Notes on the Genus Bothriocera Burmeister (Homoptera: Cixiidae)

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The Bothriocera are a homogenous group with definite generic limitations. The color and markings of the species are definite and constant enough to be of value in determination. Dr. Z. P. Metcalf[1] has done much to clarify this group and place it on a workable basis. His key supplemented by illustrations of the male genitalia is excellent and has been a great help to this writer in straightening out this heretofore confused group. Many of the older species are somewhat hazy to the modern worker and will remain so until the types can be examined; however this fact should stop no one from making identifications in this genus as long as the interpretations are firmly established by illustrations of the male genitalia. In this way we may know exactly what the various workers have had before them and this method does not add to the confusion of species. It awaits only the examination of types and at the same time permits progress.

Parvula Fabricius seems to be the only species with a double row of fuscous spots in the apical cells. Metcalf has illustrated his interpretation of *bicornis* Fabr. and Fowler[2] has illustrated his species. *Excelsa* and *venosa* Fowler are very close if not the same. *Albidipennis* Fowler is a freak in that the elytra are folded over one another apically. *Nigra* Fowler is solid black and shiny. I have seen none of these species. All types are in the authors' collection unless otherwise stated in the text.

BOTHRIOCERA TINEALIS Burmeister

Fig. 1

The type locality of this species is the lower Amazon in Brazil and it is improbable that its range extends north into central Mexico. The specimens that I have seen from the States of Chiapas, Oaxaca, and Veracruz in Mexico, and from Guatemala include forms that coincide with the illustrations by Fowler (1904, Pl. 9, figs. 11, 11a). In seventy odd specimens there is considerable variation in color and marking. The light basal spot on the elytra may either be almost absent or enlarged to include the claval area; the subapical area may be almost missing or enlarged to form a broad stripe extending from the sutural margin almost to the costal; the apical area is always clear with clear cut subapical spots present in the cells. The lighter forms appear to have the transparent elytra with a fuscous costal area and two transverse fuscous stripes, one median and the other sub-

[1] Bull. 5 Mus. Comp. Zool. Harvard **52**: 285–289, 1938.
[2] Biologia Centrali-Americana, Homopt. **1**: 82–84, 1904.

apical. In all this variation the male genitalia are constant. The specimens vary in length from 5 mm. to 6 mm. *Tinealis* Fowler is not specific with *tinealis* Metcalf and as suggested by Metcalf is probably not specific with *tinealis* Stal.

BOTHRIOCERA WESTWOODI Stal

Figs. 2, 3, & 3a

In a series of twenty-five specimens from the States of Chiapas, Guerrero, Morelos, and Veracruz in Mexico are a few that coincide with the figure of *westwoodi* Fowler (Pl. 9, fig. 12). There are also extremes in variation in color and marking that might well pass for different species except that the male genitalia is constant. The lighter forms resemble *venosa* Fowler except for the presence of faint submarginal apical spots. In darker examples the submarginal spots have fused together forming an apical band which contains a marginal row of light spots.

In color sequence based on pattern this species forms the link between those species possessing subapical fuscous spots and those that lack such spots.

Another series of specimens determined as *westwoodi* Metcalf because the male genitalia compare well with his figure (Pl. 17) have the basal half of the elytra transparent with the claval area fuscous or semifuscous. The extreme apical area is clear with the line of submarginal spots large but better defined than in *westwoodi* Fowler.

Bothriocera boliviensis n. sp.

Figs. 4 & 4a

Length 4–5.2 mm. Head yellow with central area of frons and clypeus black; margin of frons around antennae black. Pronotum yellowish; mesonotum black. Elytra fuscous with small transparent area basad lying next to claval area and sometimes extended to costal cell; extreme apex of elytra transparent with a row of fuscous submarginal spots large and poorly defined.

The male styles have the outer angles produced into a slender acute tooth. Lateral margins of pygofers somewhat angulate; medio-ventral process short, acute. Aedeagus with two slender apical processes.

Male holotype, female allotype, and eight paratypes from Coroica, Bolivia are in the H. Osborn collection at Columbus, Ohio.

BOTHRIOCERA BASALIS Metcalf

There are two females in this collection that compare well with the illustration of the elytra by Metcalf (Pl. 15), one from San Luis Potosi (DeLong) and one from Oaxaca (Dampf).

BOTHRIOCERA SIGNORETI Stal

Fig. 5

This species was taken in abundance in Oaxaca and Veracruz. Other records include Guerrero, Jalisco, Michoacan, San Luis Potosi, and Sonora.

Bothriocera metcalfi n. sp.

Fig. 6

Length 5.2–5.5 mm. Head and pronotum yellow-brown. Mesonotum fuscous. Elytra fuscous with subbasal yellow spot between claval area and costal area and a transparent postmedian spot with a poorly defined perimeter. The under wings carry the same markings on a fuscous background.

Anal segment of male very elongate, straight, flat apically. Pygofers scarcely produced laterally; medio-ventral process very long, triangular. Styles elongate, arcuate around projection of pygofer. Aedeagus with single slender apical process.

Male holotype Vergel, Chiapas, 5-15-38 and paratype Santa Julia, Chiapas, 3-15-38, (Dampf). Female allotype Orizaba, Veracruz, 10-8-41, (DeLong, Good, Caldwell & Plummer).

The writer takes great pleasure in naming this unique species in honor of Dr. Z. P. Metcalf whose work on the Fulgorina has been an inspiration and a great help.

Bothriocera dampfi n. sp.

Fig. 7

Length 5.5–6.8 mm. Head lighter in color than thorax. Elytra fuscous, pattern similar to *signoreti* Stal except that the basal transparent spot sometimes includes most of the claval area and possibly includes more of the costal area. The extreme apical area is entirely different in that the transparent subbasal spot is very irregular and reaches the apical margin whereas in *signoreti* this spot is evenly lunate and does not reach the apical margin.

Anal segment of male with base and caudal extension about right angled. Pygofers not produced laterad; medio-ventral process very short, rounded. Styles rather long, contiguous for apical half. Aedeagus with two slender apical processes.

Male holotype and paratype from Finca Vergel, Chiapas, 5-13-35, allotype female same locality 5-19-35. Paratype male Vergel, Chiapas, 6-3-35, female paratype Santa Isabel, Chiapas, 9-17-30, and one from Tierra Blanca, Veracruz, 7-29-32, (Dampf).

The writer takes great pleasure in naming this outstanding species in honor of Dr. Alfons Dampf who has initiated the first large scale systematic collection of data on the Insects of Mexico.

Bothriocera transversa n. sp.

Figs. 8 & 8a

Length 5–5.2 mm. Vertex and frons yellow-brown; clypeus broadly yellow on lateral margins. Elytra transparent with fuscous claval area; an irregular fuscous stripe present from stigmal spot to apex of clavus; another irregular but broad stripe present across the apical cross veins; and the apical margin irregularly fuscous. Wings white basad with a postmedian fuscous stripe present followed by a clear area in turn followed by a fuscous band that includes the apex.

Anal segment of male somewhat elongate. Medio-ventral process of pygofers, minute, very slender. Styles broad in either ventral or lateral aspect. Aedeagus rather complicated.

Male holotype, female allotype, and paratypes from Bonefish Key, Florida, 2-22-40, (Caldwell) and one male paratype from Dade Co., Florida, 5-12-39, (D. J. & J. N. Knull).

Bothriocera knulli n. sp.

Fig. 9

Length 5–6 mm. Head and pronotum light yellow. Mesonotum red-brown. Elytra white with claval area very light yellow to fuscous; brown dash present in apex of costal cell and another midway between apex and base; stigmal spot black with a transverse stripe starting from the inner margin thence abruptly moved basad and extended to apex of clavus; radial vein edged with black from stigmal spot to apex where the coloring broadens; cell formed by M1 and M1a(?) fuscous; and the transverse veins broadly fuscous. Markings on female not as sharply defined as on male.

Lateral margins of male pygofers with small projection somewhat ventral; medio-ventral process blunt. Styles short, angled.

Male holotype and paratypes from Gillespia Co., Texas, 6-23-40, female allotype and paratypes from Patagonia Mts., Arizona, 7-20-40, (D. J. & J. N. Knull).

The writer takes great pleasure in naming this beautiful species in honor of both Dr. Dorothy J. Knull and Dr. Josef N. Knull who have collected many new and interesting Homoptera from southern and southwestern United States.

Bothriocera furcata n. sp.

Figs. 10 & 10a

Length 5.2 mm. Vertex, frons, and pronotum yellow-brown. Clypeus yellow, especially laterad. Elytra transparent marked with fuscous; claval area dark; a spot present just caudad basal cell; costal area with a large spot that is clear in the center; a longitudinal stripe present from costal

spot through the transverse median stripe to the subapical band; the transverse median stripe originates at stigmal spot and extends half way across the elytra where it forks with the cephalic branch contacting the claval apex and the caudal branch following the margin and entering the subapical band. Apex of elytra broadly fuscous.

Pygofers of male greatly produced laterad; medio-ventral process short, rounded. Styles acute apically. Aedeagus with a process at the joint.

Male holotype Sanford, Florida, 7-8-31 and female allotype same locality 6-11-31, (at light) are in the H. Osborn collection at Columbus, Ohio.

Bothriocera fasciola n. sp.

Figs. 11 & 11a

Length 4.8–6 mm. Head and pronotum lighter brown than mesonotum. Elytra transparent with claval area brownish; irregular stripe extended from stigmal spot to apex of clavus where it fades out; narrow submarginal band present; all cross veins and forks of longitudinal veins browned. Membrane of elytra and wings minutely roughened.

Pygofers of male with slight projection laterad; medio-ventral process slender, acute. Styles sublanceolate in ventral aspect, sharply angled in lateral aspect.

Holotype male, 6-20-25, from San Pedro Yameri, Oaxaca in Mexico, (Dampf) and female allotype from Puerto Castilla in Honduras, 4-29-26, (H. Osborn collection).

BOTHRIOCERA DRAKEI Metcalf

In a series of fifteen specimens of this yellowish form from Florida there is considerable variation in intensity of color. The claval area is sometimes browned but never heavily and the apical band is sometimes nonexistent; however, the male genitalia is constant. The specimens from Ohio[3] identified as *tinealis* evidently belong to this species. The color invades the clavus and the sickle-shaped process arising from the joint of the aedeagus contains one more minute spur, otherwise the two are identical. These differences are scarcely enough to even consider that the Ohio forms are a variety and the series is too short to be certain that these differences are constant.

Bothriocera cognita n. sp.

Fig. 12

Length 5 mm. Head and pronotum smoky yellow; lateral carinae of face yellow. Elytra white with clavus entirely fuscous; and irregular fuscous stripe present from clavus to stigmal area; another fuscous stripe present subapically; apical margin slightly fumed. Under wings fuscous apically.

Anal segment of male short, curved in lateral aspect. Pygofers roundedly

[3] Ohio Biol. Sur. Bull. **35**: 306, 1938.

produced on caudal margins; medio-ventral process small, rounded. Styles very elongate, apices obliquely truncate in lateral aspect. Aedeagus with a small curved process at the joint(?); another stout process present at base of apical flagellate process.

Holotype male from Kosciusko, Mississippi, 6-9-33, collected by D. W. Grimes is in the Ohio State University Collection at Columbus, Ohio. This is probably the same species figured by Dozier[4] as *bicornis* Fabr.

Bothriocera undata Fabricius

Figs. 13 & 13a

The type locality of this species is the West Indies. The only material that I have been able to examine is from Puerto Rico. In general appearance this species can not be separated from *venosa* Fowler, however the male genitalia are distinct. The pygofers extend laterally into blunt obtuse angles; the medio-ventral process is very minute. The styles are evenly arcuate in ventral aspect and appear wider in the apical half in lateral aspect. Whether *undata* occurs in Continental America or *venosa* occurs in Insular America I do not know. It is possible that Fabricius and Fowler had the same species but the chances are very remote.

Bothriocera venosa Fowler

Figs. 14 & 14a

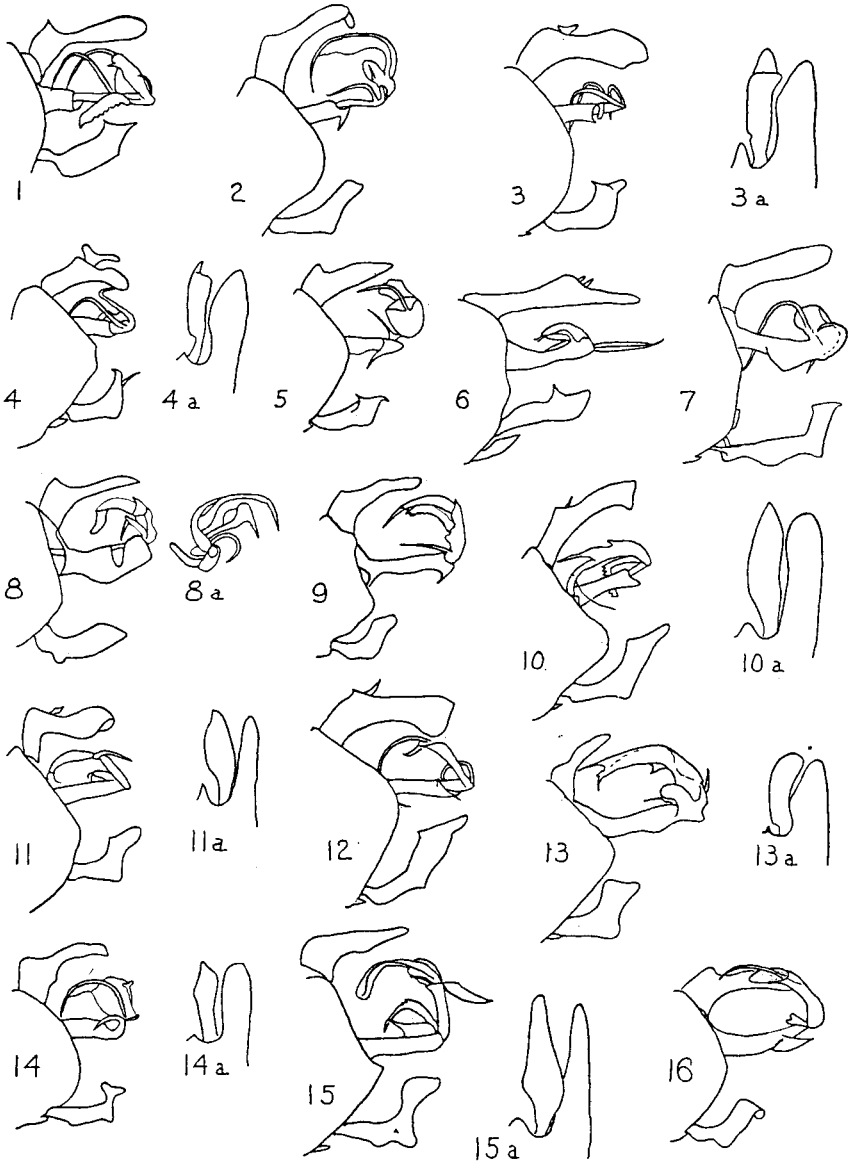
This species is resurrected because the male genitalia are distinct from *undata* Fabricius which it otherwise resembles. The pygofers are broadly rounded laterally; the medio-ventral process is larger. The styles are angulate and widely separated basad in ventral aspect; in lateral aspect the apical half is slender with the extreme apex produced cephalad and caudad. The aedeagus is of a simpler type than that in *undata*. In a series of seventeen specimens from Chiapas, Oaxaca, San Luis Potosi, and Veracruz in Mexico there is some variation. In the lighter forms, similar to the illustration by Fowler (Pl. 9, fig. 14), the claval area may even be clear. The darker examples have the mesonotum and claval area jet black. The median stripe on the elytra may be broad and diffused into the ligher areas. The submarginal stripe may be very distinct and enlarged at the costal margin. Some specimens are exactly like *excelsa* Fowler (Pl. 9, fig. 15) except that the costal cell is not as fuscous as shown in the illustration. I can go no farther than to strongly suspicion that *venosa* and *excelsa* are the same until the types can be examined.

Bothriocera alba n. sp.

Figs. 15 & 15a

Length 5.2 mm. Head and pronotum light yellow except for brown median streak on clypeus and large spot in center of face. Eyes and

[4] Tec. Bull. Miss. Agr. Exp. Sta. **14**: 57, fig. 15, 1926.



EXPLANATION OF PLATE

1. *Tinealis* Burm. Lateral view of abdominal apex of male. 2. *Westwoodi* Stal. (Interpretation by Fowler) Same view as 1. 3. *Westwoodi* Stal. (Interpretation by Metcalf) Same view as 1. 3a. Ventral view of half of abdominal apex. 4. *Boliviensis* n. sp. Same view as 1. 4a. Same view as in 3a. 5. *Signoreti* Stal. Same view as 1. 6. *Metcalfi* n. sp. Same view as 1. 7. *Dampfi*. n. sp. Same view as 1. 8. *Transversa* n. sp. Same view as 1. 8a. Caudal view of male aedeagus. 9. *Knulli* n. sp. Same view as 1. 10. *Furcata* n. sp. Same view as 1. 10a. Same view as 3a. 11. *Fasciola* n. sp. Same view as 1. 11a. Same view as 3a. 12. *Cognita* n. sp. Same view as 1. 13. *Undata* Fabr. Same view as in 1. 13a. Same view as 3a. 14. *Venosa* Fowler. Same view as 1. 14a. Same view as 3a. 15. *Alba* n. sp. Same view as 1. 15a. Same view as 3a. 16. *Maculata* n. sp. Same view as 1.

mesonotum brown. Elytra clear including the claval area; cross veins broadly smoky. Pygofers of male produced laterally, acute; medio-ventral process short, rounded. In ventral aspect, styles broadest at midlength, inner margins concave basad. Anal segment elongate.

Male holotype from Coroico, Bolivia is in the H. Osborn collection at Columbus, Ohio.

Bothriocera maculata n. sp.

Fig. 16

Length 4.7–5.5 mm. Head and pronotum yellow-brown. Mesonotum dark brown between carinae, lateral compartments darker. Elytra transparent, maculate with fuscous; claval area fuscous between claval suture and first vein; a dash present in fork of cubitus; costal area with five large spots between base and apex counting the stigmal spot; cross veins and forks of longitudinal veins smoky; apical area narrowly smoked. The elytra overlay similar to but not as much as in *albidipennis* Fowler. Aedeagus of male with a short notched process at the joint.

Male holotype, female allotype, and paratypes from Dade Co., Florida, 5-12-39, (D. J. & J. N. Knull), paratypes from New Smyrna, Florida, 5-20-43, (Mike Wright). Paratypes present in Ohio State University Collection at Columbus, Ohio.