

## NEW INDIAN PSYLLIDAE.

By D. L. CRAWFORD, *University of Hawaii, Honolulu, U. S. A.*

In a collection of Psyllidae recently sent to me for determination by Mr. T. V. Ramakrishna, Assistant Entomologist at Coimbatore, India, there are several new and interesting species, as well as some that were described in my earlier paper on Indian Psyllidae.<sup>1</sup>

In addition to the species represented in the Ramakrishna collection, I include several others of the genus *Diaphorina*, with a complete summary and synoptic key of all the species of this genus, so far as I know them.

### **Phacopteron lentiginosum** Buckton.

A conspicuous and distinctive species occurring on *Garruga pinnata* (see my previous paper in *Rec. Ind. Mus.* noted above).

### **Pauropsylla depressa** Crawford.

This species was first described in 1912<sup>2</sup>, from specimens taken on *Ficus glomerata* in Pusa, Bengal. Leaf galls are formed by this species. In the Ramakrishna collection we have this species with the following data :—

- (1) On *Ficus glomerata* at Coimbatore, July, 1923.
- (2) On cinnamon shoots (*Lauraceae*) at Mangalore, March, 1919.  
(Gall forming.)

### **Paurocephala psyloptera** Crawford.

This species was first described from the Philippines but subsequently has been found to occur in Formosa, Moluccas, Borneo, Ceylon and probably throughout the old world tropics. Enderlein described this same species from Formosa under the name of *Agonoscena* which is a synonym of *Paurocephala*. The Ramakrishna collection has several specimens of this species, taken on *Ficus* shoots at Tenmalai, Travancore, S. India, October, 1923.

### **Diaphorina** Low.

This genus was erected in 1878<sup>3</sup> by Franz Low, first as *Diaphora* and then changed to *Diaphorina*<sup>4</sup> in 1879 because the earlier name was pre-occupied in Lepidoptera. Only one species was referred by him to this genus, *D. putonii*, which was represented by several specimens collected in Italy and Greece. *Psylla aphalaroides* Put, in Spain, was referred by Low to this same species, as a synonym.

<sup>1</sup>*Rec. Ind. Mus.*, Vol. VII, pt. V, December, 1912, pp. 419 to 437 (3 plates).

<sup>2</sup>*Rec. Ind. Mus.*, Vol. VII, p. 429, December, 1912.

<sup>3</sup>*Verh. d. zool.-bot. Ges. Bd. XXVIII*, p. 603, 1878.

<sup>4</sup>Same Bd. XXIX, p. 567, 1879.

A second species, *D. guttulatus*, was described by Lethierry in 1890 from specimens taken near Bombay, India. This same species now reappears and is described on a later page.

Another species, *D. citri*, was described by S. Kuwayama in 1907<sup>1</sup> occurring in Formosa on *Citrus* foliage. This has been erroneously referred by me to the genus *Euphalerus*, which it approximates very closely. Further study, however, convinces me that *Diaphorina* is quite distinct and should have a number of species referred to it.

*Euphalerus* is very similar in many respects to this genus, especially in the appearance of the genal cones. *Diaphorina*, however, may be separated on some very good characteristics, very distinct from *Euphalerus* and other related genera.

#### DESCRIPTION OF GENUS.

The distinctive characteristics of *Diaphorina* are as follows:—Antennae very short, about as long as width of head or less, moderately thick. Genal cones thick, porrect (extending forward in same plane with vertex or nearly so). Thorax moderately narrow and slender, dorsal surface more or less granulate (gekornelt). Forewings long, broadest near the apical end, basal half narrow; membrane more or less hyaline and usually maculated extensively with brown; pterostigma very narrow or wanting.

#### *Diaphorina citri* Kuwayama.

*Diaphorina citri*, Kuwayama, *Trans. Sapp. Nat. Hist. Soc.* Vol. II, p. 160, 1907.  
*Euphalerus citri* (Kuwayama) Crawford, *Rec. Ind. Mus.*, Vol. VII, pt. V, p. 424, 1912.

*Locality*.—Formosa, Philippine Islands, Moluccas (Amboina), Southern China (Macao), India (Pusa, Punjab Province, Manbhum District, Coimbatore).

*Food plants*.—*Citrus* species, and *Murrayia koenigi*.

#### *Diaphorina guttulata* Lethierry.

*Proc. Asiat. Soc. Bengal*, 1890, p. 165.

This is very close to *D. citri*, differing in the color pattern of the forewing and in the presence of a double row of hairs on the veins of the forewing, these being large enough to be easily visible under low power of magnification (about 25 diameters). The color pattern lacks the central clear band present in *D. citri*, and shows a more or less uniform arrangement of spots and flecks in the apical half of the forewing, with the basal half more nearly clear and hyaline.

There appears to be considerable variation in the predominant color of the forewing, depending on the amount of maculation. Lethierry (1890) described the forewing as being mostly dark and opaque with numerous white spots, but noted a variation to the other extreme in which the wing is more extensively whitish and hyaline with numerous brown spots. It is this type that has come to my attention at this time.

<sup>1</sup>*Trans. Sapp. Nat. Hist. Soc.*, Vol. II, 1907, p. 160.

*Locality*—India (Poona, Bombay), collected by T. B. Fletcher, September 8, 1911. This is also the type locality.

***Diaphorina cardiae*, n. sp.**

This also is close to *D. citri* but differs a little more widely than the foregoing species (*D. guttulata*). A distinct difference is to be noted in the appearance of the vertex and genal cones, as well as in the color pattern of the forewing. The vertex is broader and larger than in *D. citri* and the genal cones much smaller and shorter. The pubescence of the dorsal surface of thorax and head is quite conspicuous, though very short.

The forewings are more densely covered with brown flecks and spots than in *D. citri*, but there are four conspicuous clear spots on the apical margin, one in each of the four cells bordering on that margin.

*Locality*.—India (Coimbatore, South India).

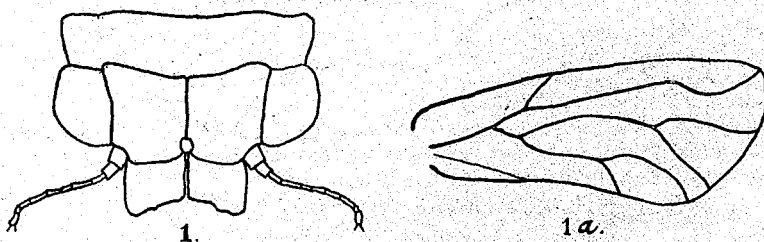
*Food plant*.—*Cardia cordata*.

***Diaphorina truncata*, n. sp.**

This is a very distinct species, differing from all other species of the genus quite conspicuously but apparently more closely related to a South African species. The somewhat truncate genal cones present the most conspicuous difference, while the forewings have a little more tendency toward an angular apex than the other species of the genus. The color of the body is chocolate brown, indistinctly mottled with a lighter shade of brown, while the forewings are of about the same deep brown color with numerous lighter spots giving a mottled effect.

*Locality*.—India (Walayar Forests), May, 1921 (Ramakrishna Coll.); Southern China (Macao)—the latter represented by one specimen taken by F. Muir.

*Food plant*.—*Nux vomica* shoots.



FIGS. 1, 1a. *Diaphorina truncata*, n. sp.

***Arytaina obscura* Crawford.**

Under the name *Psyllopa obscura* this species was described in my earlier paper<sup>1</sup> on Indian Psyllidae, only one specimen being available, which now is in the British Museum as the type of the species. In the Ramakrishna collection there are a number of specimens which

<sup>1</sup>*Rec. Ind. Mus.*, Vol. VII, p. 432.

seem to belong to this species, though a comparison with the type should be made before a positive assertion is made. These specimens were collected on shoots of *Dalbergia* at Coimbatore, October, 1923.

***Arytaina ramakrishni*, n. sp.**

A small whitish insect, with body of female about 1.2 mm. long (exclusive of wings) and male about 0.8 mm., forewings about 1.5 mm. General color creamy or yellowish white, with forewings about the same color but hyaline and transparent, antennae black at tip.

Head small; vertex considerably broader than long, with a deep and broad foveal depression on each side of median line. Genal cones small, much shorter than vertex, bluntly rounded, deflexed from plane of vertex. Antennae about  $1\frac{1}{2}$  times as long as width of head (including eyes), moderately slender, black-tipped.

Forewings small, hyaline, clear but with a whitish color (not glass-clear), broadly rounded at apex, venation as shown in illustration; veins fine.

Female genital segment large at base, apical half abruptly narrowed into a slender and acutely pointed process; the process of the dorsal valve about twice as long as that of the ventral valve. Male genital segment small; anal valve larger and a little longer than forceps; latter very slender, acutely pointed.

Described from seven specimens (both sexes) from Coimbatore, India, October 1923, in leaves of *Chloroxylon swietenia*. Named after the collector, Mr. T. V. Ramakrishna.

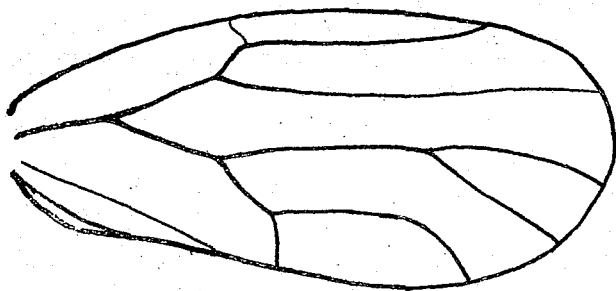


FIG. 2.—*Arytaina ramakrishni*, n. sp.

**GENUS *Dynopsylla* Crawford.**

The genus *Dynopsylla* was erected in 1913<sup>1</sup> for a remarkable species collected by C. F. Baker on *Ficus nervosa* in the Philippine Islands. A year later Enderlein placed a very closely similar species in the new genus *Sphingocladia*<sup>2</sup> which he erected probably without knowledge of my *Dynopsylla*.

<sup>1</sup>*Philippine Journ. Science*, Vol. VIII, Sec. D., No. 4, August, 1913, p. 295.

<sup>2</sup>*Entom. Mitt.* III (July, 1914), p. 231. (Illustrations of wings in *Zool. Jahrb.* 41, p. 482, 1918).

In a collection of psyllids from Brazil (South America) sent to me for identification this same genus is represented by a species which is remarkably similar to the Philippine species, but unfortunately no data accompanied the specimens to show the food plant. By an interesting coincidence, the Ramakrishna collection from India contains this same species with the information that it forms galls on leaves of *Ficus nervosa*, which is the host plant of the Philippine species.

*Dynopsylla minor*<sup>1</sup> was doubtfully referred to this genus in 1915 and later placed in a new genus, *Thysanogyna*<sup>2</sup> because it was considered on further study to be not congeneric with the type species of *Dynopsylla*. Later, it was found to be identical with Walker's old species *Carsidara marginalis*, with which it is now merged in synonymy, my names *Dynopsylla minor* and *Thysanogyna* being now synonyms of Walker's species.

There are, therefore, three species known in the genus *Dynopsylla*, a key to which is given below. The distinctive features of this genus are (1) the peculiar venation of the forewing and (2) the shape of the head; the head is deeply cleft in front and genal cones are wholly lacking and the unusually large basal segments of the antennae are very conspicuous, the vertex in some species produced into a pair of horn-like processes in front.

The three species are distributed as follows:—

1. *D. cornuta* Crawford.—Philippine Islands, on *Ficus nervosa* (gall-forming).
2. *D. pinnativena* Enderlein.—Formosa.
3. *D. grandis*, n. sp.—Taliparamba, North Malabar, S. India, on *Ficus nervosa* (galls), and in Brazil, South America.

#### Key to the species.

- A. 1. Veins of forewing with a double row of long hairs; media sinuous, closely contiguous with radius and cubitus, but not confluent; segment II of antennae not produced into a sharp point.
- B. 1. Cubital veins with a basal stem; media distinctly contiguous with radius and with Cul., antennae not hairy beyond segment II, segments III to VIII not black at tip; vertex with a pair of conspicuous horn-like processes in front. *D. cornuta* Crawford.
- B. 2. Cubital veins without basal stem, branching at same point as the media; media close to but not touching radius and cubitus; antennae hairy, segments III to VIII black at tip, head covered with thick pubescence, vertex without horns, but somewhat bulging in the corresponding place. *D. pinnativena* Enderl.
- A. 2. Veins of forewing without hairs; media not sinuous, but confluent with radius; segment II of antennae produced into a sharp point, head and dorsum sparsely pubescent. *D. grandis*, n. sp.

#### *Dynopsylla grandis*, n. sp.

Length of body 4 mm., forewing 6 mm., length of body to tip of folded wings about 7 to 8 mm. General color light brown; vertex yellowish brown, darker between posterior ocelli; prothorax brown, me-

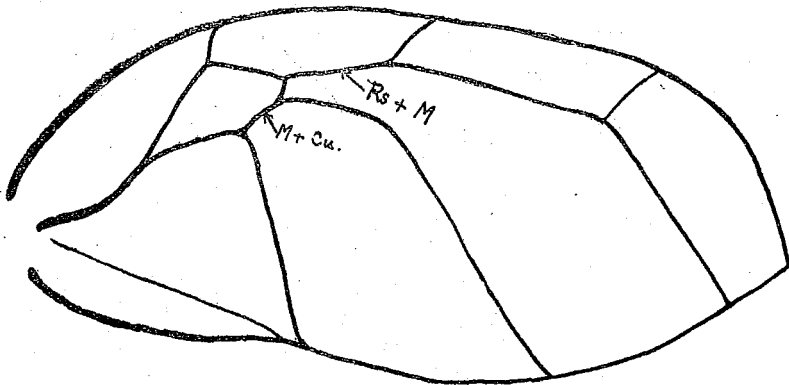
<sup>1</sup>Philippine Journ. Science, Vol. X, Sec. D., No. 4, p. 263 July, 1915.

<sup>2</sup>Same, Vol. XV, No. 2, p. 157, August, 1919.

sonotum brown with yellowish stripes and bands, legs and antennae light brown.

Head about as broad as prothorax, rather large; vertex broader than long, concave between posterior ocelli, produced into a long, up-turned horn in front of each eye, clothed with long pubescence; front ocellus visible from above. Genae protruding forward around insertion of antennae making the head cleft in front between antennae. Rostrum short. Eyes very large, constituting fully half the width of the head. Antennae long, nearly as long as body (not including wings); segment I very large, thick, more than twice as long as thickness, hirsute; II not quite so thick as I, much shorter, produced into a long, acuminate point, hirsute; III—X slender, filiform, not hirsute.

Thorax very large, broad, roundly arched, dorsum pubescent. Legs stout, relatively short, pubescent; hind tibiae short, without basal spur, with four large finger-like spines at apex; basal tarsus of hind



3.

FIG. 3.—*Dynopsylla grandis*, n. sp.

legs with one black claw. Forewings large, broad, hyaline, acutely pointed, veined as in accompanying illustration, veins black, prominent. Hind wings about half as long as forewings.

Male forceps short, broad, truncate at apex, emarginate on posterior margin; anal valve about twice as long as forceps, the terminal portion cylindrical, black, nearly as long as basal part. Female genital segment very short, acutely pointed.

*Locality*.—described from three females collected at Taliparamba, S. India, in September, 1918, by T. V. Ramakrishna; these were found in galls on *Ficus nervosa*. Also 4 specimens (males and females) in a collection from South America (Brazil) sent by Professor J. S. Tavares. These four specimens were not labelled and no information was given as to where they were taken and what host plant, but it is assumed that they were collected in Brazil. These are almost exactly identical with the India specimens even in minor details, suggesting that the species has probably been introduced in rather recent times into one or the other of these two widely separated countries.

**Megatrioza hirsuta** Crawford.

Under the name *Kuwayama hirsuta* Crawford this species was described in my earlier paper on Indian Psyllidae (p. 427). It has subsequently been referred to the genus *Megatrioza*. In the present collection the specimens were collected by Ramakrishna in galls on *Terminalia* at Mundakayam, Travancore, S. India, October, 1923.

**Trioza fletcheri** Crawford.

This species described in my earlier paper (p. 434) turns up again in the Ramakrishna collection, the specimens having been collected from galls on leaves of *Trewia* at Coimbatore, December, 1913.

## LIST OF PSYLLIDAE RECORDED FROM INDIA AND CEYLON.

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The following list of Indo-Ceylonese '*Psyllidae*' with their chief bibliographical references was prepared by the writer in connection with his recent attempt at a systematic study of this family of Homopterous insects inhabiting South India. It is published with the idea that it may serve some useful purpose to those working on this group with all its inevitable shortcomings; and no such ready reference list has been brought out till now. The classification followed is mainly that of Dr. Crawford, the well known authority on the family, and the author hereby expresses his thanks to him for the help and encouragement he is receiving in the study of this family of insects. The list also includes new South Indian species described in Dr. Crawford's paper from material submitted to him by the writer.

## Sub-family PAUROPSEYLLINAE.

*Apsylla* Crawford.

*Apsylla cistellata*, Buckton. Crawford, *Rec. Ind. Mus.* VII, p. 421, 1912.—*Psylla cistellata*, Buckton. *Ind. Mus. Notes* III, pp. 13 and 91 (1893), on mango shoots, Dehra Dun and Bengal; Letroy's *Indian Insect Life*, p. 742, figs. 514 and 515.

*Paurocephala* Crawford=*Agonoscena* Enderlein.

*P. psylloptera*, Cr., *Phil. Journ. Science*, X, p. 260, 1915, on shoots of *Ficus* spp., Peradeniya, Ceylon. On shoots of *Ficus* spp., Tenmalai, W. Ghats, Travancore, October, 1923. (Ramakrishna Coll.) Also recorded from the Philippines, Borneo, etc., see p. 149 *Phil. Journ. Sc.* XV, 1919.

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List of Literature referring to Indian Zoology (excluding Insecta) received in Calcutta during the year 1924.