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A REVISION OF THE *DROSOPHILA REPLETA* SPECIES GROUP (DIPTERA, DROSOPHILIDAE)¹.Carlos Ribeiro Vilela²

ABSTRACT

The *repleta* group of the Genus *Drosophila* is revised. The source material was museum collections, isofemale lines, and specimens collected for the purpose of this revision.

Thirteen new species are described; lectotypes are designated for 23 nominal species and nine recently proposed synonyms are discussed. Previously published diagnoses of the five recognized subgroups are brought up to date. Proposals are made to exclude *D. sercnensis* from the *repleta* group and to transfer *D. linearepleta* from the *repleta* subgroup to the *fasciola* subgroup, *D. peninsularis* from the *repleta* subgroup to the *mercatorum* subgroup, as well as *D. peruensis* from the *repleta* group to the *guarani* group.

The morphology of male genitalia is the main character utilized to distinguish between species. This character is described and illustrated for all but one described species. The comparative analyses of male genitalia have in most cases confirmed the species phylogenetic relationships previously identified by polytene chromosome inversion analyses.

The *repleta* group, currently comprising 76 described species, has wide geographical distribution, being endemic to the Americas and West Indies. The geographical distribution analysis of its subgroups suggests that speciation by geographical isolation has been responsible for most of the patterns observed and that radiations have occurred in the probable area of origin of the group (Mexico) as well as in the secondarily reached areas (West Indies, Central and South America).

INTRODUCTION

The *Drosophila repleta* species group, currently comprising five subgroups and several species not assigned to any subgroup, was formally proposed 41 years ago by Sturtevant (1942) who based his classification of the Genus *Drosophila* upon morphological grounds.

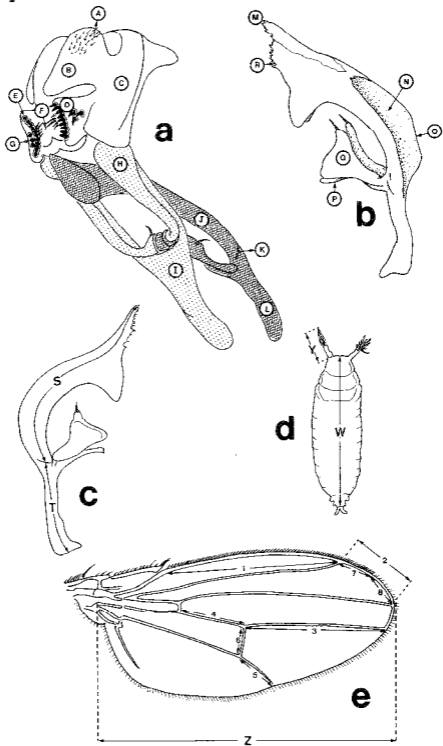
The group was tentatively divided into three subgroups (*hydei*, *repleta* and *mulleri*) by Patterson (1943). An additional subgroup (*mercatorum*) was recognized by Wharton (1944) based upon genetic and morphological similarities. Wasserman (1967d) based on cytological and morphological studies recognized a fifth subgroup (*fasciola*) and added cytological data to the diagnosis of the remaining subgroups except *repleta*.

Although the *fasciola* subgroup was formally defined in 1962, it has first appeared in the literature in a previous paper by Wasserman (1960).

Most of the species of the *repleta* group, especially those of the *mulleri* subgroup, are cactophilic flies and have been extensively used in evolutive and genetic studies. However, most of these species are not readily identified as the result of a great number of sibling species and a high morphological polymorphism among different populations of the same species or even within the same population.

It seems appropriate, on the basis of the numerous published papers dealing with one or more species and the new material available, to provide a revision of the *repleta* group in the belief that this will be of some assistance in future research on members of the group.

1. This paper is part of the author's thesis submitted to the "Departamento de Biologia, Instituto de Biociências, Universidade de São Paulo" in partial fulfillment of the requirements for the degree of Doctor in Sciences.
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METHODS AND MATERIALS

During this study, over 2,800 specimens and 700 isofemale lines were examined. These materials came from three sources: newly wild-caught specimens, laboratory cultures and old pinned collections from different museums.

The trips to collect new specimens were made in several morphoclimatic domains of South America from April 1976 to November 1981. Most of the localities of collections were already plotted on maps in previously published papers (Sene *et al.*, 1980; Vilela *et al.*, 1980). Additional localities will be detailed on forthcoming papers. Flies were collected mainly on orange and banana baits fermented with baker's yeast set in different ways according to the characteristics of the environment (Sene *et al.*, 1981).

I have examined stocks currently maintained by two institutions: "Departamento de Biologia, Instituto de Biociências da Universidade de São Paulo", São Paulo (DBUSP) and Department of Zoology, University of Texas at Austin (DZUT).

I have also analyzed several specimens, including type-series of most nominated species, from the following repositories: American Museum of Natural History, New York (AMNH); British Museum (Natural History), London (BMNH); *Drosophila* Type and Reference Collection, Austin (DTRC); "Instituto Miguel Lillo", San Miguel de Tucuman (IML); "Museu de Zoologia da Universidade de São Paulo", São Paulo (MZUSP); National Museum of Natural History, Washington, D.C. (NMNH). Where appropriate, lectotypes were designated as indicated in the text.

In the DTRC, besides the specimens cited above, I have had the opportunity to analyze the slide collection which was prepared and used by Wasserman in his series of papers published in 1962.

Each specimen was analyzed regarding to its genitalia and external morphology. Label data for each specimen were recorded, condensed and organized alphabetically under each species according to Country, State or Province, etc. The acronym of their repository is cited parenthetically, so is the number of specimens bearing the same label data. Strain numbers appear in the labels of some pinned flies of the DTRC whenever the specimens were not wild-caught ones. Name of collectors and collection dates were omitted. However, label data accompanying each examined type specimen were recorded as given, with slashes to separate data of one label from another (my own comments or notes are included parenthetically). Unless otherwise noted, I have followed Wheeler (1981b) for the distribution data of each species.

In order to identify the wild-caught females, they were each isolated and the genitalia of the male offspring were checked.

Previously undescribed species were described when at least a male specimen was present. For the descriptions of new species, I brought up to date the model proposed by Sturtevant (1942). The characters employed in this study are well-known and need no explanation. However, some of them are illustrated in figure 1 to avoid confusion. Whenever possible, measurements or ratios cited in the descriptions were based on the entire type-series.

In preparing the male and female genitalia I followed Wheeler and Kambysellis (1966) and Kaneshiro (1969). The abdominal structures including the dissected

Fig. 1. Diagrammatic sketches of male genitalia, puparium and wing:

- (a) male genitalia, lateroblique aspect: A, micropubesccence; B, cercus; C, epanthrium; D, surstylus; E, primary teeth; F, marginal bristles; G, secondary teeth; H, concha of hypandrium; I, hypandrium; J, aedeagus; K, suture; L, aedeagal apodeme.
 (b) aedeagus, lateroblique aspect: M, tip; N, dorsal cleft; O, dorsal margin; P, ventral rod; Q, gonopod; R, ventral margin.
 (c) aedeagus, lateral aspect: S/T, phallosomal index.
 (d) puparium, dorsal aspect: W/Y, horn index.
 (e) right wing, dorsal aspect: 1/2, costal index; 3/4, 4th vein index; 5/6, 5x index; 2/4, 4c index; 5/4, M index; 7/7 + 8, third costal section with heavy bristles; Z, length of wing.

genitalia, accompany the appropriate specimen in an attached microvial, pinned by the stopper. The terminology of male genitalia is that of Iisu (1949) and Kaneshiro (1969) modified to be in accordance with McAlpine (1981).

Illustrations were drawn using a compound microscope equipped with a camera lucida. Unless otherwise indicated, all illustrations under the same figure number were drawn to the same scale.

The item "other specimens examined" which appears, under some of the new species descriptions means these specimens have been examined after the description has been done; therefore, they are not being considered as paratypes.

Under the item "strains examined" I have just listed those from DZUT, which have been usually cited by several authors. The published or new ecological data for each species except for those described as new in this work are not being cited as they will be subject of a forthcoming paper (Pereira *et al.*, in press).

The diagnosis of each subgroup are up-to-date versions of those proposed by Wheeler (1949) and Wasserman (1962 a, b, c, d).

DEFINITION OF THE *D. REPLETA* SPECIES GROUP

Sturtevant (1942) proposed his definition of the *repleta* group on the basis of 27 species then known. Many species described since the publication of Sturtevant's definition, or included in this work as new, are apparently members of the same major line of descent as those *repleta* group species known to Sturtevant, and they agree mostly but not completely with Sturtevant's criteria.

A modified diagnosis of the *repleta* group is proposed although it is realized that discovery of further new species in the future may again necessitate revision of the definition. Since we have no information on polytene chromosome banding for most of the species described in this work, the homozygous inversions which according to Wasserman (1982) characterize the *repleta* group are not being considered in the diagnosis.

Species included (76) — *fasciola* subgroup (18); *hydei* subgroup (6); *mercatorum* subgroup (4); *mulleri* subgroup (34); *repleta* subgroup (6); not assigned to subgroup (8).

Diagnosis — Grayish or brownish mesonotum, each hair and bristle arising from a black or dark brown spot, sometimes absent or fused to form more or less elaborate patterns; wings clear, 3rd and 4th longitudinal veins not convergent; costal index ranging from 1.9 to 3.9; testis with number of coils ranging from 3.5 to 51; ventral receptacle with number of coils ranging from 6 to 735; surstylus not micropubescent, usually without secondary teeth; gonopod with one to three sensilla (absent in *D. inca*), usually linked to concha of hypandrium by membranous tissue.

Geographical distribution — This group is endemic to the New World; however, some of its species became geographically widespread probably due to human activities.

THE *FASCIOLA* SUBGROUP

Species included (18) — *Drasophila carolinae*, sp. nov.; *D. coroca* Wasserman; *D. ellisoni*, sp. nov.; *D. fasciola* Williston; *D. fascioloides* Dobzhansky & Pavan; *D. fulvalineata* Patterson & Wheeler; *D. hermioneae*, sp. nov.; *D. ivaí*, sp. nov.; *D. linearepleta* Patterson & Wheeler; *D. moju* Pavan; *D. mojuoides* Wasserman; *D. onca* Dobzhansky & Pavan; *D. paraguttata* Thompson; *D. pictilis* Wasserman; *D. pictura* Wasserman; *D. querubimae*, sp. nov.; *D. rosinae*, sp. nov.; *D. senai*, sp. nov.

Diagnosis — Spots of mesonotum absent or fused to form more or less elaborate patterns. Costal index ranging from 1.9 to 3.9; testis with moderate number of coils, ranging from 8 to 15; ventral receptacle with number of coils ranging from 20 to 83; phallosomal index varying from 0.9 to 2.4. Anterior margin of cerci fused to posterior margin of epandrium in various degree (free in *D. querubimae*); surstylus without secondary teeth and number of primary teeth ranging from 8 to 12; concha of hypandrium bearing one anterior bristle; aedeagus usually with a

pair of ventral posterior spurs; gonopod with one to three tiny sensilla, linked to concha of hypandrium by membranous tissue.

Geographical distribution — The species of this subgroup occur between 37°N (USA, Utah) and 28°S latitude (Argentina, Catamarca) of the New World and prefer the wet areas of the West Indies, Central and South America.

✓ ***Drosophila (Drosophila) carolinae*, sp. nov.**

(Fig. 2)

Undescribed M, Vilela *et al.*, 1985.

Type-Material — *Holotype male*, labelled: "BRASIL — SP, Est. biol. Boracéia, 23°40'S, 45°50'W, F. C. Val col., 04.vii.1978 / HOLOTIPO *Drosophila carolinae* ♂". Sixteen paratypes as follows: (1 ♂) same data as holotype; (12 ♂) *ibidem* except date: 10 in 14.ix. 1978 and 2 in xi. 1978; (1 ♂): "BRASIL — PR, 14 Km Morretes, 25°22'S, 48°53'W, F. C. Val col., 24-27. xii. 1978"; (2 ♂): "BRASIL — SP, Ibiuna, 23°39'S, 47°13'W, C. Pavan col., 13. ii. 1978". All specimens, in MZUSP (São Paulo), dissected. Type-locality: Estação Biológica de Boracéia (23°40'S, 45°50'W), Salesópolis, São Paulo, Brazil.

External characters of imagines ♂ — Arista with 3-4 dorsal and 2 ventral branches plus terminal fork. Antennae brown. Front brown, pollinose, distally darker; orbits anteriorly yellow, dark brown from median region of fronto-orbital row to posterior verticals. Ocellar triangle blackish brown, except at base of postverticals. Posterior orbital and anterior vertical arising from dark brown

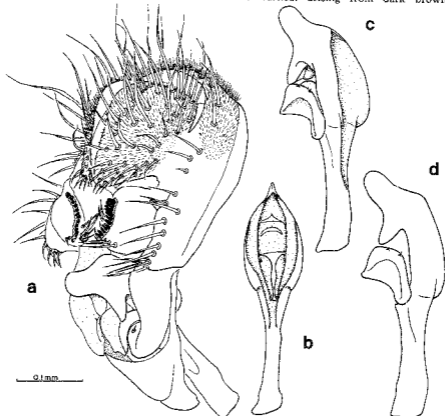


Fig. 2. *Drosophila carolinae*, sp. nov. (holotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

spots. Anterior and middle orbitals arising from yellowish area. Middle orbital about 1/2 of other two. Second oral about 1/2 of first. Face brown. Carina prominent, not sulcate, yellow. Palpi pollinose, brown, dorsally lighter, with bristles on ventral surface. Cheeks brown, their greatest width 2/5 greatest diameter of eyes. Eyes brown, with short black piles.

Acrostichal hairs in 8 irregular rows. No prescutellars. Anterior scutellars convergent. Mesonotum yellowish brown, pollinose, bristles arising from brown spots, which are larger and darker on dorsocentral rows. Some spots are fused to form: a circle anteriorly to transverse suture; a lanceolate spot outside anterior dorsocentrals; four longitudinal stripes inside dorsocentral rows, two extending from anterior margin to middle area of mesonotum, and two from anterior dorsocentrals to posterior margin of mesonotum. Scutellum brown with bristles arising from dark brown spots. Pleurae dark brown with an irregular darker longitudinal stripe from base of first coxae to halteres; an upper dark brown stripe from propleurae to base of wings. Sterno index about 0.8. Halteres pale yellow. Coxae and femora dark brown, yellowish distally. Tibiae yellow with two dark brown rings; tarsi yellow. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen yellow, 2nd to 5th tergite with a medianly enlarged and interrupted posterior blackish brown band which bends toward and reaches anterior margin at angle of tergite, leaving a yellow area laterally; 6th tergite with a narrower, fainter band.

Wings clear. Costal index about 2.5; 4th vein index about 1.7; 5x index about 1.3; 4c index about 0.9; M index about 0.5. Third costal section with heavy bristles on its basal half.

Wing length about 2.4 mm.

Genitalia ♂ — Epandrium with about 9 lower and 4 upper bristles. Cerci fused at lower half. Surstylus with about 12 primary teeth and 9 marginal bristles (Fig. 2a).

Hypandrium as long as epandrium.

Aedeagus with a pair of subapical, roundish spurs; dorsal cleft about 2/3 of length. Aedeagal apodeme almost straight, laterally flattened. Ventral rod absent. Gonopod with two tiny sensilla (Fig. 2b-d). Phallosomal index about 1.1.

Eggs, puparia, chromosomes and ♀ — Unknown.

Relationship — Belongs to the *fasciola* subgroup of the *repleta* group. It is closely related to *D. onca* Dobzhansky & Pavan, from which it differs chiefly in the shape of aedeagus.

Distribution — Brazil (São Paulo, Paraná).

Etymology — Named after Francisca Carolina do Val from the "Museu de Zoologia da Universidade de São Paulo", who collected most of the type specimens.

Note — All the known specimens were collected at rain forest localities.

***Drosophila (Drosophila) coroica* Wasserman**

(Fig. 3)

Drosophila (Drosophila) sp. L. Wasserman, 1960.

Drosophila (Drosophila) coroica Wasserman, 1962d: 125.

Type-Material — Holotype male, labelled: "HOLOTYPE / H546.43 / *D. coroica* / M. Wasserman / April 1958 / Bolivia Coroico ♂", in NMNH (Washington, D. C.). Paratypes (4 ♂, 5 ♀; 2 ♂ dissected): same data as holotype, in DTRC (Austin). Type-locality: Coroico, La Paz, Bolivia.

General characters — Described by Wasserman (1962d).

Genitalia ♂ — Epandrium with about 11 lower and 3 upper bristles. Cerci fused at lower half. Surstylus with about 11 primary teeth and 9 marginal bristles (Fig. 3a).

Hypandrium longer than epandrium.

Aedeagus with a pair of long, straight, subapical spurs; dorsal cleft about 2/3 of length. Aedeagal apodeme laterally flattened; anterior region expanded. Ventral rod rudimentary. Gonopods boomerang-shaped with one tiny sensillum, linked to each other by membranous tissue (Fig. 3b-d). Phallosomal index about 1.6.

Other specimens examined (87) — ARGENTINA: Catamarca: 2 Km N of La Viña (3 ♂, 3 ♀, IML; 5 ♂, 10 ♀, MZUSP); Tucuman: 14 Km N of San Miguel de Tucuman (3 ♂, 3 ♀, IML; 51 ♂, 4 ♀, MZUSP). BRAZIL (MZUSP): Mato Grosso do Sul: Campo Grande (1 ♂); Paraná: Fazenda Palmital (1 ♂); São Paulo: 2 Km NW of Piraçununga (1 ♂), 10 Km S of Santa Maria da Serra (2 ♂).

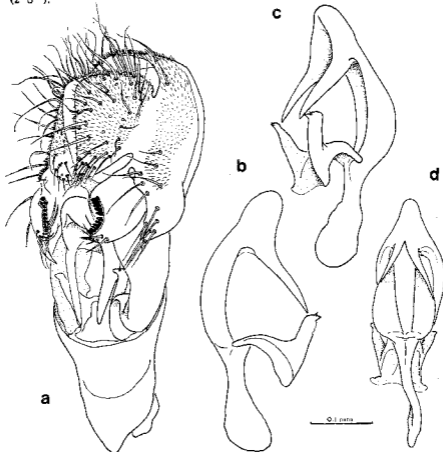


Fig. 3. *Drosophila coroica* Wasserman (paratypes): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Relationship — It is related to *D. senoi*, sp. nov., from which it differs chiefly in the shape of aedeagus.

Distribution — Brazil (Mato Grosso do Sul, São Paulo, Paraná — Vilela *et al.*, 1983), Bolivia (La Paz), Argentina (Catamarca, Tucuman — Vilela *et al.*, 1980).

Note — The table 1 of Vilela *et al.* (1980) misprinted *D. coroica* as occurring in Puerto Tirol (Province of Chaco). The 292 specimens referred to as *D. coroica* are in reality *D. simulans*.

♣ *Drosophila (Drosophila) ellisoni*, sp. nov.

(Fig. 4)

Drosophila (Drosophila) jascioides, Wasserman, 1962d (misidentification *nec* Dobzhansky & Pavan, 1943) — Wheeler, 1970, 1981 (in part.) — Hoenisberg *et al.*, 1977 (probably misidentification).

Type-Material — Holotype male, labelled: "*Drosophila ellisoni* Mar-Apr 1958 / Belém, Pará, Brazil, M. Wasserman col. / Stock H336.9 HOLOTYPE ♂" in NMNH (Washington, D.C.), N° 765701. Twenty-seven paratypes as follows: (2 ♂, 3 ♀) in NMNH, (10 ♂, 10 ♀) in DTRC (Austin), (1 ♂, 1 ♀) in MZUSP (São Paulo); same data as holotype. All type-specimens were obtained from DZUT culture H336.9 in 1979. Type-locality: Belém, Pará, Brazil.

External characters of imagines ♂, ♀ — Arista with 4 dorsal and 2-3 ventral branches plus terminal fork. Antennae brown. Front brown, pollinose; orbits, ocellar triangle and anterior region lighter. Posterior orbital, ocellar and vertical bristles arising from dark brown spots. Middle orbital about 2/3 of anterior and 1/2 of posterior. Second oral about 1/2 length of first. Face pale yellow. Carina prominent, narrow, not sulcate. Palpi pollinose, light brown, with bristles on ventral surface. Cheeks light brown, darker at lower eye margin, their greatest width 1/3 greatest diameter of eyes. Eyes cherry red, with short black piles.

Acrostichal hairs in 8 irregular rows. No prescutellars, anterior scutellars convergent. Mesonotum yellowish brown, pollinose, bristles arising from dark brown spots, which are larger on dorsocentral rows. Some spots are fused to form: 4 irregular stripes inside dorsocentral rows and 2 interrupted stripes outside to the dorsocentral rows. Scutellum light brown with bristles arising from large dark brown spots. Pleurae brown with an irregular darker longitudinal stripe from base of first coxae to halteres. Sterno index about 0.9. Halteres pale yellow. Coxae dark brown, femora dark brown at base, yellowish distally, with a distal dark brown ring. Tibiae yellow with two dark brown rings; tarsi yellow. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen yellow, 2nd to 5th tergite with a medianly enlarged and interrupted posterior blackish brown band which bends toward and reaches anterior margin at angle of tergite, leaving a triangular yellow area laterally; 6th tergite with a narrower, fainter band.

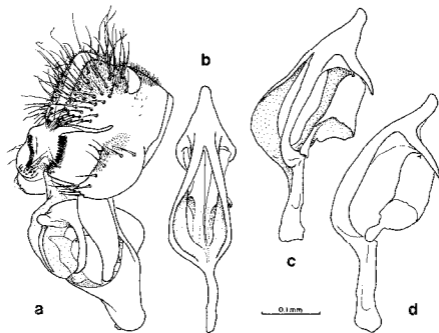


Fig. 4. *Drosophila ellisoni*, sp. nov. (strain H336.9): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Wings clear. Costal index about 2.1; 4th vein index about 1.8; 5x index about 1.4; 4c index about 1.1; M index about 0.6. Third costal section with heavy bristles on its basal 2/3.

Wing length 1.8-2.1 mm (♂ and ♀).

Body length (etherized) 2.5-2.7 mm (♂), 3.0-3.5 mm (♀).

Internal characters of imagines and genitalia (♂) — Testis yellow, with about 4 inner and 6 outer coils. Epandrium with about 11 lower and none upper bristles. Cerci fused at lower 2/3. Surstylus with about 12 primary teeth and 11 marginal bristles (Fig. 4a).

Hypandrium as long as epandrium.

Aedeagus with a pair of long subapical spurs; dorsal cleft about 3/5 of length. Aedeagal apodeme straight, laterally flattened. Ventral rod absent. Gonopod well-developed with one tiny sensillum (Fig. 4b-d). Phallosomal index about 1.8.

(♀) — Ventral receptacle an irregular spiral with about 38 tight coils. Ovipositor apically pointed with about 23 marginal and 5 discal teeth. Spermathecae almost cylindrical, weakly sclerotized; duct slightly invaginated.

Eggs — Four filaments, slightly longer than egg; egg length about 1 mm.

Puparia — Brownish yellow; horn index about 7; each anterior spiracle with about 12 branches.

Chromosomes — Not studied, but according to the literature, there are two types of metaphase karyotypes, which were figured by Wasserman (1962 d: Figs. 37, 38) as *Drosophila fasciolooides* Dobzhansky & Pavan.

Other specimens examined (28) — BRAZIL (MZUSP): Amazonas: Manaus (1 ♂), Santa Catarina: Pirabeiraba (1 ♂). COLOMBIA: Magdalena: Sierra Nevada de Santa Marta, El Recuerdo (1 ♂, 2 ♀, DTRC, H186.54). COSTA RICA: Cartago: Turrialba (2 ♂, 2 ♀, DTRC, H163.28; 1 ♂, NMNH). HONDURAS: Atlántida: Tela, Lancetilla (4 ♂, 4 ♀, DTRC, H51.5). PANAMÁ: Panamá: Cerro La Campana (2 ♂, 1 ♀, DTRC, H182.37); Canal Zone: Barro Colorado Is. (2 ♂, 4 ♀, DTRC, H181.43; 1 ♂, MZUSP).

Relationship — Belongs to the *fasciola* subgroup of the *repleta* group. It is closely related to *D. fasciolooides* Dobzhansky & Pavan, from which it differs chiefly in the shape and size of aedeagus.

Distribution — Honduras (Atlántida), Costa Rica (Cartago), Panamá (Canal Zone, Panamá), Colombia (Magdalena), Ecuador? (Wasserman, 1962d), Brazil (Amazonas, Pará, Santa Catarina).

Etymology — Named after John R. Ellison from the Department of Zoology, University of Texas at Austin, acting Director of the National *Drosophila* Species Resource Center.

***Drosophila (Drosophila) fasciola* Williston**

(Fig. 5)

Drosophila fasciola Williston, 1896: 410.

Drosophila (Drosophila) fasciola, Sturtevant, 1942: 31.

Type-Material — Lectotype male (HERE DESIGNATED), labelled: "Cotype/Windward side, St. Vincent, W. I., H. H. Smith / W. Indies / 1907-66. *Drosophila fasciola* Will. (folded) / LECTOTYPE *Drosophila fasciola* Williston by C. R. Vilela", in BMNH (London). Paralectotype male (HERE DESIGNATED): "*Drosophila fasciola* Will. ♂ / Am. Mus. Nat. Hist. Dept. Invert. Zool. N°..... (nothing written) AMNH / small black label) / 500 feet / PARALECTOTYPE *Drosophila fasciola* Williston ♂ by C.R. Vilela", in AMNH (New York), N° 20531. According to Williston (1896), the type-series should have 5 specimens; however, two of them were not located. The British Museum has an additional specimen (sex unknown, abdomen missing and probably destroyed by dermestids) which is not being considered as paralectotype as it seems to belong to another species: same label as lectotype except latter two. Type-locality: Windward side, Saint Vincent, West Indies.

General characters — Described by Williston (1896).

Genitalia ♂ — Epandrium with about 30 lower and 4 upper bristles. Cerci fused at lower half. Surstylus with about 11 primary teeth and 9 marginal bristles (Fig. 5a).

Hypandrium slightly longer than epandrium.

Aedeagus with a pair of wide, long, bent, weakly sclerotized on anterior half, subapical spurs; dorsal cleft about 2/3 of length. Aedeagal apodeme slightly bent, laterally flattened. Ventral rod rudimentary. Gonopod well-developed with one tiny sensillum (Fig. 5b-d). Phallosomal index about 2.4.

Other specimens examined (24) — COLOMBIA: Magdalena: Magdalena: 70 Km S of Santa Marta (1 ♂, DTRC, H103.30). EL SALVADOR: La Libertad: 12 Km NW of Santa Tecla (1 ♂, DTRC, H46.19). GUYANA: Georgetown (1 ♂, DTRC, H231.12). WEST INDIES: Dominica: Clark Hall (16 ♂, NMNH), Manets Gutter (1 ♂, NMNH); Granada (1 ♂, DTRC, H239.4); Martinica (1 ♂, DTRC); Saint Lucia (1 ♂, DTRC, H124.8); Saint Vincent (1 ♂, DTRC, H245.41).

Relationship — It seems to be related to *D. querubimae*, sp. nov., from which it differs chiefly in the shape of aedeagus.

Distribution — West Indies, El Salvador to Guyana.

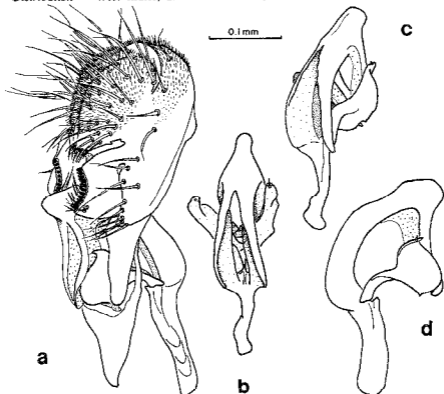


Fig. 5. *Drosophila fasciola* Williston: a (Granada), male genitalia, lateroblique aspect; b-d (Saint Lucia), aedeagus, several aspects.

***Drosophila (Drosophila) fascioloides* Dobzhansky & Pavan
(Fig. 6)**

Drosophila (Drosophila) fascioloides Dobzhansky & Pavan, 1943: 42.

Type-Material — Holotype male, labelled: "Bertioga, São Paulo, 30. iv. 1943 / *Drosophila fascioloides* (SIC) TYPE / HOLOTIPO", in MZUSP (São Paulo).

Paratypes (2 ♂, 1 ♀) in MZUSP, (1 ♂, 1 ♀) in DTRC (Austin); same data as holotype: (1 ♂, 3 ♀) in MZUSP; same data as holotype except date (iv. 943). Holotype and 2 male paratypes dissected. Type-locality: Bertioiga, São Paulo, Brazil.

General characters — Described by Dozhansky & Pavan (1943).

Genitalia ♂ — Epandrium with about 15 lower and 2 upper bristles. Cerci fused at lower half. Surstylus with about 10 primary teeth and 10 marginal bristles (Fig. 6a).

Hyandrium slightly longer than epandrium.

Aedeagus with a pair of short, bent, pointed, subapical spurs; dorsal cleft about 3/5 of length. Aedeagal apodeme laterally flattened. Ventral rod rudimentary. Gonopod with one tiny sensillum (Fig. 6b-d). Phallosomal index about 1.6.

Other specimens examined (56, MZUSP) — BRASIL: Paraná: Caiobá (9 ♂, 6 ♀), 14 Km of Morretes (1 ♂); Santa Catarina: Pirabeiraba (2 ♂, 1 ♀); São Paulo: Rio Guaratuba (10 ♂, 2 ♀), Estação Biológica de Boracéia, Salesópolis (2 ♂). Ibiuna (1 ♀), 14 Km NE of Peruibe (2 ♂).

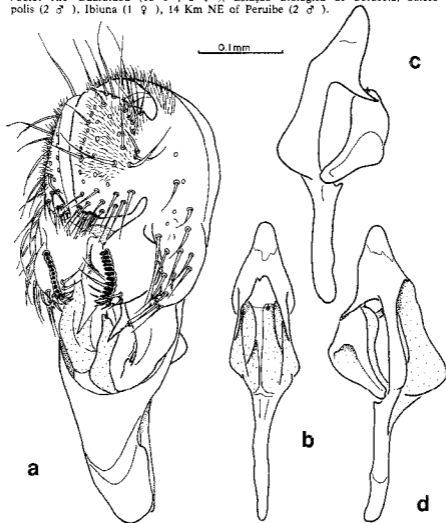


Fig. 6. *Drosophila fuscicollis* Dobzhansky & Pavan (paratype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Relationship — It is closely related to *D. ellisoni*, sp. nov., from which it differs chiefly in the shape and size of aedeagus.

Distribution — Brazil (São Paulo, Paraná, Santa Catarina).

Note — This species has been wrongly cited as occurring in several Central and South American countries (Wheeler, 1970, 1981b, for example). For details see original description of its sibling *D. ellisoni*, sp. nov.

***Drosophila (Drosophila) fulvalineata* Patterson & Wheeler**
(Fig. 7)

Drosophila (Drosophila) fulvalineata Patterson & Wheeler, 1942: 106.

Drosophila (Drosophila) fulvilineata (SIC), Wasserman, 1963, 1967.

Type-Material — Lectotype female (HERE DESIGNATED), labelled: "*D. fulvalineata* ♀ Cave Creek Ariz., G. B. Mainland col. 1940. TYPE / LECTOTYPE *Drosophila fulvalineata* Patterson & Wheeler by C. R. Vilela", in AMNH (New York). Type-locality: Cave Creek, Arizona, United States.

General characters — Described by Patterson & Wheeler (1942).

Genitalia ♂ — Epandrium with about 15 lower and 3 upper bristles. Cerci fused at lower 3/4. Surstylus with about 10 primary teeth and 9 marginal bristles (Fig. 7a).

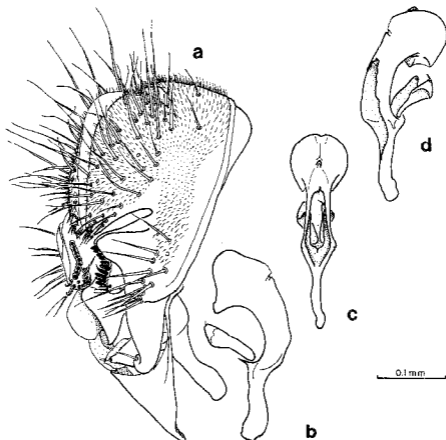


Fig. 7. *Drosophila fulvalineata* Patterson & Wheeler: a (♂ m. S. Patagonia), male genitalia, lateroblique aspect: b-d (Patagonia), aedeagus, several aspects.

Hypandrium 3/4 length of epandrium.

Aedeagus ventrally expanded, dorsally incised and slightly serrated; dorsal cleft about 2/3 of length. Aedeagal apodeme laterally flattened. Ventral rod about 1/5 length of gonopods. Gonopod with one sensillum (Fig. 7b-d). Phallosomal index about 2.1.

Other specimens examined (2, DTRC) — USA: Arizona: 4 mi S of Patagonia (1 ♂, 2358.7); New Mexico: 2 mi S of Cliff (1 ♂, 2075.9).

Strain examined — USA: Arizona, Patagonia (A? 4).

Relationship — It is related to *D. linearepleta* Patterson & Wheeler and *D. hermioneae*, sp. nov., from which it differs, chiefly in the shape of aedeagus and the mesonotum pattern. In *D. fulvalineata*, the mesonotum is striped but not spotted.

***Drosophila (Drosophila) hermioneae*, sp. nov.**

(Fig. 8)

Type-Material — Holotype male labelled: "Tenancingo Mexico / A.H. Sturtevant collection, 1970 / HOLOTYPE *Drosophila hermioneae* ♂" in NMNH (Washington, D.C.), N° 100216. Paratypes (3 ♂, 5 ♀); same data as holotype; one female paratype has an additional label "D. striped repleta", in NMNH. Holotype and two paratypes (1 ♂, 1 ♀) dissected; four paratypes (1 ♂, 3 ♀) partially destroyed, probably by dermestids. Type-locality: Tenancingo, Mexico, Mexico. *External characters of imagines* ♂, ♀ — Arista with 3-4 dorsal and 2 ventral branches plus terminal fork. Antennae brown. Front brown, pollinose; orbits anteriorly yellow, dark brown from median region of fronto-orbital row to anterior verticals. Ocellar triangle dark brown. Posterior orbital and verticals arising from

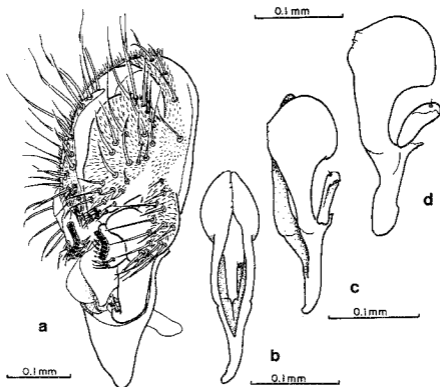


Fig. 8. *Drosophila hermioneae*, sp. nov. (holotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

dark brown spots. Anterior and middle orbitals arising from gray area. Middle orbital about half other two. Second oral about 1/2 of first. Face brown. Carina prominent, sulcate, brown. Palpi pollinose brown, with bristles on ventral surface. Cheeks brown, their greatest width 1/2 greatest diameter of eyes. Eyes red, with short black piles.

Acrostichal hairs in 8 irregular rows. No prescutellars. Anterior scutellars convergent. Mesonotum yellowish brown, pollinose, bristles arising from dark brown spots, which are larger and darker on dorsocentral rows. Some spots are fused to form: a circle anteriorly to the transverse suture; a lanceolate spot outside anterior dorsocentrals; four longitudinal stripes inside dorsocentral rows, two extending from anterior margin to middle area of mesonotum and, two from anterior dorsocentrals to posterior margin of mesonotum. Scutellum brown, yellowish in the margins; anterior scutellars arising from a large dark brown triangular area. Pleurae brown, with an irregular darker longitudinal stripe from base of first coxae to halteres; an upper dark brown stripe from propleurae to base of wings. Sterno index about 0.7. Halteres missing in all specimens. Coxae dark brown; femora brown, yellowish distally with a dark brown ring. Tibiae yellowish distally with a dark brown ring; tarsi yellow. Apical bristles on first and second tibiae, preapicalis on all three. Abdomen yellow. 2nd to 5th tergite with a medianly enlarged and interrupted posterior blackish brown band which bends toward and reaches anterior margin at angle of tergite.

Wings clear; crossveins slightly smoky. Costal index about 2.6; 4th vein index about 1.6; 5x index about 1.3; 4c index about 0.9; M index about 0.5. Third costal section with heavy bristles on its basal 1/3.

Wing length about 2.4 mm.

Genitalia (♂) — Epandrium with about 17 lower and 3 upper bristles. Cerci fused. Surstylus with about 9 primary teeth and 12 marginal bristles (Fig. 8a).

Hypandrium shorter than epandrium.

Aedeagus ventrally well-expanded; dorsally serrated; dorsal cleft about 4/5 of length. Aedeagal apodeme laterally flattened. Ventral rod about 1/3 length of gonopod. Gonopod with one sensillum (Fig. 8b-d). Phallosomal index about 1.9.

(♀) — Ovipositor apically pointed, with about 18 marginal and 5 discal teeth. Spermathecae almost cylindrical; duct deeply invaginated.

Eggs, puparia and chromosomes — Unknown.

Relationship — Belongs to the *Jasciola* subgroup of the *repleta* group. It is closely related to *D. linearepleta* Patterson & Wheeler, from which it differs chiefly in the shape of aedeagus. My comments under *D. fulvalineata* also apply here.

Distribution — Presently known from the type-locality only.

Etymology — Named after Hermione E.M.C. Bicudo from the "Departamento de Biologia, Instituto de Biociências, Letras e Ciências Exatas de São José do Rio Preto, Universidade Estadual Paulista Julio de Mesquita Filho".

Drosophila (Drosophila) ival, sp. nov.

(Fig. 9)

Type-Material — Holotype male, labelled: "BRASIL — PR, Faz. Palmital, 23°37'S, 52°22'W, Sene & Sene col. 26. xii-2. i. 1978 / HOLOTIPO *Drosophila ival* ♂". Six paratypes as follows — (3 ♂): same data as holotype; (1 ♂): "BRASIL — PR, 14 Km Morretes, 25°22'S, 48°53'W, F. C. Val enl., 24.27. xii. 1978"; (1 ♂): "BRASIL — PR, 30 Km SW Cianorte, 23°48'S, 52°47'W, Sene & Sene col. 26. xii-2. i. 1978"; (1 ♂): "BRASIL — MS, 30 Km SW B. Vista, 22°13'S, 56°47'W, Sene et alli col., 5-15. vii. 1977". All specimens in MZUSP (São Paulo), dissected. Type-locality: Fazenda Palmital (23°37'S, 52°22'W), Juçara (Rio Ivaí), Paraná, Brazil.

External characters of imagines ♂ — Arista with 3-4 dorsal and 2-3 ventral branches plus terminal fork. Antennae brown. Front brown, pollinose, posteriorly darker; orbits anteriorly yellow, brown from median region of fronto-orbital row to posterior verticals. Ocellar triangle dark brown, except at base of postverticals. Anterior verticals arising from dark brown spots. Posterior verticals and orbitals arising from yellow area. Middle orbital about 1/2 other two. Second oral about

1/2 of first. Face brown. Carina prominent, not sulcate, pollinose, yellowish brown. Palpi pollinose, brown, with bristles on ventral surface. Cheeks brown, their greatest width 1/3 greatest diameter of eyes. Eyes red, with short black piles.

Acrostichal hairs in 8 irregular rows. No prescutellars. Anterior scutellars convergent. Mesonotum yellowish brown, pollinose, bristles arising from dark brown spots, which are larger and darker on dorsocentral rows. Some spots are fused to form: a circle anteriorly to the transverse suture; a lanceolate spot outside anterior dorsocentrals; four longitudinal stripes inside dorsocentral rows, two extending from anterior margin to middle area of mesonotum and two from anterior dorsocentrals to posterior margin of mesonotum. Scutellum brown, anteriorly lighter; scutellars arising from dark brown areas. Pleurae brown, with an irregular darker longitudinal stripe from base of first coxae to halteres; an upper dark brown stripe from propleurae to base of wings. Sterno index about 0.8. Halteres yellow. Coxae and femora brown, first pair darker. Tibiae brown with dark brown rings; tarsi brown. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen yellow, 2nd to 5th tergite with a medianly enlarged and interrupted posterior blackish brown band which bends toward and reaches anterior margin

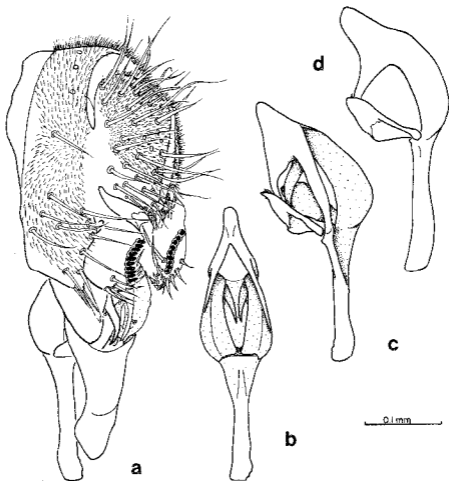


Fig. 9. *Drosophila ivai*, sp. nov. (holotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

at angle of tergite, leaving a yellow area laterally; 6th tergite with a narrower, fainter band.

Wings clear. Costal index about 2.2; 4th vein index about 1.6; 5x index about 1.3; 4c index about 1.0; M index about 0.5. Third costal section with heavy bristles on its basal 1/2.

Wing length about 2.3 mm.

Genitalia ♂ — Epandrium with about 15 lower and 4 upper bristles. Cerci fused at lower 1/2. Surstylus with about 9 primary teeth and 11 marginal bristles (Fig. 9a).

Hyandrium as long as epandrium.

Aedeagus with a pair of subapical, pointed, bent spurs; dorsal cleft about 2/3 of length, Aedeagal apodeme rod-shaped. Ventral rod absent. Gonopod with one tiny sensillum (Fig. 9b-d). Phallosomal index about 1.3.

Eggs, puparia, chromosomes and ♀ — Unknown.

Relationship — Belongs to the *fasciola* subgroup of the *repleta* group. It is closely related to *D. pictilis* Wasserman, *D. pictura* Wasserman and *D. rosinae*, sp. nov., from which it differs in the shape of aedeagus.

Distribution — Brazil (Mato Grosso do Sul, Paraná).

Etymology — The species name refers to the toponym "Rio Ivaí", where the holotype and some paratypes have been collected.

***Drosophila (Drosophila) linearepleta* Patterson & Wheeler**
(Fig. 10)

Drosophila (Drosophila) linearepleta Patterson & Wheeler, 1942: 79.

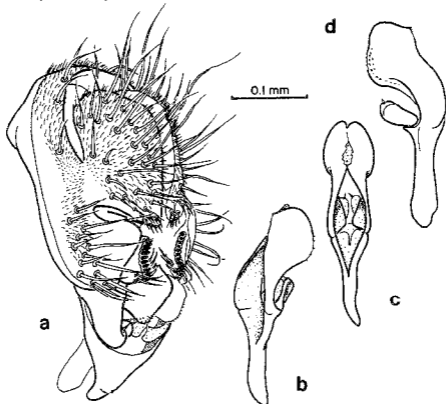


Fig. 10. *Drosophila linearepleta* Patterson & Wheeler (lectotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Type Material — Lectotype male (HERE DESIGNATED), labelled: "*D. linearepleta* ♂, Antigua, Guatemala (SIC) T. Dobzhansky col. 1939, TYPE / LECTOTYPE *Drosophila linearepleta* Patterson & Wheeler by C. R. Vilela" (head and right fore leg missing), dissected. Paralectotype female (HERE DESIGNATED): "*D. linearepleta* ♀ / PARALECTOTYPE *Drosophila linearepleta* Patterson & Wheeler by C.R. Vilela". Both specimens in AMNH (New York). Type-locality: Antigua, Guatemala, Guatemala.

General characters — Described by Patterson & Wheeler (1942).

Genitalia ♂ — Epandrium with about 14 lower and 4 upper bristles. Cerci fused at lower 1/3. Surstylus with about 9 primary teeth and 8 marginal bristles (Fig. 10a).

Hypandrium 2/3 length of epandrium.

Aedeagus ventrally expanded, with tiny teeth in and along median ventral edge, dorsally serrated; dorsal cleft about 7/8 of length. Aedeagal apodeme straight, laterally flattened. Ventral rod about 1/4 length of gonopod. Gonopod with one sensillum (Fig. 10b-d). Phallosomal index about 1.1.

Relationship — This species has been considered a member of the *repleta* subgroup since Wheeler's paper (1945); however, the mesonotum pattern and the male genitalia clearly relate this species to the members of the *fasciola* subgroup to which I am proposing its transference. *D. linearepleta* is closely related to *D. hermioneae*, sp. nov., from which it differs chiefly in the shape of aedeagus. My comments under *D. fulvalineata* also apply here.

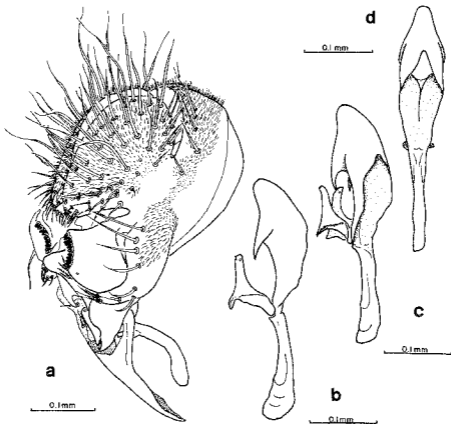


Fig. 11. *Drosophila moju* Pavan: a (strain H80.12), male genitalia, lateroblique aspect; b-d (lectotype), aedeagus, several aspects.

Distribution — Guatemala, ? Mexico.

Notes — The previously known distribution of this species in Antigua (Guatemala, type-locality) was extended to several states of Mexico by Patterson (1943: 73). However, I think that the Mexican specimens Patterson identified as *D. linearepleta* could in fact belong to its sibling form described in this paper as *D. hermioneae*. On the other hand, I have analyzed in the NMNH one specimen from Jamaica, closely related to *D. linearepleta* and *D. hermioneae*, which I was not able to assign to any of those species.

***Drosophila (Drosophila) moju* Pavan**

(Fig. 11)

Drosophila (Drosophila) moju (SIC) Pavan, 1950: 19.

Type-Material — Lectotype male (HERE DESIGNATED), labelled: "*D. moju* Pavan Belem 1948 / LECTOTIPO *Drosophila moju* Pavan por C.R. Vilela". Paralectotypes (2 ♂, 3 ♀; HERE DESIGNATED); same data as lectotype. All specimens in MZUSP (São Paulo); all males dissected. The original type-series has 7 specimens, but one (male) of them does not belong to the same species as do the lectotype and paralectotypes above designated and therefore is no longer being considered. Such a specimen in fact belongs to the sibling species *D. mojuoides* Wasserman. Type-locality: Belém, Pará, Brazil.

General characters — Described by Pavan (1950).

Genitalia ♂ — Epandrium with about 11 lower and 5 upper bristles. Cerci fused at lower 4/5. Surstylus with about 11 primary teeth and 8 marginal bristles (Fig. 11a).

Hyandrium shorter than epandrium.

Aedeagus roundish at tip with a pair of subapical, pointed spurs; dorsal cleft about 3/5 of length. Aedeagal apodeme slightly curved, laterally flattened. Ventral rod rudimentary. Gonopod with one tiny sensillum (Fig. 11b-d). Phallosomal index about 1.1.

Strains examined (3) — COLOMBIA: Meta: Villavicencio (H194.33). PANAMA: Canal Zone: Barro Colorado I. (H80.12); Panamá: Cerro La Campana (H183.25).

Relationship — It is closely related to *D. mojuoides* Wasserman, from which it differs chiefly in the shape of aedeagus.

Distribution — Costa Rica to Brazil and Bolivia.

***Drosophila (Drosophila) mojuoides* Wasserman**

(Fig. 12)

Drosophila (Drosophila) moju Pavan (in part), 1950.

Drosophila (Drosophila) sp M, Wasserman, 1960.

Drosophila (Drosophila) mojuoides Wasserman, 1962d: 121.

Type-Material — Holotype male, labelled: "HOLOTYPE / H107.7 / *D. mojuoides* / Dec. 1955 / W. B. Heed / Arima Valley Trinidad ♂", in NMNH (Washington, D.C.). Paratypes (4 ♂, 5 ♀): same data as holotype, in DTRC (Austin). Type-locality: Arima Valley, Trinidad.

General characters — Described by Wasserman (1962d).

Genitalia ♂ — Epandrium with about 10 lower and 2 upper bristles. Cerci fused at lower 2/3. Surstylus with about 8 primary teeth and 11 marginal bristles (Fig. 12a).

Hyandrium 1 and 1/2 length of epandrium.

Aedeagus pointed at tip with a pair of long, subapical, pointed spurs; dorsal cleft about 2/3 of length. Aedeagal apodeme anteriorly expanded, laterally flattened. Ventral rod absent. Gonopod with one tiny sensillum (Fig. 12b-d). Phallosomal index about 1.3.

Other specimen examined — BRAZIL: Pará: Belém (1 ♂, MZUSP); see type material of *D. moju*.

Strains examined (2) — TRINIDAD: Arima Valley (H107.7), Maravel (H352.9).

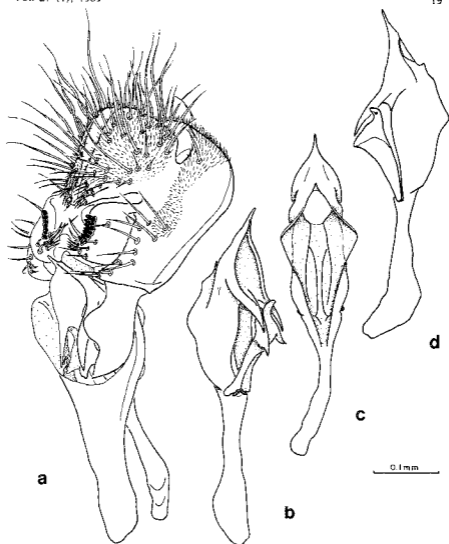


Fig. 12. *Drosophila mojuoides* Wasserman (strain H332.9): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Relationship — It is closely related to *D. moju* Pavan, from which it differs chiefly in the shape of aedeagus.

Distribution — Trinidad, Brazil (Pará, NEW RECORD).

***Drosophila (Drosophila) onca* Dobzhansky & Pavan**
(Fig. 13)

Drosophila (Drosophila) onca Dobzhansky & Pavan, 1943: 40.

Type-Material — Holotype male, labelled: "Iporanga, São Paulo, VII — 1943 / *Drosophila onca* TYPE / HOLOTIPO ♂", in MZUSP (São Paulo), dissected. Paratypes (3 ♀) in MZUSP, (2 ♀) in DTRC (Austin): same data as holotype. Type-locality: Iporanga, São Paulo, Brazil.

General characters — Described by Dobzhansky & Pavan (1943).

Genitalia ♂ — Epandrium with about 12 lower and 7 upper bristles. Cerci fused at lower half. Surstylus with about 11 primary teeth and 9 marginal bristles (Fig. 13a).

Hypandrium slightly shorter than epandrium.

Aedeagus with a pair of short, subapical spurs; dorsal cleft about 3/5 of length. Aedeagal apodeme almost straight, laterally flattened. Ventral rod absent. Gonopod with three tiny sensilla (Fig. 13b-d). Phallosomal index about 0.9.

Other specimens examined (72, MZUSP) — BRAZIL: Paraná: 14 Km of Morretes (4 ♂), Fazenda Palmital (10 ♂); Santa Catarina: 12 Km NW of Timbé do Sul (1 ♀); São Paulo: Rio Guaratuba (2 ♂), Santa Maria da Serra (45 ♂, 1 ♀), São Paulo (9 ♂).

Relationship — This species was tentatively assigned to the *repleta* subgroup by Wheeler (1949); however, as it has the mesonotum pattern and the male genitalia very similar to those of the members of the *fasciola* subgroup, it was recently transferred to this forest-dwelling subgroup by Vilela *et al.* (1983). *D. onca* is closely related to *D. carolinae*, sp. nov., from which it differs in the shape of aedeagus. *Distribution* — Brazil (São Paulo, Paraná, Santa Catarina).

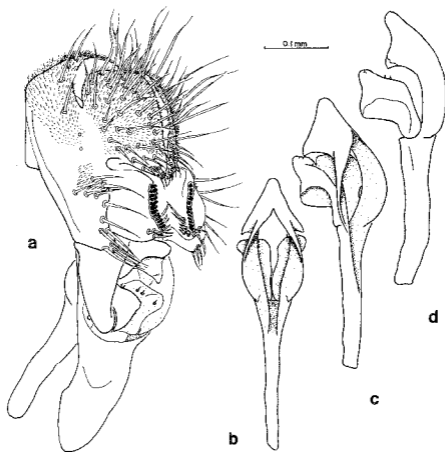


Fig. 13. *Drosophila onca* Dobzhansky & Pavan (14 Km of Morretes): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

***Drosophila (Drosophila) paraguttata* Thompson**
(Fig. 14)

Drosophila (Drosophila) paraguttata Thompson in Wheeler, 1957: 98.

Type-Material — Holotype male, labelled: 'H156.34 / HOLOTYPE / W. B. Heed / Jamaica B.W.I. / nr. Bath Feb. 1956', in NMNH (Washington, D. C.). Paratypes (6 ♂, 3 ♀): same data as holotype, in DTRC (Austin). Type-locality: Bath, Jamaica, West Indies.

General characters — Described by Thompson (Wheeler, 1957).

Genitalia ♂ — Epandrium with about 23 lower and 3 upper bristles. Cerci fused at lower 1/3. Surstylus with about 11 primary teeth and 9 marginal bristles (Fig. 14a).

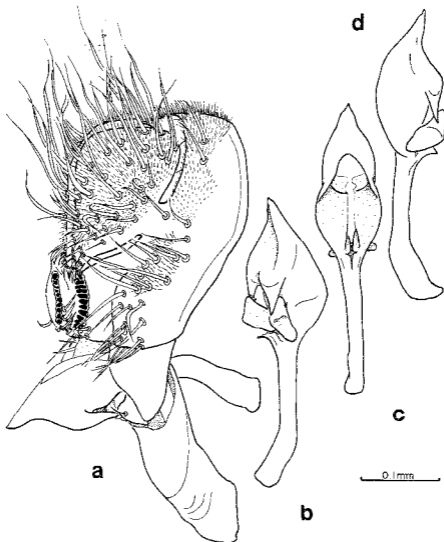


Fig. 14. *Drosophila paraguttata* Thompson (Bath, Jamaica): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Hypandrium as long as epandrium.

Aedeagus pointed at tip, with a pair of subapical, pointed spurs; dorsal cleft about 3/4 of length. Aedeagal apodeme curved. Ventral rod 1/2 length of gonopod. Gonopod with one tiny sensillum (Fig. 14b-d). Phallosomal index about 1.0.

Other specimens examined (3, DTRC) — JAMAICA: Bath (3 ♂; H136.34).
Strain examined — WEST INDIES: Jamaica: Hardware Gap (H356.18).

Relationship — It is related to *D. moju* Pavan and *D. mojuoides* Wasserman, from which it differs chiefly in the shape of aedeagus and the mesonotum pattern. In *D. parangutata* the mesonotum is faintly striped but not spotted.

Distribution — Jamaica.

***Drosophila (Drosophila) pictilis* Wasserman**
(Fig. 15)

Drosophila (Drosophila) sp. J. Wasserman, 1960.

Drosophila (Drosophila) pictilis Wasserman, 1962d: 125.

Type-Material — Holotype male, labelled: "H27.2 / *D. pictilis* / HOLOTYPE / Nov. 1953, W.B. Heed / Rep. de El Salvador / Lago Pichichuela SE Opico 12 Klm (SIC)", in NMNH (Washington, D.C.). Paratypes (4 ♂, 5 ♀; one male dissected): same data as holotype, in DTRC (Austin). Type-locality: Lago Pichichuela (12 Km SE of Opico), La Libertad, El Salvador.

General characters — Described by Wasserman (1962d).

Genitalia ♂ — Epandrium with about 12 lower and 3 upper bristles. Cerci fused

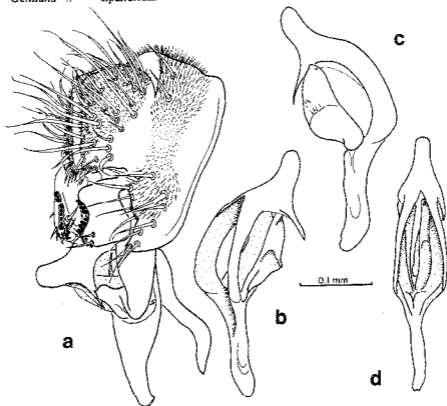


Fig. 15. *Drosophila pictilis* Wasserman: a (paratype), male genitalia, lateroblique aspect; b-d (Lago Pichichuela), aedeagus, several aspects.

at lower 2/3. Surstylus with about 9 primary teeth and 8 marginal bristles (Fig. 15a).

Hypandrium as long as epandrium.

Aedeagus with a pair of curved, subapical, pointed spurs; dorsal cleft about 3/5 of length. Aedeagal apodeme laterally flattened. Vertical rod absent. Gonopod with one tiny sensillum, laterally covered with small bristles (Fig. 15b-d). Phallosomal index about 1.8.

Other specimens examined (4) — EL SALVADOR: La Libertad: Lago Pichichuela (3 ♂, DTRC: H27.2). PANAMA: Bocas del Toro: Chiriqui (1 ♂, NMNH).

Strain examined — EL SALVADOR: La Libertad: Lago Pichichuela (H27.2).

Relationship — It is closely related to *D. pictura* Wasserman, *D. ivai*, sp. nov., and *D. rosinae*, sp. nov., from which it differs chiefly in the shape of aedeagus.

Distribution — El Salvador, Panamá (Bocas del Toro, NEW RECORD).

***Drosophila (Drosophila) pictura* Wasserman**

(Fig. 16)

Drosophila (Drosophila) sp. K, Wasserman, 1960.

Drosophila (Drosophila) pictura Wasserman, 1962d: 121.

Type-Material — Holotype male, labelled: "HOLOTYPE H109.28 / *D. pictura* / Dec. 1955 / Port of Spain, Trinidad B.W.I., W.B. Heed", in NMNH (Washington, D.C.). Paratypes (4 ♂, 5 ♀; two males dissected): same data as holotype, in DTRC (Austin). Type-locality: Port of Spain, St. George, Trinidad.

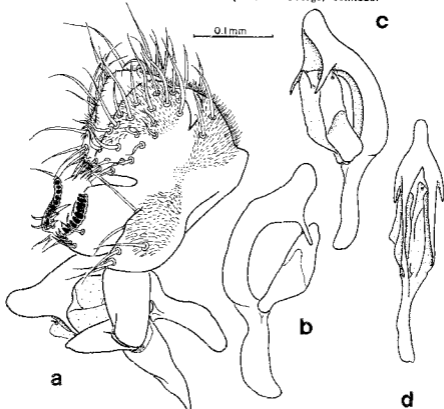


Fig. 16. *Drosophila pictura* Wasserman (paratypes): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

General characters — Described by Wasserman (1962d).

Genitalia ♂ — Epiandrium with about 6 lower and 3 upper bristles. Cerci fused at lower 3/4. Surstylus with about 9 primary teeth and 7 marginal bristles (Fig. 16a).

Hypandrium as long as epiandrium.

Aedeagus with a pair of subapical, pointed spurs; dorsal cleft about 3/4 of length. Aedeagal apodeme laterally flattened. Vertical rod absent. Gonopod with one tiny sensillum (Fig. 16b-d). Phallosomal index about 2.0.

Other specimen examined (DTRC) — BOLIVIA: Santa Cruz: Monteiro (1 ♂, H344.14).

Strain examined — TRINIDAD: St. George: Port of Spain (H109.28).

Relationship — It is closely related to *D. pictilis* Wasserman, *D. divai*, sp. nov., and *D. rosinae*, sp. nov., from which it differs chiefly in the shape of aedeagus.

Distribution — Trinidad, ? Bolivia.

Note — The specimens from Trinidad and Bolivia are slightly different with respect to the male genitalia and therefore may belong to distinct species.

♣ ***Drosophila (Drosophila) querubimae*, sp. nov.**

(Fig. 17)

Undescribed K, Vilela *et al.*, 1985.

Type-Material — Holotype male, labelled: "BRASIL. — SP, Rio Guaratuba, 23°50'S, 45°53'W, Sene *et alii* col., 21-23. x. 1977 / HOLOTIPO *Drosophila querubimae* ♂", in MZUSP (São Paulo), dissected, left wing removed and slide mounted. Type-locality: Praia de Utinga (23°50'S, 45°53'W), Rio Guaratuba, São Paulo, Brazil.

External characters of imagines ♂ — Arista with 4 dorsal and 3 ventral branches plus terminal fork. Antennae brown. Front brown, pollinose; orbits and anterior region lighter. Ocellar triangle dark brown. Posterior orbital and anterior vertical arising from dark brown spots. Middle orbital about 2/3 other two. Second oral about 2/3 of first. Face yellow. Carina prominent, narrow, slightly sulcate. Palpi pollinose, yellow, with bristles on ventral surface. Cheeks light brown, their greatest width 1/3 greatest diameter of eyes. Eyes red, with short black piles.

Acrostichal hairs in 8 irregular rows. No prescutellars. Anterior scutellars convergent. Mesonotum yellowish brown, pollinose, bristles arising from brown spots, which are larger and darker on dorsocentral rows. Some spots are fused to form: four longitudinal stripes inside dorsocentral rows, two extending from anterior margin to middle area of mesonotum and two from anterior dorsocentrals to posterior margin of mesonotum; two irregular spots outside dorsocentral

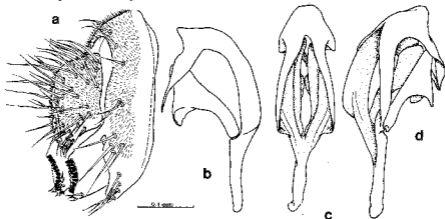


Fig. 17. *Drosophila querubimae*, sp. nov., (holotype): a, external male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

rows. Scutellum brown with a Y-shaped yellow area; bristles arising from dark brown spots. Pleurae brown, pollinose with an irregular darker longitudinal stripe from base of first coxae to halteres. Sterno index about 0.8. Halteres pale yellow. Coxae brown; femora brown with a dark brown ring. Tibiae yellow with two brown rings; tarsi yellow. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen yellow, 2nd to 5th tergite with a medianly enlarged and interrupted posterior dark brown band which bends toward and reaches anterior margin at angle of tergite, leaving a yellow area laterally.

Wings clear. Costal index about 2.3; 4th vein index about 1.6; 5x index about 1.3; 4c index about 0.9; M index about 0.5. Third costal section with heavy bristles and its basal half.

Wing length about 1.8 mm.

Genitalia — Epandrium with about 9 lower and 5 upper bristles. Cerci not fused. Surstylus with about 12 primary teeth and 10 marginal bristles (Fig. 17a).

Hypandrium as long as epandrium.

Aedeagus with a pair of long, pointed, subapical spurs; dorsal cleft about 2/3 of length. Aedeagal apodeme rod-shaped. Ventral rod absent. Gonopod well-developed with one tiny sensillum (Fig. 17b-d). Phallosomal index about 1.8.

Eggs, puparia, chromosomes and ♀ — Unknown.

Relationship — Belongs to the *fasciola* subgroup of the *repleta* group. It seems to be related to *D. fasciola* Williston, from which it differs chiefly in the shape of aedeagus.

Distribution — Presently known from the type-locality only.

Etymology — Named after Maria Augusta Querubim Rodrigues Pereira from the "Departamento de Biologia, Instituto de Biociências, Universidade de São Paulo", one of the collectors of the holotype.

Drosophila (Drosophila) rosinae, sp. nov.

(Fig. 18)

Undescribed G, Vilela *et al.*, 1983.

Type-Material — Holotype male, labelled: "BRASIL — SP, 14 Km NE of Peruibe, 24°14'S, 46°55'W, N.M.V. Bizzo col., 12. v. 1978 / HOLOTIPO *Drosophila rosinae*". One paratype female: same data as holotype, with the following additional label: "*Drosophila rosinae*, A89B, C.R. Vilela det.". Twenty-six additional paratypes as follows — (5 ♂): same data as holotype; (3 ♂, 4 ♀): same data as paratype ♀ cited above and F₁ descendants from it; (11 ♂): "BRASIL — SP, Rio Guaratuba, 23°50'S, 45°53'W, Sene *et alii* col., 21-23. x. 1977"; (1 ♂): "BRASIL — BA, 3 Km NW Milagres, 12°51'S, 39°53'W, Sene *et alii* col., 24. xi - 3. xii. 1976"; (1 ♂): "BRASIL — ES, Vitória, 20°18'S, 40°17'W, E. Stange col., x. 1977" (1 ♂): "BRASIL — RJ, 2 Km N B. S. João, 22°35'S, 42°00'W, Sene *et alii* col., 9-11. iii. 1977". Holotype and 21 paratypes dissected. All specimens in MZUSP (São Paulo). **Type-locality**: Balneário Gaivotas (24°14'S, 46°55'W), Peruibe, São Paulo, Brazil.

External characters of imagines ♂, ♀ — Arista with 4-5 dorsal and 2 ventral branches plus terminal fork. Antennae brown. Front brown, pollinose, distally darker. Orbits anteriorly yellow, brown from median region of fronto-orbitals to posterior verticals. Ocellar triangle dark brown, except at base of postverticals. Verticals and posterior orbital arising from dark brown spots. Anterior and middle orbitals arising from yellow area. Middle orbital about 2/3 other two. Second oral about 1/2 of first. Face brown. Carina prominent, not sulcate, pollinose, yellowish brown. Palpi pollinose, brown, with bristles on ventral surface. Cheeks brown, their greatest width 1/3 greatest diameter of eyes. Eyes red, with short black piles.

Acrostichal hairs in 8 irregular rows. No prescutellars. Anterior scutellars convergent. Mesonotum yellowish brown, pollinose, bristles arising from brown spots, which are larger and darker on dorsocentral rows. Some spots are fused to form: a circle anteriorly to the transverse suture; a lanceolate spot outside anterior dorsocentrals; four longitudinal stripes inside dorsocentral rows, two extending

from anterior margin to middle area of mesonotum and two from anterior dorso-centrals to posterior margin of mesonotum. Scutellum pollinose, brown, scutellars arising from dark brown areas. Pleurae pollinose, brown, with an irregular darker longitudinal stripe from base of first coxae to halteres; an upper dark brown stripe from propleurae to base of wings. Sterno index about 0.8. Halteres yellow. Coxae and femora dark brown, distally yellow. Tibiae yellow with two dark brown rings; tarsi yellow. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen yellow, 2nd to 5th tergite with a medianly enlarged and interrupted posterior dark brown band which bends toward and reaches anterior margin at angle of tergite, leaving a yellow area laterally; 6th tergite with a narrower, fainter band.

Wings clear. Costal index about 2.4; 4th vein index about 1.7; 5x index about 1.6; 4c index about 1.0; M index about 0.6. Third costal section with heavy bristles on its basal 1/2.

Wing length about 2.3 mm.

Internal characters of imagines and genitalia (♂) — Testis yellow, with about 7 inner and 8 outer coils. Epandrium with about 13 lower and 2 upper bristles. Cerci

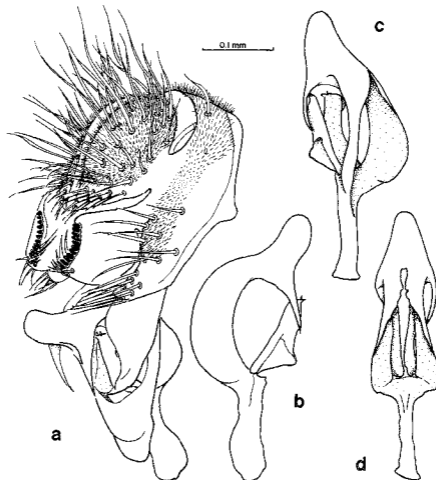


Fig. 18. *Drosophila rosinae*, sp. nov.: a (holotype), male genitalia, lateroblique aspect; b-d (paratype), aedeagus, several aspects.

fused at lower half. Surstylus with about 11 primary teeth and 10 marginal bristles (Fig. 18a).

Hypandrium as long as epandrium.

Aedeagus with a pair of subapical, pointed, bent spurs; dorsal cleft about 1/2 of length. Aedeagal apodeme laterally flattened. Ventral rod absent. Gonopod with one tiny sensillum (Fig. 18b-d). Phallosomal index about 2.2.

(♀) — Ventral receptacle an irregular spiral with about 83 tight coils. Ovipositor apically pointed with about 18 marginal and 6 discal teeth. Spermathecae rudimentary, weakly sclerotized; duct slightly invaginated.

Eggs — Four filaments, slightly longer than egg.

Puparia — Reddish brown; horn index about 13; each anterior spiracle with about 8 branches.

Chromosomes — Not studied.

Relationship — Belongs to the *fusciola* subgroup of the *repleta* group. It is closely related to *D. ivai*, sp. nov., *D. pictilis* Wasserman, and *D. pictura* Wasserman, from which it differs chiefly in the shape of aedeagus.

Distribution — Brazil (Bahia, Espírito Santo, Rio de Janeiro, São Paulo).

Etymology — Named after Rosina de Barros, former member of the "Departamento de Biologia, Instituto de Biociências, Universidade de São Paulo".

Note — This species has been collected mainly at strand vegetation on the coast nearby but never in the Atlantic Forest.

Drosophila (Drosophila) senei, sp. nov.

(Fig. 19)

Type-Material — Holotype male, labelled: "BRASIL — SP, Ibiuna, 23°39'S, 47°13'W, C. Pavan col., 05. v. 1978 / HOLOTIPO *Drosophila senei* ♂". Paratype male; same data as holotype. Both specimens collected over passionflower fruit (*Passiflora* sp.); in MZUSP (São Paulo), dissected. Type-locality: Sítio Maria Cristina, Bairro dos Alves, Ibiuna (23°39'S, 47°13'W), São Paulo, Brazil.

External characters of imagines ♂ — Arista with 4 dorsal and 2 ventral branches plus terminal fork. Antennae brown, pollinose. Front dark brown, pollinose; orbits and anterior region lighter. Ocular triangle dark brown, except at base of postverticals. Posterior orbital and anterior vertical arising from dark brown spots. Middle orbital about 1/2 other two. Second oral about 1/2 of first. Face yellow. Carina narrow, prominent, not sulcate. Palpi pollinose, light brown, with bristles on ventral surface. Cheeks brown, their greatest width 1/3 greatest diameter of eyes. Eyes red, with short black piles.

Acrostichal hairs in 8 irregular rows. No prescutellars. Anterior scutellars convergent. Mesonotum yellowish brown, pollinose, bristles arising from dark brown spots. Some spots are fused to form: a lanceolate spot outside anterior dorsocentrals; an irregular interrupted spot near the transverse suture; a small circle by the supra-alars; four longitudinal stripes inside dorsocentrals. Scutellum yellowish brown, with bristles arising from brown spots. Pleurae brown, pollinose, with an irregular darker longitudinal stripe from base of first coxae to halteres; an upper dark brown stripe from propleurae to base of wings. Sterno index about 0.8. Halteres pale yellow. Coxae brown, femora dark brown, distally yellow with a brown ring. Tibiae yellow with two brown rings; tarsi yellow. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen yellow, 2nd to 5th tergite with a medianly enlarged and interrupted dark brown band which bends toward and reaches anterior margin at angle of tergite, leaving a yellow area laterally; 6th tergite with a narrower, fainter band.

Wings clear. Costal index about 2.4; 4th vein index about 1.7; 5x index about 1.5; 4c index about 1.0; M index about 0.5. Third costal section with heavy bristles on its basal 1/2.

Wing length about 2.6 mm.

Genitalia ♂ — Epandrium with about 15 lower and 5 upper bristles. Cerci fused at lower 1/3. Surstylus with about 12 primary teeth and 11 marginal bristles (Fig. 19a).

Hypandrium as long as epandrium.

Aedeagus with a pair of waved, pointed, very long, subapical spurs; dorsal cleft about 3/5 of length. Aedeagal apodeme slightly bent, laterally flattened. Ventral rod short. Gonopod with one tiny sensillum (Fig. 19b-d). Phallosomal index about 1.4.

Eggs, puparia, chromosomes and ♀ — Unknown.

Relationship — Belongs to the *fasciola* subgroup of the *repleta* group. It seems to be related to the *D. coroica* Wasserman, from which it differs chiefly in the size and shape of aedeagus.

Distribution — The type-locality is the only site where this species has been collected.

Erymology — Named after Fabio de Melo Sene from the "Departamento de Biologia, Instituto de Biociências, Universidade de São Paulo"

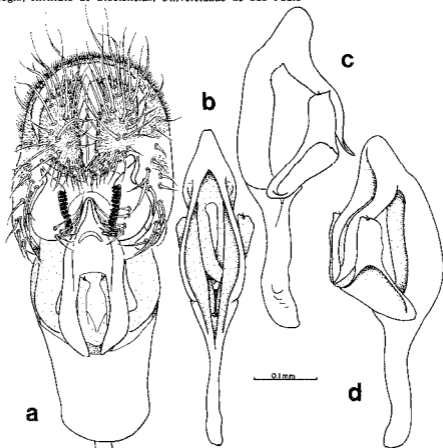


Fig. 19. *Drosophila senei*, sp. nov.: a (holotype), male genitalia, posterior aspect; b-d (paratype), aedeagus, several aspects.

THE HYDEI SUBGROUP

Species included (6) — *Drosophila bifurca* Patterson & Wheeler, *D. eohydei* Wasserman; *D. hydei* Sturtevant; *D. neohydei* Wasserman; *D. nigrohydei* Patterson & Wheeler; *D. novemariata* Dobzhansky & Pavan.

Diagnosis — Costal index ranging from 3.0 to 3.6; testis with many coils, ranging from a total of 22 to 51; ventral receptacle very long and with many coils, ranging from about 245 to 735; phallosomal index varying from 1.9 to 2.8. Ante-

rior margin of cerci fused to posterior margin of epandrium in various degree; surstylus without secondary teeth, in most species the number of primary teeth is about 11; concha of hypandrium usually bearing one anterior bristle (bare in *D. bifurca*); aedeagus usually with a pair of posterior ventral spurs; gonopod with one to two tiny sensilla, linked to concha of hypandrium by membranous tissue; lateral areas of abdominal tergites usually solid in color.

Geographical distribution — The species of this subgroup inhabit cacti areas between Southwestern North America (18°N; USA, Texas) and Northwestern South America (12°S; Peru, Junin) in altitudes varying from the sea level to more than 3,000 m. *D. neohydei* also occurs in the West Indies and *D. hydei* is cosmopolitan.

***Drosophila (Drosophila) bifurca* Patterson & Wheeler**
(Fig. 20)

Drosophila (Drosophila) bifurca Patterson & Wheeler, 1942: 85.

Type-Material — Lectotype male (HERE DESIGNATED), labelled: "*D. bifurca* ♂, Wild Rose Canyon, Texas, G. B. Mainland col., TYPE / LECTOTYPE *Drosophila bifurca* Patterson & Wheeler by C. R. Vilela". Paralectotype female (HERE DESIGNATED): "*D. bifurca* ♀ / PARALECTOTYPE *Drosophila bifurca* Patterson & Wheeler by C. R. Vilela". Both specimens in AMNH (New York). Type-locality: Wild Rose Canyon, Texas, USA.

General characters — Described by Patterson & Wheeler (1942).

Genitalia ♂ — Epandrium with about 12 lower and 2 upper bristles. Cerci fused at lower 1/4. Surstylus with about 11 primary teeth and 12 marginal bristles (Fig. 20a).

Hypandrium shorter than epandrium, strongly sclerotized; anterior margin strongly concave (Fig. 20a).

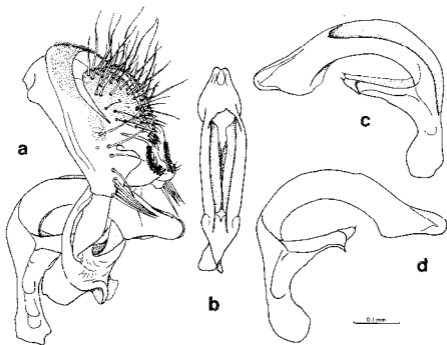


Fig. 20. *Drosophila bifurca* Patterson & Wheeler (strain A8.10 x A2): a, rostral genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Aedeagus bow-shaped; dorsal cleft longer than 1/2 of length. Aedeagal apodeme bent, anteriorly splitted; laterally flattened. Ventral rod slightly shorter than gonopod. Gonopod long with one sensillum (Fig. 20b-d). Phallosomal index about 1.9.

Other specimen examined — USA: Arizona: 5 mi SW of Portal (1 ♂, NMNH). *Strains examined* (2) — USA: Arizona: Aravaipa Valley x Patagonia (A8.10 x A2), Patagonia (A2).

Relationship — It is related to *D. nigrohydei* Patterson & Wheeler and *D. novemristata* Dobzhansky & Pavan, from which it differs chiefly in the shape of aedeagus.

Distribution — sw. USA, n. Mexico.

***Drosophila (Drosophila) eohydei* Wasserman**

(Fig. 21)

Drosophila (Drosophila) sp. A, Wasserman, 1960.

Drosophila (Drosophila) eohydei Wasserman, 1962b: 73.

Drosophila (Drosophila) pseudoneohydei Hennig, Hennig & Stein, 1970: 31 (synonymized by Glätzer, 1973: 47).

Type-Material — Holotype male, labelled: "HOLOTYPE / H191.67 ♂ / *D. eohydei*" in NMNH (Washington, D. C.). Paratypes (2 ♂, 3 ♀): same data as holotype; (2 ♂, 2 ♀): idem with an additional label: "Bucaramanga, Colombia", in DTRC (Austin). Type-locality: Bucaramanga, Santander, Colombia.

General characters — Described by Wasserman (1962b).

Genitalia ♂ — Epandrium with about 17 lower and 4 upper bristles. Cerci fused at lower 2/3. Surstylus with about 11 primary teeth and 11 marginal bristles (Fig. 21a).

Hypandrium slightly shorter than epandrium.

Aedeagus with a pair of pointed, bent spurs; slightly splitted at tip; dorsal

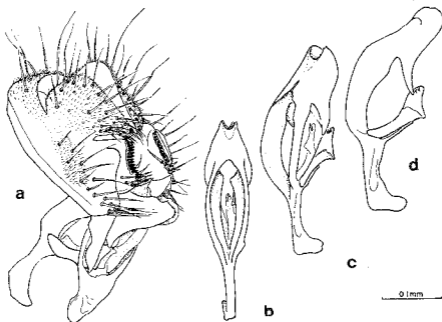


Fig. 21. *Drosophila eohydei* Wasserman (strain H191.47): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

cleft about 3/4 of length. Aedeagal apodeme laterally flattened, anteriorly bent. Ventral rod 3/4 length of gonopod. Gonopod with two tiny sensilla (Fig. 21b-d). Phallosomal index about 2.3.

Other specimen examined — PANAMÁ: Chiriqui (1 ♂, NMNH).

Strains examined (4) — COLOMBIA: Santander: Bucaramanga (H191.47, — 67); Magdalena: Sierra Nevada de Santa Marta (H186.58). EL SALVADOR: Chalatenango: La Palma (H62.57).

Relationship — It is closely related to *D. neoheydei* Wasserman and *D. heydei* Sturtevant from which it differs chiefly in the shape of aedeagus.

Distribution — Honduras to Colombia.

***Drosophila (Drosophila) heydei* Sturtevant**

(Figs. 22, 25)

? *Drosophila marmorata* Hutton, 1901: 91 (according to Harrison, 1959 and Wheeler, 1959: 193).

Drosophila heydei Sturtevant, 1921: 101.

Drosophila (Drosophila) heydei, Sturtevant, 1939: 139.

Drosophila (Drosophila) heydei yucatanensis Spencer, 1940: 159.

Drosophila (Drosophila) setosa Dobzhansky & Pavan, 1943: 46; (preocc.) *nec* Villeneuve (synonymized by Wharton, 1944: 178).

Type-Material — Holotype male, labelled: "*Drosophila heydei* Sturtevant / ac. 5497 / TYPE / Stock Lakeland Fla. 1919", in AMNH (New York), cited as in

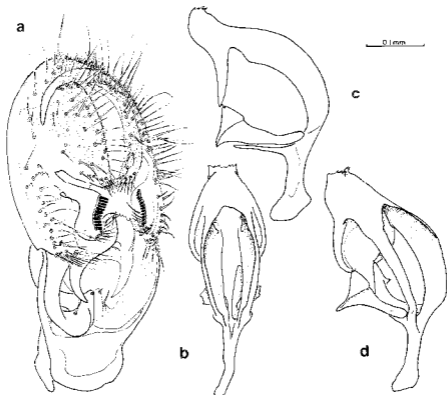


Fig. 22. *Drosophila heydei* Sturtevant (strain E22.1A): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

USNM (Washington, D.C.) by Bock (1976: 8). Paratypes (6 ♂, 4 ♀; one male dissected) in NMNH (Washington, D.C.); (1 ♂) in DTRC (Austin); same data as holotype. Type-locality: Lakeland, Florida, USA.

Holotype male of junior synonym *D. setosa*: "Mogi das Cruzes, São Paulo, IV.943 / *Drosophila setosa* sp. n. TYPE / HOLOTIPO", dissected (Fig. 23). Paratypes (3 ♂, 1 ♀); same data as holotype. All type specimens in MZUSP (São Paulo). Type-locality: Mogi das Cruzes, São Paulo, Brazil.

Holotype female of probable synonym *D. marmorata* (type-locality: Auckland, New Zealand) in Canterbury Museum (Christchurch, New Zealand), not analyzed. According to Dr. Harrison (personal communication) the specimen, which appears to be the sole representative of the species, is in poor condition (its head and one of its wings are missing).

The type-series of the subspecies *D. hydei yucatanensis* should be in the College of Wooster, Wooster, Ohio, USA; not analyzed.

General characters — Described by Sturtevant (1921), redescribed by Patterson (1943).

Genitalia ♂ — Epandrium with about 23 lower and 5 upper bristles. Cerci fused at lower half. Surstylus with about 11 primary teeth and 10 marginal bristles (Fig. 22a).

Hypandrium shorter than epandrium.

Aedeagus with a pair of pointed, bent, long spurs; serrated at tip; dorsal cleft about 3/4 of length. Aedeagal apodeme laterally flattened, anteriorly expanded. Ventral rod 3/4 length of gonopod. Gonopod with one tiny sensillum (Fig. 22b-d). Phallosomal index about 2.2.

Other specimens examined (138) — ARGENTINA: Catamarca: 2 Km N of La Viña (2 ♂, 4 ♀, IML; 2 ♂, 4 ♀, MZUSP); Chaco: 10 Km N of Puerto Tirol (3 ♂, MZUSP), 7 Km NE of Resistencia (3 ♂, 3 ♀, IML; 2 ♂, 4 ♀, MZUSP); La Rioja: 5 Km S of Chilecito (1 ♂, MZUSP), 8 Km S of Famatina (1 ♂, MZUSP); Tucuman: 2 Km N of Tapia (1 ♂, 1 ♀, IML; 4 ♂, 3 ♀, MZUSP), 14 Km N of Tucuman (2 ♂, IML). BRAZIL (MZUSP): Bahia: 27

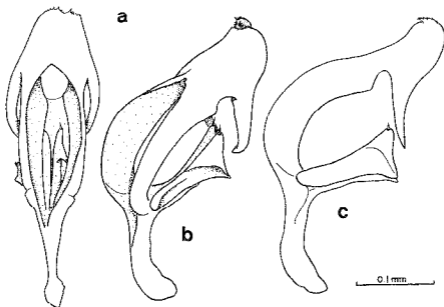


Fig. 23. *Drosophila setosa* Dobzhansky & Pavan (holotype): a-c, aedeagus, several aspects.

Km W of Barreiras (2 ♂), 61 Km W of Barreiras (1 ♂), 79 Km W of Barreiras (3 ♂), Cachoeira dos Monteiro (10 ♂), 3 Km NW of Milagres (30 ♂); Espirito Santo: Vitoria (1 ♂); Mato Grosso do Sul: 30 Km S of Campo Grande (1 ♂); Minas Gerais: 18 Km NW of Cardeal Mota (2 ♂), 12 Km N of Jaboticarubas (1 ♂); Paraíba: 1 Km E of Junco do Seridó (1 ♂); São Paulo: Rio Guaratuba (1 ♂), 14 Km NE of Peruipe (2 ♂, 1 ♀), São Paulo (1 ♂). COSTA RICA: Pedregoso (1 ♂, NMNH). ITALY: Sicily: Palermo (1 ♂, NMNH). MEXICO: Yucatan (1 ♂, NMNH). USA (NMNH, unless otherwise noted): Arizona: Tucson (1 ♂); California: Buena Park (1 ♂), Chico (1 ♂), Forest Home (1 ♂), Laguna Beach (1 ♂), Lancaster (1 ♂), Los Angeles (1 ♂), S. Fork Sta. Ana (1 ♂), Spreckels (2 ♂); Connecticut: Redding (1 ♂); Florida: Georgetown (1 ♂), Homestead (1 ♂, AMNH; 1 ♂, NMNH), Jacksonville (1 ♂), St. Augustine (1 ♂), Wintn. Gardn. (2 ♂); Hawaii: Maui (1 ♂); Massachusetts: Woodshole (1 ♂); Michigan: Detroit (2 ♂), Grosse Ile (5 ♂), Shelby (1 ♂); North Carolina: Penland (1 ♂); Oklahoma: Mill Creek (1 ♂); Texas: Dallas (1 ♂), Del Rio (1 ♂), Paris (1 ♂); Virginia: Falls Church (1 ♂); West Virginia: Cacapon St. Pk. (1 ♂).

Strains examined (5) — BRAZIL: ? (E22, 1A). MEXICO: D.F.: Mexico City (1797, 8); Veracruz: San Juan de La Punte (1385, 11).

Relationship — It is related to *D. cohydei* Wasserman and *D. neohydei* Wasserman, from which it differs chiefly in the shape of aedeagus.

Distribution — Cosmopolitan.

***Drosophila (Drosophila) neohydei* Wasserman
(Fig. 24)**

Drosophila (Drosophila) sp. B. Wasserman, 1960.

Drosophila (Drosophila) neohydei Wasserman 1962b: 75.

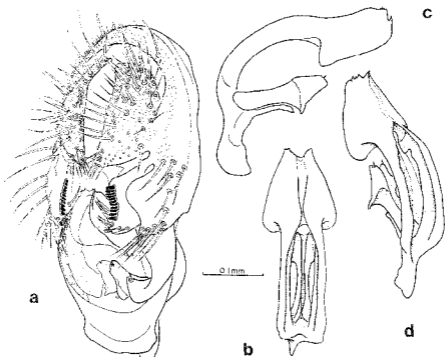


Fig. 24. *Drosophila neohydei* Wasserman (strain H207,26): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Type-Material — Holotype male, labelled: "HOLOTYPE / *D. nigrohydei* / H207.26 / M. Wasserman, Nov. 1956 ♂ / Carpentaro Venezuela", in NMNH (Washington, D.C.). Paratypes (4 ♂, 5 ♀): same data as holotype, in DTRC (Austin). Type-locality: Carpentaro, Anzoategui, Venezuela.

General characters — Described by Wasserman (1962b).

Genitalia ♂ — Epandrium with about 15 lower and 2 upper bristles. Cerci fused at lower 2/3. Surstylus with about 11 primary teeth and 8 marginal bristles (Fig. 24a).

Hypandrium as long as epandrium.

Aedeagus bent, posteriorly expanded; slightly serrated at tip; dorsal cleft about 3/5 of length. Aedeagal apodeme bent, laterally flattened. Ventral rod 3/4 length of gonopod with one tiny sensillum (Fig. 24b-d). Phallosomal index about 2.2.

Other specimens examined (8) — VENEZUELA: D. F.: near Macuto (1 ♂, 6 ♀, MZUSP). WEST INDIES: Dominica: Clark Hall (1 ♂, NMNH).

Strain examined — VENEZUELA: Anzoategui: Carpentaro (H207.26).

Relationship — It is related to *D. eohydei* Wasserman and *D. hydei* Sturtevant, from which it differs chiefly in the shape of aedeagus.

Distribution — Venezuela (Anzoategui, D. F.), West Indies (Dominica, NEW RECORD).

***Drosophila (Drosophila) nigrohydei* Patterson & Wheeler**
(Figs. 25, 26)

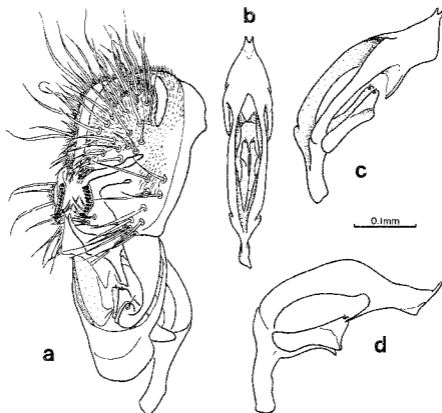


Fig. 25. *Drosophila nigrohydei* Patterson & Wheeler (lectotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Drosophila (Drosophila) nigrohydei Patterson & Wheeler, 1942: 84.

Drosophila (Drosophila) hydeoides Patterson & Wheeler, 1942: 84 (synonymized by Vilela in Wheeler, 1981b: 20).

Drosophila (Drosophila) hydeoides (SIC), Hsu, 1949.

Type-Material — Lectotype male (HERE DESIGNATED), labelled: "*D. nigrohydei* ♂, Chisos Mts. Texas, Mainland & Wagner collectors 1941, TYPE / LECTOTYPE *Drosophila nigrohydei* Patterson & Wheeler by C. R. Vilela", dissected. Paralectotype female (HERE DESIGNATED): "*D. nigrohydei* ♀ / PARALECTOTYPE *Drosophila nigrohydei* Patterson & Wheeler by C. R. Vilela". Both specimens in AMNH (New York). Type-locality: Chisos Mountains, Texas, USA.

Lectotype male of synonym *D. hydeoides* (HERE DESIGNATED): "*D. hydeoides* ♂ San Josecito, Nuevo Leon, Mex. 1940, TYPE / LECTOTYPE *Drosophila hydeoides* Patterson & Wheeler by C. R. Vilela", dissected (Fig. 26), in AMNH (New York). Type-locality: San Josecito, Nuevo Leon, Mexico (I was not able to find this locality on maps).

General characters — Described by Patterson & Wheeler (1942).

Genitalia ♂ — Epandrium with about 11 lower and no upper bristles. Cerci fused at lower half. Surstylus with about 9 primary teeth and 9 marginal bristles (Fig. 25a).

Hypandrium as long as epandrium.

Aedeagus bent with a pair of pointed spurs; posterior end ventrally expanded, splitted and weakly sclerotized at tip, dorsal cleft about 3/5 of length. Aedeagal apodeme laterally flattened. Ventral rod slightly shorter than gonopod. Gonopod with one tiny sensillum (Fig. 25b-d). Phallosomal index about 2.8.

Other specimens examined (5) — EL SALVADOR: San Salvador: Crater El Boqueron (2 ♂, DTRC). MEXICO: Amecameca (1 ♂, NMNH).

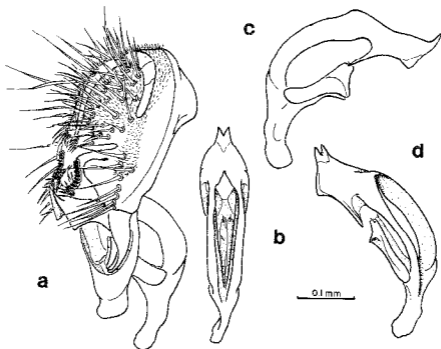


Fig. 26. *Drosophila hydeoides* Patterson & Wheeler (lectotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Strains examined (2) — GUATEMALA: Antigua Road (2510.1). USA: Arizona: Chiricahua Mountains (A39.9).

Relationship — It is closely related to *D. novemaristata* Dobzhansky & Pavan, from which it differs chiefly in the shape of aedeagus.

Distribution — sw. USA, Mexico, Guatemala, El Salvador (NEW RECORD).

Note — *D. nigrohydei* and *D. hydeoides* were synonymized on basis of morphological grounds (compare figures 25 and 26).

***Drosophila (Drosophila) novemaristata* Dobzhansky & Pavan
(Fig. 27)**

Drosophila (Drosophila) novemaristata Dobzhansky & Pavan, 1943: 55.

Type-Material — Holotype male, labelled: "Huancayo Perú, IV — 943 / *Drosophila novemaristata* TYPE / HOLOTIPO". Paratypes (5 ♂, 1 ♀); same data as holotype. Type-series in MZUSP (São Paulo). Holotype and male paratypes dissected. Type-locality: Huancayo, Junin, Peru.

General characters — Described by Dobzhansky & Pavan (1943).

Genitalia ♂ — Epandrium with about 12 lower and 1 upper bristles. Cerci fused at lower 1/3. Surstylus with about 11 primary teeth and 10 marginal bristles (Fig. 27a).

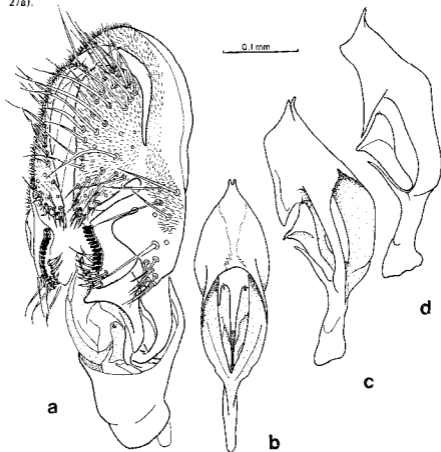


Fig. 27. *Drosophila novemaristata* Dobzhansky & Pavan (paratypes): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Hypandrium shorter than epandrium.

Aedeagus with a pair of pointed, long spurs; posterior end ventrally expanded, split and weakly sclerotized at tip; dorsal cleft slightly longer than half length. Aedeagal apodeme anteriorly expanded, laterally flattened. Ventral rod about 3/4 length of gonopod. Gonopod with one tiny sensillum (Fig. 27b-d). Phallosomal index about 2.5.

Relationship — It is closely related to *D. nigrohydei* Patterson & Wheeler, from which it differs chiefly in the shape of aedeagus.

Distribution — The type-locality is the only site where this species has been collected.

THE MERCATORUM SUBGROUP

Species included (4) — *Drosophila carcinophila* Wheeler; *D. mercatorum* Patterson & Wheeler; *D. paranaensis* Barros; *D. peninsularis* Patterson & Wheeler.

Diagnosis — Costal index ranging from 2.0 to 2.8; testis with low number of coils, ranging from a total of 4 to 7; ventral receptacle short and with few coils, ranging from about 6 to 24; phallosomal index varying from 1.7 to 2.6. Anterior margin of cerci fused to posterior margin of epandrium in various degree; surstylus without secondary teeth and number of primary teeth ranging from 7 to 12; concha of hypandrium bare except in *D. peninsularis*; gonopod triangle-shaped and with one to two sensilla, linked to concha of hypandrium by membranous tissue.

Geographical distribution — *D. mercatorum* is semicosmopolitan; *D. carcinophila* is endemic to the West Indies; *D. peninsularis* occurs in the West Indies and Florida peninsula; *D. paranaensis* is to be found from 24°N (Mexico, Tamaulipas) to 27°S (Argentina, Chaco) of the New World.

Drosophila (Drosophila) carcinophila Wheeler (Fig. 28)

Drosophila carcinophila Wheeler, 1960: 208.

Drosophila (Drosophila) carcinophila, Carson, 1967: 324.

Type-Material — Holotype male, labelled: "*Drosophila carcinophila* Wheeler /

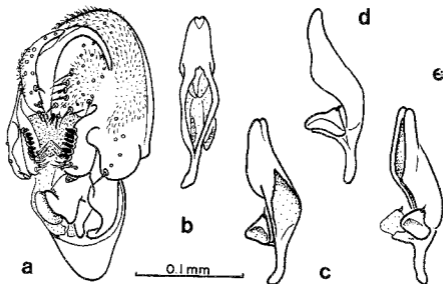


Fig. 28. *Drosophila carcinophila* Wheeler (paratypes): a, male genitalia, latero-blique aspect; b-e, aedeagus, several aspects.

Drosophila carcinochila Wheeler HOLOTYPE / 132.3 / on land crab / Cueva Los Lirios, Mona Is. PR, 1 nov. 1955, M.L. Kuns¹, in NMNH (Washington, D.C.). Paratypes (2 ♂), in DTRC (Austin): same data as holotype; (4 ♂, 2 ♀) in DTRC, (2 ♂) in NMNH: "Cueva Los Lirios, Mona Is. PR, W.H.C., 20 Nov. 55"; two males dissected. Type-locality: Cueva Los Lirios, Mona Island, Puerto Rico.

General characters — Described by Wheeler (1960) and Carson (1967).

Genitalia ♂ — Epandrium with about 6 lower and 3 upper bristles. Cerci fused at lower half. Surstylus with about 7 primary teeth and 7 marginal bristles (Fig. 28a).

Hypandrium slightly shorter than epandrium.

Aedeagus slightly incised at tip; dorsal cleft slightly longer than half length. Aedeagal apodeme rod-shaped. Ventral rod about 3/4 length of gonopod. Gonopod with one sensillum (Fig. 28b-e). Phallosomal index about 1.9.

Other specimens examined (4, DTRC) — WEST INDIES: Montserrat (2 ♂); Great Cayman (2 ♂).

Relationship — Cytologically it is closely related to *D. mercatorum* Patterson & Wheeler and *D. paranaensis* Barros but morphologically it is closely related to *D. peninsularis* Patterson & Wheeler.

Distribution — West Indies.

***Drosophila (Drosophila) mercatorum* Patterson & Wheeler**

(Fig. 29)

Drosophila carinata Grimshaw, 1901: 70 (synonymized by Hardy, 1965: 204).

This name has been suppressed and placed on the Official Index of Rejected and Invalid Specific Names in Zoology with the Name Number 1023 (I.C.Z.N., 1977).

Drosophila (Drosophila) mercatorum Patterson & Wheeler, 1942: 93. This name has been placed on the Official List of Specific Names in Zoology with the Name Number 2625 (I.C.Z.N., 1977).

Drosophila (Drosophila) pararepleta Dobzhansky & Pavan, 1943: 52.

Drosophila (Drosophila) mercatorum pararepleta (change of status by Wharton, 1944: 183).

Type-Material — Lectotype male (HERE DESIGNATED), labelled: "*D. mercatorum* ♂, Santa Barbara, California, 1940, G.B. Mailand col., TYPE / LECTO-TYPE *Drosophila mercatorum* Patterson & Wheeler by C.R. Vilela", dissected; cited as holotype by Rocha Pité & Tsacas (1979). Paralectotype female (HERE DESIGNATED): "*D. mercatorum* ♀ / PARALECTOTYPE *Drosophila mercatorum* Patterson & Wheeler by C.R. Vilela". Both specimens in AMNH (New York). Type-locality: Santa Barbara, California, USA.

Holotype male of subspecies *D. m. pararepleta*: "Mogi das Cruzes, São Paulo V. 1943 / *Drosophila pararepleta* TYPE / HOLOTIPO / (male genitalia in a small slide)". Paratypes (2 ♂, 1 ♀): same data as holotype. Type-series in MZUSP (São Paulo). Type-locality: Mogi das Cruzes, São Paulo, Brazil.

Holotype of synonym *D. carinata* not designated, one female syntype in BMNH (London), according to Rocha Pité & Tsacas (1979). Type-locality: Kona, Hawaii I., Hawaii.

General characters — Described by Patterson & Wheeler (1942) and Dobzhansky & Pavan (1943).

Genitalia ♂ — Epandrium with about 11 lower and 3 upper bristles. Cerci fused at lower half. Surstylus with about 12 primary teeth and 8 marginal bristles (Fig. 29a).

Hypandrium as long as epandrium.

Aedeagus ventrally expanded, splitted at tip, with posterior ventral margin serrated; dorsal cleft with about 2/3 of length. Aedeagal apodeme anteriorly expanded, laterally flattened. Ventral rod slightly shorter than gonopod. Gonopod with one sensillum (Fig. 29b-d). Phallosomal index about 2.6.

Other specimens examined (890) — ARGENTINA: Catamarca: 2 Km N of La Viña (3 ♂, IML; 10 ♂, MZUSP); Chaco: 10 Km N of Puerto Tirol (2 ♂,

3 ♀, JML; 2 ♂, 13 ♀, MZUSP), 7 Km NE of Resistencia (3 ♂, 3 ♀, IMI; 2 ♂, 10 ♀, MZUSP). BRAZIL. (MZUSP): Bahia: 13 Km W of Barreiras (2 ♂), 27 Km W of Barreiras (21 ♂), 61 Km W of Barreiras (12 ♂), 79 Km W of Barreiras (6 ♂), Cachoeira dos Monteiro (61 ♂), 20 Km E of Ibotirama (9 ♂), 3 Km NW of Milagres (17 ♂); D.F.: Brasília (14 ♂); Espírito Santo: Vitória (3 ♂); Goiás: 6 Km E of Luziania (44 ♂); Mato Grosso do Sul: 3 Km SW of Bela Vista (183 ♂), 30 Km SW of Bela Vista (37 ♂), Campo Grande (71 ♂), 30 Km S of Campo Grande (50 ♂), 30 Km NW of Miranda (40 ♂), 48 Km NW of Miranda (20 ♂); Minas Gerais: 11 Km NW of Cardeal Mota (7 ♂), 16 Km NW of Cardeal Mota (2 ♂), 12 Km N of Jabucatuvas (1 ♂), 3 Km SW of Lagoa Santa (2 ♂); Paraíba: 1 Km E of Junco de Seridó (2 ♂), 10 Km SE of S. José de Espinharas (12 ♂); Paraná: Calobá (4 ♂), Faz. Palmital (2 ♂), 12 Km NE of Cianorte (2 ♂); Rio de Janeiro: Arraial do Cabo (8 ♂), Reserva Biológica Nova Lombardia (1 ♂), Teresópolis (3 ♂, 2 ♀); Rio Grande do Sul: 4 Km F of Capão da Canoa (32 ♂), 3 Km NW of Jaguari (6 ♂), 14 Km NW of Jaguari (5 ♂), 3 Km S of São José (1 ♂); Santa Catarina: Barra Velha (2 ♂), Nova Teutonia (1 ♂), Pirabeiraba (11 ♂, 13 ♀); São Paulo: Estação Biológica de Boracéia (4 ♂, 3 ♀), 10 Km N of Conchal (5 ♂), Nova Itapirema (1 ♂), 14 Km NE of Peruipe (5 ♂, 16 ♀), Rio Guaratuba (5 ♂, 14 ♀), 6 Km SE of São Carlos (12 ♂), Ilha São Sebastião (2 ♂). PARAGUAY: Amam-

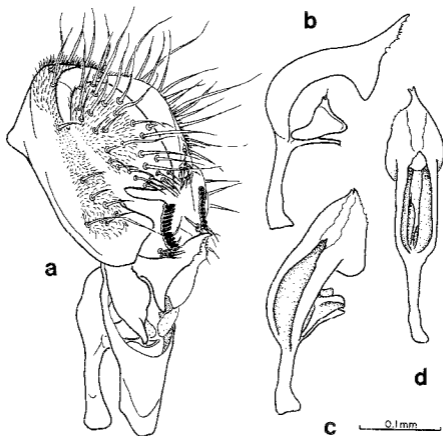


Fig. 29. *Drosophila mercatorum* Patterson & Wheeler: a (strain B13.1E), male genitalia, lateroblique aspect; b-d (strain E8.26A), aedeagus, several aspects.

bay: 13 Km SE of Bella Vista (62 ♂, MZUSP). ZIMBABWE: Salisbury (1 ♂, AMNH).

Strains examined (57) — BOLIVIA: Cochabamba: Cochabamba (2395.1); Santa Cruz: Santa Cruz (H345.12). BRAZIL: Argoim (B11.1B, .1C, .1E, .1F, .1G, .1H, .1I, .1L, .1M, .1N, .1O, .1R, .1S, .1T), Milagres (B15.1C, .1E, .1F, .1G, .1H, .1I, .1K, .1L, .1M, .1N, .1O, .1P, .1Q, .1R, .1S, .1T, .1U, .1V, .1W, .1X, .1Y, .1AA, .1AB, .1AD, .1AT), Morro do Chapéu (B17.2X); Mato Grosso do Sul: Campo Grande (E60.1, .2); Rio de Janeiro: Angra dos Reis (2507.7), Rio de Janeiro (1412.9A); São Paulo: Praia Grande (E9.1, .3A, H541.3). CHILE: Valparaíso: Valparaíso (H347.13). COLOMBIA: Valle del Cauca: Palmira (H442.13). COSTA RICA: San José: San José (1413.18). EL SALVADOR: Chalatenango: La Palma (H62.60). USA: California: Duarte (1974.7); Hawaii: Lanai (K96G8); New York City (2509.4), Rochester (3011.1).

Relationship — It is closely related to *D. paranaensis* Barros, from which it differs chiefly in the shape of aedeagus.

Distribution — USA, Mexico, El Salvador, Colombia, ? Venezuela (Cova-García & Suárez, 1962), Peru, Bolivia, Brazil, Paraguay (NEW RECORD), Argentina, Chile, Espanha (Prevosti, 1953), Portugal (Rocha Pitté, 1972), Canary Is. (Menclús, 1976), Madeira I. (Bächli & Rocha Pitté, 1981), Kenya (Ikeda *et al.*, 1982), Zimbabwe (NEW RECORD), Australia (Patterson & Wheeler, 1949), Samoa (Wheeler & Kambyseliis, 1966), India (Gupta, 1981).

Notes — The first published record (known to me) of *D. mercatorum* occurring in mainland Africa (Kenya) is that of Ikeda *et al.* (1982). However, the colonization of *D. mercatorum* in Africa could have been occurred much earlier if one considers that according to the label data, the specimen from Zimbabwe cited above was collected in Salisbury in December, 1934 by A. Cuthbertson.

Although Patterson & Wheeler (1949) cited *D. mercatorum* as occurring in Australia none has made any reference to this species being collected in that continent ever since. Even Bock (1976) does not mention it.

The drawings presented by Cova-García & Suárez (1962: 351) as *D. mercatorum* depict instead *D. martensii* Wasserman & Wilson, 1957. Hence, the occurrence of *D. mercatorum* in Venezuela remains uncertain.

Drosophila (*Drosophila*) *paranaensis* Barros

(Figs. 30-32)

Drosophila (*Drosophila*) *paranaensis* (nomen nudum) — Barros, 1947. — Dreyfus & Barros, 1947. — Pereira & Dreyfus, 1947. — Dreyfus, 1948. — Dreyfus & Barros, 1948. — Dreyfus, 1949. — Freire-Maia & Pavan, 1949.

Drosophila (*Drosophila*) *paranaensis* Barros, 1950: 266.

Drosophila (*Drosophila*) *paramercatorum* Magalhães & Malogolowkin-Cohen, 1974: 365, synonymized by Vilela in Wheeler, 1981b: 20).

Drosophila (*Drosophila*) *pseudomercatorum* Magalhães & Malogolowkin-Cohen, 1974: 363 (synonymized by Vilela in Wheeler, 1981b: 20).

Drosophila (*Drosophila*) *paranaensis* (SIC), Pilares & Vásquez, 1977.

Drosophila (*Drosophila*) *paranaensis* (SIC), Pilares & Vásquez, 1977.

Type-Material — Holotype male, labelled: "*Drosophila paranaensis* n. sp., Rós. Barros, holotipo / HOLOTIPO / (aedeagus in a small slide) / (epandrium in a small slide)". Allotype female and paratypes (4 ♂, 4 ♀): same data as holotype. Holotype, allotype and paratypes cited above in MZUSP (São Paulo). The original description also listed 10 other paratypes (5 ♂, 5 ♀) in "Museu Nacional do Rio de Janeiro" (Rio de Janeiro). Type-locality: Porto Capitão Heitor, Paraná, Brazil (I was not able to find this locality on maps).

Holotype male of synonym *D. paramercatorum*: "♂ *D. paramercatorum*, TIPO, Campo Grande, MT, col. S. Ferreira, 1973 / HOLOTIPO", dissected (Fig. 31). Paratypes (2 ♂, 2 ♀): same data as holotype. All specimens in MZUSP (São Paulo). The original description just cited one paratype, but I have found four specimens labelled as such. Type-locality: Campo Grande, Mato Grosso do Sul, Brazil.

Holotype male of synonym *D. pseudomercatorum*: "♂ *D. pseudomercatorum*. TIPO. Campo Grande, MT, col. S. Ferreira, 1975 / HOLOTIPO", dissected (Fig. 32). Paratypes (2 ♂, 2 ♀): same data as holotype, (1 ♀): "♀ *D. pseudomercatorum* holotipo (SIC) Campo Grande, MT, col. S. Ferreira, 1975 / PARATIPO". All specimens in MZUSP (São Paulo). Type-locality: Campo Grande, Mato Grosso do Sul, Brazil.

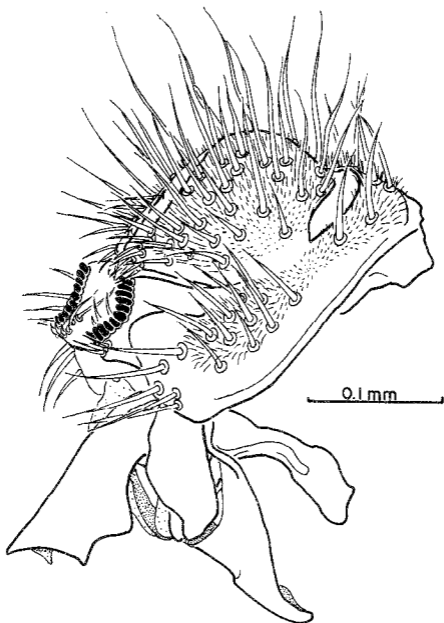


Fig. 30. *Drosophila paranaensis* Barros (strain H400.8): male genitalia, lateroblique aspect.

General characters — Described by Barros (1950).

Genitalia ♂ — Epandrium with about 13 lower and 3 upper bristles. Cerci fused at lower 2/3. Surstylus with about 11 primary teeth and 8 marginal bristles (Fig. 30).

Hypandrium slightly shorter than epandrium.

Aedeagus ventrally expanded, sometimes splitted at tip, weakly sclerotized at dorsal end, with posterior ventral margin serrated and bearing a pair of tiny pointed spurs; dorsal cleft about 1/2 of length. Aedeagal apodeme bent, laterally flattened. Ventral rod as long as gonopod. Gonopod with one sensillum. Phallosomal index about 2.1.

Other specimens examined (51) — BRAZIL (MZUSP): Amazonas: Humaitá (2 ♂); Bahia: 16 Km NW of Largo (1 ♂); D.F.: Brasília (2 ♂); Goiás: 6 Km E of Luziania (4 ♂); Mato Grosso: Rio Culene (10 ♂); Mato Grosso do Sul: 30 Km SW of B. Vista (1 ♂), 30 Km S of Campo Grande (15 ♂); Paraná: 12 Km NE of Cianorte (2 ♂, 2 ♀); Santa Catarina: Nova Teutônia (1 ♂); São Paulo: 10 Km N of Conchal (4 ♂), Rio Guaratuba (1 ♀), 2 Km NW of Piracununga (2 ♂); 6 Km SE of São Carlos (2 ♂). PARAGUAY: Guaira: Villarica (1 ♂, NMNH). TRINIDAD: Simla (1 ♂, NMNH).

Strains examined (16) — BRAZIL: Mato Grosso do Sul: Campo Grande (3335.1, -2). COLOMBIA: Amazonas: Leticia (H435.50, -60); Magdalena: S.N. of S. Marta (H186.33); Meta: Villavicencio (H194.44); Valle del Cauca: Palmira (H442.14). COSTA RICA: Heredia: Heredia (H75.10), Palmar de Norte (H400.8). EL SALVADOR: Chalatenango: La Palma (H62.31). MEXICO: Puebla: Teziutlan (2263.13); Veracruz: Minatitlan (H378.6). PANAMA: Canal Zone: Barro Colorado I. (4.B9). Las Cruces Trail (H303.19); Chiriqui: Boquete (H407.119). TRINIDAD: Maravel (H332.11).

Relationship — It is closely related to *D. mercatorum* Patterson & Wheeler, from which it differs chiefly in the shape of aedeagus.

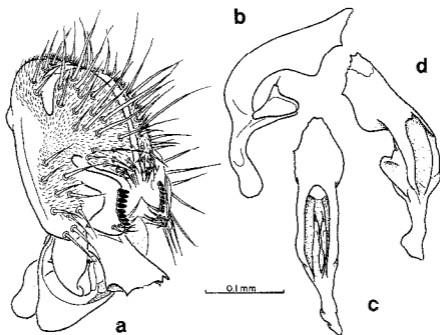


Fig. 31. *Drosophila paramercatorum* Magalhães & Malogolowkin-Cohen (holotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Distribution — Mexico to Brazil, Paraguay (NEW RECORD), Argentina (Vilela *et al.*, 1980).

Note — *D. paranaensis*, *D. paramercatorum* and *D. pseudomercatorum* cross freely in both directions producing fertile offspring (Carson, personal communication) and show no morphological difference. Hence they were synonymized on basis of genetic and morphological grounds.

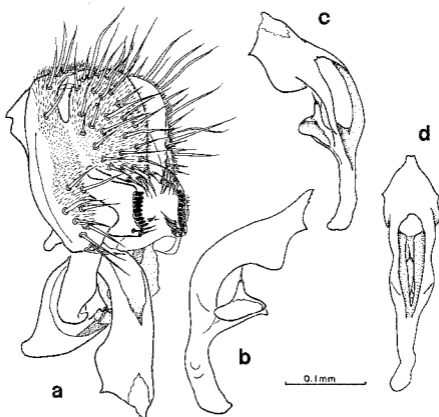


Fig. 32. *Drosophila pseudomercatorum* Magalhães & Malogolowkin-Cohen (holotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

***Drosophila (Drosophila) peninsularis* Patterson & Wheeler**
(Fig. 33)

Drosophila (Drosophila) peninsularis Patterson & Wheeler, 1942: 92.

Type-Material — Lectotype male (HERE DESIGNATED), labelled: "*D. peninsularis* ♂ Lake McKetlan Fla., Mainland & Wheeler collectors 1941 TYPE / LECTOTYPE *Drosophila peninsularis* Patterson & Wheeler by C.R. Vilela". Paralectotype female (HERE DESIGNATED). "*D. peninsularis* ♀ / PARALECTOTYPE *Drosophila peninsularis* Patterson & Wheeler by C.R. Vilela". Both specimens in AMNH (New York). Type-locality: Lake McKetlan, Florida, USA.

General characters — Described by Patterson & Wheeler (1942).

Genitalia ♂ — Epandrium with about 14 lower and 3 upper bristles. Cerci fused at lower half. Surstylus with about 11 primary teeth and 10 marginal bristles (Fig. 33a).

Hypandrium shorter than epandrium; concha bearing one anterior bristle.

Aedeagus slightly incised at tip; dorsal cleft 5/7 of length. Aedeagal apodeme rod-shaped. Ventral rod as long as gonopod. Gonopod with one sensillum (Fig. 33b-e). Phallosomal index about 1.7.

Other specimens examined (29) — USA: Florida: Highlands Co. (2 ♂, AMNH), Royal Palm Pk. (2 ♂, NMNH). WEST INDIES: Cuba: Guantanamo (3 ♂, NMNH), Guareiras (1 ♂, NMNH), Havana (4 ♂, NMNH), Herradura (3 ♂, AMNH); Jamaica: Runaway Bay (5 ♂, NMNH); Puerto Rico: Arecibo (9 ♂, AMNH).

Strains examined (2) — USA: Florida: Tarpon Springs (3371.2). WEST INDIES: Puerto Rico: Rio Pedras Experimental Station (H130.3).

Relationship — It is related to *D. carcinophila* Wheeler, from which it differs chiefly in the number of primary teeth of surstylus and size of aedeagus.

Distribution — se. USA, West Indies.

Note — *Drosophila peninsularis*, formerly a member of the *mercatorum* subgroup (Wharton, 1944) was transferred to the *mulleri* subgroup by Wheeler (1949) and later removed from it by Wasserman (1960) who, at that time considered it not assigned to any subgroup. Recently, Wasserman (1982) included it in the *repleta* subgroup. In spite of having 2nd and 3rd chromosomes not fused, *D. peninsularis* is morphologically closer to *D. carcinophila* Wheeler than to any other described species. *D. peninsularis* is hereby transferred back to the *mercatorum* subgroup where it seems to fit better.

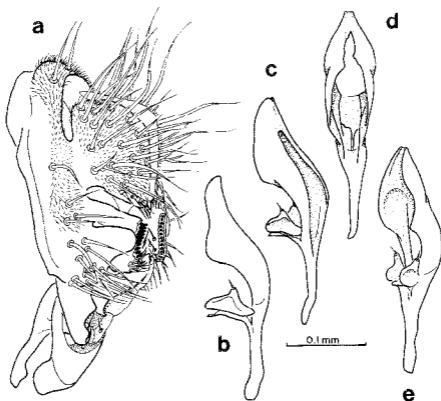


Fig. 33. *Drosophila peninsularis* Patterson & Wheeler (strain H130.3): a, male genitalia, lateroblique aspect; b-e, aedeagus, several aspects.

THE MULLERI SUBGROUP

Species included (38) — *Drosophila aldrichi* Patterson; *D. anceps* Patterson & Mainland; *D. borborema* Vilela & Sene; *D. buzzatii* Patterson & Wheeler; *D. desertorum* Wasserman; *D. eremophila* Wasserman; *D. hamatofila* Patterson & Wheeler; *D. hexastigma* Patterson & Mainland; *D. leonis* Patterson & Wheeler; *D. longicornis* Patterson & Wheeler; *D. mainlandi* Patterson; *D. martensis* Wasserman & Wilson; *D. mathisi*, sp. nov.; *D. meridiana* Patterson & Wheeler; *D. meridionalis* Wasserman; *D. mettleri* Heed; *D. mojavensis* Patterson; *D. mulleri* Sturtevant; *D. nigricruria* Patterson & Mainland; *D. nigrospiracula* Patterson & Wheeler; *D. pachuca* Wasserman; *D. pegasus* Wasserman; *D. promeridiana* Wasserman; *D. propachuca* Wasserman; *D. racemova* Patterson & Mainland; *D. richardsoni*, sp. nov.; *D. ritae* Patterson & Wheeler; *D. serido* Vilela & Sene; *D. spenceri* Patterson; *D. stalkerii* Wheeler; *D. starmeri* Wasserman, Koepfer & Ward; *D. subviridis* Patterson & Mainland; *D. uniseta* Wasserman, Koepfer & Ward; *D. wheeleri* Patterson & Alexander, and at least five undescribed species that will be described in the near future by different authors.

Diagnosis — Costal index ranging from 2.5 to 3.8; testis with few coils, ranging from 3 and 1/2 to 18; ventral receptacle short with few coils, ranging from 12 to 70; phallosomal index varying from 0.7 to 3.8. Anterior margin of cerci fused to posterior margin of epandrium in various degree (free in *D. borborema*, *D. martensis*, *D. serido* and *D. starmeri*); surstylus without secondary teeth (except in *D. aldrichi*, *D. mulleri* and *D. wheeleri*) and number of primary teeth ranging from 8 to 15; gonopod with one to two sensilla.

Geographical distribution — Members of this group are frequently associated with plant species of the family Cactaceae and are to be found from 37°N (United States, Utah) to 30°S (Argentina, La Rioja) of the New World and also in the West Indies. *D. buzzatii* and *D. aldrichi* are also present in other biogeographical regions where cacti have been introduced.

***Drosophila (Drosophila) aldrichi* Patterson**
(Fig. 34)

Drosophila aldrichi Patterson in Patterson & Crow, 1940: 251.

Drosophila (Drosophila) aldrichi Patterson & Crow in Patterson & Wheeler, 1942: 94.

Type-Material — Lectotype male (HERE DESIGNATED), labelled: "*D. aldrichi* ♂", Austin Texas, J. T. Patterson col. 1938, TYPE / LECTOTYPE *Drosophila aldrichi* Patterson by C. R. Vilela", dissected. Paralectotype female (HERE DESIGNATED): "*D. aldrichi* ♀ / PARALECTOTYPE *Drosophila aldrichi* Patterson by C. R. Vilela". Both specimens in AMNH (New York). Type-locality: Austin, Texas, USA.

General characters — Described by Patterson & Wheeler (1942).

Genitalia ♂ — Epandrium with about 9 lower and 2 upper bristles. Cerci fused at lower half. Surstylus with about 12 primary teeth, 3 bristle-shaped secondary teeth and 9 marginal bristles (Fig. 34a).

Hyandrium 1 and 1/2 longer than epandrium; concha bearing one anterior bristle.

Aedeagus long, micropubescent at posterior ventral margin, splitted at tip; dorsal cleft about 2/3 of length. Aedeagal apodeme laterally flattened. Ventral rod about 3/4 length of gonopod. Gonopod with one sensillum (Fig. 34b-d). Phallosomal index about 2.3.

Other specimens examined (24) — BRAZIL: Amazonas: Humaitá (7 ♂, 2 ♀, MZUSP); Manaus (1 ♂, 1 ♀, MZUSP); Mato Grosso do Sul: near Corumbá (1 ♂, NMNH); Paraná: 12 Km NE of Cianorte (2 ♂, MZUSP); USA (NMNH): Texas: San Antonio (8 ♂), Victoria (2 ♂).

Strains examined (18) — EL SALVADOR: Usulután: Puerto Triunfo (H52.12). MEXICO: Coahuila: Paila (1781.4); D. F.; Mexico City (3267.1); Hidalgo: Venados (E45.2-1, -2-1, -2-2); Nuevo Leon: Sabinas Hidalgo (E4.1); Oaxaca: Tehuacan

tepec (W-8, 113.4), Totolapén (W-3); Puebla: Acatlan (W-5); Sonora: Alamos (E37.3), Navojoa (E2.3, E63.1); Tamaulipas: Francisco Medrano (E51.3). USA: Texas: Austin (?), Dilley (E3.1), Lake Travis (E1.1), Weslaco (E5.1).

Relationship — It is closely related to *D. wheeleri* Patterson & Alexander, *D. mulleri* Sturtevant and one undescribed species from Venezuela. It differs from the latter two, but not from the former, chiefly in the shape of aedeagus.

Distribution — sw. USA, Mexico to Costa Rica, Brazil (Vilela *et al.*, 1983), Australia, Colombia? (Wasserman & Wilson, 1957), Venezuela? (Ruiz & Fontdevila, 1981).

Note — *D. aldrichi* was first recorded from Brazil in 1983 (Vilela *et al.*). However, the colonization of *D. aldrichi* in Brazil could have occurred much earlier if one considers that according to the label data, the specimen from Brazil (near Corumbá) cited above was collected in the State of Mato Grosso in 29. xii. 1919 by R. G. Harris.

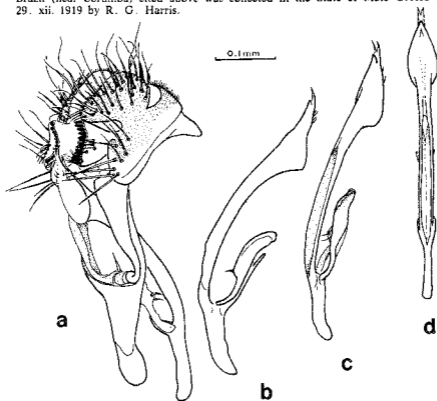


Fig. 34. *Drosophila aldrichi* Patterson (lectotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

***Drosophila (Drosophila) anceps* Patterson & Mainland
(Fig. 35)**

Drosophila (Drosophila) anceps Patterson & Mainland, 1944: 39.

Drosophila (Drosophila) anceps (SIC), Takada, 1963.

Type-Material — Holotype male, labelled: "1380.11 ♂ / HOLOTYPE / G. B. Mainland / S. Petalcingo (SIC), Puebla, Mexico, JUNE 1943", in NMNH (Washington, D.C.). Paratype female (left wing missing): same data as holotype, in DTRC (Austin). Type-locality: Petalcingo, Puebla, Mexico.

General characters — Described by Patterson & Mainland (1944).

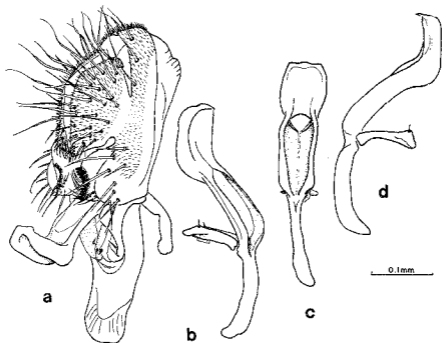


Fig. 35. *Drosophila anceps* Patterson & Mainland (strain E13.2): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

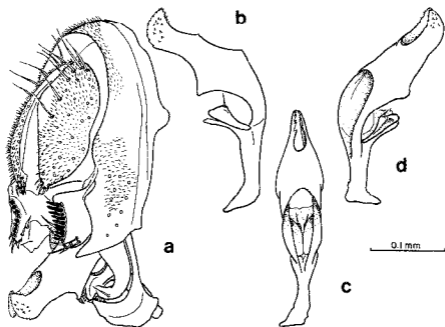


Fig. 36. *Drosophila borborema* Vilela & Sene (holotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Genitalia ♂ — Epandrium with about 10 lower and 2 upper bristles. Cerci fused at lower half. Surstylus with about 10 primary teeth and 8 marginal bristles (Fig. 35a).

Hypandrium as long as epandrium; concha bearing one anterior bristle.

Aedeagus dorsoventrally flattened, with posterior dorsal margin slightly serrated; dorsal cleft about 1/2 of length. Aedeagal apodeme bent, laterally flattened. Ventral rod absent. Gonopod with one sensillum (Fig. 35b-d). Phallosomal index about 1.8.

Other specimens examined (10, DTRC) — MEXICO: Puebla: Petlalcingo (5 ♂, 5 ♀; 1380.11).

Strains examined (2) — MEXICO: Oaxaca (1808.14b); Pachuca: Hidalgo (E13.2).
Distribution — Mexico.

***Drosophila (Drosophila) borhorema* Vilela & Sene**

(Fig. 36)

Drosophila (Drosophila) borhorema Vilela & Sene, 1977: 296.

Type-Material — Holotype male, labelled: "BRASIL — BA, 3 Km NW of Milagres, 12°51'S, 39°53'W, Sene et alii col., 24. xi - 3. xii. 1976 / HOLOTIPO *Drosophila borhorema* ♂", dissected. Paratypes (13 ♂; one dissected): same data as holotype. All specimens in MZUSP (São Paulo). Type-locality: 3 Km NW of Milagres, Bahia, Brazil.

General characters — Described by Vilela & Sene (1977).

Genitalia ♂ — Epandrium with about 8 lower and none upper bristles. Cerci not fused. Surstylus with about 9 primary teeth and 7 marginal bristles (Fig. 36a).

Hypandrium shorter than epandrium; concha bare.

Aedeagus splitted about 1/4 of length, with posterior dorsal margin serrated, laterally covered with tiny teeth at posterior end, ventrally expanded; dorsal cleft about 1/2 of length. Aedeagal apodeme anteriorly bent, laterally flattened. Ventral rod as long as gonopod. Gonopod with one sensillum (Fig. 36b-d). Phallosomal index about 2.2.

Other specimens examined (98, MZUSP) — BRAZIL: Bahia: 15 Km E of America Dourada (10 ♂, 1 ♀), 3 Km NW of Milagres (20 ♂), Cachoeira dos Montes (24 ♂), 9 Km NW of Paulo Afonso (2 ♀); Paraíba: 1 Km E of Junco do Seridó (35 ♂); Pernambuco: 3 Km NW of Petrolina (1 ♂, 2 ♀); Rio Grande do Norte: 7 Km SW of Bom Jesus (3 ♂).

Strains examined (23) — BRAZIL: Bahia: Cafarnaum (B16.2B, -2D), Morro do Chapéu (B17.2C, -21, -2J, -2K, -2Q, -2AE, -2AM, -2AS, -2AV, -2BG, -2BH, -2BJ, -2BM, -2BW, -2CB, -2DF, -2DS, -2DY, -2EA, -2FU).

Relationship — It is closely related to *D. serido* Vilela & Sene, from which it differs chiefly in the shape of aedeagus.

Distribution — ne. Brazil.

***Drosophila (Drosophila) buzzatii* Patterson & Wheeler**

(Fig. 37)

Drosophila (Drosophila) buzzatii Patterson & Wheeler, 1942: 97.

Drosophila (Drosophila) tigrina Buzzati-Traverso, 1943: 44 (synonymized by Patterson & Wheeler, 1949: 230).

Drosophila (Drosophila) buzzatii (SIC), Spieth, 1952.

Drosophila (Drosophila) versicolor Mather, 1955: 573 (synonymized by Mather, 1956: 139).

Drosophila (Drosophila) buzzatii (SIC), Dobzhansky et al. 1957, Monclús, 1964.

Drosophila (Drosophila) sp 18, David & Tsacas, 1975 (personal communication of L. Tsacas).

Type-Material — Lectotype male (HERE DESIGNATED), labelled: "*D. buzzatii* (SIC) ♂, Cordoba, Argentina, S. Horowitz col., 1939 TYPE / LECTOTYPE *Drosophila buzzatii* Patterson & Wheeler by C. R. Vilela", cited as holotype by

Roche Piré & Tsacas (1979). Paralectotype female (HERE DESIGNATED): "*D. buzzatii* ♀ / PARALECTOTYPE *Drosophila buzzatii* Patterson & Wheeler by C. R. Vilela". Both specimens in AMNH (New York). Type-locality: Provincia de Cordoba, Argentina.

Type and cotype of synonym *D. tigrina* not analyzed, in "Istituto di Zoologia e Genetica della R. Università di Pavia" (Italy). Type-locality: Trapani, Sicily, Italy.

Holotype of synonym *D. vesicator* not analyzed, in Australian Museum (Sydney). Paratypes (2 ♂, 2 ♀) in NMNH (Washington, D.C.). Type-locality: Moggil, Queensland, Australia.

General characters --- Described by Patterson & Wheeler (1942).

Genitalia ♂ --- Epandrium with about 11 lower and none upper bristles. Cerci fused at lower 2/3. Surstylus with about 11 primary teeth and 10 marginal bristles (Fig. 37a).

Hypandrium about 3/4 length of epandrium; concha bare.

Aedeagus slightly invaginated at tip; dorsal cleft about 2/3 of length. Aedeagal apodeme bent, laterally flattened. Ventral rod as long as gonopod. Gonopod with one sensillum (Fig. 37b-d). Phallosomal index about 2.0.

Other specimens examined (337) --- ARGENTINA: Catamarca: 2 Km N of La Viña (3 ♂, 3 ♀, IML; 10 ♂, 10 ♀, MZUSP); Chaco: 10 Km N of Puerto Tirol (3 ♂, 3 ♀, IML; 13 ♂, 6 ♀, MZUSP), 7 Km NE of Resistencia (3 ♀, IML; 5 ♀, MZUSP); La Rioja: 14 Km SE of Catanzaco (3 ♂, 3 ♀, IML; 10 ♂, 10 ♀, MZUSP), 5 Km S of Chilecito (3 ♂, 3 ♀, IML; 10 ♂, 10 ♀, MZUSP), 4 Km S of Famatina (3 ♂, 3 ♀, IML; 10 ♂, 10 ♀, MZUSP), 8 Km S of Famatina (1 ♂, 1 ♀, IML; 12 ♂, 2 ♀, MZUSP), 3

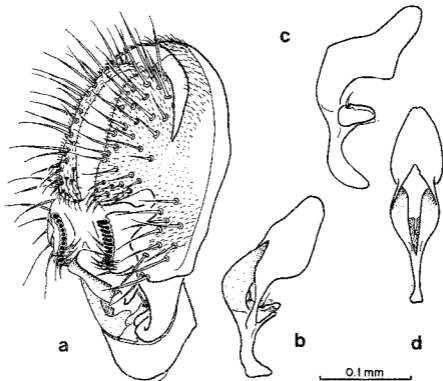


Fig. 37. *Drosophila buzzatii* Patterson & Wheeler (strain 1732.4): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Km W of Miranda (1 ♂, 1 ♀, IML; 1 ♀, MZUSP), 7 Km NW of Patquia (3 ♂, 3 ♀, IML; 13 ♂, 13 ♀, MZUSP); Santiago del Estero: 5 Km SW of Santa Catalina (5 ♂, 3 ♀, IML; 10 ♂, 10 ♀, MZUSP), 7 Km NW of Santiago del Estero (3 ♂, 3 ♀, IML; 10 ♂, 10 ♀, MZUSP); Tucuman: 14 Km N of San Miguel de Tucuman (1 ♂, 1 ♀, MZUSP), 2 Km N of Tapia (3 ♂, 3 ♀, IML; 10 ♂, 10 ♀, MZUSP). BRAZIL (MZUSP): Bahia: 15 Km E of America Dourada (1 ♂), 79 Km W of Barreiras (1 ♂), 3 Km NW of Milagres (2 ♂); Mato Grosso do Sul: Bela Vista (1 ♂), 3 Km SW of Bela Vista (14 ♂), 30 Km of Miranda (1 ♂); Minas Gerais: 11 Km NW of Cardeal Mota (2 ♂); Paraíba: 1 Km E of Junco do Seridó (1 ♂); Paraná: 12 Km NE of Cianorte (8 ♂); Pernambuco: 3 Km NW of Petrolina (2 ♂); Rio Grande do Sul: 4 Km E of Capão da Canoa (1 ♂), 14 Km NW of Jaguari (1 ♂), 7 Km NE of S. Francisco de Assis (7 ♂), 3 Km S of São José (1 ♂), Torres (7 ♂, 1 ♀), 6 Km E of Tramandaí (33 ♂); Santa Catarina: Barra Velha (1 ♂), Pirabeiraba (1 ♀). PARAGUAY (MZUSP): Amambay: 13 SE of Bella Vista (4 ♂). Strains examined (7) — ARGENTINA: Cordoba (H347.9), San Luis (H347.10), San Raphael (3340.1). AUSTRALIA: New South Wales: Gwabegar (3340.2); Queensland: Roma (3340.3). BOLIVIA: Cochabamba (H345.3, 1.13). LEBANON: Byblos (1732.4).

Distribution — S. America, c. Europe, Lebanon, Israel (Goldschmidt in Carson & Wasserman, 1965), Egypt (Dobzhansky *et al.*, 1957), Ethiopia (Carson & Wasserman, 1965), Benin (Tsacas *et al.*, 1981), South Africa (Barker & Mulley, 1976), Canary Is. (Monclús, 1976), Madeira I. (Bächli & Rocha Pitté, 1981), Reunion I. (Tsacas *et al.*, 1981; as *D. sp* 18, David & Tsacas, 1975), Australia.

***Drosophila (Drosophila) desertorum* Wasserman**
(Fig. 38)

Drosophila (Drosophila) sp 1, Wasserman, 1960.

Drosophila (Drosophila) desertorum Wasserman, 1962c: 95.

Type-Material — Holotype male, labelled: "*D. desertorum* / HOLOTYPE / 2519 22 / Dec. 1958, A. Faberge / MEXICO / 20 mi NE Pachuca (SIC) Mexico ♂", in NMNH (Washington, D. C.). Paratypes (3 ♂): same data as holotype, in DTRC (Austin). Type-locality: Pachuca, Hidalgo, Mexico (cited as Pachuca, Puebla, Mexico in original description).

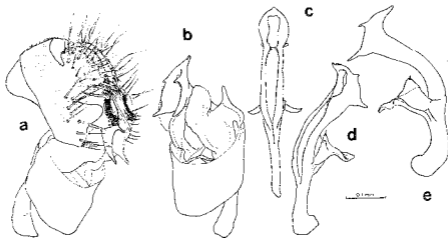


Fig. 38. *Drosophila desertorum* Wasserman (strain E42.1-2): a, male genitalia, lateroblique aspect; b, internal male genitalia, lateroblique aspect; c-c, aedeagus, several aspects.

General characters — Described by Wasserman (1962c).

Genitalia ♂ — Epandrium with about 12 lower and 1 upper bristles. Cerci fused at lower 2/3. Surstylus with about 13 primary teeth and 11 marginal bristles (Fig. 38a).

Hyandrium as long as epandrium; concha bare, posteriorly expanded and serrated at posterior inner margin (Fig. 38b).

Aedeagus with two pairs of posterior tiny spurs and slightly invaginated at tip; dorsal cleft shorter than length. Aedeagal apodeme bent, laterally flattened. Ventral rod posteriorly expanded, about 1 and 1/2 longer than gonopod. Gonopod with one sensillum (Fig. 38c-e). Phallosomal index about 1.7.

Strain examined — MEXICO: Hidalgo: San Pedro Mines (E42.1-2).

Distribution — Mexico.

***Drosophila (Drosophila) eremophila* Wasserman**
(Fig. 39)

Drosophila (Drosophila) sp F, Wasserman, 1960.

Drosophila (Drosophila) eremophila Wasserman, 1962c: 94.

Type-Material — Holotype male, labelled: "HOLOTYPE / H381.22A / *D. eremophila* / M. Wasserman, May 1959 / Puebla, Mexico, Acatlan ♂", in NMNH (Washington, D.C.). Paratypes (4 ♂, 5 ♀): same data as holotype, in DTRC (Austin). Type-locality: Acatlán, Puebla, Mexico.

General characters — Described by Wasserman (1962c).

Genitalia ♂ — Epandrium with about 14 lower and 1 upper bristles. Cerci fused at lower half. Surstylus with about 12 primary teeth and 8 marginal bristles (Fig. 39a).

Hyandrium about 2/3 length of epandrium; concha bearing one anterior bristle.

Aedeagus micropubescent at posterior ventral margin, posteriorly expanded; dorsal cleft about 3/4 of length. Aedeagal apodeme rod-shaped. Ventral rod about 1/5 length of gonopod, laterally flattened. Gonopod posteriorly pointed

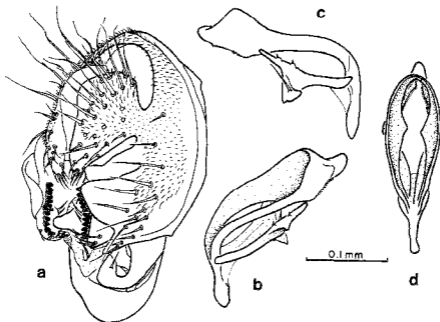


Fig. 39. *Drosophila eremophila* Wasserman (strain E52.7): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

with two tiny sensilla: fused to concha (Fig. 39b-d). Phallosomal index about 2.4. *Strains examined* (2) — MEXICO: Puebla: Acatlan (H381.22A); Tamaulipas: Guayalego (E52.7).

Relationship — It is related to *D. mettieri* Heed, from which it differs chiefly in the shape of aedeagus.

Distribution — Mexico.

***Drosophila* (*Drosophila*) *hamatofila* Patterson & Wheeler**
(Fig. 40)

Drosophila (*Drosophila*) *hamatofila* Patterson & Wheeler, 1942: 91.
Drosophila (*Drosophila*) *hamatophila* (SIC), Hsu, 1949.

Type-Material — Lectotype male (HERE DESIGNATED), labelled: "*D. hamatofila* ♂, Round Rock Tex., J. T. Patterson col., 1940, TYPE / LECTOTYPE *Drosophila hamatofila* Patterson & Wheeler by C. R. Vilela". Paralectotype female (HERE DESIGNATED): "*D. hamatofila* ♀ / PARALECTOTYPE *Drosophila hamatofila* Patterson & Wheeler by C.R. Vilela". Both specimens in AMNH (New York). Type-locality: Round Rock, Texas, USA.

General characters — Described by Patterson & Wheeler (1942).

Genitalia ♂ — Epandrium with about 8 lower and 1 upper bristles. Cerci fused. Surstylus with about 12 primary teeth and 7 marginal bristles (Fig. 40a).

Hypandrium shorter than epandrium; concha bearing one anterior bristle.

Aedeagus pointed at tip, laterally rough in anterior region; dorsal cleft about as long as aedeagus. Aedeagal apodeme anteriorly expanded. Ventral rod slightly shorter than gonopod. Gonopod with two sensilla (Fig. 40b-e). Phallosomal index about 2.3.

Other specimens examined (3, NMNH) — USA: Arizona: Tucson (1 ♂); California: Vermont (1 ♂); Texas: San Antonio (1 ♂).

Strains examined (3) — USA: Arizona: Portal (E52.2); Texas: Fort Davis (1981.1). MEXICO: Baja California: Ensenada (E10.7).

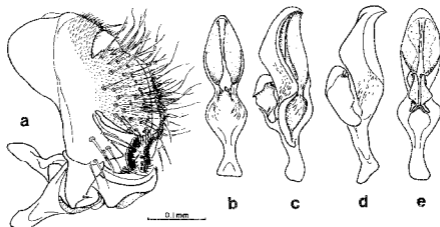


Fig. 40. *Drosophila hamatofila* Patterson & Wheeler: a (strain E52.2), male genitalia, lateroblique aspect; b-e (strain E10.7), aedeagus, several aspects.

***Drosophila (Drosophila) hexastigma* Patterson & Mainland**
(Fig. 41)

Drosophila (Drosophila) hexastigma Patterson & Mainland, 1944: 43.

Type-Material — Holotype male, labelled: "hexastigma P/ 1380.18 ♂ / HOLOTYPE / G. B. Mainland / S. Petalcingo (SIC) Puebla Mex., June 1943", in NMNH (Washington, D.C.). Paratype female; same data as holotype, in DTRC (Austin). Type-locality: Petalcingo, Puebla, Mexico.

General characters — Described by Patterson & Mainland (1944).

Genitalia ♂ — Epandrium with about 9 lower and 4 upper bristles. Cerci fused at lower 1/3. Surstylus with about 10 primary teeth and 9 marginal bristles; dorsal region strongly sclerotized (Fig. 41a).

Hypandrium as long as epandrium; concha posteriorly rough, bearing one anterior bristle.

Aedeagus with an rectangle-shaped ventral expansion; dorsal cleft about 3/4 of length. Aedeagal apodeme slightly bent. Ventral rod as long as gonopod. Gonopod with one sensillum (Fig. 41b-d). Phallosomal index about 2.0.

Other specimen examined — MEXICO: Oaxaca: Oaxaca (1 ♂, DTRC).

Strain examined — MEXICO: San Luis Potosi: San Luis Potosi (E30.1).

Distribution — Mexico.

***Drosophila (Drosophila) leonis* Patterson & Wheeler**
(Fig. 42)

Drosophila (Drosophila) leonis Patterson & Wheeler, 1942: 82.

Type-Material — Lectotype male (HERE DESIGNATED), labelled: "*D. leonis* ♂, San Josecito, Nuevo Leon, Mex. 1940, TYPE / LECTOTYPE *Drosophila leonis* Patterson & Wheeler by C. R. Vilela", dissected. Paralectotype female (HERE DESIGNATED): "*D. leonis* ♀ / PARALECTOTYPE *Drosophila leonis* Patterson & Wheeler by C. R. Vilela". Both specimens in AMNH (New York). Type-locality: San Josecito, Nuevo Leon, Mexico (I was not able to find this locality on maps).

General characters — Described by Patterson & Wheeler (1942).

Genitalia ♂ — Epandrium with about 8 lower and 1 upper bristles. Cerci fused. Surstylus with about 10 primary teeth and 10 marginal bristles (Fig. 42a).

Hypandrium slightly shorter than epandrium; concha with one anterior bristle.

Aedeagus ventrally expanded, dorsally covered with tiny teeth on middle region, splitted at tip; dorsal cleft about half of length. Aedeagal apodeme laterally flattened. Ventral rod absent. Gonopod with one sensillum (Fig. 42b-d). Phallosomal index about 2.3.

Distribution — Mexico.

***Drosophila (Drosophila) longicornis* Patterson & Wheeler**
(Fig. 43)

Drosophila (Drosophila) longicornis Patterson & Wheeler, 1942: 90.

Type-Material — Lectotype male (HERE DESIGNATED), labelled: "*D. longicornis* ♂ Austin Texas, J. T. Patterson col. 1939, TYPE / LECTOTYPE *Drosophila longicornis* Patterson & Wheeler by C. R. Vilela", dissected. Paralectotype female (HERE DESIGNATED): "*D. longicornis* ♀ / PARALECTOTYPE *Drosophila longicornis* Patterson & Wheeler by C. R. Vilela". Both specimens in AMNH (New York). Type-locality: Austin, Texas, USA.

General characters — Described by Patterson & Wheeler (1942).

Genitalia ♂ — Epandrium with about 14 lower and 2 upper bristles. Cerci fused at lower half. Surstylus with about 11 primary teeth and 8 marginal bristles (Fig. 43a).

Hypandrium longer than epandrium; concha bearing one anterior bristle.

Aedeagus pubescent and expanded at posterior ventral region, serrated at tip; dorsal cleft as long as aedeagus. Aedeagal apodeme laterally flattened. Ventral

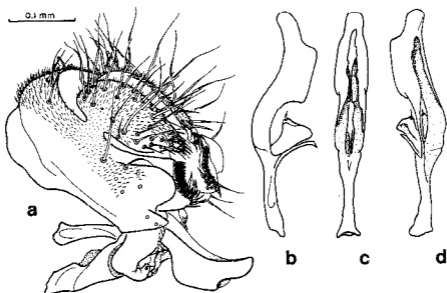


Fig. 41. *Drosophila hexastigma* Paterson & Mainland (strain E30.1): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

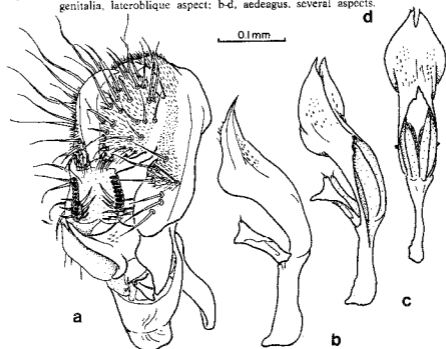


Fig. 42. *Drosophila leonis* Patterson & Wheeler (lectotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

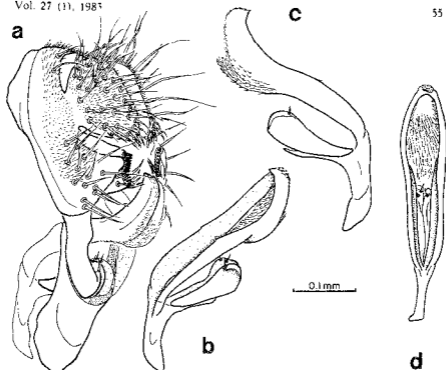


Fig. 43. *Drosophila longicornis* Patterson & Wheeler (lectotype): a, male genitalia lateroblique aspect; b-d, aedeagus, several aspects.

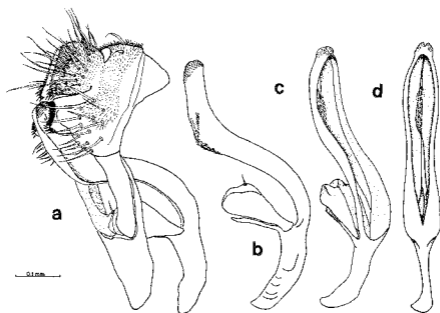


Fig. 44. *Drosophila mainlandi* Patterson (strain A519.2): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

rod about 3/4 length of gonopod. Gonopod with one sensillum (Fig. 43b-d). Phallosomal index about 2.6.

Other specimens examined (4, NMNH) — USA: Texas: San Antonio (4 ♂).

Strains examined (10) — USA: Arizona: Tucson (A286); Texas: Austin (E25.1F, 2513.1). MEXICO: Coahuila: Cuatro Ciénegas (E67.6, -.6D, -.6G); Hidalgo: San Pedro Mines (E47.36E, E26.12); San Luis Potosi: San Luis Potosi (E30.6); Sonora: Alamos (E37.2).

Relationship — It is closely related to *D. mainlandi* Patterson, *D. pachuca* Wasserman and *D. propachuca* Wasserman. It differs from the former chiefly in the shape and size of aedeagus; however, I was not able to find differences from the latter two, with which it may be conspecific.

Distribution — sw. USA, n. México, Colombia (Ruiz & Fontdevila, 1981).

***Drosophila (Drosophila) mainlandi* Patterson**

(Fig. 44)

Drosophila (Drosophila) mainlandi Patterson, 1943: 147.

Type-Material — Not located, probably lost. Type-locality: Bell, California, USA.

General characters — Described by Patterson (1943).

Genitalia ♂ — Epandrium with about 15 lower and 1 upper bristles. Cerci fused at lower 4/5. Surstylus with about 11 primary teeth and 8 marginal bristles (Fig. 44a).

Hypandrium twice as long as epandrium; concha bearing one anterior bristle.

Aedeagus ventrally pubescent at middle region and tip; dorsal cleft as long as aedeagus. Aedeagal apodeme laterally flattened. Ventral rod about 2/3 length of gonopod. Gonopod with one sensillum (Fig. 44b-d). Phallosomal index about 2.1.

Specimen examined — USA: California: Los Angeles (1 ♂, NMNH).

Strain examined — MEXICO: Baja California: Arroyo Secorro (A519.2).

Relationship — My comments under *D. longicornis* apply here too.

Distribution — sw. USA, n. Mexico, Colombia (Ruiz & Fontvila, 1981).

***Drosophila (Drosophila) martensis* Wasserman & Wilson**

(Fig. 45)

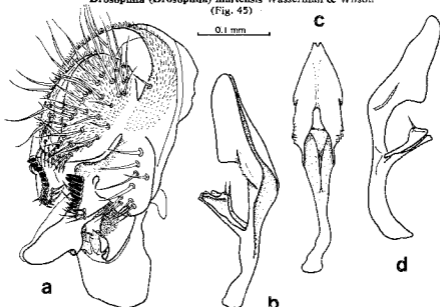


Fig. 45. *Drosophila martensis* Wasserman & Wilson (strain 511.3A): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Drosophila (Drosophila) martensis Wasserman & Wilson, 1957: 151.

Drosophila (Drosophila) mercatorum, Cova-García & Suárez, 1962 (misidentification *nec* Patterson & Wheeler, 1942). See details under *D. mercatorum*.

Type-Material — Holotype male, labelled: "martensis / HOLOTYPE / Santa Marta, Colombia / H188.12 ♂", in NMNH (Washington, D.C.). Paratype (4 ♂, 5 ♀): same data as holotype, in DTRC (Austin). Type-locality: Santa Marta, Magdalena, Colombia.

General characters — Described by Wasserman & Wilson (1957).

Genitalia ♂ — Epandrium with about 12 lower and 1 upper bristles. Cerci not fused. Surstylus with about 11 primary teeth and 9 marginal bristles; dorsal region strongly sclerotized (Fig. 45a).

Hypandrium shorter than epandrium; concha bare, posteriorly rough.

Aedeagus laterally serrated at middle region; ventrally expanded, slightly invaginated at tip; dorsal cleft about half of length. Aedeagal apodeme bent, laterally flattened. Ventral rod as long as gonopod. Gonopod with one sensillum (Fig. 45b-d).

Phallosomal index about 1.5.

Strains examined (3) — COLOMBIA: Magdalena: Santa Marta (H188.12). VENEZUELA: Anzoategui: Barcollona (511.3A); Lara: Barquisimeto (H208.1).

Distribution — Colombia, Venezuela.

***Drosophila (Drosophila) mathisi*, sp. nov.**

(Fig. 46)

Drosophila (Drosophila) ritae, Wasserman, 1962c (misidentification *nec* Patterson & Wheeler, 1942).

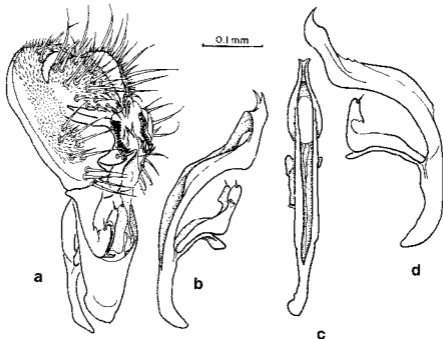


Fig. 46. *Drosophila mathisi*, sp. nov.: a (holotype), male genitalia, lateroblique aspect; b-d (paratype), aedeagus, several aspects.

Undescribed from Arizona, Wasserman, 1982.
Undescribed M2, Pereira *et al.*, in press.

Type-Material — Holotype male, labelled: "Portal, Ariz., S.W. Res. Sta., 21 Sept. 1965 / C. W. Sabrosky, over crushed *Opuntia* / HOLOTYPE *Drosophila mathisi* ♂", Nº 100217. Paratypes (7 ♂): same data as holotype. All specimens in NMNH (Washington, D.C.), dissected. Type-locality: S. W. Res. Sta., Portal, Arizona, USA.

External characters of imagines ♂ — Arista with 3-4 dorsal and 2-3 ventral branches plus terminal fork. Antennae brown, pollinose. Front brown, pollinose, anteriorly lighter; orbits gray. Ocellar triangle dark brown. Middle and posterior orbital, verticals and postverticals arising from brown spots. Middle orbital about 1/2 of other two. Second oral about half of first. Face yellow. Carina expanded at lower portion, sulcate. Palpi pollinose, light yellow, with bristles on ventral surface. Cheeks light brown, their greatest width 1/3 greatest diameter of eyes. Eyes red, with short black piles.

Acrostichal hairs in 8 irregular rows. No prescutellars. Anterior scutellars convergent. Mesonotum brown, pollinose; bristles arising from dark brown spots; middle region with one narrow gray stripe. Scutellum brown with bristles arising from dark brown spots. Pleurae brown with an upper dark brown stripe from base of first coxae to halteres. Sterno index about 0.7. Halteres yellow. Coxae yellow, femora yellow with one brown ring. Tibiae yellow with two brown rings; first to third tarsi yellow, fourth and fifth brown. Apical bristles on first and second tibiae, preapical on all three.

Abdomen yellow, tergites with an medianly enlarged and interrupted posterior brown band which bends toward and reaches anterior margin at angle of tergite; lateral areas solid in color.

Wings clear. Costal index about 3.1; 4th vein index about 1.7; 5x index about 1.4; 4c index about 0.8; M index about 0.5. Third costal section with heavy bristles on its basal half.

Wing length about 2.2 mm.

Internal characters of imagines and genitalia (♂) — Testis with 2 outer and 1 and 1/2 inner coils. Epandrium with about 12 lower and 3 upper bristles. Cerci fused at lower 2/3. Surstylus with about 15 primary teeth and 6 marginal bristles (Fig. 46a).

Hypandrium as long as epandrium; concha bearing one anterior bristle.

Aedeagus pointed and slightly bifid at tip, dorsal margin slightly serrated at middle region; dorsal cleft slightly shorter than length. Aedeagal apodeme bent, laterally flattened. Ventral rod as long as gonopod. Gonopod with one sensillum; dorsal region irregular and weakly sclerotized (Fig. 46b-d). Phallosomal index about 2.4. (♀) — Ventral receptacle with about 15 coils.

Eggs, puparia — Not known.

Chromosomes — Metaphase plate shows five pair of rods, one pair of dots. The X chromosome is a rod and the Y is J-shaped.

Strains examined (2) — USA: Arizona: Patagonia (A6.4); New Mexico: Whitewater (2360.2).

Relationship — It belongs to the *mulleri* subgroup of the *repleta* group. It is related to *D. rita* Patterson & Wheeler, from which it differs chiefly in the shape of aedeagus.

Distribution — USA (Arizona, New Mexico).

Etymology — Named after Wayne N. Mathis from the National Museum of Natural History, Smithsonian Institution (Washington, D.C.).

Note — The data on chromosomes, testis and ventral receptacle represent my interpretation of those from Wasserman (1962c) who misidentified *D. mathisi* (then undescribed) as *D. rita* Patterson & Wheeler.

***Drosophila (Drosophila) meridiana* Patterson & Wheeler**
(Fig. 47)

Drosophila (Drosophila) meridiana Patterson & Wheeler, 1942: 99.

Drosophila (Drosophila) meridiana rioensis Patterson, 1943: 152.

Type-Material — Lectotype male (HERE DESIGNATED), labelled: "*D. meridiana* ♂, Austin Texas, I. T. Patterson col.1939. TYPE / LECTOTYPE *Drosophila meridiana* Patterson & Wheeler by C. R. Vilela", dissected. Paralectotype female (HERE DESIGNATED): "*D. meridiana* ♀ / PARALECTOTYPE *Drosophila meridiana* Patterson & Wheeler by C. R. Vilela". Both specimens in AMNH (New York). Type-locality: Austin, Texas, USA.

Types of subspecies *D.m. rioensis* not located, probably lost. Type-locality: Eagle Pass, Texas, USA.

General characters — Described by Patterson & Wheeler (1942) and Patterson (1943).

Genitalia ♂ — Epandrium with about 9 lower and 2 upper bristles. Cerci fused at lower half. Surstylus with about 11 primary teeth and 7 marginal bristles (Fig. 47a).

Hypandrium about 2/3 length of epandrium; concha bare.

Aedeagus splitted at tip, laterally micropubescent at posterior end, ventrally expanded at middle region. Aedeagal apodeme bent, rod-shaped. Ventral rod as long as gonopod. Gonopod with one sensillum (Fig. 47b-d). Phallosomal index about 1.6.

Other specimens examined (3, AMNH) — USA: Texas: Brownsville (3 ♂).

Strains examined (2) — MEXICO: Puebla: Acatlan (H381.8). USA: Texas: Palmetto State Park (E64.1).

Relationship — It is closely related to *D. meridionalis* Wasserman and *D. promeridiana* Wasserman, from which it slightly differs in the shape of aedeagus.

Distribution — sw. USA, n. Mexico.

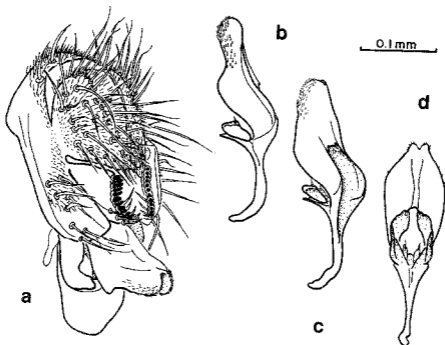


Fig. 47. *Drosophila meridiana* Patterson & Wheeler (lectotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

***Drosophila (Drosophila) meridionalis* Wasserman**

(Fig. 48)

Drosophila (Drosophila) sp. D. Wasserman, 1960.*Drosophila (Drosophila) meridionalis* Wasserman, 1962c: 88.*Drosophila (Drosophila)* sp. E. Vilela et al., 1980.

Type-Material — Holotype male, labelled: "HOLOTYPE / 2507.21 / *D. meridionalis* / Angra dos Reis, São Paulo (SIC), Brazil", in MNMH (Washington, D.C.). Paratypes (4 ♂, 5 ♀; one male dissected); same data as holotype, in DTRC (Austin). Type-locality: Angra dos Reis, Rio de Janeiro, Brazil.

General characters — Described by Wasserman (1962c).

Genitalia ♂ — Epandrium with about 5 lower and 3 upper bristles. Cerci fused at lower half. Surstylus with about 11 primary teeth and 8 marginal bristles (Fig. 48a).

Hypandrium about 2/3 length of epandrium; concha bare.

Aedeagus splitted at tip, laterally micropubescent at posterior end, ventrally expanded at middle region. Aedeagal apodeme bent, rod-shaped. Ventral rod as long as gonopod. Gonopod with one sensillum (Fig. 48b-d). Phallosomal index about 1.3.

Other specimens examined (124) — ARGENTINA: Catamarca: 2 Km N of La Viña (2 ♂, 5 ♀, MZUSP); Chaco: 7 Km NE of Resistencia (2 ♀, MZUSP), 10 Km N of Puerto Tirol (3 ♂, IML; 8 ♂, 5 ♀, MZUSP); Santiago del Estero: 3 Km SW of Santa Catalina (1 ♂, MZUSP). BRAZIL (MZUSP): Bahia: Cachoeira dos Monteiros (1 ♂); Espírito Santo: Vitória (1 ♂); Mato Grosso do

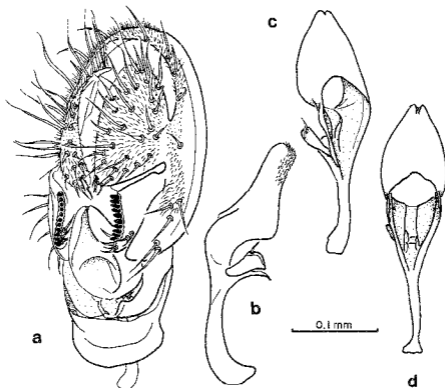


Fig. 48. *Drosophila meridionalis* Wasserman: a (strain 2507.21), male genitalia, lateroblique aspect; b-d (paratype), aedeagus, several aspects.

Sul: 30 Km of Miranda (3 ♂), 48 Km NW of Miranda (1 ♂); Minas Gerais: 11 Km NW of Cardeal Mota (1 ♂); Paraíba: 10 Km SE of S. José de Espinharas (1 ♂); Paraná: 12 Km NW of Cianorte (12 ♂); Rio Grande do Sul: 4 Km E of Capão da Canoa (4 ♂), 14 Km NW of Jaguari (2 ♀), Torres (7 ♂, 1 ♀), 6 Km E of Tramandaí (4 ♂); Rio de Janeiro: Arraial do Cabo (29 ♂), 2 Km N of Barra de São João (1 ♂); Santa Catarina: Barra Velha (5 ♂, 1 ♀), 7 Km N of Pântano do Sul (2 ♂); São Paulo: 6 Km NW of Cabreúva (14 ♂), Rio Guaratuba (7 ♂).

PARAGUAY (MZUSP): Amambay: 13 Km SE of Bella Vista (1 ♂).
 Strain examined — BRAZIL: Rio de Janeiro: Angra dos Reis (2507.21).

Relationship — My comments under *D. meridiana* apply here too.

Distribution — Brazil, Paraguay (NEW RECORD), Argentina (as *D. sp. E.* Vilela *et al.*, 1980).

Note — As far as the genitalia is concerned, the specimens dissected in 1979 from the strain (type-strain) cited above are somewhat different from the paratype obtained from the same strain more than twenty years ago. Whether this is a case of contamination or modification under laboratory conditions remains an open question.

Drosophila (Drosophila) mettleri Heed

(Fig. 49)

Drosophila (Drosophila) nigrospiracula-like, Heed *et al.*, 1962.

Drosophila (Drosophila) undescribed species, Kaneshiro *et al.*, 1973.

Drosophila (Drosophila) sp M, Heed *et al.*, 1976.

Drosophila (Drosophila) mettleri Heed, 1977: 649.

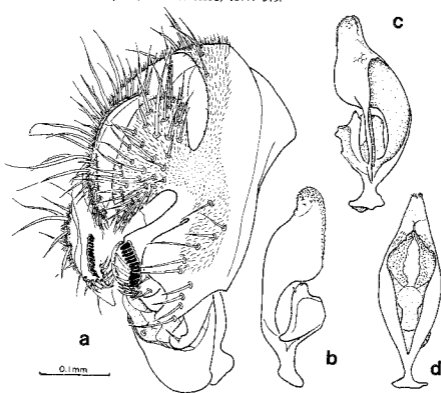


Fig. 49. *Drosophila mettleri* Heed (strain H52.2): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Type-Material — Holotype male, labelled: "*Drosophila mettleri* Heed & Sluss (SIC), det. T. P. Sluss 1972 / HOLOTYPE / Tucson, Pima Co., Arizona, 2,400-2,600', VII-27, 1972". Allotype female and paratypes (6 ♂, 6 ♀): same data as holotype. Holotype and allotype in NMNH (Washington, D.C.), paratypes in DTRC (Austin). Type-locality: Tucson, Arizona, USA.

General characters — Described by Heed (1977).

Genitalia ♂ — Epandrium with about 10 lower and 2 upper bristles. Cerci fused at lower half. Surstylus with about 11 primary teeth and 12 marginal bristles (Fig. 49a).

Hypandrium about 2/3 length of epandrium; concha bearing one anterior bristle.

Aedeagus slightly splitted at tip, expanded and micropubescent at posterior end. Aedeagal apodeme anteriorly expanded. Ventral rod weakly sclerotized, as long as gonopod, with which is posteriorly fused. Gonopod with two tiny sensilla, fused to concha (Fig. 49b-d). Phallosomal index about 3.8.

Strain examined — USA: Arizona: Tucson (H52.2).

Relationship — It is related to *D. eremophila* Wasserman, from which it differs chiefly in the shape of aedeagus.

Distribution — sw. USA, n. Mexico.

***Drosophila (Drosophila) mojavensis* Patterson**
(Figs. 50, 51)

Drosophila (Drosophila) mulleri mojavensis Patterson in Patterson & Crow, 1940: 251.

Drosophila (Drosophila) mojavensis (change of status by Patterson & Wheeler, 1942: 95).

Drosophila (Drosophila) arizonensis Patterson & Wheeler, 1942: 96 nec other American authors (synonymized by Vilela in Wheeler, 1981b: 19).

Drosophila (Drosophila) mojavensis baja Mettler, 1963: 57.

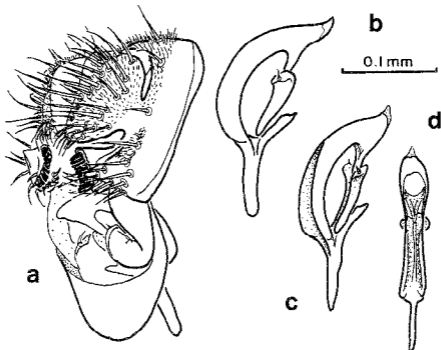


Fig. 50. *Drosophila mojavensis* Patterson (lectotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Type Material — Lectotype male (HERE DESIGNATED), labelled: "*D. mojavenensis* ♂, Mesquite Springs, California, W.P. Spencer col., 1938 TYPE / LECTOTYPE *Drosophila mojavenensis* Patterson by C. R. Vilela", dissected. Paralectotype female (HERE DESIGNATED): "*D. mojavenensis* ♀ / PARALECTOTYPE *Drosophila mojavenensis* Patterson by C. R. Vilela". Both specimens in AMNH (New York). Type-locality: Mesquite Springs, Death Valley, California, USA.

Lectotype male of synonym *D. arizonensis* (HERE DESIGNATED): "*D. arizonensis* ♂ Pima County, Arizona, G.B. Mainland col. 1940 TYPE / LECTOTYPE *Drosophila arizonensis* Patterson & Wheeler by C. R. Vilela", dissected (Fig. 51). Paralectotype female (HERE DESIGNATED): "*D. arizonensis* ♀ / PARALECTOTYPE *Drosophila arizonensis* Patterson & Wheeler by C. R. Vilela". Both specimens in AMNH (New York). Type-locality: Pima County, Arizona, USA.

Types of subspecies *D.m. baja* not located, probably lost. Type-locality: not stated (Baja California, Mexico is implied).

General characters — Described by Patterson & Wheeler (1942).

Genitalia ♂ — Epandrium with about 10 lower and 3 upper bristles. Cerci fused at lower half. Surstylus with about 12 primary teeth and 8 marginal bristles; ventral region weakly sclerotized (Fig. 50a).

Hypandrium as long as epandrium; concha bearing one anterior bristle.

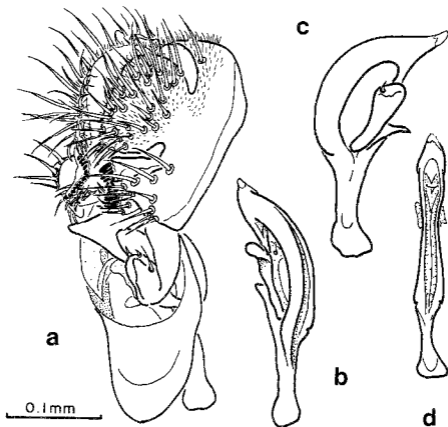


Fig. 51. *Drosophila arizonensis* Patterson & Wheeler (lectotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Aedeagus pointed, weakly sclerotized at tip with a pair of bent, ventrally fused spurs; dorsal cleft about 5/6 of length. Aedeagal apodeme laterally flattened. Ventral rod about half length of gonopod. Gonopod with one sensillum (Fig. 50b-d). Phallosomal index about 2.9.

Strains examined (20) — MEXICO: Baja California: Ensenada (E10.1), San Borja (A350), San Felipe (A211), Todos Santos (A374); Baja California Sur: Cuñahío (A202), Punta Concepcion (A352), Punta Pescadero (A372), San Ignacio (A367), San Lucas (A422); Gulf of California: San Esteban I. (A132), Tiburon I. (A122.1); Sinaloa: Los Mochis (A337); Sonora: Caborca (A319), El Desemboque (A361), Esperanza (A116.4), Hermosillo (A240), Río Bavispe (A130.1). USA: Arizona: Senita Basin (A360); California: Anza Borrego Desert (3340.4), Chocolate Mountains, Riverside Co. (2533.1).

Relationship — It is closely related to *D. arizonensis* sensu American authors (an undescribed species *nov* Patterson & Wheeler, 1942), from which it differs chiefly in the shape of aedeagus.

Distribution — w. USA, nw. Mexico.

Notes — *D. mojavensis mojavensis* has also been called *D. mojavensis* race A (Mettler & Nagle, 1966) and occurs in deserts of Southern California and Northern Baja California. *D. m. baja* is also known as *D. mojavensis* race B. (Mettler & Nagle, 1966) and occurs in two geographically distinct zones: 1) Southern Arizona, Sonora and Northern Sinaloa (subrace B1; Zouros, 1973); 2) Baja California and Gulf of California Islands (subrace B11; Zouros, 1973).

D. arizonensis sensu American authors is an undescribed and extensively-studied species of the *repleta* group which has been misidentified as *D. arizonensis* Patterson & Wheeler for about 40 years. As shown by the analysis of the lecto-

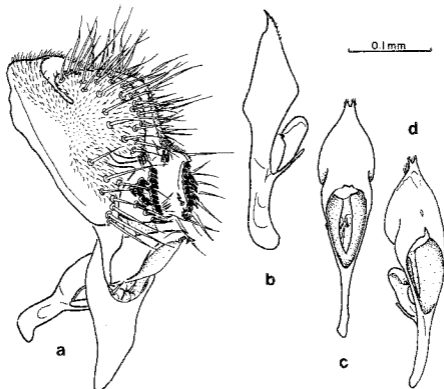


Fig. 52. *Drosophila mulleri* Sturtevant: a (strain 3370.1), male genitalia, lateroblique aspect; b-d (strain H409.16), aedeagus, several aspects.

types, *D. mojavnensis* Patterson and *D. arizonensis* Patterson & Wheeler are undoubtedly conspecific. Thinking of the unavoidable confusion in the literature, I decided not to describe *D. arizonensis* sensu American authors in the belief that the interested specialists will consider whether this is a case to be submitted to the I.C.Z.N.

The subspecies name *baja* is considered validly published (Wheeler, 1981a).

***Drosophila (Drosophila) mulleri* Sturtevant**
(Fig. 52)

Drosophila repleta variety a, Metz, 1916b.

Drosophila mulleri Sturtevant, 1921: 101.

Drosophila (Drosophila) mulleri, Sturtevant, 1939: 139.

Type-Material — Holotype male, labelled: "*Drosophila mulleri* Sturtevant / ac. 5497 / TYPE / Houston, Tex. 1915", in AMNH (New York). Paratypes 1 ♂, in DTRC (Austin); 1 ♀, in NMNH (Washington, D.C.): same data as holotype. Type-locality: Houston, Texas, USA.

General characters — Described by Sturtevant (1921), redescribed by Patterson (1943).

Genitalia ♂ — Epandrium with about 8 lower and one upper bristles. Cerci fused at lower 2/3. Surstylus with about 10 primary teeth, 10 secondary teeth and 8 marginal bristles (Fig. 52a).

Hypandrium slightly shorter than epandrium; concha bearing one anterior bristle.

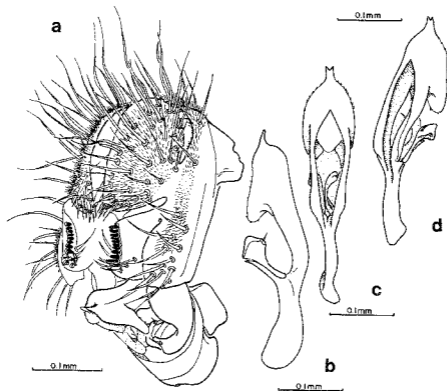


Fig. 53. *Drosophila nigricruria* Patterson & Mainland (strain H75.11): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Aedeagus slightly bifid at tip, ventrally expanded, micropubescent at posterior ventral margin; dorsal cleft about 1/3 of length. Aedeagal apodeme laterally flattened. Ventral rod about 2/3 length of gonopod. Gonopod with one sensillum (Fig. 52b-d). Phallosomal index about. 1.7.

Other specimens examined (5, NMNH) — USA: Florida: Saint Augustine (1 ♂); Texas: Camp Stanley, Bexar Co. (1 ♂), San Antonio (3 ♂).

Strains examined (2) — HAITI: Petionville (H409.16). USA: Texas: Roy Farm, Austin (3370.1).

Relationship — It is closely related to *D. aldrichi* Patterson and *D. wheeleri* Patterson & Alexander, from which it differs chiefly in the shape of aedeagus and number of secondary teeth of surstylus.

Distribution — s. USA, Mexico, West Indies (Jamaica, Cuba, Haiti (Wasserman, 1982)).

***Drosophila (Drosophila) nigricruria* Patterson & Mainland**

(Fig. 53)

Drosophila (Drosophila) nigricruria Patterson & Mainland in Patterson, 1943: 136.

Drosophila (Drosophila) nigrocruria (SIC), Hsu, 1949.

Drosophila (Drosophila) hoeckeri Brncic, 1957: 76 (synonymized by Wasserman, 1962c: 101).

Drosophila (Drosophila) nigrocruria (SIC), Pavan, 1959.

Drosophila (Drosophila) nigricruria (SIC), Takada, 1963; Pilares & Vásquez, 1977.

Type-Material — Not located, probably lost. Type-locality: El Mediñena; Jalisco, Mexico.

Types of synonym *D. hoeckeri* not analyzed, in "Facultad de Medicina, Universidad de Chile" (Santiago). Type-locality: Azapa, Arica, Chile.

General characters — Described by Patterson & Mainland (Patterson, 1943).

Genitalia ♂ — Epandrium with about 11 lower and 2 upper bristles. Cerci fused at lower half. Surstylus with about 8 primary teeth and 8 marginal bristles (Fig. 53a).

Hypandrium slightly shorter than epandrium; concha bearing one anterior bristle.

Aedeagus pointed, ventrally expanded, slightly bifid at tip and serrated at posterior ventral margin; dorsal cleft about 3/5 of length. Aedeagal apodeme bent, laterally flattened. Ventral rod slightly shorter than gonopod. Gonopod with one sensillum (Fig. 53b-d). Phallosomal index about 1.5.

Specimens examined (18) — BRAZIL (MZUSP): Bahia: 61 Km W of Barreiras (1 ♂); Minas Gerais: 27 Km NW of Cardeal Mota (1 ♂); São Paulo: 10 Km N of Conchal (5 ♂, 7 ♀). 2 Km NW of Piracununga (3 ♀). GUATEMALA (NMNH): Guatemala: Guatemala City (1 ♂).

Strains examined (4) — COSTA RICA: Heredia (H75.11). MEXICO: Michoacan: Morelia (1796.2); Puebla: Tehuacan (2261.7). PERU: Lima: Lima (2395.1).

Distribution — Mexico to Chile, Brazil (Dobzhansky & Pavan, 1950).

***Drosophila (Drosophila) nigrospiracula* Patterson & Wheeler**

(Fig. 54)

Drosophila (Drosophila) nigrospiracula Patterson & Wheeler, 1942: 81.

Type-Material — Lectotype male (HERE DESIGNATED), labelled: "*D. nigrospiracula* ♂ Tucson, Arizona, G.B. Mainland collector, 1940 TYPE / LECTOTYPE *Drosophila nigrospiracula* Patterson & Wheeler by C. R. Vilela". Paralectotype female (HERE DESIGNATED): "*D. nigrospiracula* ♀ / PARALECTOTYPE *Drosophila nigrospiracula* Patterson & Wheeler by C. R. Vilela". Both specimens in AMNH (New York). Type-locality: Tucson, Arizona, USA.

General characters — Described by Patterson & Wheeler (1942).

Genitalia ♂ — Epandrium with about 8 lower and none upper bristles. Cerci fused at lower half. Surstylus with about 12 primary teeth and 14 marginal bristles (Fig. 54a).

Hypandrium shorter than epandrium; concha bare.

Aedeagus pointed at tip and at middle dorsal region; dorsal cleft about 3/5 of length. Aedeagal apodeme dorsoventrally flattened. Ventral rod rudimentary. Gonopod with one sensillum (Fig. 54b-d). Phallosomal index about 3.2.

Other specimens examined (5, NMNH) — USA: Arizona: Tucson (5 ♂).

Strains examined (2) — MEXICO: Sonora: Magdalena (A42.2A). USA: Arizona: Tucson (A381).

Distribution — sw. USA, n. Mexico.

***Drosophila (Drosophila) pachuca* Wasserman**
(Fig. 55)

Drosophila (Drosophila) sp G, Wasserman, 1960.

Drosophila (Drosophila) pachuca Wasserman, 1962c: 95.

Type-Material — Holotype male, labelled: "2519.21 / HOLOTYPE / Dec. 1958, A. Faberge / 20 mi. NE Pachuca Hidalgo / MEXICO / *D. pachuca*", in NMNH (Washington, D. C.). Paratypes (4 ♂, 5 ♀; 2 ♂ dissected): same data as holotype, in DTRC (Austin). Type-locality: Pachuca, Hidalgo, Mexico (cited as Pachuca, Puebla, Mexico in original description).

General characters — Described by Wasserman (1962c).

Genitalia ♂ — Very similar to *D. longicornis* Patterson & Wheeler (Fig. 55a-d).

Strains examined (16) — MEXICO: Hidalgo: Pachuca (E16.1, -1A; E29.17; 401.

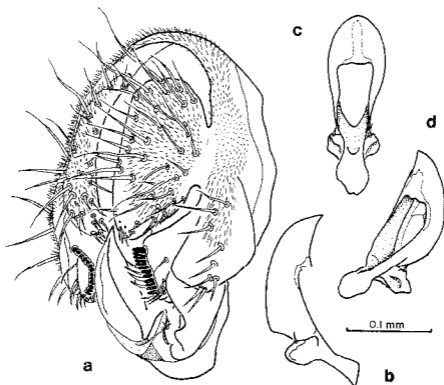


Fig. 54. *Drosophila nigrospiracula* Patterson & Wheeler (strain A42.2A): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

3A2, -3N2, -4D2, -4G, -4T, -4U, -4Y), San Pedro Mines (E26.1, -5-1), Chapingo (E14.10A, -11A, -12A, -3).

Relationship — My comments under *D. longicornis* also apply here.

Distribution — Mexico.

Note — As pointed out above, I was not able to find any remarkable difference among the male genitalia of the type specimens of *D. pachuca*, *D. propachuca* and *D. longicornis*. Whether these forms have the same status remains an open question.

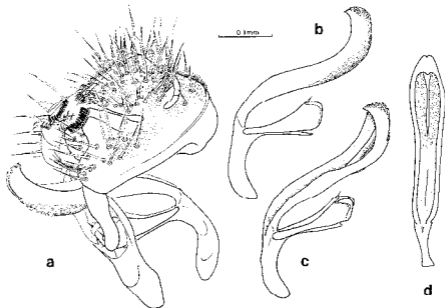


Fig. 55. *Drosophila pachuca* Wasserman: a (paratype), male genitalia, lateroblique aspect; b-d (strain 2519.21), aedeagus, several aspects.

***Drosophila (Drosophila) pegasa* Wasserman**
(Fig. 56)

Drosophila (Drosophila) sp. n., Wasserman, 1960.

Drosophila (Drosophila) pegasa Wasserman, 1962c: 94.

Type-Material — Holotype male, labelled: "*D. pegasa* / 2519.14 / HOLOTYPE / A. Faberge, Dec. 1958 / Pachuca (SIC) Hidalgo, Mexico", in NMNH (Washington, D. C.). Paratypes (4 ♂, 5 ♀): same data as holotype, in DTRC (Austin). Type-locality: Pachuca, Hidalgo, Mexico (cited as Pachuca, Puebla, Mexico in original description).

General characters — Described by Wasserman (1962c).

Genitalia ♂ — Epandrium with about 7 lower and none upper bristles. Cerci fused at lower 4/5. Surstylus with about 13 primary teeth and 6 marginal bristles (Fig. 56a).

Hypandrium slightly shorter than epandrium; concha bearing one anterior bristle.

Aedeagus ventrally expanded, weakly sclerotized at posterior end, slightly bifid and serrated at tip, micropubescent at posterior ventral margin, dorsal cleft about 3/4 of length. Aedeagal apodeme anteriorly expanded, laterally flattened. Ventral rod about half length of gonopod. Gonopod with one sensillum (Fig. 56b-d). Phallosomal index about 2.6.

Strain examined — MEXICO: Hidalgo: Pachuca (2519.14).
 Distribution — Mexico.

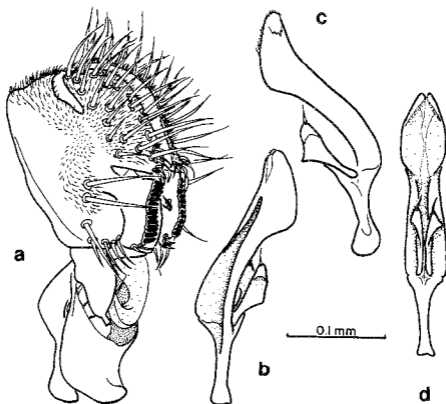


Fig. 56. *Drosophila pegasa* Wasserman (strain 2519.14): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

***Drosophila (Drosophila) promeridiana* Wasserman**
 (Fig. 57)

Drosophila (Drosophila) sp. C. Wasserman, 1960.

Drosophila (Drosophila) promeridiana Wasserman, 1962c: 94.

Type-Material — Holotype male, labelled: "H578.8 / HOLOTYPE / M R Wheeler collector/Palmira, Colombia, March 1958", in NMNH (Washington, D.C.). Paratypes (4 ♂, 5 ♀; 2 ♂ dissected): same data as holotype. Type-locality: Palmira, Valle del Cauca, Colombia.

General characters — Described by Wasserman (1962c).

Genitalia ♂ — Epandrium with about 7 lower and none upper bristles. Cerci fused at lower 2/3. Surstylus with about 12 primary teeth and 5 marginal bristles (Fig. 57a).

Hypandrium about 2/3 length of epandrium; concha bare.

Aedeagus slightly different of that of *D. meridionalis* (Fig. 57b, c). Phallosomal index about 1.1.

Strain examined — COLOMBIA: Valle del Cauca: Palmira (H318.4).

Relationship — It is closely related to *D. meridiana* Patterson & Wheeler and *D. meridionalis* Wasserman, from which it slightly differs in the shape of aedeagus.

Distribution — Presently known from the type-locality only.

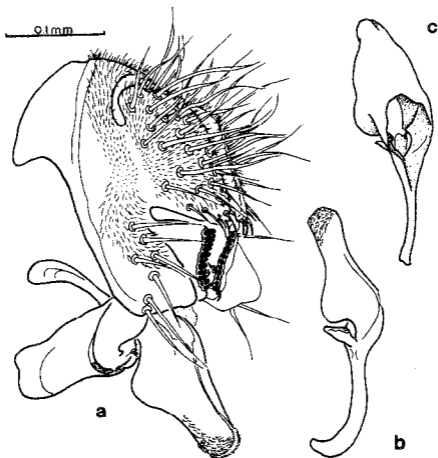


Fig. 57. *Drosophila promoteridiana* Wasserman (paratypes): a, male genitalia, lateroblique aspect; b, c, aedeagus, two aspects.

***Drosophila (Drosophila) propachuca* Wasserman
(Fig. 58)**

Drosophila (Drosophila) sp H, Wasserman, 1960.

Drosophila (Drosophila) propachuca Wasserman, 1962c: 95.

Type-Material — Holotype male, labelled: "HOLOTYPE / *D. propachuca* / 2519.18 / Dec. 1958, A. Faberge / MEXICO / 20 mi. NF Pachuca (SIC) Hidalgo", in NMNH (Washington, D.C.). Paratypes (4 ♂, 5 ♀; 1 ♂ dissected): same data as holotype, in DTRC (Austin). Type-locality: Pachuca, Hidalgo, Mexico (cited as Pachuca, Puebla, Mexico in original description).

General characters — Described by Wasserman (1962c).

Genitalia ♂ — Very similar to *D. longicornis* Patterson & Wheeler (Fig. 58a-d).

Other specimens examined (2, DTRC) — MEXICO: Hidalgo: Pachuca (2 ♂, 2519.21).

Strains examined (10) — MEXICO: D.F.: Mexico City (E7.7A); Hidalgo: Pachuca (E15.1A, 2519.18, E29.1, E16.2A), San Pedro Mines (E26.3-2), Venados (E28.2D); Mexico: Chapingo (E14.1, E18.3); San Luis Potosi: San Luis Potosi (E30.7).

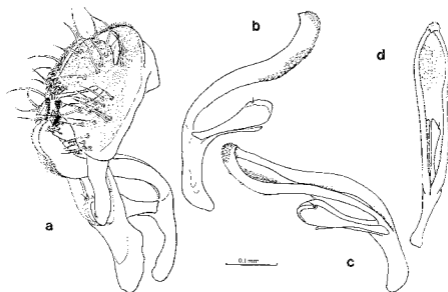


Fig. 58. *Drosophila propachuca* Wasserman: a (paratype), male genitalia, lateroblique aspect; b-d (strain 2519.18), aedeagus, several aspects.

Relationship — My comments under *D. longicornis* apply here too.

Distribution — Mexico.

Note — See my comments under *D. pachuca*.

***Drosophila (Drosophila) racemova* Patterson & Mainland
(Fig. 59)**

Drosophila (Drosophila) racemova Patterson & Mainland, 1944: 44.

Type-Material — Not located, probably lost. Type-locality: Jacala, Hidalgo, Mexico.
General characters — Described by Patterson & Mainland (1944).

Genitalia ♂ — Epandrium with about 12 lower and none upper bristles. Cerci fused at lower 2/3. Surstylus with about 13 primary teeth and 15 marginal bristles (Fig. 59a).

Hypandrium slightly shorter than epandrium; concha bare.

Aedeagus ventrally expanded at posterior end, slightly serrated at tip. Aedeagal apodeme laterally flattened. Ventral rod as long as gonopod. Gonopod with one sensillum (Fig. 59b-d). Phallosomal index about 2.2.

Specimens examined (5) — MEXICO: Hidalgo: Pachuca (2 ♂, 2519.15, DTRC); Oaxaca: Capatzipam (2 ♂, NMNH). USA: Arizona: Portal (1 ♂, NMNH).

Distribution — Mexico, USA (NEW RECORD).

/ ***Drosophila (Drosophila) richardsoni*, sp. nov.
(Fig. 60)**

Undescribed from Puerto Rico, Wasserman, 1982.

Undescribed F2, Pereira *et al.*, in press.

Type-Material — Holotype male, labelled: "*Drosophila richardsoni*, D. Bruck col. / La Parguera, Mayagüez, Puerto Rico, Feb. 1972 / Stock E. 24 HOLOTYPE ♂", in NMNH (Washington, D. C.), N° 763702. Twenty-seven paratypes as follows: (2 ♂, 3 ♀) in NMNH, (10 ♂, 10 ♀) in DTRC (Austin), (1 ♂, 1 ♀) in MZUSP (São Paulo): same data as holotype. All type specimens obtained from

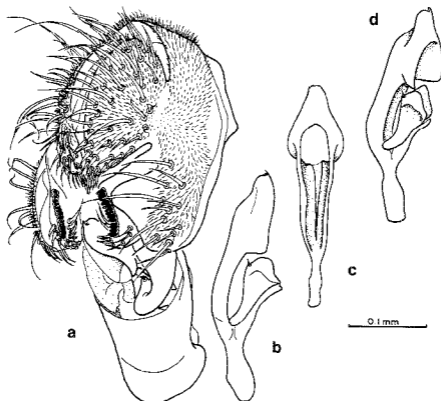


Fig. 59. *Drosophila racemova* Patterson & Mainland: a (strain 2519.15), male genitalia, lateroblique aspect; b-d (Pachuca, Mexico), aedeagus, several aspects.

DZUT culture E.24 in 1979. Type-locality: La Parguera, Mayagüez, Puerto Rico. *External characters of imagines* ♂, ♀ — Arista with 3 dorsal and 1-2 ventral branches plus terminal fork. Antennae brown. Front brown, pollinose; orbits, ocellar triangle and anterior region lighter. Posterior orbital, verticals and postverticals arising from dark brown spots. Middle orbital about 1/2 of other two. Second oral about 1/2 of first. Face pale yellow. Carina prominent, sulcate, slightly expanded at ventral region. Palpi pale yellow, pollinose, with bristles on ventral surface. Cheeks pale yellow; their greatest width 1/3 greatest diameter of eyes. Eyes red, with short black piles.

Acrostichal hairs in 8 irregular rows. No prescutellars. Anterior scutellars convergent. Mesonotum yellowish brown, pollinose, bristles arising from dark brown spots, which are irregularly fused anteriorly to transverse suture. Scutellum light brown, with one large X-shaped dark brown area; bristles arising from dark brown spots. Pleurae brown, pollinose, with an irregular darker longitudinal stripe from base of first coxae to halteres. Sterno index about 0.8. Halteres pale yellow. Coxae and femora light brown, the latter with distal darker ring. Tibiae light brown with proximal darker ring; tarsi light brown. Apical bristles on first and second tibiae, preapical on all three.

Abdomen yellow, 2nd to 6th tergite with a medianly enlarged and interrupted posterior dark brown band which hends toward and reaches anterior margin at angle of tergite, leaving a yellow area laterally, which in females increases in size from 2nd to 6th tergite; band of 6th tergite in males does not reach anterior margin.

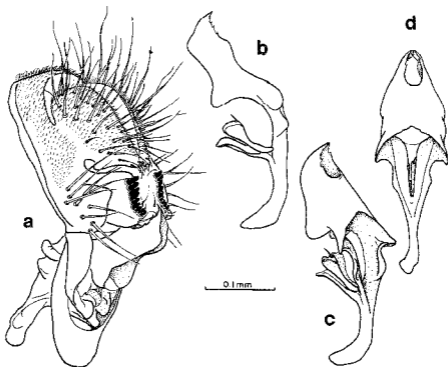


Fig. 60. *Drosophila richardsoni*, sp. nov. (strain 3371.1): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Wings clear. Costal index about 2.9; 4th vein index about 2.0; 5x index about 1.6; 4c index about 1.0; M index about 0.6. Third costal section with heavy bristles on its basal 2/5.

Body length (etherized) 2.2-2.8 mm (♂), 2.4-3.2 mm (♀).

Wing length 2.1-2.2 mm (♂, ♀).

Internal characters of imagines and genitalia (♂) — Testis dark yellow, with about 1 and 1/2 inner and 2 and 1/2 outer coils. Epandrium with about 10 lower and none upper bristles. Cerci fused at lower 2/3. Surstylus with about 9 primary teeth and 10 marginal bristles (Fig. 60a).

Hyandrium as long as epandrium; concha bare.

Aedeagus splitted about 2/7 of length, with posterior dorsal margin serrated, ventrally expanded at middle region, laterally expanded at anterior region; dorsal cleft about 1/2 of length. Aedeagal apodeme laterally flattened. Ventral rod as long as gonopod. Gonopod with one sensillum (Fig. 60b-d). Phallosomal index about 1.7. (♀) — Ventral receptacle an irregular spiral with about 14 loose coils. Ovipositor apically rounded with about 18 marginal and 2 discal teeth. Spermathecae campanula-shaped, weakly sclerotized; duct slightly invaginated.

Eggs — Four filaments slightly longer than egg; egg length about 1 mm.

Puparia — Brown; horn index about 2.1; each anterior spiracle with about 13 branches.

Chromosomes — Not analyzed, but according to Wasserman (1982), the metaphase plate of *D. richardsoni* (as undescribed species from Puerto Rico), shows five pair of rods, one pair of dots. It is similar to that of *D. stalkerii* Wheeler, from which it differs in having the long arm of J-shaped Y chromosome slightly shorter than X (equal to the X in *D. stalkerii*).

Other specimens examined (5) — WEST INDIES: Dominica: Macoucheri (4 ♂, NMNH); Puerto Rico: Mona I. (1 ♂, AMNH).

Strains examined (3) — WEST INDIES: Puerto Rico (E20.2, E.24, 3371.1).

Relationship — Belongs to the *mulleri* subgroup of the *repleta* group. It is related to *D. borborema* Vilela & Sene, *D. serido* Vilela & Sene and *D. stalkerii* Wheeler, from which it differs chiefly in the shape of aedeagus.

Distribution — West Indies (Puerto Rico, Dominica).

Etymology — Named after Richard H. Richardson from the Department of Zoology, University of Texas at Austin.

Note — According to Dr. Richardson (personal communication) the original female, which originated the strain E. 24, was collected from a rot pocket of organpipe cactus.

***Drosophila (Drosophila) ritae* Patterson & Wheeler**

(Fig. 61)

Drosophila (Drosophila) ritae Patterson & Wheeler, 1942: 87 (*nec sensu* Wasserman, 1962c).

Drosophila (Drosophila) sp. N. Wasserman, 1960.

Drosophila (Drosophila) tira Wasserman, 1962c: 96 (synonymized by Vilela in Wheeler, 1981b: 20).

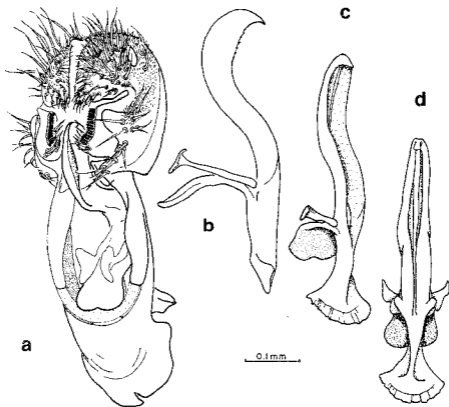


Fig. 61. *Drosophila ritae* Patterson & Wheeler (lectotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Type-Material — Lectotype male (HERE DESIGNATED), labelled: "*D. ritae* ♂, Wild Rose Canyon, Texas, 1940, G.B. Mainland col. TYPE / LECTOTYPE *Drosophila ritae* Patterson & Wheeler by C. R. Vilela", dissected. Paralectotype female (HERE DESIGNATED): "*D. ritae* ♀ / PARALECTOTYPE *Drosophila ritae* Patterson & Wheeler by C. R. Vilela". Both specimens in AMNH (New York). Type-locality: Wild Rose Canyon, Texas, USA.

Holotype male of synonym *D. tira*: "HOLOTYPE *Drosophila tira* Wasserman, 2521.D.2 / Feb. 1959, D. Hunsaker / 30 mi. E. Mexico City, Mexico ♂", in NMNH (Washington, D.C.). Paratypes (5 ♂, 4 ♀): same data as holotype, in DTRC (Austin). Type-locality: 25 mi E. of Mexico City, D.F., Mexico.

General characters — Described by Patterson & Wheeler (1942).

Genitalia ♂ — Epandrium with about 16 lower and 4 upper bristles. Cerci fused at lower half. Surstylus with about 15 primary teeth and 8 marginal bristles (Fig. 61a).

Hypandrium longer than epandrium; concha weakly sclerotized, bare; posterior region expanded.

Aedeagus pointed at tip, dorsal margin of posterior end serrated; dorsal cleft slightly shorter than aedeagus. Aedeagal apodeme laterally expanded at anterior region. Ventral rod strongly sclerotized, longer than gonopod, laterally expanded, linked to hypandrium by membranous tissue (Fig. 61b-d). Phallosomal index about 1.9.

Other specimens examined (2, NMNH) — USA: Arizona: Portal (2 ♂).

Strains examined (6) — MEXICO: D.F.: Mexico City (2521.D2); Hidalgo: Pachuca (401.4C), San Pedro Mines (E26.3-3); Puebla: Tehuacan (402.4). USA: Arizona: Cave Creek, Chiricahua Mountains (A386), Portal (E32.3).

Relationship — It is related to *D. mathisi*, sp. nov. (*D. ritae* sensu Wasserman) from which it differs chiefly in the shape of aedeagus and sclerotization of ventral rod.

Distribution — sw. USA, n. Mexico.

Note — *D. tira* was described by Wasserman as a new species, probably because he misidentified *D. ritae*. These species were synonymized on basis of morphological grounds.

Drosophila (Drosophila) serido Vilela & Sene (Fig. 62)

Drosophila (Drosophila) serido Vilela & Sene, 1977: 295.

Type-Material — Holotype male, labelled: "BRASIL — BA, 3 Km NW of Milagres, 12°51'S, 39°53'W. Sene et alii col., 24.xi-3.xii.1976 / HOLOTIPO *Drosophila serido* ♂", dissected. Paratypes (15 ♂): same data as holotype. All specimens in MZUSP (São Paulo). Type-locality: 3 Km NW of Milagres, Bahia, Brazil.

General characters — Described by Vilela & Sene (1977).

Genitalia ♂ — Epandrium with about 12 lower and none upper bristles. Cerci not fused. Surstylus with about 11 primary teeth and 7 marginal bristles (Fig. 62a).

Hypandrium shorter than epandrium; concha bare.

Aedeagus splitted about 1/4 of length, with posterior dorsal margin serrated; posterior end laterally covered with tiny teeth; ventrally expanded; dorsal cleft about 3/5 of length, Aedeagal apodeme anteriorly bent and splitted, laterally flattened. Ventral rod as long as gonopod. Gonopod with one sensillum (Fig. 62b-d). Phallosomal index about 2.8.

Other specimens examined (351) — ARGENTINA (MZUSP): La Rioja: 8 Km S of Pamatina (3 ♂), 3 Km W of Miranda (3 ♂); Tucuman: 2 Km N of Tapia (5 ♂). BRAZIL (MZUSP): Bahia: 13 Km W of Barreiras (3 ♂), 20 Km E of Ibotirama (8 ♂), 3 Km NW of Milagres (115 ♂), Cachoeira dos Monteiros (4 ♂); Espírito Santo: Vitória (12 ♂); Mato Grosso do Sul: 30 Km NW of Miranda (2 ♂); Minas Gerais: 11 Km NW of Cardeal Mota (1 ♂, 1 ♀), 16 Km NW of Cardeal Mota (3 ♂, 7 ♀); Paraíba: 1 Km E of Junco do Seridó (60 ♂), 10 Km SE of São José de Espinharas (3 ♂); Rio Grande do Norte: 7 Km SW of Bom Jesus (5 ♂), 3 Km S of Maxaranguape (7 ♂); Rio Grande

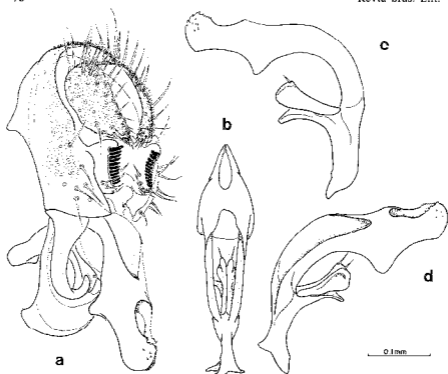


Fig. 62. *Drosophila serido* Vilela & Sene (holotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

do Sul: 4 Km E of Capão da Canoa (1 ♂), 3 Km NW of Jaguari (6 ♂), 14 Km NW of Jaguari (14 ♂), 3 Km S of São José (1 ♂), 6 Km E of Tramandai (7 ♂); Rio de Janeiro: Arraial do Cabo (61 ♂); Santa Catarina: Barra Velha (7 ♂), 7 Km N of Pântano do Sul (1 ♂); São Paulo: Rio Guaratuba (1 ♂), 14 Km N of Peruibe (3 ♂, 1 ♀). PARAGUAY: Villariçá (3 ♂, NMNH); Amambay: 13 Km SE of Bella Vista (1 ♀, MZUSP).

Strains examined (48) — BRAZIL: Bahia: Argolim (B11.2A, -2D, -2E, -2G, -2I, -2K, -2L, -2P, -2Q, -2R, -2S, -2U, -2V, -2X, -2Z, -2AA, -2AB, -2AC, -2AH, -2AW), Milagres (B13.2B, -2D, -2F, -2I, -2J, -2O, -2Q), Cafarnaum (B16.2C, -2E, -2F, -2G, -2I, -2K, -22L, -2O) Morro do Chapéu (B17.2R, -2V, -2AY, -2BL, -2BW, -2EG, -2EH, -2EN, -2EQ, -2EV, -2FT, -2FV)

Relationship — It is closely related to *D. borborema* Vilela & Sene, from which it differs chiefly in the shape of aedeagus.

Distribution — Brazil, Paraguay (NEW RECORD), Argentina (Vilela *et al.*, 1980).

Note — This is a polytypic species and the aedeagi of males from throughout its distribution are slightly different (Silva, 1981). The populations from Western Argentina and Serra do Cipó (State of Minas Gerais) could represent subspecies or even species in *statu nascenti*.

Drosophila (Drosophila) spenceri Patterson

(Fig. 63)

Drosophila (Drosophila) spenceri Patterson, 1943: 160.

Type-Material — Holotype (sex unknown), labelled: "1540.12 / spenceri / HOLOTYPE / G. B. Mainland, July 1942 / Rio Chalus (SIC), Morelos, Mexico",

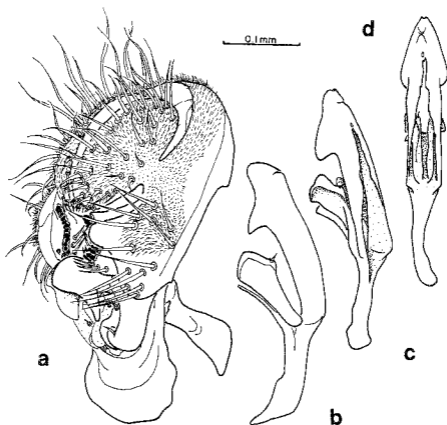


Fig. 63. *Drosophila spenceri* Patterson (strain 310.1): a, male genitalia, latero-blique aspect; b-d, aedeagus, several aspects.

in NMNH (Washington, D. C.). Abdomen not located (apparently cut, probably mounted in slide somewhere). Type-locality: Rio Chalma, Morelos, México.

General characters — Described by Patterson (1943).

Genitalia ♂ — Epandrium with about 14 lower and none upper bristles. Cerci fused at lower half. Surstylus with about 12 primary teeth and 9 marginal bristles (Fig. 63a).

Hypandrium shorter than epandrium; concha bearing one anterior bristle.

Aedeagus slightly invaginated at tip, ventrally expanded; dorsal cleft about 2/3 of length. Aedeagal apodeme laterally flattened. Ventral rod as long as gonopod. Gonopod with one sensillum (Fig. 63b-d). Phallosomal index about 1.9.

Strain examined — MEXICO: Baja California: Cufiaño (310.1).

Distribution — Mexico.

***Drosophila (Drosophila) stalker* Wheeler**
(Fig. 64)

Drosophila (Drosophila) stalker Wheeler, 1954: 52.

Type-Material — Holotype male, labelled: "HOLOTYPE / 2215.1 / H.D. Stalker / St. Petersburg, Florida, Dec-Jan 1952-53 ♂", in NMNH (Washington, D.C.). Paratypes (8 ♂, 7 ♀): same data as holotype, in DTRC (Austin). Type-locality: Saint Petersburg, Florida, USA.

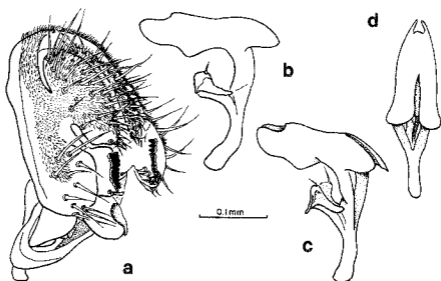


Fig. 64. *Drosophila stalkerii* Wheeler (strain 2213.1): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

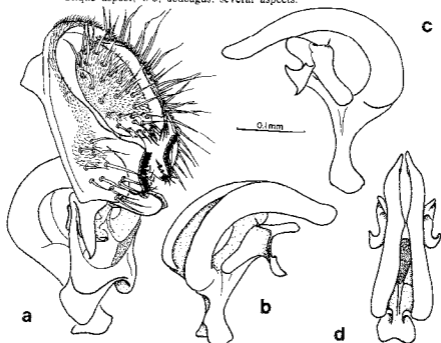


Fig. 65. *Drosophila starmeri* Wasserman, Koepfer & Ward (strain W-12), male genitalia, lateroblique aspect; b-d (strain W-17), aedeagus, several aspects.

General characters — Described by Wheeler (1954).

Genitalia ♂ — Epandrium with about 12 lower and none upper bristles. Cerci fused at lower half. Surstylus with about 11 primary teeth and 7 marginal bristles (Fig. 64a).

Hypandrium shorter than epandrium; concha bare.

Aedeagus splitted about 1/5 of length; ventrally expanded, dorsal region with well-developed anteriorly pointed wing-shaped expansions; dorsal cleft about 2/3 of length. Aedeagal apodeme bent, laterally flattened. Ventral rod as long as gonopod. Gonopod with one sensillum (Fig. 64b-d). Phallosomal index about 1.9.

Other specimens examined (12) — USA (NMNH): Florida: Sanibel Id, Lee Co. (8 ♂), Royal Palm Pk. (1 ♂), Tavernier Key Largo (1 ♂). WEST INDIES: Bahamas: Green Turtle Cay, New Plymouth (1 ♂, AMNH); Jamaica: Runaway Bay (1 ♂, NMNH).

Strain examined — USA: Florida: Saint Petersburg (2213.1).

Relationship — It is related to *D. richardsoni*, sp. nov., from which it differs chiefly in the shape of aedeagus.

Distribution — se. USA, Bahamas (NEW RECORD), Jamaica (NEW RECORD).

***Drosophila (Drosophila) starmeri* Wasserman, Koepfer & Ward
(Fig. 65)**

Drosophila (Drosophila) starmeri Wasserman, Koepfer & Ward, 1973: 1239.

Type-Material — Not located, although the original description states DTRC (Austin) and NMNH (Washington, D.C.) as repositories. Type-locality: 10 Km W of Barquisimeto, Lara, Venezuela.

Genitalia ♂ — Epandrium with about 13 lower and none upper bristles. Cerci not fused. Surstylus with about 12 primary teeth and 10 marginal bristles (Fig. 65a).

Hypandrium as long as epandrium, anterior margin strongly concave; concha bare (Fig. 65a).

Aedeagus bow-shaped; dorsal cleft as long as length, strongly narrowed near middle region. Aedeagal apodeme anteriorly splitted, laterally flattened. Ventral rod about 3/4 length of gonopod. Gonopod with one sensillum, fused to concha (Fig. 65b-d). Phallosomal index about 2.7.

Specimens examined (9, MZUSP) — VENEZUELA: D.F.: near Macuto (9 ♂).

Strains examined (2) — VENEZUELA: Lara: Barquisimeto (W-12); Carabobo: Puerto Cabello (W-17).

Relationship — It is related to *D. uniseta* Wasserman, Koepfer & Ward, from which it differs chiefly in the shape of aedeagus and of primary teeth row of surstylus.

Distribution — Venezuela.

***Drosophila (Drosophila) subviridis* Patterson & Mainland
(Fig. 66)**

Drosophila (Drosophila) subviridis Patterson & Mainland in Patterson, 1943: 140.

Type-Material — Not located, probably lost. Type-locality: Mexico City, D.F., Mexico.

General characters — Described by Patterson & Mainland (Patterson, 1943).

Genitalia ♂ — Epandrium with about 13 lower and 3 upper bristles. Cerci fused at lower half. Surstylus with about 12 primary teeth and 11 marginal bristles (Fig. 66a).

Hypandrium 3/4 length of epandrium; concha bearing one anterior bristle.

Aedeagus slightly invaginated and weakly sclerotized at dorsal tip, laterally expanded at middle dorsal region; dorsal cleft about 1/6 of length. Aedeagal apodeme bent, laterally flattened. Ventral rod as long as gonopod. Gonopod with one sensillum (Fig. 66b-d). Phallosomal index about 0.7.

Specimens examined (2, DTRC) — EL SALVADOR: Santa Ana: Cerro Monte.

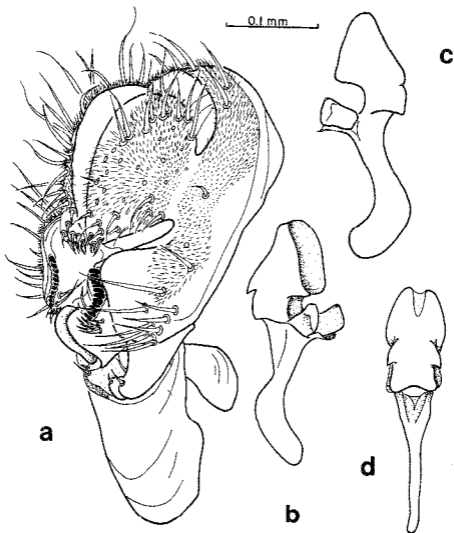


Fig. 66. *Drosophila subviridis* Patterson & Mainland: a (Monte Vyuca), male genitalia, lateroblique aspect; b-d (Cerro Montecristo), aedeagus, several aspects.

cristo (1 ♂, 44.26). HONDURAS: Tegucigalpa: 10 Km NW of Zamorano, Monte Vyuca (1 ♂, 49.24).

Distribution — Mexico, El Salvador (NEW RECORD), Honduras (NEW RECORD).

***Drosophila (Drosophila) uniseta* Wasserman, Koepfer & Ward
(Fig. 67)**

Drosophila (Drosophila) uniseta Wasserman, Koepfer & Ward, 1975: 1240.

Type-Material — Not located, although the original description states DTRC (Austin) and NMNH (Washington, D. C.) as repositories. Type-locality: 2 Km E of Coro, Falcon, Venezuela.

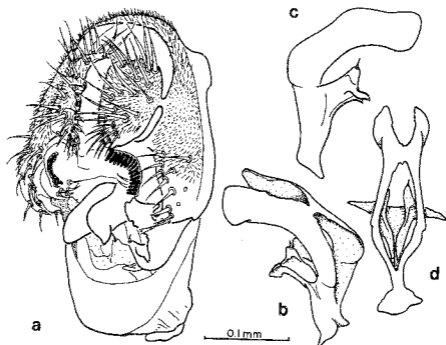


Fig. 67. *Drosophila uniseta* Wasserman, Koepfer & Ward (strain W-11): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

General characters — Described by Wasserman, Koepfer & Ward (1973).
Genitalia ♂ — Epandrium with about 15 lower and none upper bristles. Cerci slightly fused. Surstylus with about 14 primary teeth in a strongly concave row and 5 marginal bristles (Fig. 67a).

Hypandrium shorter than epandrium; concha bare, serrated at posterior inner margin (Fig. 67a).

Aedeagus splitted about 1/3 of length; dorsal cleft about 2/3 of length. Aedeagal apodeme laterally expanded at anterior end. Ventral rod weakly sclerotized, as long as gonopod. Gonopod with one tiny sensillum, fused to concha (Fig. 67b-d). Phallosomal index about 2.3.

Specimens examined (10, MZUSP) — VENEZUELA: D. F.: near Macuto (10 ♂).
 Strain examined — VENEZUELA: Zulia: Maracaibo (W-11).

Relationship — It is related to *D. starneri* Wasserman, Koepfer & Ward, from which it differs in the shape of aedeagus and of the primary teeth row of surstylus.

Distribution — Venezuela.

***Drosophila (Drosophila) wheeleri* Patterson & Alexander**
 (Fig. 68)

Drosophila (Drosophila) wheeleri Patterson & Alexander, 1952: 129.

Type-Material — Holotype male, labelled: "1980.1 / HOLOTYPE / wheeleri / Arcadia Calif. 1949-50", in NMNH (Washington, D.C.). Paratypes (4 ♂, 5 ♀; 1 ♂ dissected): same data as holotype, in DTRC (Austin). Type-locality: Arcadia, California, USA.

General characters — Described by Patterson & Alexander (1952).

Genitalia — Very similar to *D. aldrichi* Patterson & Wheeler (Fig. 68a-d).

Strain examined — MEXICO: Baja California: Arroyo Socorro (A519.1).

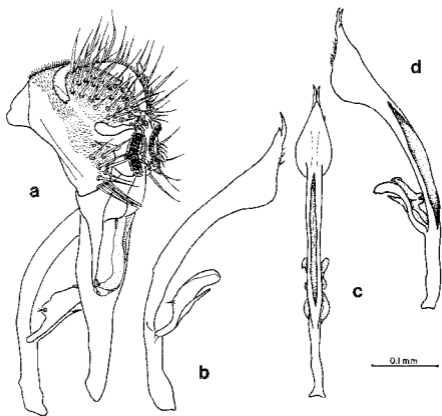


Fig. 68. *Drosophila wheeleri* Patterson & Alexander (strain A519.1): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Relationship — My comments under *D. aldrichi* also apply here.

Distribution — w. USA, nw. Mexico.

Note — As pointed out above I was not able to find any remarkable difference between the male genitalia of the type-specimens of *D. wheeleri* and *D. aldrichi*. Whether these forms have the same status remains an open question.

THE REPLETA SUBGROUP

Species included (G) — *Drosophila fulvimaculata* Patterson & Mainland; *D. fulvimaculoides* Wasserman & Wilson; *D. limensis* Pavan & Patterson; *D. neorepleta* Patterson & Wheeler; *D. repleta* Wollaston; *D. zottii*, sp. nov.

Diagnosis — Costal index ranging from 2.7 to 3.0; testis with moderate number of coils, ranging from 6 to 12; ventral receptacle with number of coils ranging from 40 to 108; phallosomal index varying from 1.1 to 2.1. Anterior margin of cerci fused in various degree; surstylus without secondary teeth and 10-11 primary teeth; concha of hypandrium usually bare; gonopod with one sensillum, linked to concha of hypandrium by membranous tissue.

Geographical distribution — The species of this subgroup occur between 32°N (USA, Arizona) and 27°S (Brazil, Rio Grande do Sul) of the New World; *D. repleta* is cosmopolitan.

***Drosophila (Drosophila) fulvimacula* Patterson & Mainland**
(Fig. 69)

Drosophila (Drosophila) fulvimacula Patterson & Mainland, 1944: 42.

Drosophila (Drosophila) fulcamacula (SIC), Hsu, 1949.

Drosophila (Drosophila) fulvacacula (SIC), Hsu, 1949.

Drosophila (Drosophila) fulvimacula flavorepleta Patterson & Pavan in Patterson, 1952: 114.

Drosophila (Drosophila) fulmimacula (SIC), Pílares & Vásquez, 1977.

Type-Material — Holotype male, labelled: "*fulvimacula* / HOLOTYPE / 1406.15 ♂", in NMNH (Washington, D. C.); according to the field book (DZUT), 1406.15 means a strain from Sedeño Cañon (near Jalapa), Veracruz, Aug. 17, 1943, G. B. Mainland col. The remaining specimens of the original type-series have been lost (Wasserman & Wilson, 1957: 136). Type-locality: Sedeño Cañon (near Jalapa), Veracruz, Mexico.

Holotype male of subspecies *D. f. flavorepleta*: "*flavorepleta* / 1975.5 ♂ / HOLOTYPE / Belém, Pará, Brasil". in NMNH (Washington, D. C.). Paratypes (4 ♂, 5 ♀): same data as holotype, in DTRC (Austin); in the original description the strain number is cited as 1980.1, rather than 1975.7 as on the label. Type-locality: Belém, Pará, Brazil.

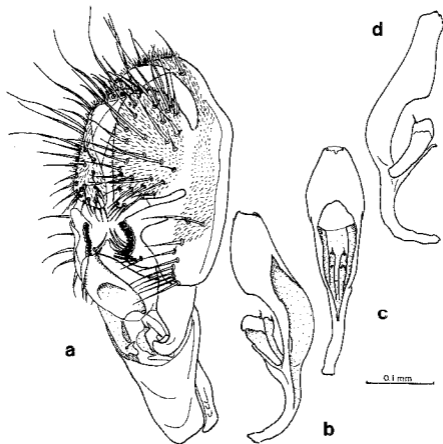


Fig. 69. *Drosophila fulvimacula* Patterson & Mainland (strain 1808.37): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

General characters — Described by Patterson & Mainland (1944).

Genitalia ♂ — Epandrium with about 10 lower and one upper bristles. Cerci fused at lower half. Surstylus with about 10 primary teeth and 10 marginal bristles (Fig. 69a).

Hyandrium slightly shorter than epandrium; concha bearing one anterior bristle.

Aedeagus ventrally expanded, slightly invaginated at tip; ventral margin of posterior end slightly serrated; dorsal cleft about 2/3 of length. Aedeagal apodeme bent, rod-shaped. Ventral rod slightly shorter than gonopod. Gonopod with one sensillum (Fig. 69b-d). Phallosomal index about 2.1.

Strains examined (4) — HONDURAS: Atlántida: Tela, Lancetilla (H51.13). MEXICO: Oaxaca: Oaxaca (1808.37). PANAMA: Canal Zone: Barro Colorado I. (21B24).

Relationship — It is closely related to *D. fulvimaculoides* Wasserman & Wilson, from which it differs chiefly in the shape of aedeagus.

Distribution — Mexico to Brazil.

***Drosophila (Drosophila) fulvimaculoides* Wasserman & Wilson
(Fig. 70)**

Drosophila (Drosophila) fulvimaculoides Wasserman & Wilson, 1957: 137.

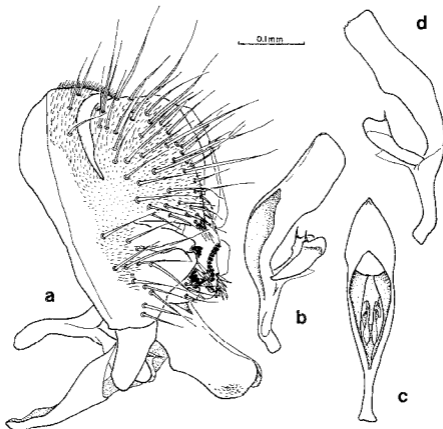


Fig. 70. *Drosophila fulvimaculoides* Wasserman & Wilson (strain H163.31): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Type-Material — Holotype male, labelled: "*Fulvimaculoides* ♂ / HOLOTYPE / Turrialba, Costa Rica / H163 31", in NMNH (Washington, D.C.). Paratypes (4 ♂, 5 ♀); same data as holotype, in DTRC (Austin). Type-locality: Turrialba, Cartago, Costa Rica.

General characters — Described by Wasserman & Wilson (1957).

Genitalia ♂ — Epandrium with about 11 lower and 2 upper bristles. Cerci fused at lower 2/5. Surstylus with about 10 primary teeth and 15 marginal bristles (Fig. 70a).

Hypandrium slightly shorter than epandrium.

Aedeagus ventrally expanded; ventral margin serrated at posterior end; dorsal cleft about 1/2 of length. Aedeagal apodeme bent, rod-shaped. Ventral rod weakly sclerotized, about half length of gonopod. Gonopod with one sensillum (Fig. 70b-d). Phallosomal index about 1.7.

Strain examined — COSTA RICA: Cartago: Turrialba (H163.31).

Relationship — It is closely related to *D. fulvimaculata* Patterson & Mainland, from which it differs chiefly in the shape of aedeagus.

Distribution — El Salvador, Nicaragua, Costa Rica.

***Drosophila (Drosophila) limensis* Pavan & Patterson**

(Fig. 71)

Drosophila (Drosophila) limensis Pavan & Patterson in Pavan & Cunha, 1947: 45.

Type-Material — Holotype male, labelled: "*D. limensis* Pava (SIC) — Patterson TIPO Lima P. / HOLOTIPO". Paratypes (2 ♂, 2 ♀; males dissected); same data as holotype. All specimens in MZUSP (São Paulo). Type-locality: Lima, Lima, Peru.

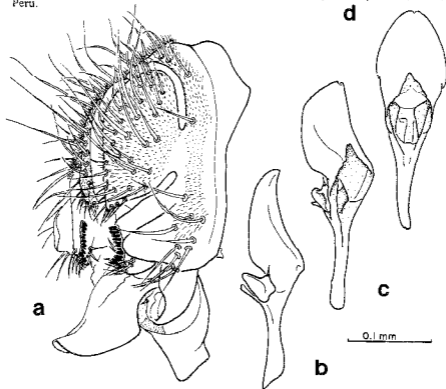


Fig. 71. *Drosophila limensis* Pavan & Patterson (paratype): a. male genitalia, lateroblique aspect; b-d. aedeagus, several aspects.

General characters — Described by Pavan & Patterson (Pavan & Cunha, 1947).
Genitalia ♂ — Epandrium with about 9 lower and one upper bristles. Cerci fused at lower 1/3. Surstylus with about 11 primary teeth and 10 marginal bristles (Fig. 71a).

Hypandrium 2/3 length of epandrium.

Aedeagus slightly invaginated at tip; dorsal cleft about 1/2 of length. Aedeagal apodeme rod-shaped. Ventral rod slightly shorter gonopod. Gonopod with one sensillum (Fig. 71b-d). Phallosomal index about 1.4.

Strain examined — PERU: Lima: Lima (1529.2A).

Relationship — It is closely related to *D. repleta* Wollaston and also related to *D. neorepleta* Patterson & Wheeler from which it differs chiefly in the shape of aedeagus.

Distribution — Peru, ? Brazil.

***Drosophila (Drosophila) neorepleta* Patterson & Wheeler**
 (Figs. 72, 73)

Drosophila (Drosophila) neorepleta Patterson & Wheeler, 1942: 78.

Drosophila (Drosophila) canapaipa Patterson & Mainland, 1944: 40 (synonymized by Vilcá in Wheeler, 1981b: 19).

Drosophila (Drosophila) melanopaipa, some authors (*nec* Patterson & Wheeler, 1942: 77).

Type-Material — Lectotype male (HERE DESIGNATED), labelled: "*D. neorepleta* ♂, Sacapulas, Guatemala, T. Dobzhansky col. 1939 TYPE / LECTOTYPE *Drosophila neorepleta* Patterson & Wheeler by C.R. Vilcá", dissected. Paralect-

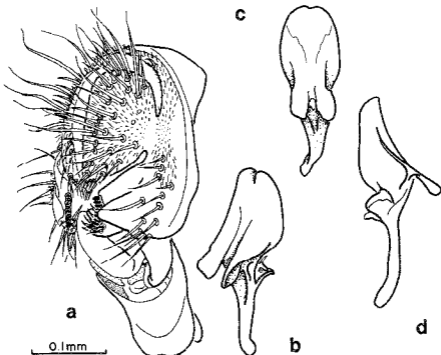


Fig. 72. *Drosophila neorepleta* Patterson & Wheeler (lectotype): a. male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

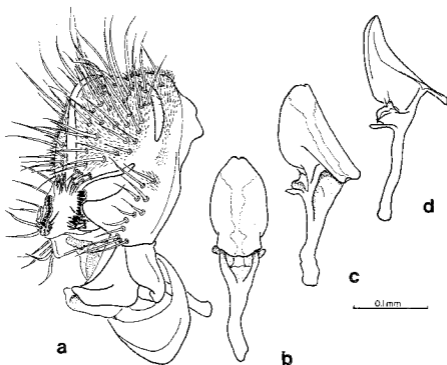


Fig. 75. *Drosophila canapalpa* Patterson & Mainland (lectotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

totype female (HERE DESIGNATED): "*D. neorepleta* ♀ / PARALECTOTYPE *Drosophila neorepleta* Patterson & Wheeler by C. R. Vilela". Both specimens in AMNH (New York). Type-locality: Sacapulas, El Quiche, Guatemala.

Lectotype male of synonym *D. canapalpa* (HERE DESIGNATED): "1402. 17 ♂ / La Placita, Hidalgo, Mexico, Aug. 12, 1943, G. B. Mainland col. / LECTOTYPE *Drosophila canapalpa* Patterson & Mainland by C. R. Vilela", dissected (Fig. 73), in NMNH (Washington, D.C.). Paralectotypes (2 ♂, 3 ♀; HERE DESIGNATED): same data as lectotype, in DTRC (Austin). Type-locality: La Placita (near Jacala), Hidalgo, Mexico.

General characters — Described by Patterson & Wheeler (1942).

Genitalia ♂ — Epandrium with about 12 lower and one upper bristles. Cerci fused at lower half. Sarcostylus with about 10 primary teeth and 8 marginal bristles (Fig. 72a).

Hypandrium $\frac{3}{4}$ length of epandrium.

Aedeagus slightly invaginated at tip, weakly sclerotized at posterior end, dorsal region well-developed with anteriorly pointed, wing-shaped expansions; dorsal cleft about $\frac{1}{4}$ of length. Aedeagal apodeme bent, rod-shaped. Ventral rod as long as gonopod. Gonopod with one sensillum (Fig. 72b-d). Phallosomal index about 1.1.

Other specimen examined — GUATEMALA: El Quiche: Sacapulas (1 ♂, NMNH). *Strains examined* (2) — MEXICO: Hidalgo: La Placita (1402.17). USA: Arizona: Coronado National Forest (2160.15).

Relationship — It is related to *D. limensis* Pavan & Patterson and *D. repleta* Wollaston from which it differs chiefly in the shape of aedeagus.

Distribution — USA, Mexico, Guatemala.

Note — *D. neorepleta* and *D. canapalpa* were synonymized on basis of morphological grounds.

***Drosophila (Drosophila) repleta* Wollaston**
(Figs. 74-76)

Drosophila repleta Wollaston, 1858: 117.

Drosophila punctulata Loew, 1862: 252 (probably synonymized by Becker & Bezzi, 1905).

Drosophila adspersa Mik, 1886: 528 (probably synonymized by Becker & Bezzi, 1905).

? *Drosophila nigropunctata* Wulp, 1892: 216 (according to Sturtevant, 1921: 99).

Drosophila maculiventris Wulp, 1897: 142 (synonymized by Duda, 1927: 168, a doubtful synonym according to Wheeler, 1981b: 49).

? *Drosophila marmorata* Hutton, 1901: 91 (according to Sturtevant, 1921: 99).

Drosophila punctata Loew (SIC), Johnson, 1913.

Drosophila repleta prorepleta Duda, 1925: 210 (described as variety; considered as subspecies by Wheeler, 1981b).

Drosophila (Drosophila) repleta, Sturtevant, 1939: 159.

Drosophila (Drosophila) melanopalpa Patterson & Wheeler, 1942: 77 (synonymized by Vilela in Wheeler, 1981b: 20) nec other American authors.

Drosophila (Drosophila) austrorepleta Dobzhansky & Pavan, 1943: 50 (synonymized by Wharton, 1944: 178).

Drosophila (Drosophila) betari Dobzhansky & Pavan, 1943: 48 (synonymized by Vilela in Wheeler, 1981b: 19).

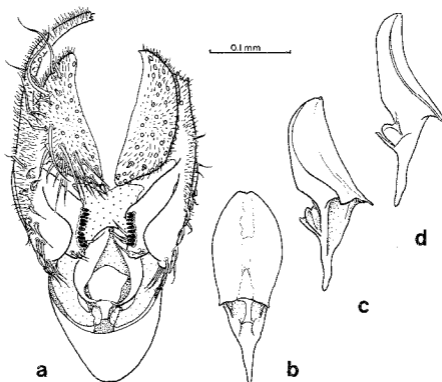


Fig. 74. *Drosophila repleta* Wollaston (lectotype): a, male genitalia, posterior aspect; b-d, aedeagus, several aspects.

Drosophila (Drosophila) brunneipalpa Dobzhansky & Pavan, 1943: 53 (synonymized, by Vilela in Wheeler, 1981b: 19).

Drosophila (Drosophila) repleta puniliaris Wheeler, 1981b: 20 (described as *D. repleta* var. *pygmaea* Duda, 1927: 125, nec *D. pygmaea* Duda, 1926: 94).

Type-Material — Lectotype male (designated by Coe, 1943: 205), labelled: "*Drosophila repleta* Wollaston TYPE / The specimen figured — Ann & Mag. Nat. Hist., vol. 1, Ser. 3, Pl. V, fig. 7, 1858 / Inhabits Madeira proper, occurring in the houses of Funchal. T.V. Wollaston, Ann & Mag. Nat. Hist., vol. 1, Ser. 3, p. 117, 1858 / Madeira Funchal T.V. Wollaston 55.7 / LECTOTYPE *Drosophila repleta* Wollaston by R. L. Coe"; dissected, cited as holotype (sex ?) by Rocha Pitê & Tsacas (1979) and as holotype by Bock (1976). Paralectotypes (3 ♀); same data as lectotype. All specimens in BMNH (London). In 1943, R. L. Coe designated as lectotype the specimen labelled by E. E. Austen as type. However, Coe has not labelled neither this specimen nor the remain flies of the probably original type-series. So, I had labelled all those above specified specimens as lectotype and paralectotypes on behalf of him. Type-locality: Funchal, Madeira Island (cited as Spain by Bock, 1976).

Holotype male of synonym *D. austrorepleta*: "Mogi das Cruzes, São Paulo, iv 943 / *Drosophila austrorepleta* TYPE / HOLOTIPO", head missing, dissected (Fig. 75a-c). Paratypes (3 ♀, head missing in two); same data as holotype. All specimens in MZUSP (São Paulo). Type-locality: Moji das Cruzes, São Paulo, Brazil.

Lectotype male of synonym *D. betari* (HERE DESIGNATED): "Iporanga, São Paulo, vii. 1943 / LECTOTYPE *Drosophila betari* Dobzhansky & Pavan by C. R. Vilela", dissected (Fig. 75d-f). Paralectotypes (3 ♂, 4 ♀, HERE DESIGNATED); same data as lectotype, one male dissected. All specimens in MZUSP (São Paulo). Type-locality: Iporanga, São Paulo, Brazil.

Holotype male of synonym *D. brunneipalpa*: "Apiá, São Paulo, vi-1943 / *Drosophila brunneipalpa* TYPE / HOLOTIPO", dissected. Paratypes (4 ♂, 3 ♀); same data as holotype, one male dissected (Fig. 75g-i). All specimens in MZUSP (São Paulo). Type-locality: Apiá, São Paulo, Brazil.

Lectotype male of synonym *D. melanopalpa* (HERE DESIGNATED): "*D. melanopalpa* ♂ Cave Creek Ariz., G. B. Mainland col. 1940, TYPE / LECTOTYPE *Drosophila melanopalpa* Patterson & Wheeler by C. R. Vilela", dissected (Fig. 76). Paralectotype female (HERE DESIGNATED): "*D. melanopalpa* ♀ / PARALECTOTYPE *Drosophila melanopalpa* Patterson & Wheeler by C. R. Vilela". Both specimens in AMNH (New York). Type-locality: Cave Creek, Chiricahua Mountains, Arizona, USA.

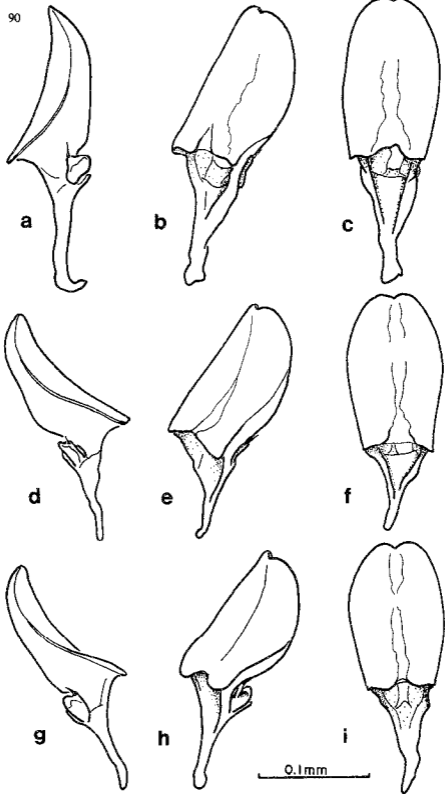
Types of synonyms *D. adspersa* (Type-locality: Vienna, Austria), *D. maculiventris* (Type-locality: Kekirawa, Sri Lanka), ?*D. marmorata* (Type-locality: Auckland, New Zealand), *D. nigropunctata* (Type-locality: "Java"), *D. punctulata* (Type-locality: "Cuba") and subspecies *D. r. prorepleta* (Type-locality: "Costa Rica"), *D. r. puniliaris* (Type-locality: "Mexico") were not analyzed. The whereabouts of type-series of *D. r. prorepleta* which should originally be in the National Museum in Budapest, is not known (Wheeler, 1963). According to Rocha Pitê & Tsacas (1979): holotype of *D. punctulata* was not designated, not located; holotype of *D. adspersa* not designated, syntypes in "Naturhistorisches Museum" (Vienna); holotype ♂ of *D. nigropunctata*, not located, probably lost; holotype ♂ of *D. maculiventris* (Type-locality cited as Kekizawa), not located.

General characters — Described by Wollaston (1858); redescribed by Patterson (1943).

Genitalia ♂ — Epandrium with about 13 lower and 3 upper bristles. Cerci fused at lower half. Surstylus with about 10 primary teeth and 7 marginal bristles (Fig. 74a).

Hyandrium 2/3 length of epandrium.

Aedeagus slightly invaginated at tip, dorsal region with anteriorly pointed expansions; dorsal cleft about 1/6 of length. Aedeagal apodeme rod-shaped. Ventral rod as long as gonopod. Gonopod with one sensillum (Fig. 74b-d). Phallosomal index about 1.3.



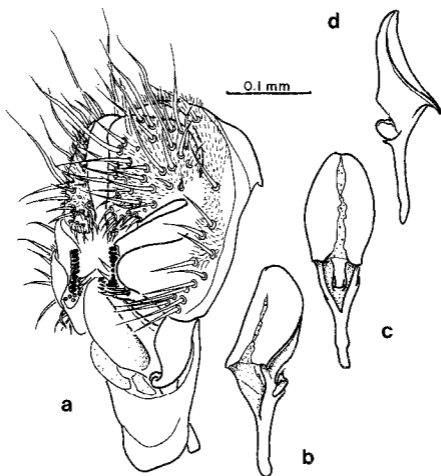


Fig. 76. *Drosophila melanopalpa* Patterson & Wheeler (lectotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Other specimens examined (75) — ARGENTINA: Chaco: 7 Km NE of Resistencia (3 ♂, MZUSP); Misiones: Iguazu (1 ♂, NMNH). BERMUDAS: St. George (7 ♂, NMNH). BRAZIL (MZUSP): Bahia: 3 Km NW of Milagres (1 ♂); Goiás: 6 Km E of Luziania (1 ♂); Mato Grosso: Ilha Taiaimã, Rio Paraguay (2 ♂, 2 ♀); Mato Grosso do Sul: Campo Grande (1 ♂); Rio de Janeiro: Arraial do Cabo (4 ♂); Santa Catarina: 3 Km of Campo Alegre (4 ♂, 1 ♀); São Paulo: Rio Guaratuba (1 ♀), Serra da Bocaina (7 ♂). INDIA: Digboi Assam (4 ♂, NMNH). MADEIRA I.: Funchal (1 ♂, NMNH). MEXICO: Tamaulipas: Tampico (1 ♂, NMNH). NICARAGUA: Matagalpa: Santa Maria de Ostuma (2 ♂, NMNH). PANAMÁ: Chiriquí (1 ♂, NMNH). RYUKYU: Okinawa (4 ♂, NMNH). USA (NMNH, unless noted): Maine: Portland (1 ♂); Maryland: Plum-

Fig. 75. a-c, *Drosophila austrorepleta* Dobzhansky & Pavan (holotype), aedeagus, several aspects; d-f, *Drosophila betari* Dobzhansky & Pavan (lectotype), aedeagus, several aspects; g-i, *Drosophila brunneipalpa* Dobzhansky & Pavan (holotype), aedeagus, several aspects.

mers Id. (1 ♂); Michigan: Ann Harbor (1 ♂); New York: Long I. (1 ♂), New York (1 ♂, AMNH); Texas: San Angelo (1 ♂), Corpus Christi (1 ♂), Mc. Allen (1 ♂); Washington, D. C. (1 ♂). WEST INDIES: Bahamas: New Providence: Nassau (4 ♂, AMNH); Cuba: Havana (1 ♂, NMNH), Vinales (7 ♂, AMNH); Dominica: Hodges R. Mouth (4 ♂, NMNH). ZIMBABWE: Salisbury (2 ♂, AMNH).

Strains examined (4) — BRAZIL: Mato Grosso do Sul: Corumbá (1529Y-A). COLOMBIA: Amazonas: Leticia (H435.43). MEXICO: Yucatán: Merida (H63.7). WEST INDIES: Barbados (H118.1).

Relationship — It is closely related to *D. limensis* Pavan & Patterson and *D. neorepleta* Patterson & Wheeler, from which it differs chiefly in the shape of aedeagus.

Distribution — Cosmopolitan.

Note — *D. melanopalpa*, *D. betari*, *D. brunneipalpa* and *D. repleta* were synonymized on basis of morphological grounds (compare figures 74 and 75).

✓ *Drosophila (Drosophila) zottii*, sp. nov.
(Fig. 77)

Drosophila (Drosophila) sp. "j", Araujo & Valente, 1981.
Undescribed J, Pereira *et al.*, in press.

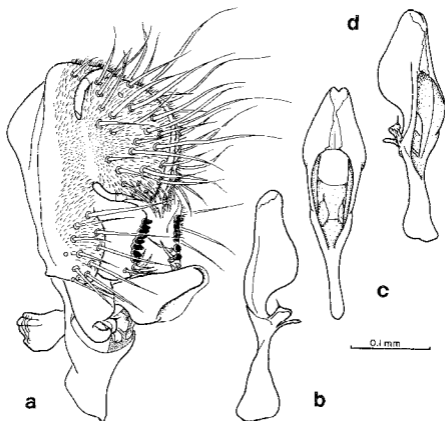


Fig. 77. *Drosophila zottii*, sp. nov. (Holotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Type-Material — Holotype male, labelled: "BRASIL — SP, 11 Km NE S. Izabel, 23°17'S, 46°12'W. C. R. Vilela col., 22.iv.1978 / HOLOTIPO *Drosophila zottii* ♂", dissected. Seventeen paratypes (4 ♂, 13 ♀, one male and one female dissected): same data as holotype. Additional paratypes: same locality as holotype and reared from passion fruit (*Passiflora alata*), collected on 12.vii.1981 by A. R. Ribeiro: flies reared on 20.vii.1981 (3 ♂, 9 ♀), 22.vii.1981 (4 ♂, 1 ♀), 24.vii.1981 (3 ♂, 1 ♀), 25.vii.1981 (4 ♂, 5 ♀); all specimens in MZUSP (São Paulo). Type-locality: Chacara Santa Mônica, 11 Km NE of Santa Izabel (23°17'S, 46°12'W), São Paulo, Brazil.

External characters of imagines ♂, ♀ — Arista with 3-5 dorsal and 2 ventral branches plus terminal fork. Antennae brown, pollinose. Front brown, pollinose; orbits, ocellar triangle and anterior region lighter. Posterior orbital, anterior vertical and ocellar arising from dark brown spots. Middle orbital about 1/2 other two. Second oral about 1/2 of first. Face pale yellow. Carina prominent, sulcate. Palpi yellow, pollinose, with bristles on ventral surface. Cheeks yellow, their greatest width about 1/3 greatest diameter of eyes. Eyes red, with short black piles.

Acrostichal hairs in 8 irregular rows. Two to four tiny prescutellars. Anterior scutellars convergent. Mesonotum yellow, pollinose, bristles arising from brown spots. Scutellum yellowish brown, bristles arising from brown spots. Pleurae yellow, pollinose. Sterno index about 0.8. Halteres yellowish brown. Coxae yellow; femora yellow, distally darker. Tibiae yellow, proximally darker; tarsi yellow. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen yellow, 3rd to 5th tergite with a medianly enlarged and interrupted brown band which bends toward and reaches anterior margin at angle of tergite, leaving a pale yellow area laterally; 2nd tergite with a fainter and 6th with a larger band.

Wings clear. Costal index about 2.9; 4th vein index about 1.6; 5x index about 1.5; 4c index about 0.8; M index about 0.5. Third costal section with heavy bristles on its basal half.

Body length (etherized) about 3.4 mm (♂), 3.6 mm (♀).

Wing length about 2.7 mm (♂, ♀).

Internal characters of imagines and genitalia (♂) — Testis yellow with about 2 inner and 5 outer coils. Epandrium with about 15 lower and 2 upper bristles. Cerci fused at lower half. Surstylus with about 9 primary teeth and 8 marginal bristles (Fig. 77a).

Hypandrium shorter than epandrium; concha bare.

Aedeagus slightly invaginated at tip, weakly sclerotized at middle dorsal surface, ventrally expanded; dorsal cleft about 1/2 of length. Aedeagal apodeme anteriorly expanded, laterally flattened. Ventral rod longer than gonopod. Gonopod with one sensillum (Fig. 77b-d). Phallosomal index about 1.2.

(♀) — Ventral receptacle an irregular spiral with about 29 coils. Ovipositor apically pointed, with about 16 marginal and 5 discal teeth. Spermathecae cocoon-shaped, weakly sclerotized; duct not invaginated.

Eggs — Four filaments about as long.

Puparia — Yellowish brown; horn index about 3.9; each anterior spiracle with about 17 branches.

Chromosomes — Not studied.

Other specimens examined (2, MZUSP) — BRAZIL: Rio Grande do Sul: Parque Florestal do Turvo (1 ♂); São Paulo: Guararema (1 ♂) reared from loquat fruit *Eriobotrya japonica* (Thumb.)

Relationship — It belongs to the *repleta* subgroup of the *repleta* group. It is related to *D. fulvimaculata* Patterson & Mainland and *D. fulvimaculoides* Wasserman & Wilson from which it differs chiefly in the shape of aedeagus and the gonopods.

Distribution — Brazil (Rio Grande do Sul, São Paulo).

Etymology — Named after Aloysio R. Ribeiro (Zotti), who collected most of the paratypes.

SPECIES NOT ASSIGNED TO SUBGROUP

Species not assigned to subgroup (8) — *Drosophila brevicarinata* Patterson &

Wheeler; *D. californica* Sturtevant; *D.icteroscuta* Wheeler; *D. inca* Dobzhansky & Pavan; *D. mariettae*, sp. nov.; *D. mayaguana*, sp. nov.; *D. ramsdeni* Sturtevant; *D. vicentinae*, sp. nov.

***Drosophila (Drosophila) brevicarinata* Patterson & Wheeler:**

Drosophila (Drosophila) brevicarinata Patterson & Wheeler, 1942: 88.

Type-Material — Not located, probably lost. Type-locality: San Josecito, Nuevo Leon, Mexico (I was not able to find this locality on maps).

General characters — Described by Patterson & Wheeler (1942).

Relationship — It is related to *D. ritae* Patterson & Wheeler (1942: 89). I was not able to locate any specimen labelled as *D. brevicarinata* so that the phylogenetic relationships could not be checked. Through the analysis of the original description it seems to be related to *D. mathisi*, sp. nov., from which it differs with respect to the metaphase plate (Wharton, 1944: 314).

Distribution — Mexico.

***Drosophila (Drosophila) californica* Sturtevant**

(Fig. 78)

Drosophila californica Sturtevant, 1923: 9.

Drosophila (Drosophila) californica, Sturtevant, 1959: 140.

Drosophila (Drosophila) fuliginosa Patterson & Wheeler, 1942: 80 (synonymized by Wheeler, 1965: 763).

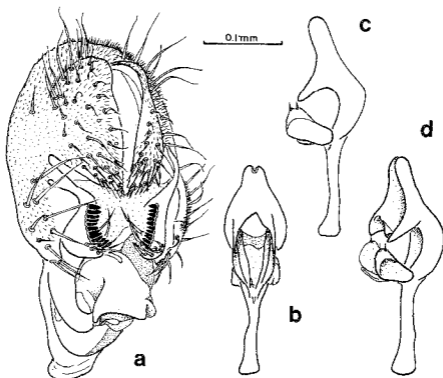


Fig. 78. *Drosophila californica* Sturtevant: a (NE of Gold Beach), male genitalia, lateroblique aspect; b-d (Mather), aedeagus, several aspects.

Type-Material — Holotype male, labelled: "*Drosophila californica* Sturtevant / ac. 2415 / TYPE / Pacific Grove, Cal., vi.2.20", in AMNH (New York). Paratypes (1 ♂, 1 ♀, male dissected): "*Drosophila californica* Sturtevant / A.H. Sturtevant collection 1970 / californica PARATYPE / Pacific Grove, Cal., v.2.20". (2 ♀); same data as other paratypes except date: vii.20.20 and vi.2.28, in NMNH (Washington, D.C.). Type-locality: Pacific Grove, California, USA:

Types of synonym *D. fuliginea* not located, probably lost. Type-locality: Silver City, New Mexico, USA.

General characters — Described by Sturtevant (1923).

Genitalia ♂ — Epandrium with about 15 lower and one upper bristles. Cerci fused at lower 2/3. Surstylus with about 12 primary teeth and 9 marginal bristles (Fig. 78a).

Hyandrium slightly shorter than epandrium; concha bearing one anterior bristle.

Aedeagus invaginated at tip, with a pair of ventral spurs linked to each other by wavy bridge; dorsal cleft about 1/2 of length. Aedeagal apodeme rod-shaped. Ventral rod 3/4 length of gonopod. Gonopod with two sensilla (Fig. 78b-d). Phallosomal index about 1.5.

Other specimens examined (3) — USA: California: Berkeley (1 ♂, NMNH), Ma-ther (1 ♂, DTRC); Oregon: NE of Gold Beach (1 ♂, DTRC).

Relationship — It belongs to the *repleta* group of the subgenus *Drosophila*.

Distribution — w. USA, n. Mexico.

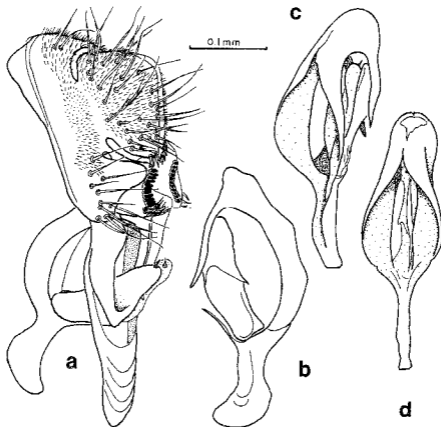


Fig. 79. *Drosophila icteroscuta* Wheeler (holotype): a, male genitalia, latéro-blique aspect; b-d, aedeagus, several aspects.

***Drosophila (Drosophila) icteroscuta* Wheeler**
(Fig. 79)

Drosophila (Drosophila) icteroscuta Wheeler, 1949: 184.

Type-Material — Holotype male, labelled: "1796.11 / HOLOTYPE / M. R. Wheeler, F. A. Cowan, Aug. 1947 / 19 mi E. Morelia, Mich., Mexico", dissected, in NMNH (Washington, D.C.). Type-locality: 19 mi E of Morelia, Michoacan, Mexico.

General characters — Described by Wheeler (1949).

Genitalia ♂ — Epandrium with about 12 lower and 2 upper bristles. Cerci fused at lower 2/3. Surstylus with about 12 primary teeth and 7 marginal bristles (Fig. 79a).

Hypandrium slightly longer epandrium; concha bare.

Aedeagus weakly sclerotized at dorsal tip, with a pair of long curved, pointed spurs; dorsal cleft about 3/4 of length. Aedeagal apodeme bent, laterally flattened. Ventral rod very thin, 3/4 length of gonopod. Gonopod well-developed with one sensillum (Fig. 79b-d). Phallosomal index about 1.8.

Relationship — The mesonotum pattern and the morphology of male genitalia seems to relate this species to the members of the *fasciola* subgroup. However, its affinities remain uncertain, mainly due to the presence of unique and well-developed gonopods.

Distribution — Presently known from the type-locality only.

***Drosophila (Drosophila) inca* Dobzhansky & Pavan**
(Fig. 80)

Drosophila (Drosophila) inca Dobzhansky & Pavan, 1945: 44.

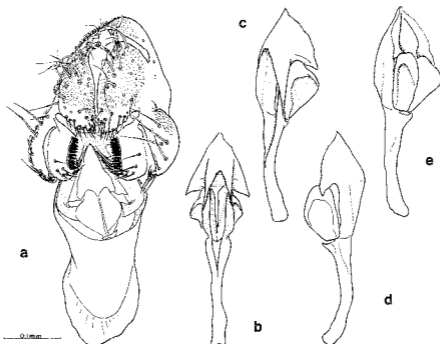


Fig. 80. *Drosophila inca* Dobzhansky & Pavan (paratypes): a, male genitalia, lateroblique aspect; b-e, aedeagus, several aspects.

Type-Material — Holotype male, labelled: "Huancayo Peru, iv.1943 / *Drosophila inca* TYPE / HOLOTIPO". Paratypes (3 ♂, 1 ♀; males dissected): same data as holotype. All specimens in MZUSP (São Paulo). Type-locality: Huancayo, Junin, Peru.

General characters — Described by Dohzhansky & Pavan (1943).

Genitalia ♂ — Epandrium with about 11 lower and 3 upper bristles. Cerci fused at lower half. Surstylus with about 12 primary teeth and 14 marginal bristles (Fig. 80a).

Hypandrium longer than epandrium; concha bare.

Aedeagus with a pair of pointed spurs; ventral margin posteriorly serrated; dorsal cleft about half of length. Aedeagal apodeme bent, rod-shaped. Ventral rod rudimentary. Gonopod bare (Fig. 80b-e). Phallosomal index about 1.0.

Relationship — It belongs to the *repleta* group of the subgenus *Drosophila*.

Distribution — Presently known from the type-locality only.

3 *Drosophila (Drosophila) mariettae*, sp. nov.
(Fig. 81)

Type-Material — Holotype male, labelled: "Monte Vyuca, 10 Klm (SIC) NW Zamorano, 5000'. 49.16 ♂ / MAR 22, 1954, W. B. HEED / Rep. de Honduras / *D. mariettae* HOLOTYPIC", in NMNH (Washington, D.C.). Paratypes: (5 ♂, 1 ♀) in DTRC (Austin); (5 ♂, 3 ♀) in MZUSP (São Paulo), 5 males and one female dissected; (1 ♂, 2 ♀) in NMNH: same data as holotype. Type-locality: Monte Vyuca (10 Km NW of Zamorano), Tegucigalpa, Honduras.

External characters of imagines ♂, ♀ — Arista with about 3-5 dorsal and 2 ventral branches plus terminal fork. Antennae brown. Front dark brown, auto-

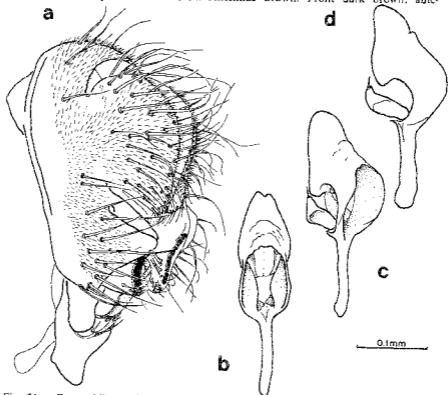


Fig. 81. *Drosophila mariettae*, sp. nov. (paratypes): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

riorly lighter. Middle orbital about 1/2 other two. Second oral about 1/2 of first. Face pale yellow. Carina sulcate, ventrally expanded. Palpi pollinose, pale yellow. Cheeks yellow, their greatest width 2/5 greatest diameter of eyes. Eyes red, with short black piles.

Acrostichal hairs in 8 irregular rows. No prescutellars. Anterior scutellars convergent. Mesonotum light brown, pollinose, with four longitudinal stripes. Scutellum brown, pollinose. Pleurae brown, pollinose, with an irregular darker longitudinal stripe from base of first coxae to halteres. Sterno index about 0.7. Halteres yellowish brown. Coxae, femora and tarsi yellow. Tibiae yellow with proximal brown ring. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen yellow, 2nd to 4th tergite with medianly enlarged slightly dark brown band; 5th tergite (♀) yellow with two submedian interrupted spots; 6th tergite bandless.

Wings clear. Costal index about 3.2; 4th vein index about 1.6; 5x index about 1.3; 4c index about 0.8; M index about 0.4. Third costal section with heavy bristles on its basal 1/3.

Wing length 2.9-3.6 mm.

Genitalia (♂) — Epandrium with about 15 lower and 4 upper bristles. Cerci fused at lower half. Surstylus with about 13 primary teeth and 14 marginal bristles (Fig. 81a).

Hypandrium as long as epandrium; concha bearing one anterior bristle.

Aedeagus slightly invaginated at tip, ventrally expanded, dorsally rough at middle region; dorsal cleft about 1/2 of length. Aedeagal apodeme rod-shaped. Ventral rod rudimentary. Gonopod with one sensillum (Fig. 81b-d). Phallosomal index about 1.4.

(♀) — Ovipositor apically pointed with about 24 marginal and 8 discal teeth. Spermathecae elongate, weakly sclerotized; duct deeply invaginated.

Eggs, puparia and chromosomes — Not studied.

Relationship — It resembles *D. fulvalineata* Paterson & Wheeler and it is tentatively assigned to the *repleta* group.

Distribution — The type-locality is the only site where this species has been collected.

Etymology — Named after Marietta Reveley, former curator of the National *Drosophila* Species Resource Center, Department of Zoology, University of Texas at Austin.

✓ ***Drosophila (Drosophila) mayaguana*, sp. nov.**

(Fig. 82)

Type-Material — Holotype male, labelled: "Van Voast — A. M. N. H., Bahama Isls. Exped., coll. E. B. Hayden / Mayaguana Island nr. Abraham Bay, March 3, 1953 / HOLOTYPE *Drosophila mayaguana* ♂", dissected, in AMNH (New York). Type-locality: Abraham Bay, Mayaguana, Bahamas.

External characters of imagines ♂ — Arista with 3 dorsal and 2 ventral branches plus terminal fork. Antennae brown, pollinose. Front brown, pollinose; orbits and anterior region lighter. Ocellar triangle dark brown. Posterior orbital and anterior vertical arising from dark brown spots. Middle orbital about 1/2 other two. Second oral about 1/2 of first. Face light yellow. Carina slightly prominent, ventrally expanded, slightly sulcate. Palpi pollinose, yellow, with bristles on ventral surface. Cheeks light brown, their greatest width about 1/2 greatest diameter of eyes. Eyes red, with short black piles.

Acrostichal hairs in 8 irregular rows. No prescutellars. Anterior scutellars convergent. Mesonotum yellowish brown, pollinose, bristles arising from brown spots. Scutellum brown, pollinose; anterior region with V-shaped yellow area. Pleurae brown, pollinose, with an irregular darker longitudinal stripe from base of first coxae to halteres. Halteres light brown. Coxae and femora yellow. Tibiae yellow with one proximal light brown ring; tarsi yellow. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen yellow, 2nd to 5th tergite with a medianly enlarged and interrupted brown band which bends toward and reaches anterior margin at angle of tergite, leaving a pale yellow area laterally.

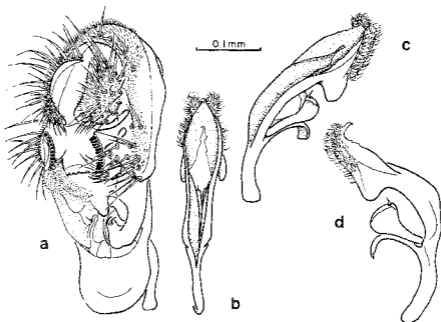


Fig. 82. *Drosophila mayaguana*, sp. nov. (holotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

Wings clear. Costal index about 2.6; 4th vein index about 2.2; 5x index about 1.4; 4c index about 1.2; M index about 0.7. Third costal section with heavy bristles on its basal 2/3.

Wing length 2.0 mm.

Genitalia — Epandrium with about 14 lower and 4 upper bristles. Cerci fused at lower half. Surstylus with about 13 primary teeth and 7 marginal bristles (Fig. 82a).

Hyandrium as long as epandrium; concha bearing one anterior bristle.

Aedeagus pointed at tip, ventrally expanded, membranous and densely micro-pubescent at posterior ventral region, slightly serrated at posterior dorsal margin; dorsally concave at posterior region; dorsal cleft slightly shorter than length. Aedeagal apodeme bent, laterally flattened. Ventral rod longer than gonopod, reaches hypandrium. Gonopod with one sensillum (Fig. 82b-d). Phallosomal index about 1.7.

Eggs, puparia, chromosomes and ♀ — Unknown.

Relationship — It belongs to the *repleta* group of the subgenus *Drosophila*.

Distribution — The type-locality is the only site where this species has been collected.

Etymology — The specific name refers to the toponym Mayaguana Island (Type-locality).

***Drosophila (Drosophila) ramsdeni* Sturtevant
(Fig. 83)**

Drosophila sp A, Metz, 1914.

Drosophila ramsdeni Sturtevant, 1916: 328.

Drosophila (Drosophila) ramsdeni, Sturtevant, 1942: 31.

Type-Material — Holotype female, labelled: "*Drosophila ramsdeni* Sturtevant / Am. Mus. Nat. Hist. Dept. Invert. Zool., N.° 24142 / TYPE / stock from Guantanamo, Cuba, ii.1914", in AMNH (New York). Paratypes (1 ♂): "*Drosophila*

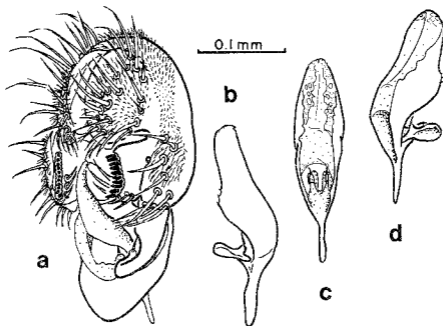


Fig. 83. *Drosophila ramsdeni* Sturtevant (paratype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

ramsdeni St / PARATYPE N.º 50009 USNM xii. 28-13 bred pineapple Sturtevant / Guantanamo Cuba", dissected; (1 ♀): same data as paratype ♂ but number. Both specimens in NMNH (Washington, D.C.). Type locality; Guantanamo. Cuba, West Indies.

General characters — Described by Sturtevant (1916).

Genitalia ♂ — Epandrium with about 8 lower and none upper bristles. Cerci fused. Surstylus with about 11 primary teeth and 8 marginal bristles (Fig. 83a).

Hypandrium shorter than epandrium; concha bare.

Aedeagus ventrally expanded, weakly sclerotized at dorsal region, ventral margin slightly serrated at posterior region; dorsal cleft about 1/5 of length. Aedeagal apodeme rod-shaped. Ventral rod about 1/3 length of gonopod. Gonopod with one sensillum (Fig. 83b-d). Phallosomal index about 2.1.

Relationship — Morphologically it resembles *D. meridiana* Patterson & Wheeler, although the relationship is not clear.

Distribution — Presently known from the type-locality only.

✓ ***Drosophila (Drosophila) vicentinae*, sp. nov.**
(Fig. 84)

Undescribed C2. Pereira *et al.*, in press.

Type-Material — Holotype male, labelled: "Gift of New York Zool. Soc. Dept. Tropical Research, William Beebe Dir. / Rancho Grande, Venezuela, 27.vi.1945 / HOLOTYPE *Drosophila vicentinae* ♂", dissected, in AMNH (New York). Paratypes (1 ♂, 2 ♀; male dissected): "*Julvimauculoides*? / Rep. de El Salvador / Jul. 1954, W.B. Heed / Volcan Boqueron, 4500 ft., 41.47", in DTRC (Austin). According to old field book of DTRC the specimens were reared on 24.vii.1954 from fruits of *Inga spuria* collected on 18.vii.1954 by W.B. Heed at a coffee finca nearby Crater Boqueron (Volcan San Salvador). Type-locality: Rancho Grande, Aragua, Venezuela.

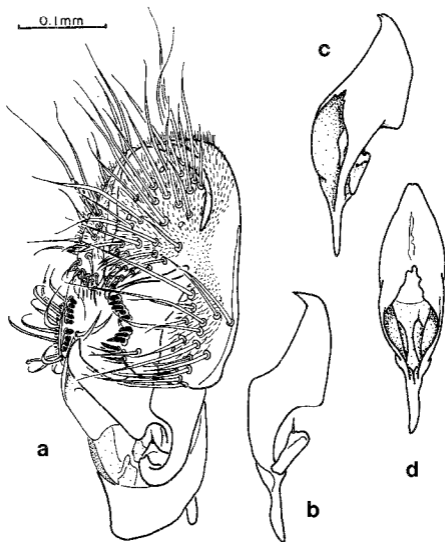


Fig. 84. *Drasophila vicentinae*, sp. nov. (holotype): a, male genitalia, lateroblique aspect; b-d, aedeagus, several aspects.

External characters of imagines ♂ — Arista with 4 dorsal and 2 ventral branches plus terminal fork. Antennae brown, pollinose. Front brown, pollinose; orbits and anterior region lighter. Ocellar triangle dark brown. Posterior orbital and anterior vertical arising from dark brown spots. Middle orbital about 2/3 of anterior and 1/2 of posterior. Second oral about half of first. Face yellow. Carina yellow, prominent, sulcate. Palpi pollinose, yellow, with bristles on ventral surface. Cheeks yellow, their greatest width about 1/4 greatest diameter of eyes. Eyes red, with short black piles.

Acrostichal hairs in 8 irregular rows. No prescutellars. Anterior scutellars convergent. Mesonotum yellowish brown, pollinose, bristles arising from brown spots. Some spots are fused to form: two irregular anterior stripes inside

dorsocentral rows; four roundish spots outside dorsocentral rows, two placed anteriorly and two posteriorly to transverse suture. Scutellum brown, pollinose; bristles arising from dark brown spots. Pleurae brown, pollinose, with an irregular darker longitudinal stripe from base of first coxae to halteres. Sterno index about 0.8. Halteres pale yellow. Coxae and femora yellow. Tibiae yellow with a proximal dark brown ring; tarsi yellow. Apical bristles on first and second tibiae, preapicalis on all three.

Abdomen yellow; 2nd to 5th tergite with a medianly enlarged and interrupted posterior dark brown band which bends toward and reaches anterior margin at angle of tergite, leaving a yellow area laterally.

Wings clear. Costal index about 3.1; 4th vein index about 1.6; 5x index about 1.4; 4c index about 0.8; M index about 0.5. Third costal section with heavy bristles on its basal half.

Wing length about 3.0 mm.

Genitalia (♂) — Epandrium with about 17 lower and none upper bristles. Cerci fused at lower 1/3. Surstylus with about 9 primary teeth and 5 marginal bristles (Fig. 84a).

Hypandrium shorter than epandrium; concha bare.

Aedeagus ventrally expanded, strongly pointed and slightly invaginated at tip; dorsal cleft about 1/2 of length. Aedeagal apodeme rod-shaped. Ventral rod rudimentary. Gonopod with one sensillum (Fig. 84b-d). Phallosomal index about 3.4.

(♀) — Ovipositor slightly pointed with about 17 marginal and 6 discal teeth. Eggs, puparia and chromosomes — Unknown.

Relationship — It belongs to the *repleta* group of the subgenus *Drosophila*.

Distribution — El Salvador, Venezuela.

Etymology — Named after Vicentina R. Pereira da Silveira, from the "Departamento de Biologia, Instituto de Biociências, Universidade de São Paulo".

Note — It is likely that the three paratypes cited above, originally belonged to the 15 specimens reared from *Inga spuria* and referred to as *D. fulvimaculata* by Heed (1957: 68).

SPECIES REMOVED FROM THE *REPLETA* GROUP

During the past 41 years, since its establishment by Sturtevant (1942), several mainly spotted thorax species has been misplaced in the *repleta* group; they are as follows:

D. obsoleta Malloch (1923) and *D. poecilithorax* Malloch (1925), both endemic to Australia, were considered members of the *repleta* group by Wheeler (1949) on basis of their original descriptions. Bock (1976) transferred the former to the subgenus *Scaptodrosophila* and regarded the latter as one species tentatively placed in the genus *Drosophila* rather than as a *repleta* group species.

D. annulimana Duda (1927), first regarded as an aberrant member of the *repleta* group by Dobzhánsky & Pavan (1943), was later removed and used to nominate a new species group (Breuer & Pavan, 1950).

D. peruensis Wheeler, 1959 (as *D. maculipennis* Duda, 1927 *nec* Gimmerthal, 1847) was tentatively assigned to the *repleta* group by Sturtevant (1942) and since then has been regarded as a true member of such a group (Patterson & Wheeler, 1949; Patterson & Stone, 1952). In 1979, I analyzed the holotype female of *Drosophila peruensis*, which had been loaned to the DTRC (Austin) by the Dresdener Museum (Dresden). Although faint, the holotype is in relatively good condition, and seems to be conspecific with those specimens we have collected in Argentina in 1978 and identified as *D. peruensis* (Vilela *et al.*, 1980). The pattern of the wings, the morphology of arista and the male genitalia, suggest close relationship to the members of the *guarani* group (figured by Val, 1982) to which I am proposing its transference. Details on the morphology and relationship of this species will be presented in a forthcoming paper.

The cactophilic *D. pachea* Patterson & Wheeler (1942), formerly a member of the *hydei* subgroup (Patterson, 1943), was later transferred to the subgenus *Sophophora* (Mettler, 1962), and it is currently considered to be a member of the *nannoptera* group (Ward & Heed, 1970), of the subgenus *Drosophila* (Throckmorton, 1975).

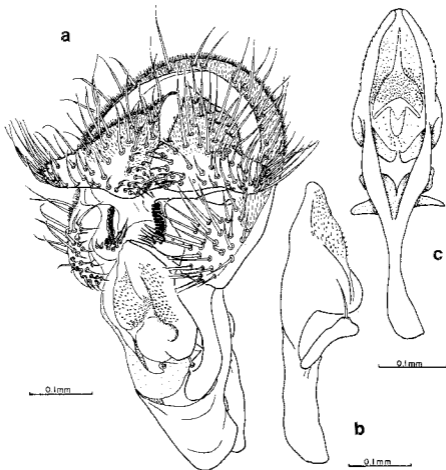


Fig. 85. *Drosophila serenensis* Brncic (Chile): a, male genitalia, lateroblique aspect; b, c, aedeagus, two aspects.

The oriental species *D. chinoi* Okada (1956) described as a probable *hydei* subgroup species is currently (Wheeler, 1981b), considered a synonym of *D. reptoides* Hsu (1943), an ungrouped species.

D. aureola Wheeler (1957), first tentatively assigned to the *repleta* group, was later removed from this group (Throckmorton, 1962), and it is now regarded as a monotypic group (Wasserman, 1982).

D. serenensis Brncic (1957), described as a *repleta* group species, is hereby removed from this group. The shape of epandrium, the unique cerci, the type of fusion gonopod-concha of hypandrium, the general configuration of aedeagus (Fig. 85) and the wandering behavior of adults, seem to be enough reasons to place this species together with those of uncertain affinity of the subgenus *Drosophila*.

DISCUSSION

I have enumerated or described, in the preceding pages, 76 *repleta* group species for which 98 binomials (see index) have been published; so far 22 synonyms have been recognized in this group. The highest number of synonyms (seven,

two additional ones being doubtful) were given to *D. repleta* Wollaston, a geographically widespread species often closely associated with human activities.

The subgenus *Drosophila* up to now comprises over 760 species, 276 of which occur in the Neotropical Region (Val *et al.*, 1981; Wheeler, 1981b); hence ca. 25% of described species of the subgenus in the Neotropics belong to the *repleta* group.

The *repleta* group, as currently understood, consists of five subgroups (*fasciola*, *hydei*, *mercatorum*, *mulleri* and *repleta*) and eight species unassigned to the subgroups. The last are in fact quite distinctive and not closely related to any other species to permit recognition of species subgroup consisting of several members.

The forest-dwelling *fasciola* subgroup is the dominant one in South America, whereas the desert-dwelling *mulleri* subgroup is the best represented in the Mexican Transitional Zone. The species of the *hydei* subgroup inhabit from Southern North America to Northwestern South America, whereas the *repleta* subgroup species are to be found in North as well as Central and South America. The smallest subgroup, namely *mercatorum*, inhabits chiefly West Indies, Central and South America.

According to Wasserman (1982) who made a discussion on inter-subgroup relationships within the *repleta* group, mainly based on chromosomal banding analysis, the *fasciola* subgroup is closely related to the *mulleri* and the *mercatorum* to the *repleta*; the *hydei* subgroup would represent an independent line. All analyzed species belonging to these subgroups share some identical inversions and could have arisen from a common ancestor.

There are at least five phyletic units in the group, represented by the subgroups. The populations ancestral at each of these subgroups presumably arose in or around the Mexican Transitional Zone, where most species occur (Paterson & Stone, 1952).

The subgroups are mostly sympatric throughout their geographical range. Within each subgroup, however, many of the species are generally allopatric. The analysis of geographical distribution of closely related species suggest speciation by the orthodox model of geographical isolation. Nevertheless, it should be pointed out that many of the so far known allopatric distribution of closely related species may just be a reflection of poorly or not surveyed areas. For instance, *D. moju* and *D. mojuoides*, closely related species previously thought to be allopatric in their ranges (Wasserman, 1982), are sympatric at Belém (Brazil).

Flies of the *repleta* group, mainly those of the *mulleri* subgroup, are frequently associated with plant species of the family Cactaceae although none of them is known to be truly monophagous.

It may, in the absence of more comprehensive ecological studies, be somewhat premature to perform a detailed discussion of relationships and origin of the subgroups and their members, but a few points can be made on the basis of the morphological and cytological evidence and known geographical distribution. They are presented below under each subgroup.

fasciola subgroup — *D. fulvalineata*, a morphologically and cytologically primitive member of the *fasciola* subgroup, unlike the majority of the mesophyllic species of this subgroup, is a desert dweller, suggesting that this form could have split off prior to the adaptation to wet conditions has been initiated (Wasserman, 1962d).

Throckmorton (1975) proposes an alternative hypothesis, consistent with the cytological, morphological, ecological and distributional evidence, that the *fasciola* subgroup species, as rain-forest dwellers, would represent the primitive type out of which the *repleta* radiation evolved, originating the desert-adapted species.

D. linearepleta, heretofore considered a *repleta* subgroup member, together with its sibling *D. hermioneae*, has the typical mesonotum pattern of the *fasciola* subgroup. The analysis of the male genitalia of both species showed a remarkable similarity with that of *D. fulvalineata*. These facts suggest that the former could be a link between *D. fulvalineata* and the remaining *fasciola* subgroup species. Chromosomal banding analysis are desirable to help clarifying these relationships.

Through geographical distribution analysis, it is possible to recognize at least three expansion nucleous in the *fasciola* subgroup. The first one on the Southwestern

USA, Mexican Transitional Zone and Northern Central America, where the three most primitive members are present (*D. fulvilineata*, *D. hermioneae* and *D. linearepleta*).

The second one in the rain forests of Central America, Northwestern South America and West Indies, where seven described species are to be found (*D. ellisoni*, *D. fuscicola*, *D. moju*, *D. mojuoides*, *D. paraguttata*, *D. pictilis* and *D. picturata*).

Finally there is a third nucleus represented by 8 species inhabiting the Atlantic Forest, its adjacent areas and inland rain forest of Southern Brazil, Bolivia, and Northwestern Argentina (*D. caroliniae*, *D. coroica*, *D. fuscicoloides*, *D. ivai*, *D. onca*, *D. querubinae*, *D. rosinae* and *D. senei*).

According to Ab'Saber (1977) the paleoclimatic studies of South America show, during the Quaternary, rapid and drastic recurrent cycles of cold-dry episodes followed by hot-wet weather. During the cold-dry events, the hylaea and the Atlantic Forest became isolated and reduced to small "islands" allowing the forest dwellers species to differentiate during isolation (Haffer, 1969; Vanzolini & Williams, 1970). As most of the *fuscicola* subgroup species seems to be stenocoic species, the cycles cited above could have played important role in the speciation events underwent by this subgroup in South America.

Ecological information concerning the breeding sites of the majority of *fuscicola* subgroup species is scanty or absent, but at least one species (*D. onca*) was reared out of an epiphytic cactus of the genus *Rhipsalis* (Sene *et al.*, 1977). Whether or not other species restrict to rain forests use this genus of cactus as feeding and or breeding sites remains an open question.

hydei subgroup — As far as it is known, the geographical distribution of four species of the *hydei* subgroup do not overlap. This allopatry observed between the members of closely related pair of species (*D. neohydei*-*D. eohydei* and *D. nigrohydei*-*D. novemariata*) suggests speciation by the model of geographic isolation.

According to Patterson & Wagner (1943) and Patterson & Mainland (1944), *D. hydei* is much more "wild" in Mexico where it has probably originated, than in USA where it should be introduced. If this is true, *D. hydei* would be formerly also allopatric with its closely related species *D. eohydei* and *D. neohydei*.

The relationships between *D. nigrohydei* and *D. novemariata*, first suggested by Wasserman (1962b), on the basis of the shape of spermathecae, are confirmed in the present study by the noticeable similarity of their male genitalia.

This subgroup seems to have originated somewhere in or around the Mexican Transitional Zone, where two out of three species considered morphologically and cytologically primitive (*D. bifurca* and *D. nigrohydei*) occur sympatrically (Wasserman, 1982).

Apart from the polyphagous condition of *D. hydei* and from the fact that *D. novemariata* has been collected on cactus, nothing else is known of the ecology of the *hydei* subgroup species.

mercatorum subgroup — The *mercatorum* subgroup consists of four species, which are sympatric two by two.

D. carcinophila and *D. peninsularis* occur sympatrically in the West Indies, and the latter also reaches Southeastern United States. The former is a high specialized form and its distribution depends on that of its host crab *Gecarcinus ruricola* (Carson, 1967).

D. mercatorum and *D. paranaensis* are widespread species and occur sympatrically in the continental tropical Americas; the former is also found in other biogeographical zones where it is clearly an introduced species. Allopatry occurs between the subspecies of *D. mercatorum* (Carson, 1965).

mulleri subgroup — The desert-dwelling *mulleri* subgroup currently consists of 34 described species and has been extensively studied mainly by Wasserman (1982) who proposed its subdivision into several complexes and clusters of related species.

Unlike the remaining subgroups, the *mulleri* consists of several phyletic units and their relationships are still not well-established. As I do not have enough new data on the members of this subgroup, any further discussion in the present

paper would be redundant to those previously presented by Wasserman (1954, 1960, 1962c, 1963, 1982).

However, it should be stressed that in this and other subgroups, the comparative analysis of male genitalia have, with few exceptions, confirmed the phylogenetic relationships previously identified by polytene chromosome inversion analysis, which in turn had confirmed those first evidenced by genetic and general morphology analysis.

repleta subgroup — Since the forties, the species of the *repleta* subgroup have been misidentified by different authors. This fact became evident as I analyzed old previously identified pinned specimens of several museum collections. Hence, it does not seem advisable to use old geographical distribution data from the literature to prepare distribution patterns and try to understand them.

The most likely picture that therefore emerges regarding the evolution of the *repleta* group is one of the origin and initial speciation in the Mexican Transitional Zone; the most successful species expanded their ranges and underwent further burst of speciation. Representatives of all subgroups, mainly the *fuscicola*, reached South America through both Central America and West Indies and speciated there.

As far as South America is concerned, the climate alternation during the Quaternary seems to have played an important role in the differentiation of species and populations.

A few species have become adapted to the special conditions about human activities and habitations and have apparently become very widespread in association with them.

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SPECIES INDEX

The following table lists species of the genus *Drosophila* included, or originally described, in the *repleta* group with figure-number and or page-number. Names removed in this or earlier papers by synonymy, homonymy, transfer to another group or subgenus, etc. are asterisked. The subgroups are indicated as follows: fa, *fasciola*; hy, *hydei*; me, *mercatorum*; mu, *mulleri*; re, *repleta*.

	figure	page	subgroup
* <i>adpersa</i> Mik	—	88	re
<i>aldrichi</i> Patterson	34	46	mu
<i>anceps</i> Patterson & Mainland	35	46	mu
* <i>annulimana</i> Duda	—	102	—
* <i>arizonensis</i> Patterson & Wheeler	51	62	mu
* <i>aureata</i> Wheeler	—	103	—
* <i>austrorpleta</i> Dobzhansky & Pavan	75a-c	88	re
* <i>betari</i> Dobzhansky & Pavan	75d-f	88	re
<i>hijurni</i> Patterson & Wheeler	20	29	hy
<i>borborena</i> Vilela & Sene	36	48	mu
<i>brevicarinata</i> Patterson & Wheeler	—	94	—
* <i>brunneipalpa</i> Dobzhansky & Pavan	75g-i	89	re
<i>buzzatii</i> Patterson & Wheeler	37	48	mu
<i>californica</i> Sturtevant	78	94	—
* <i>canapalpa</i> Patterson & Mainland	73	86	re
<i>carcinophila</i> Wheeler	28	37	me
* <i>carinata</i> Grimshaw	—	38	me
<i>carolinae</i> , sp. nov.	2	5	fa
* <i>chinoi</i> Okada	—	103	—
<i>coroica</i> Wasserman	3	6	fa
<i>desertorum</i> Wasserman	38	50	mu
<i>ellisoni</i> , sp. nov.	4	7	fa
<i>eohydei</i> Wasserman	21	30	hy
<i>eremophila</i> Wasserman	39	51	mu
<i>fasciola</i> Williston	5	9	fa
<i>fascioloides</i> Dobzhansky & Pavan	6	10	fa
* <i>fuliginea</i> Patterson & Wheeler	—	94	—
<i>fulvilineata</i> Patterson & Wheeler	7	12	fa
<i>fulvamacula</i> Patterson & Mainland	69	83	re
<i>fulvamacula flavorepleta</i> Patterson	—	83	re
<i>fulvamaculoides</i> Wasserman & Wilson	70	84	re
<i>hamatofila</i> Patterson & Wheeler	40	52	mu
<i>harmionaea</i> , sp. nov.	8	13	fa
<i>hexastigma</i> Patterson & Mainland	41	53	mu
* <i>hoeckeri</i> Brncic	—	66	mu
<i>hydei</i> Sturtevant	22	31	hy

	figure	page	subgroup
<i>hydei yucatanensis</i> Spencer	—	31	hy
* <i>hydeoides</i> Patterson & Wheeler	26	35	hy
<i>icteroscuta</i> Wheeler	79	96	—
<i>inca</i> Dobzhansky & Pavan	80	96	—
<i>ivat</i> , sp. nov.	9	14	fa
<i>leonis</i> Patterson & Wheeler	42	53	mu
<i>limensis</i> Pavan & Patterson	71	85	rc
<i>linearepleta</i> Patterson & Wheeler	10	16	fa
<i>longicornis</i> Patterson & Wheeler	43	53	mu
* <i>maculipennis</i> Duda	—	102	—
* <i>maculiventris</i> Wulp	—	88	re
<i>mainlandi</i> Patterson	44	56	mu
<i>mariettae</i> , sp. nov.	81	97	—
* <i>marmorata</i> Hutton	—	31, 88	?
<i>martensis</i> Wasserman & Wilson	45	56	mu
<i>mathisi</i> , sp. nov.	46	57	mu
<i>mayaguana</i> , sp. nov.	82	98	—
* <i>melanopalpa</i> Patterson & Wheeler	76	88	re
<i>mercatorum</i> Patterson & Wheeler	29	38	me
<i>mercatorum pararepleta</i> Dobzhansky & Pavan	—	38	me
<i>meridiana</i> Patterson & Wheeler	47	58	mu
<i>meridiana rioensis</i> Patterson	—	58	mu
<i>meridionalis</i> Wasserman	48	60	mu
<i>mettleri</i> Heed	49	61	mu
<i>mojavensis</i> Patterson	50	62	mu
<i>mojavensis baja</i> Mettler	—	62	mu
<i>moju</i> Pavan	11	18	fa
<i>mojuoides</i> Wasserman	12	18	fa
<i>mulleri</i> Sturtevant	52	65	mu
<i>neohydei</i> Wasserman	24	33	hy
<i>neorepleta</i> Patterson & Wheeler	72	86	re
<i>nigricurria</i> Patterson & Mainland	53	66	mu
<i>nigrohydei</i> Patterson & Wheeler	25	34	hy
* <i>nigropunctata</i> Wulp	—	88	?
<i>nigrospiracula</i> Patterson & Wheeler	54	66	mu
<i>novemariata</i> Dobzhansky & Pavan	27	36	hy
* <i>obsoleta</i> Malloch	—	102	—
<i>onca</i> Dobzhansky & Pavan	13	19	fa
* <i>pachea</i> Patterson & Wheeler	—	102	—
<i>pachuca</i> Wasserman	55	67	mu
<i>paraguttata</i> Thompson	14	21	fa
* <i>paramercatorum</i> Magalhães & Malogolowkin-Cohen	51	40	me
<i>paranaensis</i> Barros	30	40	me
<i>pegasa</i> Wasserman	56	68	mu
<i>peninsularis</i> Patterson & Wheeler	33	43	me
* <i>peruensis</i> Wheeler	—	102	—
<i>pictilis</i> Wasserman	15	22	fa
<i>pictura</i> Wasserman	16	23	fa
* <i>poecilithorax</i> Malloch	—	102	—
<i>promeridiana</i> Wasserman	57	69	mu
<i>propachuca</i> Wasserman	58	70	mu
* <i>pseudomercatorum</i> Magalhães & Malogolowkin-Cohen	32	40	me
* <i>pseudoneohydei</i> Hennig, Hennig & Stein	—	30	hy
* <i>punctulata</i> Loew	—	88	re
<i>querubimae</i> , sp. nov.	17	24	fa
<i>racemosa</i> Patterson & Mainland	59	71	mu
<i>ramsdeni</i> Sturtevant	83	99	—

	figure	page	subgroup
<i>repleta</i> Wollaston	74	88	re
<i>repleta prorepleta</i> Duda	--	88	re
<i>repleta pumiliaris</i> Wheeler	--	89	re
<i>richardsoni</i> , sp. nov.	60	71	mu
<i>ritae</i> Patterson & Wheeler	61	74	mu
<i>rosinae</i> , sp. nov.	18	25	fa
<i>senai</i> , sp. nov.	19	27	fa
* <i>serrenensis</i> Brncic	85	103	—
<i>serido</i> Vilela & Sene	62	75	mu
* <i>setosa</i> Dobzhansky & Pavan	23	31	hy
<i>spenceri</i> Patterson	63	76	mu
<i>stalker</i> Wheeler	64	77	mu
<i>starmeri</i> Wasserman, Koepfer & Ward	65	79	mu
<i>subviridis</i> Patterson & Mainland	66	79	mu
* <i>tigrina</i> Buzzati-Traverso	--	48	mu
* <i>tira</i> Wasserman	--	74	mu
<i>uniseta</i> Wasserman, Koepfer & Ward	67	80	mu
* <i>versicolor</i> Mather	--	48	mu
<i>vicentinae</i> , sp. nov.	84	100	—
<i>wheeleri</i> Patterson & Alexander	68	81	mu
<i>zottii</i> , sp. nov.	77	92	re

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Dejean, P.F.M.A. 1825. *Species général des coléoptères, de la collection de M. le Comte Dejean* 1: 1-463, Paris.

Hull, D.I. 1974. Darwinism and historiography, pp. 388-402, in T.F. Glick (ed.). *The comparative reception of darwinism*. IX + 505 pp., University of Texas Press, Austin and London.

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