

CUBAN FULGORINA

1 THE FAMILIES TROPIDUCHIDÆ AND ACANALONIIDÆ

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The present series of papers will deal with the Fulgorids of Cuba. It is our purpose not only to list the species which have been recorded previously from Cuba with critical bibliographic and taxonomic notes, but also to describe certain species which are apparently new. Special emphasis is placed on the male genitalia, as it is believed that these furnish the most reliable, specific characters. The descriptions will include only characters which may be readily observed by external examination. The internal genitalia of nearly all the species are illustrated by detailed drawings which are believed to be of more value than any attempt to describe these elaborate structures.

The specimens on which the present paper is based were collected largely by S. C. Bruner, J. Acuna and C. H. Ballou.

FAMILY TROPIDUCHIDÆ

The family Tropiciduchidæ was monographed in 1914 by Melichar. He listed only one species, *Tangia sponsa* Guerin, from Cuba, although Uhler, 1910a: 510, described *Cyphoceratops furcatus* from Cuba and Haiti. However, four years previously Pedro Valdes, 1910: 442, had recorded four species belonging to this family from specimens preserved in the Gundlach Museum, Havana, although the systematic position of all of these cannot be determined either from the names employed, which are badly mis-

spelled, or from the word or two of description giving only the length and color of the insects. Osborn, in 1926c: 354, listed *Pelitropis rotulata* Van Duzee among the Fulgoridæ taken by him in Cuba, a species described from Florida and known also from Mississippi and North Carolina. Myers in a recent paper, 1928a:23, deals with two species of this family, *Neurotmeta sponsa* Guerin and *Remosa spinolæ* Guerin. A number of other genera and species have been recorded from the adjacent West Indian Islands, but so far as we know no other species heretofore assigned to this family have been recorded from Cuba. The present paper lists eight species, four species apparently being new. The synonymy and distribution of the other species are discussed.

Neurotmeta sponsa Guerin

This species was described by Guerin Meneville in 1856a: 180. This description was copied in Guerin Meneville, 1857a: 429. There is a brief popular description of this insect by Uhler, 1884a: 231. He lists it from Cuba, San Domingo and Florida, and assigns it to the genus *Tangia* Stal. The next reference to the species is by Van Duzee, 1907a: 35. But the insects which he collected in Jamaica and which we have examined are not the same as the Cuban material; "Elytra with a broad costal membrane crossed by numerous oblique veinlets." Melichar, 1914f: 100-101, redescribed the genus *Tangia* Stal with *Monopsis viridis* as the type, and then redescribes the species *sponsa*, which he assigns to Uhler. Van Duzee, 1917b: 739, assigns this species to the genus *Neurotmeta*. Metcalf, 1923a: 154, separated *Neurotmeta sponsa* from *Monopsis tabida* Spinola on the basis of the presence of costal cross-veins in the former and their absence in the latter. This is not a good character, however, as it is doubtful if the few irregular lines in the costal area can be interpreted as costal cross-veins. As has been pointed out by Melichar it would be better to separate these two genera on the basis of the branching of medius, the fork occurring near the base of the wing in *Monopsis* and near the middle of the wing in *Neurotmeta*. Otherwise these two genera are quite similar.

In *Neurotmeta* the costal vein is separated from the costal margin and connected apically with the costal margin by a series of short, indistinct transverse veinlets.

In this connection it might not be amiss to make a statement in regard to the status of the genus *Tangia* Stal. This genus was described by Stal, 1859a: 317-318, for three species *Monopsis viridis* Walker, and *Tangia kraatzi* and *Tangia schauumi* n. spp., *viridis* Walker differing in having no transverse veins in the costal area while these veins are present in the other two species. Melichar, failing to recognize that Guerin in describing *sponsa* and *spinolæ* had indicated the new genus *Neurotmeta*, made *viridis* the type of *Tangia* and erected a new genus *Tangiopsis*, including *Tangia kraatzi* and *T. schauumi* with *kraatzi* as the type. If *viridis* Walker is congeneric with *sponsa*, as the descriptions would seem to indicate, then *Tangia* Stal would be a synonym of *Neurotmeta* Guerin and *Tangiopsis* Melichar, with *Tangia kraatzi* Stal as type, is a valid genus. The name *Tangiopsis*, however, is preoccupied by *Tangiopsis* Uhler, 1901a: 512, haplotype *T. tetrastichus* Uhler, which is described as a Dictyopharid with a median ocellus. An examination of the type, through the kindness of Dr. E. D. Ball, reveals that this genus belongs to the *Tropiduchidæ*, falling into Melichar's tribe *Tambinini* near the genus *Amapala* Melichar. The median ocellus is not present, being represented by a small spot of glue or similar substance which simulates an ocellus. We propose the name *Tangella* type *Tangia kraatzi* Stal, 1859a: 318, to replace *Tangiopsis* Melichar, and would suggest that Van Duzee's *Tangia sponsa* belongs to this genus, although the vertex is very much prolonged, median length 1.75 times the width between the eyes.

Neurotmeta sponsa may be recognized by its distinct venation and by the short, broad, spatulate vertex. Fresh specimens are light green, but fade to dull tawny yellow. The last ventral segment of the female is short with the median length one-third the length of the lateral borders.

The male genitalia may be described as follows: The eighth ventral segment deeply incised on the median line, elevated in a U-shaped ridge almost to the base of the segment. The ninth segment short, ring-like, the posterior

border when viewed laterally is strongly sloping cephalad. Genital plates large, extending caudad beyond the apex of the tenth segment. The ventral margins straight, contiguous, the apical border triangularly produced, the dorsal margin strongly curved with a distinct notch. The tenth segment spatulate, deeply notched, caudad; the anal notch deep; the anal spine small.

This species is common and widely distributed in Cuba. Specimens are at hand from Jarahueca, Oriente, July 14-18, 1927, S. C. B., on *Coffea arabica*; Nagua, Oriente, July 7, 1922, S. C. B. and C. H. B.; Santiago de las Vegas, June 12, 1920, Havana, S. C. B.; S. Nicholas, Oriente, July 20-21, 1927, S. C. B., taken at light; Camaguey, August 10-20, 1924, J. A., and Manzanillo, Oriente, July 31, 1922, S. C. B. and C. H. B.

Neurotmeta breviceps n. sp.

Head across eyes narrower than prothorax. Vertex, flat, somewhat more than twice as broad as median length, considerably produced in front of eyes, anterior margin obtusely angled, slightly rounded, posterior margin deeply incised to beyond anterior margin of eyes, lateral margins straight, parallel, median carina strong, lateral and anterior margins strongly but obtusely carinate. Pronotum, as long or slightly longer than median length of vertex, flattened above, strongly tricarinate as is also mesonotum. Venation, transverse line of veins to apex of clavus nearly straight, at right angle to longitudinal axis of elytra, costal membrane narrow, without distinct transverse veinlets.

Color, testaceous, but probably green in life.

Length, 7 mm., approximately.

Type, from Havana, Cuba, Dr. J. Gundlach, collector; in Gundlach Museum, Havana, No. 289, labeled "*Monopsis tabida* Spin."

The junior writer is indebted to Prof. Joaquin Folchs and Lieutenant Gonzalez of the Instituto de la Habana, for the privilege of examining this and several other specimens in the Gundlach Museum referred to in this paper.

In general facies this species resembles *Neurotmeta sponsa* Guer., except for much shorter vertex and broader form, aside from smaller size. It was listed by Valdés, 1910a, under the name given on the label in the Gundlach Museum, but it is quite distinct from *Monopsis tabida*, which does not appear to have been taken since the original description was published. Dozier, 1928a, says that *Monopsis tabida* was described from Cuban material, but he is evidently mistaken, as Spinola only mentions the "United States." On what authority the species has been listed by Van Duzee and others from Florida, we are unable to learn.

Pelitropis rotulata Van Duzee

This species is rather common in Cuba. Specimens are at hand from Omaja, Oriente, July 24, 1927, S. C. B.; Sto. Thomas, P. de Zapata; Sto. Clara, May 5-9, 1927, S. C. B. and J. A.; Santiago de las Vegas and Cojimar, Habana, S. C. B.; Sierra Rangel, P. del Rio, August 29, 1927, altitude 1500 feet; Camaguey, December 29, 1921, J. A.; and Nagua, Oriente, July 7, 1922, S. C. B. and C. H. B.

Nymphs are at hand from Nagua and from Santiago de las Vegas. They resemble the adult in a general way, being bright green in color with the carinæ tending toward bright orange. Vertex, distinctly spatulate, about as in the adult with the posterior border deeply incised and with a distinct median carina. Frons differs in having two strongly elevated median carinæ and a pair of intermediate carinæ which originate on the clypeal border about midway between the median carina and the lateral border and diverge upward, uniting with the carina at the apical border in front of the compound eyes.

Female genitalia, the last ventral segment of the female, is as long as the penultimate and about two-thirds as wide.

Male genitalia, eighth segment very short; deeply and roundly emarginate. Ninth segment ring-like, the caudal margins sinuate. Genital plates broadly triangular in outline, ventral margins slightly curved and contiguous. Tenth segment elongate, exceeding the genital plates. The caudal margins reflexed over the apex of the genital plates. Anal spines small, conical.

The name *Pelptiopsus mitratus* (Uhler MS) employed by Pedro Valdés (1910a: 443) for a specimen, No. 777, in the Gundlach Museum, Havana, is a synonym.

Colgorma Kirk

This name was proposed by Kirkaldy, 1904b: 279, to take the place of *Temora* Kirkaldy, 1901a:6, which was to take the place of *Rudia* Stal, 1866a:187, nec Costa 1861, Hymenoptera. Unfortunately *Temora* Kirkaldy, 1901, was preoccupied by *Temora* Baird, 1860, a genus of Crustacea. Since Stal, 1866c: 392, made *Achilus dilutus* Stal, 1859b: 271, the type of the genus *Rudia*, it is the type of the genus *Colgorma*. Melichar, 1914f: 79, uses *Temora* Kirk. with *Achilus dilutus* Stal as the type, and places it in the tribe *Tambiniini* and *Colgorma* Kirk with type *C. fowleriana* Kirk and places it in the tribe *Paricanini*. The tribe *Tambiniini* is distinguished from the tribe *Paricanini* by both Melichar and Muir because the genera in the former tribe have the "cross line distad of the middle of the wing," whereas in the latter tribe the "cross-vein is basad of the middle of the wing." Assuming that this is correct, and assuming further that *Rudia diluta* as figured by Fowler, 1904b, Pl. 11, Fig. 10, is correct and really represents *diluta*, as Fowler states that he compared his specimens with the type, *Colgorma* Kirk type *Achilus dilutus* Stal would fall in the tribe *Tambiniini* and would include *Temora* Kirkaldy as used by Melichar. This genus would include, therefore, the three species *C. diluta* Stal, *C. proxima* Fowl and *C. verticalis* Fowl. In regard to *Achilus bicinctus* Spinola, 1839a: 321, and *Rudia bicincta* Fowler, 1904b: 105, Kirkaldy, 1907b: 249, believed that these were distinct species, and he renamed the latter *Colgorma fowleriana*. Careful examination of the two descriptions and figures would lead us to believe that these are the same or closely related species. They differ in several respects from typical *Colgorma*, the most important being that the first branch of cubitus is not branched before the transverse line as it is in *Colgorma*. We would suggest, therefore, a new genus *Achilorma*, type *Achilius bicinctus* Spinola, and including the *Colgorma fowleriana* Kirk.

Our Cuban material includes two new species of the genus *Colgorma*.

***Colgorma montana* n. sp.**

This species is close to *C. diluta* Stal as figured by Fowler; the head is narrower, the vertex longer and more pronounced, the frons narrower, meeting the vertex at an acute angle not broadly rounded as in *diluta*.

Vertex, elongate, about one and one-half times as broad as the median length; anterior margin broadly curved with a strongly elevated carina; lateral margins nearly parallel, carinæ distinct; posterior margin curved having the appearance of being triangularly incised because there is a triangular elevated area, the lateral margins of which extend from the posterior angles almost to the anterior margin of the vertex. Frons, about twice as long as its greatest width, appearing longer because it is distinctly narrowed between the eyes; central area almost flat, distinctly separated from the lateral margins by furrows which are characteristic of the genus; dorsal margin distinctly separated from the vertex by a transverse carina, the margin itself is straight and horizontal; lateral margins with an evident carina, nearly parallel to the lower margin of the eye, then gradually diverging for an equal distance, then converging to the clypeal margin which is narrower than the dorsal margin; clypeal margin broadly concave. Clypeus, elongate, triangular, obtuse, about one-third as long as the frons, shallowly inserted in the frons; central area strongly elevated, continuing the central area of the frons. Labium, short, the basal segment about one-half as long as the distal segment which is about one-half as long as the median segment. Genæ, distinctly separated from the frons and vertex. Antennæ, short; the basal segment, collar-like; distal segment capitate; flagellum elongate, about five times as long as the distal segment. Ocelli, distinct, placed below the ventral margin of the eyes. Compound eyes, sub-globular, ventral sinus indistinct. Pronotum, short, broad, median carina distinct; lateral carinæ strongly diverging, following the contour of the compound eyes. Fore legs, coxa, short, about as long as the diameter

of the eye; femora, slender, elongate, about twice as long as the coxæ, prismatic, the margins with short, slender but distinct sub-erect setæ; fore tibiæ stout, about as long as the femora, prismatic, the margins lined with hairs as in the femora. Mesonotum, large, quadrangular; the median and lateral carinæ very distinct, the lateral carinæ converging anteriorly meeting on the median line. Tegulæ rather large; broadly elliptic with a horizontal carina. Fore wings, broad, the costal margin nearly straight, the apical border broadly rounded; costal vein broad, with fine tubercles on the apical half, these tubercles continuing around the apical margin; transverse line distinct but irregular; sub-costal-radial vein branching just anterior to the transverse line; medius united with radius for about one-half the length of the basal cell; cubitus one branched about two-thirds the distance between the basal cell and the transverse line; anal veins united for about two-thirds their length. Middle legs about as the fore legs but slightly longer. Hind femora elongate, somewhat capitate; hind tibiæ prismatic, longer than the femora with distinct sub-erect setæ on the margins, three evident spines on the lateral margins before the apex, two groups of spines at the apex, the lateral group of two elongate spines, and a median group with four shorter spines.

Male genitalia, eighth ventral segment short, collar-like; roundly emarginate posteriorly. Ninth ventral segment about three times as long as the eighth, the lateral margins sinuately curved. Tenth segment elongate spatulate, the apex broadly sinuate. Anal style short. Genital plates quadrate, the ventral margin curved, continuous along the median line.

Color, fresh specimens are pale olive green, more or less tinged with tawny, especially on the venter and legs. Wing veins in both fore and hind wing bright olive green. Eyes reddish brown. Antennæ greenish olive. Claws and tibial and tarsal spines black.

Size, length of apex to abdomen 4.5 mm. Length of the tip of the wing 5.1 mm. Width across the tegulæ 1.6 mm.

Types, Holotype, male, Sierra Mæstra, July 10-20, '22, 1100-1300 meters, C. H. B. and S. C. B. Allotype, female, Sierra Mæstra, July 10-20, '22, 1100-1300 meters, C. H. B.

and S. C. B. Paratypes, three males, one female, Sierra Maestra, July 10-20, '22, 1100-1300 meters, C. H. B. and S. C. B., Pico Turquino, July 20, '22, S. C. B. and C. H. B. 5500 ft.

Colgorma campestris n. sp.

This species differs chiefly from *Colgorma montana* in the following points: the vertex is much shorter and broader; the wings are narrower and more elongate with the costal cell narrower and more elongate.

Vertex, broad and short, three times as long as broad; anterior margin broadly rounded; posterior margin triangularly incised; lateral margins parallel. Frons, broad; lateral margins nearly parallel, not narrowed between the eyes, slightly wider at the level of the antennæ; the median area broadly elevated. Clypeus, elongate diamond-shaped, triangularly inserted into frons; the median elevated area not conspicuous. Antennæ, with basal segment very short; apical segment capitate. Pronotum, short and broad; with median carina indistinct; lateral carinæ conspicuous; the lateral impressed points deep. Mesonotum slightly broader than long, about as 13 is to 10; median and intermediate carinæ distinct, intermediate carinæ converging anteriorly nearly parallel posteriorly. Fore wings, narrow, elongate, the costal cell narrow elongate.

Holotype male, Jarahueca, July 14-18, '27, on *Coffea arabica*. S. C. B.

Allotype female, Jarahueca, July 14-18, '27, on *Coffea arabica*. S. C. B.

Paratypes, one male, Jarahueca, July 14-18, '27, on *Coffea arabica*. S. C. B.; one male, Barrio Caobilla, Camaguey, June 23-25, '27, J. A.; two females, Jarahueca, July 14-18, '27, on *Coffea arabica*. S. C. B.; and one female, Nagua, Oriente, July 7, '22, S. C. B. and C. H. B.

Cyphoceratops furcata Uhler

This species was described by Uhler 1901a: 510 from Cuba and Port au Prince. We have seen one of the type series from Port au Prince through the kindness of Dr. E.

D. Ball. It agrees in all essential details with our series from Barrio Caobilla, Camaguey, June 23-25, '27, J. A. This genus was described by Uhler as belonging to the family *Cixiidæ*. It belongs, however, to the family *Tropiduchidæ* and the tribe *Tambiniini*. In Melichar's key it falls next to his genus *Amapala* with two species from South and Central America. It differs principally from this genus in cephalic and thoracic characters. The wing venation is apparently quite similar. The essential characters of this genus are well illustrated by the figures and need not be repeated. The general color is greenish testaceous, bright green on the frons between the carinæ and on the lateral fields of the pronotum. The carinæ of the frons, the lateral carinæ of the clypeus and a stripe on the lateral fields of the pronotum are bright orange red. The lateral carinæ of the vertex are bordered with black. There is also a broad irregular cloud of the same color on the genæ above the compound eyes, on the anterior margin of the mesonotum and on the bases of the wings, also on the lateral fields of the clypeus. Two irregular rings on the fore and middle femora and one at the apices of the fore and middle tibia and an irregular cloud on the hind femora are dark brown shading to black. The mesopleura have a conspicuous round black spot.

Male genitalia, the ninth segment is short and broad. The genital plates are about three times as long as the ninth segment with a distinct triangular tooth occupying the basal third, followed by a distinct notch apically. Tenth segment elongate, slender, deeply inserted into the ninth segment. Anal spine reaching about half way to the apex of the tenth segment.

There is also a specimen of this insect in the Gundlach Museum, Havana, labeled "*Steptocratus*, No. 328." Gundlach records this (MS notebook) as taken at "Rangel" (Sierra Rangel Mountains, Pinar del Rio).

***Remosa spinolae* Guerin**

Myers 1928a: 23 places *Fulgora spinolæ* Guerin in the genus *Remosa* Distant after comparing specimens with the type of the genus. Melichar 1914f: 11 describes the genus

as having the costal membrane broad with many cross-veins. Distant 1906n: 355 in the original description makes no mention of costal cross-veins, neither does Myers. The specimens we consider *spinolæ* have no costal cross-veins. The structural characters are indicated by the figures. This insect was listed by Pedro Valdés as *Dictyophora spinolæ* based on the specimen in the Gundlach Museum (No. 102) which is probably also the origin of the name employed by Osborn 1926c: 354.

The color of fresh specimens is bright olive green with the eyes orange brown, faded specimens are more or less testaceous.

Male genitalia, seventh segment elongate, the median notch strongly elevated, forming a triangular tooth. Eighth segment short, almost concealed by the seventh segment. The median length of the ninth segment about twice as long as the median length of the seventh segment, broadly emarginate posteriorly. Genital plates elongate, nearly three times as long as the median length of the ninth segment; contiguous ventrally; dorsal margin with a distinct triangular tooth, basally. Tenth segment spatulate; the apex notched. Anal spine elongate, extending about one-third of its length beyond the apex of the tenth segment.

Specimens are at hand from Camaguey, July 15, J. A., Jarahueca, Oriente, July 14-18, '27; Sierra Rangel, P. del Rio, August 29, '27, 1500 feet; Casa Blanca, Havana, June 2, '26, S. C. B. and Santiago de las Vegas, September 2, '23; J. A., and June 3, '27, S. C. B. and B. T. Barreto, on *Cestrum diurnum* L.

Ladella acunæ n. sp.

This species differs principally from *Ladella pallida* Walk in the short transverse vertex. The vertex in *acunæ* is twice as broad as its median length whereas in *pallida* it is not as broad as its median length.

Vertex, twice as broad as its median length; the anterior and lateral margins distinctly carinate, the anterior margin broadly rounded, the lateral margins parallel, the posterior margin nearly parallel to the anterior margin; median carina not strongly elevated. Frons, elongate, about

one and one-half times as long as the greatest width, distinctly narrowed between the eyes; the lateral margins parallel to the level of the lower margin of the eyes, divergent to the level of the antennæ, suddenly converging to the narrower clypeus. Dorsal margin with a broad carina, the lateral margins strongly carinate, the median carinæ not strongly elevated. Clypeus broader and more elongate than in *pallida*; the lateral margins of the clypeus almost continuous with the lateral margins of the frons. Antennæ short, the second segment about four times as long as its basal width. Ocelli inconspicuous. Prothorax short, broad; anterior margin broadly rounded following the contour of the posterior margin of the vertex, the posterior margin broadly incised forming about a right angle; lateral margins straight, about as long as the median length; median carina distinct; intermediate carinæ converging to median line anteriorly, broadly diverging but not reaching the posterior margin; lateral margin with two distinct carinæ diverging posteriorly; lateral area of the pronotum almost quadrangular. Anterior legs short, weak; tibia shorter than the femora. Mesonotum large; median length about equal to its width between the tegulæ; median and intermediate carinæ strongly elevated meeting anteriorly on the median line and reaching the posterior margin. Fore wings, venation characteristic of the genus; the costal border relatively broader than in *pallida*; radius and cubitus forked at about the same distance from the basal cell, medius forked at slightly greater distance; transverse line irregular, crossveins in apical area few, some of which form a single distinct line. Hind legs, long, slender; tibiæ one and one-half times as long as the femora; tibiæ armed with three distinct spines, one near the apex, one near middle and one between these two; claws weak. Male genitalia, ninth ventral segment robust, broadly excavated posteriorly; genital plates elongate triangularly, rounded apically, meeting on the median line; tenth segment elongate, exceeding the genital plates, slender, spatulate; apex broad, rounded, notched.

Color, uniform pale green; spines on the posterior tibiæ and tarsi tipped with black; eyes concolorous.

Size, length to apex of wing 8.40 mm., width across tegular 1.90 mm.

Male Holotype, Los Llanos, Maisi, Oriente, Cuba. February 5, 1929, J. A.

FAMILY ACANALONIIDAE

In this family Guerin, Melichar, Osborn and Myers all record *Acanalonia servillei* Spinola from Cuba; Osborn records *Acanalonia sublinea* Walker; and Myers records an undetermined species. Our collection contains no less than seven species as indicated below.

Acanalonia servillei Spinola

This well known species has a wide distribution in the Southeastern states, having been recorded from Pennsylvania to Florida and in Cuba and Jamaica. We are inclined to question the Pennsylvania record of Amyot and Serville 1843a: 520. The short description would fit *Acanalonia latifrons* Walker, which was described later equally well and *latifrons* is the more northern species. The length given, 10 mm., is much nearer the average length of *latifrons* than it is of *servillei*. According to Melichar 1901a: 186 and Dozier 1928a: 110, this species is also found in South America but according to Distant 1910a: 298 the South American species is *A. laurifolia* Walker, which is distinct. *Servillei* may be recognized by its large size, 14-15 mm. to tip of wings, nearly uniform green color with the apical border of the wings marked by short brown dashes. The last ventral segment of the female is short with a short but distinct median flap with a curved posterior border. The width of the median flap is about one-fifth the width of the entire segment. In the male the genital plates are very broad, about three-fourths as broad as long. The tenth segment is short and broad, not reaching the apex of the genital plates. Anal style short, reaching about one-third the distance to the apex of the tenth segment; broadly spatulate in outline, bulbous at the base.

Specimens are at hand from Santiago de las Vegas, May, June and October, S. C. B., Hoyo Colorado, Havana, Camaguey, July 20, '23 and August 20, '24, J. A.; and from Mansanillo, July 31, '22, S. C. B. and C. H. B.

Acanalonia pumila Van Duzee

This species was described from Florida and has been recorded from Bermuda and North Carolina. Specimens are at hand from Isla de Pines, January 15, 1923, C. H. B., Barrio Caobilla, Camaguey, June 1927, J. A., Cojimar, Havana, July 1928, S. C. B., and Playa de Marianao, Havana, August 1927, S. C. B., Loma J. de la Torre, Oriente, January 1929, J. A. Also a pair of nymphs from the last locality. In general they resemble the adults. The frons is more elongate however, and has a double row of pustules along the lateral borders. These pustules are closely crowded and the inner row extends from the clypeal margin to the vertex and consists of about 13 distinct pustules. The outer row is shorter with about 8 pustules.

Female genitalia, the last ventral segment elongate; lateral and posterior borders distinctly sinuate to a rather deep notch on either side of the median projection which is about as long as the lateral margins of the segment and obtuse apically.

Male genitalia, the genital plates triangularly obtuse at the apex, exceeding the tenth segment by about one-fourth of their length. The tenth segment broad at the base; the anal groove broad and flat. Anal style elongate slender, bulbous at the base, the apex extending almost to the apex of the tenth segment.

Acanalonia impressa n. sp.

This species resembles *A. depressa* Melichar and *A. brevifrons* Muir. All three species have peculiar depressed vertexes. The present species is smaller than *depressa* but larger than *brevifrons*. From *brevifrons* it differs also in the more depressed vertex with the anterior margin nearly straight, not upturned as in *brevifrons*. The genital styles are not roughened in *impressa* as they are in *brevifrons*.

Vertex, impressed; its median length about half its width; surface smooth, somewhat shiny; anterior margin projecting in front of the eyes about one-half the median length; the posterior margin broadly rounded, indistinctly carinate; lateral margins about as long as the diameter of the eyes; diverging at an angle of about 20 degrees with strongly elevated carinæ which are continuous with the lateral carinæ of the frons and then curving abruptly caudad; lateral margins strongly carinate; nearly parallel but slightly diverging for about one-half the length and then abruptly converging to the clypeus; clypeal margin indistinct, the two arms forming an angle of about 45 degrees with each other. Clypeus, triangular, shallowly inserted in the frons, its width about three-fourths its length. Labrum, conical, about one-third the length of the clypeus; its surface distinctly hirsute. Epipharynx about one-half as long as the labrum. Labium, with basal segments small; second segment about twice as long as the distal segment. Mandibular sclerite small. Genæ, surface smooth, distinctly separated from the rest of the head by lateral carina of vertex and frons. Antennæ, short, length about one-fourth the diameter of the eyes; the basal segment about one-half as long as the distal segment; distal segment cylindrical; flagellum slender, length about twice the diameter of the eye. Ocelli, evident, situated below the horizontal diameter of the eye. Compound eyes, large, ventral emargination indistinct. Pronotum, short, deeply impressed on either side of the median line; anterior margin rather broadly rounded, projecting about one-half its length; posterior margin very broadly rounded, not parallel with the anterior margin; lateral flaps large. Fore legs, coxæ large; femora stout, about as long as the coxæ without evident spines; tibiæ stout, prismatic; tarsi short, claws weak. Mesonotum, large, smooth, shiny; lateral carinæ indistinct; disc somewhat elevated, lateral areas strongly sloping; lateral borders elongate. Metanotum, small, triangular. Tegulæ, about as long as the diameter of the eye; somewhat crescentic with apices blunt. Fore wings, large; costal borders nearly straight; apical borders slightly rounded. Venation typical; stem of medius about twice as long as the basal cell, three branches occurring together, the first

branch branching distad to the third branch. Middle coxæ shorter than the fore coxæ but about as stout; middle femora about as the fore femora with a row of six to eight indistinct teeth along the ventral anterior border. Middle tibiæ about as the fore tibiæ. Hind femora stout, about as long as the fore femora; hind tibiæ prismatic, distinctly clubbed apically, apex of the median face with two groups of teeth, one composed of two large teeth and the other of four small teeth. Hind tarsi, with the basal joint swollen with two large lateral teeth apically and a row of small teeth ventrally; claws short, stout.

Male genitalia, ninth segment broad, about three times as long as the eighth segment. Tenth segment short, not reaching the apex of the genital plate. Anal style short, robust, reaching about half way to the apex of the tenth segment. Genital plates elongate, nearly four times as long as its width; median border straight, contiguous throughout their entire length with an evident tooth dorsally; when viewed laterally genital plates are broadly triangular with the dorsal margin distinctly thickened posteriorly and projecting caudad as a blunt triangular tooth, and cephalid as a triangular tooth.

Female genitalia, last ventral segment short, the median flap short but distinct, its posterior border broadly rounded. Its width about twice its length.

Color, general color light green. The head and thorax tinged with tawny, especially on the carinæ and sides which are inclined to orange yellow; compound eyes dark with border distinctly black. Legs inclined to brown, the apex of femora and tibia externally more or less fuscous, with the claws and spines black. Fore wings with the costal and sutural borders tawny, the former paler anteriorly; the posterior half of the costal, apical and sutural borders distinctly marked with short brown dashes between the veins, the latter in large part faintly tinged with tawny. Hind wings milky with veins brownish. Abdomen tawny.

Size, length to apex of wings 10 mm; to apex of abdomen 6 mm; width across tegulæ 2.2 mm; length of wing 8.5 mm; width at apex 4.5 mm.

Holotype, male, Sierra Rangel P. del Rio, Cuba, August 29. Altitude 1500 feet. J. A. and S. C. B., on *Phoebe*

elongata. Allotype, female, Barrio Caobilla Camaguey, Cuba, June 23-25, J. A. Paratypes, two males same as allotype and male, Baracoa, Oriente, Cuba, April 21-30, 1929, S. C. B. and L. Boucle.

***Acanalonia lineata* n. sp.**

This species may be the same as the species listed by Osborn as *Acanalonia sublinea* Walk. It is apparently close to *A. viridis* Melichar. Walker gives no diagnostic characters of value for *sublinea* except length of body and length of wings. Our species is much smaller. Melichar gives as the chief diagnostic character for *viridis* "dass der innere Gabelast des N. ulnaris Ext. einfach ist," but it is evidently branched in the specimens before us.

Head across the eyes as wide as prothorax. Vertex, broad, about five times as broad as the median length; anterior margin confluent with the frons, broadly rounded when viewed laterally; posterior margin not concentric with the anterior margin, more deeply angularly emarginate; lateral margins diverging, definitely carinate. Frons, about one and one-third times as wide as long with a definite median carina; lateral margins carinate, slightly diverging to the level of the antennæ and then converging to the clypeus; clypeal margin fairly definite. Clypeus, conical, the median carina indistinct. Labium, basal segment short, intermediate segment elongate, robust; distal segment about two-thirds as long as the intermediate, slender. Antennæ, basal segment short, collar-like; distal segment broader than long, capitate with a definite apical notch. Flagellum, elongate, slender, longer than the great diameter of the eye. Ocelli, conspicuous at the level of the horizontal diameter of the eye. Compound eyes, large, ventral sinus small. Pronotum, broad, the dorsal field barely four times as broad as its median length, without carinæ or with faint median carina; anterior margin following contour of the head; posterior margin shallowly excavated; lateral fields large. Fore legs, coxæ elongate, about one-half as long as the femora; tibiæ prismatic, the margins distinctly elevated, ciliate with very short sub-erect setæ. Mesonotum,

large, about three times as long as the vertex and pronotum together, wider across the tegulæ than its median length with a fine but distinct median carina. Tegulæ, very small, broadly U-shaped. Fore wings, subcosta short; radius elongate, breaking up into reticulations; medius branching into two branches at about the length of the basal cell, the costal branch branching again at about the same distance; claval branch unbranched; cubitus one unbranched. Middle coxæ, shorter than the fore coxæ, definitely conical; middle femora about as long as fore femora, stout; the ventral border carinate; middle tibiæ about as the fore tibiæ, the margins definitely short, ciliate. Hind legs, femora slightly longer and stouter than the fore femora; tibiæ about twice as long as the hind femora, distinctly clavate, the base slender, the apex with seven stout spines; tarsi with the basal segment stout, about twice as long as the intermediate, with a pair of stout lateral spines and eight short ventral spines.

Male genitalia, ninth ventral segment slender, elongate, about twice as long as the eighth; the genital plates very obtuse but slightly longer than the ninth segment; tenth segment elongate, slender deeply inserted in the ninth segment, not exceeding the genital plates; anal style short, slender, reaching one-third of the distance to the apex of the tenth segment.

Female genitalia, last ventral segment short, the median flap about as long as the lateral margins, its width about four times its median length.

Color, general color greenish, head and thorax fading to tawny olive green. Fore wings bright green, the apical margin marked with a row of indistinct brownish dashes. There is a distinct pale tawny line from the apex of the vertex to the tip of the mesonotum, which is continued along the commissural margins, where it is margined by indistinct brownish dashes. The pale tawny line from apex of vertex is absent in one of the paratypes. Legs tawny. The fore and middle tibiæ and hind tarsi brownish. Eyes dark brown.

Size, total length 8.25 to 9.00 mm., from apex of vertex to apex, 8.25 mm.; width of tegulæ, 2.10; total length of wings, 7.20; greatest width of wings, 4.70.

Holotype male, Barrio Caobilla, Camaguey, June 23-25, 1927, J. A. Allotype, female, Sto. Thomas, P. de Zapata, May 5-9, 1927, S. C. B. and J. A. Paratypes, male and female, Barrio Caobilla Camaguey, June 23-25, 1927, J. A.; female, Sto. Tomas, P. de Zapata, May 5-9, 1927, S. C. B. and J. A.

Acanalonia carinata n. sp.

This species resembles *A. umbraculata* Fabr., but is smaller, the median carina of the frons is very evident and extends to the base of the vertex.

Vertex, strongly sloping, confluent with the frons, anterior and posterior margins parallel, lateral margins strongly diverging. Frons, distinctly longer than broad, the side margins diverging slightly to the level of the eye and then converging to the clypeus, dorsal margins confluent with the vertex, median carina strongly elevated; a pair of intermediate carinæ start above the clypeal margins and diverge to the level of the dorsal margin of the frons, then converge to the base of the vertex where they are united by a transverse carina. Clypeus about as long as the width of the frons, median carina indistinct, the frontal margin indistinct, forming an obtuse angle. Antennæ, short, the basal segment collar-like, about one-half as long as the distal segment, which is short terete, the two segments together about one-fourth as long as the great diameter of the eye. Pronotum short, the anterior margin obtusely produced, the posterior margin shallowly excised; the impressed points small and shallow. Mesonotum, elongate without definite carinæ. Fore wings, elongate, relatively narrow, nearly twice as long as its greatest width. Medius three-branched.

Male genitalia, ninth segment elongate, tenth segment elongate, not reaching the apex of the genital plates; genital plates about twice as long as broad, obtuse, the dorsal angle strongly recurved in a blunt hook.

Color, grass green, the head, thorax, legs and abdomen fading to tawny, eyes clouded with black, claws and tips of spines black; margins of the wing fuscous or with fuscous dashes between veins.

Length, to the apex of wing, 6.50 mm.; length of wing, 6.00 mm.; width of wing, 3.20 mm.; width across tegulæ, 180 mm.

Holotype, male, Santiago de las Vegas, June 2, 1922, S. C. B. Allotype, female, Sto. Tomas, P. de Zapata, Cuba, May 5-9, 1927, J. A. Paratypes, male Sto. Tomas, P. de Zapata, May 5-9, 1927, S. C. B. and J. A.; Habana, Nov., 1927; Sto. Fe, Is. de Pines, Sept. 6, 1926, S. C. B.; Wajay, Aug. 31, 1928, S. C. B., Santiago de las Vegas, Feb. 1, 1929, and May 24, 1928, S. C. B. Female, Calabazar, August 5, 1928, S. C. B.

Acanalonia viridula n. sp.

This species is close to *A. virescens* Stal, but the vertex is rounded anteriorly, not produced as in that species, and the wings are elongate.

Vertex, anterior and posterior margins nearly parallel, surface smooth, median carina indistinct. Lateral margins but slightly diverging, nearly parallel to the anterior margins of the eyes, strongly elevated. Frons, slightly broader than long, the median carina strongly elevated to the dorsal margin; lateral margins slightly diverging to the level of the antennæ and then strongly converging to the clypeus; clypeal margin distinct, the two limbs forming a right angle. Clypeus elongate, together with the labrum, longer than the frons. Antennæ, short, length about one-third the great diameter of the eye; basal segment, collar-like, distal segment capitate. Flagellum about as long as the great diameter of the eye. Pronotum short, its width to the tegulæ about six times its length; anterior and posterior margins not parallel, without carinæ. Fore legs, the fore tibiæ longer than the femora and trochanter together; femora stout, tibiæ prismatic, the margins strongly emarginate and ciliate. Mesonotum about twice as long as the vertex and pronotum together; median and lateral carinæ evident. Middle legs, about the same as the fore legs, hind tibiæ elongate, clavate. Fore wings are elongate, nearly twice as long as their greatest width. Medius with three branches evident, the inner branch indistinctly forked near the apex.

Male genitalia, the ninth segment elongate, about one-half as long as the genital plates; the tenth segment reaching the apex of the genital plate, genital plates broad, their width about three-fourths their length, apex broadly rounded, distinctly ciliate.

Size, length to the apex of the wing, 7.50 to 7.75 mm.; width across the tegulæ, 2.20 mm.; total length of the wing, 6.60 mm.; greatest width, 3.50 mm.

Color, general color grass green, the head, legs and abdomen fading to tawny green, the eyes clouded with black. The flagellum, claws and spines of the legs tipped with black. Apical border of wings with short, indistinct fuscous dashes.

Holotype, male, Cape San Antonio, March 13, 1924, S. C. B. Paratype, male, Santiago de las Vegas, July 11, 1922.

Acanalonia gundlachi n. sp.

Head across eyes distinctly narrower than prothorax. Vertex, strongly produced into an acute angle, obtusely rounded at extreme apex, as long or somewhat longer than broad, about twice the length of pronotum, flat or very faintly concave over disc, slightly elevated towards apex, surface smooth, without carinæ, lateral margins sharp. Frons, flattened, meeting vertex at an acute angle. Pronotum, short, rather strongly impressed on either side of median line, anterior margin well rounded and extending between eyes to more than three-fourths distance to their anterior margin, posterior margin very broadly and shallowly emarginate, not parallel with anterior margin, surface smooth, without carinæ, somewhat flattened dorsally. Mesonotum, large, about four times as long as pronotum, smooth with faint indications of lateral carinæ, rounded above, disc not distinctly elevated. Fore wings, large, broad, broadest across center, narrowing slightly towards apex, strongly rounded before center, then straight, apical margin vertical, nearly straight, slightly rounded. Venation, prominent, medius long, strongly elevated. Color, bright green; fore wings very narrowly bordered with tawny, broader on sutural margins; the elevated medius

appearing pale orange testaceous; legs brownish testaceous.

Size, length to apex of tegmen, 13 to 15 mm.

Holotype and paratype from Yateras, Oriente Province, and Monte Toro, Cuba, Dr. J. Gundlach, collector; in the Gundlach Museum, Habana, Cuba, No. 344.

The above brief description was made from the two specimens preserved in the Gundlach Museum in a sealed, glass-covered box, from which they could not be removed for more careful study. This striking species is not easily confused with anything else reported from the West Indies. It appears to be related to the very recently described *Acanalonia coniceps* Osborn from Porto Rico (Jour. Dept. Agric. Porto Rico, 3, pp. 108-109, July, 1929—issued November, 1929), but is much larger.

Acanalonia insularis n. sp.

This species resembles *Acanalonia lineata* in general appearance, but is much smaller, 6.5 mm., as contrasted with 9.5 mm. of the other species. The genitalia is also decidedly different. It resembles *carinata* in having the diverging intermediate carinæ, but differs in having the shorter, somewhat broader frons and in having relatively narrow and more elongate wings. The genitalia is also decidedly different from those of *carinata*.

Vertex, somewhat elongate with median length slightly more than one-half the width between the eyes; median carina fine, distinct; anterior margin broadly triangular; lateral margin slightly diverging. Frons, nearly as broad as long; lateral margins parallel to the level of the antennæ and then converging to the clypeus. Median carina distinct; a pair of intermediate carinæ arise about the middle of the frons and diverge to the lateral margin. Clypeus, short, about as long as broad. Pronotum, short, with its median length about two-thirds as long as the median length of the vertex; anterior margin obtusely produced; posterior margin broadly sinuate. Mesonotum, longer than broad, ecarinate. Fore wings, rather short and broad; medius, three-branched.

Male genitalia, ninth segment elongate; tenth segment short, reaching about two-thirds of the distance to the apex of the genital plates. Genital plates, broad, obtuse; dorsal angle broad, not recurved.

General color, grass green, with the tips of the tibia and the tarsi fading to tawny. Eyes, chocolate color. Claws and spines black. Costal and apical margins of wings with fine black dashes between the veins. A median pale stripe extends from the apex to the vertex across the pro and mesonotum to the apex of the claws.

The length to the apex of wings, 6.80 mm. Length of wings, 5 mm. Greatest width of wings, 4.50 mm.

Holotype: Male, Sta. Fe, Isla de Pinos, Sept. 8, 1928. S. C. B. and L. B.

Allotype: Female, Sta. Fe, Isla de Pinos, Sept. 8, 1928. S. C. B. and L. B.

Paratypes: Male, Sta. Fe, Isla de Pinos, Sept. 8, 1928. S. C. B. and L. B. Female, Buena Gerona, Isla de Pinos, Sept. 12, 1928. S. C. B.

BIBLIOGRAPHY

- Distant, W. L. 1910a. Rhynchotal Notes L. Ann. Mag. Nat. Hist. (8) 5: 297-322.
- Dozier, H. L. 1928a. The Fulgoridæ or Plant-Hoppers of Mississippi, Including Those of Possible Occurrence. A Taxonomic, Biological, Ecological and Economic Study. Tech. Bull. Mississippi Agr. Exp. Sta. 14: 1-152; Figs. 1-35.
- Fowler, W. W. 1904b. Fulgoridæ. Rhynchota. Homoptera. Biologia Centrali-Americana; Contributions to the Knowledge of the Fauna and Flora of Mexico and Central America. 1: 85-108. Pls. 10-11.
- Guerin-Meneville, F. E. 1856a. Segunda seccion. Homopteros. Historia Fisica, politica y natural de la Isla de Cuba por D. Ramon de la Sagra. Segunda Parte Historia Natural Tomo 7: 1-868; Pls. 1-20 (178-182; Pl. 13).

- 1857a. Seconde section. Homoptères Latr. Histoire Physique, Politique et Naturelle de l'Île de Cuba par M. Ramon de la Sagra, 1-868; Pls. 1-20 (424-435; Pl. 13).
- Kirkaldy, G. W. 1904b. Bibliographical and nomenclatorial notes on the Hemiptera. No. 2. Entomologist 37: 254-258.
1901a. Miscellanea Rhynchotalia. Entomologist 34: 5-6.
1907b. Notes on Central American Hemipterous Fauna. Canadian Ent. 39: 248-250.
- Melichar, L. 1914f. Monographie de Tropicuchinen (Homoptera). Verh. Naturf. Ver. Brunn 53: 1-145; Figs. 1-35.
- Metcalf, Z. P. 1923a. A Key to the Fulgoridæ of Eastern North America with Descriptions of New Species. Jour. Elisha Mitchell Soc. 38: 139-230; Pls. 38-70.
- Myers, J. G. 1928a. Notes on Cuban Fulgorid Homoptera. Studies on Cuban Insects: 13-28; figs. 1-15.
- Osborn, H. 1926c. Faunistic and Ecologic Notes on Cuban Homoptera. Ann. Ent. Soc. America 19: 335-366; Pls. 30-31.
- Spinola, M. M. 1839a. Essai sur les Fulgorelles, Sous-tribu de la tribu des Cicadaïres, ordre des Rhyngotes. Ann. Soc. Ent. France 8: 133-337; Pls. 1-7, i. e. 10-16.
- Stal, Carl. 1859a. Novæ quædam Fulgorinorum formæ speciesque insigniores. Berliner Ent. Zeit. 3: 313-328.
1866a. Hemiptera Africana. Tomus 4: 1-275; Pl. i.
- Uhler, P. R. 1884a. Order VI. Hemiptera. Standard Natural History 2: 204-296; Pl. 1. Figs. 286-343.
1901a. Some new genera and species of North American Hemiptera. Proc. Ent. Soc. Washington 4: 507-515.
- Valdes Ragues, Pedro. 1910a. Clasificacion Gundlach de Hemipteros Cubanos conforme a los ejemplares que existen en el Museo del instituto de 2a. enseñanza de la Habana. An. Acad. Cien. Habana 46: 425-446.

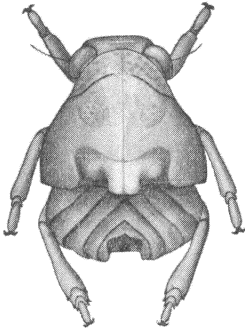
- Van Duzee, E. P. 1907a. Notes on Jamaican Hemiptera: A report on a collection of Hemiptera made on the Island of Jamaica in the Spring of 1906. Bull. Buffalo Soc. Nat. Sci. 8: 1-79. Pls. 1-2.
- 1917b. Catalogue of the Hemiptera of America north of Mexico excepting the Aphididæ, Coccidæ and Aleurodidæ. Tech. Bull. Univ. California Agr. Exp. Sta. 2: 1-14; 1-902.

DESCRIPTIONS OF PLATES

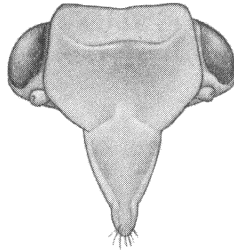
- Plate 21. Adults and nymphs of Cuban Tropicuchidæ and Acanaloniidæ.
- Plate 22. Outlines of head and thoracic characters of Cuban Tropicuchidæ and Acanaloniidæ.
- Plate 23. Wings of Cuban Tropicuchidæ.
- Plate 24. Male Genitalia of Cuban Tropicuchidæ.
- Plate 25. Male genitalia of Cuban Acanaloniidæ.

Psyche, 1930

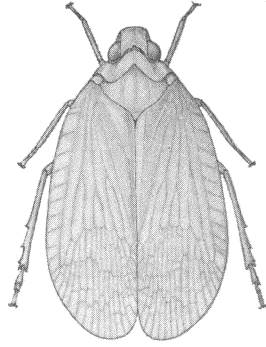
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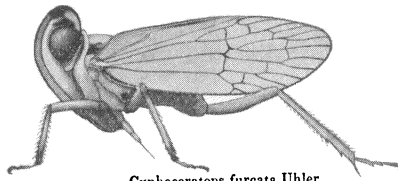
Acanalonia pumila Van D. nymph



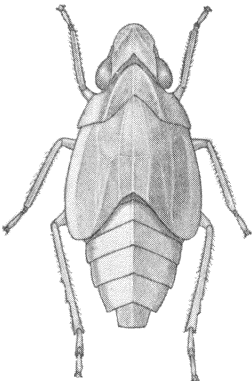
Acanalonia impressa n.sp.



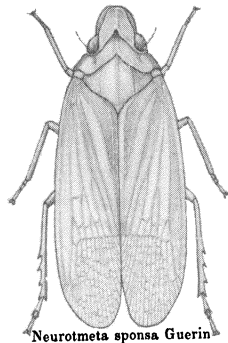
Ladella acunae n.sp.



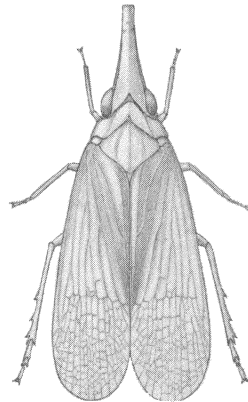
Cyphoceratops furcata Uhler



Neuroteta sponsa Guerin.nymph.



Neuroteta sponsa Guerin

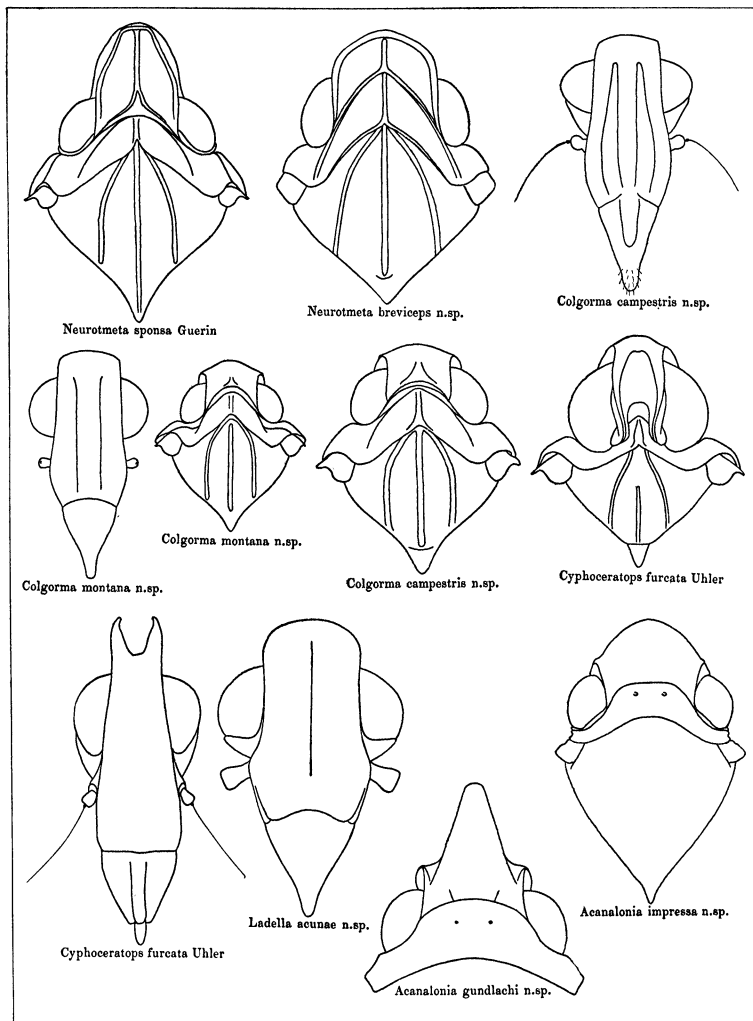


Remosa spinolae Guerin

Metcalf and Bruner—Cuban Fulgorina.

Psyche, 1930

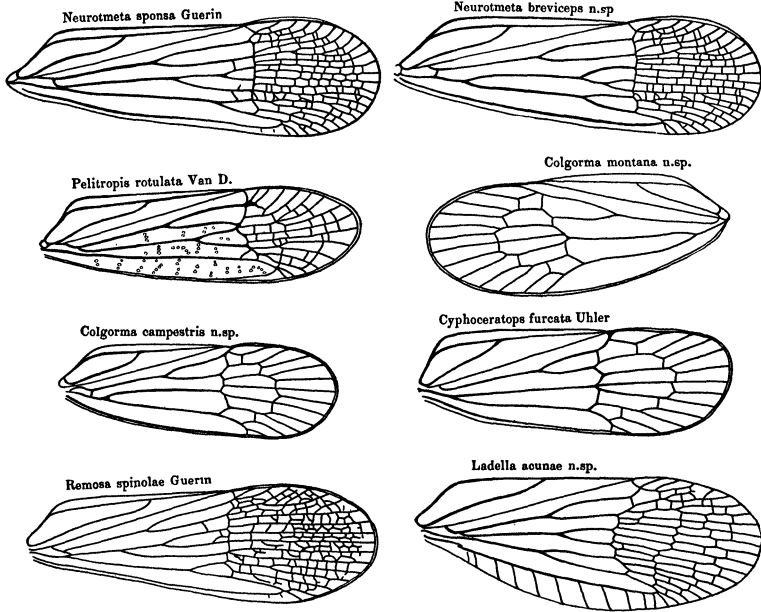
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Metcalf and Bruner—Cuban Fulgorina, Head and Thoracic Characters.

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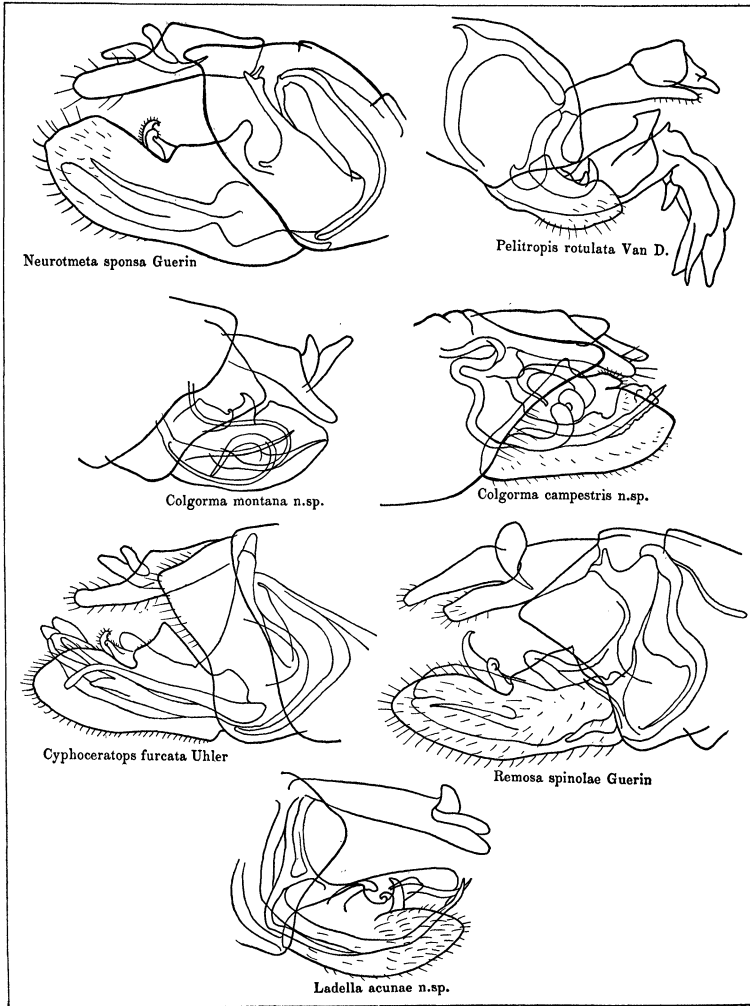
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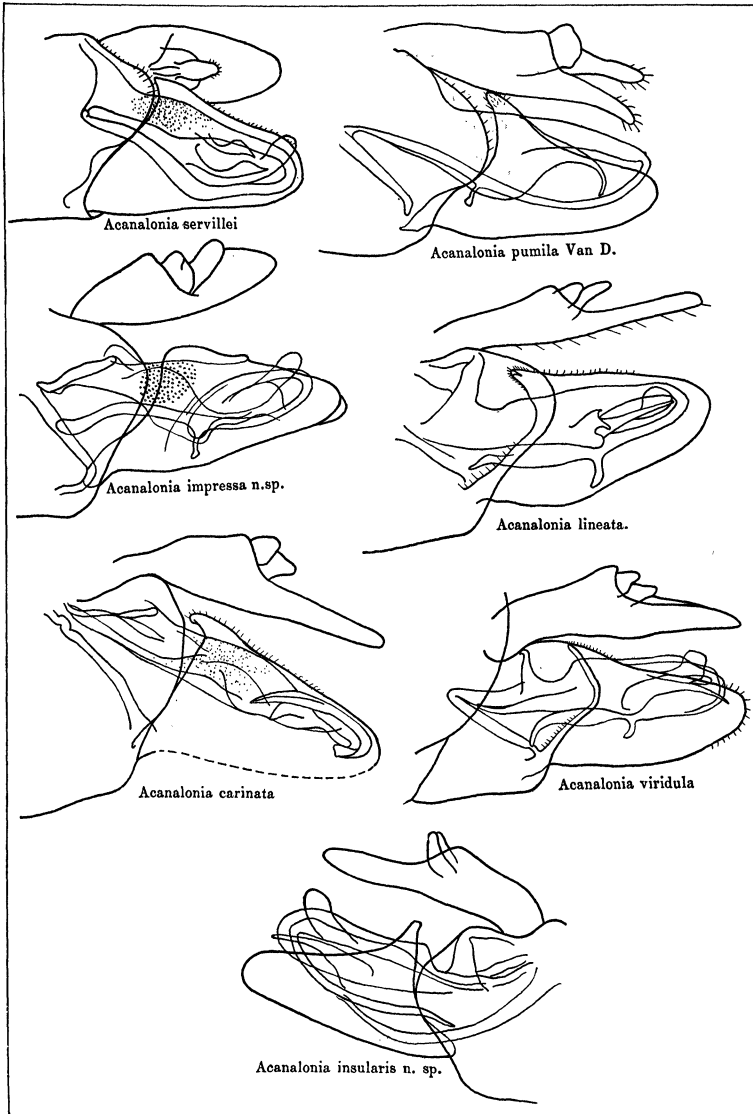
Metcalf and Bruner—Cuban Tropiciduchidæ, Fore Wings.

Psyche, 1930

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Metcalf and Bruner—Cuban Tropicuchidæ, Male Genitalia.



Metcalf and Bruner—Cuban Acanaloniidæ, Male Genitalia.