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A GENERIC REVISION OF THE LEAFHOPPER SUBFAMILY
NEOCOELIDIINAE
(HOMOPTERA: CICADELLIDAE)

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The leafhopper subfamily Neocoelidiinae was erected by Oman (1943) in order to accommodate the two North American genera, *Neocoelidia* and *Paracoelidea*, which had been placed in the Jassinae (Deltocephalinae of modern workers) for many years. Evans (1947) added the Neotropical genera *Biza*, *Chinaia*, *Coelidiana*, and *Salvina* in his generic checklist of the subfamily. DeLong (1953) partially revised the group, adding new genera and subgenera as well as many new species. He included only one of the genera added by Evans and attempted to place the Neotropical Neocoelidiinae described by Fowler and Osborn with reference to the literature alone. More recently new genera and species have been added by Kramer (1959, 1961, and 1962) and by Kramer and Linnavuori (1959). Although our knowledge of Neotropical fauna is still quite meager, it seems appropriate to synthesize the information we do have at present in order that future workers may have a foundation upon which to build.

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Subfamily Neocoelidiinae

DESCRIPTION.—Small to large leafhoppers (3–13 mm.). Clypellus either approximately parallel-sided or widened distally. Lateral frontal sutures extended near or to ocelli, which are on or near anterior margin of crown or less often on face. Ocellocular areas developed as distinct ledges above antennal pits. Antennae long to very long, frequently exceeding entire length of body including forewings at rest. Face and crown either separated by carina or with carina lacking; carina, when present, usually limited to distance between ocelli. Head in dorsal view angled or rounded apically, often strongly produced beyond eyes. Pronotum short, much wider than long, with lateral margins carinated. Scutellum large and well developed. Venation of forewings usually obscure except apically and with either two or three preapical cells. Male genital structures variously modified but styles usually simple. Ground color various shades of white, yellow, or orange. There are often contrasting markings of various hues on the head, thorax, and forewings.

DIAGNOSIS.—The most useful set of characters for recognition of the Neocoelidiinae consists of the distinct ledge above each antennal base, the exceptionally long antennae (particularly as found in many of the Neotropical genera), and the venation of the forewings, which is usually highly obscure except apically.

DISCUSSION.—As far as it is known, the subfamily is restricted to the Americas, with good representation in both the temperate and tropical areas. The available host and food plant records seem to indicate that most of the species occur on trees or shrubs. According to DeLong (1953), various Nearctic species have been taken on the following genera of plants: *Pinus*, *Acacia*, *Rhus*, *Arctostaphylos*, and *Sphaeralcea*. Except for one species of *Chinaia* known to breed on avocado, the plant relationships of the Neotropical species are unknown.

The key to genera which follows is based almost entirely upon characters of the male genitalia. Although most of these structures are concealed within the genital capsule and require dissection and clearing in order to be observed, they provide the most concrete evidence for an arrangement of genera within the subfamily. Emphasis on the male genitalia for the delimiting of genera is not without precedent. Oman (1949) used this feature extensively in arranging the North American Deltocephalinae, as did Young (1952) in revising the New World Typhlocybinae. Both men provided generic definitions within the respective subfamilies that were more definite and better delimited than any prior to their work. It is hoped that this study will serve a similar purpose.

Key to Genera of Neocoelidiinae

1. Aedeagus consisting of two shafts, one above other, dorsal shaft bearing gonoduct (figs. 2, 8, 17) **Neocoelidia** Gillette and Baker
 Aedeagus consisting of single shaft, which may be simple or elaborated with processes (figs. 42, 99) 2
2. Face and crown separated by carina, which is as long as distance between ocelli 5
 Face and crown not separated by carina (i.e., carina absent). 3
3. Ocelli located on face below anterior margin of crown; clypellus distinctly expanded distally; connective cruciform . . . **Chinaia** Bruner and Metcalf
 Ocelli located on anterior margin of crown; clypellus not distinctly expanded distally; connective Y-shaped or nearly so 4
4. Aedeagus without apical modifications but with long recurved lateral, paired processes; male plates fused for entire length.
 Deltocoelidia Kramer
 Aedeagus with apical modifications but without lateral processes; male plates not fused for entire length **Xenocoelidia** Kramer
5. Exceedingly large and robust forms, males over 12 mm. in length; head including eyes less than two-thirds pronotal width.
 Megacoelidia Kramer and Linnavuori
 Small to moderate-sized species, males less than 10 mm. in length; head including eyes always more than two-thirds pronotal width 6
6. Ventral margin of male pygofer with distinct apical or preapical hook or pygofer terminating with pointed process (figs. 75, 81) 8
 Ventral margin of male pygofer without hooks and pygofer not terminating with pointed process 7
7. Aedeagus strongly asymmetrical; pygofer with dorsal process; styles of moderate length, not wrinkled, well sclerotized (figs. 49, 45, 47).
 Tozzita, new genus
 Aedeagus symmetrical; pygofer without dorsal process; styles long, wrinkled, and weakly sclerotized (figs. 58, 55, 60) **Xiqilliba**, new genus
8. Male pygofer inflated, laterally with distinct dorsoventral suture, hook on ventral margin large and heavy (fig. 50) **Coelana** DeLong
 Male pygofer not inflated, laterally without distinct dorsoventral suture, hook on ventral margin small, slender, or absent 9
9. Aedeagus asymmetrical and deeply cleft dorsoventrally; pygofer with crossed internal processes at apex **Tichocoelidia** Kramer
 Aedeagus symmetrical but at times twisted, never deeply cleft; crossed processes of pygofer, if present, external 10
10. Apex of pygofer in lateral view appearing cleft due to long mesally curved dorsal hook and weakly sclerotized ventral extension; stylar apex in dorsal view curving laterally and caudally (figs. 62, 65) . **Salvina** Melichar
 Apex of pygofer in lateral view and stylar apex in dorsal view not as above . 11
11. Anal tube of male with forked ventral hook; ventral cover of genital capsule sharply narrowed on distal half appearing as two extended "fingers" (figs. 67, 70) **Cocoelidia** DeLong
 Anal tube of male with single simple or pair of ventral hooks or none; ventral cover of genital capsule not as above 12
12. With small but distinct dark-brown or black spot at apex of crown. . . . 15
 Without spot at apex of crown 13

13. Cercopidlike species (fig. 114); forewing venation distinct; aedeagus simple or with long lateral processes **Biza** Walker
Not cercopidlike species; forewing venation obscure; aedeagus simple or with apical processes 14
14. Aedeagus slender, with paired apical processes; male plates with long macrosetae (figs. 80, 78) **Nelidina** DeLong
Aedeagus not particularly slender, without apical processes; male plates without macrosetae (figs. 95, 98) **Coelidiana** Oman
15. All veins of forewings brown and distinct; male plates with macrosetae (figs. 88, 89) **Coelella** DeLong
Most veins of forewings yellowish and highly obscure; male plates without macrosetae (figs. 81, 85) **Neocoelidiana** DeLong

***Neocoelidia* Gillette and Baker**

FIGURES 1-35

Neocoelidia Gillette and Baker 1895, p. 103. Type of genus *Neocoelidia tumidifrons* Gillette and Baker by original designation.

Paracoelidea Baker 1898, p. 292. Type of genus *Paracoelidea tuberculata* Baker by original designation. New synonymy.

Stenocoelidia DeLong 1953, p. 104. Type of genus *Stenocoelidia virgata* DeLong by original designation. New synonymy.

Stenocoelidia subgenus *Eurycoelidia* DeLong 1953, p. 112. Type of subgenus *Neocoelidia pulchella* Ball by original designation. New synonymy.

DESCRIPTION.—Carina separating face and crown distinct, weakly developed, or absent. Shape of crown in dorsal view highly variable, extremes with anterior margin broadly rounded to sharply angular, nearly always longer at middle than next to eye. Ocelli occur on anterior margin of crown. Head including eyes usually narrower than pronotum, which is more or less indented on posterior margin. Antennae from about half to three-fourths total length of body including forewings. Venation of forewings highly obscure, except apically, in most species.

Ground color ivory white to yellow. Often with spot at apex of crown and pair of dark spots on scutellum. Many with dorsal stripe from apex of crown to distal portion of forewings. Species rarely immaculate.

Male genitalia as discussed below.

DISCUSSION.—The reduction of *Paracoelidea*, *Stenocoelidia*, and *Eurycoelidia* to synonymy under *Neocoelidia* is based upon the consistently uniform pattern of the male genitalia and the lack of sharply defined limits in gross characters between the groups as previously defined.

Attention is called to the following drawings for the purposes of the discussion: *N. tumidifrons* (figs. 1-6), *N. tuberculata* (figs. 7-13), *N. virgata* (figs. 14-16), and *N. pulchella* (figs. 17-24). The male genitalia of these various type-species show that in all cases the venter of the capsule is covered by a single plate presumably formed

by a complete fusion of the normally paired plates. Other mutually shared characters are the comparatively simple pygofers distinguished by a single ventral hook or tooth and the pair of slender simple processes at the base of the anal tube. In all of them the aedeagus consists of two shafts which are arranged one above the other with the dorsal shaft bearing the gonoduct. The connective is uniformly Y-shaped and the styles are basically alike.

DeLong's separation of *Stenocoelidia* and *Eurycoelidia* from *Neocoelidia* on the basis of elongate and slender forms versus short and robust forms holds for some of the species, but others cannot be separated on this basis because of their intermediate condition. *Paracoelidea*, although striking because of the tuberculate clypellus, is considered here as a group within *Neocoelidia* because of the similarities in male genitalia.

The genus *Neocoelidia* is primarily North and Central American but a few species range into northern South America. Knull (1942) has reviewed the North American species, providing a key based largely on color and size. DeLong (1953) described many new species primarily from Mexico and Central America; and although he provided no key, his illustrations of the pygofers and aedeagi are highly adequate for species recognition.

Three species of *Neocoelidia*, the types of which have not been studied since their original description, are discussed here.

Neocoelidia fuscodorsata (Fowler), new combination

FIGURES 25-28

Tettigonia fuscodorsata Fowler 1900, p. 269, tab. 18, fig. 6.

Stenocoelidia fuscodorsata (Fowler), DeLong 1953, p. 121.

Stenocoelidia clara DeLong 1953, p. 104, new synonymy.

Fowler described *T. fuscodorsata* from a long series of specimens collected at several localities in Mexico and Guatemala. DeLong assumed that Fowler's series included more than one species, which is probably true, but he studied no type material. Through the cooperation of Dr. W. E. China and the British Museum (Natural History), three of Fowler's syntypes, one male and two females, were made available for study. The male with data "Teapa, Tabasco, Mexico" is hereby designated as the lectotype. A comparison of this lectotype and the type of *S. clara* DeLong show that these are conspecific. The colored illustration of *T. fuscodorsata* which appeared with Fowler's description is not diagnostic for the species. The general coloration is as figured, with the following modification: distinct black spot at apex of crown and near each basal angle of scutellum; apical spot fused with dorsal stripe whereas spots on scutellum free. The male genitalia are shown in figures 25-28.

Neocoelidia verecunda (Fowler), new combination

Tettigonia verecunda Fowler 1900, p. 269, tab. 18, fig. 7.

Stenocoelidia verecunda (Fowler), DeLong 1953, p. 122.

Unfortunately this Guatemalan species is known from females only, and its generic placement is open to question. I have studied Fowler's two syntypes in the British Museum and two additional specimens in the collection of the U.S. National Museum. In none of the specimens are the longitudinal red markings on the crown, pronotum, and forewings quite as distinct as illustrated with Fowler's original description.

Neocoelidia crenulata Osborn

FIGURES 29-35

Neocoelidia crenulata Osborn 1923, p. 79.

This species was described from a single male from Minca, Colombia. The type was made available through the courtesy of Dr. G. E. Wallace and the Carnegie Museum. In general it is marked like *N. fuscodorsata* except that there are no spots on the scutellum and the longitudinal dorsal stripe is crenulate on its margins. The genitalia of the type are illustrated in figures 29-35.

Chinaia Bruner and Metcalf

FIGURES 37, 113

Chinaia Bruner and Metcalf 1934, p. 120. Type of genus *Chinaia bella* Bruner and Metcalf by original designation.

DESCRIPTION.—Without carina separating face and crown. Clypellus expanded distally. Shape of crown in dorsal view broadly rounded, wider than long. Ocelli on face distinctly below anterior margin of crown. Head including eyes narrower than pronotum, which is not indented on posterior margin. Antenna very long, exceeding total length of body including forewings. Venation of forewings obscure except at apex.

Ground color yellowish to pale orange, with orange to bright red-orange markings on pronotum and extensively on forewings. Dark-brown markings often found on clavus and apical portion of forewings as well.

Male genitalia: Valve obscure. Plates deep and scoop-shaped. Pygofer either with dorsal processes or an elongation of terminus. Anal tube simple. Connective cruciform and not fused with aedeagus. Aedeagus moderately straight or recurved with or without lateral flaps.

DISCUSSION.—This is a Neotropical genus; most of the described species occur in Central America, but a few are South American.

Chinaia was recently revised by Kramer (1959). A habitus drawing of a typical *Chinaia* can be seen in figure 113.

***Deltocoelidia* Kramer**

Deltocoelidia Kramer 1961, p. 238. Type of genus *Deltocoelidia maldonadoi* Kramer by original designation.

DESCRIPTION.—Without carina separating face and crown. Shape of crown in dorsal view bluntly angular. Ocelli located on anterior margin of crown. Head including eyes about as wide as pronotum, which is broadly indented on posterior margin. Antennae about as long as total length of body including forewings. Venation of forewings obscure except apically.

Ground color stramineous with contrasting markings on crown, pronotum, and forewings in form of stripes and spots.

Male genitalia: Male plates solidly fused and appear as single plate on venter of genital capsule. Both pygofer and anal tube simple. Connective Y-shaped and poorly sclerotized. Aedeagus slender, recurved, and with paired lateral processes.

DISCUSSION.—The single leafhopper at present referable to this genus is the type-species, *Deltocoelidia maldonadoi* Kramer, known only from Venezuela. Illustrations of the male genitalia appeared with the original description.

***Xenocoelidia* Kramer**

FIGURES 38-44

Xenocoelidia Kramer 1959, p. 30. Type of genus *Xenocoelidia youngi* Kramer by original designation.

DESCRIPTION.—Without carina separating face and crown. Shape of crown in dorsal view rounded or subangular. Ocelli located on anterior margin of crown. Head including eyes either as wide as pronotum or slightly narrower. Posterior margin of pronotum broadly and very shallowly indented. Antennae as long as total length of body including forewings. Venation of forewings obscure except at tip.

Ground color ivory to yellowish with or without contrasting markings on crown, pronotum, and forewings.

Male genitalia: Valve lacking. Male plates fused at least basally, at times for most of length. Pygofer with or without ventral tooth but always with terminus slightly thickened and bearing setae. Anal tube simple. Connective Y-shaped and closely associated with aedeagus but joint between them flexible. Style long with mesal curvature. Aedeagus slender and broadly U-shaped in lateral view with apical elaborations.

DISCUSSION.—This genus was originally described to receive the species *X. youngi* Kramer and *X. colombiana* Kramer. Osborn (1923, p. 77) described *Neocoelidia inflata*, which has been found to be congeneric with the two originally included species. Through the cooperation of Dr. G. E. Wallace of the Carnegie Museum, the types of Osborn's species were made available for study. The generic transfer is made at this time: *Xenocoelidia inflata* (Osborn), new combination.

Key to Species of *Xenocoelidia*

1. Coloration almost uniform ivory white except for tiny fuscous spot at tip of each clavus and yellow hyaline apical portion of each forewing; apex of aedeagus in lateral view with sharp tooth and broad acute bladelike dorsal expansion (Colombia) **X. youngi** Kramer
- Coloration involving distinct markings on head and pronotum; apex of aedeagus in lateral view appearing as two sharp points 2
2. Head with two pairs of orange spots, one marginal between ocelli and one discal on crown. Pronotum with two orange-margined black spots near anterior margin. Each lateral margin of scutellum with black spot. Orange triangular spot at scutellar apex. Forewings unmarked except for very slight enbrowning along commissural margin. Aedeagal apex in posterior view with one pair of long antlerlike processes (Brazil) (genitalia illustrated in figs. 39-44) **X. inflata** (Osborn)
- Head with pale-yellow band below and a bright-orange band above anterior margin. Pronotum with lateral margins and an irregular U-shaped anterior central marking bright orange. Scutellum unmarked. Forewings marked as follows: claval suture with a pale yellow band becoming obscure distally; clavus with dusky orange stripe running along scutellum and commissural margin; a brown spot flanks stripe laterally before apex of each clavus. Aedeagal apex in posterior view with two pairs of comparatively short processes (Colombia) **X. colombiana** Kramer

Megacoelidia Kramer and Linnavuori

Megacoelidia Kramer and Linnavuori 1959, p. 55. Type of genus *Megacoelidia splendida* Kramer and Linnavuori by original designation.

DESCRIPTION.—With distinct carina separating face and crown. Shape of crown in dorsal view subquadrate, wider than long, scarcely angular apically, distinctly concave, and with lateral and posterior margins carinate. Ocelli on anterior margin of crown. Head including eyes comparatively small, less than two-thirds as wide as pronotum. Posterior margin of pronotum broadly but slightly indented. Antennae longer than entire length of body including forewings. Venation of forewings obscure except apically.

Ground color rich deep orange with or without black markings on legs, pronotum, and forewings.

Male genitalia: Valve lacking. Male plates fused basally. Pygofer variously modified distally with elongations or processes. Anal tube and styles simple. Connective Y-shaped and clearly articulated with aedeagus. Aedeagus stout with apical portion recurved.

DISCUSSION.—*Megacoelidia* contains only two known South American species, both of which appeared with the original generic description. The genus contains the largest members of the subfamily.

Key to Species of *Megacoelidia*

Dorsal markings consisting of single narrow black border on posterior margin of pronotum and on apex of each forewing. Male plates in ventral view pointed apically and aedeagus with long paired lateral processes (Brazil).

M. splendida Kramer and Linnavuori

Dorsal markings limited to single narrow black border on apex of each forewing.

Male plates in ventral view rounded apically and aedeagus with short paired lateral processes (Bolivia) *M. aurantia* Kramer and Linnavuori

Tozzita, new genus

FIGURES 45-49

Type of genus *Tozzita ips*, new species.

DESCRIPTION.—With slender but distinct carina separating face and crown. Crown in dorsal view much longer than wide, bluntly angular apically, and strongly produced beyond eyes. Ocelli near anterior margin of crown but posterior to carina. Head including eyes distinctly narrower than pronotum. Posterior margin of pronotum broadly indented. Antennae as long as body including forewings at rest. Venation of forewings highly obscure except apically.

Ground color stramineous to light brown without definite markings except for black spot at apex of crown. Forewings stramineous hyaline.

MALE GENITALIA.—Valve lacking. Male plates fused for nearly entire length. Pygofer modified only dorsally with processes or extensions. Anal tube with heavily sclerotized portions. Connective more or less V-shaped and articulated with strongly asymmetrical aedeagus.

Tozzita ips, new species

FIGURES 45-49

LENGTH.—Male 6.75 mm.

COLORATION.—Stramineous with indefinite brownish areas on head and thorax. Only distinct marking is black apical spot on crown. Forewings stramineous hyaline.

MALE GENITALIA.—Capsule in ventral view with slight apical notch on ventral cover which is exceeded by the pygofer (fig. 48). Capsule in lateral view with few tiny spines on ventral margin of pygofer, dorsum with blunt, sclerotized process; anal tube with two heavily sclerotized plates, posterior one notched dorsally (fig. 45). Aedeagus in ventral aspect slender and strongly asymmetrical (fig. 49), with apex forked and gonopore opening on narrow mesal extension (fig. 46).

Aedeagus slender in lateral view with dorsal hump on basal half and with apical mesal extension slender and recurved (fig. 47).

HOLOTYPE.—Male, Riberalta, Bolivia, W. M. Mann, January, 1921–22, Mulford Biological Expedition. USNM type 65826. Female unknown.

Xiqilliba, new genus

FIGURE 55–60

Type of genus *Xiqilliba bellator*, new species.

DESCRIPTION.—With distinct carina separating face and crown. Crown in dorsal view wider than long and bluntly angular apically. Ocelli near anterior margin of crown but slightly posterior to carina. Head including eyes narrower than pronotum. Posterior margin of pronotum mesally indented. Antennae as long as body including forewings. Venation of forewings comparatively distinct.

Ground color yellow marked with brown or black on head, pronotum, and forewings.

MALE GENITALIA.—Valve lacking. Male plates fused basally for about half length. Pygofer simple. Anal tube with long paired processes extending anteriorly into genital chamber. Styles very long, wrinkled, slender, and poorly sclerotized. Connective modified Y-shaped. Aedeagus slender and simple.

Xiqilliba bellator, new species

FIGURES 55–60

LENGTH.—Male 6.5 mm.

COLORATION.—Grossly appearing as yellow leafhopper with brown stripe extending from anterior margin of crown across pronotum and scutellum on to forewings, where abruptly widens near midpoint of each clavus extending laterally to costal margin of each forewing, thus covering entire distal portion of forewings.

Ground color yellow. Black spot at apex of crown below carina. Crown mesally brown but color vaguely delimited. Pronotum mesally brown with color widest posteriorly. Scutellum with four very dark stripes: two wide lateral and two narrow double-toothed central stripes. Forewings brown except for large yellow patches in anterior costal area.

MALE GENITALIA.—As defined generically with additional characters as follows: long paired processes of anal tube moderately slender but irregular in lateral view (fig. 55), sharply pointed and partially crossed anteriorly and double-pronged basally where joining anal tube in ventral view (fig. 56). Partially crossed anterior portions of processes form base on which aedeagus rests. Aedeagus uniformly slender, upturned distally, with apex projecting slightly caudally (fig. 58).

HOLOTYPE.—Male, and one paratype male, Itaituba, Brazil, no other data. USNM type 65827. Female unknown.

Coelana DeLong, new status

FIGURES 50-54, 108-109

Coelidiana subgenus *Coelana* DeLong 1953, p. 128. Type of subgenus *Neocoelidia modesta* Baker by original designation.

DESCRIPTION.—With carina separating face and crown. Crown in dorsal view broadly angular at apex and slightly wider than long. Ocelli on anterior margin of crown. Head including eyes distinctly narrower than pronotum. Posterior margin of pronotum broadly and sharply indented. Antennae about half as long as body including forewings. Venation of forewings obscure except apically.

Ground color stramineous with small black spot at coronal apex. Forewings stramineous hyaline.

Male genitalia: Valve lacking. Male plates fused basally. Pygofer greatly inflated, clearly exceeding length of plates, and ventral margin with large and heavy hook. Anal tube with ventral process. Connective approximately Y-shaped and articulated with simple aedeagus.

DISCUSSION.—*Coelana* includes two species, *C. modesta* (Baker) (figs. 50-54) and *C. drakei* new species, from South America. Both are known from Bolivia, but *C. modesta* is recorded also from northern Argentina and southern Brazil.

Key to Species of *Coelana*

MALES ONLY

Length 7 mm. or more; pygofer in lateral view broadly rounded apically and with inner process entire distally (fig. 50); aedeagus transverse (fig. 54).

C. modesta (Baker)

Length 6.5 mm. or less; pygofer in lateral view narrowed apically and with inner process dentate distally (fig. 108); aedeagus short-coupled (fig. 109).

C. drakei, new species

Coelana drakei, new species

FIGURES 108-109

LENGTH.—Male 6.3 mm.

COLORATION.—Uniformly stramineous with only distinct marking consisting of black spot at coronal apex.

MALE GENITALIA.—Capsule in lateral view with pygofer narrowed apically and inner processes double-toothed ventrally at apex, only one process visible in drawing (fig. 108). Aedeagus in lateral view with shaft sharply upturned (fig. 109).

HOLOTYPE.—Male, Bolivia, no other data. USNM type 66368
Female unknown.

DISCUSSION.—This species is very close to *C. modesta* but is separated easily from it by the characters in the above key. The species is named for Dr. Carl John Drake, from whose collection the specimen was obtained.

Tichocoelidia Kramer

Tichocoelidia Kramer 1962, p. 104. Type of genus *Tichocoelidia clarkei* Kramer by original designation.

DESCRIPTION.—With carina separating face and crown, lateral and posterior coronal margins carinate. Concave crown in dorsal view angled apically, approximately pentagonal in shape and well produced beyond eyes with ocelli on anterior margin. Head including eyes distinctly narrower than pronotum. Antennae about three-fourths as long as body including forewings. Posterior margin of pronotum mesally indented. Venation of forewings comparatively distinct.

Ground color stramineous to light brown with few additional markings, most of which are inconspicuous. Forewings stramineous hyaline.

Male genitalia: Valve lacking. Male plates short and fused except apically. Pygofers with ventral processes and paired internal processes at apex. Anal tube with pair of ventral hooks. Connective modified Y-shaped and firmly fastened to slender, cleft, asymmetrical aedeagus by flexible joint.

DISCUSSION.—*Tichocoelidia clarkei* Kramer, a Colombian species, is the lone representative of the genus. The genital structures were fully illustrated with the original description cited above.

Salvina Melichar

FIGURES 61-65

Salvina Melichar 1926, p. 344. Type of genus *Tettigonia dorsisignata* Fowler by subsequent designation of China 1938, p. 184.

DESCRIPTION.—With carina separating face and crown. Crown in dorsal view wider than long, sharply rounded apically, and produced beyond eyes. Ocelli near anterior margin of crown but posterior to carina. Head including eyes slightly narrower than pronotum. Antennae nearly as long as body including forewings. Posterior margin of pronotum broadly and sharply indented. Venation of forewings obscure except apically.

Ground color yellow to orange with contrasting markings, especially on forewings, of black and brighter hues.

Male genitalia: Valve lacking. Male plates separated only apically. Pygofer in lateral view with ventral tooth and appearing cleft at apex due to long mesally curved dorsal hook and weakly sclerotized ventral extension. Anal tube simple but long. Styler apex in dorsal view curving laterally and caudally. Connective heavy and Y-shaped. Aedeagus simple, compressed and upturned at apex.

DISCUSSION.—The type species was illustrated in color when originally described by Fowler (1900, p. 282, tab. 19, fig. 6). This illustration is very good for showing the general markings of the leafhopper; however, in the specimen at hand the ground color is a brighter yellow-orange and the stripe on the commissural claval area is of a red-wine shade. This species is known from three syntypes, all of which are in the British Museum. Through the kindness of Dr. W. E. China, one male specimen was made available for this study. This male with data "Panama, Volcan de Chiriqui 4000 to 6000 feet, Champion" is hereby designated as the lectotype. The male genitalia of *Salvina dorsisignata* (Fowler), the only included species, are illustrated in figures 61-65.

Cocoelidia DeLong, new status

FIGURES 66-74

Neocoelidiana subgenus *Cocoelidia* DeLong 1953, p. 126. Type of subgenus *Neocoelidiana antlera* DeLong by original designation.

DESCRIPTION.—With carina separating face and crown. Crown in dorsal view wider than long, bluntly angular apically, and produced beyond eyes. Ocelli on anterior margin of crown. Head including eyes narrower than pronotum. Antennae only about half as long as body including forewings. Posterior margin of pronotum broadly indented. Venation of forewings obscure except at apex.

Ground color sordid yellow to light brown with weakly contrasting yellowish markings on head and dorsum of thorax. Apex of crown with black spot. Forewings brown hyaline.

Male genitalia: Valve lacking. Ventral cover of genital capsule sharply narrowed on distal half appearing as two extended "fingers." Pygofer in lateral view with ventral tooth and dorsal distally hooked process. Anal tube with short, forked ventral process. Connective Y-shaped with stalk bifurcate to receive aedeagus. Style simple. Aedeagus slender, recurved distally with pair of preapical processes.

DISCUSSION.—The Mexican leafhopper, *Cocoelidia antlera* (DeLong), is the only included species. The male genitalia are illustrated in figures 66-74.

***Nelidina* DeLong, new status**

FIGURES 75-80, 110-112

Coelidiana subgenus *Nelidina* DeLong 1953, p. 129. Type of subgenus *Coelidiana defila* DeLong by original designation.

DESCRIPTION.—With carina separating face and crown. Crown in dorsal view wider than long, sharply rounded apically, and produced beyond eyes. Ocelli on anterior margin of crown. Head including eyes narrower than pronotum. Length of antennae at least half as long as body. Posterior margin of pronotum approximately straight across or slightly indented. Venation of forewings most distinct apically.

Ground color various shades of yellow without strongly contrasting markings.

Male genitalia: Valve lacking. Male plates fused basally and with long apical macrosetae. Pygofer in lateral view with a dorsal process or terminal hook. Anal tube simple. Connective very broadly Y-shaped with stalk bifurcate to receive aedeagus. Stylar apex weakly hooked in lateral view. Aedeagus slender with paired apical processes.

DISCUSSION.—*Nelidina* includes two species, *N. defila* (DeLong) (figs. 75-80) and *N. taeniola*, new species, from South America. The type of the genus, *N. defila*, is known only from Peru, and *N. taeniola* is recorded only from Colombia.

Key to Species of *Nelidina*

MALES ONLY

Length 7 mm.; aedeagal processes uniformly slender and not twisted (figs. 79, 80).

N. defila (DeLong)

Length 4.5 mm.; aedeagal processes ribbon-like and twisted (figs. 111, 112).

N. taeniola, new species

***Nelidina taeniola*, new species**

FIGURES 110-112

LENGTH.—Male 4.5 mm.

COLORATION.—Uniformly yellowish or yellowish-green without distinct markings. Exceedingly faint dark longitudinal striping on forewings.

Male genitalia: Posterior margin of pygofer beset with numerous fine setae and with small sharp hook or tooth ventrally (fig. 110). Rest of capsule like *N. defila*. Aedeagus transverse with long, twisted, ribbon-like, paired apical processes (figs. 111, 112).

HOLOTYPE.—Male, Chicó, Colombia, elevation 2,900 meters, January 2, 1959, R. F. Ruppel. USNM type no. 34882. Paratype, male with same data.

Neocoelidiana DeLong

FIGURES 81-86

Neocoelidiana DeLong 1953, p. 122. Type of genus *Neocoelidia obscura* Baker by original designation.

DESCRIPTION.—With carina separating face and crown. Crown in dorsal view wider than long, very broadly or bluntly angled apically, and produced beyond eyes. Head including eyes narrower than pronotum. Ocelli on anterior margin of crown. Antennae from half to three-fourths as long as body including forewings. Posterior margin of pronotum broadly and often sharply indented. Venation of forewings highly obscure except apically.

Ground color stramineous to yellow, often with three inconspicuous longitudinal stripes of slightly darker shade on crown and pronotum. Apex of crown with black spot. Forewings yellowish hyaline, at times with few additional brown markings or tinges, with veins concolorous.

Male genitalia: Valve lacking. Male plates fused basally for more than half length, without short macrosetae apically. Pygofer in lateral view with dorsal process and either ventral process or ventral hook. Anal tube with single ventral hook. Connective broadly Y-shaped. Apex of style strongly hooked in lateral view. Aedeagus in lateral view approximately S-shaped, often somewhat twisted, and with some sort of apical modifications.

DISCUSSION.—The genus as here defined contains seven species from western United States and Mexico, all of which were treated by DeLong (1953). The male genital structures of the type-species, *Neocoelidiana obscura* (Baker), are shown in figures 81-86.

Coelella DeLong, new status

FIGURES 87-93

Neocoelidiana subgenus *Coelella* DeLong 1953, p. 125. Type of subgenus *Neocoelidia distincta* Oman by original designation.

DESCRIPTION.—With carina separating face and crown. Crown in dorsal view wider than long, bluntly angled apically, and produced beyond eyes. Head including eyes narrower than pronotum. Ocelli on anterior margin of crown. Antennae from half to three-fourths as long as body including forewings. Posterior margin of pronotum broadly and sharply indented. Venation of forewing highly distinct.

Ground color stramineous to yellow, usually with three more or less well-defined longitudinal stripes of slightly darker hue on crown and pronotum. Apex of crown with black spot. Forewings hyaline with veins uniformly brown.

Male genitalia. Valve lacking. Male plates fused for basal two-thirds, with short macrosetae apically. Pygofer with both dorsal process and ventral hook. Anal tube simple. Connective broadly Y-shaped. Apex of style hooked in lateral view. Aedeagus in lateral view with shaft turned either dorsally or ventrally in apical portion. Aedeagal apex simple or elaborated with short paired processes.

DISCUSSION.—The genus contains only two species. The type-species, *Coelella distincta* (Oman), occurs in the southwestern United States, while the second species, *C. venosa* (DeLong) 1953, p. 126, is Mexican. The male genital structures of the type-species are illustrated in figures 87–93.

Biza Walker

FIGURES 36, 114

Biza Walker 1858, p. 253. Type of genus *Biza crocea* Walker by original designation.

DESCRIPTION.—With carina separating face and crown. Crown in dorsal view subquadrate, wider than long, produced beyond eyes, rounded apically, and carinated laterally and posteriorly. Ocelli on anterior margin of crown. Antennae at least half as long as body including forewings. Head including eyes narrower than pronotum. Posterior margin of pronotum broadly but rather shallowly indented. Forewings broad with venation distinct.

Ground color yellow to orange with extensive brown or fuscous markings on the forewings.

Male genitalia: Valve lacking. Male plates fused only basally. Pygofer in lateral view with only ventral hook or tooth, no dorsal processes, apex acute or rounded. Anal tube and styles simple. Connective Y-shaped and clearly articulated with aedeagus. Aedeagus simple, upturned apically, with or without lateral processes.

DISCUSSION.—As can be seen by reference to the habitus drawing (fig. 114), the general cercopid-like appearance is striking. The included species are known from Central and South America. The genus *Biza* was recently revised by Kramer (1962).

Coelidiana Oman

FIGURES 94–107

Coelidiana Oman 1938, p. 397. Type of genus *Neocoelidia rubrolineata* Baker by original designation.

Acocoelidia DeLong 1953, p. 130. Type of genus *Acocoelidia unipuncta* DeLong by original designation. New synonymy.

DESCRIPTION.—With carina separating face and crown. Crown in dorsal view variable with length and width subequal or length exceeding width, angled apically, and produced beyond eyes. Ocelli on anterior margin of crown. Head including eyes narrower than

pronotum. Antennae from half to nearly equal length of body including forewings. Posterior margin of pronotum broadly and usually sharply indented. Venation of forewings highly obscure except apically.

Ground color stramineous to yellow. Head, pronotum, and scutellum immaculate or with distinct or inconspicuous yellow-to-red markings in form of longitudinal and/or lateral stripes. Apex of crown without black spot. Forewings varying from concolorous to moderately heavily marked with dark brown or black.

Male genitalia: Valve lacking. Male plates fused basally and often for nearly entire length. Pygofer in lateral view quite variable, no true dorsal process, but either terminating with spine of variable length and development or simple; ventral margin with hook or hooks, long apical spine or simple. Anal tube with paired ventral hooks or none. Connective Y-shaped. Style in lateral view strongly hooked apically. Aedeagus simple, slender, or moderately stout, and upturned at apex.

DISCUSSION.—The male genitalia of *Coelidiana rubrolineata* (Baker) and *Coelidiana unipuncta* (DeLong) are illustrated in figure 99 and figures 100–107. Members of *Coelidiana*, as here defined, range from southern Mexico to Brazil. DeLong (1953) treated seven members of this group. *C. undata* (Linnavuori) was transferred to this genus by Kramer (1959).

Two species of *Coelidiana*, the types of which have not been studied since their original description, are discussed below.

***Coelidiana coronata* (Ball), new combination**

Neocoelidia coronata Ball 1916, p. 208.

This rather long-crowned species described by Ball was based upon a unique female from Guatemala. Its generic placement will not be certain until males are available for study. The red markings of the dorsum are quite similar to some other *Coelidiana*.

***Coelidiana croceata* (Osborn), new combination**

FIGURES 94–98

Neocoelidia croceata Osborn 1923, p. 78.

This Brazilian species is very close to the type-species, *C. rubrolineata*, also from Brazil. The only characters that will successfully allow differentiation are found in the aedeagus. In *C. croceata* the aedeagus is crenulated ventrally and narrowed apically (fig. 95), whereas in *C. rubrolineata* the aedeagus is smooth ventrally and broad apically (fig. 99). The drawings of *C. croceata* male genitalia (figs. 94–98) are based upon the allotype, which is in the Carnegie Museum, Pittsburgh, Pennsylvania.

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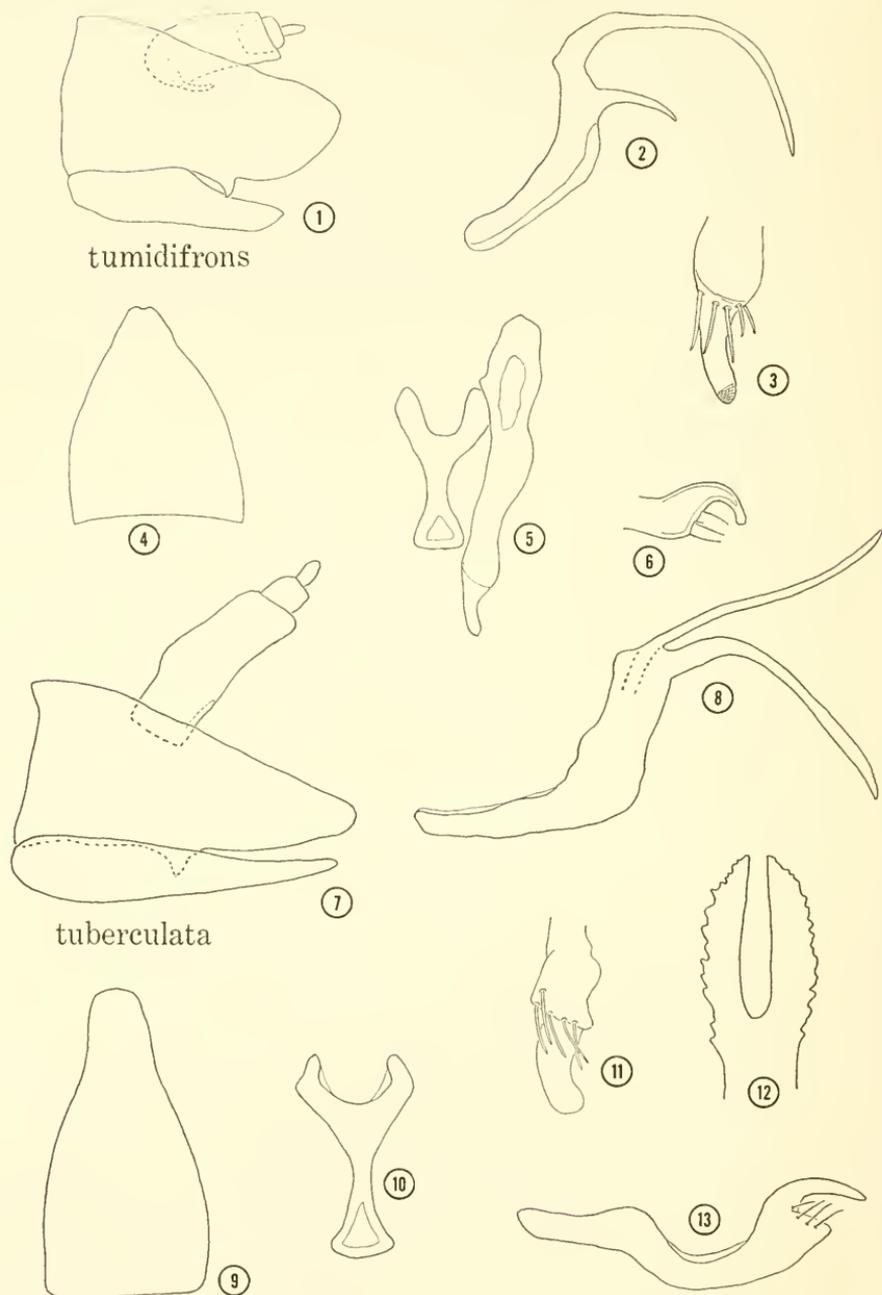
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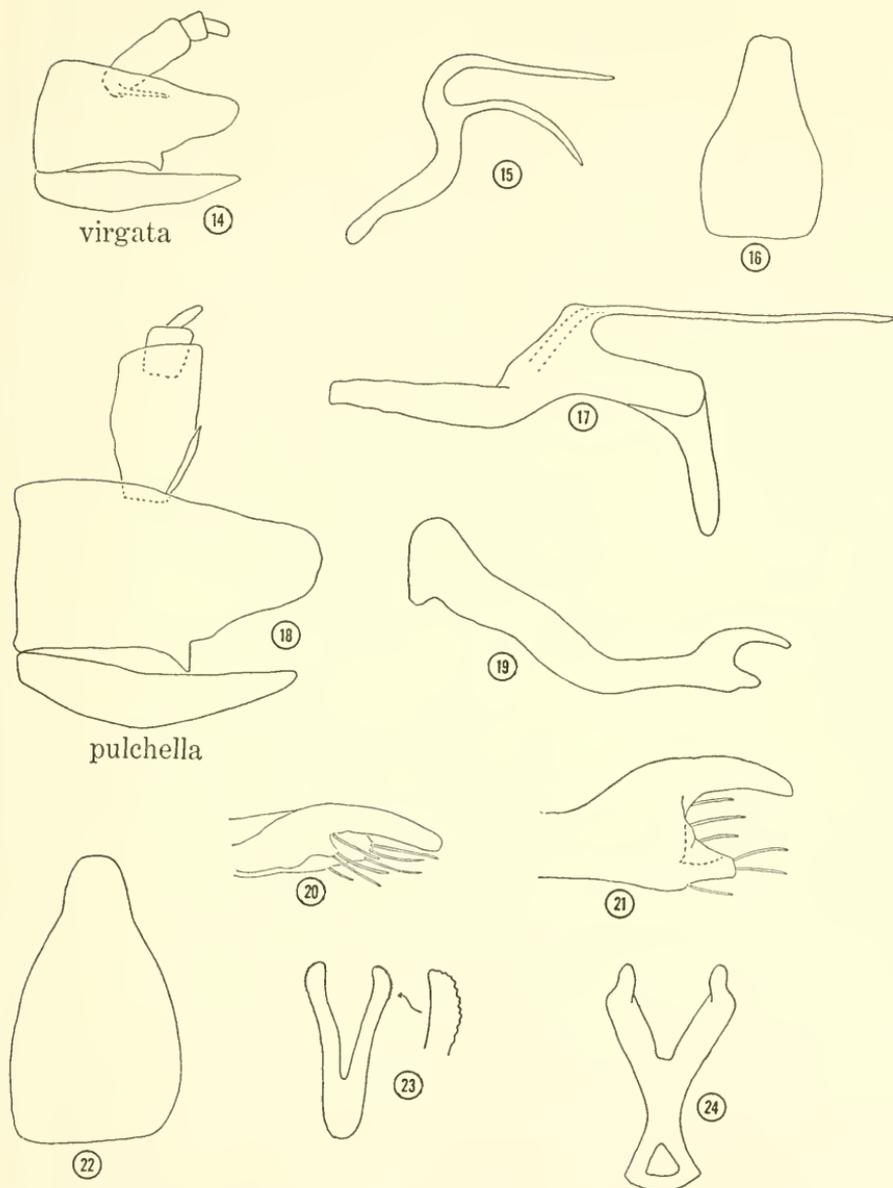
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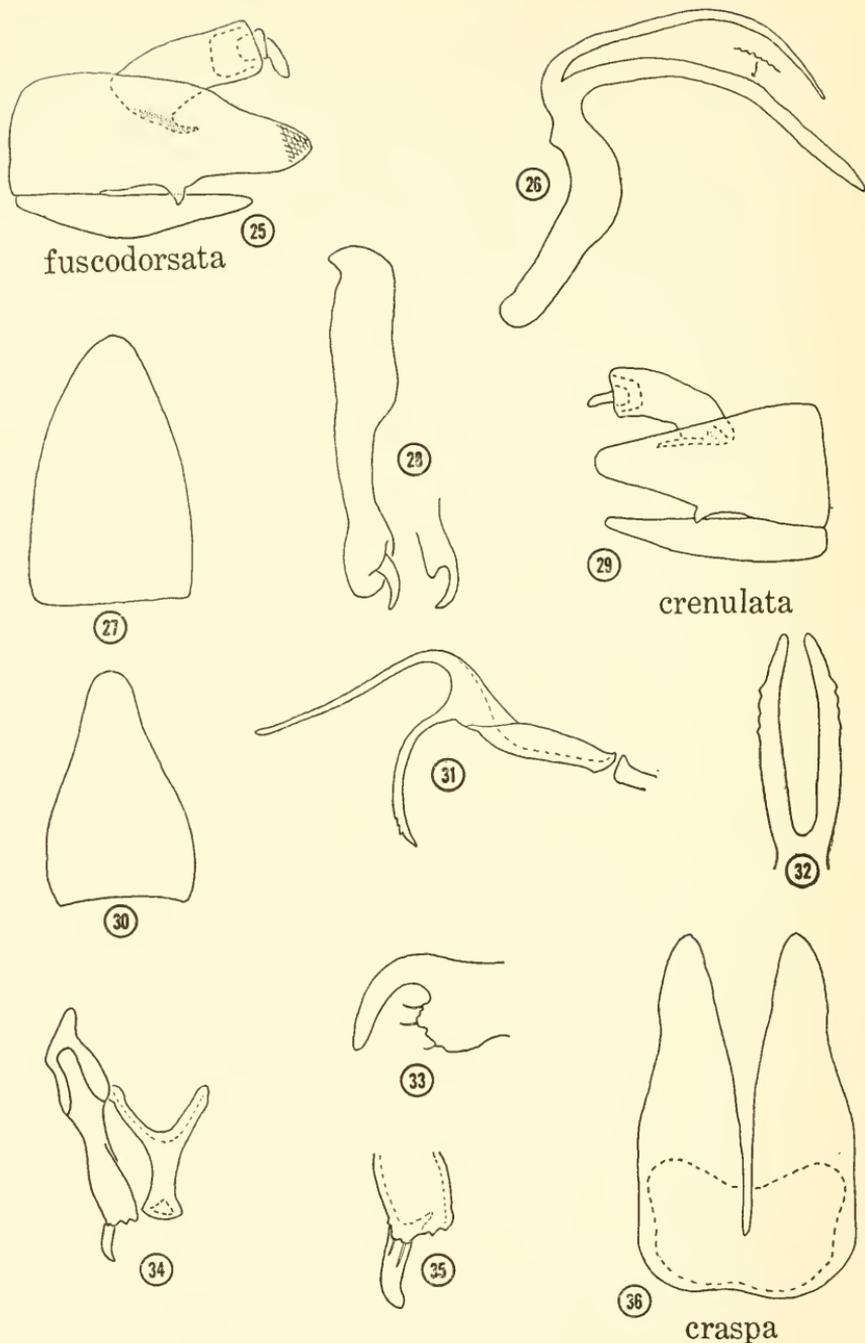
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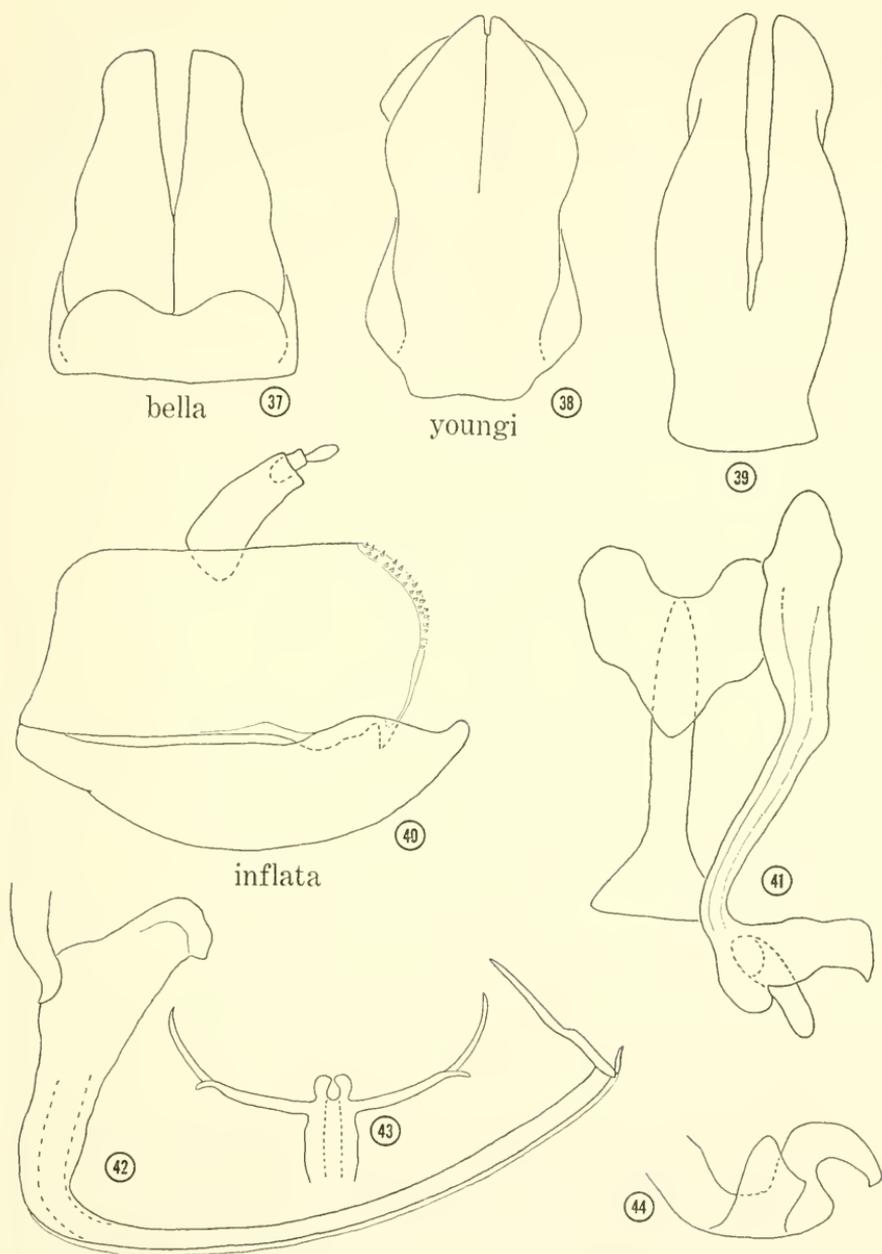
FIGURES 1-13. *Neocoelidia tumidifrons* Gillette and Baker: 1, lateral view of genital capsule; 2, lateral view of aedeagus; 3, ventral aspect of stylar apex; 4, ventral cover of genital capsule; 5, ventral view of connective and style; 6, lateral aspect of stylar apex. *Neocoelidia tuberculata* (Baker): 7, lateral view of genital capsule; 8, lateral view of aedeagus; 9, ventral cover of genital capsule; 10, ventral view of connective; 11, ventral aspect of stylar apex; 12, dorsal view of apical portion of lower aedeagal shaft; 13, lateral view of style.



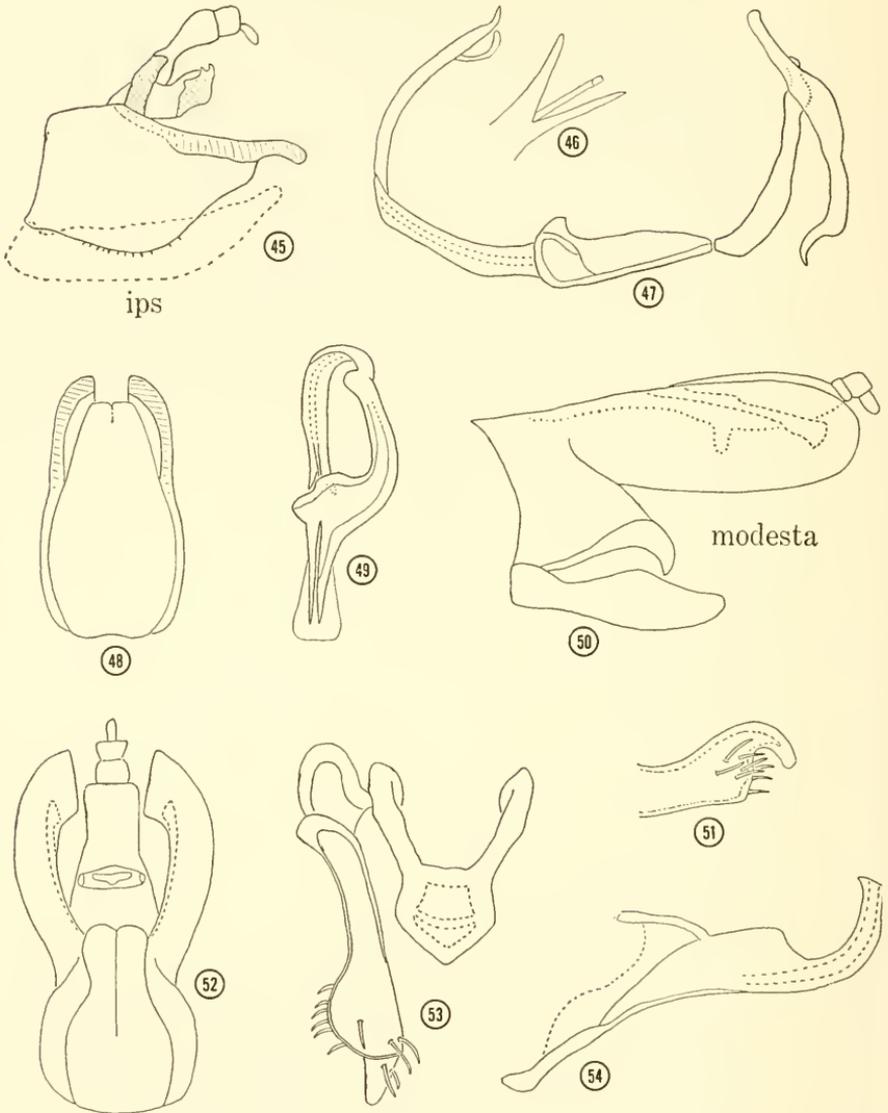
FIGURES 14-24.—*Neocoelidia virgata* (DeLong): 14, lateral view of genital capsule; 15, lateral view of aedeagus; 16, ventral cover of genital capsule. *Neocoelidia pulchella* Ball: 17, lateral view of aedeagus; 18, lateral view of genital capsule; 19, lateral view of style; 20, dorsal aspect of stylar apex; 21, lateral aspect of stylar apex; 22, ventral cover of genital capsule; 23, dorsal view of apical portion of lower aedeagal shaft; 24, dorsal view of connective.



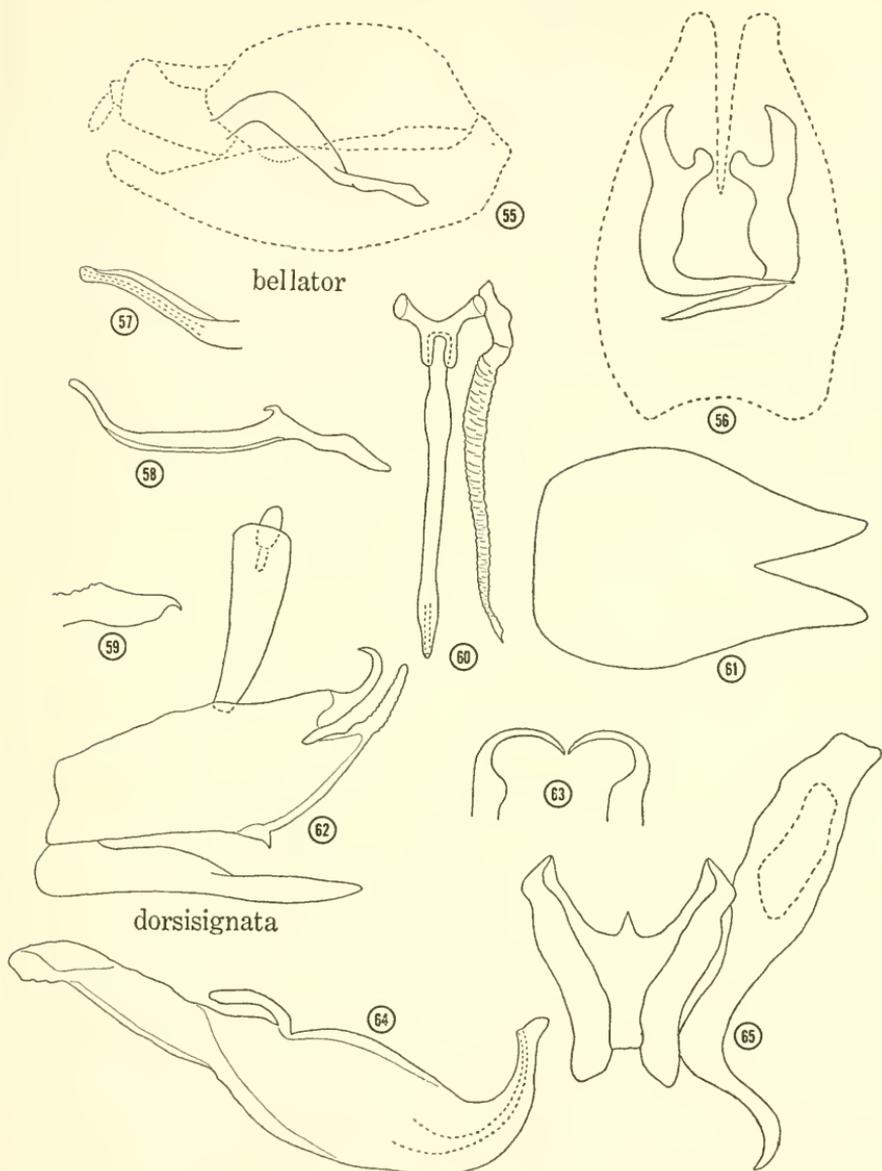
FIGURES 25-36.—*Neocoelidia fuscodorsata* (Fowler): 25, lateral view of genital capsule; 26, lateral view of aedeagus; 27, ventral cover of genital capsule; 28, dorsal view of style and lateral view of styler apex. *Neocoelidia crenulata* Osborn: 29, lateral view of genital capsule; 30, ventral cover of genital capsule; 31, lateral view of aedeagus; 32, dorsal view of apical portion of lower aedeagal shaft; 33, lateral aspect of styler apex; 34, ventral view of connective and style; 35, dorsal view of styler apex. *Biza craspa* Kramer; 36, ventral cover of genital capsule.



FIGURES 37-44.—*Chinaia bella* Bruner and Metcalf: 37, ventral cover of genital capsule. *Xenocoelidia youngi* Kramer: 38, ventral cover of genital capsule. *Xenocoelidia inflata* (Osborn): 39, ventral cover of genital capsule; 40, lateral view of genital capsule; 41, ventral view of connective and style; 42, lateral view of aedeagus; 43, posterior view of aedeagal apex; 44, lateral view of stylar apex.



FIGURES 45-54.—*Tozzita ips*, new species: 45, lateral view of genital capsule; 46, dorsal view of aedeagal apex; 47, lateral view of connective, style, and aedeagus; 48, ventral cover of genital capsule with pygofer showing; 49, ventral view of aedeagus. *Coelana modesta* (Baker): 50, lateral view of genital capsule; 51, lateral view of stylar apex; 52, ventral cover of genital capsule with pygofer and anal tube showing; 53, ventral view of connective and style; 54, lateral view of aedeagus.



bellator

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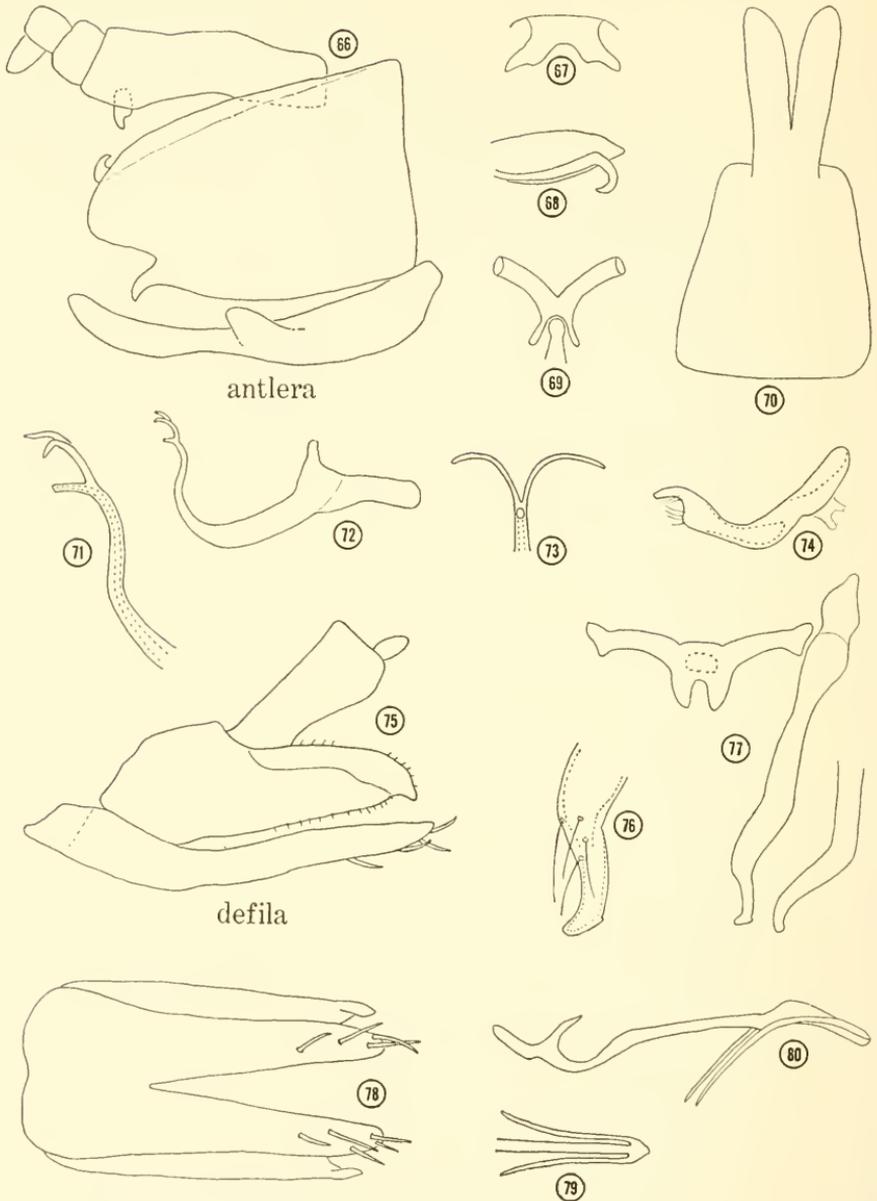
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dorsisignata

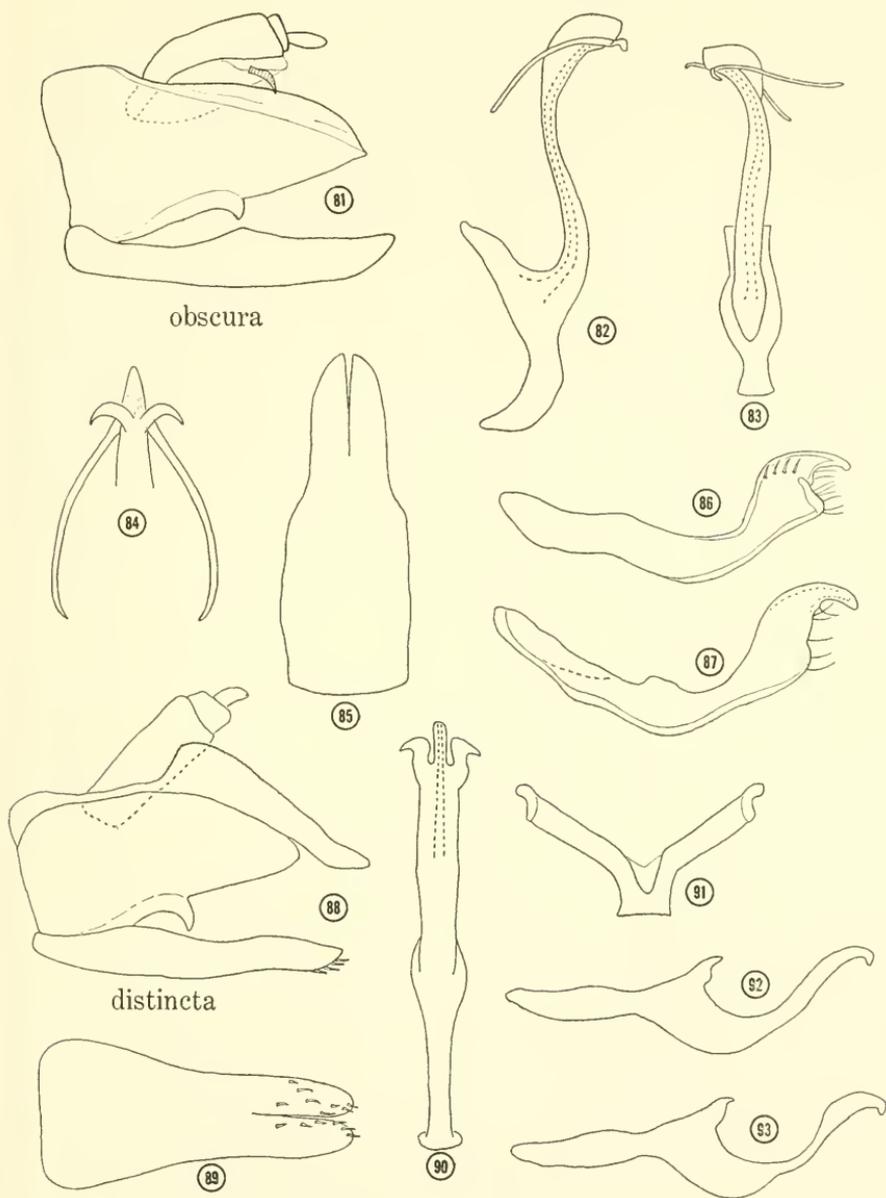
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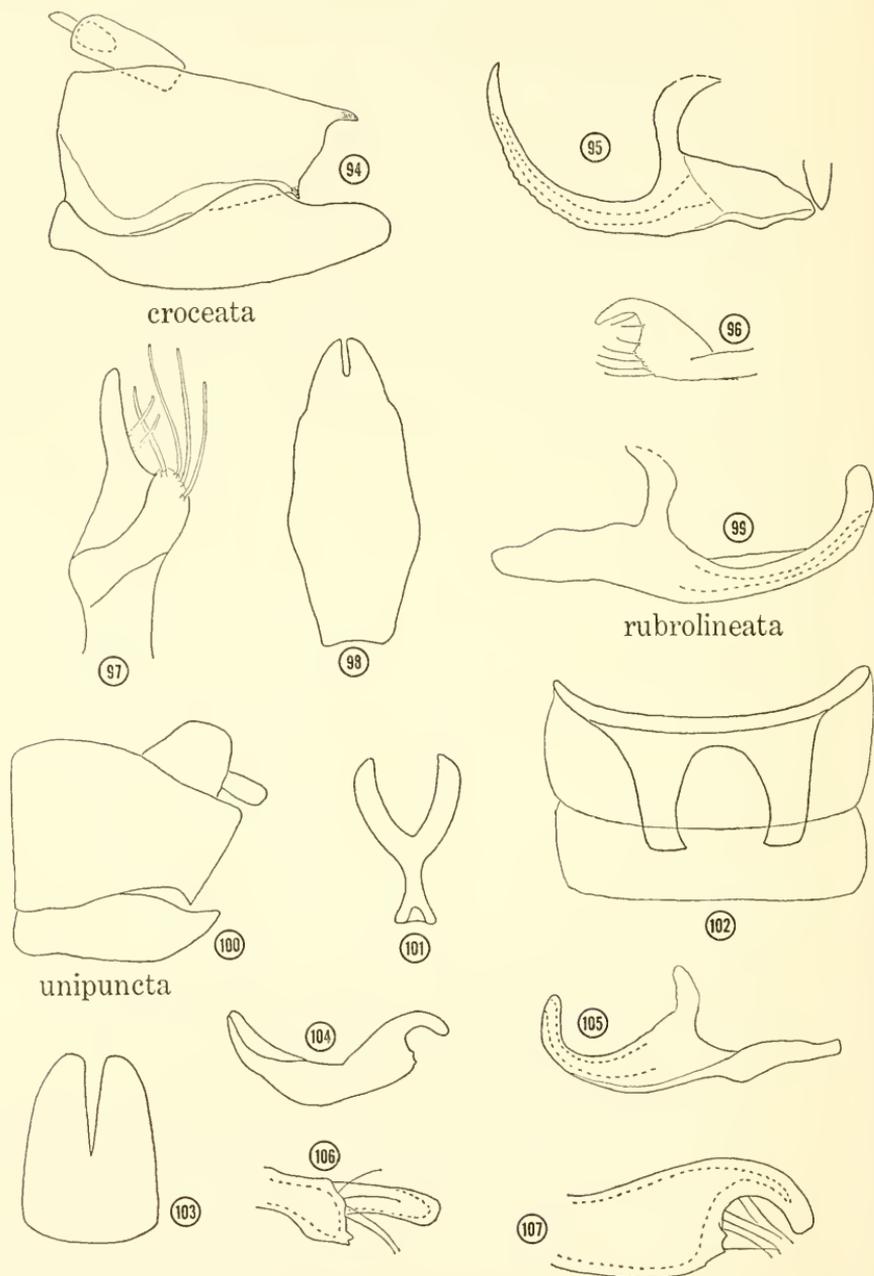
FIGURES 55-65.—*Xiqilliba bellator*, new species: 55, lateral view of genital capsule; 56, ventral cover of genital capsule showing processes of anal tube; 57, lateral view of aedeagal apex; 58, lateral view of aedeagus; 59, lateral view of stylar apex; 60, dorsal view of connective, style, and aedeagus. *Salvina dorsisignata* (Fowler): 61, ventral cover of genital capsule; 62, lateral view of genital capsule; 63, dorsal view of hooks at apex of pygofer; 64, lateral view of aedeagus; 65, dorsal view of connective and style.



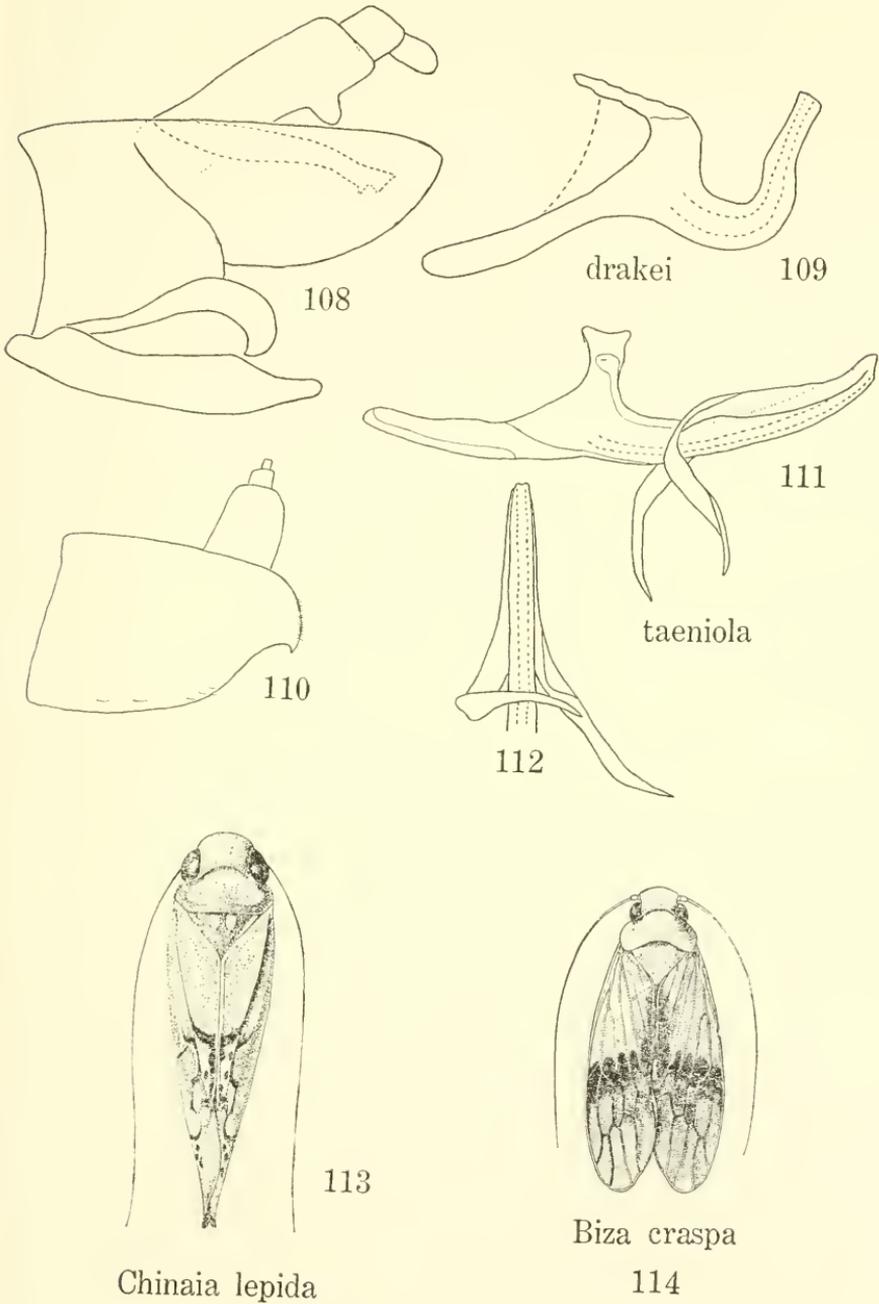
FIGURES 66-80.—*Coccolidia antlera* (DeLong): 66, lateral view of genital capsule; 67, posterior view of processes on anal tube; 68, dorsal view of apex of pygofer; 69, ventral view of connective with basal portion of aedeagus; 70, ventral cover of genital capsule; 71, lateral view of aedeagal apex; 72, lateral view of aedeagus; 73, posterior view of aedeagal apex; 74, lateral view of style. *Nelidina defila* (DeLong): 75, lateral view of genital capsule; 76, ventral view of styler apex; 77, ventral view of connective and style, also with lateral view of styler apex; 78, ventral cover of genital capsule with pygofer showing; 79, ventral view of aedeagal apex; 80, lateral view of aedeagus.



FIGURES 81-93.—*Neocoelidiana obscura* (Baker): 81, lateral view of genital capsule; 82, lateral view of aedeagus; 83, posterior view of aedeagus; 84, posterior view of aedeagal apex; 85, ventral cover of genital capsule; 86, lateral view of style. *Coellella distincta* (Oman): 87, lateral view of style; 88, lateral view of genital capsule; 89, ventral cover of genital capsule; 90, ventral view of aedeagus; 91, posteroventral view of connective; 92, lateral view of aedeagus; 93, lateral view of aedeagus, a variant.



FIGURES 94-107.—*Coelidiana croceata* (Osborn): 94, lateral view of genital capsule; 95, lateral view of aedeagus; 96, lateral view of stylar apex; 97, ventral view of stylar apex; 98, ventral cover of genital capsule. *Coelidiana rubrolineata* (Baker): 99, lateral view of aedeagus. *Coelidiana unipuncta* (DeLong): 100, lateral view of genital capsule; 101, ventral view of connective; 102, ventral view of abdominal base showing apodemes; 103, ventral cover of genital capsule; 104, lateral view of style; 105, lateral view of aedeagus; 106, ventral view of stylar apex; 107, lateral view of stylar apex.



FIGURES 108-114.—*Coelana drakei*, new species: 108, lateral view of genital capsule; 109, lateral view of aedeagus. *Nelidina taeniola*, new species: 110, lateral view of pygofer and anal tube; 111, lateral view of aedeagus; 112, ventral view of aedeagal apex. *Chinaia lepida* Kramer: 113, habitus in dorsal view. *Biza craspa* Kramer: 114, habitus in dorsal view.