracanthus in the legs and absence of pterostigma, but is distinct in having distinctly long, stout, thick setae of antenna and head, dark black body, the serrated nature of genal cones and antennae, and characteristic size and shape of genitalia.

Type : *Indotrioza hirsuta* gen. et. sp. nov.

Indotrioza hirsuta n. sp.

(Fig. 23)

Colouration : general colour of body dark brown ; basal part of costal vein, prothorax, head, antennal flagellum, all tibiae and tarsi of fore-and mid legs, genitalia dark black, basal antennal segments and hind tibia yellow, all femora and meso-and meta-thorax dark brown, wings transparent, veins yellow.

Head : wider than long, with eyes broader than thorax, highly pubescent ; vertex 1.5 times as wide as long with an anteriorly directed upward projection on either side of median suture, vertex emarginate at posterior margin, anterior margin with a deep sulcus in the centre near median line ; ocelli yellow, anterior ocellus clearly visible from above ; genal cones twice as long as wide, broad at base, narrow and diverted towards apex ; genal cones and vertex with long, thick, black, pointed setae ; antennal sockets lateral ; eyes large and hemispherical.

Antenna : long, large, about 1.26mm long ; ten-segmented, strongly rugulose, densely hirsute with long black and thick setae ; basal segments robust and yellow, other segments dark black, third longest, about 8 times as long as second, fourth longer than fifth but smaller than third, fifth and sixth almost equal, seventh longer than eighth, apical segments almost equal, terminal segment with two unequal spines at its apex, margins of the segments highly serrated ; sensoria on segments 4, 6, 8, 9 and 10.

Legs : highly pubescent, robust ; femur shorter than tibia ; hind tibia light yellow, fore-and mid tibiae black, hind tibia with 4-6 short thick spines at apex, besides a comb of apical setae ; apical tarsal segment slightly longer and wider than basal segment, basal tarsal segment with 3-4 pointed black spines arranged subapically, terminal tarsal segment with two unequal claw-like spines at the tip ; meracanthus large and long.

Wings : forewings clear, transparent, hyaline, broadest in the middle, about 3 times as long as wide, acutely pointed at apex, strictly trichotomous, median vein 1.4mm long ; fork M1+2 1.5 times as long as fork M3+4 ; cubitus longer than fork M1+2 but shorter than basal vein ; radius slightly shorter than R1 ; radial sector short and curved to costa ; anal vein 1.0mm long, base of costal vein black, yellowish towards its apex ; second marginal cell longer than first ; distance between Cu1 and Cu2 greater than between

Cu1 and fork M3+4 ; hind wings very small, with minute points, costal margin with 4-7 stout setae including some hooked setae.

Genitalia : Male : smaller than abdomen, pubescent, black ; proctiger 1.5 times as long as paramere, lateral margins folded inward, anterior margin with pointed apex, posterior margin straight ; hypandrium longer than paramere, but shorter than proctiger, tip of earh arm of forceps thicker and darker than other regions ; outer arm of aedeagus smaller than basal inner arm, the tip ending in a spoon-like structure.

Female : smaller than abdomen, sparsely pubescent, setae long and pointed, dark black ; dorsal plate longer than ventral, sloping down posteriorly, broad at base, gradually narrowing towards apex ; circum anal pore ring 0.112mm long, ovate, formed by two rows of round pores ; ovipositor long and acutely pointed.

Measurements : Male (female) : length of forewings 2413-2497 (2428-2487)., Width of head with eyes 652-658 (640-649)., Width of vertex between eyes 398-409 (405-411)., Length of antenna 1264-1266 (1250-1261)., Hind femur 510-513 (503-511), Hind tibia 683-688 (685-691)., Proctiger 367-370., Paramere 265-268., Dorsal plate (377-387).

Host plant : *Vaccinium nilgherrensis,* W., (Vacciniaceae).

Types : holotype female, allotype male, paratypes 26 males and 21 females, Shevoroy hills (1650m), Tamilnadu, 5-6-1976.

This species was found to occur throughout the year. Its distribution is noted in Shevoroy hills wherever *Vaccinium nilgherrensis* plant grows.

Subfamily : PAUROPSYLLINAE Crawford.

Body generally robust ; head rounded, deflexed ; frons not covered by genae, genae almost absent ; front ocellus at extreme frons ; vertex flexed downward in front ; thorax arched ; forewings membranous, sometimes maculate, ovate, mostly rounded at apex ; pterostigma long, up to the apex of wing ; antenna always short, sometimes with equally long apical setae ; hind tibia with apical comb of setae.

Next to Triozinae, this subfamily includes more number of gall forming psyllid species. Out of the total 21 species reported from India only 7 are from Southern States. During the present investigation one more new species is added from South.

KEY TO THE GENERA OF PAUROPSYLLINAE

1. Legs all similar and equal in length ; hind coxae unusually small and almost obsolete ; antenna with 3 terminal setae, almost as long as three apical segments, segments with characteristic biramous setae, antennal joints thick. *Apsylla* Crawford

   All legs not similar, hind pair longer than middle ; hind coxae of normal size ; antenna generally with two terminal setae of unequal length, antennal joints and setae not as above. 2

2. Head not as wide as thorax ; frons large, prominently visible ; genae absent ; eyes globose ; wings narrowly or broadly rounded at apex ; M+Cu as long as radius ; first marginal cell narrow and long, often muculate. *Paurocephala* Crawford

   Head as wide as or narrower than thorax ; frons visible as a small sclerite ; genae conical ; eyes hemispherical ; wings broadly rounded ; M+Cu smaller than radius ; first marginal cell wide, rarely maculate. 3

3. Head as wide as thorax ; forewings broadly rounded, cross veins absent ; pterostigma often present, nonmaculate. *Pauropsylla* Rubsasmen

   Head narrower than thorax ; forewings rhomboidal, cross veins present between radial sector and fork M1+2 ; pterostigma absent, maculate. *Phacopteron* Buckton

Genus : *Apsylla* Crawford.

1912 *Apsylla* Crawford, *Rec. Indian mus. 7* : 421

Type : *Apsylla cistellata* (Buckton)

1975 *Apsylla*, Mathur, *Psyllidae of the Indian subcontinent*, 44

Head narrower than thorax ; vertex with emarginate posterior margin ; lateral ocelli elevated, anterior ocellus at extreme front ; genal cones swollen ; antenna ten-segmented, segments with distinctive, thick joints, and characteristic biramous setae, apex with two equal apical setae ; hind legs as long as middle ; hind coxae unusually small, coxal spur absent, basal and apical spines absent in hind tibiae ; forewings clear, transparent, hind wings with prominent veins, broadest in the middle ; first marginal cell smaller and narrower than second, narrowly rounded at apex ; radial sector short, curved to costa ; dorsal plate of female genitalia of a distinct shape.

Only one species was reported so far (Mathur, 1975) from U. P. and Bihar. During the survey for the present study many specimens of this species were collected from Shevoroy hills, Tamilnadu.

Apsylla cistellata (Buckton)

1893 *Psylla cistellata* Buckton, *Indian Mus. Notes. 3* : 91-92

1912 *Apsylla cistellata* (Buckton), *Rec, Indian Mus.*, 7 : 421-422

1975 *Apsylla cistellata*, Mathur, *Psyllidae of the Indian subcontinent*, 44.

General body colour black, head smaller than thorax, black, width of head with eyes and length of antenna almost equal ; genal cones long, deflexed downward ; antennal segments brown, porrect, apical segment with two equal spines, equal to the length of antennal segments together, apical tarsal segment black, other segments yellow ; hind tibia longer than mid and fore legs with 8-10 long pointed apical spines ; forewings broadly rounded at apex, broadest subapically ; basal vein longer than M+Cu ; cubital petiole more than twice as long as cubitus ; R1 longer than radius ; median vein shorter than cubital petiole ; fork M1+2 longer than fork M3+4 joining above apex ; marginal cells subequal, second nearly twice as large as first ; apex of proctiger and parameres brown ; inner margin of forceps hirsute ; apical half of dorsal plate narrow, pointed, hirsute

Detailed description and distribution are discussed by Mathur (1975). Only male specimens were available in the present collection.

Measurements : Male : length of the forewings 2981-2997., Width of head with eyes 734-748., Width of vertex between eyes 443-450., Length antenna 781-792., Hind femur 546-548., Hind tibia 806-811., Proctiger 338-340., Paramere 261-264.

Host plant : *Mangifera indica* Linn. (Anacardiaceae)

43 male specimens of this species has been collected from Shevoroy hills (1550m), Tamilnadu, on 31-3-1977.

This economically important and endemic species has been reported (Crawford, 1912) to destroy buds of mango trees by making galls. Its distribution was so far known only from north India, and during present study its occurrence has been reported from South India. This species has been declared as a serious pest of mango, due to its damage potential.

Genus : *Paurocephala* Crawford

1913 *Paurocephala* Crawford, *Philipp. J. Sci. 8*(4) : 293-294

Type : *Paurocephala phylloptera* Crawford

1975 *Paurocephala*, Mathur, *Psyllidae of the Indian subcontinent*, 48

Head smaller than thorax ; vertex deflexed downward ; posterior ocelli elevated ; frons visible from above as a small sclerite ; anterior ocellus prominent ; antenna ten segmented with two unequal spines at apex of terminal segment ; hind leg longer than middle ; metacoxae larger than mesocoxae, maculate or clear, ovate, broad in the middle, narrow at base, broadly rounded at apex ; first marginal cell long ; median vein always parallel to Cu1 ; cubital petiole almost as long as radius ; external processes in parameres absent.

KEY TO THE SOUTH INDIAN SPECIES

Maculae restricted to central and apical bands in forewings ; terminal antennal segment with two unequal setae ; hind femur with three sensoria-like structures ventrally near base ; radius as long as cubital petiole ; marginal cells almost equal in width. *phalaki* Mathur

Maculae scattered all over forewing; terminal segment of antenna with two equal setae ; femoral sensoria absent ; radius shorter than cubital petiole , second marginal cell twice as wide as first.	*grewiae* n. sp.

Paurocephala grewiae n. sp.

(Fig. 24)

Colouration : general body colour dark brown ; abdomen with black bands on the dorsal and ventral sides ; wings light green; hind femur brown ; tibia yellow, forceps black.

Head : narrower than thorax, strongly deflexed downward, sparsely pubescent ; vertex about twice as wide as long ; anterior ocellus clearly visible on prominent large frons, post ocellur region elevated, lateral ocelli at extreme posterior margin of vertex ; median suture prominent ; genal cones long, beneath the base of antennae ; eyes hemispherical, large.

Antenna : comparatively small, less than half as long as forewings ; setae almost absent except two equally long apical setae at terminal segment ; basal segments robust, equally long ; third longest, as long as the length of segments 4 and 5 together, sixth and eighth equal, each longer than fifth but shorter than fourth, seventh longer than fourth, apical segments shorter than rest of the flagellum, ninth slightly longer than apical segment, apical segment with two equal setae ; sensoria on segments 4, 6, 8 and 9.

Legs : femur of hind leg unusually larger than mid-and front legs, shorter than tibia, about 2/3 as long as tibia ; tibial margins with thin long setae uniformally spaced ; basal spur absent, enlarged apex with 10-14 short thick black spurs ; tarsal segments unequal, apical tarsal segment slightly longer than basal with two claw-like spines at its tip.

Wings : forewing almost ovate, broad subapically, maculate, scattered, transparent, 14 patches along the wing margin ; basal vein nearly 1.5 times as long as cubital petiole ; radius shorter than cubital petiole ; R1 long forming a broad and long pterostigma with costal margin ; radial sector, median, and Cu1 almost parallel to each other for a distance beyond the centre of wing ; fork M1 +2 longer than fork M3 +4 ; Cu1 nearly 1/4 as long as Cu2 ; first marginal cell longer than pterostigma, second twice as wide as first, surface

with a number of scattered round patches of maculae ; junction of veins and wing margin filled by maculae ; hind wings small, transparent.

Genitalia : Male : shorter than abdomen, parameres dark brown ; outer margin of proctiger black, serrate and setose, concave subbasally, inner margin curved backward at base ; apex flat, transparent ; fore arm of aedeagus distinctly curved inward at apex ending in a spoon-like structure ; parameres slightly longer than proctiger, broad basally, gradually narrowing from subapical region ending with blunt apex ; hypandrium triangular with a few setae scattered on surface.

Female : smaller than abdomen, pubescent only at apex ; sloping posteriorly ; plates unequal, dorsal about 1.5 times as long as ventral, triangular ; basal margin broadly rounded, lateral margins gradually tapering towards apex with a sharp inward curve from both sides, basal margin almost straight, lateral margins uniform ; anal pore ring arrow-like, formed by two rows of equally long pores ; tip of ovipositor pointed.

Measurements : Male (female) : length of forewings 1482-1531 (1580-1599)., Width of the head with eyes 540-548 (552-560)., Width of vertex between the eyes 335-339 (341-345)., Length of antenna 745-755 (750-764)., Hind femur 324-328 (330-332)., Hind tibia 508-511 (510-515)., Proctiger 151-153., Dorsal plate (508-512).

Host plant : *Grewia rotundifolia* Juss. (Tiliaceae)

Types : holotype male, allotype female, paratypes 7 males and 7 females, Madras, 20-1-1978.

Paurocephala grewiae n. sp. is closely related to *P. phaluki* Mathur ing shape and venation of forewings, the size of fore arm of aedeagus, and structure of female genitalia, but is distinct in having a characteristic shape of anal pore rings, many (14) maculae along the forewing margin, and radius shorter than cubital petiole.

Paurocephala phalki Mathur

1975 *Paurocephala phalaki* Mathur, *Psyllidae of the Indian subcontinent*, 58

Head ovate, brown, width with eyes nearly twice as that of vertex between eyes ; genal cones short, broadly rounded at apex ; vertex wider than

long ; apical half of fourth, sixth, and eighth and the entire ninth and tenth antennal segments brown, apical antennal segment with 2 unequal setae ; legs distinctly longer than in normal psyllid species ; apical half of tibia and apical tarsal segments brown, rest of the regions yellow, hind femur with 3 sensoria-like regions near ventral base ; hind tibia characteristically with 8-12 large pointed setae on both the margins besides 6-8 similar apical setae ; tibia with a triangular short basal spur ; basal tarsal segment longer and more slender than the apical ; forewings nearly 2.5 times as long as antenna, broadly rounded at apex, apices of all veins with a brown patch, wings with two bands of maculae at middle ; radius and cubital petiole equally long ; radial sector strongly curved ; basal vein longer than cubital petiole ; radius, median and cubitus parallel ; first marginal cell as wide as second ; parameres smaller than hypandrium, broad at base and narrow towards apex ; dorsal plate of female genitalia longer than ventral, sloping posteriorly.

Host plant : unidentified.

3 males and 1 female were collected from Madras on 29-8-1977.

This species has been compared with type material from the Forest Research Institute, Dehra Dun, the measurements of the originally described species show slight variations from the present observations as in the table below :

Characters	Range of measurements of specimens collected from S. India (Male) (in mm)	Measurements of the type specimen (from F. R. I.) (Male) (in mm)
Length of forewings	2.028-2.039	1.82
Width of head with eyes	0.637-0.644	0.60
Width of vertex between eyes	0.356-0.360	0.38
Length of antenna	0.851-0.866	0.98

The original description by Mathur (1975) included ten specimens from Bengal. This species has been reported for the first time from the Southern part of India.

Genus : *Pauropsylla* Rubsaamen

1899 *Pauropsylla* Rubsaamen, *Ent. Nachr. Berlin 25* : 262

Type : *Pauropsylla udei* Rubsaamen

1975 *Pauropsylla* Mathur, *Psyllidae of the Indian subcontinent*, 72

Head smaller than thorax, deflexed, vertex wider than long ; posterior ocelli elevated, anterior ocellus not visible ; frons visible dorsally, seen as a small sclerite ; antenna ten-segmented, short, robust ; terminal segment with unusually long setae at apex ; eyes recessive ; hind tibia with rows of stout black apical spines ; hind femur with a comb of long setae subapically ; apical tarsal segment with two claw-like spines at tip ; forewings ovate, transparent, hyaline, broadly rounded at apex, broadest subapically ; cubital petiole usually shorter than radius, sometimes very small like a stub ; second marginal cell larger than first ; anterior median joining below middle of apical margin.

Of the 7 species in Oriental region 3 are from South for which the key is provided based on the available reference.

KEY TO THE SOUTH INDIAN SPECIES

1. Forewings with pterostigma ; second marginal cell remarkably smaller than first ; terminal segment with two equally long spines which are half as long as antenna. *longispiculata* Mathur

   Forewings without pterostigma ; second marginal cell as long as or longer than first ; terminal antennal segment with two small (smaller than third segment) unequal spines. 2

2. Head with median suture ; forewing broadly rounded at apex ; basal tarsal segment of hind leg smaller than apical, genal cones small, swollen beneath antennal sockets. *ficicola* Kieff

   Head without median suture, forewing almost square at apex, tarsal segments of hind legs equally long, genal cones absent. *depressa* Crawford

Pauropsylla depressa Crawford

1912 *Pauropsylla depressa* Crawford, *Rec. Indian Mus.* 7(5) : 429-430

1973 *Pauropsylla depressa* Mani, *Plant galls of India*, 354

1975 *Pauropsylla depressa* Mathur, *Psyllidae of the Indian subcontinent*, 81

Head smaller than thorax, median suture fused ; genae swollen beneath, genal cones absent ; vertex nearly twice as wide as the length ; frons visible from above ; antennae short, equally long, apical segments with two equal spines ; hind tibia about 1.5 times as long as hind femur, with four short basal triangular spurs, two of which longer than others, and four thick, black, apical spines, one of which subapical projecting laterally ; basal tarsal segments almost equally long ; forewings broadly rounded at apex, narrow basally ; cubital petiole short, (0.364-0-369mm) ; basal vein longer than cubitus ; cells almost equally long ; pterostigma absent ; proctiger longer than paramere, broadest in middle ; inner margin of paramere hirsute.

Measurements : Male : length of forewings 3536-3551., Width of the head with eyes 788-796., Width of vertex between eyes 443-452., Length of antenna 1579-1611., Hind femur 572-578., Hind tibia 845-852., Paramere 216-219.

Host plant : *Ficus glomerata* Roxb. (Moraceae)

This species has been collected from Madras on 5-3-1976, and 16 male specimens were examined.

This species forms leaf galls, the morphology of which has been described by Mani (1973). Distribution is reported from all over the Oriental region.

Pauropsylla longispiculata Mathur

1975 *Pauropsylla longispiculata* Mathur, *Psyllidae of the Indian subcontinent*, 88

Head highly elongate laterally, vertex almost twice as wide as long ; genae small, ventral in position ; posterior margin deeply curved inward ; antenna short with two equal apical setae as long as the length of segments 4-10 together ; segments 4, 6, and 8 much broader than the rest of flagellum ; femur and base of the tibia brown, other regions yellow, hind tibia with 4-6

long, stout, brown, blunt spines on one side and two such spines on other side of apex ; forewings broadest subapically, gradually narrowing towards base, broadly rounded at apex ; cubital petiole shorter than cubitus ; basal vein and radius almost equal ; median bending upward in middle, parallel to Cu1 ; Cu2 much smaller than first, second marginal cell distinctly smaller, both cells with marginal radular structures ; pterostigma present, paramere strongly bifurcated at its apex, proctiger with rectangular projections, ovipositor pointed.

Detailed description of adults and nymphs were given by Mathur (1975).

Measurements : Male : length of forewings 1560-1611., Width of head with eyes 788-795., Width of vetex between eyes 378-383, Length of antenna 270-286., Hind femur 475-482., Hind tibia 552-559., paramere 132-135.

Host plant : *Buchanania lanzan* Spreng. (Anacardiaceae)

This species has been collected from Madras on 18-5-1976, 12 males and 16 females were examined.

Pauropsylla longispiculata Mathur, another endemic species to Oriental fauna, was first reported by Mathur in 1956 (and in 1959) from Nimar forest, M. P., but subequently no report was made about its occurrence. During the present study many specimens of this species were collected also from Tirupathy hills, Andra pradesh ; Kolli hills and Yercud, Tamilnadu.

While the size of other parts almost remains the same as in the species described from the Northern region, the length of antenna of South Indian species shows a remarkable variation, 0.45mm and 0.27mm from Minar forest and from Madras respectively. The leaf galls formed by this species are present almost throughout the year and adults occur in abundance only during the month of February. Severe infestation leads to defoliation.

Genus : *Phacopteron* Buckton

1894 *Phacopteron* Buckton, *Indian Mus. Notes*, *3*(5) : 18-19

Type : *Phacopteron lentiginosum* Buckton

Head smaller than thorax, vertex flat with a cleft in front, deflexed downward anteriorly ; anterior ocellus visible, lateral ocelli elevated ; genal

cones punctate, divergent, narrowly rounded at apex ; median epiphysis present in prothorax ; hind coxal spur small ; apical and basal spines of hind tibia absent ; forewings rhomboidal, broadest subapically, rounded at apex, veins often maculated ; first marginal cell much smaller than second ; cross veins often present connecting radial sector and fork M1+2 ; apices of antennal segments black, terminal segment with two unequal claw-like apical setae.

Phacopteron lentiginosum Buckton

1894 *Phacopteron lentiginosum* Buckton, *Indian Mus. Notes* 3(5) : 18-19

1919 Ayyar, T. V. R. *Rept. Proc. Third Ent. Meet. Pusa*, 1030

1975 Mathur, R. N. *Psyllidae of the Indian subcontinent*, 119

Head smaller than thorax, vertex wider than long, divided in front ; genal cones deflexed, brown, divergent ; except in basal and apical segments, apices of all other antennal segments club-shaped and large ; basal and apical segment, middle of third segment, and apices of segments 4, 5, 6, 7, and 8 distinctly brown ; hind femur dark brown, apex of hind tibia with 18-25 thick, long, pointed spines ; basal tarsal segment with two black apical spines ; forewings more than twice as long as wide, broadest in middle ; radial sector and fork M1+2 of median connected by a short cross vein ; R1, apical half of radial sector, and forks of median and cubitus surrounded by dense maculae, rest of veins with small rounded patches ; parameres slender, their apices curved inward facing each other ; dorsal plate longer than ventral.

Measurements : Male : length of forewings 3936-4015., Width of vertex between eyes 432-440., Width of head with eyes 907-922., Length of antenna 836-850., Hind femur 1118-1130., Hind tibia 1224-1236., Paramere 194-199.

Host plant : *Garuga pinnata* Roxb. (Burseraceae)

This species has been collected from Nilgiris (2600m), and Shevoroy hills (1600m), Tamilnadu. 5-8-1977 and 29-1-1978.

Female specimens were not available during the collection in South India.

This species forms galls on leaves. Its distribution is reported from all over India (Mathur 1975). This is the only species in India represensing the genus *Phacopteron* collected during the present study, and it conforms to the original description except for the presence of three dense maculae in the basal half of posterior margin of forewings. The antenna is distinctly shorter (1.5mm, North India, 0.8mm Nilgiris).

Subfamily : CIRIACREMINAE Enderlein

Head as wide as thorax with a cleft in front, vertex broader than long with anterior margin concave ; frons covered by genae ; genal cone absent, not visible from above ; anterior ocellus visible ; thorax slightly elevated ; antennae ten-segmented, basal segments robust, terminal segment with two unequal spines at apex ; forewings transparent, always like a parallellogram cross vein between radial sector and anterior median sometimes present, forewing with additional cells ; cubital petiole prominent and short ; base of hind tibia and basal segment of hind tarsus with spines ; proctiger always elongate, broad at base, narrow at apex ; dorsal plate of female genitalia always longer than ventral.

Species represending 9 genera are reported (Mathur, 1975) under this subfamily from Oriental region. The 2 genera represented from South India are discussed below.

KEY TO THE GENERA OF CIRIACREMINAE

Radius and media contiguous for a greater or shorter distance ; first marginal cell usually absent but if present, smaller than second ; terminal segment of antenna very small giving the appearence of nine-segmented antenna. — *Psausia* Enderlein

Radius and media separate, not contiguous ; first marginal cell present, larger than second ; antenna ten-segmented, large, longer than the width of head with eyes. — *Mycopsylla* Froggatt

Genus : *Mycopsylla* Froggatt

1901 *Mycopsylla* Froggatt, *Proc. Linn. Soc. N. S. W*, *26* : 258-259

Type : *Mycopsylla fici* (Tryon)

1975 *Mycopsylla*, Mathur, *Psyllidae of the Indian subcontinent*, 150

Head almost as wide as thorax, deeply cleft vertex ; genal cones very small ; front ocellus visible, surrounded by the sclerite-like frons, lateral ocelli elevated ; eyes rounded ; antenna slender ; apical and basal spines in hind tibia, apical tarsal segment with two claw-like spines at apex ; forewings membranous, broadest in middle, acutely pointed at apex ; radius and media not contiguous, second marginal cell in a rectangle with apical margin of wing ; pterostigma short, narrow ; radial sector short, curved to costa before middle of wing ; Cu1 and fork M3+4 parallel to each other ; two distinct caudally directed long processes in the proctiger ; parameres 'T' shaped apically.

Mathur (1975) described only one species from India representing this genus. Among the following 2 species, *M. mathuriana* is new to science and *M. gardenensis* is a new record to Oriental psyllid fauna.

KEY TO THE SOUTH INDIAN SPECIES

Forewings (slightly less than about 1.5 times) as long as antenna ; five short black spines at apex of hind tibia ; radius about three times as long as cubital petiole ; first marginal cell larger than the second ; anal pore ring arrow-shaped on its dorsal side. *gardenensis* Bhenotar et al.

Forewings about twice as long as antenna ; eight short spines at apex of hind tibia ; radius about twice as long as cubital petiole ; second marginal cell larger than the first ; anal pore ring round-shaped on its dorsal side. *mathuriana* n. sp.

Mocopsylla gardenensis Bhanotar et al.

(Fig. 25)

1971 *Mycopsylla gardenensis* Bhanotar, *Bull. Ent.*, *12*(2) : 109-112

Colouration : general body colour greenish yellow ; head pale yellow with black patch in between genae ; wings pale green ; hypandrium and lateral margins of the forceps brown ; dorsal plate light green.

Head : with eyes broader than thorax, sparsely pubescent, rugulose ; vertex broader than long, depressed between the eyes ; two round foval impressions near posterior margin ; postocellar region swollen, lateral ocelli elevated from surface of the head, anterior ocellus visible from above ; eyes large, hemispherical.

Antenna : ten-segmented, long, slender ; basal segments robust, third longest, fifth longer than sixth but shorter than fourth, seventh longer than eighth, apical segments small, terminal segment with two unequal spines ; sensoria on segments 4, 6, 8, and 9.

Legs : pubescent, with minute points arranged linearly ; tibia longer than femur ; basal tarsal segment of hind tibia longer than apical segment, tibia with five short, black spines at apex ; basal tarsus with five long spurs and apical tarsus with two claw-like terminal spines.

Wings : Broadest in the middle, hyaline, acutely pointed ; basal vein longest, about 5 times as long as cubital petiole ; fork M3+4 three times as long as fork M1+2 ; fork M1+2 joining well above the margin of wing apex ; cubitus longer than R1 but shorter than radius ; radius about 3 times as long as cubital petiole ; first marginal cell larger than second, second cell almost rectangular ; Rs short, curved to costa ; pterostigma narrow and closed.

Genitalia : Male : smaller than abdomen, paramere unusually with triangular projections in the middle of outer margin ; proctiger broad basally, narrow apically, apex curved inward ; hypandrium with long transparent setae.

Female : smaller than abdomen, pubescent ; basal plate about twice as long as ventral, sloping posteriorly, pointed apex with dark, serrate margin ; ovipositor pointed ; pore rings broad, formed by 2 rows of pores, outer row longer and those of inner circular ; base of the ring arrow-shaped.

Measurements : Male (female) : Length of forewings 3044 (3075-3086)., Width of head with eyes 863 (890-895)., Width of vertex between eyes 429 (451-455)., Length of antenna 2531 (2651-2678)., Hind femur 670 (683-690)., Hind tibia 851 (857-862)., Paramere 223., Dorsal plate (624-649)., Ventral plate (260-268).

Host plant : *Ficus religiosa* Linn. (Moraceae)

2 male and 12 females were examined, Yelagiri hills (1400m), North Arcot, Tamilnadu, 26-5-1976.

Mycopsylla gardenensis Bhanotar is closely related to *M. indica* Mathur in the shape and structure of wing venation. This species has been reported for the first time in the Oriental region. The adults cause severe damage to the leaves of their host plants by making enoromous pouch galls on the laminae.

Mycopsylla mathuriana n. sp.

(Fig. 26)

Colouration : general body colour dark brown with black bands on the dorsal and ventral sides of the abdomen ; head black ; antenna greenish yellow, wings pale yellow ; legs greenish brown, apices of the tarsal segments brown.

Head : shorter than vertex, sparsely pubescent, vertex longer than wide with two foval impressions on either side of median line near eyes ; post ocellar region slightly elevated backwards with posterior ocelli above eyes ; posterior margin swollen in middle, anterior ocellus visible from above ; frons not visible except a narrow border with front ocellus ; genal cones wider than long, smaller than the length of vertex, broad basally, narrow apically ; antennal sockets lateral, eyes large, hemispherical.

Antenna : slender, as long as the width of head with eyes, ten-segmented, hairy ; basal segments robust, third longest, about twice as long as fourth, fifth longer than sixth and seventh but smaller than fourth, ninth about twice as long as tenth, terminal segment smallest with two unequal apical setae ; sensoria on segments 4, 6, 8, and 9,

Legs : sparsely pubescent with minute dots ; femur shorter than tibia ; tibia with long dense setae at apical margin of femur, hind tibia with eight thick, black spines apically ; basal tarsal segment longer and wider than apical, with two black spines at its apex, apical segment with two claw-like spines at its tip.

Forewings : about twice as long as antenna, clear, hyline, about 2.5 times as long as wide, with minute dots ; radius longer than cubital petiole ; cubitus about twice as long as cubital petiole ; radius 3 times as long as R1

and twice as long as cubital petiole ; radial sector curved to costa ; pterostigma long and narrow ; fork M1 +2 nearly three times as long as fork M3 +4, fork M1 +2 joining the margin of wing above the tip ; second marginal cell longer than first, length between first and second marginal cells shorter than the width of the marginal cells ; hind wings three time as long as wide, large, with minute dots, costal margin with many hooked setae.

Genitalia : Female : smaller than abdomen, pubescent ; dorsal plate twice as long as ventral ; anal pore ring 'V' shaped with a deep notch of anterior margin, base round-shaped, longer than ventral plate, with short thin setae ; ovipositor pointed, with claw-like teeth in its apex.

Measurements : Female : length of forewings 5140., Width of head with eyes 1040., With of vertex between eyes 624., Length of antenna 3005., Length of hind femora 728., Hind tibia 988., Dorsal plate 598.

Male specimen was not available. The description is based on the female specimen.

Host plant : *Ficus religiosa* Linn. (Moraceae)

Types : Holotype female, Madras, 12-10-1978

Mycopsylla mathuriana n. sp. is the third species of this genus recorded in India. This is closely related to *Mycopsylla indica* Mathur in the dorsally depressed vertex between eyes, emarginate posterior margin, and shape of genitalia, but is distinct in having radius longer than cubital petiole, and is not having basal tibial spur of hind leg. This could be compared with *M. gardenensis* Bhanotar and distinguished by the shape of anal pore ring.

Genus : *Psausia* Enderlein

1914 *Psausia* Enderlein, *Ent. Mitt.*, *3* : 7

Type : *Psausia radiata* (Kuwayama)

Head broader than thorax, deeply cleft in front, vertex sloping forward, broader than long ; lateral ocelli elevated, anterior ocellus not visible from above ; genal cones divergent, pubescent, setae long, clypeus large, visible from below ; antenna densely hirsute, ten-segmented, apical segment with two unequal spines at its tip ; hind tibia with basal and apical spines ; tarsal segments equal in hind legs, mercanthus conical, apical tarsal segment with

two claw-like spines ; forewings transparent, rhomboidal ; veins hairy ; first marginal cell small or absent ; second marginal cell includes apex ; radius and media contiguous ; anterior median meeting with margin above apex ; cubital petiole distinct.

Only 2 species were reported under this genus from Dehra Dun, and the following record of *P. indica* forms the first report of its occurrance in South India.

Psausia indica Mathur

1975 *Psausia indica* Mathur, *Psyllidae of the Indian subcontinent*, 158

Head with eyes about twice the width of vertex, deeply cleft in front ; posterior ocelli unusually in the middle of vertex, anterior ocellus scarcely visible ; antenna highly hirsute, setae as long as apical segment ; 6-8 thick straight, black, pointed spines and two black stout curved spines at the apices of hind tibia and basal tarsal segments respectively ; forewings more than twice as long as wide, acutely pointed at apex, maculate along the apical half of radial sector ; median and radial sector contiguous for 2/3 of their length forming a cell with costal margin of wing ; first marginal cell small, second large and wide ; veins with long setae as in antenna ; proctiger divided into two pointed projections at apex ; parameres with black medial ridge ; dorsal plate longer than ventral, sloping posteriorly and slightly curved upward at apex.

The detailed description is given by Mathur (1975). During the present survey 4 male specimens were collected from South India.

Measurements : Male : length of forewings 3010-3090., Width of head with eyes 670-682., Width of vertex between eyes 281-293., Length of antenna 2097-2108., Hind femur 572-583., Hind tibia 650-661., Proctiger 260-274.

Host plant : *Ficus retusa* Linn. (Moraceae)

This species has been collected from Shevoroy hills (1550m), Tamilnadu, 22-2-1978.

Psausia indica Mathur is one of the two species of genus *Psausia*, already reported from the Forest Research Institute, Dehra Dun (Mathur

1975). Its distribution is not reported from any other part of the Oriental region. The species collected from South India distinctly possesses posterior ocelli just below the anterior ocellus and above the centre of vertex instead of on the extreme posterior margin of vertex as usual.

DISCUSSION

The available literature on the taxonomy of psyllids of 1300--1500 species belonging to 81 genera of 7 subfamilies (Crawford, 1914 ; Miyatake, 1964 ; Mathur, 1975 ; Loginova, 1964) of various regions of the world provides an opportunity to assess the overall knowledge of their distribution, evolutionary significance and phylogenetic relationships.

Controversial views exist among workers of Palaearctic psyllid fauna regarding retention of psylloidea (the rank of super family) to this group of insects. However, Oriental psyllids have been grouped under the family psyllidae and classified into 6 subfamilies, viz., Liviinae (2 species under one genus), Aphalarinae (3 species under 2 genera), Pauropsyllinae (21 species under 3 genera), Ciriacreminae (12 species under 8 genera), Psyllinae (35 species under 4 genera) and Triozinae (29 species under 4 genera) (Mathur, 1975). The present study includes a further addition of 21 species and one genus under 4 of the 6 subfamilies.

Among subfamily psyllinae thirty five species under six genera were known from India (Mathur, 1975) and nine more species are added in this study as new from South India. Most of the new species described here are based on their characteristic features of wing structure, venation and setal arrangements. Interestingly, *Psylla hyalina* Mathur collected from *Cassia siamea* appears to be brachypterous forms whereas the Macropterous forms of the same species were observed on *Albizzia procera* reported from Dehra Dun. The study on this family includes new record of a South African species *Euphalerus marginalis* Capener. Rutaceous and leguminosaeous plants are susceptible for infertation of species of psyllinae. The economically important *Murraya* plant was noticed to harbour thick population of *Diaphorina murrayi* n. sp. Nymphal feeding results loss of chlorophyll and crinkling of leaves. Leaves of sandalwood trees are reported to infestation by another new species viz. *Diaphorina verbera*. Four Indian species were already known to occur on *Santalum album*. The adult specimens of Psyllinae were collected throughout the year indicating the

overlaping of generations. Life cycle under normal conditions was observed as around two months in most of the species.

Under the subfamily Triozinae, in addition to the known 29 species in India, 10 species, 1 sub species and one genus are added as new in this study. Modifications of wing venation played major role in forming keys for various species. The new genus *Indotrioza* showed characteristic hirsute body with unusually thick long spines, so far not come across with any genus. Adults of this species appear during summer and the nymphal stages take several months to complete the life cycle. Their feeding on the leaves of *Vaccinium neilgherensis* causes inward curling and crinkling.

Triozinae of the Oriental region is known for their gall forming habit. Out of 41 species described under Triozinae from Oriental region, 19 are known as gall forming species. *Diospyros melonoxylon*, a commercially valuable plant, is severelly damaged by leaf galls of *Trioza obseleta*. Life cycle of this species is around 40 days and the adult emerges during February —March. Tender leaves are more susceptible for gall formation. Most of the species of *Terminalia* serve as host plants for gall forming Triozinae. *Cer psylla indica*, a new species described here, has got an unique feature of forming flower galls on *Terminalia arjuna*.

In addition to the existing 21 species under Psyllinae, one new species is described from South India. The distribution of *Apsylla cistellata* is first time reported in South India. This is a known pest on mango causing damage to the plant with their bud galls. *Paurocephala phalaki*, described from Bengal (Mathur, 1975) was collected during this study from Southern region and found to be comparatively smaller in size. Distribution of another species *Pauropsylla longispiculata* throughout south is also recorded. Out of 22 species reported under this subfamily from India, 11 are known as gall makers, of which 4 species are collected from southern part. This includes economically important species viz., *Pauropsylla tuberculata* and *P. trimaculata*, which infest pumpkin and *Zizyphus jujuba* respectively.

Only two species of the genus *Mycopsylla* are recorded under Ciriacreminae from south India, of which one is new to Science. *Mycopsylla gardenensis* is a new record to Oriental psyllid fauna and was observed to damage the host plant *Ficus religiosa* by causing pouch galls on leaves.

Crawford's (1914) classification of psyllids of the New World includes only the size and shape of the sclerites of head and length of forewings. Major characters like the structure and shape of antenna have been ignored by him. The significance of this character was emphasised by Heslop-Harrison, as early as in 1948, while he was discussing the subfamily separation of Psyllidae.

The present study on South Indian species throws more light on the importance of characters viz., the shape and size of genal cones, genitalia and anal pore rings for assessing the position and identity of the species. For example, in the subfamily Ciriacreminae the newly errected South Indian species *Mycopsylla mathuriana* n. sp. has the close resemblance in few characters with both *M. indica* Mathur and *M. gardenensis* Bhanotar. Nevertheless, the structure and shape of anal pore rings of *M. mathuriana* help in framing the key by its close relationship with *M. gardenensis* avoiding the confusion whether to compare this new species with *M. indica* or *M. gardenensis*. The anal pore ring of the new species is round shaped while that of *M. gardenensis* is distinctly arrow shaped.

The morphology of forewing is also used in assessing the correct systematic position of some genera and species, especially based on the specialised venation pattern. Among the branching patterns, the basal vein giving rise to the radial and cubital petiole termed as 'psylline form' is considered to be a less specialised pattern ; the 'triozine form' with radial, median and cubital branchings of the basal vein is considered to be an evolved type of psyllid wings secondarily specialised. Curiously, there appears to be a correlation between the existence of Triozine venation and pterostigma. Normally the species with triozine venation never show the occurrence of the pterostigma. The 'RM', a cross vein reported mostly in psylline forms, is also considered to be a common feature in the 'less specialised' psyllids. The latter pattern is met within the subfamily Ciriacreminae. This fact is exemplified in many species included in this text under this subfamily.

Forewing venation occupies important place while establishing new species. This character is taken into major consideration for some new species included in the text viz., *Psylla cubicella* (Fig. 3D). *P. longus* (Fig. 4D), and *Ceropsylla longivenata*. In addition to the venation, the texture of of the forewing helped for erecting *Psylla alaspina* (Fig. 2D) another South Indian species, new to science.

The presence of spines, spurs, setae and their arrangements were included even in the descriptions of subfamilies. While discussing the subfamily Triozinae, Mathur (1975) had gone to the extent of distinguishing two separate genera *Phylloplecta* and *Trioza*, which he called as "groups", based on the occurrence of a long pointed process in the hind coxae (in addition to meracanthus). Originally the genus *Phylloplecta* was synonymised by Laing (1930) with *Megatrioza* of Crawford (1915). Other added characters for supporting *Phylloplecta* as a separate genus is not clearly indicated either by Mathur or by the previous workers. Because of these facts, all the new species of this text described under the genus *Trioza* from South India are not isolated and classified under *Phylloplecta* group.

Exclusive emphasis has been given to the antennae which so far did not receive attention, at least as far as the taxonomy of Oriental psyllid species are concerned, except for one species viz., *Trioza longiantennata* described by Mathur (1975) where the third antennal segment is exceptionally long. *Trioza nigriantennata* n. sp., discussed in the text, possess unusually black antennal segments (Fig. 20 B). The new genus *Indotrioza* with its type species *Indotrioza hirsuta* shows remarkable antenna with its blaek antennal setae which are thick, pointed and almost as long as the antennal segments itself (Fig. 23 B). This sort of antennal texture is generally rare for psyllids and this type of material is the first report to Indian psyllid fauna.

SUMMARY

A brief outline on the morphological features is given after mentioning the methodology and area of study. Detailed descriptions for 21 new species, one subspecies and one genus and additional information for 14 species are given in the text with respective illustrations.

13 species under 4 genera of Psyllinae,

15 species under 3 genera of Triozinae,

6 species under 4 genera of Pauropsyllinae, and

3 species under 2 genera of Ciriacreminae are studied.

Biological notes, host plants, locality of collection and systematic position are also added to each species along with the number of specimens studied. Economical importance, gall forming behaviour etc., is also cited,

A discussion chapter on the South Indian psyllid fauna in relation to Indian fauna, their distinctiveness and host plant association is given. Importance of genal cones, genitalia and anal pore rings in assessing the position and identity of certain species are discussed. Finally a list of important references are also cited.

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KEY TO LETTERING OF FIGURES

ae	...	aedeagus
an	...	antenna
ao	...	anal opening
apr	...	anal pore ring
as	...	antennal socket
Av	...	anal vein
avl	...	anal valve
Ax scl	...	axillary sclerite
bs	...	basal antennal segments
bv	...	basal vein
Cl	...	clypeus
C+Sc	...	Costal+Subcosta
Cu	...	Cubitus
Cul	...	first cubital branch
Cu2	...	second cubital branch
Cx	...	Coxa
dp	...	dorsal plate
e	...	eye
Epm	...	epimeron
Eps	...	episternum
f	...	forceps
fa	...	fore arm of aedeagus
fo	...	front ocellus
gc	...	genal cone
hy	...	hypandrium
lbm	...	labium
M	...	median vein
M1+2	...	first fork from median
M3+4	...	second fork from median
1st mc	...	first marginal cell
2nd mc		second marginal cell
Mer	...	meracanthus
M Pn	...	Mesopostnotum
M P Sc		Prescutum of Mesothorax
M Sc	...	Scutum of Mesothorax

M Scl... Metasctellum
Mt Sc... Metascutum
Mt Scl Metascutellum
op ... ovipositor
po ... posterior ocellus
R ... radius
Rs ... radial sector
sp ... spiracle
tis ... tibial spines
V ... vertex
Vp ... ventral plate

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Figures

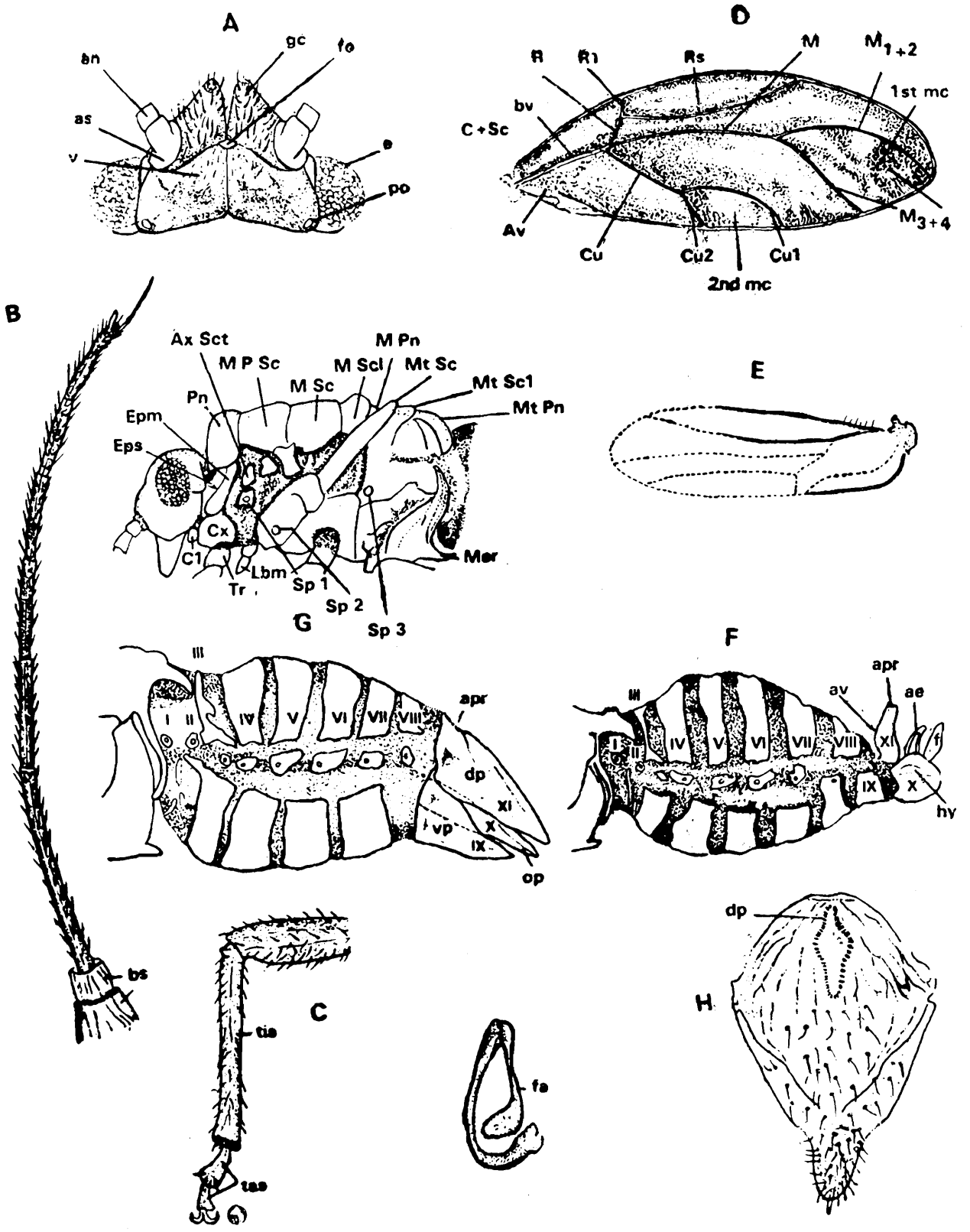

Figure : 1

Strictural features of a generalised adult psyllid

A Head B Antenna C Hind leg R Fore wing E Hind wing F Abdomen—male G Abdomen—Female H Anal plate I Aedeagus

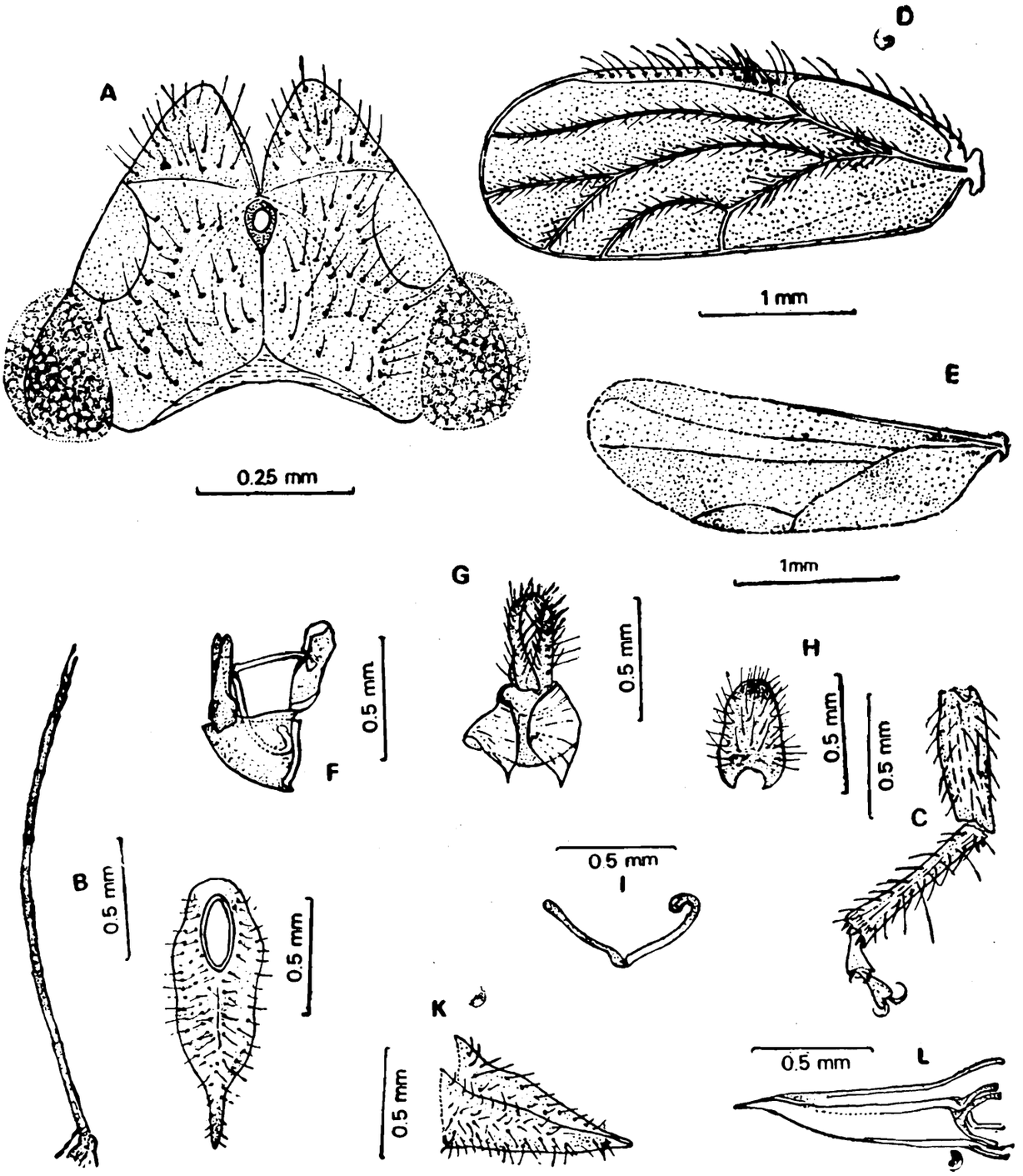

Figure : 2

Psylla alaspina n. sp.

A Head B Antenna C Hind leg D Fore wing E Hind Wing F Male genitalia—entire G Parameres and Hypandrium H Proctiger I Aedeagus J Dorsal plate K Ventral plate L Ovipositor

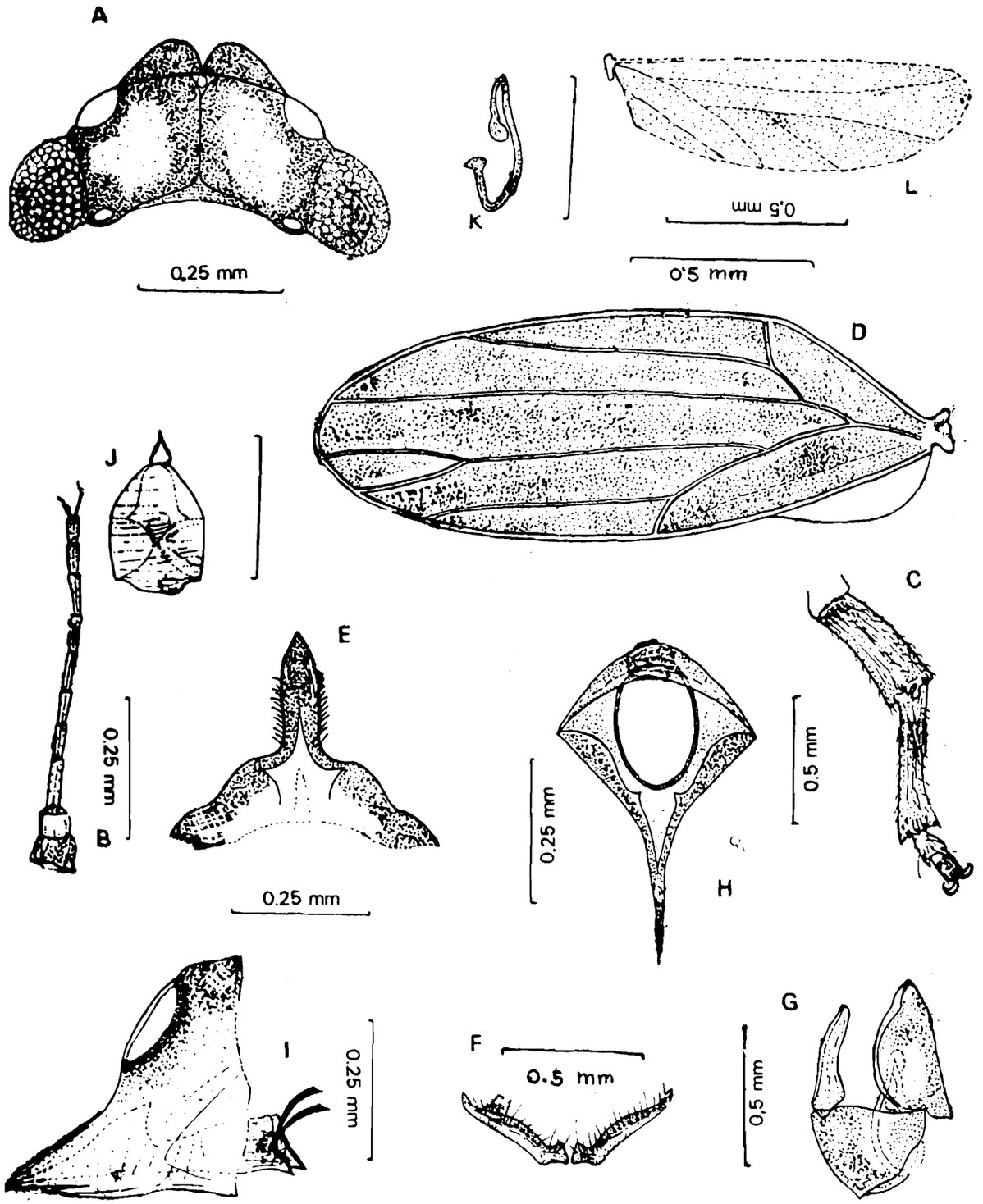

Figure : 3

Psylla cubicella n. sp.

A Head B Antenna C Hind leg D Fore wing E Ventral plate F Parameres G Male genitalia—entire H Dorsal plate I Female genitalia—entire J Proctiger K Aedeagus L Hind wing

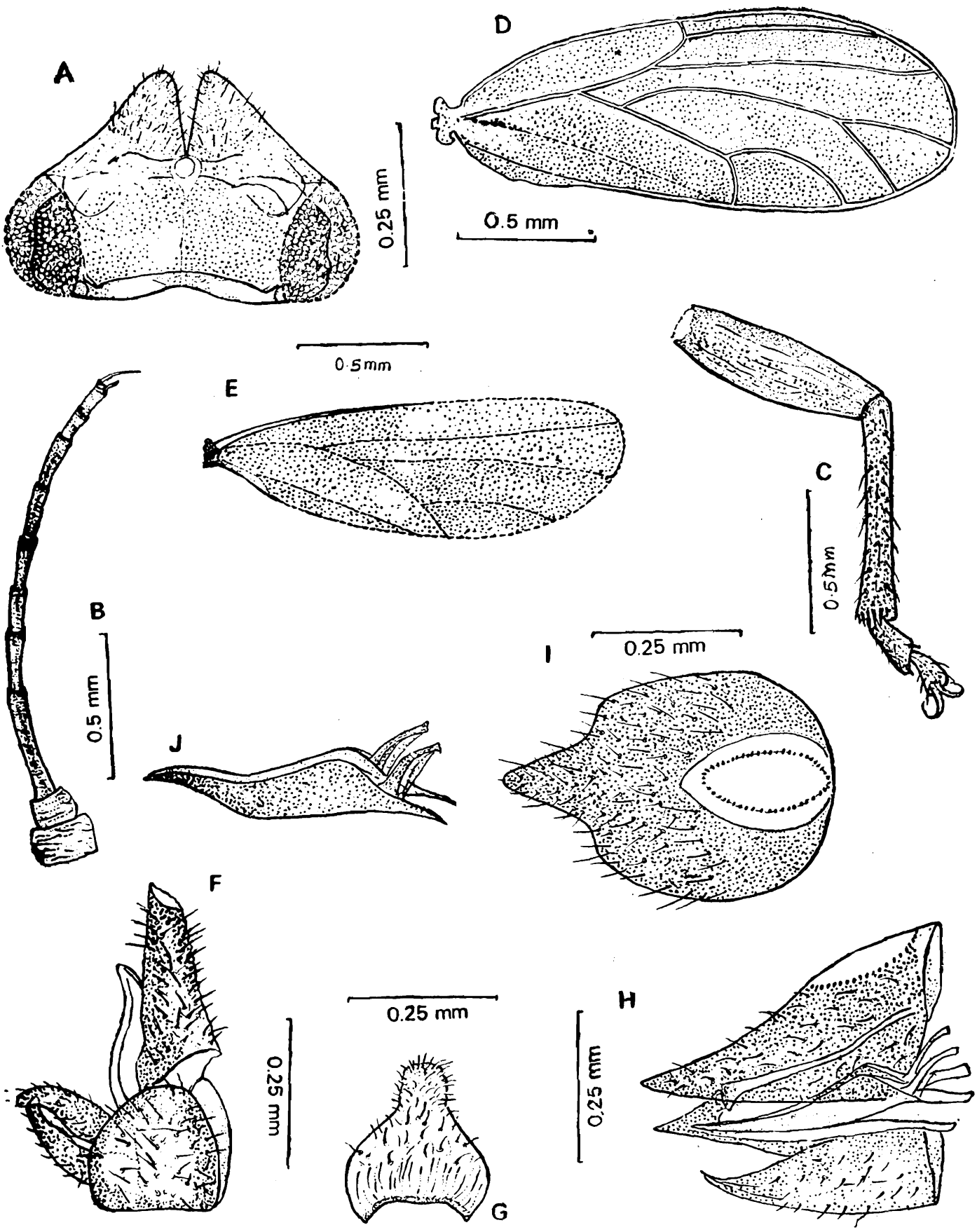

Figure : 4

Psylla longus n. sp.

A Head B Antenna C Hind leg D Fore wing E Hind wing F Male genitalia—entire G Proctiger H Female genitalia—entire I Dorsal plate J Ovipositor

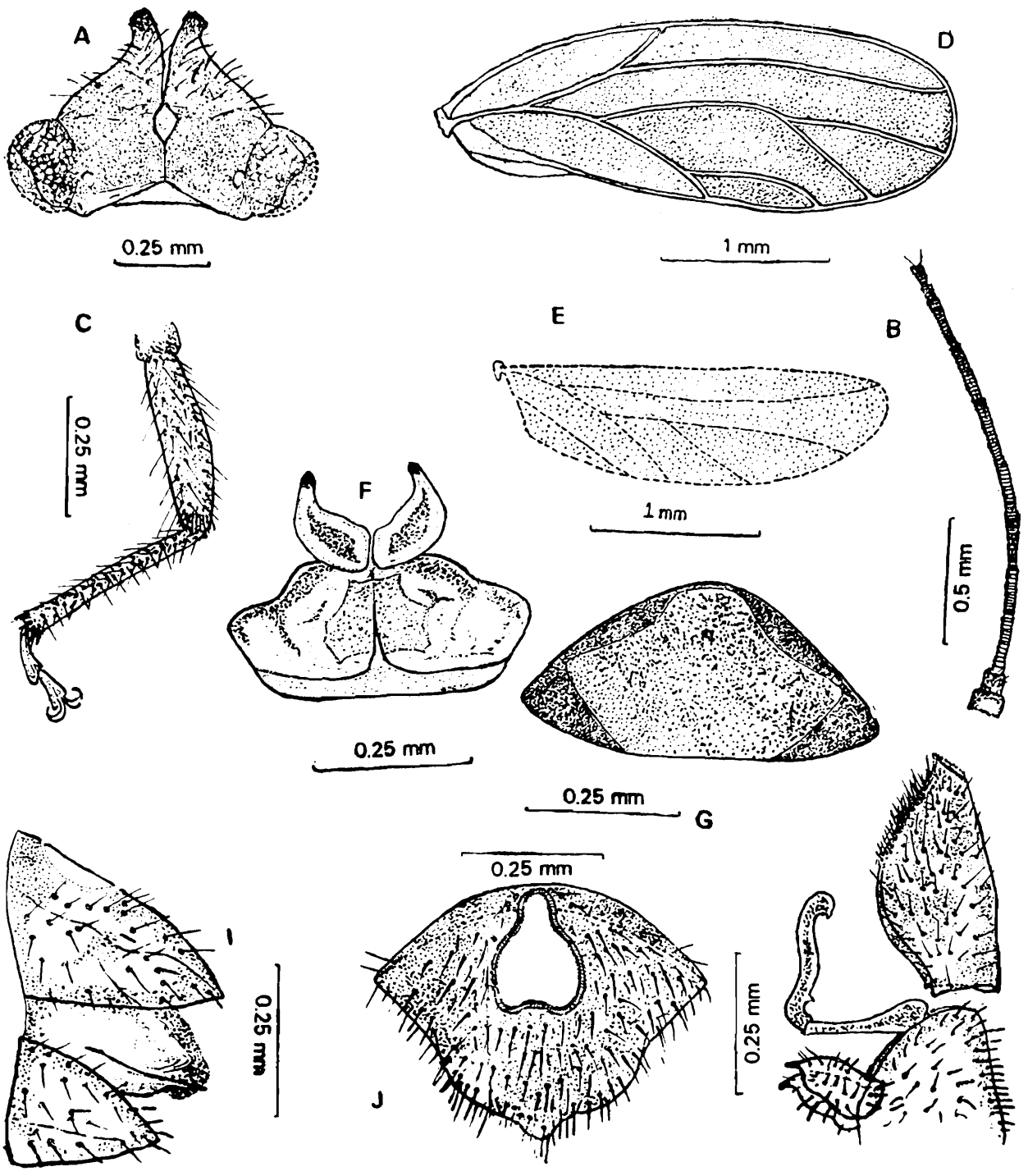

Figure : 5

Psylla shevoroyensis n. sp.

A Head B Antenna C Hind leg D Fore wing E Hind wing F Hypandrium and parameres G Proctiger H Male genitalia—entire I Female genitalia—entire J Dorsal plate

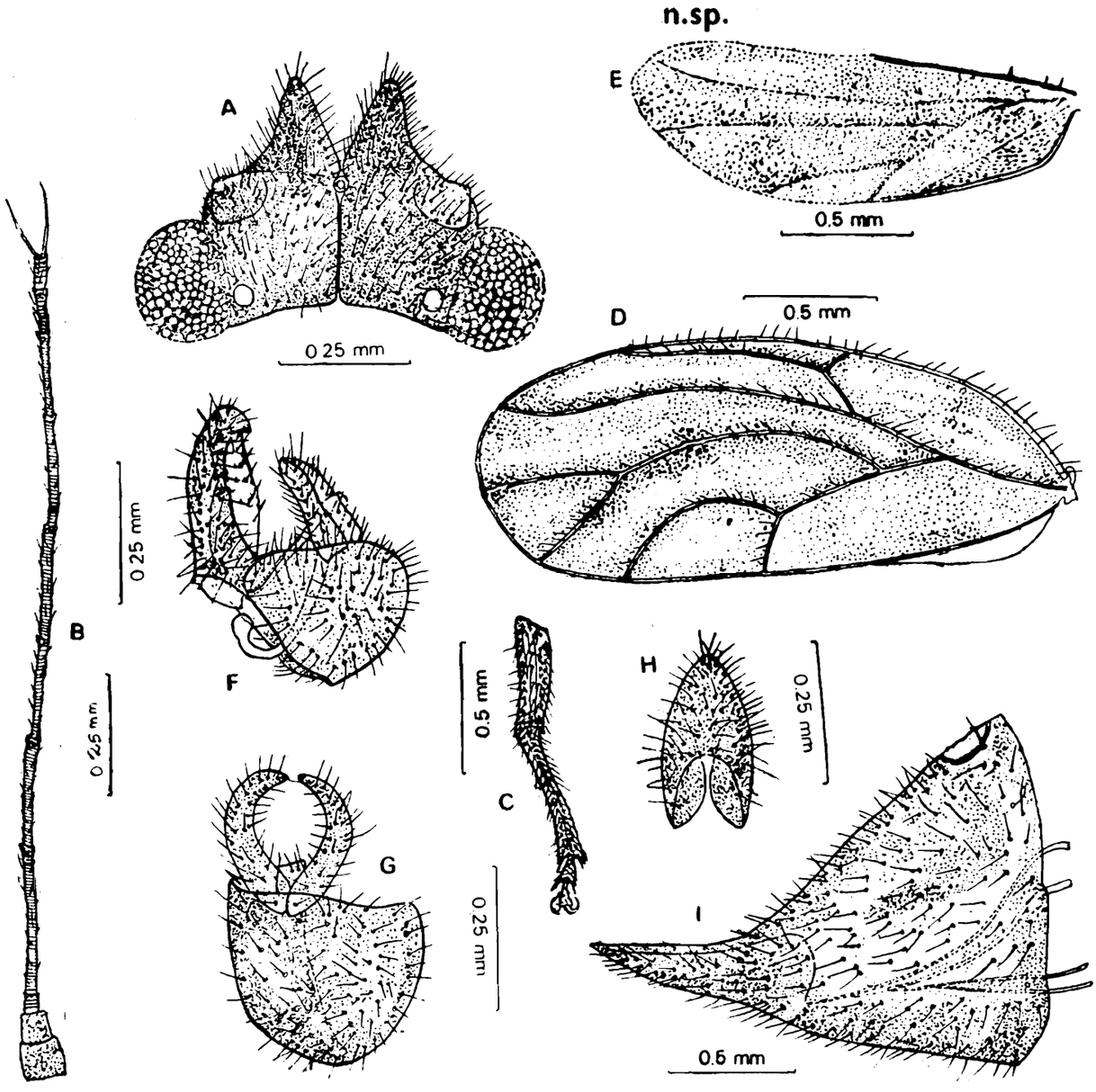

Figure : 6

Psylla ternstroemiae n. s.

A Head B Antenna C Hind leg D Fore wing E Hind wing F Male genitalia—entire G Parameres and hypandrium H Proctiger I Female genitalia—entire

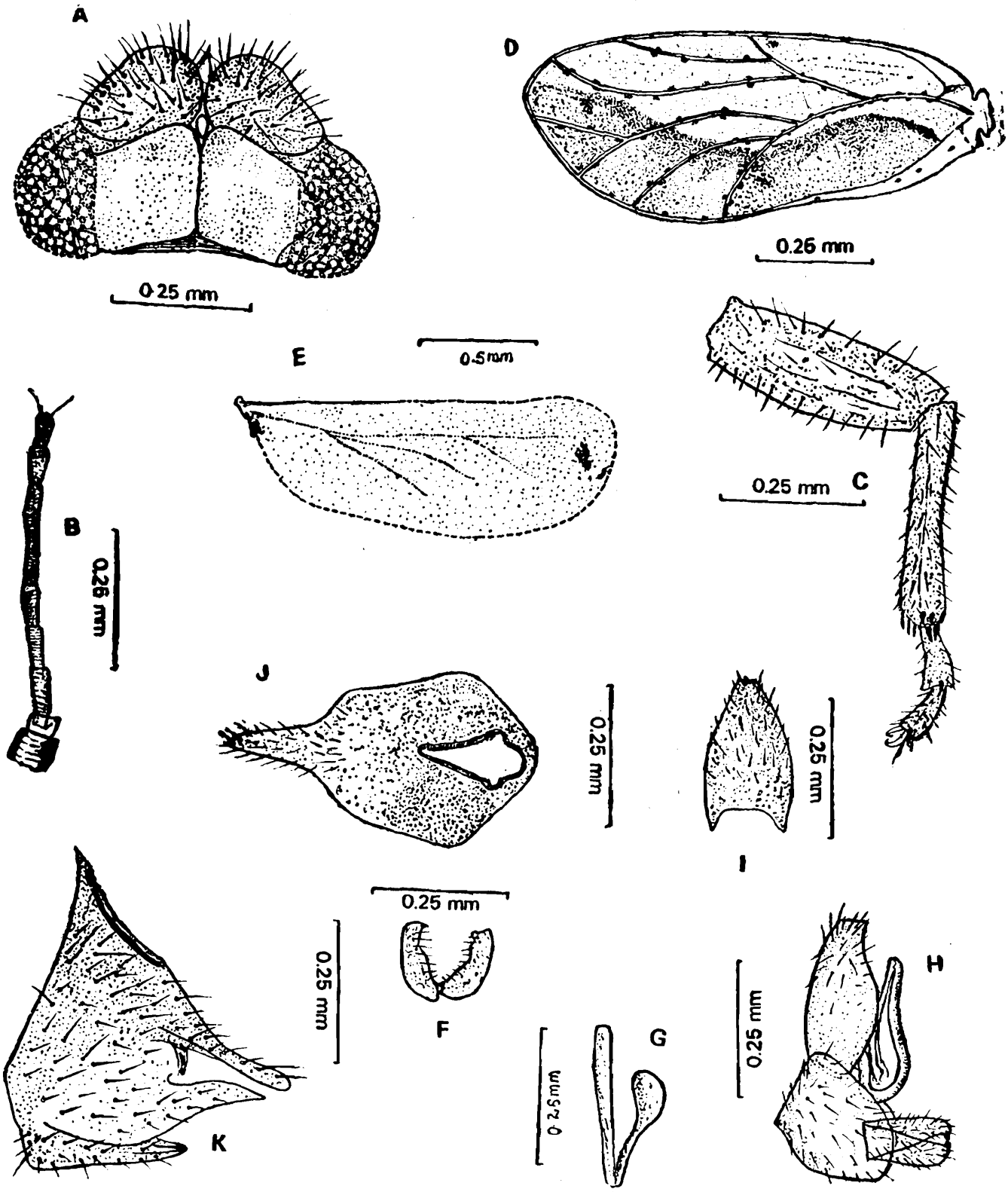

Figure : 7

Euphalerus marginalis Capener

A Head B Antenna C Hind leg D Fore wing E Hind wing F Parameres F Parameres G Aedeagus H Male genitalia—entire I Proctiger J Dorsal plate K Female genitalia—entire

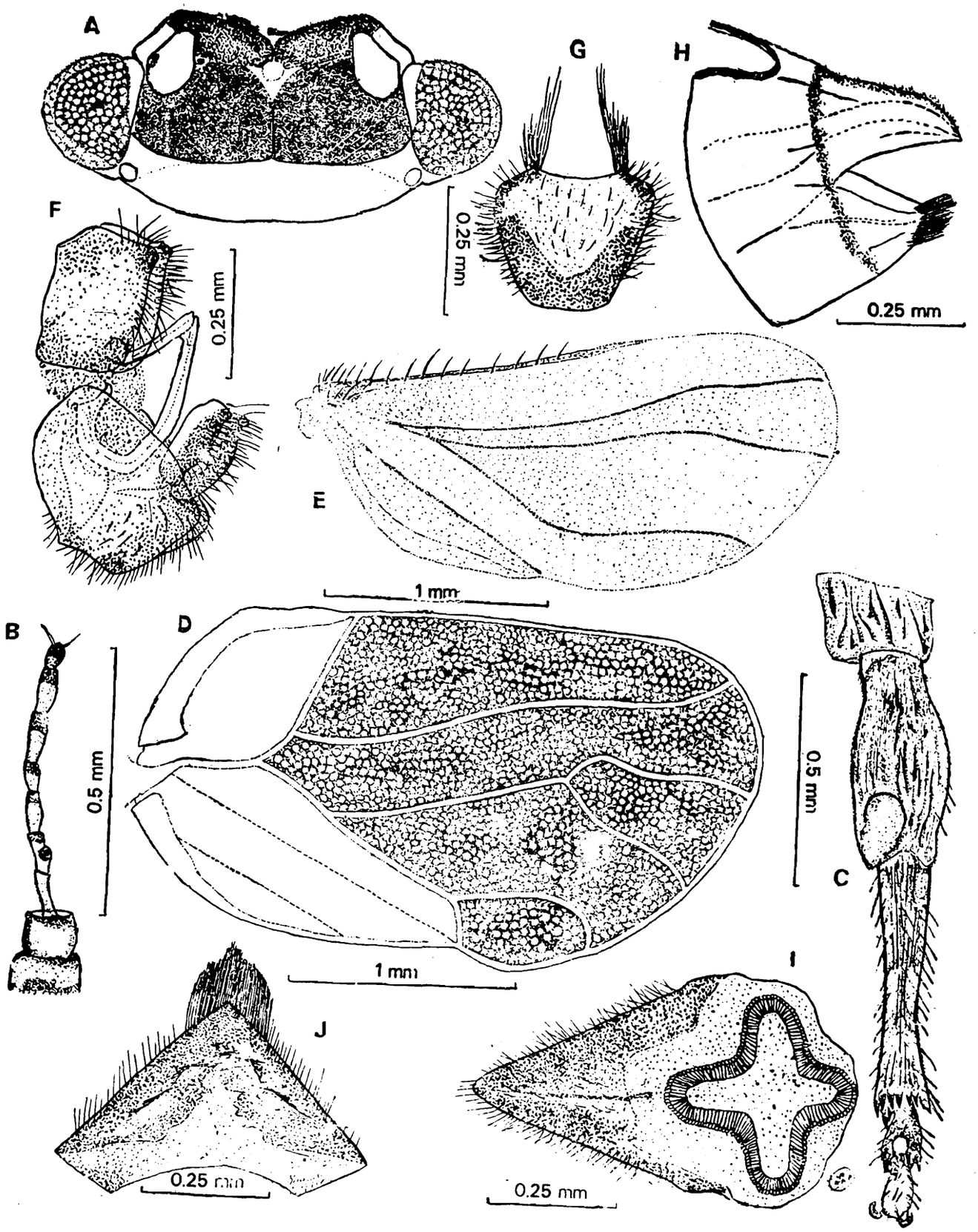

Figure : 8

Euphyllura nigriantennata n. sp.

A Head B Antenna C Hind wing D Fore wing E Hind wing F Male genitalia —entire G Hypandrium H Female genitalia—entire I Dorsal plate J Ventral plate

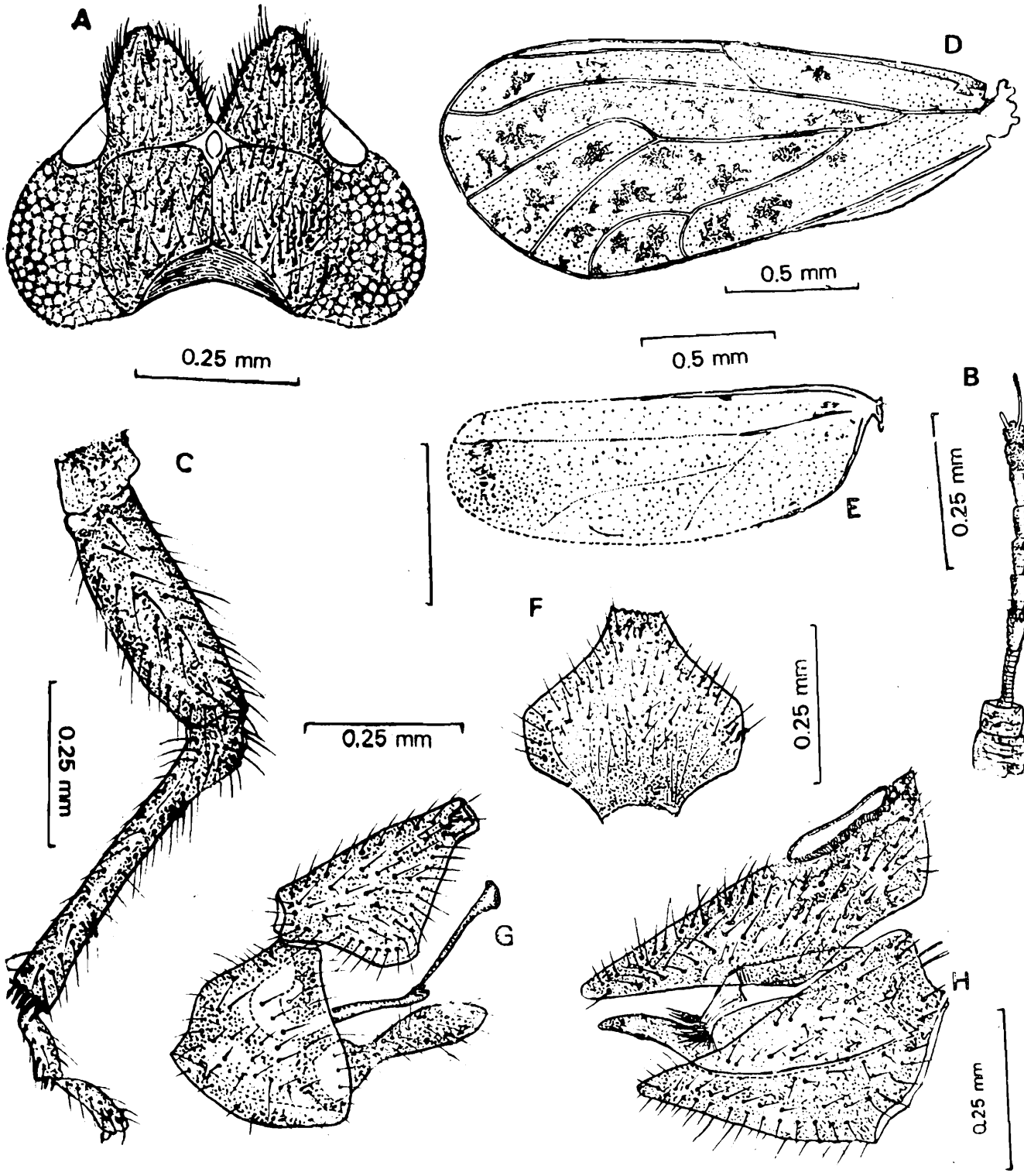

Figure : 9

Diaphorina lovolae n. sp.

A Head B Antenna C Hind leg D Fore wing E Hind wing F Proctiger G Male genitalia—entire H Female genitalia—entire

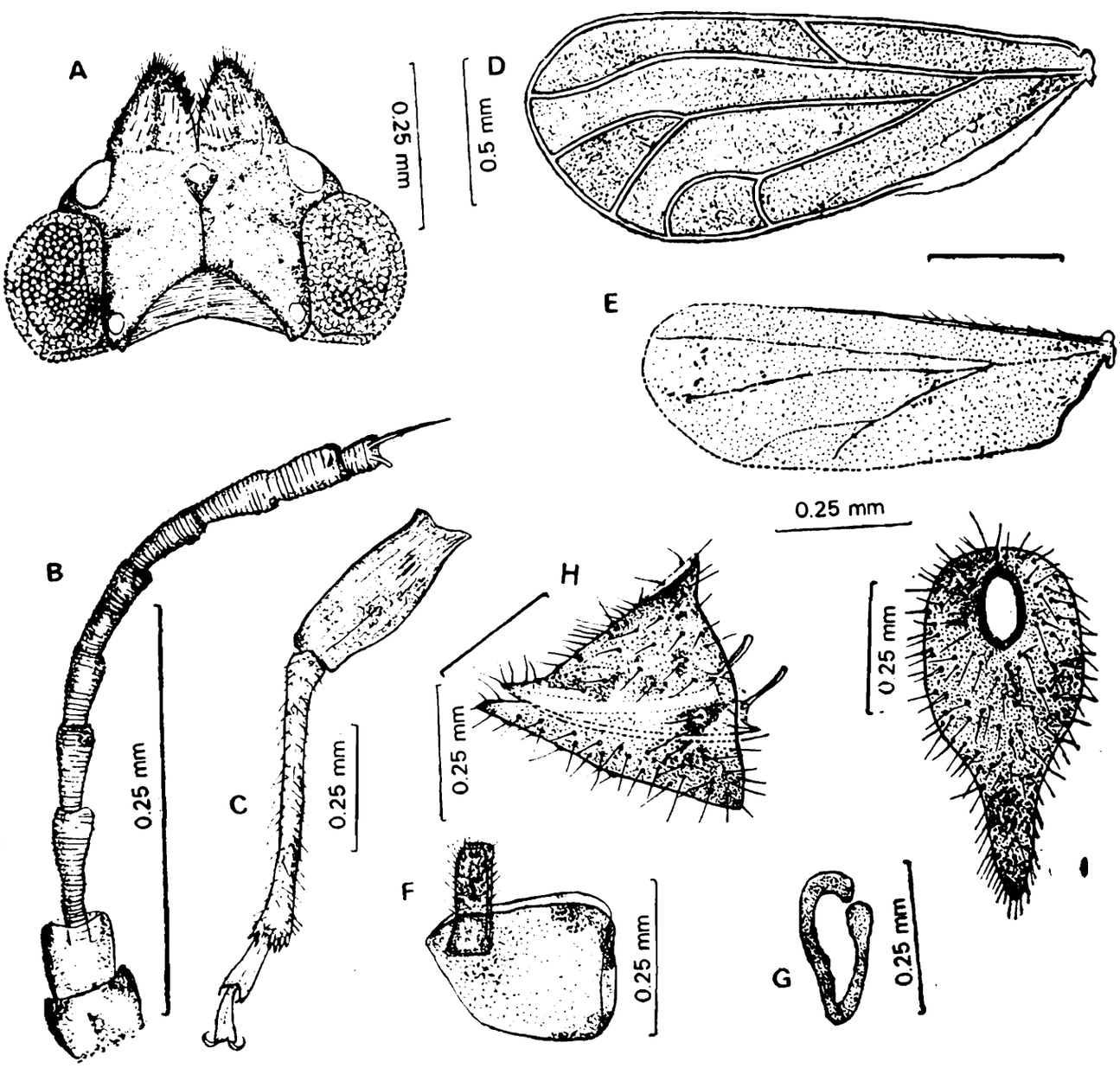

Figure : 10

Diaphorina murrayi n. sp.

A Head B Antenna C Hind leg D Fore wing E Hind wing F Hypandrium and parameres G Aedeagus H Female genitalia—entire I Dorsal plate

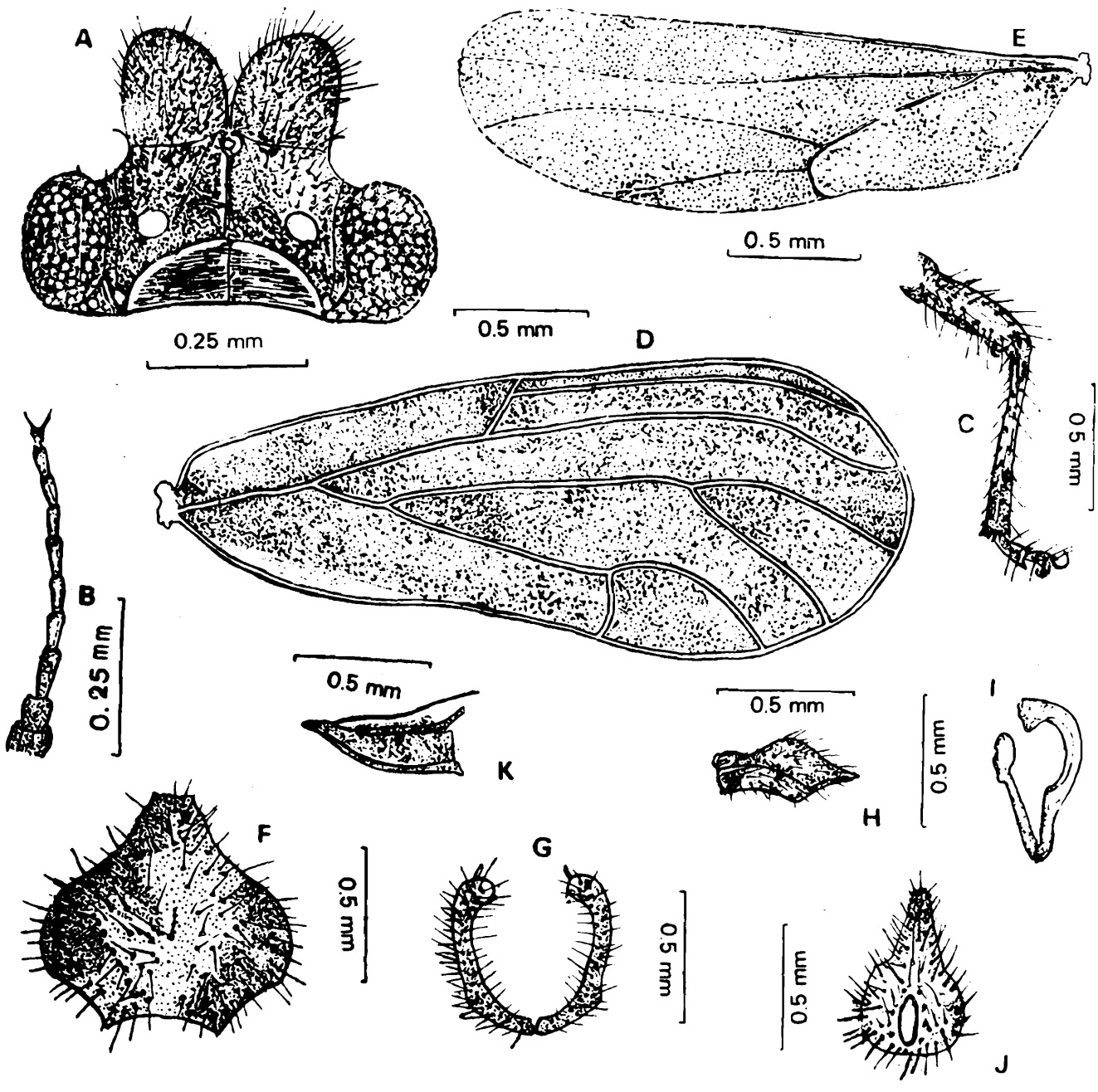

Figure : 11

Diaphorina verbera n. sp.

A Head B Antenna C Hind leg D Fore wing E Hind wing F Proctiger G Parameres H Ventral plate I Aedeagus J Dorsal plate K Ovipositor

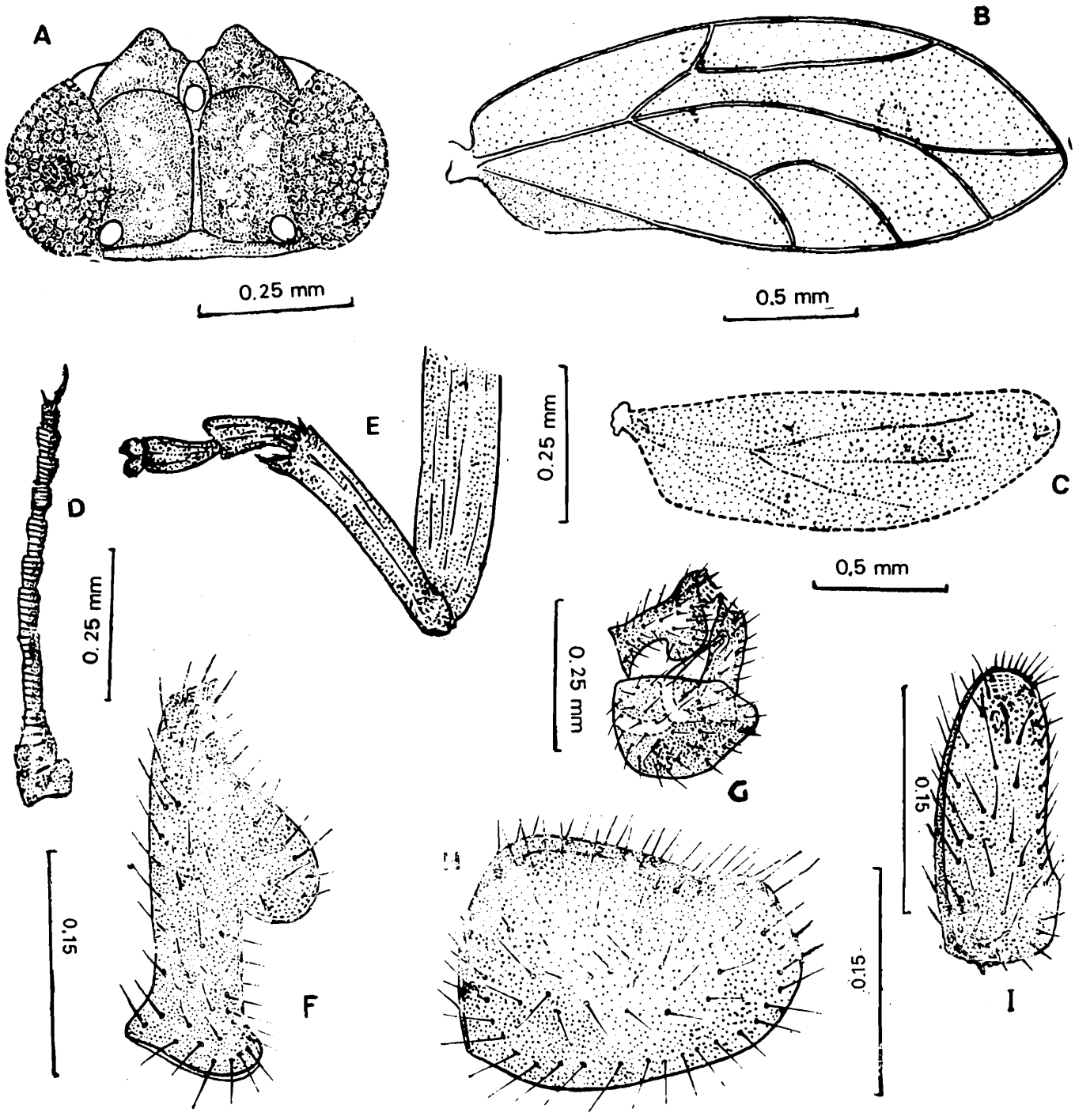

Figure : 12

Ceropsylla indica n. sp.

A Head B Fore wing C Hind wing D Antenna B Hind leg F Male genitalia—entire G Proctiger H Hypandrium I Paramere

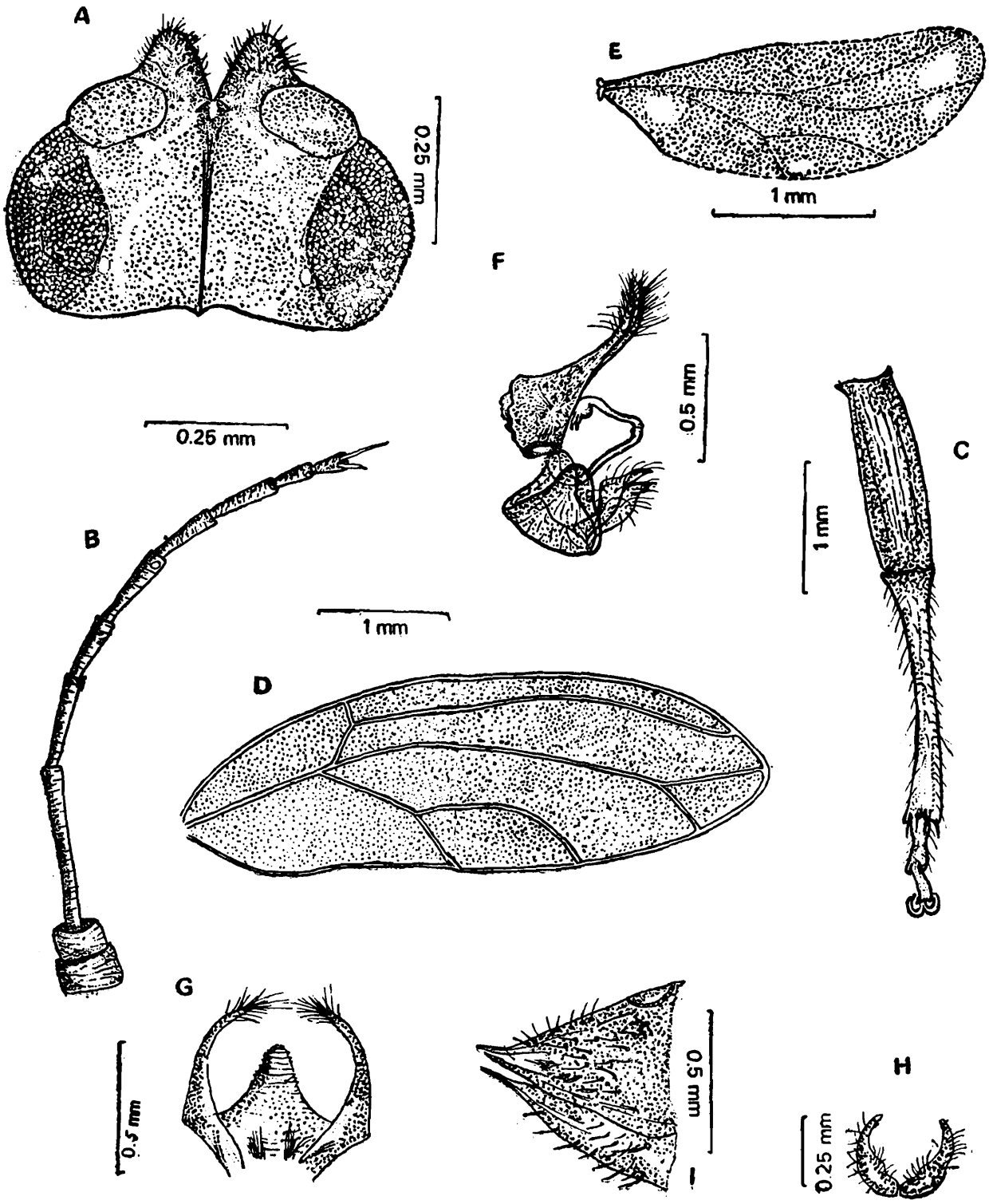

Figure : 13

Ceropsylla longivenata n. sp.

Head B Antenna C Hind leg D Fore wing E Hind wing F Male genitalia—entire G Parameres H Proctiger I Female genitalia—entire

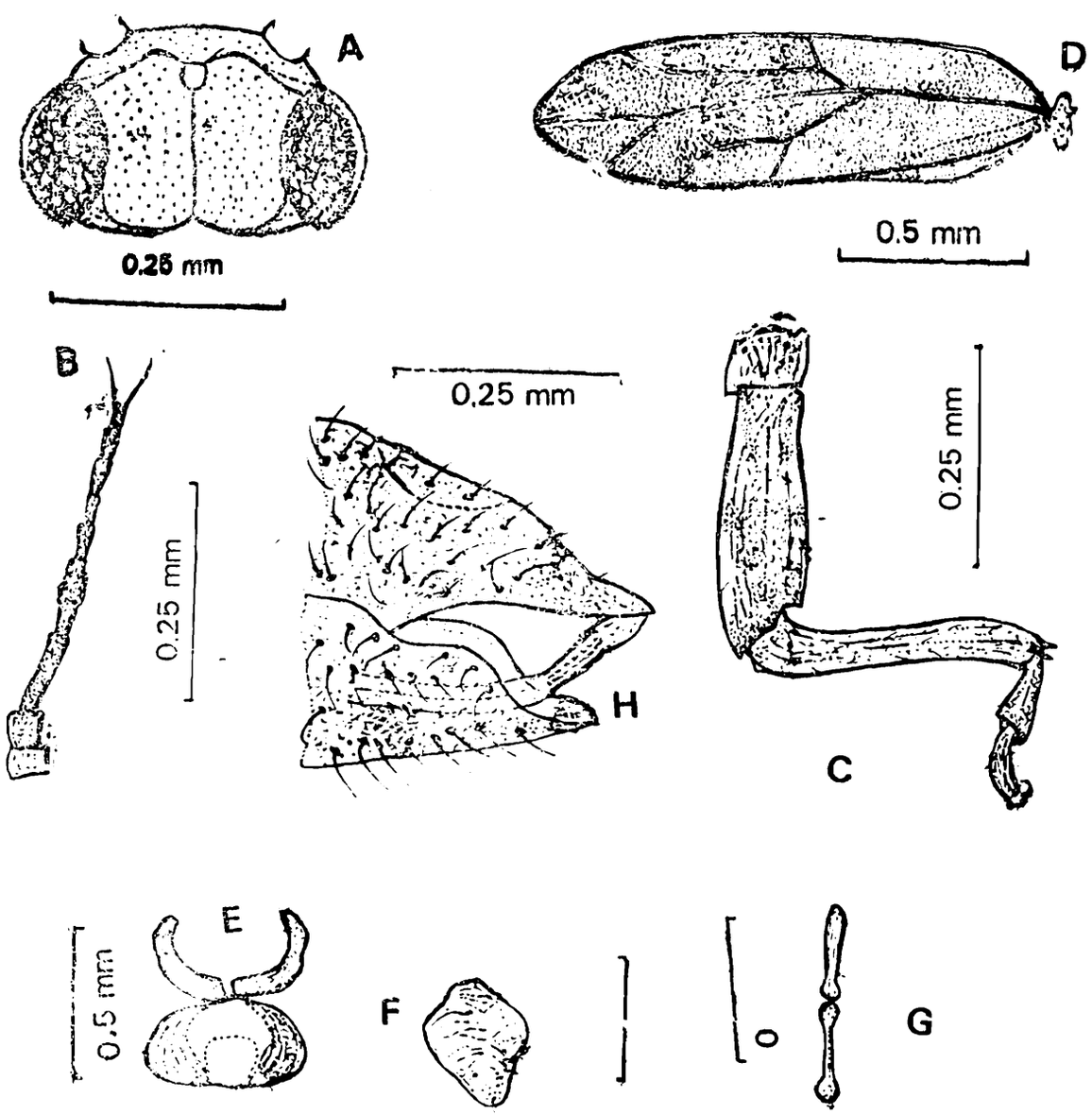

Figure : 14

Ceropsylla parvus n. sp.

A Head B Antenno C Hind leg D Fore wing E Hypandrium and parameres F Proctiger G Aedeagus H Female genitalia—entire

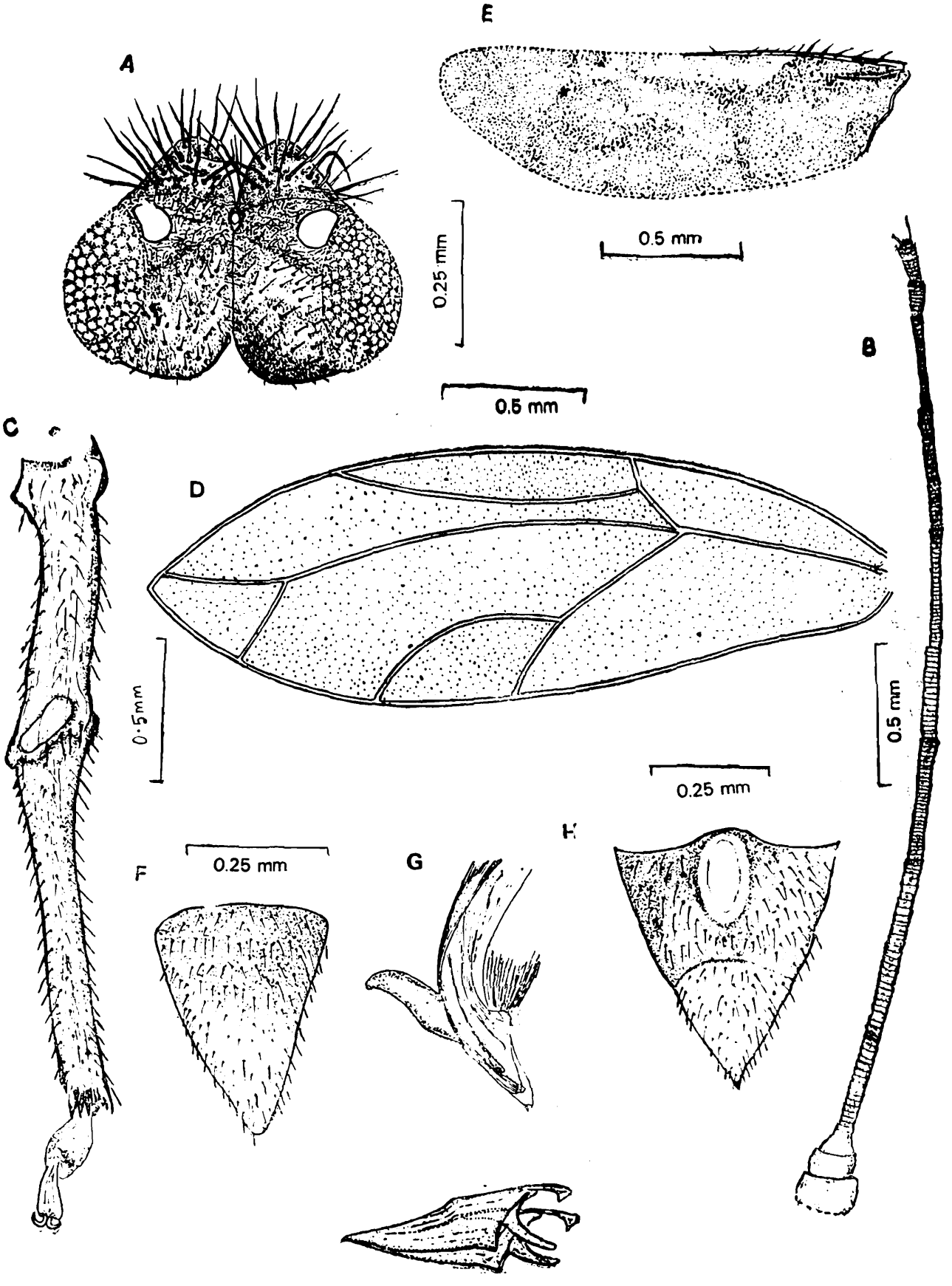

Figure : 15

Trioza anamalaiensis n. sp.

A Head B Antenna C Hind leg D Fore wing E Hind wing F Ventral valve G Meracanthus H Dorsal plate I Ovipositor

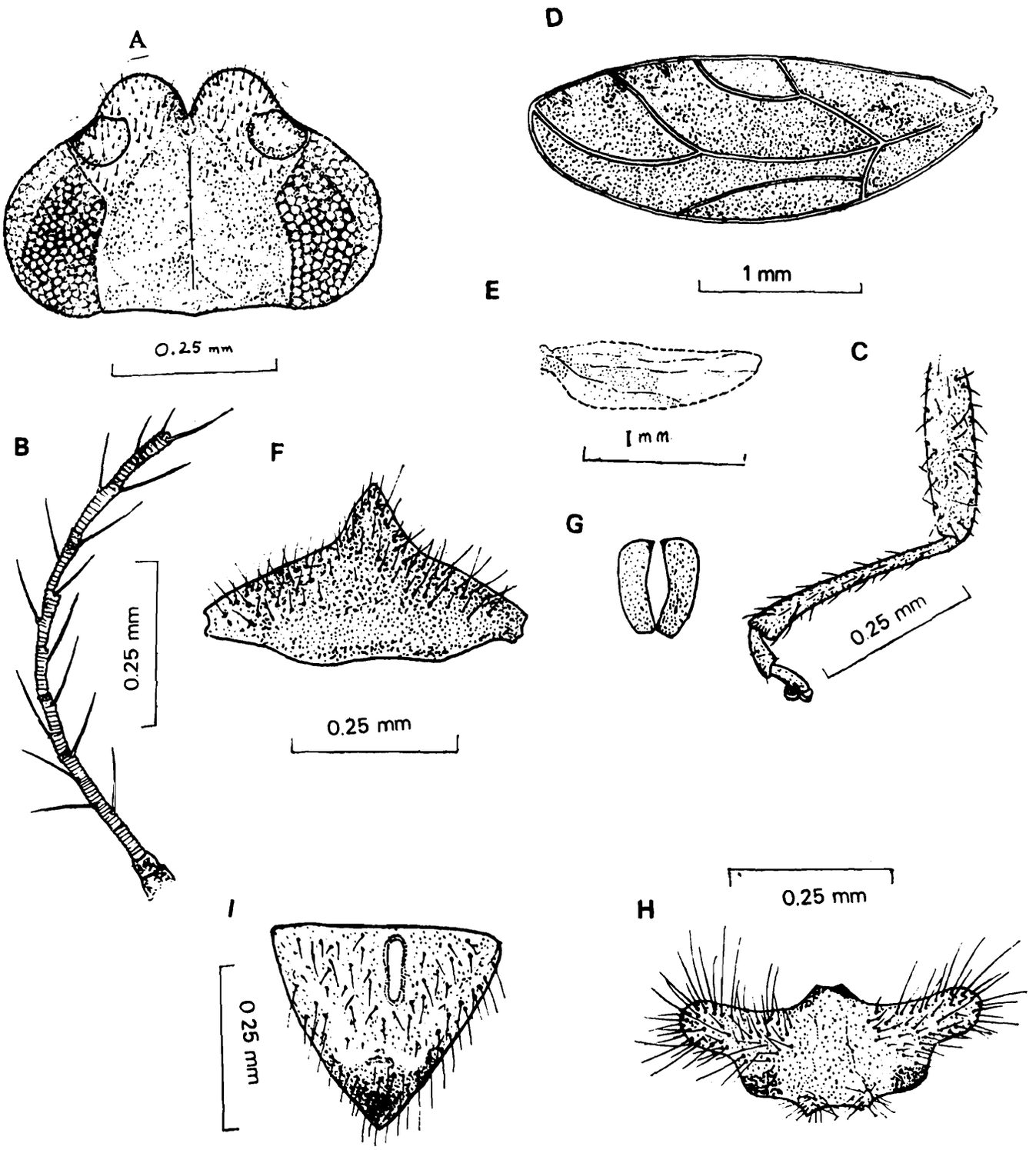

Figure : 16

Trioza hypandriata n. sp.

A Head B Antenna C Hind leg D Fore wing E Hind wing F Ventral plate G Parameres H Hypandrium I Dorsal plate

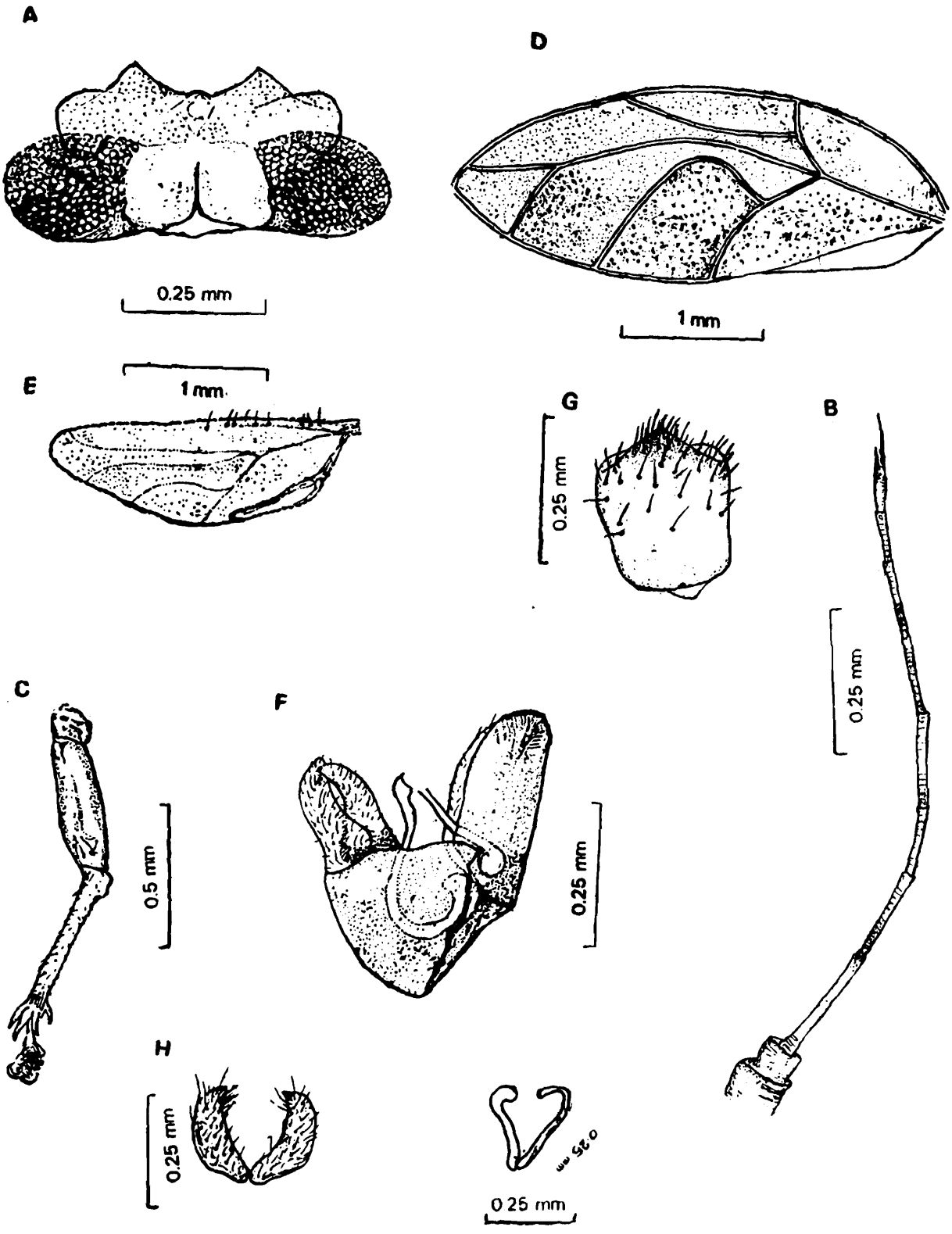

Figure : 17

Trioza laqueus n. sp.

A Head B Antenna C Hind leg D Fore wing E Hind wing F Male genitalia—entire G Proctiger H Parameres I Aedeagus

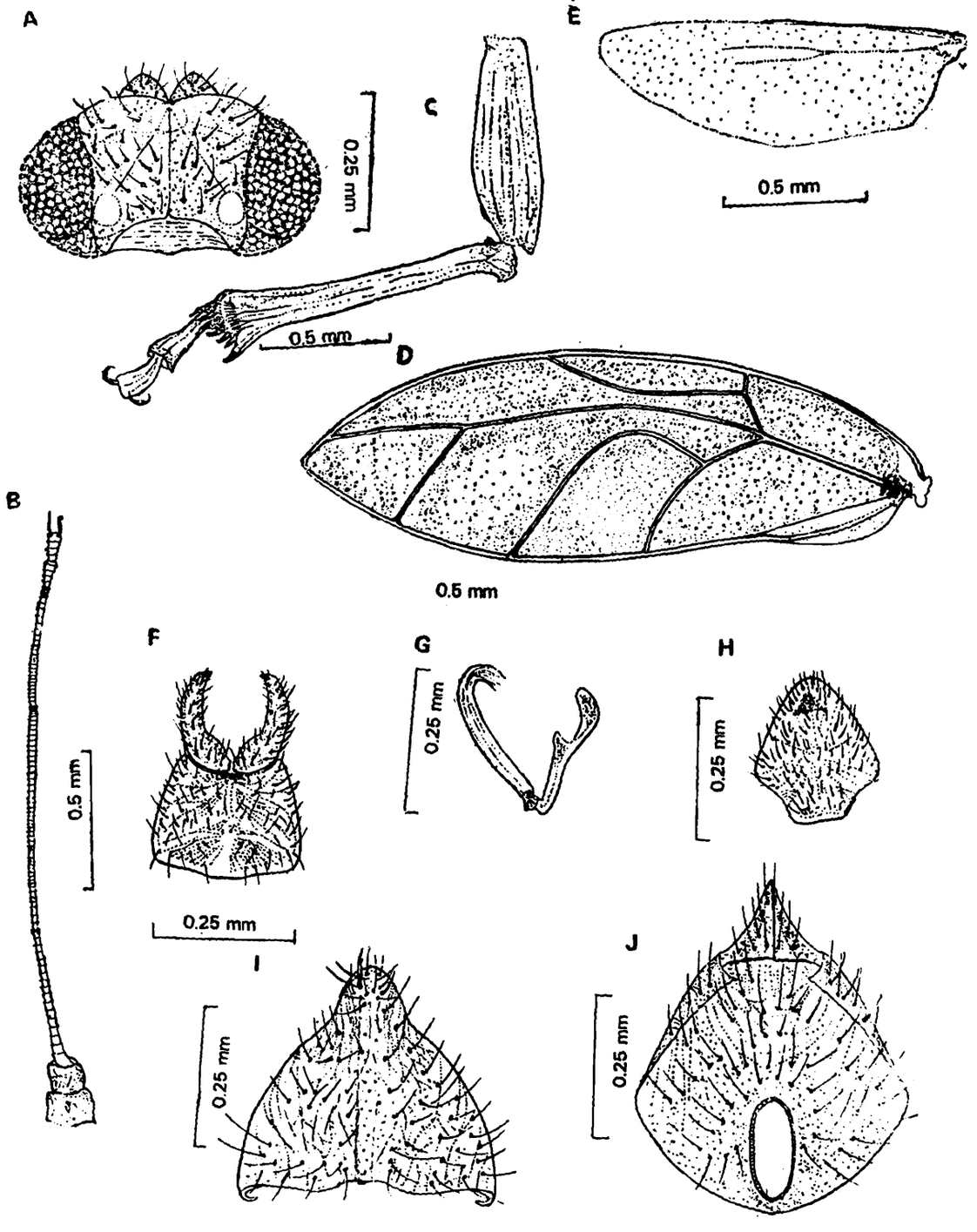

Figure : 18

Trioza laqueus minor n. sp.

A Head B Antenna C Hind leg D Fore wing E Hind wing F Hypandrium and parameres G Aedeagus H Proctiger I Ventral valve J Dorsal valve

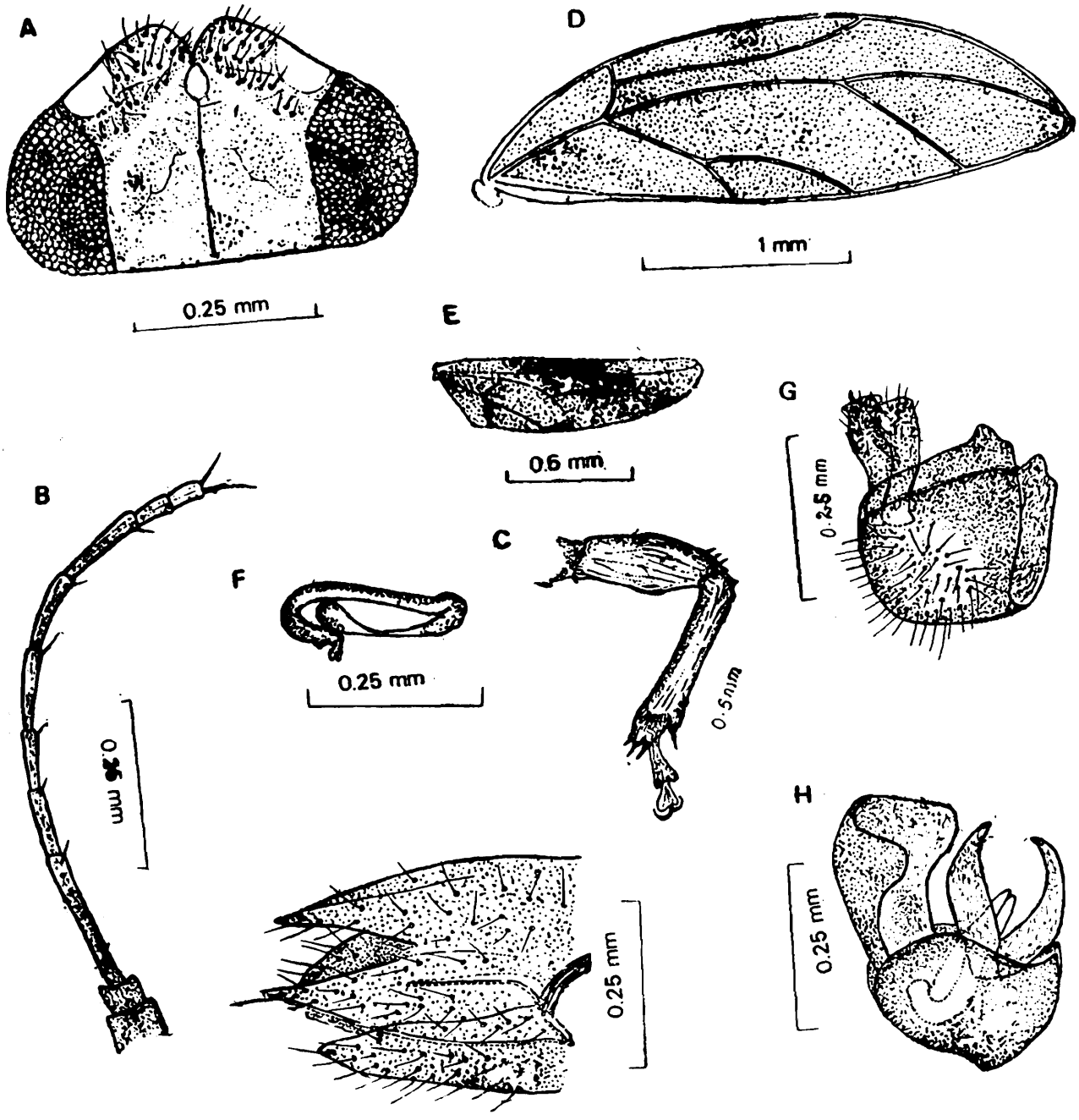

Figure : 19

Tsioza magnus n. sp.

A Head B Antenna C Hind leg D Fore wing E Hind wing F Aedeagus G Hypandrium and parameres H Male genitalia—entire I Female genitalia—entire

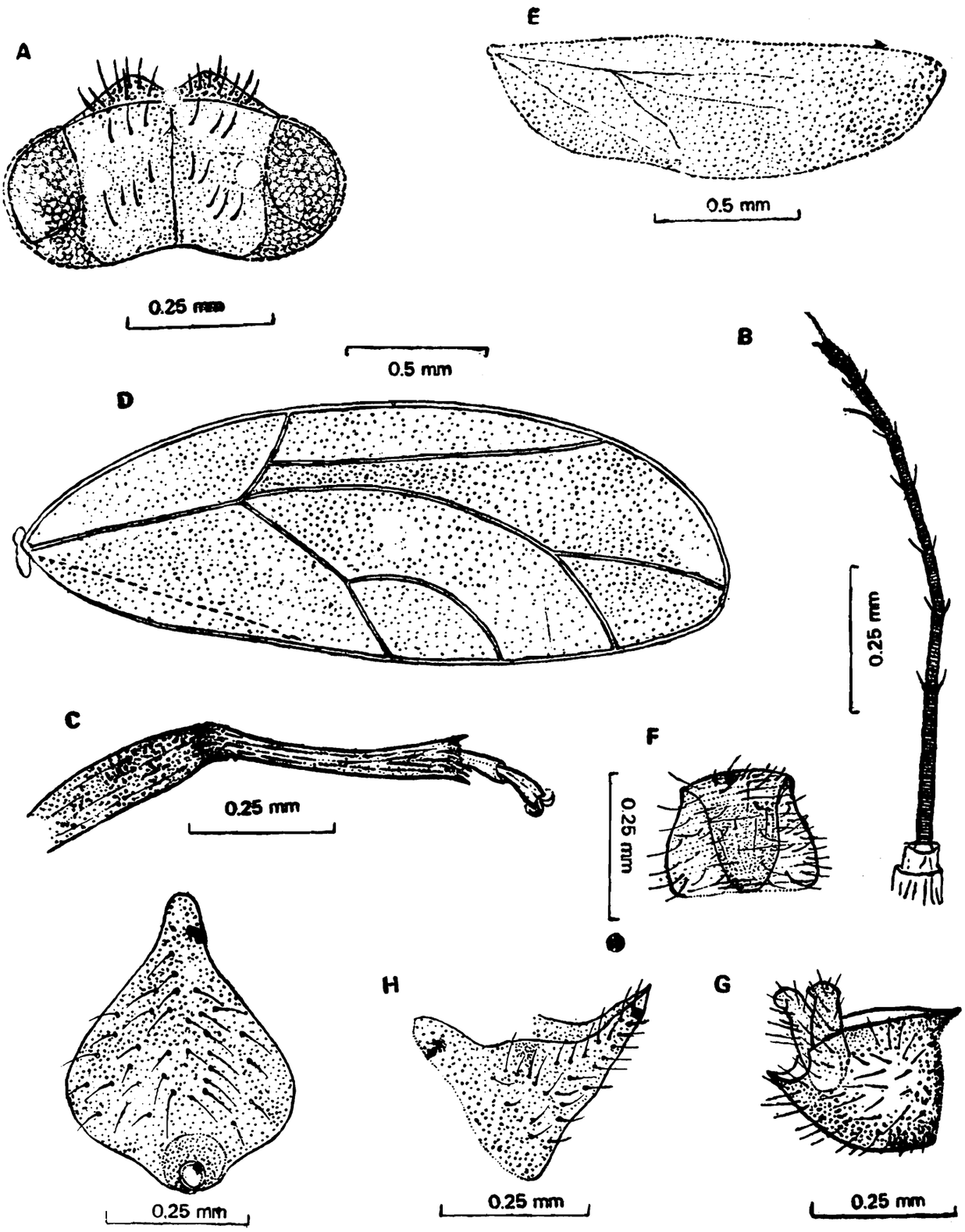

Figure : 20

Trioza nigriantennata n. sp.

A Head B Antenna C Hind leg D Fore wing E Hind wing F Proctiger G Hypandrium and parameres H Ventral plate I Dorsal plate

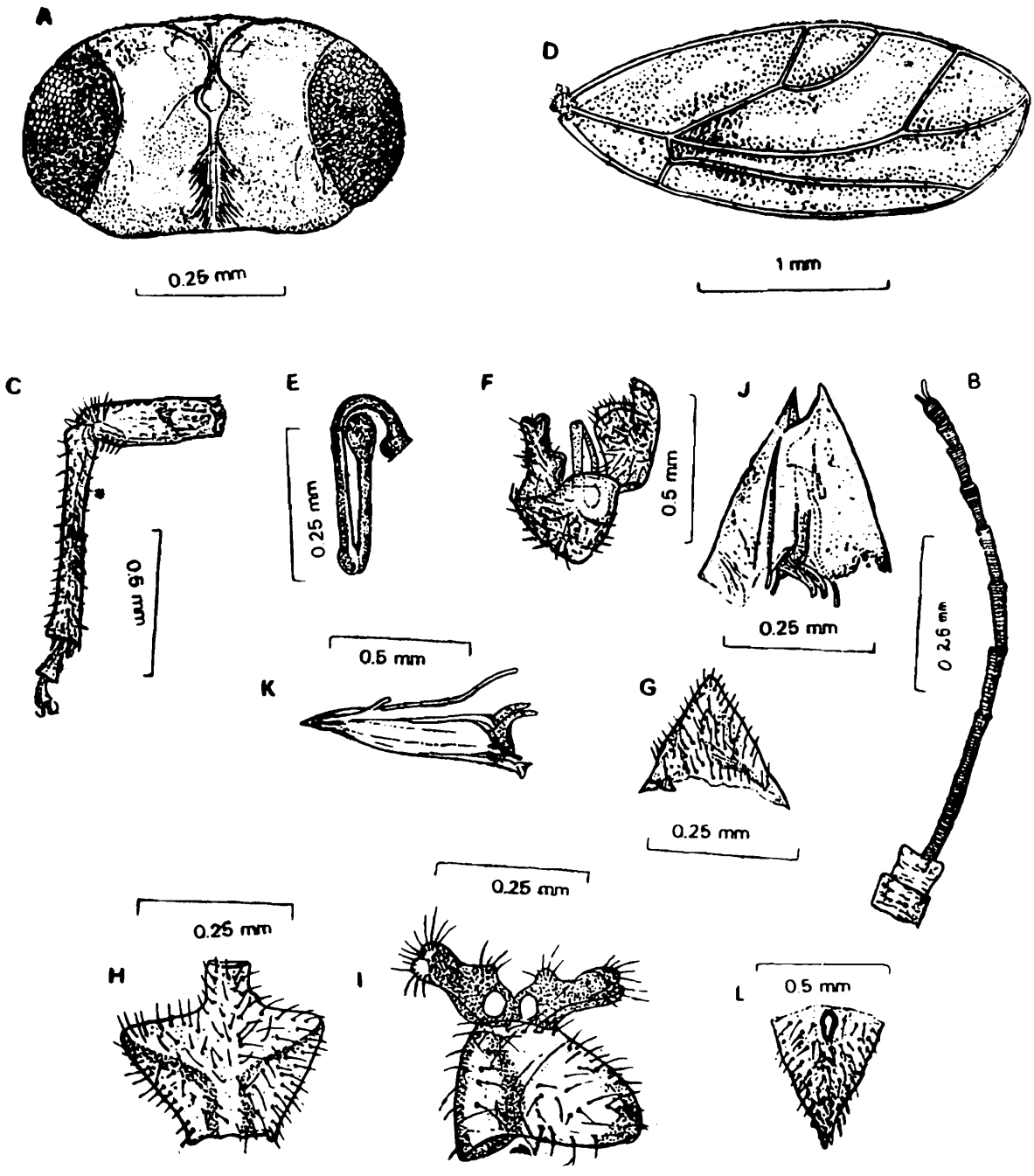

Figure : 21

Trioza subnigra n. sp.

A Head B Antenna C Hind leg D Fore wing E Aedeagus F Male genitalia—entire G Ventral plate H Proctiger I Hypandrium and parameres J Female genitalia—entire K Ovipositor L Dorsal plate

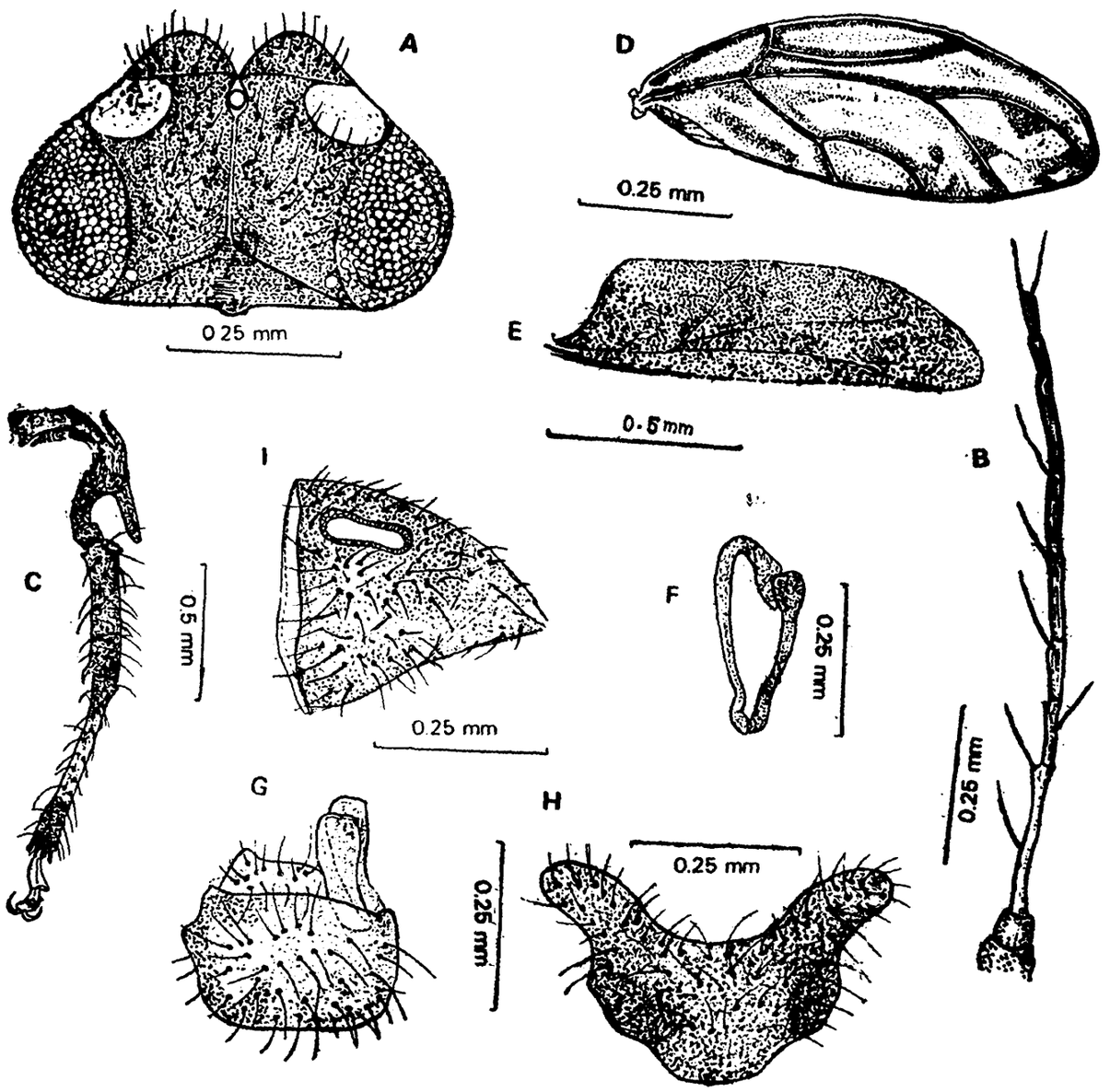

Figure ; 22

Trioza tibialis n. sp.

A Head B Antenna C Hind leg D Fore wing E Hind wing F Aedeagus
G Hypandrium and parameres H Proctiger I Dorsal plate

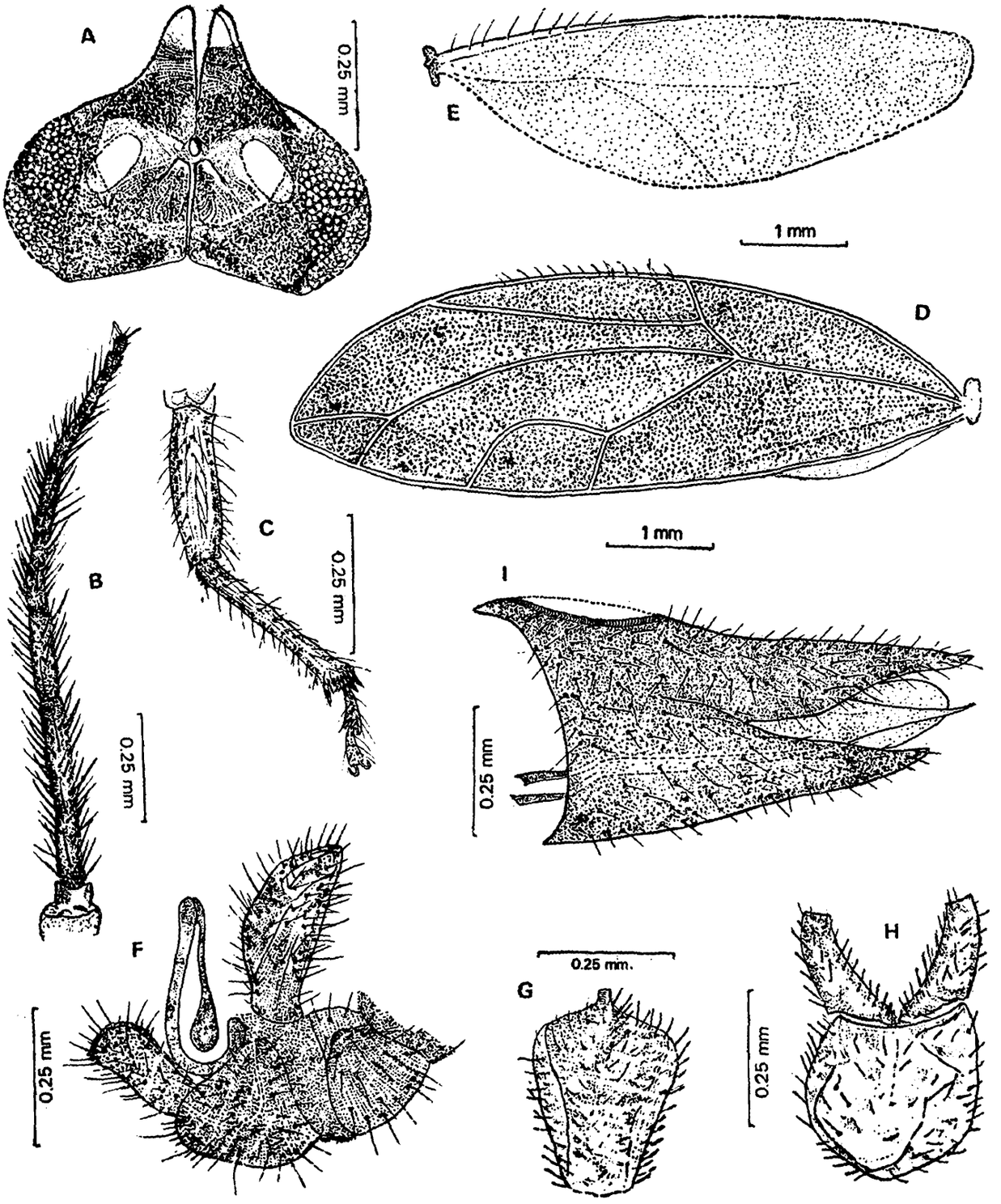

Figure ; 23

Indotrioza hirsuta

A Head B Antenna C Hind leg D Fore wing E Hind wing F Male genitalia—entire G Proctiger H Hypandrium and parameres I Female genitala—entire

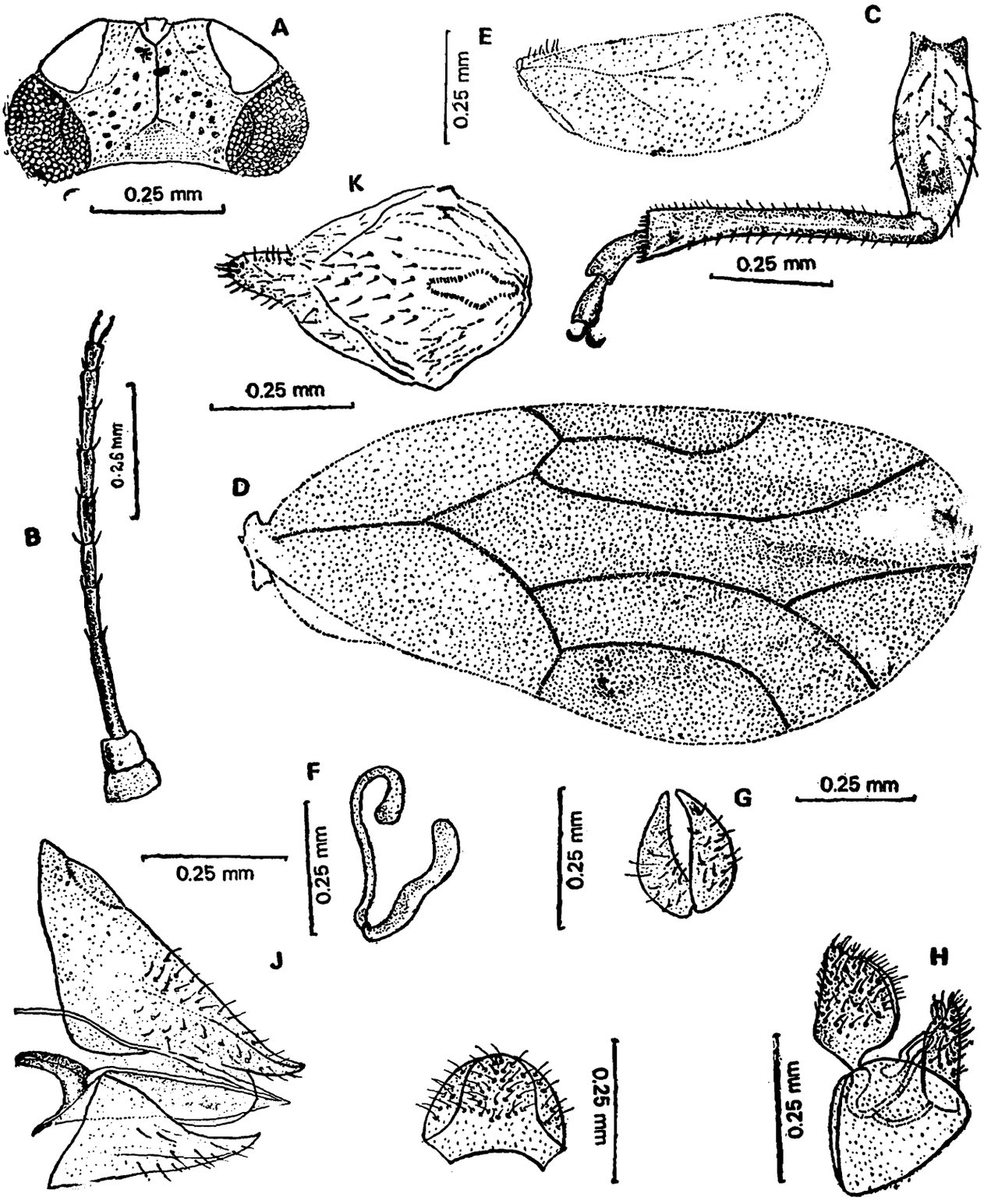

Figure ; 24

Paurocephala grewiae n. sp.

A Head B Antenna C Hind leg D Fore wing E Hind wing F Aedeagus G Parameres H Male genitalia—entire I Proctiger J Female genitalia—entire K Dorsal plate

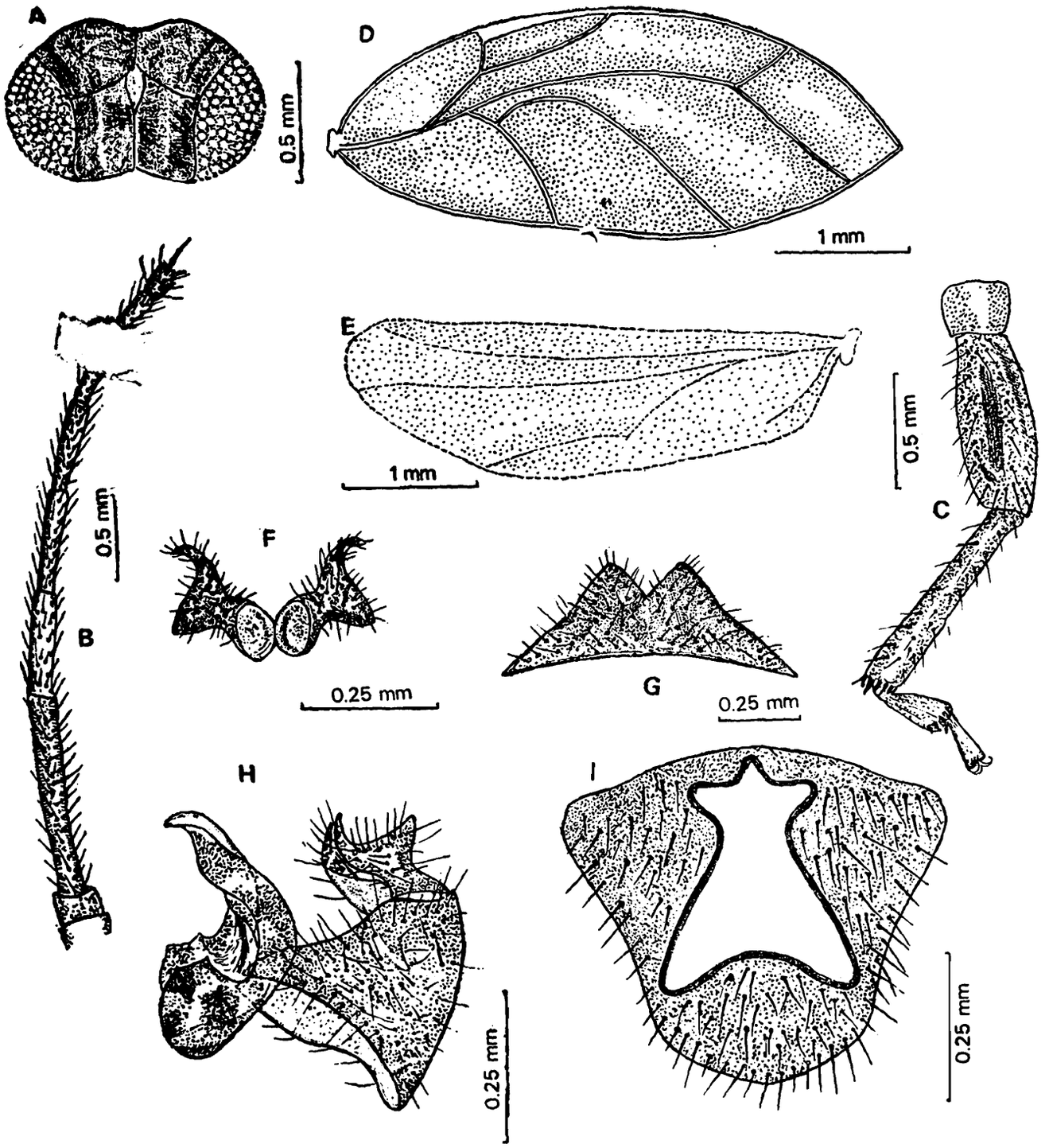

Figure ; 25

Mycopsylla gardenensis Hbanotar

A Head B Antenna C Hind leg D Fore wing E Hind wing F Parameres G Ventral valve H Male genitalia—entire I Dorsal plate

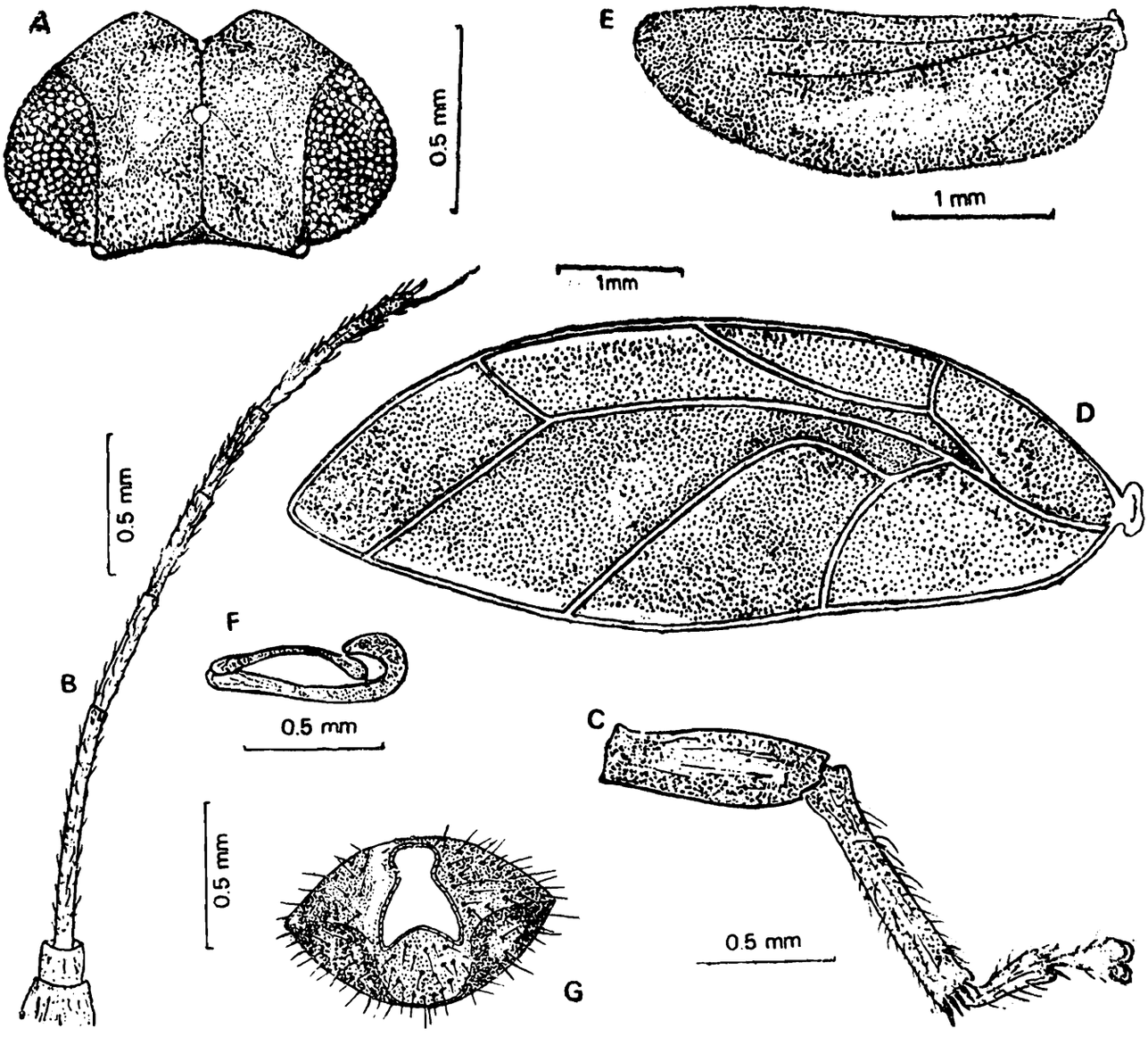

Figure : 26

Mycopsylla mathuriana n. sp.

A Head B Antenna C Hind leg D Fore wing E Hind wing F Aedeagus G Dorsal plate

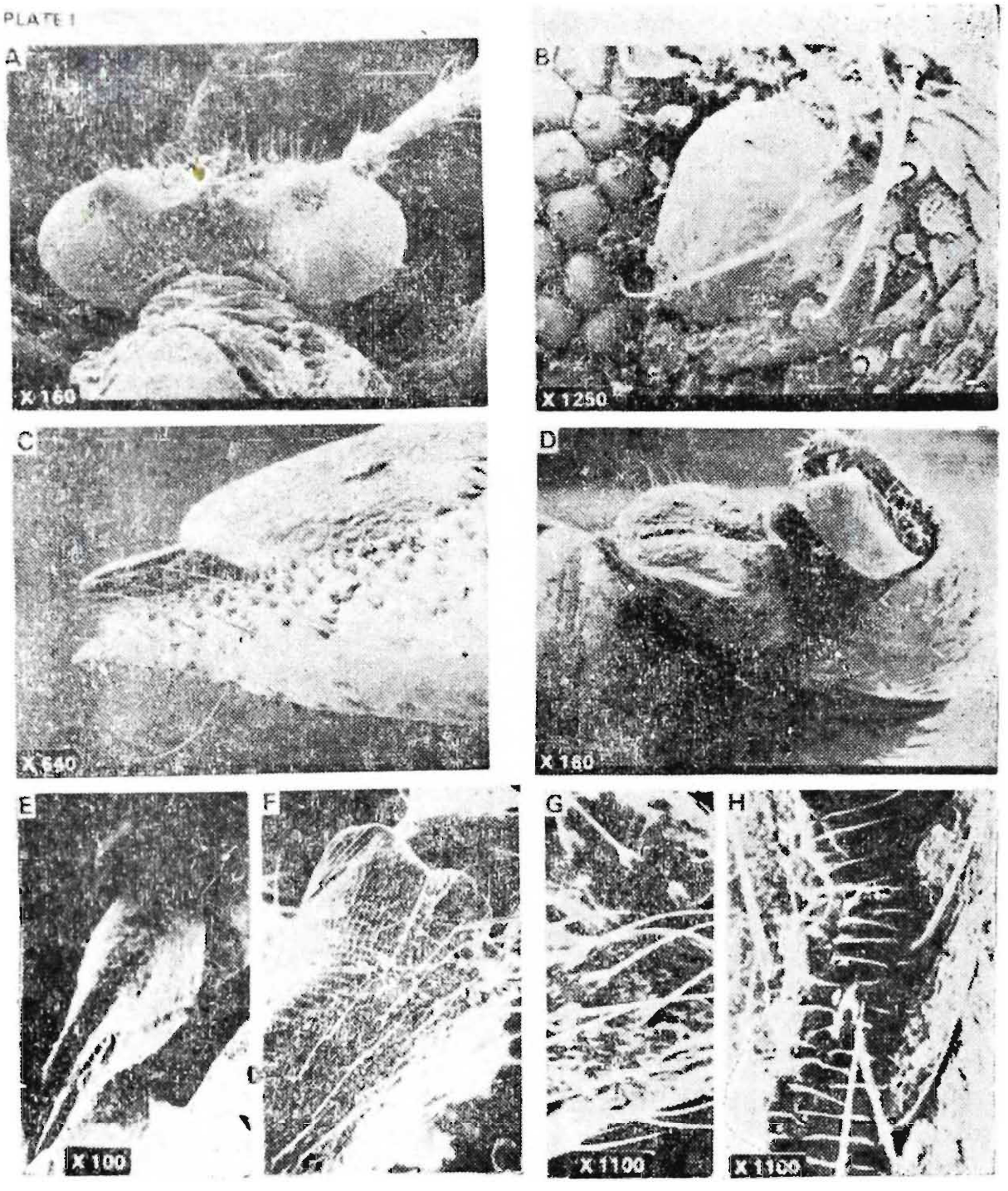

PLATE : I

Indotrioza gen. nov.

A—Head × 120.

B—Ocellus-showing the setae compared to the size of the ocellus × 933.

C—Female genitalia—showing the dorsal ventral plates and ovipositor × 426.

D—Male genitalia—showing hypandrium, proctiger and parameres × 107.

E—Female genitalia—dorsal view × 69.

F—Hind femur × 276.

G—Hind tibia—showing the long setae × 761.

H—Antenna—showing the long setae × 761.