

## NOTES ON SOME CHALCID PARASITES OF LAC-INSECTS.

By CH. FERRIÈRE, D.Sc.

*Senior Assistant, Imperial Bureau of Entomology.*

Many parasitic Hymenoptera are already known to live on lac-insects, and they are of importance either as noxious insects by destroying the Coccid (*Tachardia lacca* (Kerr)), or as useful insects when parasiting the predators of lac. As a result of the studies of Cameron, Imms, Misra and Mahdihassan, something is already known about them, but the systematic position and the identity of many of the species are still uncertain.

We shall mention here only four species, which were received by the Imperial Bureau of Entomology from C. S. Misra, from India. Three of them are of special interest, as they are still little known, and we intend to give more detailed descriptions to facilitate their identification.

## Family ENCYRTIDAE.

**1. *Tachardiaephagus tachardiae* (How.).***Encyrtus tachardiae*, Howard 1896.*Tachardiaephagus thoracicus*, Ashmead 1904 (new syn.).*Lissencyrtus troupi*, Cameron 1913 (new syn.).

Several females bred from lac on *Zizyphus jujuba* (Nankom, Bengal) were examined and compared with the type of *Lissencyrtus troupi*, Cam. Dr. A. B. Gahan, of the U.S. Bureau of Entomology, had the kindness to compare some of these females with Ashmead's type of *Tachardiaephagus thoracicus*, and finding them identical with this species as well as with the *Encyrtus tachardiae* of Howard, called our attention to the above synonymy.

This species is well known and has been recognised by all students of lac-insects. Good coloured figures of the male and female have been given by Imms and Chatterjee, who give also a description of the male. Mahdihassan has also published interesting information about it and mentions another allied species, which he names *Lissencyrtus somervilli*; but this must be included also in the genus *Tachardiaephagus*. This species as well as distinguished from *T. tachardiae* (How.) especially by the colour of the head, which is orange-yellow, like the thorax, instead of dark.

## Family ELASMIDAE.

**2. *Elasmus claripennis* (Cam.).***Cyclopleura claripennis*, Cameron 1913.*Elasmus colemani*, Mahdihassan 1923 (new syn.).

♀. Length 3 mm. Face and vertex finely punctate with some larger scattered points. Lateral ocelli separated from the eye-margin by a space three times as long as their diameter. Antennae with the pedicellus shorter than the funicular joints; these are about three times as long as broad, the 2nd only a little longer than the 1st and 3rd; club 3-jointed, somewhat longer than the 2nd joint of the funicle. Pronotum without a transverse carina; mesonotum finely punctate and covered with short black hairs; scutellum and propodeum slightly rugulose, without hairs, the propodeum without median carina and with small rounded spiracles. Wings hyaline with a faint brownish cloud around the stigma, and reaching not quite to the end of the abdomen. Abdomen elongate and pointed, almost twice as long as the thorax. Ovipositor very short.

Black, with a green reflection, especially on the head, mesonotum and propodeum ; the scutellum and the sides of the thorax more bluish-violet; Antennae brown, scape yellow. The axillae, a point on each side of the mesonotum beside them, and the postscutellum, yellow. Abdomen dark brown, with the base of the 1st segment greenish ; the end of segments 1 and 2, the base of segments 3 and 4, and the sides of the abdomen, reddish-yellow. Legs pale yellow, almost whitish, except the base of the middle and hind coxae, which is greenish black, and a small black stripe on the upper part of the hind femora. The tibiae with rows of black hairs ; on the hind tibiae they form four regular lozenges (fig. 1, a).

♂. Length 1.7–2.2 mm. In structure and color similar to the female. Antennae with 3 long branches. Abdomen much shorter, as long as or shorter than the thorax ; the end of the 1st, the 2nd and the base of the 3rd segment reddish-yellow, more or less black above ; the remaining segments black. Legs darker ; the base of all the coxae and the middle and hind femora (except base), black. On the hind tibiae the black hairs are arranged as in the female.

♀ and ♂ bred from larvae of *Eublemma*, a Noctuid predacious on lac occurring on *Zizyphus jujuba*, Nankom, Bengal.

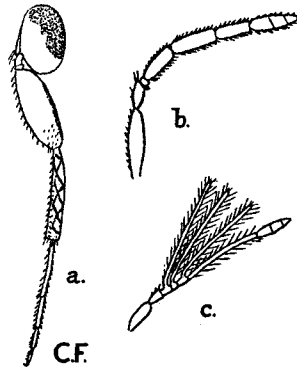


Fig. 1. *Elasmus claripennis* (Cam.): a, hind leg ; b, antenna of female ; c, antenna of male.

The description of the genus *Cyclopleura*, Cameron, sufficiently indicated its relationship to *Elasmus*, and, as Mahdihassan says (1925), Waterston wrote to him : " I have long regarded *Cyclopleura* Cam. as a synonym of *Elasmus*." Cameron's type is in the British Museum, and we are able not only to confirm the synonymy of the genera, but also to say that *C. claripennis*, Cam., bred from lac at Dehra Dun, Northern India, is exactly the same species as the ♀ specimen of which we give here the description.

We identify also our *Elasmus* with *Elasmus colemani*, Mahdihassan, which the author bred from larvae of *Eublemma amabilis*, Moore, and mentioned without description. He said only (1923) : " It is allied to *Elasmus articles* described by Walker in 1843 from a specimen collected in Bombay and differs in having smoke-white legs instead of their being pitch-brown." In 1925 he speaks of two distinct species, saying that his *E. colemani* has " lozenge-shaped three cells on the hind tibiae formed by hairs so arranged, while the other species which I designate *E. claripennis* has two irregularly shaped rows of hairs not forming any cells." We have seen that the type of Cameron has also lozenge-shaped cells on the hind tibiae, as have many other *Elasmus*, and the second species mentioned by Mahdihassan must be still another species.

*E. claripennis* (Cam.) differs also from *E. indicus*, Rohwer, especially by being larger and having the joints and club of the antennae more elongate, the scutellum darker, the abdomen more reddish yellow, and the legs almost quite clear instead of brown. It stands nearer *E. nephanididis*, Rohwer, another Indian species, by the form of the antennae, but differs especially by the hairs on the mesonotum being black (and not whitish), the propodeum a little rugulose (and not polished), the thorax darker, the abdomen with more brownish parts and the legs clearer.

Family EULOPHIDAE.

3. *Coccophagus tschirchii*, Mahdihassan.

This is really a new species, which has not been described by Mahdihassan, but only referred to in a few words. We give here a description and a drawing.

♀. Length 1-1.2 mm. Head as broad as the thorax, vertex very short, eyes ciliate, lateral ocelli a little nearer to the eye margin than to each other. Cheeks as long as the diameter of the eyes. Antennae with 8 joints, inserted near the clypeus, scape elongate, pedicellus short,  $1\frac{1}{2}$  times as long as broad, 1st joint of funicle almost twice as long as the pedicellus, 3 times as long as broad, 2nd joint a little shorter, as

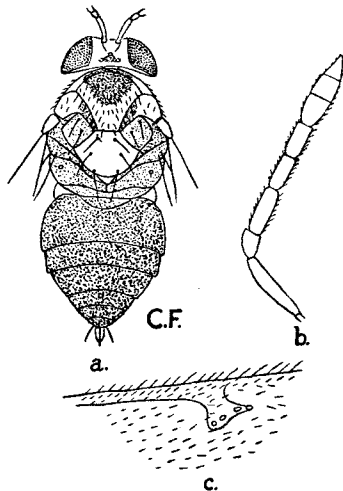


Fig. 2. *Coccophagus tschirchii*, Mahd. : a, dorsal aspect ; b, antenna ; c, stigmal nerve.

long as the 3rd, club with 3 joints, not much broader than the funicle and as long as the two preceding joints together. Thorax rounded, finely reticulated on the mesoscutum, the scutellum almost polished ; parapsidal furrows well marked, axillae large, scutellum largely rounded behind. Propodeum short without lateral grooves, the spiracles small and rounded. Thorax more or less covered with black hairs, which are smaller in front and become larger behind ; the mesoscutum with several rows of small hairs, one row on each lateral part along the parapsidal furrows, two longer hairs on each axilla and 6 long hairs arranged in pairs on the scutellum, the two posterior the largest. Wings broad, hyaline, reaching far beyond the end of the abdomen, covered with short ciliae, the fringes also very short. Marginal nerve much longer than the submarginal, stigma and postmarginal nerves very short. Abdomen as long as the thorax, rounded ; 1st segment the longest, 2nd half the length of the 1st,

3rd a little longer than the 2nd, 4th short, transverse, the following shorter. Ovipositor very little exerted. Legs not broadened, normal; spurs of middle tibiae as long as the metatarsus.

Head yellow, only the stemmaticum and eyes black. Antennae brown, the scape clearer. Thorax lemon-yellow, with the middle of pronotum and a rounded spot on the middle front part of the mesonotum black; the axillae, the narrow parts between these and the parapsidal furrows, the sides of the thorax, and the propodeum, more or less brown. Abdomen black. Legs entirely light yellow.

Several ♀♀ obtained from lac on *Butea frondosa*, Kundari, Bengal.

Mahdihassan mentioned this species only in the following words (1923): "There is at least one chalcid which so far I have not reared from any other insect than the Mysore lac insect. It belongs to the genus *Coccophagus* and is black and lemon-yellow in colour . . . It would be interesting to compare it with a similar black and yellow Apheline of this genus named *C. scutatus* by Dr. L. O. Howard." The coloration of the thorax is very peculiar, and the species is most nearly related to *C. scutatus*, How., from which it differs in the following characters:—

*C. scutatus*, How. Scutellum black; mesonotum with a lemon-yellow stripe which goes from tegula to tegula; legs more or less dark.

*C. tschirchii*, Mahd. Scutellum yellow; mesonotum lemon-yellow with a large black spot near the pronotum; legs entirely yellow.

Every specimen examined was a female. The males seem to be always very rare. Mahdihassan says (1925): "The usual ratio between males and females is about one to fifty respectively. . . In August 1923, lac from Khonde Bhavi, Kolar District, in Mysore State, gave rise to hundreds of females without a single male."

#### 4. *Tetrastichus (Geniocerus) purpureus* (Cam.).

*Hadrothrix purpurea*, Cameron 1913.

*Tetrastichus immsii*, Mahdihassan 1923 (new syn.).

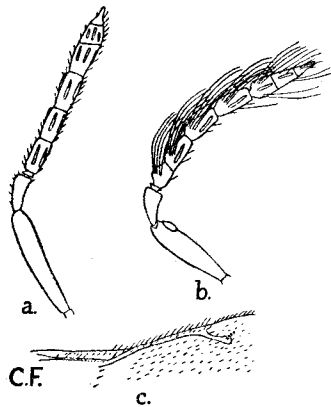


Fig. 3. *Tetrastichus purpureus* (Cam.): a, antenna of female; b, antenna of male; c, wing nerves.

♀. Length 1.5–1.8 mm. Head shining, very slightly punctulate, rounded, vertex very short. Antennae elongate, scape reaching a little beyond the front ocellus; the 3 funicle joints and the pedicellus nearly all of equal length, about twice as long as

broad; the club 3-jointed, as long as the two preceding joints together, the last joint short and pointed; ciliae short. Mesonotum and scutellum slightly reticulate, the median groove of the mesoscutum and the two longitudinal grooves of the scutellum well marked. Propodeum polished, with a small median carina and lateral grooves; spiracles small. Wings large, hyaline, reaching beyond the end of the abdomen. Marginal nerve longer than the submarginal; stigma as long as a third of the marginal nerve; submarginal nerve with 4 ciliae. Abdomen a little longer than the thorax, slightly broadened until beyond the middle, then sharply pointed. Ovipositor slightly protruding.

Black with purplish and greenish reflection. Base of abdomen more or less yellow. Antennae brown. Legs yellow; the base of the coxae, stripes above and below the femora, and the end of tarsi brownish. Marginal and stigmal nerves light yellow.

♂. Length 1.2 mm. Similar to female. Antennae with long bristles arranged in half-circles on the outer part of the funicle joints and almost twice the length of the joints; club 3-jointed, elongate and pointed; scape with a small rounded sense organ. Abdomen shorter than the thorax, with the 1st segment yellow. Legs clear yellow; coxae, part of femora, and end of tarsi brown.

Reared from lac on *Zizyphus jujuba*, Nankom, Bengal.

The type of Cameron's *Hadrothrix purpurea*, which he places among the APHELININAE, is also in the British Museum. It is in reality a male *Tetrastichus*, quite similar to those received from India. The "characteristic long, stiff bristles on the antennae and the long thin stigmal vein" are typical for many males of the TETRASTICHINAE, and we are astonished that Cameron did not notice the longitudinal grooves on the mesonotum and scutellum.

Imms & Chatterjee (1915, pl. viii, fig. 35) give a figure of a "common unnamed Chalcid bred from lac obtained from Siwalik forests." This figure has all the characteristics of the female of our *Tetrastichus*. Mahdihassan was the first to recognise that these Chalcids, which he also obtained in great numbers, were *Tetrastichus*, and he named them *T. immsii*, without giving any description. His only morphological reference to it was (1923): "The most common Chalcid enemy of lac insects on *Shorea* is a black insect allied if not the same as illustrated by Dr. Imms . . . It has not been described but it belongs to the genus *Tetrastichus* or to a closely allied one. I am hoping to receive some specimens reared by him, but provisionally, in honour of its discoverer, I have named it *T. immsii*." In his paper of 1925 he adds nothing to this, but confirms the fact that it is really the species illustrated by Imms & Chatterjee, and says that it is very abundant. "In Mysore lac it constitutes more than half the Chalcids reared at the end of the monsoon season" . . . "It has been found to have a very wide distribution." He confirms also that it is a direct parasite of the Coccid and not an hyperparasite.

This *Tetrastichus* having four ciliae on the submarginal nerve, belongs to the subgenus *Geniocerus*, Ratz. It appears to differ from all other species of *Tetrastichus* described from India, in particular from those described by Rohwer and Waterston.

#### References.

- ASHMEAD, W. H. Classification of the Chalcid Flies of the Super-Family Chalcidoidea.—Mem. Carnegie Mus., i, no. 4, 1904. (*Tachardiaephagus*, p. 303).
- CAMERON, P. On the parasitic Hymenoptera reared at Dehra Dun, Northern India, from the Lac (*Tachardia*) and Sal Insects.—Ind. For. Rec., iv, 1913, pp. 91-110.
- GIRAULT, A. A. Notes on described Chalcidoid Hymenoptera with new Genera and Species.—Soc. Entom., xxxi, 1916. pp. 35-38; 42-44. (Description of *Tachardiaephagus thoracicus*, p. 43.)

- HOWARD, L. O. & ASHMEAD, W. H. On some reared parasitic Hymenopterous Insects from Ceylon.—Proc. U.S. Nat. Mus., xviii, 1896, p. 633-648.
- IMMS, A. D. & CHATTERJEE, N. C. On the Structure and Biology of *Tachardia lacca*, Kerr, with observations on certain insects predaceous or parasitic upon it.—Ind. For. Mem., Forest Zool. Ser., iii, pt.1, 1915, 42 pp., 8 figs.
- MAHDIHASSAN, S. Classification of Lac Insects from a physiological Standpoint.—J. Sc. Ass. Maharajah's Coll., Vizianagaram, i, 1923, pp. 47-99.
- MAHDIHASSAN, S. Some Insects associated with Lac and a symbolic Representation of their Relationship.—J. Sc. Ass. Maharajah's Coll., ii, 1925, pp. 64-87.
- MISRA, C. S., The Cultivation of Lac in the Plains of India.—Agr. Res. Inst. Pusa, Bull. 142, 1923, 83 pp., 23 pls., 14 figs.
- ROHWER, S. A. Description of new Chalcidoid Flies from Coimbatore, South India.—Ann. Mag. Nat. Hist., (9) vii, 1921, pp. 123-135, 9 figs.
-