

OCCASIONAL PAPER NO. 237

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ZOOLOGICAL SURVEY OF INDIA**

**A taxonomic review of the Chalcidoids
(Hymenoptera : Chalcidoidea) associated with
Ficus benghalensis Linnaeus**

**T. C. NARENDRAN
K. SUDHEER**

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Edited by the Director, Zoological Survey of India, Kolkata



सत्यमेव जयते

**Zoological Survey of India
Kolkata**

CITATION

Narendran, T.C., and Sudheer, K. 2005. A taxonomic review of the Chalcidoids (Hymenoptera : Chalcidoidea) associated with *Ficus benghalensis* Linnaeus. *Rec. zool. Surv. India, Occasional Paper* No. 237 · 1-35 (Published by the Director, *Zool. Surv. India*, Kolkata)

Published : June, 2005

ISBN 81-8171-073-0

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PRICE

Indian : Rs.75.00

Foreign : \$ 7 £ 5

Published at the Publication Division, by the Director, Zoological Survey of India, 234/4 A.J.C. Bose Road, 2nd MSO Building, Nizam Palace (13th floor), Kolkata - 700 020 and printed at Krishna Printing Works, 106, Vivekanand Road, Kolkata - 700 006.

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2005

Pages 1-35

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INTRODUCTION

The genus *Ficus* Linnaeus, which belongs to Family Moraceae, is represented by about 1,000 species from pantropical and subtropical regions (Wagner *et al*, 1999). *Ficus benghalensis* Linnaeus, commonly known as the Banyan or Indian fig, Bengal fig or Bar tree, is native to India, Sri Lanka and Pakistan. *F. benghalensis* L. is the World's largest tree in terms of spread (Riffle, 1998) with some old trees covering over an acre of ground. The tree's name "banyan" refers to the Hindu traders, Banyans who set up shops under the spreading trees. This species is one of the wonders of the plant kingdom, because of the aerial roots that support the canopy that extend over several acres. The Banyan tree is widely cultivated in the tropics and naturalized in almost every wet tropical area of the earth (Riffle, 1998). *F. benghalensis* L. is spreading from cultivation in Australia, American Samoa, the Commonwealth of Northern Mariana Islands, Guam, Fiji, French Polynesia, Kiribati, Uganda, Zanzibar and Florida (PIER, 2004).

The Banyan tree starts its life as an epiphyte growing on another tree when some fig-eating bird deposits a seed. It produces aerial roots as it grows which hang down from horizontal branches and takes root where they touch the ground. A banyan tree makes a fine specimen and shade tree. In India, the edible leaves are used as plates. The fig "fruit" is actually a hollow, globular receptacle with hundreds of small fleshy flowers facing each other on the inside. Tiny specialized chalcidoid wasps that enter the receptacle through a small opening pollinate figs. The Banyan tree is well known for its medicinal and religious importance. The plant sap is used to treat rheumatism and lumbago; the bark may cure dysentery, diarrhoea and diabetes; leaves are applied to abscesses and root fibres are used in gonad problems (PIER, 2004).

Brickell and Zuk (1997) reported the following pests associated with the *Ficus* species: Mealy bugs, scale insects, spider mites, root knot nematodes, thrips, fungal and bacterial spots, crown gall, twig dieback and Southern blight. The larvae of *Euploea core* (Cramer) and *Trilocha varians* (Walker) cause defoliation (CABI, 2000). Many chalcidoids have been reported associated with *F. benghalensis* L. Chalcidoidea, one of the superfamilies of the Order Hymenoptera, vary greatly in their form, habits and host relationships and have a wide distribution. About 26 valid species belonging to 8 families of chalcidoids have been listed as plant associates of *F. benghalensis* L. by Noyes 2004. Boucek *et al* (1981) studied the fig wasp fauna of the receptacles of the Chinese Banyan, *Ficus thonningii* Blume. Walker (1871, 1875), Westwood (1883), Grandi (1930), Joseph (1953, 1954, 1957 & 1961), Wiebes (1967 & 1994), Joseph and Abdurahiman (1968 & 1969), Mani (1989), Shamim and Shafee (1989), Narendran and Sheela (1994), Narendran *et al* (1995), Narendran (1999) and Priyadarsanan (2000) contributed to the study of chalcidoids associated with *Ficus benghalensis* L.

There has been no comprehensive publication on the aspects of taxonomy, habits, etc.

of the chalcidoid fauna of *Ficus benghalensis* L. and all we have is only scattered pieces of information. Hence the aim of this paper is to provide a comprehensive taxonomic treatment of all the chalcidoid species associated with *Ficus benghalensis* L., (similar to a previous work by Boucek *et al*, 1981 on *Ficus thonningii* Blume), which is economically an important tree, so that this work may aid not only for the easy identification of these insects but also enable to know their habits, distribution, etc. 29 species (including two indetermined ones) of chalcidoids associated with *F. benghalensis* L. are taxonomically treated and provided with diagnosis along with data on type locality, type depository, distribution, list of synonyms, host data, biology, etc. The life history of many fig wasps is more guessed at than really known. Many non-pollinating species, named as 'parasites' by some authors, are apparently phytophagous but compete for food and space with the pollinating agaonines. The latter feed in the larval stage on the fig ovaria, i.e., are also seed eaters and seed galls, as are many so-called 'parasites' (Boucek, 1988). Some of the chalcidoids like the Ormyrids, Eulophids, Pteromalid and Encyrtid are parasitic on the plant galls. Based on their hosts and biology, the chalcidoids associated with *F. benghalensis* L. are treated hereunder three headings, viz., the pollinator species, phytophagous inquilines found in the receptacles and parasitoids. *Closterocerus pulcherrimus* (Kerrich) is reported for the first time from Kerala and this is a new record of this species from the leaf galls of *F. benghalensis* L. A key to the identification of the chalcidoids recorded from *F. benghalensis* L. is also provided.

The morphological terminology used in this paper generally follows that of Boucek (1988). The following abbreviations are used ATREE - Priyadarsanan collections, ATREE, Bangalore; BMNH - The Natural History Museum, London SW7 5BD, England; DZUC - Department of Zoology, University of Calicut, Kerala, India; HDOU - Hope Department, Oxford University, Oxford, England; QMB - Queensland Museum, Brisbane, Australia; USNM - United States Museum of Natural History, Washington D.C., USA; ZAMU - Zoological Museum, Aligarh Muslim University, Uttar Pradesh, India; ZSIC - Zoological Survey of India, Calcutta, India; ZSIK - Zoological Survey of India, Western Chats Field Research Station, Kozhikode 673002, Kerala, India.

Key to the Chalcidoid species Associated with *Ficus benghalensis* Linnaeus

- 1 Mesopleuron greatly enlarged, (Fig. 984 & 1015 of Boucek, 1988), convex, forming a large shield like part without impression of mid femur; posterior margin of prepectus often loose and thin; mid tibial spur often bare and minutely hairy. 2
- Mesopleuron not enlarged to form a shield, impression of mid femur present; posterior margin of prepectus closely attached to adjacent region; mid tibial spur usually thin and not as in above alternate. 3
2. Mid coxae attached nearer to fore coxae than to hind coxae in front of middle of mesopleura; (Fig. 30 of Boucek, 1988), head orange brown; mesosoma and gaster dark brown *Rhopus aligarhensis* (Shamim and Shafee)

- Mid coxae attached nearer to hind coxae than to fore coxae; (Fig. 984 of Boucek, 1988), head green; face metallic red; punctate part of mesonotum reddish brown, otherwise bluish green; scutellum reddish brown; rest of mesosoma and legs reddish brown or purple; gaster bright golden green, with a white transverse band near hind margin of first tergite. *Anastatus colemani* Crawford
3. Hind femur strongly enlarged and with teeth on ventral edge; gena posteriorly with strong carina; prepectus very small and tegula only slightly longer than broad; apex of hind tibia tapering into a strong spine extended far beyond insertion of tarsus; malar suture distinct, usually indicated by a carina; postmarginal vein often longer than stigmal vein *Brachymeria* sp.
- Hind femur not enlarged and toothed; other characters partly or completely different 4
4. All tarsi four segmented. 5
- Tarsi, at least fore and mid ones, five segmented (sometimes tarsi four segmented in Epichrysomallinae, where stigmal vein is fairly long and very nearly at a right angle with the short marginal vein and body almost smooth and yellow). 7
5. Mesoscutum with notauli complete, virtually reaching transscutal suture except rarely; axillae strongly angulately advanced along hind portion of straight, groove like notauli, sometimes moderately advanced, then scutum and scutellum with delicate sculpture; propodeum mesad of spiracle with an inverted Y-shaped carina; submarginal vein with one or two dorsal bristles *Tetrastichus* sp.
- Mesoscutum with notauli incomplete, in posterior half or third absent or indistinct or transformed to broad depressions; axillae not angulately advanced or if angulately advanced then scutum and scutellum with dense deep reticulations; other characters partly or completely different 6
6. Antenna with 3 segmented funicle; subtorular grooves absent, body largely yellow; mesothorax dark greenish brown; gaster dark brown except base yellow.
Chrysocharis echinata (Mani)
- Antenna with 2 segmented funicle; subtorular grooves present; body with yellow or paler colour on clypeus, mesosoma and gaster except head with frontovertex wholly, mesosocutum above, scutellum with a large median mark, propodeum and gaster with a weak transverse band on basal tergite metallic green; gaster with a pair of dark marks behind and at apex blackish with metallic tinge
Closterocerus pulcherrimus (Kerrich)
7. Males apterous or brachypterous usually, ocelli reduced or indistinct, tarsi strongly reduced, fore femur strongly swollen in most species 8

- Males and females never apterous; other characters partly or completely different
20
8. Mandibles underneath with conspicuous flat appendages; head often prognathus; fore tibia always much shorter than femur; notauli incomplete; head posterior part, antennal segments 4-11, pronotum, mesonotum, metanotum, propodeum, third to eighth tergites and ovipositor valve dark castaneous brown; anterior part of head yellow-ferruginous
..... *Eupristina masoni* Saunders
- Mandibles normal, without appendages; head often orthognathus; fore tibia often as long as femur; other characters partly or completely different 9
9. Gaster without narrow tail at apex 10
- Gaster with narrow tail, formed by tubular extension of last one or two tergites
15
10. Head and mesosoma mostly smooth and shiny; body yellowish brown or black, always non metallic; stigmal vein longer than postmarginal vein 11
- Mesosoma more or less sculptured, often reticulate; body bluish black or green, sometimes metallic; postmarginal vein often longer than stigmal vein 14
11. Anterior margin of scutellum not narrower than hind margin of mid lobe of mesoscutum; axillae well separated medially; antenna 13 segmented; head and mesosoma yellowish brown; propodeum and gaster yellowish black except tergites two to seven brownish black
Sycophilomorpha saptapurensis Joseph and Abdurahiman
- Anterior margin of scutellum narrower than hind margin of mid lobe of mesoscutum; axillae almost touching medially; antenna less than 13 segments; other characters partly or completely different 12
12. Tarsi four segmented; antennal formula 1115(3); antennal scape short, stout, 2.4x as long as broad; dorsal part of head, mesosoma and gaster and eyes black
Josephiella malabarensis Narendran
- Tarsi five segmented; antennal formula 1116(3); other characters partly or completely different 13
13. Length of postmarginal vein equal to stigmal vein; head, mesosoma and abdomen of males yellowish brown; gaster depressed
Sycophilodes moniliformis Joseph
- Postmarginal vein rudimentary; males with clay colour body; mandibles brownish yellow; abdomen brownish yellow, pale testaceous towards tip; gaster subcompressed from sides *Sycobia bethyloides* Walker

14. Antennal toruli close to each other than distance between eye and toruli; antenna with 2 anelli; epistomal margin in emargination with small median tooth or tubercle; head, mesosoma and gaster iridescent green
Walkerella temeraria Westwood
- Antennal toruli far apart, much closer to eyes than to each other; antenna with 3 short anelli; epistomal emargination without median tooth; body shiny metallic bluish black
Micranisa pteromaloides (Walker)
15. Gastral tail consists of two or three parts, anterior broad part formed by two narrowed last tergites and posterior thin part consisting only of ovipositor and its sheaths; notauli complete; hypostomal margin deeply distinctly emarginate in middle 16
- Gastral tail undivided, thin only, usually a little thicker at base and apex; whole length of ovipositor covered by thin epipygium; notauli traceable only in anterior part of scutum; hypostomal margin shallowly emarginate in middle 18
16. Dorsum of mesosoma distinctly hump-backed; fore tibia with long ventro-apical spines
Philotrypesis transiens (Walker)
- Dorsum of mesosoma faintly curved; fore tibia with stout and cone like or long spines 17
17. Pronotum with a few microsetae and many long macrochetae; mesonotum with many long and short macrochetae; head a little wider than long
Philotrypesis affinis (Westwood)
- Mesosoma with some long lateral setae and scattered shorter dorsal setae; head distinctly longer than wide
Philotrypesis anguliceps (Westwood)
18. Posterior half of head with irregular rugosities; antennae eleven segmented; head yellowish brown; dorsum of mesosoma and gaster pale iridescent green
Sycoscapter guruti (Joseph and Abdurahiman)
- Head punctate or reticulate, without rugosities; antenna 12 or 13 segmented; other characters partly or completely different 19
19. Epistomal margin faintly bilobed; gaster banded dark brown above; antenna 13 segmented
Sycoscapter monilifer Westwood
- Epistomal margin produced into a long process, not bilobed; gaster iridescent green or brown, without any bands; antenna 12 segmented
Sycoscapter stabilis (Walker)
20. Pronotum dorsally subrectangular, large body usually non metallic in colour, often black or yellow or mixed with black and yellow; notauli complete; gaster convex, non-collapsing; mesosoma dorsally often with coarse punctures 21

- Pronotum dorsally not subrectangular, if rarely so, then either body with some refringence or gaster collapsing or mesosoma without coarse punctures 27
- 21 Fore wing not unusually stigmated; marginal vein slightly expanded and without infumation; genotemporal margin weakly carinate; body largely black; antennae brownish yellow, club darker; ocelli, tegulae, legs, hypopygium, epipygium and tip of ovipositor sheath yellowish brown except hind coxae brownish yellow; eyes blackish brown; propleuron brown; rest of tergites brownish black.
Bruchophagus rexus Narendran
- Fore wing stigmated, broadened; a dark spot which expands below marginal vein; short marginal vein; other characters partly or completely different 22
22. Pedicel as long as or longer than first funicular segment 23
- Pedicel shorter than first funicular segment 24
23. Pedicel as long as first funicular segment; median furrow of propodeum wide and smooth; head and mesosoma ferrugino-testaceous; gaster brownish black; pterostigma 0.5x as long as wide
Sycophila dharwarensis (Joseph and Abdurahiman)
- Pedicel longer than first funicular segment; median furrow of propodeum not so wide and smooth, with a number of setae on lateral and basal sides; head, mesosoma and gaster largely rusty yellow brown; pterostigma 1.5-2x as long as wide
Sycophila benghalensis (Joseph and Abdurahiman)
24. Third tergite longest of all tergites in dorsal view 25
- Fourth tergite longest of all tergites in dorsal view 26
25. Head width 1.4x distance between compound eyes; sides of median fovea of propodeum weakly reticulate; costal cell sparsely pilose with one row of pilae along its margin; scape not reaching front ocellus
Sycophila karnatakensis (Joseph and Abdurahiman)
- Head width 1.18x distance between compound eyes; sides of median fovea of propodeum smooth and shiny; costal cell with moderate pilosity; scape reaching front ocellus
Sycophila decatomoides Walker
26. Sides of median furrow of propodeum punctate; gaster yellowish brown; costal cell closely pilose with minute pilae *Sycophila pilosa* (Joseph and Abdurahiman)
- Sides of median furrow of propodeum rugulose; gaster with first to fourth tergites with transverse bands of reddish brown colour; anterior margin of costal cell bare; inside of costal cell minutely and sparsely pubescent
Sycophila robusta (Joseph and Abdurahiman)

27. Hind coxa not larger and longer than fore coxa; antenna with 12 segments; gaster not heavily sculptured as in alternate; head unusually broad, with distinct occipital carina; lower posterior corner of gena developed into a short spine; antennal flagellum pale brown *Acroclisoides indicus* Ferriere
- Hind coxa usually 3x or more larger than fore coxa; antenna 13 segmented; gaster usually heavily sculptured with characteristic foveolae; other characters partly or completely different 28
28. Propodeum without median or submedian carinae; basal cell of fore wing with no ventral or dorsal setae; third tergite with three cross rows of foveolae, followed by weak cross line of crenulate border without cusps, finely reticulate
Ormyrus zamoorini Narendran
- Propodeum with a median longitudinal carina; basal cell of fore wing with a single ventral seta; third tergite with three cross rows of foveolae, posterior row of foveolae followed by crenulate border containing cusps, area posterior to crenulate border finely punctulate *Ormyrus sheelae* Narendran

POLLINATOR SPECIES

1. *Eupristina masoni* Saunders [Agaonidae : Agaoninae]

1882. *Eupristina masoni* Saunders, *Ent. month. Mag.*, 19 : 163. Type : F. India : Calcutta. (BMNH)(TCN examined)
1916. *Eupristina grassi* Grandi, *Boll. Lab. Zool. Gen. Agr. R. Sc. Sup. Agri., Portici*, 11 : 218. Sri Lanka : Peradeniya. Synonymy by Wiebes, 1992.
1994. *Eupristina (Eupristina) masoni* Saunders : Wiebes, *Verh. Konin. Ned. Akad. Weten.*, 92 : 44.

Diagnosis : Female : Head posterior part, antennal segments 4-11, pronotum, mesonotum, metanotum, propodeum, third to eighth tergites and ovipositor valve dark castaneous brown; anterior part of head yellow-ferruginous; first three antennal segments, legs, sternopleurae and sternites ochraceous white; hind femora, hind tibiae basally concolourous with pronotum; wings hyaline. Head prognathous, about as long as wide at compound eyes; mandibles with well developed apical teeth and conspicuous flat appendages underneath; appendage with 8 dentiform projections on inner margin. Pronotum subtrapezoid-rounded, with short setae, notauli weak but complete; axillae subtriangular.

Male : Similar to female except body yellowish white and partly yellowish brown.

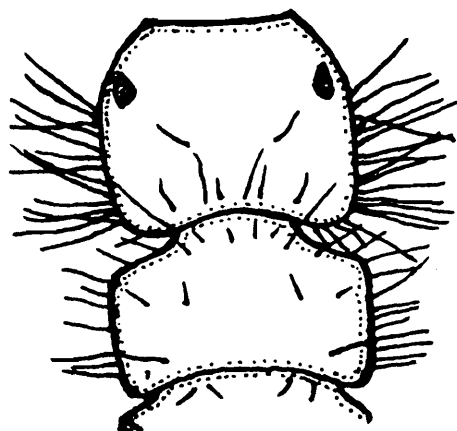
Distribution : India (Kerala, West Bengal); Sri Lanka; United States of America (Florida).

Host : Figs of *F. benghalensis* L.

Biology Each species of *Ficus* has an associated species of agaonid wasp. *Ficus* species can only be pollinated by the associated agaonid wasps and in turn, the wasps can only lay eggs within their associated *Ficus* fruit. Successful pollination and reproduction of *Ficus* species depends on presence of the associated pollinator wasp and the successful reproduction of the associated wasps depends on the presence of associated *Ficus* species. The pollinator wasp for *F. benghalensis* L. is *Eupristina masoni* Saunders (Nadel *et al.* 1991).

PARASITOID SPECIES

1 *Philotrypesis anguliceps* (Westwood) [Agaonidae Sycoryctinae]



Head & thorax of *Philotrypesis anguliceps*

1883. *Sycoscaptella anguliceps* Westwood, *Trans. Ent. Soc. London*, 1883 : 42. M. type : M. Sri Lanka : Peradeniya (Lectotype HDOU)
1904. *Sycosapterella anguliceps* (Westwood) : Ashmead, *Mem. Car. Mus.*, 1 (4) : 239.
1967. *Philotrypesis anguliceps* (Westwood) : Wiebes, *Tijd. Ent.*, 110 (13) : 431.
1975. *Philotrypesis anguliceps* (Westwood) : Abdurahiman and Joseph, *Entomophaga*, 20(1) : 78. F. India : Kerala, Calicut (ATREE) (examined).

Diagnosis : Male : Body yellowish brown. Head distinctly longer than wide, with posterior angles produced, with dorsal and lateral setae; antenna 11 segmented; one anellus; club 3 segmented; maxillary palpus 4 segmented; labial palpus 2 segmented. Mesosoma with some long lateral setae; no wing remnant. Claspers of genitalia with three claws. Alate form of male similar except following : smaller in size; antenna with 13 segments; 3 anelli; mandible tridentate. Mesosoma with several long setae; notauli complete; submarginal vein of fore wing about 2x marginal vein; marginal vein 3x stigmal vein, slightly longer than postmarginal vein. Parameres with long setae, claspers with 4 claws.

Female : Dorsum of head, mesosoma and abdomen with iridescent green and brown colouration; antennal scape and legs pale yellowish brown; ovipositor valves and antennae

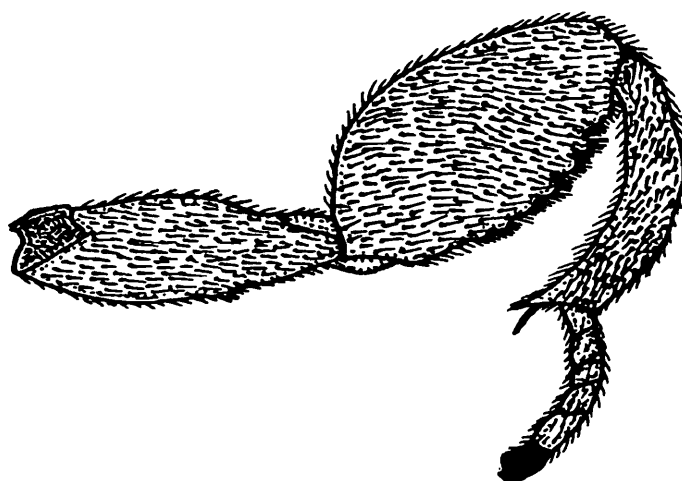
except scape smoky brown; eyes pinkish red. Head glabrous, faintly reticulate; antenna 13 segmented, with 3 anelli; mandible bidentate. Mesosoma faintly rugulose; fore wing with submarginal vein distinctly longer than marginal vein; marginal vein slightly about 2x postmarginal vein; postmarginal vein 2x stigmal vein; distal end of stigmal vein with 4 rounded sensillae. Ovipositor 1.7x as long as gaster.

Distribution : India (Bihar, Kerala); Sri Lanka.

Host : Figs of *F. benghalensis* L.

Biology : Abdurahiman and Joseph (1975) reported that *P. anguliceps* (Westwood) is cleptoparasitic on *Blastophaga quadraticeps* Mayr (Agaonidae), which develops in the fig receptacles of *Ficus religiosa* L.

2. *Brachymeria* sp.
[Chalcididae : Chalcidinae]



Hind leg of *Brachymeria*

Rao and Sharma in 1977 reported an indetermined species of *Brachymeria* Westwood from the leaf galls of *F. benghalensis* L. This report needs further checking since *Brachymeria* is not usually associated with plant galls.

3. *Rhopus aligarhensis* (Shamim and Shafee)

[Encyrtidae : Tetracneminae]

1989. *Platyrhopus aligarhensis* Shamim and Shafee, *Ind. J. Sys. Ent.*, 6(2) : 45-46. M, F. Type : F. India : Uttar Pradesh, Aligarh (ZAMU)

1981. *Asitus phragmitis* (Ferriere) : Hayat and Subba Rao, *Colemania*, 1 : 108. Pakistan. Misidentification of *R. aligarhensis*. Noyes and Hayat, 1994.

1994. *Rhopus aligarhensis* (Shamim and Shafee) : Noyes and Hayat, *Oriental mealybug parasitoids of the Anagyrini (Hymenoptera : Encyrtidae)*, 211-213.

Diagnosis : Female : Head orange brown; antennae dark brown; mesosoma and gaster dark brown; wings slightly infusate; legs yellowish, hind femora and tibiae strongly marked with dark brown. Body and head strongly flattened; head and dorsum of mesosoma quite shiny; head about one third broader than long; frontovertex about three quarters head width; ocellar area with a few pairs of conspicuously longer setae, one of these longer setae between each posterior ocellus and eye margin; antenna with 11 segments; scape broadened and flattened; clava three segmented. Fore wings about 1.2x as long as broad; marginal fringe about 0.125x wing width; ovipositor distinctly longer than mid tibia.

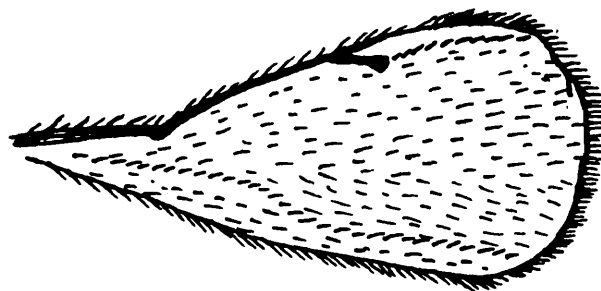
Male : Similar to female apart from antenna and genitalia; aedeagus about 0.7x as long as mid tibia.

Distribution : India (Himachal Pradesh, Uttar Pradesh); Pakistan.

Host : Reared from *Adelosoma phragmitidis* Borchsenius (Homoptera : Pseudococcidae) (Noyes and Hayat, 1994).

Remarks : The above diagnosis is from published literature.

4. *Closterocerus pulcherrimus* (Kerrich)
[Eulophidae : Entedoninae]



Forewing of *Closterocerus pulcherrimus*

1970. *Achrysocharis pulcherrimus* Kerrich, *Bull. Ent. Res.*, **60** : 330-331. F. Type : F. Malawi : Bvumbwe (BMNH) (TCN examined).
1981. *Chrysonotomyia latipennis* Khan and Shafee, *J. Bomb. Nat. Hist. Soc.*, **78** : 350. Type : F. India : Uttar Pradesh, Aligarh. Probable synonym of *C. pulcherrima* (Kerrich) by Boucek, 1986.
1986. *Chrysonotomyia pulcherrima* (Kerrich) : Husain and Khan. *Oriental Ins.*, **20** : 215.
1994. *Closterocerus pulcherrimus* (Kerrich) : Hansson, *Ent. Scand.*, **25** : 2.

Diagnosis : Female: Body with yellow or paler colour on clypeus, mesosoma and gaster except head with frontovertex wholly, mesoscutum above, scutellum with a large median mark, propodeum and gaster with a weak transverse band on basal tergite metallic green; gaster with a pair of dark marks behind and at apex blackish with metallic tinge. Funicle 2 segmented; mesoscutum with two pairs of strong setae; notauli incomplete; scutellum with a pair of setae, strongly reticulated, reticulations weaker on sides; propodeum without median

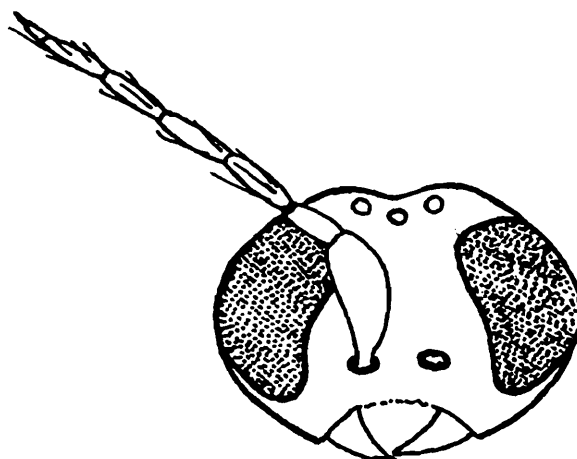
carina; fore wing clear hyaline, relatively broad, subtruncate at apex; submarginal vein with 3 dorsal setae; a single setal track extended from stigma. Gaster with first tergite having reticulations of moderate stretch in middle.

Distribution : India (Gujarat, Karnataka, Kerala, Uttar Pradesh); Kenya; Malawi; Mozambique; North Africa; Pakistan; South Africa; Sri Lanka.

Host : Cecidomyiids producing leaf galls.

Remarks : 10 females in the TCN Collections, DZUC, (collected from Calicut University Campus, Kerala by Sheela and Narendran between 21.xi. 1993 and 7. vii. 1994) belong to this species. This is the first record of this species from the leaf galls of *F. benghalensis* L. and first report of this species from Kerala.

5. *Chrysocharis echinata* (Mani)
[Eulophidae : Entedoninae]



Head and antenna of *Chrysocharis echinata* [Courtesy: Mani, 1989]

1989. *Nesomyia echinata* Mani, *The fauna of India and adjacent countries, Chalcidoidea (Hymenoptera Part III)*, 1473. M, F. Type : F. India : Tamil Nadu : Chennai (=Madras) (ZSIC).

1976. *Chrysocharis echinata* (Mani) : Kamijo, *Kontyu*, 44(4) : 491.

Diagnosis : Female : Body largely yellow in colour; mesothorax dark greenish brown; gaster dark brown except base yellow; antennae dark brown except scape and pedicel yellow; ocelli red. Head slightly wider than mesosoma; antenna with 9 segments, inserted slightly above level of lower orbital borders; anellus minute but distinct; funicle and club 3 segmented. Mesonotum with fine reticulate squamous sculpture; notauli indistinct and fading posteriorly; fore wing with marginal vein distinctly longer than submarginal vein; postmarginal vein equal to length of stigmal vein. Gaster sessile, subequal to rest of body, globosely ovate.

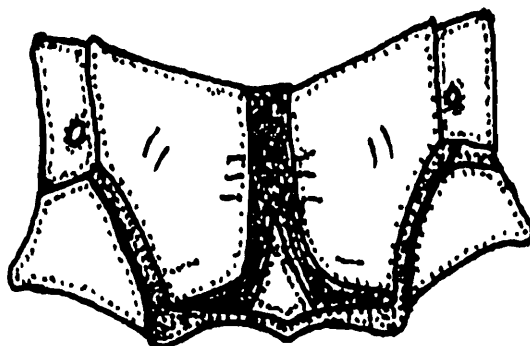
Male : Body sculpture and colour similar to female. Gaster somewhat widened apically, second tergite large.

Distribution India (Tamil Nadu)

Host Reared from echinate leaf galls of *F. benghalensis* L.

Remarks : The above diagnosis is based on the already available published literature.

6. *Tetrastichus* sp.
[Eulophidae Tetrastichinae]



Propodeum of *Tetrastichus*

An indetermined species of *Tetrastichus* Haliday was reported (Thirumalai and Ananthakrishnan, 1977) associated with *F. benghalensis* L.

7. *Anastatus colemani* Crawford
[Eupelmidae Eupelminae]

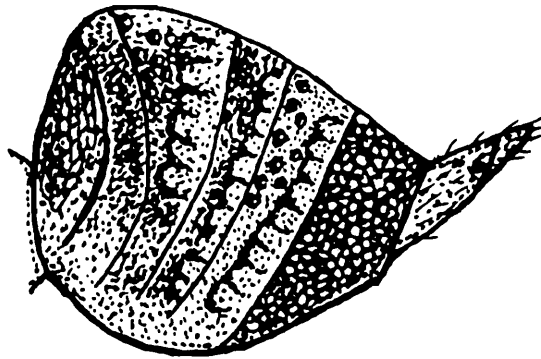
1912. *Anastatus colemani* Crawford, *Proc. U.S. Natl. Mus.*, **42** : 6. F. Type : F. India : Karnataka, Bangalore (USNM) (TCN examined).

Diagnosis : Female : Head green; face metallic red; punctate part of mesonotum reddish brown, otherwise bluish green; scutellum reddish brown; rest of mesosoma and legs reddish brown or purple; tarsi, fore and mid legs in front reddish brown; gaster bright golden green, with a white transverse band near hind margin of first tergite; scape testaceous; pedicel green; basal funicular segments bright golden green. Face below antennae rough and granular, reticulate above. Mesoscutum with median and lateral lobes finely reticulate, with close shallow punctures behind; scutellum and axillae umbilicately punctate; mesopleuron finely striate; fore wing hyaline basally, with a curved hyaline band in middle of marginal vein; marginal vein equal to submarginal vein; postmarginal vein about 0.5x marginal vein; stigmal vein less than 0.5x postmarginal vein. Gaster short.

Distribution India (Bihar, Karnataka, Tamil Nadu, Uttar Pradesh); Malaysia; Taiwan.

Host : Pentatomid eggs (Thirumalai and Ananthakrishnan, 1977).

8. *Ormyrus sheelae* Narendran
[Ormyridae]



Gaster of *Ormyrus sheelae*

1999. *Ormyrus sheelae* Narendran, *Indo-Australian Ormyridae (Hymenoptera; Chalcidoidea)* 20, 126-128.
F. Type : F. India : Kerala, Calicut University Campus (BMNH).

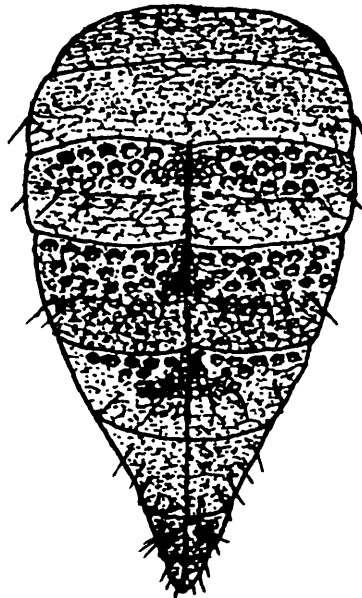
Diagnosis : Female : Body dull metallic bluish green except following markings antenna brown except scape brownish yellow and anelli and club pale brown; mandibles brown; eyes dark brown with pale patches; tegula pale yellow; fore coxa pale brown with base slightly metallic green on anterior side, hind coxa pale yellowish brown with metallic bluish green on basal half; rest of legs largely pale yellowish brown to brown with dark patches; gaster liver brown with metallic bluish green on crenulate border, on region posterior to crenulate border and on sixth tergite; wings hyaline with veins and pilosity pale brownish yellow. Head largely striate; antennal formula 11263. Mesosoma largely cross striate; scutellum with 3 pairs of setae on sides, semicircularly striate on posterior half, propodeum lying vertical to longitudinal axis of mesosoma, smooth, shiny with a median longitudinal carina connecting anterior and posterior margins, callus sparsely pilose; fore wing with basal line of setae distinct; basal cell with a single ventral seta; costal cell with two ventral setae on anterior margin and a posterior row of five to six ventral setae, three ventral setae at proximal end region. Gaster slightly compressed from sides, with a median longitudinal ridge extending from posterior margin of first tergite to posterior margin of fifth tergite; first tergite cross striato-reticulate, posterior margin notched medially; second tergite finely reticulate; third tergite with three cross rows of foveolae, posterior row of foveolae followed by crenulate border containing cusps, area posterior to crenulate border finely punctulate; fourth tergite with two rows of foveolae; fifth tergite mostly shiny with sparse punctulae posterior to crenulate border; sixth tergite finely punctulate.

Distribution : India (Kerala).

Host : Receptacles of *F. benghalensis* L.

Biology : The status of this wasp is guessed to be parasitic, since all other ormyrids from galls are of that nature. Hence for the time being, this wasp is placed among the group of parasitoids.

9. *Ormyrus zamoorini* Narendran
[Ormyridae]



Gaster of *Ormyrus zamoorini*

1999. *Ormyrus zamoorini* Narendran, *Indo-Australian Ormyridae (Hymenoptera; Chalcidoidea)* 18, 143-145. M. F. Type : F. India : Kerala, Calicut University Campus (BMNH).

Diagnosis : Body colour metallic green with slight bluish metallic tinge on some parts; antenna brownish yellow; eye yellowish brown; ocelli pale reflecting yellow; fore and mid legs pale yellow with brownish tinge on middle of femur and base of mid coxa; hind coxa metallic green except for pale brownish yellow at apical one-third; hind trochanter and femur pale brownish yellow; hind tibia and tarsus pale yellow, pretarsus slightly darker; wings hyaline, veins pale brown. Head with vertex and area between front ocellus and upper scrobe margins distinctly cross striate, antennal formula 11263. Mesosoma largely cross striate; pronotum with a line of setae on each anterior and posterior margins; scutellum with semicircular cross striations posteriorly, with 7 pairs of long setae; propodeum lying subvertical to longitudinal axis of mesosoma, surface finely reticulate except smooth on middle region, without median or submedian carinae, callus moderately pilose; fore wing with basal line of setae indistinct; basal cell asetose ventrally and dorsally; costal cell with four or five ventral setae; costal margin asetose. Gaster not compressed from sides, with a median longitudinal dorsal ridge from posterior margin of first tergite to posterior margin of sixth tergite; first tergite with a basal median pit, region adjacent to pit smooth, posterior half of first tergite finely reticulate; second tergite finely reticulate, foveolae not visible, crenulate border faintly visible; third tergite with three cross rows of foveolae, followed by weak cross line of crenulate border without cusps, finely reticulate; fourth tergite with more strong foveolae; fifth tergite with a single row of foveolae, remaining part resembles fourth tergite; sixth tergite finely punctulate.

Male : Similar to female except more bluish tinge on body, striae of mesosoma weaker,

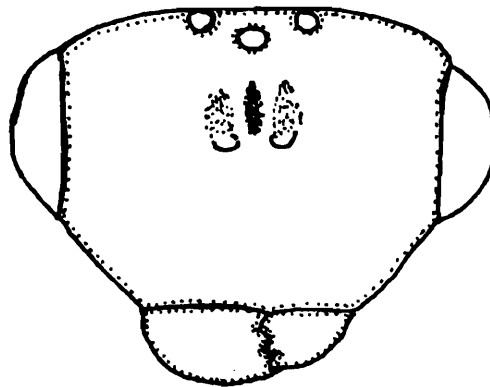
foveolae mostly absent on gaster and median ridge on gaster absent.

Distribution : India (Kerala).

Host : Receptacles of *F. benghalensis* L.

Biology : The status of this wasp is guessed to be parasitic, since all other ormyrids from galls are of that nature. Hence for the time being, this wasp is placed among the group of parasitoids.

10. *Acroclisoides indicus* Ferriere
[Pteromalidae : Pteromalinae]



Head of *Acroclisoides indicus*

1931. *Acroclisoides indicus* Ferriere, *Bull. Ent. Res.*, **22**(2) : 279. M. Type : M. India : Dehra Dun (BMNH) (TCN examined).

2002. *Acroclisoides indicus* Ferriere : Sureshan and Narendran, *Rec. zool. Surv. India.*, **100** (3 & 4) : 128. F. India : Kerala, Calicut University Campus (ZSIK).

Diagnosis : Female : Head and mesosoma dark metallic blue, lower face bright metallic blue with golden green reflection; gaster dark blue dorsally and brown ventrally; antennae with scape, pedicel and anelli testaceous, rest pale brown; fore and hind coxae concolorous with mesosoma except tips testaceous; tegula pale brown; wings hyaline, veins pale brown. Head with distinct occipital carina, closely reticulate; head unusually broad, in dorsal view 1.9x as wide as long; lower posterior corner of gena developed into a short spine; clypeus clearly separated from rest of face. Pronotal collar dorsally shiny behind anterior carina; mesoscutum with mid lobe moderately reticulate, reticulations finer on side lobes; propodeum reticulate, reticulations finer on lateral areas, median carina complete, plicae indicated anteriorly. Gaster short, length 0.6x as long as head plus mesosoma combined.

Male : Similar to female but differs in having: head and mesosoma dark metallic green; petiole black, second tergite brown or more or less yellow; gaster more compressed; antennae with funicular segments elongated and with long hairs.

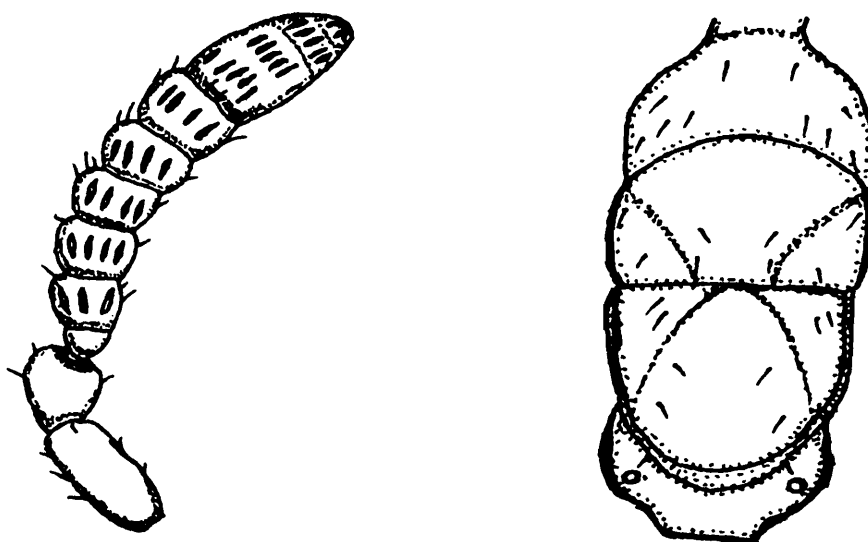
Distribution : India (Kerala, Tamil Nadu, Uttaranchal); Myanmar; Peoples' Republic of

China (Hunan, Jiangxi).

Host Pentatomid eggs (Boucek *et al.*, 1979; Thirumalai *et al.*, 1977).

PHYTOPHAGOUS INQUILINES

1. *Josephiella malabarensis* Narendran [Agaonidae : Epichrysomallinae]



Josephiella malabarensis - Antenna and dorsal view of mesosoma

1994. *Josephiella malabarensis* Narendran, *J.Zool. Soc. Kerala*, 3(1) : 9. Type : F. India : Kerala, Tellicherry (QMB).

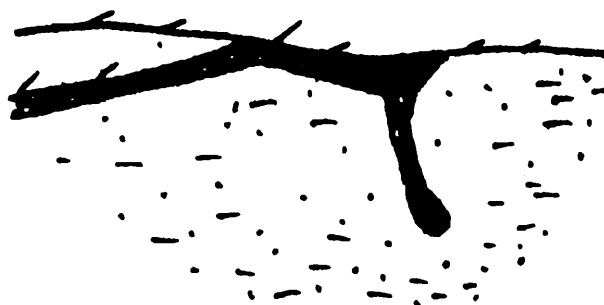
Diagnosis : Female : Dorsal part of head, mesosoma and gaster and eyes black; antennae pale yellow; legs brownish black except tibiae, tarsi and apices of femora pale yellow; wings hyaline, veins pale transparent whitish yellow. Head lightly reticulate, transverse in dorsal view; vertex convex with few bristles; temples round, broad; clypeus subtriangular, with lower margin bilobed; posterior margin of clypeus indistinct; supraclypeal area along with clypeus form a uniform depression; malar groove indistinct; mandibles bidentate; antennae inserted middle of distance between lower margin of front ocellus and lower margin of clypeus, distinctly above lower ocular line; antennal formula 1115(3); scape short, stout; thin anellus. Mesosoma shiny with light reticulations; each scapula dorsally with a single bristle; each axilla with two pairs of bristles pointing forward; propodeum broad, faintly rugulose, largely smooth, without median carina; callus with four to six bristles at its antero-ventral margin; mesopleuron and metapleuron reticulate, reticulations not so strong on metapleuron; metapleuron with a median oblique groove; dorsal margin of hind tibia with six strong spines; tarsi four segmented. Gaster sessile, hump like, strongly compressed from sides.

Distribution : India (Kerala).

Host : Leaf galls of *F. benghalensis* L.

Biology : Nothing is known on the exact nature of habit of this species. All the species of Epichrysoallinae are phytophagous and gall makers (Boucek, 1988). It is probable that this species may also be phytophagous. Hence for the time being, this wasp is placed among the group of phytophagous species.

2. *Sycobia bethyloides* Walker
[Agaonidae : Epichrysoallinae]



Forewing venation of *Sycobia bethyloides*

1871. *Sycobia bethyloides* Walker, *Notes on Chalcididae*, 4 : 61. F(=M). Type : F(=M). India : Calcutta (BMNH) (TCN examined).
1875. *Agrianisa myrmecoides* Walker, *Entomologist*, 8 : 18. Synonymy by Dalla Torre, 1898.
1883. *Sycobia bethyloides* Walker : Westwood, *Trans. Ent. Soc. London*, 1883 : 31. rectified mistake (type species as Male).
1957. *Sycobia bethyloides* Walker : Joseph, *Ann. Soc. Ent. France*, 125 : 129. F. India : Kerala : Trivandrum.

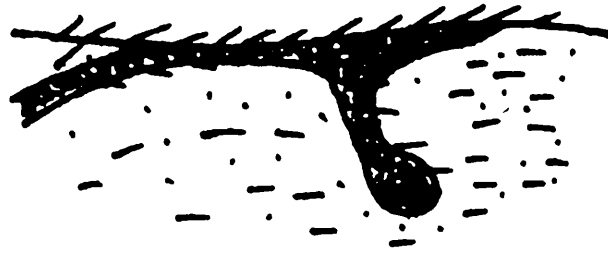
Diagnosis : Male : Body clay colour; mandibles brownish yellow; abdomen brownish yellow, pale testaceous towards tip; wings hyaline; veins pale testaceous. Body slender, flat, shiny and nearly smooth with fine punctures. Head elongate-quadrate; eyes small, flat; mandibles acutely bidentate; antennae 11 jointed, slightly setose. Scutum triangular; notauli well defined; scutellum rhomboidal. Gaster sessile; first segment slightly contracted.

Female : Head and mesosoma smoky brown; gaster yellowish brown; mandibles reddish brown in distal half; eyes dark brownish black; wings hyaline. Antenna 12 segmented, with one anellus; mandibles bidentate. Mesosoma glabrous; notauli complete; fore wing with submarginal vein 5x marginal vein; postmarginal vein extremely short; stigmal vein a little longer than half length of marginal vein, with four small rounded sensillae distally. Gaster subcompressed; ovipositor projecting a little beyond gaster.

Distribution : India (Kerala, West Bengal).

Host : Figs of *F. benghalensis* L.

3. *Sycophilodes moniliformis* Joseph
[Agaonidae Epichrysomallinae]



Fore wing venation of *Sycophilodes moniliformis*

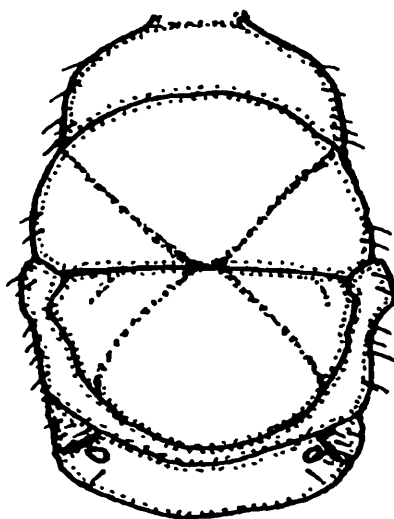
1961. *Sycophilodes moniliformis* Joseph, *J. Kar. Univ.*, 4 : 92. M. Type : M. India : Kerala, Trivandrum (ATREE) (examined).

Diagnosis : Male : Head, mesosoma and abdomen yellowish brown; legs greyish brown; wing veins castaneous. Head distinctly wider than long; antennae twelve segmented, with one anellus; scape claviform; flagellum moniliform; club three segmented; mandibles bidentate; maxillary palpus four segmented. Fore wing densely hairy; submarginal vein about 3x as long as marginal vein; postmarginal vein equal to stigmal vein; legs with long setae; hind tibia distinctly longer than 2x length of metatarsus. Gaster depressed; second segment forms a short, thick petiole; genitalia with two digitus bearing two odontoid spines apically; parameres long; aedeagus long, sublanceolate.

Distribution : India (Kerala).

Host Figs. of *F. benghalensis* L.

4. *Sycophilomorpha saptapurensis* Joseph and Abdurahiman
[Agaonidae Epichrysomallinae]



Sycophilomorpha saptapurensis - Mesosoma [dorsal view]

1969. *Sycophilomorpha saptapurensis* Joseph and Abdurahiman, *Oriental Ins.*, 3 : 37. M, F. Type : F. India : Karnataka, Dharwar (ATREE) (examined).

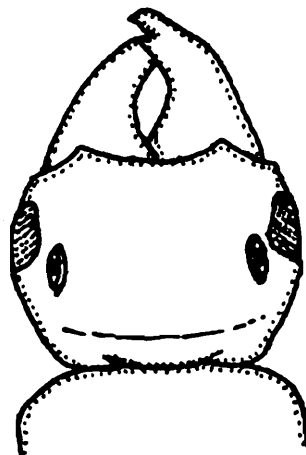
Diagnosis : Female : Head and mesosoma yellowish brown; eyes pinkish red; scape and pedicel pale yellowish brown; flagellum yellowish brown; propodeum and gaster yellowish black except tergites two to seven brownish black. head distinctly wider than long; antenna thirteen segmented, with a single anellus; mandibles bidentate; maxillary and labial palpi three segmented. Notauli complete; fore wing with submarginal vein 3x as long as marginal vein; postmarginal vein reduced; hind wing with three frenal hooks. Gaster subcompressed; ovipositor not exerted.

Male : Similar to female except following : head, mesosoma and legs pale sooty brown; gaster yellowish brown except tergites two to seven sooty brown. Antenna twelve segmented; epistomal margin with two small lateral and two large median convexities. Gaster with ninth tergite having two digitiform pseudocerci each bearing four long macrochetae; genitalia with two digitus each bearing three odontoid spines and a pair of digitiform ventral processes each with two macrochetae.

Distribution : India (Karnataka).

Host : Figs of *F. benghalensis* L.

5. *Micranisa pteromaloides* (Walker)
[Agaonidae : Otitesellinae]



Head of *Micranisa pteromaloides*

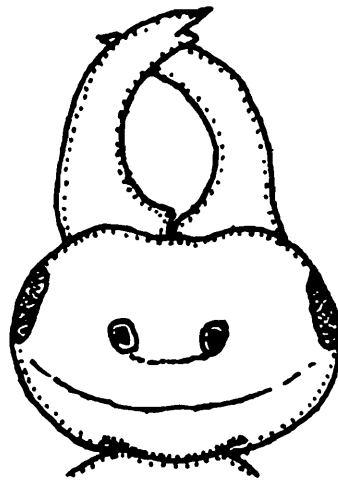
1871. *Idarnes pteromaloides* Walker, *Notes on Chalcidiae*, 4 : 63. F. Type : F. India : Calcutta (Lectotype BMNH) (TCN examined).
1883. *Sycobiella saundersii* Westwood, *Trans. Ent. Soc. London*, 1883 : 34. M. India : Calcutta (Lectotype BMNH) Synonymy by Wiebes, 1967.
1884. *Micranisa pteromaloides* (Walker) : Patton, *Pro. Ent. Soc. London*, 1884 : 17.
1938. *Sycobiella pteromaloides* (Walker) : Mani, *Catalogue of Indian Insects, Part 23- Chalcidoidea*, 37.

Diagnosis Female Body shiny metallic bluish black; antennae, mouth parts and legs yellowish, coxae dark brown; hind femora with light brown patch on antiaxial discs. Head with shallow longitudinal groove from mouth to front ocellus; epistomal margin with 2 prominent lobes, without median tooth; antennal toruli far apart, much closer to eyes than to each other; antenna with 13 segments; anelli and club 3 segmented; flagellar segments 7-10 with regular whorls of oblong sensilla and long basal setae; maxillary palpus 4 segmented; labial palpus 2 segmented; mandibles tridentate. Pronotum short; notauli complete; propodeum with 8 long setae next to circular spiracular peritremata; submarginal vein of fore wing longer than 2x length of marginal vein; postmarginal slightly shorter than marginal vein; fore wing with some stouter setae along marginal and postmarginal veins, e-3 large setae in front of submarginal vein. Pygostyles with 4 long setae; ovipositor short.

Distribution : India (Bihar, Kerala, Tamil Nadu, Uttar Pradesh, West Bengal).

Host : Figs of *F. benghalensis* L.

6. *Walkerella temeraria* Westwood
[Agaonidae : Otitesellinae]



Head of *Walkerella temeraria*

1883. *Walkerella temeraria* Westwood, *Trans. Ent. Soc. London*, 1883 : 33. F. Type : F. India : Calcutta (Lectotype HDOU).

1957. *Terastiozoon keralensis* Joseph, *Ann. Soc. Ent. France*, 125 : 124. M. India : Kerala, Trivandrum. Synonymy by Wiebes, 1967.

Diagnosis Female Head, mesosoma and gaster iridescent green; antenna pale yellowish brown; eyes pinkish red; wings hyaline; coxae of all legs partly iridescent green; ventral part of gaster sooty brown. Antennal toruli close to each other than distance between eye and toruli; antenna twelve segmented, with two unequal anelli; mandibles tridentate; maxillary palpus four segmented; labial palpus two segmented. Mesonotum with close reticulated punctae; postero-lateral regions of mesonotum, lateral regions of metanotum and propodeum

glabrous with rugosities; parapsidal furrows complete; fore wing with submarginal vein 2x as long as marginal vein; marginal vein distinctly longer than 2x postmarginal vein; stigmal vein shorter than postmarginal vein, distal part swollen with four rounded sensillae. Gaster glabrous with distinct rugosities.

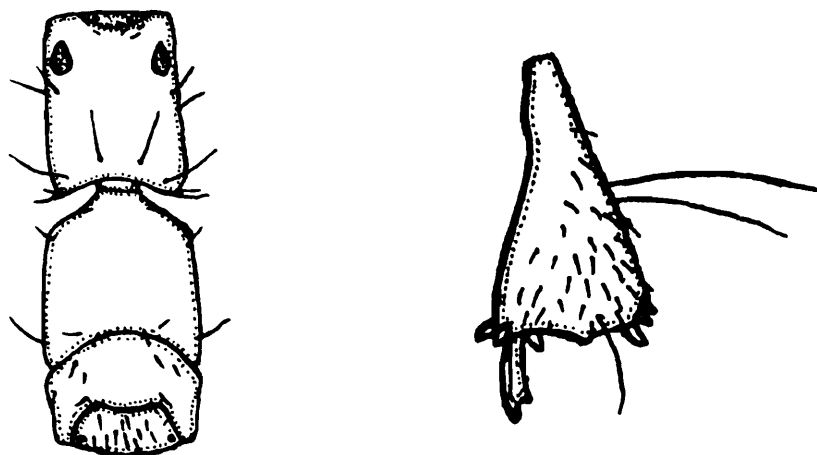
Male : Body generally yellowish brown; mandibles reddish brown; eyes black; antenna 10 segmented; mandibles bidentate, with 3 dentiform processes basally. gaster subdepressed; genitalia with each of two dorsal appendages bearing 4 odontoid spines at tip and each of ventral processes with 2 setae; penis sublanceolate.

Distribution : India (Kerala, Tamil Nadu, West Bengal).

Host : Figs of *F. benghalensis* L.

Remarks : The diagnosis is based on already available published literature.

7. *Philotrypesis affinis* (Westwood)
[Agaonidae Sycoryctinae]



Philotrypesis affinis - Head and prothorax and fore tibia

1883. *Sycoscaptella affinis* Westwood, *Trans. Ent. Soc. London*, 1883 : 36. M. Type : M. India : Calcutta (BMNH) (TCN examined).
1954. *Philotrypesis travancoricus* Joseph, *Agra Univ. J. Res. (Sci.)*, 3(1) : 83. M. Type : M. India : Kerala, Trivandrum. Synonymy by Wiebes, 1967.
1967. *Philotrypesis affinis* (Westwood) : Wiebes, *Tijd. Ent.*, 110(13) : 419.

Diagnosis : *Male* : Head yellowish brown; mesosoma and gaster pale yellowish brown; mandibles pale brownish red; scape yellowish brown, rest of antenna whitish yellow; legs pale yellowish brown, with trochanters and tibiae rusty yellowish brown; eyes black. Head a little wider than long, with numerous long macrochetae; epistomal margin medially emarginate; antenna 11 segmented; maxillary palpus 4 segmented; labial palpus 2 segmented. Pronotum with a few microsetae and many long macrochetae; mesonotum with many long and short

macrochetae. Gastral tergites with a row of long setae; genital armature with a pair of ventral, flattened processes, each with an apical long seta and minute setae a little to the front and 2 dorsal long depressed distally dilated appendages each bearing 3 short, stout odontoid spines.

Distribution : India (Bihar, Kerala, Uttar Pradesh, West Bengal).

Host : Figs of *F. benghalensis* L.

8. *Philotrypesis transiens* (Walker)
[Agaonidae : Sycoryctinae]



Fore tibia of *Philotrypesis transiens*

1971. *Idarnes transiens* Walker, *Notes on Chalcididae*, 4 : 62. F. Type : F. India : Murutt (near Mumbai) (Lectotype BMNH) (TCN examined).
1875. *Polinisa lutea* Walker, *Entomologist*, 8 : 18. F. Type : F. India : Murutt (near Mumbai) (Lectotype BMNH). Synonymy by Dalla Torre, 1898.
1883. *Idarnella transiens* (Walker) : Westwood, *Trans. Ent. Soc. London*, 1883 : 37.
1884. *Polinisa transiens* (Walker) : Patton, *Pro. Ent. Soc. London*, 1884 : 16.
1930. *Philotrypesis transiens* (Walker) : Grandi, *Boll. Lab. Ent. R. Inst. Sup. Agr. Bologna*, 3 : 175.

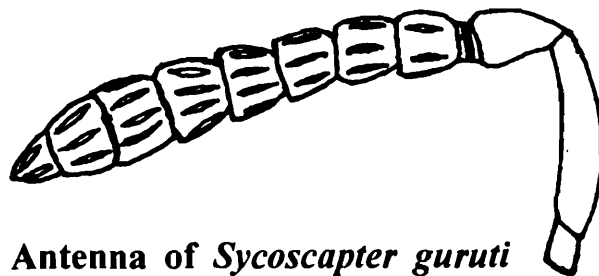
Diagnosis : Female : Head large; antennae long and slender; basal segment long and not clavate; second segment about 0.25x length of preceding; third and fourth segments equal sized, longer than second; third segment annular; ninth, tenth and eleventh forming a long articulated club. Dorsum of mesosoma distinctly hump backed; prothorax rather small and conical; fore tibia with long ventro-apical spines; fore wings have an elongated deflexed vein; abdomen terminated by a long slender cylindrical segment as long as whole of preceding portion of abdomen and this is succeeded by another still more cylindrical segment, from the extremity of which arise ovipositor sheaths of very long, extremely slender and hair-like ovipositor (thickened at their extremities).

Male : Similar to female. Gaster armed with 2, 3 dentate retinacula.

Distribution : India (Bihar, West Bengal); Sri Lanka.

Host : Figs of *F. benghalensis* L.

9. *Sycoscapter guruti* (Joseph and Abdurahiman)
[Agaonidae : Sycoryctinae]



Antenna of *Sycoscapter guruti*

1969. *Sycoscapteridea guruti* Joseph and Abdurahiman, *Oriental Ins.*, 3 : 42. M, F. Type : F. India : Karnataka, Saptapur (ATREE) (examined).

1988. *Sycoscapter guruti* (Joseph and Abdurahiman) : Boucek, *Australasian Chalcidoidea*, 182.

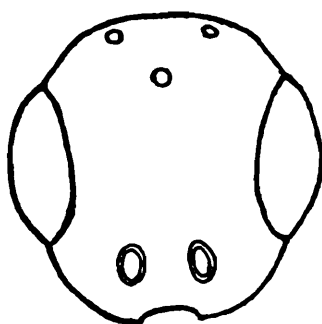
Diagnosis : Female : Head yellowish brown; eyes pinkish red; dorsum of mesosoma and gaster pale iridescent green; flagellum smoky brown; wings hyaline. Posterior half of head with irregular rugosities; antennae eleven segmented, with a single anellus; maxillary palpus four segmented; labial palpus two segmented. Pronotum with close oblong reticulations; notauli incomplete posteriorly; scutellum with longitudinally arranged elongate reticulated punctae; fore wing with marginal vein longer than submarginal vein; postmarginal vein distinctly shorter than marginal vein, equal to 2x stigmal vein; distal part of stigmal vein swollen and with three sensillae. Ovipositor about 2.6x as long as than gaster.

Male : Largely similar to female except apterous.

Distribution : India (Karnataka, Kerala).

Host : Figs of *F. benghalensis* L.

10. *Sycoscapter monilifer* Westwood
[Agaonidae : Sycoryctinae]



Head of *Sycoscapter monilifer*

1883. *Sycoscapter monilifer* Westwood, *Trans. Ent. Soc. London*, 1883 : 41. M. Type : M. Sri Lanka : Peradeniya (Lectotype HDOU).

1883. *Sycoscapter gracilipes* Westwood, *Trans. Ent. Soc. London*, 1883 : 41. M. Type : M. Sri Lanka : Peradeniya (Lectotype HDOU) Synonymy by Wiebes, 1967.

1904. *Sycosapteridea monilifera* (Westwood) : Ashmead, *Mem. Car. Mus.*, 1(4) : 239. Synonymy by Boucek, 1988.

Diagnosis Female : Body yellowish brown; gaster banded dark brown above. Head shorter than wide; epistomal margin faintly bilobed; toruli close to epistomal margin; antenna 13 segmented, with anelli and club 3 segmented; maxillary palpus with 4 and labial palpus with 2 segments; mandibles tridentate. Notauli almost complete; scutellum reticulate; fore wing with submarginal vein distinctly longer than marginal vein; postmarginal vein 3x stigmal vein, slightly shorter than marginal vein.

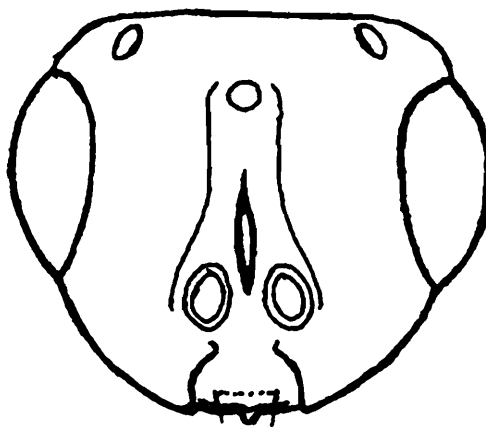
Male : Largly similar to female except following : epistomal margin almost straight; antenna with 11 segments; one anellus; mandible with a truncate subapical tooth. Mesosoma with several long setae; no wing remnants. Gaster equal to mesosoma; genital claspers with 3 claws.

Distribution : India (Bihar, Kerala, West Bengal); Sri Lanka.

Host : Figs of *F. benghalensis* L.

Remarks : The diagnosis is based on already available published literature.

11. *Sycosapter stabilis* (Walker)
[Agaonidae : Sycoryctinae]



Head of *Sycosapter stabilis*

1871. *Idarnes stabilis* Walker, *Notes on Chalcidiae*, 4 : 61. F. Type : F. India : Calcutta (Lectotype HDOU).

1875. *Idarnes orientalis* Walker, *Entomologist*, 8 : 17. Type : F. India : Calcutta (Lectotype HDOU).
Synonymy by Dalla Torre, 1898.

1883. *Sycosapter insignis* Saunders, *Trans. Ent. Soc. London*, 1883 : 1-27. M. Type : M. India : Calcutta
(Lectotype HDOU). Synonymy by Wiebes, 1967.

1928. *Sycosapter stabilis* (Walker) : Grandi, *Bull. Soc. Zool., France*, 53 : 81.

1953. *Indothymus crenulatus* Joseph, *Agra Univ. J. Res.*, 2 : 77. F. Type : F. India : Kerala, Trivandrum
(Probably lost). Synonymy by Joseph, 1957.

Diagnosis : Female : Head and mesosoma metallic with a greenish hue; gaster brown; antennae and legs yellowish brown, scape and coxa darker. Head finely reticulate with scattered small setae; a shallow groove from front ocellus to toruli; epistomal ridge with a rather long median process; antenna twelve segmented; maxillary palpus four segmented; labial palpi two segmented; mandibles bidentate. Mesosoma reticulate with scattered small setae; scutellum regularly pentagonal; propodeum with longitudinal ridges; fore wing with submarginal vein equal to marginal vein; postmarginal vein longer than marginal vein; stigmal vein short. Gaster with distal margins of tergites not distinctly crenulate.

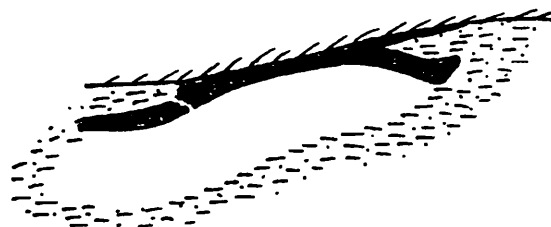
Male : Largely similar to female but differs in having colour uniform yellowish brown, head with epistomal margin bisinuate and antennae 11 segmented.

Distribution : India (Bihar, Kerala, Tamil Nadu, Uttar Pradesh, West Bengal).

Host : Figs of *F. benghalensis* L.

Remarks : The diagnosis is based on already published literature. Noyes (2004) listed *S. insignis* Saunders as a valid species, but Wiebes (1967) had synonymized *S. insignis* Saunders under *S. stabilis* (Walker). Wiebes (1967) also discussed the variations shown by the type of *Indothymus crenulatus* Joseph with that of *S. stabilis* (Walker). In this paper we have followed Wiebes (1967).

12. *Bruchophagus rexus* Narendran [Eurytomidae : Eurytominae]



Forewing venation of *Bruchophagus rexus*

1995. *Bruchophagus rexus* Narendran, *J. Adv. Zool.*, 16(2) : 75-76. M, F. Type : F. India : Kerala, Calicut University Campus (DZUC).
2004. *Bruchophagus rexus* Narendran, *Uttar Pradesh J. Zool.*, 24(2) : 179. F. India : Kerala, Calicut University Campus **syn. nov.** (Repeated description).

Diagnosis Female : Black; antennae brownish yellow, club darker; ocelli, tegulae, legs, hypopygium, epipygium and tip of ovipositor sheath yellowish brown except hind coxae brownish yellow; eyes blackish brown; genal area black; propleuron brown; rest of tergites brownish black; wings hyaline, wing veins pale yellowish white. Head broader than mesosoma, with rugulose sculpture on vertex, frons and face; face without radiating carinae; frons not bulging; genotemporal margin weakly carinate with an adjoining groove; postgenal groove never extend downward and postgenal lamella absent; pre- and postorbital carinae absent; malar groove distinct; antennal formula 11153; scape reaching front ocellus. Mesosoma with

dorsum transversely striato-reticulate, striations weak; anterior margin of pronotal collar ecarinate, its posterior margin concave; prepectus smooth, depressed subtriangular; mesopleuron with epicnemial area sloping, mesepisternum and anterior half of mesepimeron with shallow punctures; posterior half of epimeron with a few transverse striations; fore coxal depression on mesopleuron not distinct; fore coxa without an anterior tooth; propodeum slightly convex, depressed in middle, weakly punctured and with rugoso-reticulate sculpture on sides. Gaster petiolate, compressed from sides; petiole length a trifle shorter than hind coxa; dorsal surface rugose, apical part carinate on sides; all tergites smooth and shiny; fourth tergite largest.

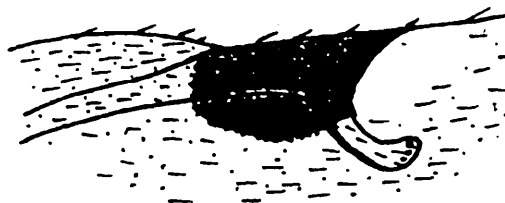
Male : Similar to female except funicular segments pedunculate with longer hairs on it, pedicel short and petiole longer than hind coxa.

Distribution : India (Kerala).

Host Leaf galls of *F. benghalensis* L.

Biology : The better known species of *Bruchophagus* are phytophagous (Boucek, 1988). Hence the nature of this species is guessed to be phytophagous and for the time being placed in this category.

13. *Sycophila benghalensis* (Joseph and Abdurahiman)
[Eurytomidae : Eurytominae]



Forewing venation of *Sycophila benghalensis*

1968. *Decatoma benghalensis* Joseph and Abdurahiman, *Oriental Ins.*, 2(1) : 72. M, F. Type : F. India : Karnataka, Dharwar (ATREE) (examined).

1986. *Eurytoma benghalensis* (Joseph and Abdurahiman) : Farooqi and Subba Rao, *Oriental Ins.*, 20 : 250.

1994. *Sycophila benghalensis* (Joseph and Abdurahiman) : Narendran, *Torymidae and Eurytomidae of Indian subcontinent (Hymenoptera : Chalcidoidea)*, 166-167.

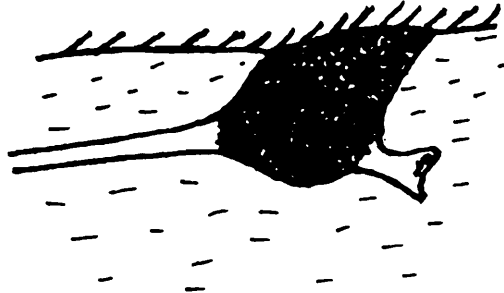
Diagnosis : Female : Head, antennae, mesosoma and gaster rusty yellow brown; legs pale brownish yellow; wings hyaline, pterostigma rusty yellow brown. Head with rugulose sculpture; scrobe not reaching front ocellus, lateral margins weakly carinate; malar groove complete; antennal formula 11153; scape not reaching front ocellus. Dorsum of mesosoma rugulose; propodeum vertical with a median smooth depression, with a number of setae on lateral and basal sides; fore wing with pterostigma 1.5-2x as long as wide. Gaster compressed; fourth tergite distinctly longest; hypopygium ending well before middle of gaster.

Male : Similar to female except in having petiole, first, fourth and fifth tergites smoky brown; petiole longer than hind coxa and third tergite longest.

Distribution : India (Karnataka).

Host : Galls in the fig receptacles of *F. benghalensis* L.

14. *Sycophila decatomoides* Walker
[Eurytomidae : Eurytominae]



Forewing venation of *Sycophila decatomoides*

1871. *Sycophila decatomoides* Walker, *Notes on Chalcidiae*, 4 : 64. M. F. India? (Lectotype BMNH) (TCN examined).
1875. *Isanisa decatomoides* (Walker) : Walker, *Entomologist*, 8 : 16. India.
1968. *Decatoma longipetiolata* Joseph and Abdurahiman, *Oriental Ins.*, 2(1) : 72. India : Karnataka, Dharwar (ATREE). Synonymy by Narendran, 1994. (examined).
1986. *Eurytoma longipetiolata* (Joseph and Abdurahiman) : Farooqi and Subba Rao, *Oriental Ins.*, 20 : 251.

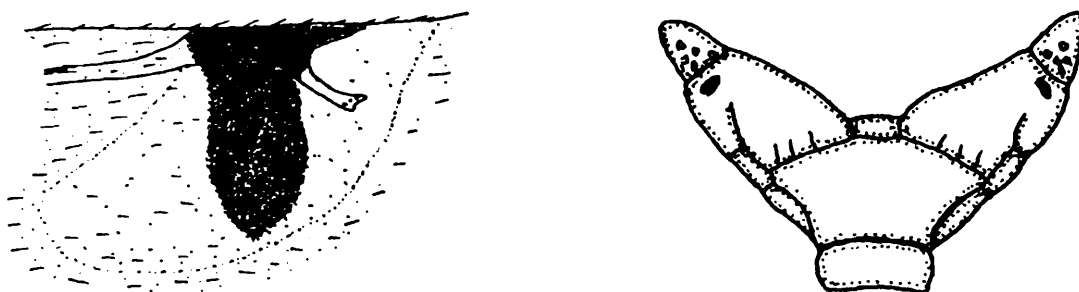
Diagnosis : Female : Body colour pale rusty brown; parts of prosterna and dorsomedian line of gaster, median part of third and fourth sternites and posterior margins of second to fifth tergites blackish brown; wings hyaline, pterostigma rusty yellow-brown; antenna pale brownish yellow. Scrobe deep, not reaching front ocellus, margins ecarinate; vertex and frons mostly smooth with many little or no rugosities, malar groove complete; antennal formula 11153; scape reaching front ocellus. Dorsum of mesosoma shin, almost smooth, with faint alveolate sculpturing under strong illumination; propodeum vertical, with a broad depressed fovea present on meson, bounded laterally by carinae, surface of fovea smooth and shiny, area lateral to fovea mostly smooth; pterostigma as in figure. Gastral petiole a little less than length of hind coxa; gaster strongly compressed, smooth and shiny; third tergite longest.

Male : Similar to female except area between ocelli, antennal fossa, scape, collum, prepectus, part of scapula and dorso-median part of propodeum sooty brown; gaster with sooty brown patches more than that of female; petiole longer than gaster.

Distribution : India (Karnataka).

Host : Galls in the fig receptacles of *F. benghalensis* L.

15. *Sycophila dharwarensis* (Joseph and Abdurahiman)
[Eurytomidae : Eurytominae]



Sycophila dharwarensis Forewing venation and Propodeum

1968. *Decatoma dharwarensis* Joseph and Abdurahiman, *Oriental Ins.*, 2(1) : 83. M. F. Type : F. India : Karnataka, Dharwar (ATREE)(examined).
1986. *Eurytoma dharwarensis* (Joseph and Abdurahiman) : Farooqi and Subba Rao, *Oriental Ins.*, 20 : 250.
1994. *Sycophila dharwarensis* (Joseph and Abdurahiman) : Narendran, *Torymidae and Eurytomidae of Indian subcontinent (Hymenoptera : Chalcidoidea)*, 167.

Diagnosis Female : Head and thorax ferrugino-testaceous; gaster brownish black; tibiae black; wings hyaline, pterostigma smoky brown. Scrobe not reaching front ocellus; malar groove complete; antennal formula 11153; scape not reaching front ocellus; pedicel as long as first funicular segment. Mesosoma with dorsum minutely regulose or with leathery texture; propodeum with a broad median depression which narrows towards anterior and posterior ends, depression laterally bounded by carinae; posterior part of propodeum narrowed and neck like; costal cell sparsely pilose with a few long pilae in its posterior half in front of submarginal vein; pterostigma 0.5x as long as wide Figure. Gastral petiole length a trifle over half length of hind coxa; gaster compressed, longer than mesosoma; fourth tergite longest.

Male Similar to female except in having four segmented funicle, petiole longer than hind coxa and third tergite being longest.

Distribution India (Karnataka).

Host Galls in the fig receptacles of *F. benghalensis* L.

16. *Sycophila karnatakensis* (Joseph and Abdurahiman)
[Eurytomidae Eurytominae]



Forewing venation of *Sycophila karnatakensis*

1968. *Decatoma karnatakensis* Joseph and Abdurahiman, *Oriental Ins.*, 2(1) : 68. F. Type : F. India : Karnataka, Dharwar (ATREE) (examined).
1986. *Eurytoma karnatakensis* (Joseph and Abdurahiman) : Farooqi and Subba Rao, *Oriental Ins.*, 20 : 250
1974. *Sycophila karnatakensis* (Joseph and Abdurahiman) : Boucek, *Redia*, 55 : 268.

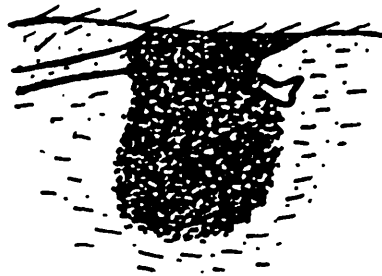
Diagnosis : Female : Head and mesosoma ferrugino-testaceous; gaster brownish black; tibiae black; wings hyaline, pterostigma smoky brown. Scrobe not reaching front ocellus; malar groove complete; antennal formula 11153; scape not reaching front ocellus. Dorsum of mesosoma minutely regulose or with leathery texture; propodeum with a broad median depression which narrows towards anterior and posterior ends, depression laterally bound by carinae; pterostigma as in figure. Gaster compressed; gastral petiole a trifle longer than hind coxa; fourth tergite longest.

Male : Similar to female except in having four segmented funicle, petiole longer than hind coxa and third tergite being longest.

Distribution : India (Karnataka).

Host : Galls in the fig receptacles of *F. benghalensis* L.

17. *Sycophila pilosa* (Joseph and Abdurahiman)
[Eurytomidae : Eurytominae]



Forewing venation of *Sycophila pilosa*

1968. *Decatoma pilosa* Joseph and Abdurahiman, *Oriental Ins.*, 2(1) : 74. M, F. Type : F. India : Karnataka, Dharwar (ATREE) (examined).
1986. *Eurytoma pilosa* (Joseph and Abdurahiman) : Farooqi and Subba Rao, *Oriental Ins.*, 20 : 252.
1994. *Sycophila pilosa* (Joseph and Abdurahiman) : Narendran, *Torymidae and Eurytomidae of Indian subcontinent (Hymenoptera : Chalcidoidea)*, 166.

Diagnosis : Female : Head, mesosoma and hind legs rusty brown; fore and mid legs and gaster yellowish brown. Scape not reaching front ocellus; pedicel distinctly shorter than first funicular segment. Mesosoma with pronotum, anterior one-fourth and posterior half of scutum, lateral parts of scapulae and scutellum with reticulate setigerous punctures, other

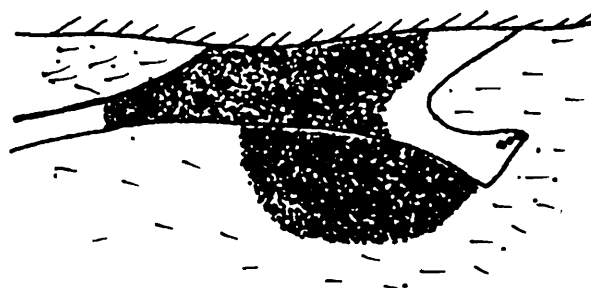
parts of mesoscutum with transverse rugosities; propodeum with a median fovea, sides of fovea punctate with large number of macrochetæ on either side; posterior end of propodeum with a neck; stigmal vein much shorter than marginal vein; large pterostigma; costal cell closely pilose with minute pilæ. Gastral petiole shorter than half length of hind coxa.

Male Similar to female except in having four segmented funicle, petiole longer than hind coxa and gaster subequal to length of mesosoma in dorsal aspect.

Distribution India (Karnataka).

Host : Galls in the fig receptacles of *F. benghalensis* L.

18. *Sycophila robusta* (Joseph and Abdurahiman)
[Eurytomidae Eurytominae]



Forewing venation of *Sycophila robusta*

1968. *Decatoma robusta* Joseph and Abdurahiman, *Oriental Ins.*, 2(1) : 63. F. Type : F. India : Karnataka. Dharwar (ATREE) (examined).

1986. *Eurytoma robusta* (Joseph and Abdurahiman) : Farooqi and Subba Rao, *Oriental Ins.*, 20 : 252.

1974. *Sycophila robusta* (Joseph and Abdurahiman) : Boucek, *Redia*, 55 : 268.

Diagnosis : Female Body largely rusty brown yellow with gena brown; propodeum, coxae, fore femur, hind femur and hind tibia largely reddish brown; gaster with transverse bands; first four tergites and pterostigma reddish brown; antenna pale reddish brown. Head impunctate, finely rugulose; scrobe not reaching front ocellus; antennal formulla 11153; scape reaching front ocellus but not reaching level of vertex; pedicel a trifle shorter than first funicular segment. Mesosoma with dorsum finely rugulose and sparsely reticulate; propodeum with a median fovea, sides of fovea rugulose; distal end of propodeum with a short neck; marginal vein distinctly longer than stigmal vein; anterior margin of costal cell bare; inside of costal cell minutely and sparsely pubescent; submarginal vein with a row of about 20 bristles; pterostigma as in figure. Gastral petiole shorter than hind coxa; gaster compressed from sides; fourth tergite largest; gaster distinctly longer than mesosoma.

Male Similar to female except in having four segmented funicle, petiole longer than hind

coxa and gaster including petiole subequal to length of mesosoma.

Distribution : India (Karnataka).

Host : Galls in the fig receptacles of *F. benghalensis* L.

SUMMARY

The chalcidoids associated with *Ficus benghalensis* L. are dealt with. The pollinator species, parasitoids and phytophagous inquiline associated with the plant are treated separately. 29 species of chalcidoids under 8 families associated with the plant are taxonomically treated and provided with diagnosis along with data on type locality, type depository, distribution, list of synonyms, host data, biology, etc. *Closterocerus pulcherrimus* (Kerrich) that emerged from the leaf galls of the Banyan tree is recorded for the first time from Kerala. A key to the identification of the chalcidoids recorded from *F. benghalensis* L. is also provided.

ACKNOWLEDGEMENTS

T.C.N is grateful to BMNH and USNM for facilities to work at BMNH in 1979-1980 and USNM in 1986, which enabled him to examine several relevant types. KS is grateful to the University Grants Commission, New Delhi for the award of Research Fellowship. We are grateful to Prof. M. Hayat of Aligarh Muslim University for his critical review of this paper and useful suggestions which we have incorporated in the revised text. We thank the authorities of the Department of Zoology, University of Calicut for the facilities provided.

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