

## CEYLONESE AND PHILIPPINE PSYLLIDÆ (HOMOPTERA)

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### ONE PLATE

The tropics of the Old World contain a host of interesting insects, and many of them are still unknown to science. Two small collections of Psyllidæ, or jumping plant lice (Homoptera), have been recently received by me from two distinct parts of the eastern tropics. One is from the Philippine Islands, sent by Prof. C. F. Baker, of the College of Agriculture at Los Baños, and the other is from Ceylon, sent by Mr. Andrew Rutherford, of Peradeniya. It is not surprising that some of the species are found in both of these regions, and that several species in each are very closely related to species in the other. A few species of psyllids seem to be widely distributed throughout all the Asiatic tropics, such as the citrus psyllid, *Euphalerus citri* (Kuwayama).

These two collections are not treated separately, for there are several species identical in both. The Philippine collection contains 23 species, most of which are new. The Ceylon collection contains 4 species, one of which has already been described from the Philippines, another is closely related to a Bengalese species, and a third resembles another Philippine species.

The descriptions of several species, mostly of the genera *Psylla* and *Trioza*, are deferred until a later date.

The type specimens are retained in my collection, awaiting later disposal.

A synoptic key of the genera thus far known to occur in the Philippines is presented for facilitating the determination of species. There are several other genera doubtfully represented by a few undescribed insects in the collections before me, but these will be added to the key at a later date. Also there are several other genera in Formosa, Japan, and southern Asia which may have representatives in the Philippine Islands as well. This key, therefore, is simply temporary.

#### *Synopsis of the Philippine genera of Psyllidæ.*

- a<sup>1</sup>. Head deeply cleft in front between antennal bases. Antennæ very thick at base and attached at apex of lobes, increasing the cleft appearance. Genæ may be produced beneath into lobes or cones.
- b<sup>1</sup>. Antennæ very slender and long, not hairy. Vertex with a pair of horns between eyes. Genal cones wanting..... *Dynopsylla*.

- b*<sup>2</sup>. Antennæ very thick and often long, densely clothed with long hairs.  
Vertex without horns. Genal cones present, may be small or large.

Homotoma.

- a*<sup>2</sup>. Head not deeply cleft, as above, and antennæ not thickened so conspicuously. (Genal cones may give appearance of a cleft head, but antennæ are not attached to their apices.)

- b*<sup>1</sup>. Genal cones wanting.

- c*<sup>1</sup>. Wings broad and more or less angular at the apex; vertex rather smoothly and uniformly rounded down in front. Antennæ short, not much longer than width of head. Thorax usually very thick and robust ..... Pauropsylla.

- c*<sup>2</sup>. Wings ovate, rounded at apex, smaller; vertex less smoothly rounded down in front, sometimes flattish. Antennæ relatively a little longer. Thorax not strongly arched, often pubescent.

Paurocephala.

- b*<sup>2</sup>. Genal cones present.

- c*<sup>1</sup>. Head as in *Pauropsylla*, but with small or large genal cones far underneath, projecting down or forward. First marginal cell much larger than second ..... Calophya.

- c*<sup>2</sup>. Head not as above; cones not far underneath.

- d*<sup>1</sup>. Cubital petiole (stem of media and cubitus) present. First tarsal segment with 2 spines at apex.

- e*<sup>1</sup>. Genal cones very long, longer than vertex, pointing forward.

Epipsylla.

- e*<sup>2</sup>. Genal cones shorter, pointing downward obliquely or vertically.

- f*<sup>1</sup>. Genal cones continuing in plane of vertex, broad and rounded.

Euphalerus.

- f*<sup>2</sup>. Genal cones depressed below plane of vertex and not continuing in same line, usually tapering to a point ..... Psylla.

- d*<sup>2</sup>. Cubital petiole wanting, media and cubitus arising together from basal vein. First tarsal segment without spines at apex.

- e*<sup>1</sup>. Dorsum scarcely arched; pronotum long and not depressed below level of mesonotum and vertex ..... Megatrioza.

- e*<sup>2</sup>. Dorsum arched; pronotum short and distinctly depressed.

- f*<sup>1</sup>. Genal cones long, slender, not at all divergent, pointing forward or down. Body slender ..... Neotrioza.

- f*<sup>2</sup>. Genal cones divergent, thicker, usually pointing down. Trioza.

#### Genus PAUROPSYLLA Rübsam

Body usually short and thick. Head short, without genal cones. Antennæ short. Wings usually broad, hyaline, or maculated. Insect usually gall-forming. Species mostly tropical.

*Pauropsylla trioza* Crawford.<sup>1</sup>

One female from Mount Maquiling, Luzon, P. I. (*Baker*).

*Pauropsylla bakeri* sp. nov. Plate I, fig. *f*.

Length of body, 1.9 millimeters; length of forewings, 2.6; width, 1.4; width of head, 0.7. General color chocolate brown to

<sup>1</sup> *This Journal*, Sec. D (1913), 8, 296.

black; mesosternum and legs, except tibiæ and hind femora, yellowish brown; surface of vertex and thorax finely reticulated.

Head nearly as broad as thorax, short; vertex convexly rounded downward, very finely pubescent, with posterior ocelli somewhat elevated; frons mostly covered by genæ; antennæ a little longer than width of head, slender; terminal setæ short.

Thorax thick and very robust as in congeners, but pronotum and prosternum much smaller and partly covered by mesothorax; legs moderately long and slender; wings large, hyaline, nearly half as broad as long, broadest subapically; first marginal cell twice as large as second.

Abdomen rather short and thick; female genital segment not quite as long as rest of abdomen, subacute at apex; dorsal valve a little longer than ventral.

Described from one female, collected on Mount Maquiling, Luzon, P. I. (Baker). This is very close to an Indian (Bengalese) species, *Pauropsylla depressa* Crawford.<sup>2</sup>

*Pauropsylla floccosa* sp. nov. Plate I, fig. j.

Length of body, 0.9 millimeter; length of forewing, 1.2; width, 0.4; width of head, 0.25. General color light brown, with lighter spots and streaks; legs lighter colored. A very small species.

Head as broad as thorax, short; vertex rounded down in front, but less evenly so than in some congeners, with posterior ocelli not much elevated; frons, with its ocellus, visible as a small, narrow sclerite to clypeus; antennæ somewhat longer than width of head, slender; terminal setæ much longer than two terminal segments.

Thorax moderately robust; legs relatively rather long and slender; wings hyaline, with a whitish tinge, brownish in apical half, rather small, broadly rounded, about twice as long as broad; veins spotted with brown; venation somewhat similar to that of *P. tuberculata* Crawford, a Bengalese species, but the first marginal cell is much larger relatively.

Abdomen small; third and fourth tergites rather prominent. Male genital segment small; forceps relatively long and slender, as long as genital segment; anal valve as long as forceps, larger, simple. Female genital segment nearly as long as rest of abdomen, acutely pointed at apex.

Described from 17 males and females collected at Peradeniya, Ceylon (Rutherford), on leaves of *Aglaia roxburghiana*. "The leaf is inrolled along the edge from below upward. The nymphs

<sup>2</sup> *Indian Mus. Rec.* (1912), 7, pt. 2, 429.

are enclosed in a woolly covering of wax. Some Chalcid parasites emerged from the material (*Psylledontus secundus* Girault n. sp.)."

This species bears a close resemblance to the Bengalese species referred to above, *Pauropsylla tuberculata* Crawford,<sup>3</sup> which was taken on leaves of *Alstonia scholaris*, but the Ceylonese species differs markedly in being much smaller, in having ovate wings with a whitish tinge and brown spots and venational difference as noted above, and a longer female genital segment.

A single mutilated female specimen from Butuan, Mindanao, P. I. (*Baker*), resembles very closely both of these species and more closely the Ceylonese species, although its size is somewhat larger. A description of this, however, is deferred until more material becomes available.

*Pauropsylla spondiasæ* sp. nov. Plate I, fig. g.

Length of body, 1.5 millimeters; length of forewing, 2.1; width, 1.3; width of head, 0.7. Head and thorax dark brown; legs, abdomen, and antennæ except apical segments greenish yellow or light brown; wings yellowish.

Head very short, not quite as broad as thorax, rounded down in front uniformly, with posterior ocelli a little elevated, finely pubescent; frons not wholly covered by genæ, but largely so; antennæ not longer than width of head, slender, with terminal setæ longer than 2 terminal segments.

Thorax very thick and strongly arched, surface reticulated; legs short; wings large and broad, scarcely twice as long as broad, broadest near apex, hyaline but with yellowish tinge, with a pterostigma; marginal cells rather large.

Abdomen short, thick. Male: Forceps rather long, curved forward, tapering to a point, pubescent. Anal valve shorter than forceps, erect, narrow. Female genital segment not as long as rest of abdomen, dorsal valve blunt, short; ventral valve longer, acutely pointed and curved upward.

Described from two males and two females from Peradeniya, Ceylon (*Rutherford*), taken from galls on leaves of *Spondias mangiferæ*. "Leaves inrolled on the margins."

*Paurocephala psyloptera* Crawford.<sup>4</sup>

One female from Los Baños, P. I. (*Baker*), and 23 males and females collected in Peradeniya, Ceylon, May 24, 1914, on young shoots of *Ficus hispida* and *Ficus asperrima* (*Rutherford*). An

<sup>3</sup> Ibid. (1912), 7, pt. 2, 430.

<sup>4</sup> This Journal, Sec. D (1913), 8, 294.

accompanying note states that "these insects are attended by ants. The nymphs excrete a long filament of white wax."

*Paurocephala orientalis* sp. nov. Plate I, fig. *i*.

Length of body, 1 millimeter; length of forewing, 1.5; width, 0.7; width of head, 0.3. General color light brown to yellowish. Antennæ black at tips.

Head about as wide as thorax, short; vertex rather flat, slightly concave on each side of median line, posterior ocelli slightly elevated, emarginate in front at median suture; frons not covered by genæ, visible as a narrow sclerite from front ocellus to clypeus; genal cones wanting; antennæ about one and one-half times as long as width of head, slender; terminal setæ short.

Thorax moderately arched; legs rather short; wings hyaline, with a yellowish tinge, rounded broadly at apex; pterostigma small; cells elongate.

Abdomen small. Male: Forceps nearly as long as anal valve, broadened at apex; anal valve rather narrow and short. Female genital segment as long as rest of abdomen, thick; dorsal valve longer than ventral, both subacute.

Described from one male and one female from Los Baños, P. I. (*Baker*).

This species differs somewhat from the typical species of the genus in having the vertex a little more flattened, in this resembling species of *Aphalaroida*, an American genus.

#### Genus *CALOPHYA* Loew

The genus *Calophya* belongs to the subfamily Pauropsyllinæ<sup>5</sup> and is represented in Asia and the Orient by several species, four of which are Japanese. It differs from the related genera in that the members have the genæ produced into short or long conical processes which are situated far back under the head.

*Calophya luzonensis* sp. nov. Plate I, fig. *k*.

Length of body, 0.7 millimeter; length of forewing, 1.2; width, 0.6; width of head, 0.25. Head and thorax dark brown or black; abdomen, legs, antennæ, and genal cones yellowish to green. Wings hyaline.

Head small, short, nearly as broad as thorax, rounded down in front, surface smooth, posterior ocelli only a little elevated; frons covered by genæ; genal cones slender, acute, as long as 2 basal antennal segments, well separated and divergent; an-

<sup>5</sup>*Bull. U. S. Nat. Mus.* (1914), No. 85, 42.

tennæ short, about two thirds as long as width of head, terminal setæ about as long as antennæ.

Thorax thick, strongly arched, surface finely reticulated. Legs short and small. Wings clear, transparent, rounded at apex. First marginal cell much larger than second.

Abdomen small, short. Male: Forceps very small and slender, acutely pointed; anal valve longer, thicker. Female genital segment thick, not as long as rest of abdomen; apex abruptly and acutely pointed.

Described from one male and one female from Mount Maquiling, Luzon, P. I. (*Baker*).

This species is rather closely related to a Japanese species, *Calophya nigradorsalis* Kuwayama, differing primarily in characters of the genal cones and forewings.

#### Genus HOMOTOMA Guérin

The members of the genus *Homotoma* seem to be mostly tropical in their distribution. The very thick and densely hirsute antennæ are very characteristic of the genus. The genæ are produced beneath into broadly rounded cones or prominent swellings. The wing venation is usually peculiar.

*Homotoma radiatum* Kuwayama is a Japanese species, while *H. distincta* Crawford is a closely related Bengalese species. Two new species are added now from the Philippine Islands.

*Homotoma pacifica* sp. nov. Plate I, fig. b.

Length of body, 3.7 millimeters; length of forewing, 4.6; width, 1.5; width of head, 0.7. General color glossy black; tibiæ and tarsi brown; wings hyaline, veins black and margined with black; body surface, legs, antennæ, and wing veins clothed with prominent black hairs; the dorsum and antennæ very conspicuously hirsute.

Head not as broad as thorax, not deflexed; vertex somewhat cleft in front, concave on each side of median suture, posterior ocelli somewhat elevated; frons covered by genæ; genæ swollen beneath, but not strongly conical; antennæ very thick, very hirsute, five sixths as long as forewings, 2 basal segments very thick, remainder thinner, but very much thicker than in species of other genera, somewhat carinate.

Thorax not strongly arched, surface glossy but hirsute; pronotum long and prominent; legs short, thick, and hairy; wings long, relatively rather slender, hyaline, with black veins and black margins on veins, acute at apex; marginal cells long and large; radial sector short.

Abdomen very long and slender, shining black; male genital segment small; forceps nearly as long as anal valve, slender, apical half a little slenderer than basal, not acute at apex; anal valve slender, tapering to a narrowly rounded end.

Described from one male from Mount Banahao, Luzon, P. I. (*Baker*).

*Homotoma bakeri* sp. nov. Plate I, fig. c.

Length of body, 3.1 millimeters; length of forewing, 5.6; width, 2.5; width of head, 0.9. General color shining black; venter of thorax and head reddish brown; wing veins black and margined with black; body surface conspicuously hairy.

Head as in *H. pacifica*, but more deeply cleft in front, genæ less swollen and produced into 2 small, blunt cones. Antennæ less thick, not carinate, wholly terete, only about three fourths as long as forewings.

Thorax more strongly arched, hairy. Legs short and thick. Wings very large, broad, acute at apex, hyaline, but veins black and margined with black; venation suggestive of *H. radiata* Kuwayama, but quite different, first marginal cell very small; second very large; fourth furcal (M 1+2), adjacent to radial sector, and practically fused therewith and thence with costal margin to apex of wing.

Abdomen short and thick; genital segment thick, as long as rest of abdomen; dorsal valve a little longer than ventral, sub-acute at apex.

Described from one female from Mount Maquiling, Luzon (*Baker*).

*Dynopsylla minor* sp. nov. Plate I, fig. a.

Length of body, 3 millimeters; length of forewing, 4.3; width, 1.6; width of head, 0.8. General color light brown to brown with spots and streaks of yellowish to brownish yellow on body, legs, antennæ, and wings.

Head not as broad as thorax, deeply cleft with front ocellus at bottom of cleft and just visible from above; vertex concave, sparsely hairy, with horns a little smaller than in *D. cornuta*, but rather prominent; eyes large; genæ somewhat swollen, covering frons; antennæ about four fifths as long as forewing, very slender, 2 basal segments thicker.

Thorax broad, large, well arched, very sparsely hairy; legs of medium length, rather thick; hind tibiæ with a spur at base and several conspicuous spines at apex; wings elongate, acute, hyaline; venation suggestive of the genus *Carsidara*.

Abdomen rather long. Male forceps cultrate in shape, posterior edge sharp, apex truncate; anal valve twice as long as forceps, thick at base and tapering to a blunt apex.

Described from one male from Los Baños, Luzon, P. I. (Baker).

This species resembles the American species of *Carsidara* in wing venation, but is allied to *Dynopsylla cornuta* Crawford<sup>6</sup> in the shape of the vertex and genæ and in the presence of the vertex horns. In the larger species the hind tibiæ are not spurred at the base, but this was stated to be a less important character. However, it is apparent that *Dynopsylla* and *Carsidara* are closely related.

A Japanese species, *Mesohomotoma camphorae* Matsumura, is also closely allied to this species and is, perhaps, congeneric.

#### Genus MEGATRIOZA novum

Allied to *Leuronota*; dorsum scarcely arched; pronotum long, not or only slightly depressed below level of mesonotum and vertex; head long, not deflexed; genal cones long, directed forward; legs long; hind tibiæ armed with a spur at both base and apex, and several large spines at apex; wings long, acute at apex, triozine in venation.

Type of genus: *Megatrioza armata* sp. nov.

*Megatrioza armata* sp. nov. Plate I, fig. d.

Length of body, 3.5 millimeters; length of forewing, 6.7; width, 2.1; width of head, 0.8. General color light to yellowish brown; eyes dark. Body elongate, surface covered with long pale hairs.

Head not quite as broad as thorax, long, not much deflexed; vertex somewhat concave between posterior ocelli; front ocellus visible from above; genal cones longer than vertex, divergent, thickest midway between base and apex, tapering to a blunt point, directed forward in plane of vertex; antennæ about two and one-half times as long as width of head, slender.

Thorax long and large, but not much arched, ascending a little to mesonotum and rather straight; pronotum nearly as long as vertex, with an epiphysis on anterior edge dorsad; hind tibiæ with a large spur at base and a larger, conspicuous one at apex, as well as 3 large spines and several smaller ones as a fringe around apex; wings more than three times as long as broad, hyaline, acute at apex, extending fully one half their length beyond abdomen in both sexes; first marginal cell larger than second.

Abdomen rather long. Male: Genital segment small; forceps as long as anal valve, relatively thick, not acutely pointed; anal

<sup>6</sup> This Journal, Sec. D (1913), 8, 295.



valve short, rather broad, hairy. Female genital segment long, as long as rest of abdomen, dorsal valve tapering to a slender apex, both acute.

Described from one male and one female from Butuan, Mindanao, P. I. (*Baker*).

#### Genus NEOTRIOZELLA Crawford

This small genus is characterized by the very peculiar genal cones, which are not in the least divergent. They extend either down almost vertically from the head or more nearly horizontally. The body is typically slender, and the legs are small and delicate. The venation is triozine, lacking the cubital petiole.

*Neotriozella bicolor* sp. nov. Plate I, fig. *h*.

Length of body, 1.8 millimeters; length of forewing, 3.1; width, 0.9; width of head, 0.35. General color reddish to chocolate brown on dorsal half and yellow on ventral half, including venter of both head and thorax and abdomen, legs, antennæ except tip, and lower portion of wings (when folded).

Head not as broad as thorax; eyes large; vertex a little longer than breadth between eyes, slightly convex; genal cones longer than vertex, extending in same plane, slender, tapering slightly to a blunt point, yellowish beneath; antennæ scarcely twice as long as cones, slender.

Thorax a little arched, dorsal surface reticulated; pronotum scarcely visible between vertex and mesonotum; legs short, small, apparently weak; wings long, slender, acute, subhyaline, with a dark band extending from basal attachment to apex; cells elongate; abdomen long, rather slender; female genital segment short, about half as long as rest of abdomen; valves about equal in length, thick at base, subacutely pointed.

Described from one female from Los Baños, Luzon, P. I. (*Baker*).

#### Genus TRIOZA Foerster

For a description and discussion of this old and large genus see Crawford.<sup>7</sup> In the collections before me there are 6 Philippine species. Some of these, however, are not sufficiently represented to be included in these descriptions.

*Triozella eugeniæ* sp. nov. Plate I, fig. *e*.

Length of body, 2 millimeters; length of forewing, 5.2; width, 1.7; width of head, 0.7. General color greenish yellow; abdomen bright green, wings shining (field notes by Rutherford).

<sup>7</sup> *Bull. U. S. Nat. Mus.* (1914), No. 85, 74.

Head distinctly narrower than thorax, rather large; vertex concave on each side of median suture; genal cones scarcely half as long as vertex, broadly rounded, a little divergent, pubescent; antennæ about one and one-half times as long as width of head, slender.

Thorax broad, long; pronotum large; præscutum longer than broad; legs moderately long; hind tibiæ with 4 black spines at apex, 3 together and 1 alone; wings hyaline, very long, acute at apex, more than half of length beyond abdomen; marginal cells long.

Abdomen rather short, especially in male; forceps short, slender; anal valve larger, triangular, with a petiolate attachment at base. Female genital segment very short; dorsal valve longer than ventral; both subacute.

Described from 9 males and females from Peradeniya, Ceylon, collected by A. Rutherford on May 12, 1913, in galls on leaves of *Eugenia malaccensis*. "The galls were so numerous that they formed a continuous gall on the upper surface of the leaf."

This and the next species are closely related both in structure and habits to two American species of the same genus, *Trioza magnoliæ* Ashmead and *T. koebelei* Kirkaldy. An Asiatic genus, *Cecidotrioza* Kieffer, bears a close resemblance to these gall makers and is probably congeneric.

*Trioza asiatica* sp. nov.

Allied closely to *T. eugeniæ*, but differs markedly as follows: Color shining black or dark brown; middle and hind tibiæ and antennæ whitish, except at tip; body distinctly more slender; head nearly as wide as thorax, because of the slenderer thorax; genal cones smaller, about one third as long as vertex, orange to brown; antennæ twice as long as width of head; thorax more slender. Wings similar, a little shorter (4.2 millimeters), differing slightly in venation as follows: Second marginal cell scarcely twice as long as greatest width; first marginal cell smaller, narrower; cubital vein about twice as long as first furcal. Abdomen more elongate. Male anal valve much larger, more rectangular rather than triangular. Female genital segment large, nearly as long as rest of abdomen, thick at base, converging to acute apex; dorsal valve a little longer than ventral.

Described from two males and two females from Butuan, Mindanao, P. I. (*Baker*), and one male from Mount Maquiling, Luzon, P. I. (*Baker*). Judging from its close resemblance to the foregoing species, it is probable that this is a gall-making species.

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## ILLUSTRATION

### PLATE I. FOREWINGS OF PSYLLIDÆ.

- FIG. a. *Dynopsylla minor* sp. nov. Dotted portions brown.  
b. *Homotoma pacifica* sp. nov. Dotted portions black.  
c. *Homotoma bakeri* sp. nov. Dotted portions black.  
d. *Megatrioza armata* sp. nov.  
e. *Triozia eugenixæ* sp. nov.  
f. *Pauropsylla bakeri* sp. nov.  
g. *Pauropsylla spondiasæ* sp. nov.  
h. *Neotriozella bicolor* sp. nov.  
i. *Paurocephala orientalis* sp. nov.  
j. *Pauropsylla floccosa* sp. nov.  
k. *Calophya luzonensis* sp. nov.

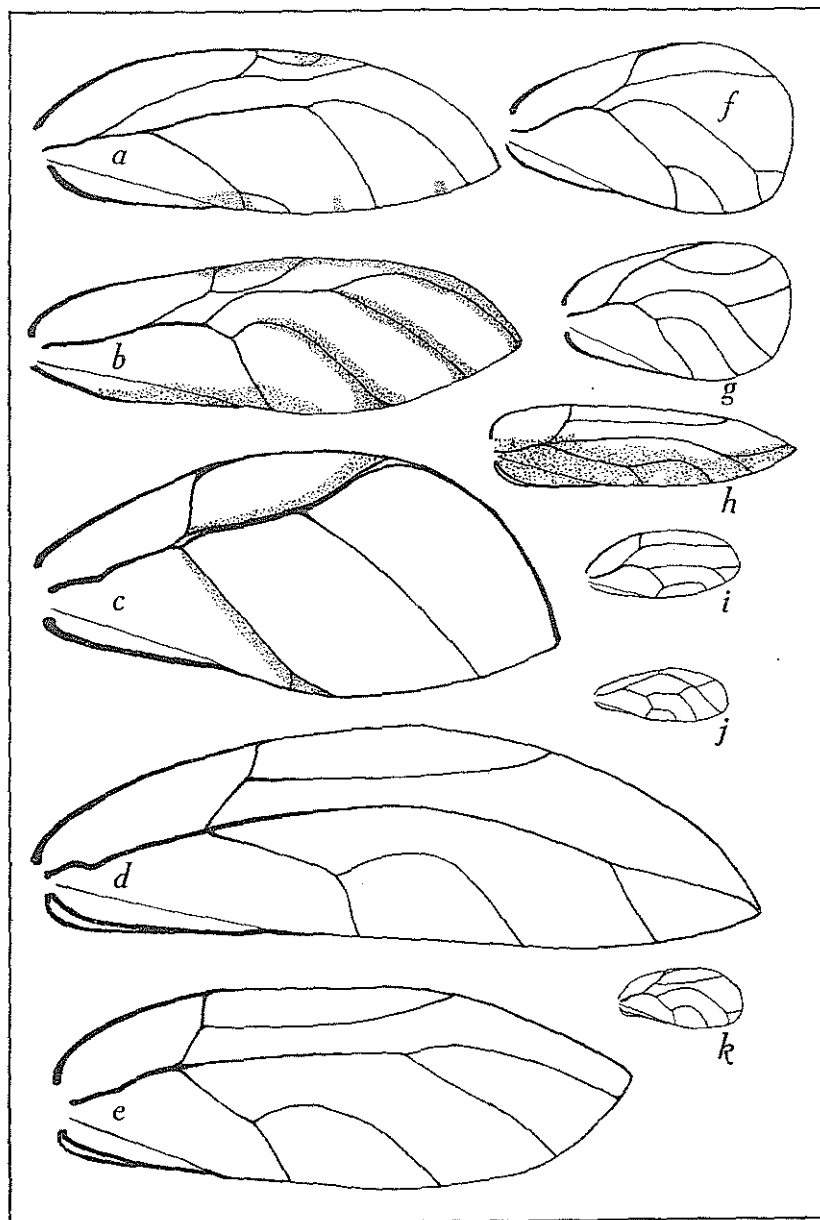


PLATE I. FOREWINGS OF NEW PSYLLIDÆ.

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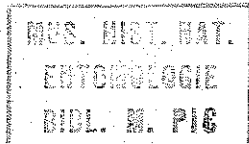
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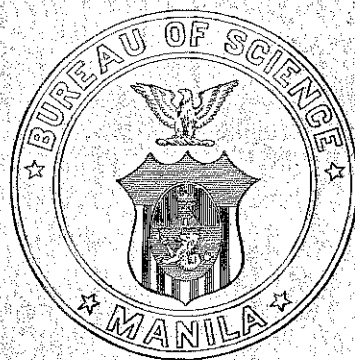
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