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NOTES ON GUATEMALAN HEMIPTERA WITH DESCRIPTIONS OF A FEW NEW SPECIES.

HERBERT OSBORN.

During the winter of 1905 Prof. J. S. Hine made a collecting trip in Guatemala and the Hemiptera collected, except the aquatics, have been turned over to me. As the material in this collection adds new localities for many of the species recorded in the *Biologia Centrali Americana*, in some instances entirely new records for the Central American region, and also some few species that appear to be new to science, it seems desirable to give a list of all the species so far as determined with the records of the localities where collected and such notes on distribution as may add to our knowledge of the geographical range of the species. The localities worked by Prof. Hine were Puerto Barrios near the coast and Morales, Los Amates, Gualan, for the Atlantic slope; and Guatemala City, Amatitlan, Santa Lucia, Mazatenango, San José, for the Pacific slope. Considering the time during which the collections were made and that quite a number of species are still undetermined, this list must be considered as quite extended particularly if we note that Hemiptera were only one group in which collections were made.

As it is but a few years since the appearance of the "Biologia" articles on Hemiptera of this region, it seems unnecessary to attempt a full bibliography and only such citations of references or synonymy are given as seem necessary to properly locate the species or to correct what appear to be erroneous references in previous articles. The work in the "Biologia" seems to have been done with too little regard to determination of the previously described forms and there is a large number of new species described which will probably have to be reduced to synonyms when the fauna is more carefully worked.

It will be noticed that while a considerable number of species in this list corresponds with the nearctic representatives of our own latitude, the great majority are different. A considerable number are South American and so far as records show many are restricted in range to the Central American region. While these records will be of service in deductions concerning the relationship of this fauna it is not my purpose here to go into any discussion of the geographical affinities. This can better be done in connection with discussions of the geographical range in particular families.

MEMBRACIDAE.

Pterygia bituberculata Fowl.

One good example of this species from Los Amates agrees closely with Fowler's description and figure. I have not seen *hispidata* Fairmaire and cannot determine as to distinctness of the two species.

Sphongophorus ballista.

Taken at Puerto Barrios, March 3d, and Livingston, March 5, 1905. Certainly one of the most grotesque of this peculiar group.

Bolbonota pictipennis Fairm.

From Puerto Barrios, March 3d.

Tylopelta gibbera Stal.

Puerto Barrios, March 3d, evidently fairly common, the collection including nine examples.

Aconophora temaxia Fowler.

Four females, six males Puerto Barrios, March 3d.

Fowler's description is based on three females only. The males associated here differ from the females in being smaller and of a darker color the pronotal horn slightly shorter but otherwise very similar.

Aconophora nigra Stal.

A single specimen from Puerto Barrios, March 3d, and one from Mazatenango Feb. 3d.

Hyphonæ asphaltina Fairm.

A number of specimens of this common species from Puerto Barrios, and Los Amates. These show quite a little variation in size and convexity of anterior face of pronotum.

Acutalis fusconervosa Fairm.

One specimen, collected at Los Amates in February, and four from Mazatenango February 3d. The anterior face of pronotum is decidedly tawny.

Micrutalis lugubrina Stal.

One specimen, Los Amates, is referred here. In some points it agrees with the variety *parallela* of Fowler.

Micrutalis binaria Fairm.

One specimen from Puerto Barrios (March) two from Los Amates (January and February). Evidently not common.

Micrutalis malleifera Fowler.

Los Amates, January, 1905. Santa Lucia, February 2, 1905. Two specimens from Gaulan, differ from the more typical example and possibly represent another species.

Cyphonia clavata Fab.

A good series of this very striking species from Puerto Barrios (March) and Los Amates and Mazatenango (February). Fowler records it for Guatemala only from Mirandilla.

Poppea munda Fowler.

A single specimen collected at Puerto Barrios March 3, 1905. The species was described by Fowler as from one locality only. "Panama, Caldera in Chiriqui 1200 feet (Champion)."

Polyglypta maculata Burm.

The single specimen referred here was taken at San Pedro in February. While it might easily be referred to some of the described varieties of dorsalis, it seems on the whole to agree best with this species.

Enchenopa lanceolatum Fab.

Membracis lanceolatum Fab. Mant. Ins. II p. 263, 10 (1787).

Enchophyllum (*Tropocera*) *lanceolatum* Fabr. Stal. Hemipt. Fabricana, 2, 42.

Enchenopa, lanceolata. Fowler, Biol. Cent. Em. 1, 9.

Two specimens Puerto Barrios. Four specimens Los Amates, February and March.

These differ from our northern form of *E. binotata* in having the pronotal horn longer and more curved, the tip much less expanded laterally, and the carinæ at base fewer and less distinct so that I conclude they must be referred here, rather than to *binotata*, in spite of Fowler's statement that it does not occur in the northern part of Central America.

Ceresa vitula Fab.

Puerto Barrios, Los Amates, Mazatenango. These specimens correspond closely with the var. minor of Fowler, but whether they merit varietal rank seems doubtful.

Stictocephala sp.

One specimen Santa Lucia Feb. 2, 1905.

Stictocephala dubia Fowler.

Two specimens taken at Gaulan Feb. 2, 1905. It seems very probable that this species will prove to be a synonym of some of the earlier described forms but I have not material at hand to undertake a comparison.

Sphaerocentrus curvidens Fairm.

One specimen, Los Amates, February, 1905.

Brachybelus cruralis Stal.

Three specimens from Los Amates and one from Puerto Barrios are referred here. They vary considerably in size but in other characters seem too closely related to merit separation.

CERCOPIDAE.

Tomaspis postica Walk.

Monecphera postica Walker, List, Hom. Sus. Suppl. 177.
Tomaspis pictipennis Stal. Stett. Ent. Zeit. 25, 63.
Tomaspis postica Fowl. Biol. Cent. Am. Hom. II 184.
Tomaspis jugata Fowl. Biol. Cent. Am. Hom. II 183.

A good series of 21 specimens are in hand from Puerto Barrios, Panzos and Los Amates. Also from San Pedros, Hond. Feb. 21, 1905 (E. B. W.)*. Some of the smaller specimens agree so perfectly with Fowler's *jugata* that I feel convinced that this should be considered a synonym.

Tomaspis bicincta Say.

Several specimens collected at Puerto Barrios in early March.

Clastoptera compta Fowl.

Abundant, Los Amates, Puerto Barrios.

Clastoptera funesta Stal.

Los Amates, Panzos, Santa Lucia and Mazatenango (January, February and March). These specimens vary considerably in presence or absence of the yellow markings but seem to belong together.

TETTIGONIDAE.

Phera atra Walk.

One specimen Puerto Cortez, Honduras, March 23, 1905.
 Two specimens Puerto Barrios, March 3, 1905.

Phera centrolineata Sign.

One specimen Mazatenango, Feb. 3, 1905.

Oncometopia invidenda Fowler, Biol. Cent. Am.

Morales, March 8, 1905. A good series of eight specimens.

Oncometopia speculifera Sign.

One specimen from Los Amates, Feb. 18th.

Oncometopia anceps, Fowl.

Two specimens Feb. 17, 1905.

Oncometopia obtusa, Fab.

Oncometopia interjecta, Fowler, Biol. Cent. Am. Homp. 11, 228.

A series of 6 specimens varying much in color, especially underneath, but with apparently constant color pattern. These appear to me to include the form described and figured as *interjecta* by Fowler. One specimen otherwise apparently identical is only about half the size of the others, 9 m. m., against 14.5 in length for the large individuals.

*E. B. Williamson, to whom a number of records in Honduras are due.

Dilobopterus 5-signata Walk.

One specimen Los Amates Feb. 17, 1905.

Tettigoniella redundans, Fowl.

Taken at Los Amates, Feb. 18-26, Mazatenango, Feb. 3, 1905.

Tettigoniella Stali var. **fractinota** Fowl.

Puerto Barrios March 3d, Los Amates Feb. 28, 1905. Mazatenango, Feb. 3d. Also at San Pedro, Honduras, Feb. 21, 1905. (E. B. W.)

Tettigoniella pulchella, Fab.

An abundant and widely distributed species. Los Amates, Feb. 17, 1905. Santa Lucia, Feb. 2d, 1905. Gualan, Feb. 14th, 1905. Also at San Pedro Honduras, Feb. 21, 1905 (E. B. W.).

Tettigoniella jucunda, Walk.

Taken abundantly at Los Amates, Feb. 18-28, 1905. Puerto Barrios, also San Pedro, Honduras, Feb. 21, 1905 (E. B. W.)

Tettigoniella laudata, Walk.

Los Amates, Feb. 17. Puerto Barrios, March 3d. Also San Pedro, Honduras, Feb. 21, 1905 (E. B. W.)

Tettigoniella areolata Sign.

Gualan, Feb. 14th. Mazatenango, Feb. 3, 1905. Apparently an abundant species at these points.

Tettigoniella 6-guttata, Fab.

Mazatenango, Feb. 3d.

Tettigoniella bifida Say. var. **fuscolineella** Fowl.

Tettigonia fuscolineella Fowl, Biol. Cent. Am. Homop II, 290.

Los Amates, Jan. 17th, Panzos, March 18th. Mazatenango, Feb. 3d, Santa Lucia, Feb. 2d. Also San Pedro, Honduras, Feb. 21, 1905 (E. B. W.)

While there is quite constant difference between the Central American forms and our northern *bifida*, especially in the shorter vertex and brown face, it seems quite probable that the difference is varietal rather than specific.

Tettigoniella geometrica Sign.

Tettigonia psittacella, Fowl. Biol. Cent. Am. Homop, II, 290.

This species was taken at Los Amates in January and February and at Mazatenango, Feb. 3d. I see no basis for separating Fowler's species from Signoret's and probably he was not familiar with the latter.

Tettigoniella satelles Fowl.

Two specimens, Los Amates, Feb. 18-28, 1905.

Tettigoniella virgaticeps Fowl.

One specimen Puerto Barrios, March 3, 1905.

Tettigoniella caeruleovittata Sign.

Among the many specimens of this species, there are two fairly well marked color varieties, one considerably darker than the other. Aguas Calientes, Jan. 28th, Mazatenango Feb. 3d, Los Amates, Feb. 18-28, 1905.

Tettigoniella miniaticeps, Fowl.

Common, Puerto Barrios, March 3d, Los Amates, Jan. 17. Also San Pedro, Honduras, Feb. 21, 1905 (E. B. W.)

Tettigoniella venusta Stal.

Two specimens from Santa Lucia Feb. 2, 1905.

Tettigoniella reservata Fowl.

Two specimens, Los Amates, Jan. 17th and Feb. 18th.

Tettigoniella rufimargo Walk.

Los Amates January and February.

Tettigoniella occatoria Say.

Apparently very abundant and specimens are included from Mazatenango, Feb. 3d, Los Amates, Feb. 18-28, Puerto Barrios, March 3d, 1905. San Pedro, Honduras Feb. 21, 1905 (E. B. W.).

Tettigoniella mollicella Fowler.

Los Amates Jan. 17th. Gaulan Feb. 14, 1905.

Tettigoniella sexlineata Sig.

Plentiful at Los Amates, Feb. 18-28.

Tettigoniella lativittata Fowl.

A good series from Los Amates, Feb. 18-28. One, San Pedro, Honduras, Feb. 21, 1905 (E. B. W.)

Tettigoniella similis Walker.

Tettigonia prolixa, Fowl. Biol. Cent. Am. Homop. II, 275.

Of this widespread and abundant species numerous examples are in hand from Mazatenango, Feb. 3d, Los Amates, Puerto Barrios, March 3d, Santa Lucia, Feb. 2d. Also, San Pedro, Honduras, Feb. 21, 1905 (E. B. W.)

Tettigoniella salutaris, Fowl.

One specimen Los Amates, Feb. 1905.

Diedrocephala sanguinolenta Fab.

Cicada sanguinolenta Fab.

Tettigonia sanguinolenta, Sign. Ann. Ent. Soc. Fr.; Fowler Biol. Cent. Am. Homop. II, 262.

This common species appears in number in collections at Puerto Barrios, March 3d, Los Amates, Feb. 18-28, Mazatenango, Feb. 3d. Two, San Pedro, Honduras, Feb. 21, 1905. (E. B. W.)

Diedrocephala variegata Fab.

Cicada variegata Fab.

Tettigonia variegata, Fowler, Biol. Cent. Am. Homop. II, 291.

One specimen Los Amates, Feb. 16-28.

- Diedrocephala versuta** Say. var. **lineiceps** Spin.
Santa Lucia, Feb. 3d, Mazatenango, Feb. 3, 1905.
- Diedrocephala rufoapicata** Fowl.
Tettigonia rufoapicata Fowl. Biol. Cent. Am. Homop. II, 206.
A single specimen Los Amates Jan. 17th. The species appears well marked but will come under *Diedrocephala* as now defined.
- Diedrocephala orbata** Fowl.
Tettigonia orbata Fowler, Biol. Cent. Am. Homop. II, 286.
Puerto Barrios, March 3d, Los Amates, Jan. 17th.
- Diedrocephala limbaticollis** Stal.
Tettigonia limbaticollis, Stal. Ent. Zeit., Stett. 25. 75; Fowler, Biol. Cent. Am. Homop. II, 279.
Los Amates, Feb. 18-28, Puerto Barrios, March 3d.
- Draeculacephala reticulata** Sign.
Santa Lucia Feb. 2, 1905.
- Draeculacephala mollipes**, Say.
Abundant at Santa Lucia on Pacific Slope, Feb. 2, 1905.
- Draeculacephala mollipes** Say, var. **minor** Walk.
Taken in large numbers at Mazatenango, Feb. 3d. Also at San Pedro, Honduras, Feb. 21, 1905 (E. B. W.) This variety seems to have been the only form taken at most of the Atlantic slope stations while typical *mollipes* occurred very abundantly on Pacific slope. The varietal character is apparently very well established and in this instance seems to be associated with geographic limitations.
- Gypona unicolor** Stal.
One specimen Santa Lucia, Feb. 2d.
- Gypona germari** Stal.
Los Amates, Jan. 17, Mazatenango, Feb. 3d, Puerto Barrios, March 3d.
- Gypona bigemmis** Spang.
Puerto Barrios, March 3d.
- Gypona punctipennis** Stal.
Los Amates, Jan. 17th, one specimen.
- Gypona proscripta** Fowler=*consersa* Spang.?
One specimen Mazatenango, Feb. 3, 1905.
- Gypona fuscinervis** Stal.
One specimen, Panzos, March 18, 1905.
- Gypona teapensis** Fowl.
One specimen Los Amates, Jan. 17, 1905.
- Gypona vinula** Stal.
Three specimens Mazatenango, Feb. 3, 1905.

JASSIDAE.

Dorydium maculatum, n. sp.

Light cinereus with brown or fuscous on vertex, pronotum and elytra. Vertex at tip, sinuous lines on the face, clypeus, coxæ, pectus and spots on the legs black. Length of female 5 m. m.; male 4 m. m.

Head with eyes scarcely wider than the pronotum, eyes large, vertex narrow, about three times as long as width between eyes, flat faintly impressed on median line and with slight depression on disk and next the tip. Apex acute, slightly upturned, front rather strongly keeled at tip becoming convex at clypeus. Clypeus with parallel sides nearly twice as long as wide; lorae longer than wide, outer margin nearly semi-circular not reaching margin of cheek. Genae broad rather deeply sinuate behind the eye. Rostrum shorter than clypeus. Pronotum strongly arched in front, lateral margin short, hind margin slightly concave, surface minutely striated or faintly rugose on central part, not carinate; scutellum with apex very acute, length scarcely equal to the width at base, elytra opaque except for small sub-hyaline areas in first, second, third and fifth apical cells and anteapical and discal cells. Clavus with two veins situated rather close together the outer one remote from claval suture; corium with five apical, one ante-apical and two discal cells; the costal veins reflexed; the vein below anteapical cell expanded into a minute cellule.

Color cinereous or somewhat stramineus with light brown markings on vertex, forming a large discal spot in front of middle, two marginal triangular spots, and central transverse band with more definite spots toward the margin, and a central line running backward, another brownish band between the eyes with darker spots toward the center, pronotum with three indefinite brownish longitudinal stripes, a pair of dark brown slightly infuscated spots on anterior margin, the outer longitudinal stripes and the spot behind the eye fuscous; scutellum with a basal median spot and anteapical arch broadening at margin, fuscous two spots in basal portion of clavus, two on the disk, and sutural line and the reflexed costal veins and spot on inner apical veinule dark fuscous or blackish. Face with the tip of vertex black; face with somewhat broken sinuate lines each side, fuscous or blackish lower part of face including most of clypeus and cheeks below the lorae black, and propleural spots and spots on the pectus, tarsal claws on front and middle feet and a series of spots at base of spines, apex of tibia, apex of tarsal joints and claws of hind feet black. Line on the inner side of hind tibia black. All marks are more intense in the male but color pattern is identical.

Genitalia: Last ventral segment of female about as long as the preceding, hind margin not produced, slightly sinuate, ovipositor exceeding the pygofer by about $\frac{1}{4}$ its length and tipped with reddish; the male valve hidden under last ventral segment, plates and pygofer very short, the former thick narrow and reaching the lower apex of pygofer. Pygofer obliquely truncate, margins meeting ventrally in an obtuse angle.

Described from a series of five specimens collected at Los Amates, Guatemala, by Prof. J. S. Hine, Jan. 17, 1905. It is an interesting addition to the Dorydine fauna differing quite distinctly from the European representatives of the genus.

Scaphoideus scalaris Van D.

Mazatenango, Feb. 3d. Originally described from California the species is now known from Washington and New York

through Mexico, and now to Guatemala the most southerly point yet recorded. It is perhaps worthy of note that these specimens have typical form of head and do not approach the form described from Mexico as *mexicana* by the writer.

Scaphoideus tessellatus n. sp.

Size and general facies of *scalaris* but conspicuously tessellate; elytral veins conspicuously marked with alternating black and white spots. Female, length 5 m. m.

Head distinctly angulate, sub-conical; vertex margins sloping, length about equal to width between eyes; front elongate, narrowing slightly to clypeus. Clypeus about twice as long as broad, slightly wider at apex; lorae very large reaching almost the border of the cheeks which form a very narrow margin; genae very slightly sinuate; antennae very long, extending almost to tip of abdomen. Pronotum strongly arcuate in front; truncate behind; lateral margins very short. Costal nervures not reflexed; first one opposite basal part of outer ante-apical cell, ante-apical cells equal, parallel margined; apical cells sub-equal in size.

Color: Vertex blackish with two small whitish points at extreme apex; two small semi-circular spots between ocelli, behind which are two brownish depressed sub-triangular spots; faint median whitish line and faint whitish borders at occiput against the eyes and distinct whitish circles around ocelli. Face brownish; border next the vertex black, margined by sinuate whitish line; antennae pallid brownish at base, seta darker; pronotum brown with darker fuscous on anterior border and irrorate with transverse whitish spots; scutellum fulvus at center, two fuscous spots each side, basal angles and apex yellowish white. Elytra golden brown with dark fuscous or blackish on the veins and at apex of clavus, interrupted by conspicuous white spots; three larger whitish spots on clavus; two on the sutural margin; one near the base next claval suture; three larger whitish spots on corium two corresponding with transverse veinules and one on first costal cross vein. Apical veins broadly margined with smoky fuscous.

Genitalia: Last ventral segment of female nearly twice as long as the penultimate; broadly excavate and with a broad rather blunt median tooth; pygofer rather narrow, as long as ovipositor, narrowed posteriorly with rather stiff short bristles arranged in two somewhat irregular series each side.

The single specimen of female was collected by Prof. J. S. Hine at Los Amates, Guatemala, Feb. 18-05. While distinctly belonging to the *scalaris* group, it is very distinct indeed from any of the known species. Its handsome checkered appearance will readily distinguish it.

Chlorotettix vittata n. sp.

Greenish white with distinct fusco-hyaline lines on elytra. Female length to tip of elytra 7 m. m., male 6.75 m. m.

Head scarcely as broad as pronotum; vertex round in front, scarcely longer at middle than next the eye; front narrowed apically; clypeus widened at apex; lorae elliptical, rather narrow; genae with sinuate margin. Pronotum concave behind; elytra sub-hyaline, veins small and indistinct.

Color: Pallid greenish white; elytra somewhat milky with two slender oblique lines on clavus parallel to claval suture on the corium. The first and longest lying in the cell between sectors of the inner vein, second and third in the adjacent cells; fourth in the outer ante-apical and apical cells.

Genitalia: Last ventral segment of female rather short; hind border roughly toothed; pygofer rather long, bristled near the tip. Male valve rounded behind, plates short about half as long as pygofer; borders curved; a few bristles near margin; pygofers tapered, strongly bristled.

23 specimens, 7 females and 16 males collected at Los Amates, Guatemala, Jan. 17, 1905, by Professor J. S. Hine.

Phlepsius costumaculatus Van. D.

Allygus costumaculatus Van Duzee, Bull. Buffalo Soc. Nat. Hist., V. 207.

Three specimens, Puerto Barrios, Mazatenango, Feb. 3d. It has been known heretofore from Texas and Florida.

Acinopterus acuminatus Van D.

Three specimens taken at Los Amates in January and February.

REMOVAL OF THE SHOWY PARTS OF FLOWERS AS AFFECTING FRUIT AND SEED PRODUCTION.

ARTHUR H. McCRAY.

OBJECT OF EXPERIMENT.

In this experiment it was attempted to determine the effect of the cutting away and removing entirely of the showy parts of blossoms on the production of fruit and its consequent seed. As will be seen in the great majority of cases, these showy parts will be also enveloping parts, covering, especially in early period of blooming the stamens and pistils and thus affording more or less protection from the elements, to these essential parts of the flower. Those who are familiar with the works of Chas. Darwin, will remember that he devoted much time and study to the pollination of flowers and that he embodied the results of his studies in a book entitled: "Cross and Self-Fertilization in the Vegetable Kingdom." One of these extended experiments was the exclusion of insects from flowers by covering with a netting. All flowers so excluded from insect visits, failed to set fruit. And so it was thought that by removing the large attractive parts of flowers, that insects would perhaps pass such by and hence no fruit would be produced. The experiments recorded below were carried out during the spring and summer of 1907.

These parts were easily removed by use of either a knife blade pressing it down upon the base of petal or whatever the part might be, and forcing it by a quick stroke from its place, or by a small pair of very fine pointed scissors. In either case care was taken not to unduly injure by mutilation any of the essential parts of the flower.