

NOTES ON THE EXTANT TYPES OF DR. O. DUDA'S COSTA RICAN DROSOPHILIDAE (DIPTERA)

By MARSHALL R. WHEELER¹

Abstract: *The extant type specimens (39) of the Drosophilidae named by Dr. Duda from Costa Rica were borrowed for study from the National Museum in Budapest, Hungary. They represented 26 species of the 56 named by Duda, the remaining types having been lost. Notes on the morphology and distribution of these species are presented, lectotypes are chosen when required, and the following nomenclatural and systematic changes are made: Cladochaeta infumata (Duda), New Combination (from Diathoneura); Diathoneura nigrifrons Duda, New Status (described as a "variety" of nigrescens); Paramycodrosophila poeciloptera Duda, 1925 = Drosophila schildi Malloch, 1924, New Synonymy; Paraliodrosophila mihalyii Wheeler, New Species (Costa Rica, Panama); Bunostoma brasiliensis Frota-Pessoa, 1946 = Noetanygastrella tricoloripes Duda, 1925, New Synonymy.*

One of the major contributions to our knowledge of the Neotropical Drosophilidae was that of Dr. Oswald Duda (1925) on the species of Costa Rica. His study was based on the specimens in the Hungarian National Museum in Budapest, all apparently collected in 1921 at Suiza de Turrialba. In this paper Duda described 56 new species (including some as "varieties") and all of the types seem to have been retained in the museum in Budapest.

In the hope of settling some confusing taxonomic problems uncovered while working with the extensive Neotropical material in the University of Texas collection,² I contacted Dr. F. Mihályi of the Zoological Department of the museum. With his cooperation, for which I am extremely grateful, I was able to borrow for study 39 type specimens representing 26 of Duda's Costa Rican species. The holotype of one species, *Diathoneura taeniatipennis*, was inadvertently left out of the shipment; specimens of the remaining 29 species were no longer available. Dr. Mihályi has written me concerning them as follows (paraphrased in part for grammatical reasons):

"There is Drosophilid material of Duda's from Costa Rica,

¹ Department of Zoology, The University of Texas, Austin, Texas.

² Field collections were made possible by grant G-4999 from the National Science Foundation.

Africa, Far East, Australia and Europe. Unfortunately this material has been damaged by water and partly destroyed. Therefore nearly half of the Costa Rican types are missing. All types of the following genera are missing: *Pseudocacoxenus*, *Stegana*, *Oxyphortica*, *Protostegana*, *Neorhinoleucophenga* and *Zygothrica*. Also missing are: *Drosophila nasalis*, *D. nigrohalterata*, *D. glabrifrons*, *D. fuscohalterata*, *D. flavohalterata*, *D. semialba*, *D. fundamaculata*, *D. prorepleta*, *D. limbiventris*, *D. medioobscurata*, *D. fumipennis*, *D. subinfumata*, *D. kertesztina*, *D. mediotriata*, *Paramydrosophila costaricana*, *Tanyglossa tenuirostris*, and *Diathoneura quadrivittata*.

"I am sending you the remaining 39 types; some do not bear the same name exactly as the one they were described by; for example, four names ending with "... *lineata*" are labelled as "... *striata*." Duda very rarely labelled the specimens as "type," but as he gave the number and date of the types, they are unquestionably the same. If they were described from a single specimen, I have labelled it as Holotype; if there are more of them, as Syntypes. Duda used to write on the first specimen of his new species both the generic and the species name, but on the following specimens only the species name. I think that it is desirable to choose and label these 'first' specimens as lectotypes. As nearly as possible, therefore, I am sending you the first specimen, which I would like for you to denominate as lectotypes and publish this information."

Lectotypes are here being designated for 16 of Duda's species, each being represented by two or more syntypes; red lectotype labels bearing my name have been attached to the pins bearing the specimens and have been returned to the museum. The remaining 10 species are represented by holotypes.

From our own collections we have been able to identify with reasonable certainty 19 of the 26 species represented by these types. For each of these any additional information on geographic distribution is given below, with occasional remarks on their morphology or classification. For the seven species still known only by their unique types, more extensive notes are presented, including some carefully drawn figures prepared by Mrs. Linda Kuich. For each species I have indicated first the number of specimens now present in the Budapest collection, as reported by Dr. Mihályi, and, in parentheses, the number and sex of those loaned for study.

1. *Drosophila abregolineata* Duda, 1925, *op. cit.*: 214. One; (Holotype ♂). Mesonotal pattern very distinctive, with the six clearly defined dark brown marks strongly contrasting with the dull tan background; the two more elongated marks are separated in

the midline by exactly one acrostichal row; posterior third of mesonotum with whitish pollinosity when seen from certain angles. The exposed part of the genitalia shows a slender pincer with a secondary branch, similar to that figured for *bocainensis* by Wheeler and Magalhaes (1962, Fig. 6, C) but the branch is located farther basally. Other characters, such as the sternopleurals, orals, etc., support the conclusion that *abregolineata* belongs in the subgenus *Sophophora*, and most probably in the *willistoni-bocainensis* complex.

2. *Drosophila alternolineata* Duda, 1925, *op. cit.*: 213. Two; (Lectotype ♀). The wings are light brown, with a moderately heavy cloud over the posterior crossvein; anterior crossvein dark and with a small cloud; apex of first costal section a little darkened. Setulae of third costal section on the basal 0.5. Additional records are: San José, **Costa Rica**; La Palma, **El Salvador**; Santa Maria de Ostuma, **Nicaragua**; Boquete, **Panama**.

3. *Drosophila angustibucca* Duda, 1925, *op. cit.*: 218. Fifteen; (Lectotype ♀, plus 1 ♀). This seems to be a widespread Neotropical species. We have only compared specimens from San José, **Costa Rica**, and Boquete, **Panama**, but this was enough to indicate that the species considered *angustibucca* in Brazil by Frota-Pessoa (1954) is probably an undescribed sibling species.

4. *Drosophila fuscolineata* Duda, 1925, *op. cit.*: 213. One; (Holotype ♂). No recurved hairs on the fore tarsi; setulae of third costal section on the basal 0.5; posterior crossvein dark but without cloud; mid-frontal hairs arranged in an obvious V-shaped pattern. In addition to Turrialba, **Costa Rica**, we have specimens from San Salvador, **El Salvador**.

5. *Drosophila gigas* Duda, 1925, *op. cit.*: 217. Five; (Lectotype ♂, plus 1 ♀). A distinctive character for this unusually large species is a rather sudden curving of the apex of the fourth vein toward the third, as in some members of the *annulimana* group. New records are: Santa Maria de Ostuma, **Nicaragua**; Volcan Santa Ana, San Salvador, **El Salvador**; Monte Vyuca, **Honduras**; Boquete, **Panama**; Chapulhuacan, Hid., **Mexico**. The specimens reported as *gigas* from Uruapan, Mexico, by Patterson and Mainland (1945) are actually *tuchaua* Pavan, judging from the individuals remaining in our collection at this time.

6. *Drosophila limbinervis* Duda, 1925, *op. cit.*: 215. Two; (Lectotype ♂, plus 1 ♀). This belongs to the *guarani* group, subgenus *Drosophila*. We have material from Monte Vyuca, **Honduras**, and from many localities in **El Salvador**.

7. *Drosophila pictiventris* Duda, 1925, *op. cit.*: 211. One; (Holotype ♀). This distinctive member of the subgenus *Hirtodrosophila* has been discussed earlier (Wheeler 1954: 54). Widespread, from **Mexico** to **Brazil**.

8. *Drosophila rostrata* Duda, 1925, *op. cit.*: 219. One; (Holotype ♂). Front dull tan; middle orbital minute; carina rather large, its surface moderately flat; face, cheeks, clypeus and palpi all tan; one prominent oral bristle; proboscis (Fig. 1) bearing a remarkable median horn-like process as described. Mesonotum and scutellum dark tan, moderately shiny; pleura and legs tan; first femur normal; fore tarsi without recurved hairs; third tarsi with two black bristles near base ventrally. Wings a bit dark, the posterior crossvein with a weak cloud, the anterior one dark but not clouded; setulae of third costal section on the basal 0.4. Abdomen appearing teneral, mostly tan with poorly defined bands. The banding pattern does not, in my opinion, agree with the description and my interpretation is shown in Figure 2. This specimen will not key correctly in Frota-Pessoa (1954) because of this pattern.

9. *Diathoneura adumbrata* Duda, 1925, *op. cit.*: 178. One; (Holotype ♂). Anterior half of wing noticeably dusky, and both crossveins with strong clouds. Mesonotum dark tan, the pleura contrastingly darker brown, this color also covering the fore coxae and the basal third of the fore femora; reminder of legs apparently pale, but the third femora may be darker near base. Halteres tan; palpi light brown; abdomen all dull brown; postvertical bristles of moderate size; anterior reclinate orbital short and thin, situated behind proclinate. Male genitalia not visible.

10. *Diathoneura albifacies* Duda, 1925, *op. cit.*: 181. Five; (Lectotype ♂, plus 1 ♀). Although the whitish face is distinctive, it also occurs in some undescribed similar Neotropical species. New records are: La Lola, Palmar, **Costa Rica**; El Recreo, Santa Maria de Ostuma, **Nicaragua**; Leticia, El Recuerdo, **Colombia**.

11. *Diathoneura cruciata* Duda, 1925, *op. cit.*: 177. One; (Holotype ♀). This species appears to belong with a group of about six undescribed Neotropical species representing (on the basis of preliminary studies of male genitalia) a new subgenus, or possibly a new genus. New records are: Volcan Boqueron, Cerro Monte Cristo, Volcan Santa Ana, **El Salvador**; Monte Vyuca, **Honduras**.

12. *Diathoneura euryopa* Duda, 1925, *op. cit.*: 179. Two; (Lectotype ♂, plus 1 ♀). The flat front with its whitish pollinose orbits is distinctive. In addition to Turrialba, we have seen material from

Higuito, **Costa Rica**; Bluefields, **Nicaragua**; Almirante, Venado Beach, **Panama**; Ft. Sherman, Mindl Dairy, Galeta Pt., **Canal Zone**; Hardware Gap, Mt. Diablo, Mavis Bank, **Jamaica**.

13. *Diathoneura guttipennis* Duda, 1925, *op. cit.*: 171. Three; (Lectotype ♀, plus 1 ♂). The particular pattern of wing spots seems to be distinctive, but there are several undescribed species with rather similar patterns. Our only new record is Changuinola, **Panama**.

14. *Cladochaeta infumata* (Duda). **New Combination.** = *Diathoneura infumata* Duda, 1925, *op. cit.*: 179. One; (Holotype ♀). The arista, with its single dorsal branch basally, is intact and not damaged as Duda suspected. The species is unique in *Cladochaeta* (known at present by the type species, *nebulosa*, and an estimated 15 undescribed Neotropical species) by having an unusually high costal index (3.7–3.9). We have four specimens from Boquete, **Panama**.

15. *Diathoneura laticeps* Duda, 1925, *op. cit.*: 175. One; (Holotype, sex uncertain). There is an undescribed similar species from El Salvador in which the posterior orbits and ocellar triangle are distinctly shiny (dull in *laticeps*) and the pleural darkening is much more widespread. In addition to Turrialba, we have seen material from La Lola, **Costa Rica**, and Cerro la Campana, Almirante, **Panama**.

16 *Diathoneura minuta* Duda, 1925, *op. cit.*: 182. Three; (Lectotype ♂, plus 1 ♀). On the lectotype the arista has four dorsal and one ventral branch in addition to the terminal fork; front tan, the triangle and orbits browner; postverticals of moderate size; proclinate and posterior reclinate orbitals rather far apart, the anterior reclinate quite minute and situated just a little behind the proclinate; palpi dark brown. Mesonotum dark tan, the scutellum darker; pleura also darkened but lacking a distinct pattern; halteres discolored; legs pale tan, the fore tarsi normal. Abdomen apparently wholly dull dark brown; the visible parts of the male genitalia are shown in Figure 3.

The female paralectotype seems to be another species. The anterior reclinate orbital is situated beside the proclinate; palpi pale tan; scutellum with the same color as the mesonotum; pleura with an ill-defined large dorsal stripe and a second stripe along the upper edge of the sternopleura; halteres tan.

17. *Diathoneura nigrescens* Duda, 1925, *op. cit.*: 184. Twenty-seven; (Lectotype ♂, plus 1 ♀). Arista with six dorsal and four ventral branches basal to the terminal fork; proclinate orbital 0.7 length posterior reclinate; middle orbital very tiny; postverticals

small; mildly polyvibrissal. Mesonotum dark tan, the pleura much blacker. Also known from Boquete, **Panama** and Santa Maria de Ostuma, **Nicaragua**.

18. *Diathoneura nigrifrons* Duda. **New Status.** = *Diathoneura nigrescens* var. *nigrifrons* Duda, 1925, *op. cit.*: 184. Three; (Lectotype ♂, plus 1 ♀). This species, along with *nigrescens*, belongs to a group of about 12 undescribed Neotropical species, all superficially quite similar but differing significantly in male genitalia. We have specimens of *nigrifrons* from Turrialba, **Costa Rica**, and Boquete, **Panama**.

19. *Diathoneura nubeculosa* Duda, 1925, *op. cit.*: 180. One; (Holotype ♂). We have three specimens from Boquete, **Panama**, which agree with the type except for a more intense color, especially on the wings. The visible parts of the male genitalia of the type agree well, however, with our material, and we suspect that the type male was teneral.

20. *Diathoneura pleurolineata* Duda, 1925, *op. cit.*: 183. Two; (Lectotype ♀). There are at least five Neotropical species similar to this one, but we have not been able to match any of them with the type. On both aristae there are two ventral branches and no signs of damage, while on our specimens there is either a single ventral branch, or there are three or four. In addition, the pleural stripe is considerably paler than on our specimens and while this could be due to a teneral condition, this does not seem to be the case. The abdomen is dull brown, with the circumanal tergite, anal plates and ovipositor distinctly paler yellow.

21. *Diathoneura tanyptera* Duda, 1925, *op. cit.*: 170. One; (Holotype ♂). The abbreviated posterior wing margin is distinctive (and very rare in the family). Anterior half of wing strongly browned, noticeably less so posteriorly; pleural stripe prominent, dark brown, but lower half of humeral callus quite pale and contrasting with the upper half which is as dark as or darker than the mesonotum. Palpi dark, paler at base, strongly protruding from the oral cavity, expanded at the tip when viewed from above. Face white; cheeks pale except for a small brown mark at vibrissal area. Legs pale; abdomen dark brown; halteres dirty-colored. The species belongs to a group of about six undescribed species all characterized by having prominently protruding black palpi.

22. *Diathoneura tessellata* Duda, 1925, *op. cit.*: 174. Four; (Lectotype ♂, plus 1 ♀). The tessellated pattern on the abdomen, consisting of distinct black blotches on a gray to grayish-yellow pollinose background, is shared by at least four undescribed Neotropical species. In addition, the ovipositor in each species is elon-

gated, essentially toothless, resembling a sword (Figure 4). The generic reference for the group is dubious, but until a more thorough study has been made, it seems premature to remove the species from *Diathoneura*. The male genitalia of the lectotype were removed, examined, and then mounted on a small bit of plastic which was attached to the pin bearing the specimen. A male from our collection, from Palmar, **Costa Rica**, agrees but other specimens, from more distant localities, have not yet been examined. On superficial resemblances, however, we seem to have material from Panama, El Salvador, Colombia, Venezuela, Puerto Rico and Jamaica.

23. *Diathoneura uniradiata* Duda, 1925, *op. cit.*: 182. Five; (Lectotype ♂, plus 1 ♀). Mesonotum moderately dark tan, the pleura darker brown but paler along the suture between sterno- and mesopleura, especially anteriorly. Abdomen dark brown, dull when viewed from most angles. Arista with six dorsal and one ventral branch basal to the terminal fork, and without signs of damage. Palpi more brown than black; postverticals of moderate size; front dull tan to light brownish. A single stout sternopleural bristle seen; legs, including fore coxae, tan. The male genitalia, moderately well exposed, are shown in Figures 5 and 6; the ovipositor of the female appeared to be somewhat retracted but its general appearance, as well as we could determine it, is shown in Figure 7.

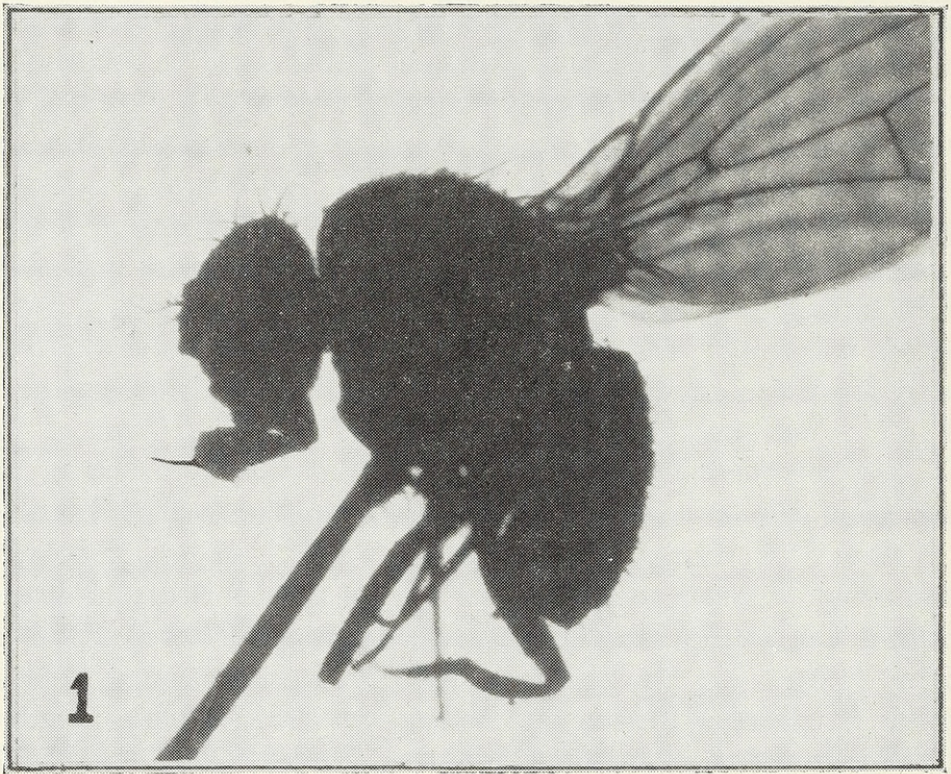
24. *Neotanygastrella tricoloripes* Duda, 1925, *op. cit.*: 224. = *Bunostoma brasiliensis* Frota-Pessoa 1946, Sum. Brasil. Biol. 1: 175. **New Synonymy.** Two; (Lectotype ♀). This is a relatively common, widespread species, known from **Costa Rica, Honduras, Panama, Colombia, Trinidad, Brazil, Peru, Puerto Rico, and Haiti**. The synonymy of *Bunostoma brasiliensis*, suggested as a possibility by Frota-Pessoa and Wheeler (1951) is confirmed.

25. *Paramycodrosophila poeciloptera* Duda, 1925, *op. cit.*: 226. = *Drosophila schildi* Malloch 1924, Proc. U. S. Nat. Mus. 66: 10. **New Synonymy.** Twenty-one; (Lectotype ♂, plus 1 ♀). The types of both *schildi* and *poeciloptera* have now been examined, and the synonymy, first suggested as a possibility by Burla and Pavan (1953), is confirmed. *D. schildi* is a member of the *calloptera* group of the subgenus *Drosophila*, and has now been seen from several localities in **Costa Rica, Panama, Canal Zone, Colombia, Brazil and Trinidad**.

Further nomenclatural problems involving the name *poeciloptera* in *Drosophila* have been discussed by Wheeler (1959: 184).

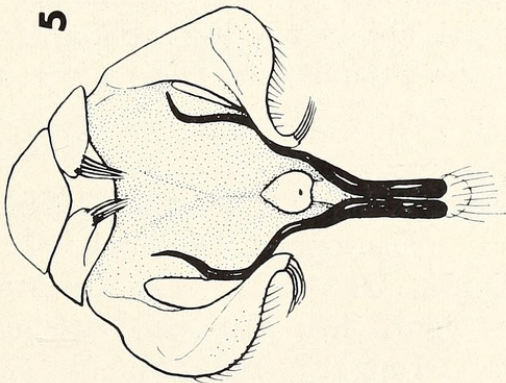
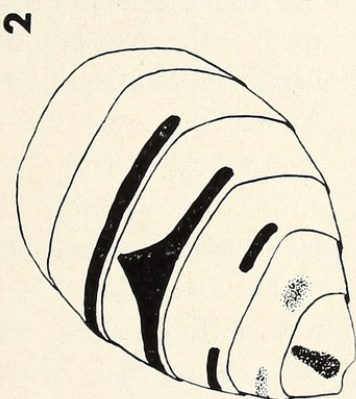
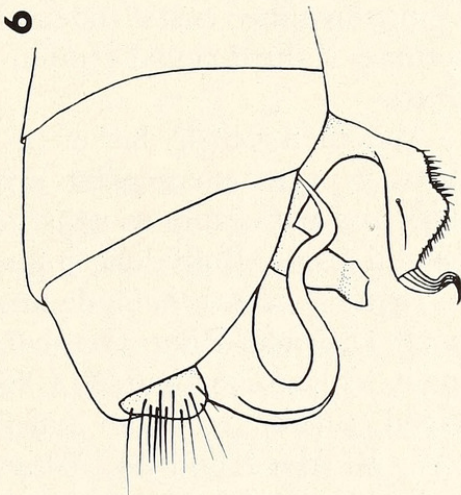
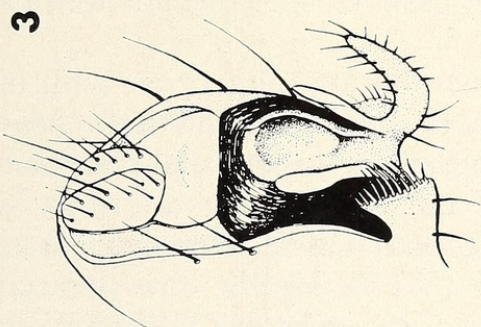
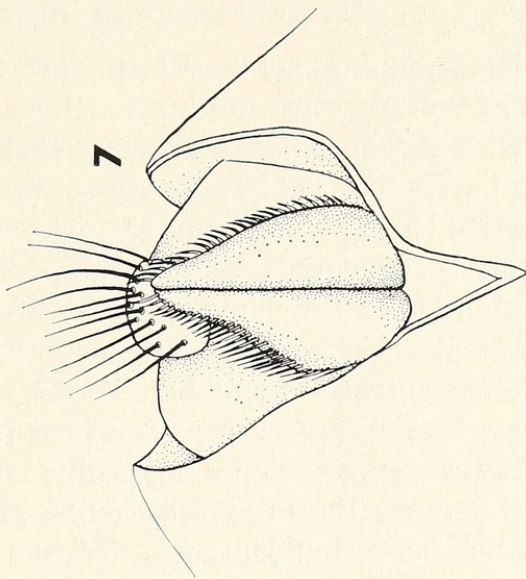
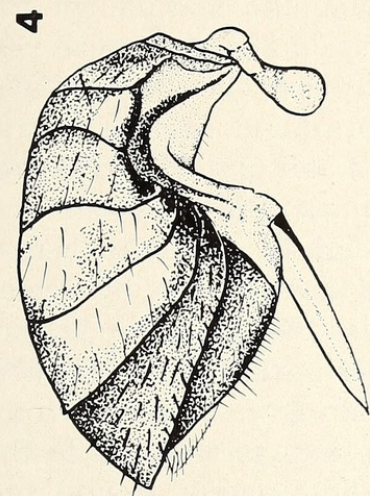
26. *Paraliiodrosophila bipartita* Duda, 1925, *op. cit.*: 184. Two; (Lectotype ♂, plus 1 ♀, the latter becoming a paratype of the new

species described below). *P. bipartita* is a fungivorous species known from **Mexico, El Salvador, Costa Rica, Nicaragua** and **Panama**. In a discussion of this species I earlier stated (Wheeler 1954: 56) that the female specimen mentioned by Duda belonged to the species *dudai* which was being described by me at that time. The present study of this syntype female shows this to have been an error, this specimen belonging rather to an undescribed species represented by an additional five specimens in the University of Texas collection. I am taking this opportunity to describe this new one, which I am pleased to name for Dr. Mihályi of the Budapest museum.



EXPLANATION OF FIGURES

Fig. 1, *Drosophila rostrata* Duda, holotype male: Shadow photograph showing horn-like protrusion on proboscis. Fig. 2, *Drosophila rostrata* Duda, holotype male: Abdominal pattern. Fig. 3, *Diathoneura minuta* Duda, lectotype male: Sketch of the exposed portion of the male genitalia. Fig. 4, Abdomen of female of *tessellata* group showing position and appearance of ovipositor. Fig. 5 and 6, *Diathoneura uniradiata* Duda, lectotype male: Postero-ventral and lateral views of the exposed parts of the genitalia. Fig. 7, *Diathoneura uniradiata* Duda, paralectotype female: Semi-ventral view of the exposed part of the ovipositor.



Paraliodrosophia mihalyii Wheeler, n. sp.

Male and female.—Front chestnut brown, the margins of the large subquadrate shining portion appearing darker. Antennae yellowish tan, the third segment a little darker; face, cheeks, palpi and proboscis pale yellowish; arista with five dorsal and a single ventral branch basal to the terminal fork; proclinate and posterior reclinate orbitals subequal, the middle orbital minute. Mesonotum and scutellum of the same color as the front, lightly pollinose; acrostichal hairs irregularly 4-rowed; basal scutellars weakly divergent or straight and about half length of apicals. Pleural color distinctive; lower part very pale yellow, the upper part chestnut brown; this brown area running solidly (not appearing as a stripe) from the base of the fore coxae across the meso- and pteropleura to the haltere base, but leaving a distinct pale yellow region around and below the wing base. Legs wholly pale yellow. Halteres pale. Wings hyaline; costal index about 1.4; fourth vein index about 2.2; setulae of third costal section on the basal 0.5–0.6 but not well defined.

Abdomen a little darker brown than thorax, the tergites with indistinct paramedian paler areas. Male genital arch broad above, dark and noticeably contrasting with the pale yellow anal plates and genital area. Body length about 1.5 mm.

Types.—*Holotype* male and one *paratype* male, Heredia (10 km north), **Costa Rica**, October, 1955 (W. B. Heed); one paratype male, Volcan Irazu, at 9000 feet, Costa Rica, October, 1955 (W. B. Heed); two paratype males, Boquete, **Panama**, August, 1958 (W. B. Heed and M. Wasserman); one paratype female, Turrialba, Costa Rica (syntype of *bipartita*). The latter specimen is in the Hungarian National Museum, Budapest; the remaining types are in the *Drosophila* Type and Reference Collection, Genetics Foundation, The University of Texas, Austin.

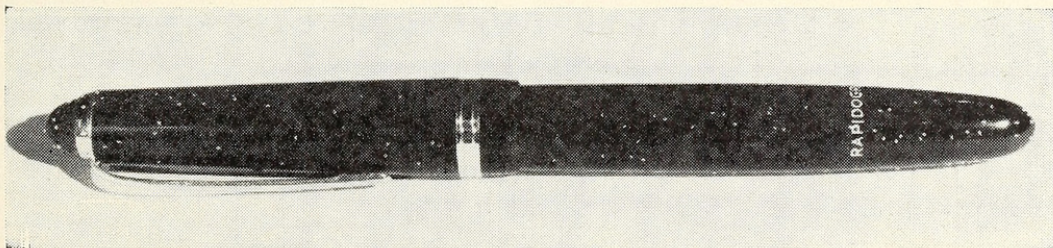
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A note on abnormal oviposition habits of the cowpea weevil, *Callosobruchus maculatus*. The pen illustrated in the figure below was brought to my attention by a colleague with an inquiry concerning the numerous eggs on the cap and on the barrel. The pen was still kept in its original card-board and cellophane box, which at this time also contained a dead adult female of the cowpea weevil, *Callosobruchus maculatus* (Fab.). Approximately half the eggs had hatched, and the small larvae had eaten into the plastic pen casing to a depth of about 0.5 mm., leaving frass-filled eggshells behind them. When the pen was cleaned, it was found to be profusely pitted by their borings, though no living larvae were seen.

A semi-transparent, plastic, draftsman's triangle kept near the pen was attacked in a similar manner.—EDWIN W. KING, Department of Entomology and Zoology, Clemson College, South Carolina.





Wheeler, Marshall R. 1963. "Notes on the extant types of Dr. O. Duda's Costa Rican Drosophilidae (Diptera)." *Bulletin of the Brooklyn Entomological Society* 58, 51–61.

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