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THE GENUS BRUCHOMORPHA NEWMAN (HOMOPTERA-FULGORIDAE).

By E. D. BALL, University of Arizona, Tucson, Arizona.

The small curious barrel-shaped species of this North American genus like those of their relatives in the genus *Aphelonema* are very variable in color. This is especially so in the subtropical regions and has resulted in considerable confusion and synonymy.

Melichar ('06) keyed out eight species. One (*B. globosa*) did not belong to the genus or to North America but was from Liberia, Africa, leaving seven North American species which he separated almost entirely on color. His material was limited and mostly from the more northern regions where the colors are more stable, but even then the results were not satisfactory.

Metcalf ('23) added five new species and gave a key to twelve. He omitted *mormo* Kirk. and redescribed it as *minima*—and his *vittata* and *bicolor* were taken together and proved to be long and short winged forms of the same species. His *dorsata* is not that of Fitch.

Dozier ('28) distributed a publication variously dated 1922 and 1926, but actually distributed about July 1, 1928. In this he redescribed *jocosa* Stål as *bimaculata* and gave a color key to eleven species. He evidently lacked material as much of the information was apparently copied from previous descriptions.

The writer has recently studied examples of all the described species including several hundred collected in Florida, Texas and Arizona. These subtropical representatives exhibit variations in color in what is apparently the same species from pale yellow through straw and pale red to definitely black striped, brown and even totally black forms, indicating that in subtropical material at least color can not be used as a major differentiating character. The following key is based mainly on structural characters and only uses color to assist in placing the more stable temperate region forms.

KEY TO THE SPECIES OF BRUCHOMORPHA.

- A—Elytra with the venation obscure, the nervures concolorous with the membrane.
- B—Nasal protuberance short not as long as wide.
- C—Species very broad, highly iridescent, black.
- CC—Species normal, barrel shaped.
- D—Frontal tablet oval, widest near the middle.

I. *tristis* Stål

- E—Frontal tablet very broad, $\frac{2}{3}$ as wide as long—species black 2. *mormo* Kirk.
 EE—Frontal tablet elongate, not as wide as long, species with three stripes 3. *triunata* Ball
 DD—Frontal tablet top shaped, elongate below.
 F—Species usually reddish or pale, sometimes with dark lateral stripes, rarely all dark without a dorsal stripe.
 G—Nasal protuberance (as seen from side) as long as broad 4. *vittata* Metc.
 GG—Nasal protuberance (as seen from side) very short and broad 5. *jocosa* Stål
 FF—Species black with a broad dorsal light stripe.
 H—Stripe extending from tip to tip 6. *dorsata* Fh.
 HH—Stripe extending only to end of elytra or one segment beyond.
 I—Front in profile straight or rounding at tip.
 7. *pallidipes* Stål
 II—Front in profile slightly elevated before apex.
 8. *suturalis* Melic.
 BB—Nasal protuberance long, as long as or longer than its width at the constriction 9. *oculata* Newm.
 AA—Elytra with the venation coarsely reticulate, the nervures pale or yellow.
 J—Front broadly oval nasal protuberance very broad and short.
 10. *decorata* Metc.
 JJ—Front long and slender, nasal protuberance narrow.
 11. *rugosa* Metc.

1. *Bruchomorpha tristis* Stål.

This is the shortest, broadest species of the genus and is always iridescent black. The writer's material is all from northern and mountain regions from Ontario and New York through Wisconsin, Iowa, Dakota, Colorado, Montana and Oregon, south in California to Dunsmuir and in Arizona to Oak Creek Canyon. The writer did not take it in Florida and has not taken it in Arizona below the yellow Pine Belt.

2. *Bruchomorpha mormo* Kirk.

(*Bruchomorpha minima* Metc.).

This small shiny black species is common in southern Arizona and can be distinguished by its broadly oval front. This is probably the species Metcalf described as *minima* from N. C. His figures show the nasal process produced but his description says "not produced."

3. *Bruchomorpha triunata* Ball n. sp.

A small shiny black species resembling *tristis* but with three broad white stripes and a very narrow front widest in the middle. Length 1.6 mm.

Front a long oval abruptly pointed below. Much narrower than in *mormo* and not top shaped as in most species; the disc flat or concave, the bounding carinae light, the median one faint. Nasal process even shorter and broader than in *dorsata*, strongly carinate. Color black, a broad white stripe from apex of front across the first exposed abdominal segment, as wide as frontal carinae at the vertex. A pair of oblique white stripes broadly covering the lower half of clypeus and gradually narrowing to beyond the middle of the elytra. A pair of white crescents arising under the lateral margin of the elytra and curving around to the genitalia. The pustules and legs pale.

Holotype, ♂, Patagonia, September 10, 1933. Paratype male and a female nymph, Nogales, July 13, 1934. Taken by the writer sweeping range grasses.

4. *Bruchomorpha vittata* Metcalf.

(*Bruchomorpha bicolor* Metc.).

A slightly larger and more definitely striped species than *jocosa*, with a much longer nasal protuberance. Known only from Brownsville, Texas, where the writer took it in abundance January 2, 1932, including the long-winged form. Metcalf described this species as *bicolor* but on a previous page he had described the long-winged form taken with it as *vittata*, evidently not recognizing that all long-winged forms have practically the same dark color and that they all have much enlarged mesonotal protuberances and consequently notched pronotums. The form of the nasal process is however distinctive.

5. *Bruchomorpha jocosa* Stål.

(*Bruchomorpha bimaculata* Doz.).

A small compact barrel-shaped species with a very short broad projection and top-shaped front. Color reddish or rusty straw with a black mark on the "nose" and another on the genitalia, the male with the lower part of the elytra obliquely black, in sharp contrast. Melichar, Metcalf and Dozier all treat *jocosa* as entirely pale reddish with the black "nose" but Stål in his original description of the male says "tegminibus, parte commissurali excepta—

nigris," thus covering *bimaculata* of Dozier. This form is abundant throughout the Gulf region and is occasionally taken as far north as Virginia, Iowa and Nebraska.

KEY TO JOCOSA VARIETIES.

- A—Females red or pale sometimes with a lateral dark stripe.
 B—Female all reddish or pale 1. var. *jocosa* Stål
 BB—Female reddish or pale with a lateral dark stripe.
 2. var. *craniata* Ball
 AA—Females (and males) all dark (or with only a trace of light
 stripes) 3. var. *obscura* Ball

Var. *craniata* Ball n. var.

Resembling *jocosa* usually, but definitely larger and longer, with less of the "barrel" shape. A broad creamy median stripe from tip to tip covering all the space between the lateral carinae on front and pronotum. Outside of this on either side a still broader pair of smoky or almost black stripes arising on the black "nose" and usually omitting the margins of the abdomen. Legs and below reddish.

Holotype ♀, allotype ♂, and seven paratypes, Onaga, Ks. (Crevec.); five paratypes, Stratton, Neb., and one each, Ames, Ia., and Spring Green, Wis.; all, except those from Kansas, collected by the writer. This form might easily be confused with *vittata* but the short nose will separate it.

Var. *obscura* Ball n. var.

Form and size of *jocosa*, almost uniformly dark smoky or rusty brown sometimes almost black with the legs and lower part reddish. The males often show a more or less definite dorsal light or reddish line.

Holotype ♀, allotype ♂, and ten paratypes, Sanford, Florida, taken by the writer. This dark form is common in the winter period from Florida to Mississippi and has been taken as far north as New Jersey, D. C., and Virginia. It has, however, never before been recognized as a color phase of *jocosa*.

6. *Bruchomorpha dorsata* Fitch.

(*Bruchomorpha flavo-vittata* Stål).

An exceedingly short nosed black species with a broad white stripe from tip to tip. The feet are usually pale. A northern species ranging from New York and North Carolina to Dakota and Kansas.

7. *Bruchomorpha pallidipes* Stål.

Similar to *dorsata* but with the dorsal stripe ending on the first visible abdominal segment. Probably only a variety of the above.

8. *Bruchomorpha suturalis* Melich.

Resembling *pallidipes* except that the stripe is often narrower, the end of the "nose" is elevated and the front sinuated—this is probably only a variety of *dorsata* as suggested by Melicher. It appears to be the most abundant form in Colorado and northern Arizona.

The writer is inclined to believe that the three preceding species are all forms of *dorsata*, the first described. His material, however, is limited, having only about 50 examples of the three. In other species where the examples run into the hundreds it has been possible to determine the limits of normal variation with more accuracy. It is even possible that *dorsata* and its variations represent the temperate region expression while *jocosa*, and its varieties, are the subtropical representatives of a single abundant and very variable species. If these two groups were united then all the known species would have definite structural characters on which they could be readily separated.

9. *Bruchomorpha oculata* Newman.

The long nasal protuberance will at once separate this species from any other, but it is widely distributed, occurring from the Atlantic to the Pacific and from Canada to Mexico and highly variable in size and color and to a less extent in form. It can only be adequately treated by considering the following varieties:

KEY TO THE VARIETIES OF OCULATA NEWMAN.

A—Body black, no dorsal stripe or at most a narrow rusty one on carinae of front.

B—Legs reddish or yellowish 1. var. *oculata* New.

BB—Legs black, size small, nasal protuberance narrow.

2. var. *nigrata* Ball

AA—Body black, a broad white dorsal stripe.

C—Dorsal stripe extending to apex of abdomen. Nose broad.

3. var. *extensa* Ball

CC—Dorsal stripe fading out on abdomen.

D—Legs yellow—nose broad 4. var. *nasuta* Stål

DD—Legs black in female—nose narrow

5. var. *abrupta* Ball

1. *B. oculata-oculata* Newman is very dark with a definite red-

dish cast accentuated on the legs and below; the stripe is narrow and reddish or absent. This is the dominant form in the northern states and Canada.

2. *B. oculata-nigrata* Ball n. var.

Form of *oculata*, smaller, darker, with legs black and the nasal protuberance long and narrow. Holotype ♀, allotype ♂, and eight paratypes Sanford, Florida, taken by the writer. This form almost entirely replaces *oculata* in the Gulf region and is abundant during the winter season.

3. *B. oculata-extensa* Ball n. var. (*B. dorsata* of Metc. not Fitch).

Form of *oculata* nearly slightly larger, the nasal protuberance more foliaceous, the dorsal stripe very broad, creamy and extending from apex of front to apex of abdomen. Holotype ♀, and four paratype females, Granite Dell, Arizona, July 6, 1929. Allotype ♂, and one paratype male, Ashfork, Arizona, August 16, 1929. This is the form illustrated by Metcalf, as *dorsata* but is quite different from that short headed species. It is found sparingly in the Gulf region and extends through to southern California and north into Utah.

4. *B. oculata-nasuta* Stål.

This large dark form, with the broad stripe running back to the first visible abdominal segment and the striking red legs; is northern in distribution and particularly abundant in the Rocky Mountain region from Canada to Colorado.

5. *B. oculata-abrupta* Ball n. var.

Form of *nasuta* nearly, larger with a narrower rounder nasal protuberance. Black with black legs in the females and black or dark red ones in the males, the dorsal stripe is definite but narrower and reddish and often does not extend onto the abdomen. Holotype ♀, allotype ♂, and eight paratypes taken by the writer at Sanford, Florida. This is a fairly common summer form in the Gulf region.

10. *Bruchomorpha decorata* Metcalf.

A short stout strikingly distinct species by the coarsely reticulate elytra and the broad nasal protuberance. Color very variable, mottled yellow (or pale) and dark. The writer has taken this species at Brownsville, Texas, and in the Baboquivari Mountains in Arizona and has material from Cuernavaca, Mexico. It appears to be

strictly confined to a single species of grass, the Arizona fox-tail (*Chaetochloa grisebachii*) as a food plant.

11. *Bruchomorpha rugosa* Metcalf.

Resembling a very small *Fitchiella robertsoni* in the reticulate elytra and linear markings on the abdominal segments, thus strikingly distinct in this group. The anterior tibiae are slightly dilated and it may be necessary to transfer this species to *Fitchiella*.

Described from Brownsville, Texas, and Nogales, Arizona. The writer has taken it on range grasses in several places in Southern Arizona.