Muir 1925f

ON THE GENERA OF CIXIIDÆ, MEENOPLIDÆ AND KINNARIDÆ

BY F. MUIR

Honolulu, T. H.

(Continued from Page 110)

The Genera of Cixiidæ

The family Cixiidæ, as above restricted, contains about seventy-four genera at the present time, and as these insects have been given comparatively little attention by collectors in the tropics, where they are most numerous and diverse, the number is likely to be greatly increased. As the least specialized of the five families which appear to be descended from a similar type (Cixiidæ, Delphacidæ, Tropiduchidæ, Derbidæ, and Achilixiidæ), the classification of the genera of this family is of considerable interest, and the recognition of the lines of evolution among them may be of help in understanding the lines of evolution among the genera of allied families. Among these five families we find some male genitalia which approach the meenopolid type, but the difference is generally recognizable and, as a rule, they are specialized representatives of families whose generalized forms have typical cixiid types of male genitalia. As an example, the Delphacinæ can be cited; these often have a ring at the base of the ædeagus which may be the periandrium, but they are descended from the Asiracinæ, which have a typical cixiine genitalia.

No attempt has been made to tabulate all the genera of Cixiidæ since 1866, when Stål mentioned most of the then known genera, Fieber's work being confined mainly or entirely to European genera; it is, therefore, apparent that an attempt should be made to list and classify them. Stål's classification has been followed by nearly all subsequent workers. His first division segregates the Meenoplidæ of the present paper; his second and third divisions segregate a few forms without carinæ on the clypeus or with longer antennæ than normal, and are purely artificial. His fourth division is based upon the presence or absence of spines on the hind tibiæ before the apex. It is unfortunate for systematists that these spines are not dependable, as there are too many genera in which they are obscure, and one cannot say whether spines should be considered as present or absent. Again, the use of these characters bring together forms widely separated on general morphological grounds, and separates others which are closely allied. But until the morphology of the family is much better understood, we find this last disadvantage in any dichotomous table that may be drawn up.

The writer's conception of the most primitive cixiid is one in which the tegmina and wings are fairly large, tectiform when at rest, with C coincident with the costal margin, Sc, R, M, and Cu all arising separately from the basal cell or only touching at their bases and not forming a stalk; the body compressed laterally with a well-developed ovipositor in which the anterior and middle gonopophyses or styles are co-ordinated and work together as a simple organ, the ovipositor, with the posterior styles acting as a sheath for them when at rest; the female pygofer not much longer than wide and not flattened into a large surface bearing wax glands; the median ocellus present. The genus which appears to approach nearest to this theoretical types is *Andes* Stål, and after that *Parandes, Melandeva, Brixidia, Brixia, Southia, Benna, and Bennaria,* with the *Pintalia* group gradually passing through the *Ptoleria* into the *Cixius* group, in which the body is horizontally flattened, the tegmina but slightly tectiform, the ovipositor incomplete or abortive, the female pygofer flat, wide and secreting long filaments of wax. In the *Andes* group we find three conditions of the Sc, R and M, viz.: (a) All three arising separately from the basal cell, (b) Sc + R forming a stalk, and (c) Sc + R + M forming a stalk; in the Cixius group we find only the second and third conditions. It is to be regretted, for taxonomic reasons, that the main dichotomy of the family cannot be made between these two groups, but there are some forms that are intermediates and make it difficult to define. In both these groups the tend of evolution has been towards the joining together of the bases of the veins, Sc, R and M, sometimes accompanied by a slight stenogenesis; in no case is there a great platygenesis, and in no case is there a costal area with transverse veins.

Four genera have been segregated off as a tribe, Bothriocerini, and if *Kinnara* be retained in the Cixiidæ it should be

placed with them. These possess a subantennal plate or the antennæ are sunk into a pit. *Euryphlepsia* and *Stenophlepsia* are closely allied genera; *Bothriocera* and *Borysthenes* are not so closely allied, and both are considerably different from the former two; the tribe may only be one of convenience.

The Genera of Meenoplidæ

The eleven genera forming this family are all closely related and form a homogeneous and, evidently, a monophyletic group. They require a careful revision, as the characters upon which they are founded are very slight. At present the writer is unable to separate *Anigrus* and *Inxwala, Kermesia* and *Eponisia, Robigalia* and *Nisia.*

The species are all fairly thick-set and small, with the tegmina, when at rest, tectiform, the veins fairly thick, the clavus granulate, and very often the Sc + R also granulate. M3 + 4 is often in contact with Cu 1. A median ocellus is nearly always present, or a scar represents its position. The male genitalia have the periandrium large, more or less funnel-shape, with the penis tubular and passing through the periandrium, with a large apodeme of the penis. The ovipositor is incomplete, the posterior styles (sheath of ovipositor) short, broad, subquadrate, the median and anterior styles (ovipositor) very small or missing. The pygofer does not secrete wax, but this is done by some of the abdominal tergites, a condition also found in *Kinnara.* This type of female genitalia is very different from the Cixiidæ, and is nearer to Flatidæ and the other families with the meenoplid type of male genitalia.

Kinnaridæ

This family is represented by the one genus, *Kinnara* Distant.

Head distinctly narrower than thorax. Vertex small, about as long as broad, base straight or but slightly emarginate, divided from frons by a straight, transverse carina which is sometimes obscure. Frons longer than broad, sides arcuate, broadest in middle, lateral carinæ large, with a small, clear spot (fenestra) in front of antennæ, no median carina, in lateral view edge of frontal lateral carinæ slightly sinuous. Clypeus tricarinate, the lateral carinæ continuing from the frons; labium reaching nearly to apex of abdomen, apical segment long. Eyes a little wider than deep, antennal sinus small, three distinct ocelli. Antennæ small, globose; subantennal process present in the shape of a strong ridge across the gena, with a smaller one at right angles to it and between it and the antenna. Pronotum very short, hind margin widely emarginate. The lateral carinæ following the hind margin of eyes and reaching the hind margin in front of tegulæ; mesonotum wider than long, tricarinate, the carinæ sometimes obscure. Legs slender, hind tibiæ unarmed.

Tegmina fairly broad, tectiform, the apical margins generally touching when at rest. Sc and R forking near middle of tegmen in most species. R joining M for a short distance before Mf and looking like a part of M system; M arising from basal cell or from base of Sc + R, but does not form a stalk, with three or four apical veins, Cu normal; claval veins joining near apex and entering suture at or near apex, without granulation; costal cell broad, the stigma large.

The male ædeagus consists of an outer tube, the periandrium, and an inner tube, the penis, which passes through the periandrium. The female ovipositor is incomplete, the styles being small; the pygofer is small and obscure and appears to bear no wax-secreting gland, but this function is taken on by the sixth, seventh, and eighth tergites, which are large and bear wax-secreting glands.

This is an anomalous genus, and it would be good if it could be placed elsewhere, but no other existing family could contain it. The male and female genitalia place it among the meenopline group of families. The claval vein joining the suture at apex is a character which should take it from the Cixiidæ.

Kinnara albiplaga Dist. does not belong to this genus, but to *Suva* Kirk.

Remarks on Certain Genera

Akotropis Mats. If Matsumura's figure of the tegmen of *Akotropis fumata* be correct, this should not be an Achilid, but more likely a Cixiid.

Aulocorypha Berg. The writer is unable to place this genus in this table. The genus *Cixiosoma* Berg has been placed there with great doubt as to what it really is. The absence of the median ocellus would indicate that they do not belong to the Cixiidæ.

Betacixius Matsumura. The writer is not acquainted with this genus, either by specimens or the description.

Bodecia Walker. The type material of this genus is in the British Museum and consists of a single mutilated specimen with the abdomen missing. The head belongs to a Delphacid, evidently *Ugyops,* and has been gummed onto the thorax, which belongs to *Mnemosyne.* Neither the head or tegmina agree with the description. The antennæ are described as very short,

whereas the specimens have long, cylindrical antennæ of *Ugyops*. The description does not allow it to be placed in the table. We must await the finding of locotypes which agree with the description.

Calerda Signoret. The writer is not acquainted with this genus.

Cyphoceratops Uhler. The writer has not seen this genus, and the description leads him to think it is not a Cixiid. The description of the hind tibiæ having "a stout, long spur at tip" would indicate that it is a Delphacid.

Eucarpia Walker. The type of this genus is a damaged specimen in the British Museum. It comes very near to *Ptoleria* Stål, but the writer is loath to sink the latter until it has been shown that it is necessary.

Eudelphax Melichar. An examination of the type *Eudelphax setulosus* shows that it belongs to the Delphacidæ, and is the same as *Eodelphax serendiba* Kirkaldy. The type specimen is damaged, but one hind leg is present and it bears an awl-shaped apical spur that shows it belongs to the subfamily Asiracinæ. The specimen bears Kirkaldy's type label, and also Melichar's label, *Eudelphax setulosus*.

Ipsnola Sign. This genus was placed in "*Achilides* Stål," but was compared with *Cixius*. The description does not allow the writer to place it in either the Achilidæ or Cixiidæ with any certainty. The location of the type specimen is not known to the writer.

Macrocixius Matsumura. The writer is not acquainted with this genus, either by specimens or the description.

Monorachis Uhler. The writer only knows this genus by the original description, Van Duzee's [1] remarks upon it, and Metcalf's [2] figures of the head and thorax. Not knowing the condition of the tegmina, he is unable to place it in his table. The frons is as broad as long and nearly round.

Nesomyndus Jacobi. The writer is unable to place this genus in his table. It is stated to be near *Myndus;* the base of vertex is more deeply angularly emarginate, and there is no trace of a transverse carina before the apex.

Prosops Buckton. The type of this genus is in the British

1 Proc. Acad. Nat. Soc. Philadelphia, 1907 (published 1908), p. 484.

2 Jour. Elisha Mitchell Sci. Soc. (1923), XXXVIII, Pl. 54, figs. 278, 279.

Museum, and is mounted on a glass microscope slide. There appear to be no characters to separate it from *Oliarus*.

Prosotropis Uhler. The type specimen of this species could not be traced in the British Museum. It was compared by Uhler to Cercopis, and the description does not enable the writer to place it in the table. In the United States National Museum there is a specimen labeled "*Prosotropis decorata* Uhler," evidently in Uhler's handwriting, and it may be a cotype. The specimen is in a bad condition and gummed on a card, and belongs to the Delphacidæ, apparently a *Delphacodes*.

Tiriteana Myers. The writer has no specimens of this genus, and several characters are omitted in the description which prevents him from placing it in his table.

The following genera belong to the Achilidæ: *Chroneba* Distant; *Clusivius* Distant; *Taloka* Distant; *Hamba* Distant; *Amblycratus* Uhler; *Cionoderus* Uhler.

Oliarus Stål. Kirkaldy erected two subgenera in this genus, one, *Nesoliarus,* to contain all the Hawaiian species, and another, *Nesopompe,* to contain one Australian and one Fijian species, *felix* and *saccharicola*. The first is purely a geographical subgenus and is of great convenience, as it segregates a number of species, varieties and forms, which are closely allied and monophylatic; among them we find some forms that could go into the typical subgenus *Oliarus* and others into *Nesopompe*. Kirkaldy erected the genus *Mesopompe* upon the characters found in the spines on the first and second hind tarsal joints (not tibiæ as stated in his table). The writer considers *felix* and *saccharicola* to be the same species; it has an undivided fosette, the transverse carina being curved, and there is no carina joining it to the carina at apex of vertex. The writer would consider this as the better character to erect the subgenus upon. All the New Zealand and some Malayan species would then come into this subgenus.

New Genera and Species

Olonia Muir, gen. nov.

Width between the posterior angles of vertex greater than length along middle line; apex strongly angular and carinate, base angularly emarginate, the angle subequal to apex, width between apical angles of the vertex less than between basal angles, sides nearly straight, diverging posteriorly, a medio-longitudinal carina runs from base to

near apex, but does not join apical carina. Clypeal suture obscure, frons and clypeus appearing as a single body, sides arcuate, elevated, especially about level with median ocellus, where frons is widest; median carina simple, distinct, continuing unbroken through frons and clypeus. Antennæ small, second segment about as long as broad; no carina across gena below eyes. Labium reaching slightly beyond hind coxæ, apical segment long. Pronotum nearly perpendicular in the middle, fitting into the base of vertex, very short, mostly covered by head. Mesonotum about as wide as long, tricarinate, outer carinæ straight, slightly diverging posteriorly. Hind tibiæ without spines. Ovipositor complete, long, projecting considerably beyond pygofer, which is a little longer than wide. Tegmina long, about three times the width beyond clavus, where it is widest. Sc + R and Cu forks less than one-third from base, Mf distad of middle, 3 Rs and 5 Ms, M1a present. Claval vein entering commissure a little before apex. The insect is fairly narrow and the tegmina fairly tectiform, the hind margins coming together when at rest.

Type *Bothriocerodes metallicus* Fowler.

Colvanalia Muir, gen. nov.

The type of this genus is a species of Walker's in the British Museum labeled *concinnula* Walk, Sula, and appears to be *Brixia concinnula* Walk. (Jl. Linn. Soc. Lond. Zool., X, 1868, p. 110.)

Width of vertex at base equal to length, twice the width of apex, slightly arcuately emarginate, apex slightly angular, sides nearly straight, slightly carinate, no longitudinal or transverse median carina; frons about as wide as long, narrowest at base, broadest near apex, ocellus distinct, median carina present, but obscure, sides slightly carinate; clypeus obscurely tricarinate. Sc + R forking about one-third from base, Cuf more distad, but before apex of clavus, Mf about level with node; 2 Rs, M arising from basal cell with five apical veins: M1, 1a, 2; 3, 4.

Nothocharis Muir, gen. nov.

Width between basal angles of vertex considerably greater than length in middle and 2.3 times width at apex, sides nearly straight, deeply carinate, base arcuately emarginate, disc excavate, a distinct medio-longitudinal carina. Frons considerably longer than broad, narrowest at base, gradually increasing to near apex, then decreasing, the sides straight on basal half then arcuate, width at apex slightly more than twice the width at base, carinæ on sides and in middle distinct; median ocellus obscure, only represented by a minute scar. Clypeus tricarinate, continuous with carinæ of frons. No carina across gena below antenna. Eyes with a small antennal sinus. Antenna small, second segment globose. Pronotum short, hind margin deeply and angularly emarginate, tricarinate, the lateral carinæ nearly straight, diverging posteriorly, reaching hind margin. Mesonotum compressed laterally, tricarinate, about as long as broad. Tegmina fairly tectiform, apices touching or almost touching when at rest; Sc + R forking near to basal cell; M arising from basal cell, Mf slightly basad of apex of clavus; Cuf about middle of clavus; eleven apical veins, Sc 1, 2; R 1, 2; M 1, 1a, 2, 3, 4; Cu 1, 2. Hind tibiæ without spines. Ovipositor complete, pygofer longer than wide.

Type *Nothocharis bakeri.*

Nothocharis bakeri Muir, sp. n.

Female. Length, 2.8 mm.; tegmen, 3.7 mm.

Carinæ of head yellow fuscous brown between carinæ, antennæ light brown, pronotum and mesonotum dark brown or black, carinæ yellow, posterior angle of mesonotum yellowish; legs light, anterior and middle tibiæ banded; abdomen dark brown. Tegmina light at base, fuscous over the rest with nine hyaline marks in apical cells between Sc and M 4; veins same color as membrane, granules small and obscure. Wings hyaline, slightly fuscous, with brown veins.

Described from one female from Baguio, Benguet, Philippine Islands (*C. F. Baker*). This genus comes into a small group between 13 and 20 in the table. Type, No. 1165.

Nothocharis tayabasensis Muir, sp. n.

Female. Length, 3 mm.; tegmen, 4 mm.

This species differs from the genotype, in having the Sc strongly bent inward at the stigma, and Cu strongly bent towards M 3 + 4, which it touches for a short distance.

Stramineous; slightly fuscous at base of frons and on vertex between carinæ, dark brown between carinæ of mesonotum. Tegmina hyaline, stramineous, dark brown over apex of clavus, apical portion of Cu and M 3 + 4, with four raised, shiny, white spots, one on Cu 2, one on Cu 1, and two on M 3 + 4. Apical cells very slightly fuscous, with lighter areas in apical cells; veins same color as membrane. Wings slightly fuscous, veins brown.

Described from one female from Malinao, Tayabas, Philippine Islands. (C. F. Baker, No. 10,003). Type, No. 1166.