

REVISION OF THE **TRIPUNCTATA** GROUP OF
DROSOPHILA WITH DESCRIPTION OF FIFTEEN NEW
SPECIES (**DROSOPHILIDAE, DIPTERA**)

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REVISION OF THE TRIPUNCTATA GROUP OF DROSOPHILA WITH DESCRIPTION OF FIFTEEN NEW SPECIES

(DROSOPHILIDAE, DIPTERA) ¹

(WITH 107 FIGURES)

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I N T R O D U C T I O N

In the Brazilian fauna of *Drosophila*, the *tripunctata* group of the subgenus *Drosophila* is of great importance. While PATTERSON & STONE (1952) listed but two species from the nearctic region we are concerned, in this paper with 28 neotropical species, among which 23 are Brazilian. This group is now the greatest in number of species among the Brazilian groups of *Drosophila* and, in addition, it is the dominant one in number of individuals in many natural populations, in Brazil, especially during winter (PAVAN, 1952).

In the present revision are included in the *tripunctata* group 25 species, in addition to the 6 already considered to belong to it. A new definition and a full description of the group are given, as well as a discussion of its relations to other groups. It is also presented a division, in subgroups, a key to the species, the description of 15 new species and additional notes on some of the already known species. Male and female genitalia were taken into account since they proved to be important for the species identification. For some species data are included about the intraspecific variation.

Material and methods

The types mentioned in the descriptions are in the Museu Nacional, Quinta da Boa Vista, Rio de Janeiro, D. F.,

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Brazil. Almost all the specimens studied were taken from natural populations and described while still fresh. Offspring from many species were obtained on the usual banana-agar medium, thus providing suitable material for the study of eggs and pupae. The description of common or easily bred species is based on ample material, while a description of other species is given only if they showed characters that left their apartness beyond doubt.

The material was collected from various places in the Distrito Federal and in the States of São Paulo, Rio Grande do Sul, Minas Gerais, Bahia, Pará, Amazonas and Territory of Acre. A culture of *D. tripunctata* from Florida was kindly sent by Dr. Marshall R. Wheeler, of the University of Texas.

In order to avoid repetitions in text, the characters common to all known members of the group are only cited in the group description. The characters typical for the genus and subgenus are not mentioned. To facilitate typography and to permit more accuracy, it was decided to give all the ratios in entire numbers or in decimals, and not in vulgar fractions. From the characters which are easily noted in the figures, there are mentioned in the text only those which are especially useful to the particular diferencial diagnosis. For the descriptions of the genitalia, the nomenclature by SALLES (1938), HSU (1949) and BREUER & PAVAN (1950) were combined, and a new, i. e., "the bow of the hypandrium", was introduced for a character not described for the genus until now.

Some indices are employed by different students of *Drosophila* species in different ways. The following re-definitions might be useful.

Cheek index — Definition: greatest diameter of eye divided by the width of the cheek at the lowest point of the eye; the part of the cheek to be measured is restricted to the distance between the eye border and the line connecting the bases of the oral bristles. The index so obtained is reciprocal to the relation given by DUDA (1938), who divided the cheek width by the diameter of eye, and was preferred in order to avoid fractions. STURTEVANT (1921, 1942) measured the "greatest width of cheek" at the rear part of it, but recognized that "it is often more convenient to use the width in a perpendicular axis." (STURTEVANT, 1942). The first method seems to be subject to errors, because of the rounded

shape of the cheek par, where a distinct rear point is often missing. The values obtained by the two different methods are, in general, strongly different.

Eye index — Definition: greatest longitudinal diameter of eye divided by its greatest transversal diameter. This index was applied by POMINI (1943) and gives an idea of the shape of the eye.

Horn index — Definition: length of the puparium excluding the anterior spiracles, divided by the length of the anterior spiracle consisting of stalk and branches. STURTEVANT (1921, 1942) used the reciprocal ratio. SPENCER (1942), PATTERSON & WHEELER (1942), PAVAN & CUNHA (1947) and others inverted the original ratio probably in order to avoid fractions, and called it "horn index", without defining it. FREIRE-MAIA & PAVAN (1950) defined it again following STURTEVANT. Here it is adopted the horn index definition first given by BURLA (1951). KIKKAWA & PENG (1938) introduced a different ratio called SB, by dividing the length only of the stalk of the horn by the length of the body of the puparium. DOBZHANSKY & PAVAN (1943) apparently employed this latter ratio, hence the discrepancy between their values and mine, for instance in *D. mediosignata* and *D. mediotriata*.

THE TRIPUNCTATA GROUP

STURTEVANT (1942) divided the subgenus *Drosophila* into 14 species groups to which 8 more groups were added by later workers (PATTERSON & STONE, 1952). The tripunctata group of STURTEVANT's was then formed by *D. tripunctata* and, doubtfully, by *D. histrio* MEIGEN 1830, which was later removed from this group (HSU, 1949, WHEELER, 1949). PATTERSON & MAINLAND (1944) placed *D. crocina* and *D. unipunctata* in it (the latter species formerly were thought to belong to the immigrans group). HSU (1949) suggested that the group might be divided into two subgroups, one including *D. crocina*, and the other including *D. tripunctata* and *D. unipunctata*. FREIRE-MAIA & PAVAN (1950) included three Brazilian species in the tripunctata group, i. e., *D. mediopunctata*, *D. mediosignata* and *D. mediotriata*. In the present work, 10 species, until now unclassified as regarding grouping, are considered to belong to this group. *D. bandeirantorum*, *D. cam-*

pestris and *D. prosimilis*, previously placed in the *cardini* group (WHEELER, 1929 and, for *D. campestris*, BURLA, 1950) are transferred to the *tripunctata* group. In addition, 14 new species are described, the group consisting at present of the following 31 species:

Subgroup I

- D. angustibucca* DUDA 1925
- D. platitarsus* sp. n.
- D. medioobscurata* DUDA 1926
- D. medioeris* sp. n.
- D. paraguayensis* DUDA 1927
- D. rostrata* DUDA 1926

Subgroup II

- D. medioimpressa* sp. n.
- D. medionotata* sp. n.
- D. mediotruncata* DOBZHANSKY & PAVAN 1943
- D. mediosignata* DOBZHANSKY & PAVAN 1943
- D. morena* sp. n.
- D. prosimilis* DUDA 1927
- D. unipunctata* PATTERSON & MAINLAND 1943

Subgroup III

- D. bandelatorum* DOBZHANSKY & PAVAN 1943
- D. bifurca* sp. n.
- D. bipunctata* PATTERSON & MAILAND 1943
- D. campestris* BURLA 1950
- D. crocina* PATTERSON & MAINLAND 1944
- D. curvapez* sp. n.
- D. divisa* DUDA 1927
- D. nigricincta* sp. n.
- D. mesostigma* sp. n.
- D. mediopicta* sp. n.
- D. mediotriata* DUDA 1926
- D. triangulina* DUDA 1927
- D. trifilum* sp. n.

Subgroup IV

- D. albescens* sp. n.
- D. albicans* sp. n.
- D. mediovittata* sp. n.
- D. pruinifacies* sp. n.
- D. tripunctata* LOEW 1862

The group was tentatively divided in subgroups by employing a method similar to that used by STURTEVANT (1942). Twenty pairs of antagonistic characters, excluding those presented by one single species, were selected and the relations between the species were analysed according to the number of similarities they present. This led to a preliminary division, which was modified by checking it against a direct comparison between the species, whereby the totality of a-

available characters could be considered. As a result, the above-listed subgroups were obtained. Subgroup II is the most typical of the group. Subgroup I seems transitional to the *guarani* group, and some species belonging to subgroup III seem transitional to the *cardini* group. Also subgroup IV shows some affinities to this group, since three of its species have white faces like some members of the *cardini* group. Subgroups I and II are more related to each other than to subgroups III and IV. The subgroups will be more fully discussed in the next chapter on the relations of the *tripunctata* group to other groups.

The former definitions of the *tripunctata* group (STURTEVANT, 1942, PATTERSON & MAINLAND, 1944, FREIRE-MAIA & PAVAN, 1950, PATTERSON & STONE, 1952), given when but a few species were known, must be revised. On the other hand it became difficult to distinguish the *tripunctata* from the *cardini* group, since several species turned out to be intermediate. We can only distinguish with accuracy the most typical species of both groups and include the remaining ones rather subjectively in either of them. This ought not to impress one as inconvenient, since it means rather an approximation toward the natural situation.

For instance, the presence of median spots on the tergites was once considered as the main character of the *tripunctata* group. Nevertheless, in *D. mediopunctata* there are specimens with three, two or one spot, as well as completely unspotted ones. In *D. bandeirantorum*, *D. medionotata* and *D. mediosignata* there also occur spotted and unspotted individuals. With this in mind, we place *D. prosimilis* in the *tripunctata* group, since it differs from *D. medionotata* only by the complete absence of spots in all the specimens.

The other three features formerly assigned to the *tripunctata* group were: arista with about 12 branches, costal index about 4.3 and general color yellowish. It appears now that the variation of these characters within the group has rather large limits. The same picture of a large range of interspecific variation holds true in other features, and there was found no single character that would be common to all the species of the *tripunctata* group and, at the same time, restricted to it exclusively. The only way of defining the *tripunctata* group, therefore, is to take into account a large num-

ber of different characters and to indicate their variation within the group, when compared with other groups. This method leads to an idea of the evolutive tendencies within the group and the already acquired distinctness from other such groups.

Characters typical of all the species of the group

1. Mesonotum without markings.
2. Carina never sulcate.
3. No prescutellars.
4. A row of peg-like bristles along hind tarsus.
5. A sinuous bow connecting the arms of the hypandrium and surrounding the penis.
6. Anal plates separated from the genital arch and without teeth.
7. Absence of the posterior process of the forceps.
9. Larvae do not skip (few species observed).

Characters common to all the species of the group, expressed in varying degree

9. Body color from yellow to light brown. *D. angustibuca*, *D. bifilum*, *D. bipunctata*, *D. curvaxep*, *D. plaitarsus*, *D. nigricincta* and *D. morena* are rather brownish in color; the remaining ones are yellowish.
10. Mesonotum dull to shining, seldom brilliant. In *D. albescens*, *D. albicans*, *D. campestris* and *D. mediovitata* it is rather brilliant; in the remaining species, dull or subshining.
11. Eye with black pile on the dorsal part and yellow pile on the ventral one; consequently, the eye appears darker above than below. The difference is small in *D. mediostrata*, *D. mediovitata* and *D. tripunctata*.
12. Number of branches of arista high, varying from 8 to 16; but only *D. curvaxep*, *D. divisa*, *D. mediovitata* and *D. triangulina* have less than 10.
13. Costal index high, ranging between 2.6 and 5.5; but only *D. albescens*, *D. albicans*, *D. crocina*, *D. medioocris*, *D. mediostrata*, *D. mediovitata*, *D. paraguayensis*, *D. pruinifacels* and *D. tripunctata* have as a rule, less than 4.0.
14. Sterno index about 0.6, varying between 0.45 and 0.75.

Characters typical of most of the species, while lacking in others

15. Cheek narrow. *D. bipunctata* has broad cheeks.
16. Eye index between 1.1 and 1.4. In *D. albescens* it is 1.6.
17. Anterior ocellars divergent. They are convergent in *D. mesostigma*, convergent or parallel in *D. campestris*, and slightly divergent in *D. crocina*.
18. Posterior crossvein clouded, except for *D. mesostigma*. They are very slightly clouded in *D. divisa*, *D. mediostrata* and *D. triangulina*.
19. No short stout bristles on front femur. They are present in *D. campestris*, *D. mediostrata* and *D. mesostigma*.
20. Acrostichals in 6 rows, excepto for *D. angustibuca*, *D. medioopunctata* and *D. plaitarsus*, wchich have 6 or 8 rows and for *D. bipunctata*, which has 8 rows.
21. Anterior crossvein not clouded, except for almost all the species of subgroup I and *D. bipunctata*, *D. campestris*, *D. crocina* and *D. trifilum*.

22. Forceps with a row of primary teeth and no secondary teeth. *D. angustibuca*, *D. campestris*, *D. mediopicta*, *D. mediovitata* and *D. nigricincta* have some secondary teeth or tooth-like bristles; *D. bandeirantorum* has several secondary teeth. (Evidence lacking for some species).
23. Spermatheca spherical, oval or nearly so. In *D. trifilum* it is long and slender. (Evidence lacking for some species).
24. Egg with four tapering filaments. *D. bandeirantorum* has a single one, the four being fused. *D. bifilum* and *D. bipunctata* have only two filaments. In *D. trifilum* the two distal filaments are free and the two proximal ones are fused, except at the tips. (Evidence lacking for some species).
25. Posterior Malpighian tubes fused apically, forming a continuous lumen. In *D. angustibuca*, *D. campestris*, *D. mediocris*, *D. mediopicta*, *D. mediostriata* and *D. platitarsus* they are merely apposed apically, without forming a continuous lumen. In *D. mesostigma* they are free. (Evidence lacking for some species).
26. 6th tergite with a dark median spot. This spot is lacking in certain specimens of *D. bandeirantorum*, *D. mediopunctata* and *D. mediosignata*, it is replaced by a posterior band expanded in the middle in *D. angustibuca*, *D. erocina* and *D. platitarsus*, and is totally absent in *D. albescens*, *D. curvipes*, *D. mediocris*, *D. paraguayensis* and *prosimilis*. Most individuals of *D. bandeirantorum* have a pair of paramedian spots on the 6th tergite.

Group definition

We may summarize the above list of characters in the following definition:

tripunctata group — Yellowish to brownish species, in general dull or slightly shining, without markings on the mesonotum, but with a tendency to have dark median spots on the distal tergites. Eyes red, darker dorsally than ventrally. Number of branches of arista and costal index comparatively high. Posterior crossvein in general clouded. Sterno index about 0.6. A row of peg-like bristles along the hind tarsus. Cheek narrow. Anterior scutellars in general divergent. Hypandrium with a distal bow that surrounds the penis. Anal plates not fused to the genital arch.

In addition to the above-mentioned characters, the species present the following features, that are, within the group, of minor value for a diagnosis, and are not repeated in each description:

Third joint of antennae with dense yellow pile; 2nd joint with 2 bristles and several hairs. Arista with 2-4 branches below the terminal fork. Inner ocellar orbits brown. Lunula, orbital plates and frontal triangle not very distinct from the surrounding. A row of hairs in front of middle orbital (orbital

hairs) and some frontal hairs. Proboscis and palpi tannish yellow. Apicals on first and second tibiae, preapicals on the three. Halteres tannish yellow. First tergite with diffuse paramedian darkenings on posterior margin. Markings of the tergites brown to black. Sternites and conjunctivae grayish white.

Description of the male genitalia

Genital arch with well developed anterior process; toe, in general, with a few bristles in addition to the other few ones on the lateral part of the genital arch. Anal plate separated from the genital arch, covered with long hairs, sometimes with a group of small hairs on the lower tip. Forceps fused basally to the genital arch, with the posterior margin reinforced basally ("lingueta", SALLES). The forceps has a row of primary teeth and sometimes a few secondary teeth; it has also marginal bristles and often other bristles placed on the upper surface. Bridge connecting the forcipes broad, with the posterior border round, seldom straight, surpassing the forceps backward, but not forward. The anterior part of the bridge bears a median strongly chitinized plate, where it is fused with apex of the bow of the hypandrium. Hypandrium formed by the arch and the shells ("arco", "conchas", BREUER & PAVAN, 1950). The arms of the arch of the hypandrium articulate with the heel of the genital arch and are connected by a strongly chitinized bow, that is sinuous and has a median horn-like projection. The shells of the hypandrium are two thin plates fused by their outer borders with the arms of the hypandrium; the posterior border of the shells is little distinct and continues by a conjunctiva. The shells are fused by their bases with the outer border of the gonapophyses ("pinças", SALLES). Each shell bears a long bristle. Apodema of the penis rod-like, surpassing the anterior border of the hypandrium; it widens to form a crest at the distal tip, that is fused with the base of the penis. Penis in general with the distal part expanded to form a funnel; the distal end bears very often some fringes or points, forming an intricate complex. A pair of gonapophysis fused by their bases with the region where the penis meets the apodema of the penis and, by their outer border, connected with the shells of the hypandrium. The gonapophysis bears some small bristles or hairs.

Biological notes

Most of the species of this group do not breed in the usual banana-agar medium. Sometimes ill-formed larvae or pupae appear, but seldom develop into adults. Certain species, as *D. bandeirantum*, *D. mediotriata*, *D. mediopunctata* and *D. tripunctata* are more easily bred. The adults are, in general, very little active, and show a cataleptic reaction to mechanical shocks.

Geographical distribution

The known species of the group are confined to the New World. *D. tripunctata* is recorded from the United States, *D. bipunctata*, *D. unipunctata* and *D. crocina* are from Mexico, while all the other species are from the neotropical region. *D. mediotriata* is recorded from Bolivia, Brazil, Costa Rica, Paraguay and Peru, *D. paraguayensis* from Brazil and Paraguay, *D. divisa* from Bolivia and Peru, *D. angustibucca* from Brazil, Costa Rica and Peru, *D. triangulina* from Peru, and *D. medioobscurata* and *D. rostrata* from Costa Rica; the remaining ones are from Brazil.

Individuals of species of the group form the bulk of *Drosophila* in collections from various localities, as for instance Campos do Jordão (State of São Paulo), and also Rio Grande do Sul, during winter (personal communication of Dr. A. Cordeiro). Professor Th. Dobzhansky (personal communication) found that the group is very common in the State of Amazonas. Regarding density of populations, the group comes perhaps second behind the *willistoni* group, while regarding number of species it is unsurpassed in Brazil.

RELATIONS TO OTHER GROUPS

The distal bow of the hypandrium, typical of the *tripunctata* group, occurs also in several other groups of the subgenus *Drosophila* (MALOGOLOWKIN, in preparation). The structural modification of the genitalia brought about by the presence of the bow of the hypandrium is of such a degree that it seems warranted to consider all these groups more related among them than with the groups that do not show the bow. The majority of the other groups with a bow are easily distinguishable from the *tripunctata* group, even by the shape

of the bow and by other characters of the genitalia (MALOGO-LOWKIN). However, the *cardini* and *guarani* groups, and also the *calloptera* group (BURLA, in preparation) have the genitalia very similar to that of the *tripunctata* group. The relations of this group to the *testacea*, *quinaria* and *guttifera* groups were pointed out by HSU (1949).

Relations to the *guarani* group

The *guarani* group, as defined by KING (1947a), differs from the *tripunctata* group as follows:

<i>tripunctata</i> group	<i>guarani</i> group
Thorax without pollinosity.	Thorax pollinose.
Mesonotum without markings.	Mesonotum with a pattern in some species.
Anal plates without spikes (evidence lacking for some species).	Anal plates with bent spikes in subgroup II
One or two prominent orals.	Always two prominent orals.
Larvae do not skip (only a few species tested).	Larvae skip (not all species tested).
Species yellowish (there are some exceptions).	Species brownish.
Anterior crossvein not clouded (there are some exceptions).	Anterior crossvein strongly clouded (lightly clouded in <i>D. guaraja</i> KING 1947b).

Besides, the two groups differ strongly in the color pattern of the tergites.

Subgroup I of the *tripunctata* group seems to represent a transition toward the *guarani* group, for its species are brownish and have, in general, the anterior crossveins clouded. They are, however, easily distinguishable from the *guarani* group by having only one prominent oral and lacking a typical pollinosity. The three species on which evidence is available (*D. angustibucca*, *D. medioocris* and *D. platitarsus*) have the posterior Malpighian tubes apposed apically without forming a continuous lumen and the anal plates without bent spikes, as in subgroup I of the *guarani* group, but have the abdomen ellipsoidal, as in subgroup II. Perhaps the subgroup I of the *tripunctata* group is close to the ancestral forms that split into the two subgroups of the *guarani* group.

As pointed out by DUDA (1927) *D. griseolineata* DUDA 1927, has an abdominal pattern similar to that of *D. medioobscurata*, with a longitudinal stripe on the 5th and 6th tergites.

Relations to the cardini group

Undoubtedly the *tripunctata* group is closer to the *cardini* group than to any other. There has not been found a single character presented by all the members of either group and absent in all the species of the other group. Thus the distinction between the groups must be based on characters owned by the most typical species of each of them, but missing in some others. These characters are the following:

<i>tripunctata</i> group	<i>cardini</i> group
1. Species dull or subshining.	Species brilliant.
2. Distal tergites with median spots hor posterior bands expanded in the middle.	Distal tergites with posterior bands interrupted in the middle and expanded laterally.
3. Anterior scutellars divergent.	Anterior scutellars convergent.
4. Posterior crossvein clouded.	Crossveins not clouded.
5. Costal index, as a rule, 4.0 or more.	Costal index, as a rule, less than 4.0.
6. Arista with 9-16 branches.	Arista with 8-10 branches.
7. Posterior Malpighian tubes fused apically, lumen continuous.	Posterior Malpighian tubes apposed apically, no continuous lumen.
8. Forceps with no or a few secondary teeth.	Forceps with many secondary teeth (cf. HSU, 1939).
9. Larvae do not skip (only a few species tested).	Larvae skip (some species not tested).

Some species have characters of both groups, therefore being transitional between them. There have been included in the *tripunctata* group the species that show a majority of the characters listed above for this group. *D. bandeirantorum* has the characters (2) and (8) of the *cardini* group and all the others from the *tripunctata* group; *D. prosimilis* has none of the *cardini* group and all but one character (2) of the *tripunctata* group. Therefore, both species are transferred from the *cardini* to the *tripunctata* group.

Each of the following species, here included in the *tripunctata* group, has some characters of the *cardini* group (the numbers in brackets refer to such characters):

D. angustibucca (7), *D. curv apex* (6), *D. divisa* (6), *D. medioobscurata* (1), *D. mediopicta* (7), *D. nigricincta* (6), *D. plattarsus* (7), *D. pruinafacies* (5), *D. rostrata* (1), *D. triangulata* (6), *D. tripunctata* (5), *D. albescens* (1, 5), *D. albicans* (1, 5), *D. crocina* (5-6), *D. mediocris* (5,7), *D. mediotriata* (5,7), *D. mediovittata* (1, 5, 6), *D. mesostigma* (3, 4, 7), *D. campestris* (1, 3, 5, 7).

Subgroup II is the most typical of the *tripunctata* group, since its species do not show any character of the *cardini* group. Subgroup IV has all of its species, except one, with low costal index and all except one are shining; this represents an incipient deviation toward the *cardini* group. The corresponding deviation toward the *tripunctata* group, in the *cardini* group, is indicated by *D. albirostris* STURTEVANT 1921, and *D. metzii* STURTEVANT 1921. Both species have white faces, like *D. albescens* and *D. albicans* in subgroup IV, and *D. albirostris* has an abdominal pattern more common in the *tripunctata* group. When more evidence is available, it will be pertinent to reconsider the position of *D. albirostris* and perhaps *D. metzii*.

It seems, however, that the most probable phylogenetic transition is to be looked for in subgroup III, where *D. mediotriata* has the tips of the posterior Malpighian tubes apposed, without continuous lumen, and a low costal index; in addition, it has a subshining mesonotum and a shining abdomen, and the cloud around the posterior crossvein is very faint. Its position as a transitional form becomes more likely because of its great resemblance with *D. campestris*, that is brilliant and has convergent or parallel anterior scutellars, and was included by BURLA (1950) in the *cardini* group. Both species have a row of short stout bristles on the front femur and are very similar to each other in the pattern of the abdomen. *D. campestris* has, however, strongly clouded anterior and posterior crossveins, a feature more typical of the *tripunctata* group than of the *cardini* group. It seems that both species and also *D. crocina*, are near the phylogenetic bridge between the two groups, and that *D. mesostigma* is not far away. *D. campestris*, has four characters of the *tripunctata* group and four others of the *cardini* group. It is, nevertheless, undoubtedly closer to *D. mediotriata* than to any species of the *cardini* group, and was therefore, transferred to the *tripunctata* group.

Other relationships

D. campestris, *D. mediotriata* and *D. mesostigma* have a row of short stout bristles on the front femur like *D. immigrans* STURTEVANT 1921. Nevertheless, the latter species, in spite of a superficial resemblance with some species of the *tripunctata* group, is not related to it, since *D. immigrans*

has the genitalia very differently constructed, lacking a distal bow in the hypandrium.

Through the kindness of Mr. F. Finsinger, we had the opportunity of examining some specimens of *D. histrio* MEIGEN 1830, from Switzerland. The construction of its genitalia, where the bow of the hypandrium is lacking, confirms the opinion of HSU (1949) and WHEELER (1949), who removed this species from the tripunctata group.

Another unclassified species, *D. mesophragmatica* DUDA 1927, was also examined and turned out to be clearly strange to the tripunctata group, since it lacks the bow of the hypandrium and the row of peg-like bristles on the hind tarsus.

KEY TO THE SPECIES OF THE TRIPUNCTATA GROUP

1. A row of short stout bristles on front femur (fig. 83, Pl. XXI) 2
- No row of short stout bristles on front femur 5
2. Crossveins not clouded. 6th tergite without posterior band, with a median spot of sharp boundaries, that does not reach posterior margin. 5th tergite without a distinct posterior band and without spot. Anterior scutellars convergent 1 *D. mesostigma*
- Posterior crossvein clouded. 6th tergite with a great median spot or a posterior band widened in the middle. 5th tergite with a posterior band often widened in the middle 3
3. Anterior crossvein not clouded; posterior crossvein slightly clouded (fig. 91 Pl. XXII). Anterior scutellars divergent. Thorax subshining. 6th tergite without posterior band, with a great median spot that reaches, as a rule, both anterior and posterior margins (fig. 77, 78, Pl. XXI) 2 *D. mediotriata*
- Anterior and posterior crossveins deeply clouded. (fig. 90, Pl. XXII). 6th tergite with posterior band widened in the middle or connected with a median dark area 4
4. Anterior scutellars parallel or convergent. Sterno index about 0.6 3. *D. campestris*
- Anterior scutellars slightly divergent. Sterno index about 0.47 4. *D. crocina*
5. Only one prominent oral bristle 6
- Two prominent oral bristles 24
6. Anterior crossvein clouded. Three or four black bristles on base of hind tarsus (fig. 84, 86, Pl. XXI). Ovipositor plate relatively narrow and pointed (fig. 27, 28, 38, Pl. XVII). Tips of posterior Malpighian tubes apposed without forming a continuous lumen 7
- Anterior crossvein not clouded or, if so, not entirely as above.... 12
7. 5th and 6th tergites with no markings or with posterior border only narrowly darkened 8
- 5th—6th tergites with posterior bands or median spots 9
8. The four anterior tergites with posterior bands that are not interrupted in the middle. Middle orbital closely behind the anterior one 5. *D. paraguayensis*

- 2nd—3rd tergites with posterior bands narrowed in the middle, 4th tergite broadly interrupted in the middle. Middle orbital almost at equal distance between anterior and posterior orbitals. Spermatheca cylindrical tending to conical (fig. 47, Pl. XVIII). Ventral receptacle with about 110 coils (Male unknown) 6. *D. medioeris*
9. 5th—6th tergites without posterior bands and with median longitudinal stripes. Abdomen yellow, cheeks and pleurae light yellow. Middle sternopleural minute or absent 10
- 5th—6th tergites with posterior bands or with a median darkening or spot, but without longitudinal stripes. Abdomen, cheeks and pleurae brownish yellow. Middle sternopleural almost as long as the anterior one. Spermatheca oval or elliptical (fig. 48, 59, Pl. XVIII). Ventral receptacle with less than 80 coils 11
10. Proboscis (following DUDA) with a strong whitish process that is turned upward between the labellae. (Female unknown) 7. *D. rostrata*
- Proboscis without such a process 8. *D. medioobscurata*
11. First joint of hind tarsus broad, its greatest width 1.3—2.0 of the width of second joint (fig. 84, Pl. XXI). Distance of posterior orbital from inner vertical 1.5—1.8 of the distance between anterior and posterior orbitals. 5x index 0.7—0.8. Sperm duct of the spermatheca with a median narrowing (fig. 59 Pl. XVIII). Ovipositor plate with about 26 teeth (fig. 28, Pl. XVII) 9. *D. platitarsus*
- First joint of hind tarsus of normal width, i. e., 1.3 of the width of second joint (fig. 85, Pl. XXI). Distance of posterior orbital from inner vertical 1.9—2.3 of the distance between anterior and posterior orbitals. 5x index 1.0—1.1. Sperm duct of the spermatheca with a spherical widening at the base (fig. 48, Pl. XVIII). Ovipositor plate with about 20 teeth (fig. 38, Est. XVII) 10. *D. angustibuca*
12. First joint of hind tarsus broad, its greatest width 1.8—2.0 of the width of second joint (fig. 84, Pl. XXI) 9. *D. platitarsus*
- Tarsi of normal width. Anterior crossvein clouded. 5th—6th tergites without markings. Costal index 3.0—3.5. 5x index about 0.7. 4th vein index about 1.5. 5. *D. paraguayensis*
- Not entirely as above 13
13. 2nd—5th tergites with wide black posterior bands interrupted in the middle, forming pairs of paramedian triangles. 6th tergite and anal tubercle entirely black in both sexes. Arista with 8—9 branches. Posterior crossvein almost invisibly clouded. 5x index 1.5 14
- Abdomen without such a pattern 15
14. Abdomen narrower than the thorax. Length of 4th and 5th tergites together greater than their width. Length of the body, in pinned specimens, about 2.5 mm. 11. *D. triangulina*
- Abdomen broader than the thorax. Length of 4th and 5th tergites together smaller than their width. Length of the wing about 4 mm. 12. *D. divisa*
15. 5th—6th tergites with a median longitudinal stripe, without posterior bands. Arista with 9—10 branches. Mesonotum shining 16
- 5th—6th tergites without longitudinal stripes. Arista with 10—13 branches 18
16. 4th tergite with a longitudinal stripe, without posterior band. Costal index 2.8—3.0. Middle sternopleural as long as anterior. Middle orbital 0.4 anterior. 13. *D. mediovittata*
- 4th tergite without a longitudinal stripe, with a posterior band. Costal index near 4.0. Middle sternopleural minute or absent. Middle orbital minute 17

17. Proboscis with a strong, whitish process that is turned upward between the labellae (Female unknown) 7. *D. rostrata*
 — Proboscis without such a process 8. *D. medioobscurata*
18. Face and carina white. Thorax and abdomen shining. Costal index 3.0—3.8. 4th vein index 1.5—1.7. 19
 — Face and carina yellowish 20
19. Head depressed. Cheek index 20. Eye index 1.6. 6th tergite without markings. Middle orbital 0.4—0.5 anterior. No bristles on toe; forceps with a straight row of primary teeth (fig. 9, Pl. XV).
 14. *D. albescens*
 — Head normal. Cheek index 14. Eye index 1.6. 6th tergite with a median spot or stripe. Middle orbital minute. More than 10 bristles on toe; forceps with a curved row of primary teeth (fig. 10, Pl. XV).
 15. *D. albicans*
20. 6th tergite with a median rectangular spot that is diffusely outlined and reaches both anterior and posterior borders. Ventral receptacle with about 10 coils. Spermatheca elliptical (fig. 48, Pl. XVIII). (Male unknown) 16. *D. morena*
 — 6th tergite with elliptical, circular or trapezoidal median spot that is sharply outlined, or without spot. Ventral receptacle with more than 15 coils. 21
21. Egg with only two filaments (fig. 88, Pl. XXI). Ovipositor plate narrow and long (fig. 31, Pl. XVII). Spermatheca with basal neck-like narrowing (fig. 50, Pl. XVIII). Ventral receptacle with about 100 coils. Costal index 4.6—4.8. 17. *D. bifilum*
 — Egg with four filaments. Ovipositor plate broader apically. Spermatheca without basal narrowing. Ventral receptacle with less than 50 coils. 22
22. 6th tergite without median spot in both sexes. 18. *D. prosmililis*
 — Males always with median spot on 6th tergite. Females with or without such a spot 23
23. Males with slender abdomen, marginal bristles of the 6th tergite long and erect and tendency to larger median spots on 5th—6th tergites (fig. 73—76, Pl. XX). Females with pear-shaped spermatheca (fig. 61, Pl. XVIII). Apex of the ovipositor plate broader (fig. 32, Pl. XVII, full lines). 19. *D. mediosignata*
 — Males with abdomen of normal width, the marginal bristles of 6th tergite as on the other tergites; median spots on 5th—6th tergites smaller. Females with oval or elliptical spermatheca (fig. 65, Pl. XVIII). Apex of the ovipositor plate narrower (fig. 32, Pl. XVII, the upper border in dotted line). 20. *D. medianotata*
24. Median spot on 6th tergite tending to be squared or rectangular. Arista with 9—11 branches 25
 — Median spot on 6th tergite, present or absent; if present circular or elliptical. 26
25. 5th tergite without posterior band, with a large median spot (fig. 79, Pl. XX). 31. *D. medioimpresata* Male.
 — 5th tergite without median spot, with posterior band interrupted in the middle. 25a
- 25a. Median spot on 6th tergite very large, shining rectangular, occupying almost the entire tergite with the exception of the lateral borders. Heavy bristles on 0.4—0.5 of third costal section. Base of hind tarsus with two black bristles (Female unknown). 21. *D. nigricincta*

- Median spot of the 6th tergite confined to median region, not shining, squared or nearly so (fig. 70, Pl. XIX). Heavy bristles on 0.2—0.3 of the third costal section. Base of hind tarsus with three brown or black bristles. 22. *D. mediopicta*
26. Face white, or yellowish with white pollinosity 27
 — Face brownish yellow without white pollinosity 29
27. Two black bristles on the base of hind tarsus. Apex of first costal section with two bristles. Costal index about 4.0. 5th tergite without median spot. Heavy bristles on 0.3 of third costal section. (Male unknown) 23. *D. pruinifacies*
- No black bristles on the base of hind tarsus. Apex of first costal section with one bristle. Costal index 4.4—5.1 Heavy bristles on 0.4—0.5 of third costal section. 28
28. Anterior crossvein slightly clouded (fig. 104, Pl. XXIII). Spermatheca long and narrow (fig. 52, Pl. XVIII). The distal two filaments of the egg are free, while the two proximal ones are fused and heavily chitinized, their tips being free again. (fig. 58, Pl. XVIII). 24. *D. trifilum*
- Anterior crossvein not clouded. Spermatheca pear-shaped (fig. 53, Pl. XVIII). Eggs with four free filaments 25. *D. mediopunctata*
29. Eggs with all the filaments fused forming a single strong one. 6th tergite with a pair of paramedian spots of varying size, which may lack in some females. Two black bristles on the base of hind tarsus. Heavy bristles on 0.2—0.3 of third costal section. Costal index 4.6—4.9. 26. *D. bandeirantorum*
- Egg with two or four filaments. 6th tergite with a median spot or without markings 30
30. Ovipositor plates with very broad, rounded apex (fig. 36, Pl. XVII). Ventral receptacle with about 250 coils. Sperm duct of the spermatheca wide (fig. 54, Pl. XVIII). 6th tergite without markings. Heavy bristles on 0.2—0.3 of third costal section. Arista with 9—10 branches. 27. *D. curvapex*
- Ovipositor plate with the apex narrow as usual. Ventral receptacle with less than 100 coils. 6th tergite, as a rule, with median spot .. 31
31. Egg with two filaments. Middle orbital about 0.2 anterior. Heavy bristles on about 0.25 of third costal section. Ventral receptacle with about 77 coils. Sterno index 0.75. Posterior bands on 2nd—4th tergites widened in the middle. Arista with 12 branches. Anterior crossvein clouded. Cheek broad. 28. *D. bipunctata*
- Egg with four filaments. Heavy bristles on 0.3—0.7 of third costal section. Ventral receptacle with less than 65 coils 32
32. 4th tergite with large median spot; 5th—6th tergites with smaller spots. Posterior spiracle of pupae yellowish brown. Acrostichal hairs in 6 rows Heavy bristles on 0.3—0.4 of third costal section. Arista with 10—12 branches. Two black, weak bristles on base of hind tarsus. Costal index 2.6—4.3. Length of wing 2.0—2.7mm. 29. *D. tripunctata*

- 4th tergite, as a rule, without median spot. Acrostichal hairs in 6—8 rows. Heavy bristles on 0.3—0.7 third costal section 33
33. Posterior spiracles of pupae yellowish brown. Arista with 9—11 branches. Acrostichal hairs, as a rule, in 6 rows. 5th—6th tergites with median spots. (Fig. 79, 80, Pl. XX), which are very large in males and small in females. 4th tergite without median spot. Costal index 4.7—5.3. 31. *D. mediopressa*
- Posterior spiracles of pupae black. Arista with 11—16 branches. Acrostichal hairs in 6—8 rows. 34
34. Middle orbital 0.2—0.3 anterior. 4th vein index 1.5. Acrostichal hairs in 8 rows 30. *D. unipunctata*
- Middle orbital 0.4—0.6 anterior 4th vein index 1.1—1.2. Acrostichal hairs in 6—8 rows. Thorax humped up if viewed from the side. Eye large. Hind tarsus without black basal bristles. Palpi with about four prominent bristles in females, and about six in males. Median spots on 4th—6th, 5th—6th, 6th tergite only, or none. 25. *D. mediopunctata*

DESCRIPTIONS OF THE SPECIES

1. *Drosophila mesostigma* sp. n.

Male and Female. Head — Antennae tannish yellow. Arista with 10-12 branches. Front tannish yellow, dull. Anterior orbital 0.7 posterior; middle orbital weak, 0.3 anterior. About 7 orbital and 12 frontal hairs. Face tan, carina narrow. One prominent oral, second 0.6 first or smaller. Cheek index 15. Palpi with 2 prominent hairs. Eyes red; eye index 1.3.

Thorax tannish yellow, subshining, pleurae becoming slightly lighter from above to below. Acrostichal hairs in 6 rows. Anterior scutellars convergent. Sterno index 0.5; middle sternopleural 0.5-0.8 anterior. Legs yellow. A row of 9-12 short stout bristles on lower part of front femur. Two bristles on base of fore tarsus and one bristle on apex of each of its four proximal joints. One bristle on base of mid-tarsus. Two black bristles on base of hind tarsus. Wings (fig. 89, Pl. XXII) clear, veins tannish yellow, without clouds. Apex of first costal section with one bristle. Heavy bristles on 0.6-0.9 of third costal section. Costal index 3.6-4.6; 4th vein index 1.7-2.0; 5x index 1.2-1.5.

Abdomen yellow, subshining. 2nd-4th tergites with posterior bands interrupted in the middle and ending on reaching the lateral regions. 5th tergite with the posterior band reduced to a narrow border widely interrupted in the middle. 6th tergite without band and with a distinct median spot, cir-

cular in males and elliptical in females, and not reaching the posterior border.

Genitalia (fig. 1, Pl. XIII) — Toe elliptical, with a row of 2-6 bristles from base to apex, the remaining of the genital arch with 3-5 bristles on each side, close to the base of the forceps. Forceps with a row of 8 primary teeth, 1-5 strong bristles on upper surface and about 10 marginal bristles. Hypandrium very short on the middle, elliptical. Gonapophysis great, with two large bristles placed together. Distal end of the penis very complex, bearing on the lateral borders a saw-like membrane and, near the apex, three little processes. Ovipositor plate (fig. 37, Pl. XVII) with about 20 teeth, apex acute with almost straight margins, forming a relatively great angle.

Internal characters — Tips of posterior Malpighian tubes free (one specimen dissected). Testes with about 6 outer and 3 inner coils. Sperm pump with a pair of tiny diverticula of about double length of the pump. Spermatheca (fig. 44, Pl. XVIII) yellow, chitinized, nearly cylindrical; sperm duct widening on distal half. Ventral receptacle with 40 coils.

Dimensions — Length body (pinned specimens) 2.5-3.0 mm; wing 2.4-2.5 mm.

Egg with (4) filaments.

Types — Holotype male, paratypes 5 males and 5 females from Belém (State of Pará) where the species must be frequent, since 40 specimens were collected by Pavan, II-1953. The species was collected also in Florianópolis (State of Piauí) and Territory of Acre.

Variation — The means of the wing indices of 10 specimens measured were: costal index 4.19; 4th vein index 1.82; 5x index 1.40; heavy bristles on 0.69 of third costal section.

Relationship — *D. mesostigma* is a somewhat aberrant species of the *tripunctata* group, because of the free posterior Malpighian tubes, the not clouded posterior crossvein and the convergent anterior scutellars. However, the pattern of the abdomen and other features are very characteristic of the group. *D. mesostigma* has, like *D. campestris* and *D. mediostrata*, short stout bristles on the front femur.

2. *Drosophila mediostrata* DUDA

Acanthophila mediostrata DUDA 1926:223 (original description), nec *Acanthophila* HEINEMANN 1877:320 (Lepidoptera), — DUDA 1927:122, 124, 140 (key, citations).

Drosophila mediostrata — DOBZHANSKY & PAVAN 1943:28, 66 (fig. 47-49, 119, 146) (redescription, key, fig. spermatheca, puparium, chromosomes).

- PAVAN & CUNHA 1947:42 (key).
- WHEELER 1949:187 (sp. included in the immigrans group).
- PATTERSON & WHEELER 1949:223 (citation).
- PAVAN 1950:31 (key).
- FREIRE-MAIA & PAVAN 1950:22, 59 (sp. included in the tripunctata group; key).
- PATTERSON & STONE 1952:27, 55, 60, 140 (chromosomes, distribution, citation).
- PAVAN 1952:15 (citation).

The former descriptions may be completed as follows:

Male, Female H e a d — Middle orbital 0.2 anterior. The darkening of the dorsal part of eye by black pile less pronounced than in most other species of the group. Cheek index 13. Eye index 1.3.

T h o r a x — Wings (fig. 91, Pl. XXII) with two prominent bristles at apex of first costal section, the lower one being sometimes thinner. Heavy bristles on 0.3-0.5 of third costal section.

A b d o m e n (fig. 77, 78, Pl. XX) tannish yellow, shining. Posterior bands of 2nd-4th tergites with irregular anterior border but almost equal width on the entire dorsal region, except in dorsal midline where they are narrowed or narrowly interrupted. The bands end abruptly in the lateral regions. On the 4th tergite the band is sometimes slightly widened laterally or in paramedian region. 5th tergite with the posterior band gradually narrowing toward the sides and reaching at times the lateral margin; in dorsal midline it may be slightly narrowed or widened, sometimes reaching the anterior border, the widening tending to be divided by an anterior irregular incision. 6th tergite without posterior band, but with a large and irregular median spot that is roughly trapezoidal or oval and reaches, as a rule, both anterior and posterior borders, but which can be smaller. The median dark areas of 5th and 6th tergites are often connected to form a wide longitudinal stripe covering both tergites. At times there may be seen a slight darkening on the anterior lateral parts of 2nd-5th tergites.

G e n i t a l i a (fig. 2, Pl. XIII and 23, Pl. XVI), Anterior process of the genital arch large; toe short, rounded, with 1-2 bristles, the lateral part of the genital arch bearing 2-5 more bristles. Anal plate with the regular bristles and a group of hairs on the lower tip. Forceps with 6 primary teeth, about 6

marginal bristles, as well as 3 bristles on the upper surface; forceps connected with the genital arch by means of a strongly chitinized reinforcement. Bridge broad, protruding backward in its median part. Hypandrium large. The common posterior margin of the two shells and gonapophyses forming a large quadrangular incision, along which there are two pairs of bristles of different size and a group of hairs. Penis weakly chitinized. Ovipositor plate (fig. 25, Pl. XVII) reddish yellow, acute, with 17-19 teeth.

I n t e r n a l c h a r a c t e r s — Spermatheca as in fig. 45, Pl. XVIII.

D i m e n s i o n s — Length body 2.5-3.6 mm; wing 2,1-3.0.

P u p a r i u m — Posterior spiracles black, with diffuse tan spots. Horn index 2.4-3.4.

L a r v a — Cephalopharyngeal apparatus as in fig. 82, Pl. XX.

D i s t r i b u t i o n — Costa Rica, Peru, Bolivia, and Brazil (States of São Paulo, Minas Gerais, Bahia, Rio de Janeiro, Amazonas, Territory of Acre and Distrito Federal).

R e l a t i o n s h i p — The material studied agrees with the description by DOBZHANSKY & PAVAN, except, in the number of bristles at the apex of first costal section and in the horn index, the latter discrepancy resulting from a different technique to measure it. The same material agrees satisfactorily also with the original description by DUDA. **Acanthophila** was considered by DUDA 1926 as a subgenus, but at the same time was used as if it were of generic rank; besides, it is a substitute of **Spinulophila** DUDA 1924 because of the latter being a hybrid name (DUDA 1926:200). However the substitution is illegitimate following the International Rules of Nomenclature; in addition, **Acanthophila** was preoccupied by a genus of **Lepidoptera**. MALLOCH (1934) transferred **Spinulophila** to generic rank while STURTEVANT (1927, 1939) and KIKKAWA & PENG (1938) maintained it as a subgenus of **Drosophila**. Later STURTEVANT (1942) did no longer accept **Spinulophila** as a subgenus, and since then it is considered as a synonym of **D. (Drosophila)**. **D. mediostriata** possesses, like **D. immigrans**, a row of short stout bristles on front femur, and WHEELER (1939) included it in the **immigrans** group. However, as DOBZHANSKY & PAVAN pointed out, **D. mediostriata** is closer to **D. mediosignata**, **D. prosimilis** and **D. bandeirantorum** than to **D. immigrans**, and FREIRE-MAIA & PAVAN transferred it to the **tripunctata** group.

V a r i a t i o n — A stock from Rio Negro (State of Amazonas) col. Dobzhansky & Pavan, IX-1952 was compared with another from Pirassununga (State of São Paulo), col. Pavan III-1952. The wing indices of males from Rio Negro and of both sexes from Pirassununga, 10 individuals of each class, were taken, with the exception that for the costal index 28 males from Rio Negro and 25 males from Pirassununga were measured. The numbers indicate range and mean (the latter in brackets):

STRAIN	Lo. wing in mm	Costal index	4 th v. index	5x index
Females Rio Negro	2.4-2.6 (2.53)	3.6-4.1 (3.85)	1.4-1.7 (1.56)	1.1-1.5 (1.27)
Males Rio Negro	2.1-2.5 (2.27)	3.2-4.1 (3.59)	1.4-1.7 (1.60)	1.1-1.6 (1.37)
Males Rio Negro	2.1-2.9 (2.58)	3.1-4.1 (3.75)	1.5-1.6 (1.55)	1.0-1.5 (1.26)

It appears that, while the means are different for both localities in males, the males from Pirassununga and females from Rio Negro gave almost identical results. The differences are probably not meaningful, since we obtained quite different means using flies from different cultures of the same stock.

In 50 aristes of both sexes and from both localities there was found only one with 9 branches, while the others showed 10 or 11 branches in about equal numbers. In 5 males and 5 females from Rio Negro, the sterno index ranged from 0.5 to 0.8, and the middle sternopleural ranged from 0.5 to 0.9 of the anterior one. In 10 pupae from Rio Negro, the horn index varied between 2.8 and 3.3, and in pupae from Pirassununga between 2.7 and 3.1. In 20 anterior spiracles of the puparium there were found 17 to 22 branches.

R e l a t i o n s h i p — Close *D. campestris*, *D. croceina* and *D. mesostigma*.

3. *Drosophila campestris* BURLA

- Drosophila campestris*** BURLA 1950:9 (original description).
 — PAVAN 1950:31 (key).
 — FREIRE-MAIA & PAVAN 1950:58 (key).
 — PATTERSON & STONE 1952:7, 39, 72 (citation, distribution).

The original description may be completed as follows (in collaboration with Burla):

Male and Female. T h o r a x — Wing (fig. 90, Pl. XXII) with the tips of 2nd-3rd longitudinal veins clouded. Costal index reaching 3.5.

G e n i t a l i a (fig. 7, Pl. XV). — Genital arch with large anterior process. Toe rounded, with about 4 bristles; about 2 more bristles on the lateral part of genital arch. Forceps with about 7-8 primary teeth, 5 long and acuminate secondary teeth and about 5 marginal bristles. Hypandrium short and broad. Gonapophysis with one bristle. Ovipositor plates (fig. 26, Pl. XVII) with about 20 teeth.

I n t e r n a l c h a r a c t e r s — Tips of posterior Malpighian tubes apposed, without forming continuous lumen. Testes with 8-10 outer coils. Sperm pump with two diverticula, which are 10 times as long as the pump.

Spermatheca (fig. 46, Pl. XVIII) pear-shaped; sperm duct widening on distal third.

Distribution — Burla recorded this species from States of São Paulo, Golaz and Bahia. I examined material from Minas Gerais (Boa Esperança, col. Freire-Mala, II-1953; Montes Claros, col. Brito da Cunha, IV-1953), and Bahia (Barreiras, col. Brito da Cunha, I-1953). This is a species typical of the "campos cerrados" and "caatingas" of Brazil.

Relationship — *D. campestris* has some characters typical of the *cardini* group, viz. the brilliant thorax, the convergent or parallel anterior scutellars, a low costal index and the tips of posterior Malpighian tubes apposed. It is, nevertheless, very close to *D. mediostriata* and chiefly to *D. crocina*, and it seems better to place it in the *tripunctata* group. Comparing *D. campestris* with the available information about *D. crocina*, there were discovered only the two differences mentioned in the key, which are rather small. It would be interesting to compare the two species thoroughly, because they might turn out to be the same species.

4. *Drosophila crocina* PATTERSON & MAINLAND

Drosophila crocina PATTERSON & MAINLAND 1944:20, 34, 35, 69, 70, 90, plate XV (key, original description, distribution, fig. adult).

- HSU 1949:103, 121, plate X-9 (genitalia, relationship, description of fore leg, fig. genitalia).
- WHEELER 1949:180 (citation).
- PATTERSON & WHEELER 1949:213, 220 (distribution, citation).
- PATTERSON & STONE 1952:27, 55, 60, 140 (citation, distribution, chromosomes).
- PAVAN 1952:15 (citation).

No specimen examined.

Distribution — Mexico (State of Vera Cruz), in the neotropical region.

Relationship — PATTERSON & MAINLAND (1944) described *D. crocina* as a member of the *tripunctata* group. Later HSU (1949) gave the additional information that *D. crocina* has short spinules on front femur, like *D. immigrans*, and that it differs meaningfully in the genitalia from *D. tripunctata* and *D. unipunctata*. Therefore he stated that the *tripunctata* group might be divided into two subgroups, one containing *D. tripunctata* and *D. unipunctata* and the other including *D. crocina*. Based on other characters I placed *D. crocina* and *D. tripunctata* in different subgroups, which confirms HSU's opinion. *D. crocina* is very close to *D. campestris* judging from both external and internal characters. The morphology of genital arch, anal plates and forceps of *D. crocina* (cf. HSU) agrees also with that of *D. campestris*. It is very possible that the two forms will turn out to be the same species.

5. *Drosophila paraguayensis* DUDA

Drosophila paraguayensis DUDA 1927:138, 185 (key, original description, fig. ovopositor).

No specimen examined.

Distribution — Brazil, Paraguay.

Relationship — As pointed out by DUDA, *D. paraguayensis* is very similar to *D. angustibuca*, and perhaps it is but a variety of the latter species. By comparing DUDA descriptions, there were found the following differences:

D. paraguayensis

5th and 6th tergites with no markings.

Front wider than long.

General color rather yellowish.

Middle orbital closely behind anterior.

Acrostichals in 6 rows.

Longitudinal distance between dorsocentrals an half the transversal distance.

Costal index 3.0-3.5.

3rd costal section twice the 4th costal section.

Ovopositor plate narrow and rounded apically.

D. angustibuca

5th-6th tergites with posterior bands that are not interrupted, or entirely black.

Front as wide as long.

General color brownish.

Middle orbital at equal distance from anterior and posterior orbitals.

Acrostichals in 6-8 rows.

Longitudinal distance between dorsocentrals slightly greater than the transversal distance.

Costal index almost 4.0.

3rd costal section equal to the 4th costal section.

Ovopositor plate narrow and pointed.

Perhaps some of these differences are due to intraspecific variation. On his key, DUDA distinguishes both species only by the color of the pleurae.

6. *Drosophila mediocris* sp. n.

Female. Head — Antennae yellowish tan, third joint darker. Arista with 12-13 branches. Front tannish yellow, subshining. Anterior orbital 0.6 posterior, middle orbital minute, 0.3 anterior. Face light tan, carina large and broad. One prominent oral, second 0.6 first. Cheek index 16. Eyes red; eye index 1.3.

Thorax yellowish tan, subshining, pleurae lighter. Acrostichal hairs in 6 rows. Anterior scutellars divergent. Sterno index 0.5; middle sternopleural 0.7 anterior. Legs yellow. One strong bristle on base of fore and mid-tarsus and 3 black bristles on base of hind tarsus. Wings (fig. 92, Pl. XXII) slightly pointed at the tip of third longitudinal vein, tannish yellow, veins tan. Anterior and posterior crossveins clouded. Apex of first costal section with one bristle. Heavy bristles on 0.4 of third costal section. Costal index 3.6; 4th vein index 1.3; 5th vein index 0.7.

Abdomen tannish yellow, shining. Posterior bands on 2nd-3rd tergites narrowed in the middle, ending abruptly in lateral regions. 4th tergite with the band widely interrupted in the middle. 5th-6th tergites without markings.

Genitalia (fig. 27, Pl. XVII) — Apex of ovopositor plate narrow, long, with 23 teeth.

Internal characters — Tips of posterior Malpighian tubes apposed, without formation of a continuous lumen. Spermatheca (fig. 47, Pl. XVIII) cylindrical tending to conical, base with a little constriction; sperm duct with a median bulb, cylindrical from bulb to apex. Ventral receptacle with about 110 coils, which are gradually smaller from the middle to end, the 20 last ones very compact and thin.

Dimensions — Length body (pinned specimens) 2.7 mm; wing 2.4 mm.

Types — Holotype female and one paratype female from Rio Negro (State of Amazonas) col. Dobzhansky & Pavan IX-1952.

Relationship — Very close to *D. paraguayensis*. The differences on the key and the opinion of DUDA that perhaps *D. paraguayensis* is but a variety of *D. angustibuca*, from which *D. medioeris* clearly differs, made me describe this species as new.

7. *Drosophila rostrata* DUDA

Drosophila rostrata DUDA 1926:219 (original description).

— DUDA 1927:137, 138, 139, 184 (key, citation).

No specimen examined.

Distribution — Costa Rica.

Relationship — DUDA declares that *D. rostrata* differs from *D. medioobscurata* only by the presence of an unusual process in the proboscis and that the single male of *D. rostrata* upon which he based his description is perhaps an abnormal male of *D. medioobscurata*.

8. *Drosophila medioobscurata* DUDA

Drosophila medioobscurata DUDA 1926:217 (original description).

— DUDA 1927:137, 138, 139, 184 (key, citation).

No specimen examined.

Distribution — Costa Rica.

Relationship — According to the description, this species belongs to the *tripunctata* group and is close to *D. mediovitata*.

9. *Drosophila platitarsus* sp. n.

Male and Female. Head — Antennae tannish, third joint darker. Arista with 13-17 branches. Front brownish yellow with golden reflexes and diffuse darker spots. Distance between posterior orbital and inner vertical 1.5-1.8 of the distance between posterior and anterior orbitals. Anterior orbital 0.6-0.9 posterior; middle orbital 0.3-0.5 anterior. About 8 orbital and 16 frontal hairs. Face brownish yellow; carina large and broad. One prominent oral, the second 0.6 first. Cheek index 13-18. Palpus with 4 prominent hairs. Eyes dark red; eye index 1.2-1.3.

T h o r a x yellowish brown, subshining; pleurae slightly pollinose. Acrostichal hairs in 6-8 irregular rows. Anterior scutellars divergent. Sterno index 0.65; middle sternopleural 0.8 anterior. Legs tannish yellow. First joint of hind tarsus wider and shorter than it is common in the group, this condition also present, but less pronounced, in fore tarsus. Greatest width of first joint of fore tarsus 1.4 greatest width of second joint. Greatest width of first joint of hind tarsus 1.8-2.0 greatest width of second joint; its length 4.9-5.0 its greatest width and 1.8-2.0 the length of second joint. One bristle on the base of fore and mid-tarsus and 4 black bristles on the base of hind tarsus, the first one being small. Wings (fig. 93, Pl. XXII) fuscous, slightly pointed at the tip of third longitudinal vein. Posterior crossvein clouded. Anterior crossvein sometimes slightly clouded. Apex of first costal section with two bristles, the ventral one weaker. Heavy bristles on 0.4-0.7 of third costal section. Costal index 3.5-4.5; 4th vein index 1.3-1.4; 5x index 0.7-0.8.

A b d o m e n tannish yellow, shining. Posterior bands narrowed or almost interrupted in the middle on 2nd tergite, narrowed in males and widely interrupted in females on 3rd-4th tergites, reduced to a narrow border with diffuse anterior margin on 5th-6th tergite; the border on the 6th tergite is expanded in the middle to form an approximately triangular spot, higher than wide and with rounded apex.

G e n i t a l i a (fig. 19, Pl. XVI) — Toe rounded, with one bristle. Forceps with 8-9 primary teeth, 8 marginal bristles and one more bristle on the upper surface. Ovipositor plate (fig. 28, Pl. XVII) reddish tan, long and slender, with rounded apex and with 27 teeth.

I n t e r n a l c h a r a c t e r s — Tips of posterior Malpighian tubes apposed, without forming a continuous lumen. Spermatheca (fig. 59, Pl. XVIII) well chitinized, pear-shaped, with a little basal constriction. Ventral receptacle with 35-40 coils, the 20 terminal ones very tight.

D i m e n s i o n s — Length body 4.3 mm; wing 3.5 mm.

E g g with 4 filaments.

T y p e s — Holotype male, 1 paratype male and 1 female from Rio (Distrito Federal), col. Burla XI-1952; 2 paratypes female from Vila Atlântica (State of São Paulo), col. Pavan IX-1952, and from Mogi das Cruzes (State of São Paulo), col. Pavan IV-1952.

Variation — One female paratype has, on the left side, an extra-numerary presutural bristle in dorsocentral line and a third humeral bristle, shorter than the two usual ones.

Relationship — *D. platitarsus* is close to *D. angustibuca*, from which, however, it differs clearly. The typical widening and shortening of the first joint of hind tarsus occurs in smaller degree in *D. bifidum*, but in this species, the black bristles on the base of hind tarsus are lacking.

10. *Drosophila angustibuca* DUDA

Drosophila angustibuca DUDA 1926:218 (Original description).

— DUDA 1927:137, 144, 148, 184 (Key, citation, fig. of wing).

Male and Female. **Head** — Antennae tan, third joint darker. Arista with 10-13 branches. Front tannish yellow with golden reflexes, space between ocelli darker. Distance between the posterior orbital and inner vertical 1.9-2.3 the distance between anterior and posterior orbitals. Anterior orbital 0.7 posterior; middle orbital 0.3 anterior, and at equal distance from anterior and posterior orbitals. About 3 orbital and 20 frontal hairs. Face tannish yellow; carina large and broad. One prominent oral, the second 0.5 first. Cheek index 12-18. Palpus with 3-4 prominent hairs. Eyes dark red; eye index 1.1-1.2.

Thorax dull tan, slightly pollinose, specially on pleurae. Acrostichals in 6-8 rows. Anterior scutellars divergent. Sterno index 0.50-0.65; middle sternopleural 0.8 anterior. Legs (fig. 85, Pl. XXI) tannish yellow. Greatest width of first joint of fore tarsus 1.2 greatest width of the second. Greatest width of first joint of posterior tarsus 1.3 greatest width of the second, its length 7.1 its greatest width and 2.4-2.5 the length of the second joint. One bristle at the base of anterior and middle tarsi, and three black bristles at the base of the posterior one. Wings (fig. 94, Pl. XXII) fuscous, slightly pointed at the tip of third longitudinal vein. Anterior and posterior crossvein clouded. Apex of first costal section with two bristles, the ventral one weaker. Heavy bristles on 0.3-0.4 of third costal section. Costal index 3.6-4.4; 4th vein index 1.3-1.7; 5x index 0.7-1.1.

Abdomen tannish yellow, shining. Regions with a darker shade and others with a golden pollinosity can be seen according to the direction of the light. 2nd-4th tergites with posterior bands entire, narrowed or narrowly interrupted in the middle; 5th-6th tergites, sometimes also the 4th, with posterior bands and a median, diffuse darkening connected

with them, its intensity and extension being variable, but more intense on the 6 th tergite than on the 5 th, and more intense on 5 th tergite than in 4 th. In general the darkenings are the median broadening of the posterior bands and reach the anterior border of the tergite on the 5 th-6 th tergites, becoming narrower forward on the 5 th tergite, but not on the 6 th. The posterior bands reach the lateral margins of the tergites and, in general continue through them as a narrow darkened border.

Genitalia (fig. 4, 5, Pl. XIV; 67, Pl. XIX) — Toe rounded, with one bristle. Anal plates with a bundle of little hairs at the lower tip. Forceps with 7 primary teeth, about 3 secondary teeth near the hind margin and about 6 marginal bristles. Penis and gonapophysis as in fig. 5, Pl. XIV. Ovipositor plate (fig. 38, Pl. XVII) slender and acute, with about 20 teeth.

Internal characters — Tips of posterior Malpighian tubes apposed without continuous lumen. Testes white with 6 outer and 2 inner coils. Spermatic pump with two long diverticles. Spermatheca (fig. 48, Pl. XVIII) elliptical, with two furrows at the base; sperm duct with a spherical dilatation at the base, becoming gradually wider apically. Ventral receptacle with about 60 coils.

Dimensions — Length body 3.0-3.5; wing 3.0-3.5.

Egg (fig. 57, Pl. XVIII) with four filaments.

Notes — Difficult to breed on the agar-banana medium. The adults are very quiet, hardly moving even when shaken.

Distribution — Type material from Costa Rica. DUDA 1927 recorded the species also from Peru. I examined material from Distrito Federal, Feliz (State of Rio Grande do Sul) and Campos do Jordão, Mogi das Cruzes, Vila Atlântica, Pirassununga and São Paulo (State of São Paulo).

Relationship — It seems that *D. angustibucca*, *D. platitarsus* and *D. mediocris* belong to a natural subgroup characterized by the tannish color, the clouded anterior crossvein, the presence of 3-4 black bristles on the base of posterior tarsus, the slender form of ovipositor plates and the apposed posterior Malpighian tubes. It is easy, however, to distinguish the three species.

11. *Drosophila triangulina* DUDA

Drosophila triangulina DUDA 1927:139, 186 (key, original description).

No specimen examined.

Distribution — Type material from Peru.

Relationship — Of the characters referred to in the description, only the low number of branches of the arista is not typical of the tripunctata group.

12. *Drosophila divisa* DUDA

Drosophila divisa DUDA 1927:139, 187 (key, original description).

No specimen examined.

Distribution — Type material from Bolivia and Peru.

Relationship — According to DUDA, this species is very close to *D. triangulina*, and perhaps is a variety of it.

13. *Drosophila mediovittata* sp. n.

Male and Female. Head — Antennae tannish yellow. Arista with 9-10 branches. Front tannish yellow, dull; space between the ocelli brown. Anterior orbital 0.7 posterior; middle orbital 0.4 anterior. About 5 orbital and 10 frontal hairs. Face grayish yellow with a light brown line connecting the bases of the orals; carina large. One prominent oral, second 0.6 first. Cheek index 27. Palpus with about 5 prominent hairs. Eye red; eye index 1.3.

Thorax yellow, shining, pleurae lighter. Acrostichals in 6 rows. Anterior scutellars divergent. Sterno index 0.5; middle sternopleural as long as anterior. Legs yellow. One bristle on base of anterior and middle tarsi; two black weak bristles on base of hind tarsus. Wing (fig. 95, Pl. XXII) fuscous, vein brown. Posterior crossvein clouded. Apex of first costal section with one bristle. Heavy bristles on 0.3 of third costal section. Costal index 2.8-3.0; 4th vein index 1.6-1.7; 5 x index 1.0-1.1.

Abdomen yellow, brilliant. Posterior bands on 2nd-3rd tergites entire or widened in the middle and restricted to dorsal region. 4th-6th tergites without posterior bands, with a median longitudinal stripe over the three tergites, narrowing anteriorly on 4th or on 4th-5th tergites. In ♀♀, 7th tergite with a brown border.

Genitalia (fig. 8, Pl. XV) — Toe with 1-2 bristles. Forceps with 7 primary teeth and about 14 marginal bristles, the outer ones resembling teeth. Penis with very large distal end and with a pair of lateral protuberances. Ovipositor plate (fig. 39, Pl. XVII) with about 22 teeth.

Internal characters — Tips of posterior Malpighian tubes fused, forming continuous lumen. Spermatheca (fig. 62, Pl. XVIII) rounded, sperm duct with uniform diameter. Ventral receptacle with uncoiled base, the remaining spiral with about 6 very irregular coil.

Dimensions — Length body 1.9 mm; wing 2.2 mm.

Types — Holotype male, 1 paratype male and 2 paratypes females from Gavea (Distrito Federal) col. Burla VI-1952.

Relationship — *D. mediovitata* resembles *D. tripunctata* in some characters, but differs from it by the shining mesonotum and abdomen, the shape of the spots on the tergites, the number of prominent orals and other features.

14. *Drosophila albescens* sp. n.

Male and Female. **Head** somewhat depressed, what is easily noticeable in lateral view. Antennae yellow. Arista with 9-11 branches. Front whitish yellow or tannish yellow; space between ocelli yellowish tan. Anterior orbital 0.7-0.9 posterior; middle orbital 0.4-0.5 anterior. About 6 orbital and 3-14 frontal hairs. Face white; a brownish band along the bases of orals, including the central part of cheek; lateral regions of mouth margin dark brown. Carina large, without sharp edges. One prominent oral, second 0.5-0.6 first. Cheek index 20. Palpus with 5 prominent hairs. Eyes light red; eye index 1.6.

Thorax yellowish tan, brilliant; body wall on the mesonotum almost transparent; pleurae whitish. Acrostichals in 6 rows. Anterior scutellars divergent. Sterno index 0.4-0.5; middle sternopleural 0.7-1.0 anterior. Legs tannish yellow, coxae, trochanters and femora tannish white. Wing (fig. 96, Pl. XXII) fuscous, veins tannish yellow. Posterior crossvein clouded. Apex of first costal section with one bristle. Heavy bristles on 0.4 of third costal section. Costal index 3.5-3.7; 4th vein index 1.7; 5x index 1.1-1.3.

Abdomen yellow, brilliant, without markings, sometimes with broad bandlike darkenings on 2nd-3rd tergites. Tergites slightly lighter on the sides than dorsally. Erect hairs on paramedian areas of 2nd tergite.

Genitalia (fig. 9, Pl. XV) — Genital arch with well developed anterior processes. Toe rounded, without bristles. Forceps with a straight row of 7-9 primary teeth, about 7 marginal bristles and 4-5 bristles on upper surface. Ovipositor plate (fig. 40, Pl. XVII) with 28 teeth; apex broad and triangular.

Internal characters — Tips of posterior Malpighian tubes fused, with continuous lumen. Testes yellow or whitish, with 6 outer and 2 inner coils. Sperm pump without

diverticula. Spermatheca (fig. 60, Pl. XVIII) spherical, brownish on the apex; sperm duct of uniform diameter. Ventral receptacle with about 12 very large and irregular coils, reaching the median region of the abdomen.

Dimensions — Length body 2.2-3.4 mm; wing 2.0-2.7 mm.

Egg with 4 filaments of 1.4 egg length.

Notes — The species was collected above fungi and decaying leaves and it has not been possible to breed it.

Types — Holotype male, 1 paratype male and 1 paratype female from Gávea (Distrito Federal) col. Burla VI-1952.

Relationship — *D. albescens* is an aberrant form into the *tripunctata* group because of its depressed head, its brilliant and almost transparent mesonotum and its lacking of posterior bands in the tergites.

15. *Drosophila albicans* sp. n.

Male and Female. **Head** — Antennae tannish yellow. Arista with 12 branches. Front tannish yellow. Anterior orbital 0.7 posterior; middle orbital absent or indistinguishable from the orbital hairs. About 7 orbital and 14 frontal hairs. Face white (in some pinned specimens the face became yellowish in frontview), contrasting with the front, the cheeks, the proboscis and the palpi, which are tannish yellow. Carina large, wide; region between first orals and carina prominent. One prominent oral, the second 0.3 first. Cheek index 14. Palpus with 3 prominent hairs. Eyes red; eye index 1.4.

Thorax tannish yellow, shining, pleurae lighter. Acrostichals in 6 rows. Anterior scutellars divergent. Sterno index 0.58; middle sternopleural as long as the anterior. Legs tannish yellow. One bristle at base of anterior tarsus. Two or three black or brown thin bristles at base of hind tarsus. Wings (fig. 97, Pl. XXII) fuscous. 4th-5th longitudinal veins very dark. Posterior crossvein clouded. Apex of first costal section with two bristles. Heavy bristles on 0.5-0.6 of third costal section. Costal index 3.0-3.8; 4th vein index 1.5-1.7; 5x index 0.9-1.2.

Abdomen tannish yellow, shining. 2nd-3rd tergites with posterior bands occupying the posterior half, narrowed or faded in the middle, ending abruptly on reaching the lateral regions. 4th tergite with the posterior band very narrow or faint and with some little irregular median markings, or with a triangular spot on the middle. 5th tergite as the 4th or as

the 6 th. 6 th tergite with the posterior band reduced to a yellowish tan border and with a median longitudinal irregular stripe, that can extend from posterior to anterior margin.

Genitalia (fig. 10, Pl. XV) — Toe large, with about 15 bristles. Forceps with a curved row of primary teeth. Gonapophysis without conspicuous bristle. Ovipositor plate (fig. 29, Pl. XVII) with 18 teeth.

Internal characters — Tips of posterior Malpighian tubes fused, with continuous lumen. Spermatheca (fig. 63, Pl. XVIII) spherical; sperm duct with a little apical widening. Ventral receptacle with 10-15 coils.

Dimensions — Length body 3.4 mm; wing 2.7 mm.

Puparium reddish tan. Posterior spiracles shining black, slightly divergent. Horn index 3.7. Horn with about 15 filaments.

Egg with 4 filaments, the distal ones 0.6 the length of egg, the proximal ones only slightly shorter than the egg.

Notes — A few individuals were obtained from a wild female reared in the agar-banana medium, but a second generation failed to develop.

Types — Holotype female from Pirassumunga (São Paulo), col. Breuer & Pavan II-1952. Paratypes: 1 male, 6 females bred in the laboratory from the holotype.

Relationship — *D. albicans* seems related to *D. mediovitata* and *D. albescens*.

16. *Drosophila morena* sp. n.

Female. Head — Antennae tannish yellow, third joint darker. Arista with 12 branches. Front tannish, space between ocelli brown. Anterior orbital 0.7 posterior; middle orbital 0.5 anterior. About 6 orbital and 10 frontal hairs. Face yellowish. Carina large, wide below. One prominent oral, the second 0.4 first. Cheek index 14. Eye red; eye index 1.3.

Thorax yellowish brown, subshining. Acrostichals in 6 rows. Anterior scutellars divergent. Sterno index 0.6; middle sternopleural 0.9 anterior. Legs tannish yellow. No black bristle on base of hind tarsus. Wing fuscous. Posterior crossvein clouded. Apex of first costal section with one bristle. Heavy bristles on 0.35 of third costal section. Costal index 4.4; 4 th vein index 1.3; 5 x index 1.0.

Abdomen tannish yellow, shining, 2 nd-3 rd tergites with posterior bands narrowed in the middle, occupying the posterior half of the tergites in paramedian regions and nar-

rowing laterally. 4 th-5 th tergites with posterior bands broadened on the middle until reaching anterior margin. 6 th tergite without band, with a median large spot, diffusely outlined, occupying the entire median region. 7 th tergite with faint posterior border. The posterior bands reach the lateral margins and continue through them as a narrow border.

Genitalia — Ovipositor plate (fig. 30, Pl. XVII) yellow, apex rounded, with 28 teeth.

Internal characters — Spermatheca (fig. 49, Pl. XVIII) tannish, elliptical; sperm duct with a median dilatation. Ventral receptacle with 9 coils.

Dimensions — Length body 3.9 mm; wing 3.6 mm.

Types — Holotype female from Feliz (Rio Grande do Sul) col. Cordeiro VIII-1951.

Relationship — *D. morena* is related with *D. mediosignata*.

17. *Drosophila bifilium* sp. n.

Male Female. Head — Antennae light reddish tan. Arista with 11 branches. Front light reddish tan. Anterior orbital 0.8 posterior; middle orbital 0.4 anterior. About 7 orbital and 18 frontal hairs. Face yellowish, carina large. One prominent oral, the second 0.4 first. Cheek index 9. Palpus with 3 prominent hairs. Eyes red; eye index 1.2.

Thorax tannish yellow, dull. Acrostichals in 6 rows. Anterior scutellars divergent. Sterno index 0.6-0.7; middle sternopleural 0.5-0.6 anterior. Legs tannish yellow. First joint of hind tarsus slightly wider and shorter than it is common in the group, this character being less pronounced than in *D. platitarsus*. Greatest width of first joint of hind tarsus 1.3-1.4 greatest width of second joint; its length 5.5 its greatest width and 1.6-1.8 the length of second joint. One bristle on base of anterior and middle tarsi; two black or yellowish brown bristles on base of hind tarsus. Wings (fig. 98, Pl. XX) fuscous, veins brown. Posterior crossvein clouded. Apex of first costal section with one bristle. Heavy bristles on 0.4 of third costal section. Costal index 4.6-4.8; 4 th vein index 1.5-1.6; 5 x index 1.1.

Abdomen tannish yellow, dull. Posterior bands of 2 nd-4 th tergites narrowed or interrupted in the middle, narrowing laterally and not reaching the lateral regions, represented there by a narrow border. 4 th tergite sometimes without band. 5 th tergite without markings, at most with a nar-

row border. 6th tergite without posterior band, with a roughly elliptical spot on the middle, larger in males.

Genitalia (fig. 11, Pl. XV) — Toe small, with 2 bristles. Forceps with a straight row of primary teeth, about 5 marginal bristles and 4 bristles on upper surface. Ovipositor plate (fig. 31, Pl. XVII) reddish tan, narrow with 25 teeth.

Internal characters — Tips of posterior Malpighian tubes fused, with continuous lumen. Testes tannish white, with about 7 outer and 4 inner coil. Spermatheca (fig. 50, Pl. XVIII) weakly chitinized, pear-shaped, the basal third cylindrical and narrower than the remaining part; sperm duct forming a narrow funnel. Ventral receptacle with about 100 regular coils.

Dimensions — Length body 4.3 mm; wing 3.6 mm.

Puparia reddish tan, posterior spiracles black, parallel. Horn index 6. Horns with 12 branches.

♂ **Egg** (fig. 56, Pl. XVIII; 83, Pl. XXI) with only two proximal filaments. Egg white; filaments, region between their bases on the apex of the egg tannish yellow, as if strongly chitinized. The filaments are slightly longer than the egg.

Types and distribution — Holotype male from Vila Atlântica (State of São Paulo) col. Pavan VIII-1951. Paratypes: 1 male, 1 female from Vila Atlântica col. Magalhães & Frota-Pessoa 2-1953. The species occurs also in Montes Claros (State of Minas Gerais) col. Brito da Cunha IV-1953.

Relationship — *D. bifilum* resembles *D. platitarsus* in the narrow ovipositor plates, the single prominent oral and the widening of first joint of the hind tarsus, but the shape of the spermatheca and the eggs with only two filaments are distinctive. *D. bipunctata*, from Mexico, has also eggs with two filaments, but differs in other characters from *D. bifilum*.

18. *Drosophila prosimilis* DUDA

Drosophila prosimilis DUDA 1927:194 (original description).

- DOBZHANSKY & PAVAN 1943:23, 63, fig. 22, 23, 103, 135 (redescription, key, fig. espermatheca, egg, chromosomes).
- PAVAN & CUNHA 1947:43 (key).
- WHEELER 1949:186 (species included in *cardini* group).
- PATTERSON & WHEELER 1949:226 (citation).
- FREIRE-MALTA & PAVAN 1950:60 (key).
- PAVAN 1950:33 (key).
- PATTERSON & STONE 1952:39, 73, 150, 152, (citation, distribution, chromosomes).

Distribution — State of São Paulo, Distrito Federal (according to Dobzhansky & Pavan).

Relationship — DOBZHANSKY & PAVAN 1943 described tentatively as *D. prosimilis* DUDA a species they succeeded to breed and which

had no markings on the 5 th-6 th tergites in both sexes. The new species *D. medionotata* corresponds exactly to the description of *D. prosimilis* made by DOBZHANSKY & PAVAN, except that the new species has a median spot in the 6 th tergite, which spot is lacking, however, in some females. In cultures from unspotted females taken in collections, I obtained only a few males: some of them were spotted, showing that they belonged to *D. medionotata*. Studying two unspotted males thus obtained I was unable to discern, even in the genitalia, any meaningful differences between the two species besides the presence or absence of the median spots. A comparison between the spotted females (of *D. medionotata*) and the unspotted ones, even when they were sisters of the unspotted males also failed to reveal any differences.

Therefore I cannot prove at present whether *D. prosimilis* and *D. medionotata* are actually distinct species, as I tentatively admit, or whether they constitute a single species having spotted and unspotted males and females. From a practical viewpoint, I found it better to consider *D. medionotata* as a new species, instead of until of amplifying the concept of *D. prosimilis* to include spotted individuals, until the situation becomes clearer.

19. *Drosophila mediosignata* DOBZHANSKY & PAVAN

Drosophila mediosignata DOBZHANSKY & PAVAN 1943:24, 69, fig. 50-52, 120 (original description, key, fig. spermatheca, chromosomes).

- PAVAN & CUNHA 1947:43 (key).
- PATTERSON & WHEELER 1949:223 (citation).
- FREIRE-MAIA & PAVAN 1950:22, 60 (inclusion in the *tripunctata* group, key).
- PAVAN 1950:33 (key).
- PATTERSON & STONE 1952:27, 55, 60, 140 (citation, distribution, chromosomes).
- PAVAN 1952:15 (citation).

The original description may be completed as follows:

Thorax — The bristle on the base of the hind tarsus mentioned by DOBZHANSKY & PAVAN is not black, as in *D. angustibucca*, but tannish yellow like the surrounding hairs.

Abdomen — The variation of the abdominal pattern is considerable, specially in males (fig. 73-76, Pl. XX), where the pattern may vary from the condition described by DOBZHANSKY & PAVAN (4 th-5 th tergites without markings, median spot on 6 th tergite) to individuals with large median spots on 4 th-6 th tergites, the spots occupying the entire width of the tergites, and posterior bands on 4 th-5 th tergites, confluent with the spots. The specimens with intermediate pattern may show, besides the median spot on 6th tergite, diffuse posterior bands on paramedian regions of the 4 th-5 th tergites, or a band interrupted in the middle on 4 th tergite. In females, besides the specimens without marking on 5 th-6 th

tergites, there are frequently others with median spot of varying size on 6 th tergite and sometimes bands interrupted in the middle or diffuse paramedian spots on 5 th tergite.

Genitalia (fig. 12, Pl. XV) — Toe with 5-6 bristles. Anal plate with 2-5 hairs on lower tip. Forceps with a sigmoid row of 8-10 primary teeth, and about 10 marginal bristles. Gonapophysis with two little bristles. Ovipositor plate (fig. 32, Pl. XVII), in full lines; in the same figure, the dotted line marks the upper border of an ovipositor plate of *D. medionotata* to show the difference in the width of the plate between the two species) with about 23 teeth.

Internal characters — Spermatheca (fig. 61, Pl. XVIII) pear-shaped, with a little furrow on the base; sperm duct slightly widened in the middle and keeping the wider diameter until its end.

Distribution — São Paulo Rio Grande do Sul and Distrito Federal.
Relationship — *D. mediosignata* resembles very much *D. medionotata*. By means of the pronounced sexual dimorphism in *D. mediosignata*, it is easy to distinguish its males from the males of *D. medionotata*: the males of *D. mediosignata* has a slender abdomen, resembling that of *Scaptomyza*, and the marginal bristles on 5 th tergite, and specially on 6 th tergite, are erect and distinctly longer than in the other species. In females the species distinction is more difficult, but can be made safely chiefly by means of the spermatheca and by a couple of small differences in other characters, as shown in the following list:

D. mediosignata

Males:

Abdomen slender.

Bristles on 6 th tergite long and erect.

6 th tergite longer.

Spots on tergites tending to be larger (fig. 73-76, Pl. XX).

Forceps with a sigmoid row of 8-10 primary teeth (usually 8).

Some small hairs on lower tip of anal plate.

Females:

Spermatheca (fig. 61, Pl. XVIII). pear-shaped, longer and narrower, width about 0.7 length, with a small furrow on the base; sperm duct with small dilatation in the middle, maintaining distal half wider than proximal one.

Apex of ovipositor plate broader (fig. 32, Pl. XVII, full lines).

D. medionotata

Abdomen of the common shape.

Bristles on 6 th tergites of normal length and position.

6 th tergite shorter.

Spots on tergites tending to be smaller.

Forceps with a hook-shaped row of 6-8 primary teeth (usually 7).

No small hairs on anal plate.

Spermatheca (fig. 65, Pl. XVIII) elliptical, shorter and wider, width about 0.85 length, without furrow on the base; sperm duct with a dilatation followed by a constriction, forming a spherical widening in the middle.

Apex of ovipositor plate narrower (fig. 32, Pl. XVII, dotted line).

Eyes slightly darker.
Palpi tending to be darker than the surrounding areas.

Abdomen tending to be darker (tannish yellow).

Tergites with diffuse darkenings along anterior border on the sides; diffuse golden reflexes.

Eye slightly lighter.
Palpi tending to be of the same shade than the surrounding areas.

Abdomen tending to be lighter (yellow).

Tergites without lateral darkenings along anterior margins; no golden reflexes.

20. *Drosophila medionotata* sp. n.

Male e Female. H e a d — Antennae tannish yellow. Arista with 11-12 branches. Front yellowish, dull, space between ocelli brown. Anterior orbital 0.8 posterior, middle orbital minute, 0.3 anterior. About 5 orbital and 14 frontal hairs. Face tannish yellow, carina of median size. One prominent oral, the second 0.5 first. Cheek index 16. Palpus with 4 prominent hairs. Eyes red; eye index 1.2.

T h o r a x yellowish tan, subshining, pleurae lighter. Acrostichals in 6 rows. Anterior scutellars divergent. Sterno index 0.6; middle sternopleural 0.7 anterior. Legs tannish yellow. No black bristles on base of hind tarsus. Wings (fig. 100, Pl. XXIII) fuscous, specially on its anterior half. Posterior crossvein clouded. Apex of first costal section with two bristles, the lower weak. Heavy bristles on 0.5 of third costal section. Costal index 4.4-5.0; 4 th vein index 1.4-1.5; 5 x index 0.9-1.3.

A b d o m e n yellow, subshining. 2 nd-3 rd tergites with posterior bands narrowed or interrupted in the middle, narrowing laterally and ending on reaching the lateral regions. 4 th tergite with posterior band interrupted in the middle or reduced to a narrow border or to spots on the base of some bristles. 5 th tergite without band, with a rounded spot or irregular tannish yellow markings in the middle or without markings. 6 th tergite without band, with rounded median spot. In female, the bands of 4th-5th tergites are interrupted in the middle, sometimes just narrowed on 4 th tergite; 6 th tergite without band, with oval median spot that does not reach neither the anterior nor posterior margins and may be reduced in size, or lacking.

G e n i t a l i a (fig. 13, Pl. XV) — Genital arch with small anterior processes. Toe small, rounded, with 5 bristles beside of which the arch has another one at the base of the forceps.

Forceps with a row of 6-8 primary teeth and about 10 marginal bristles. Tongue that connects the forceps with the genital arch very strong. Gonapophysis with two small bristles. Ovipositor plate (fig. 32, Pl. XVII), upper margin in dotted line) with 20-24 teeth

I n t e r n a l c h a r a c t e r s — Tips of posterior Malpighian tubes fused, with continuous lumen. Testes yellowish white, with about 3 outer and 3 inner coils. Sperm pump with a pair of diverticula that are about a third as long as the pump itself. Spermatheca (fig. 65, Pl. XVIII) tannish, oval; sperm duct with a spherical median widening, from where it widens slightly toward the apex. The median widening, is sometimes hard to see. Ventral receptacle with about 17 coils.

D i m e n s i o n s — Length body 2.5 mm; wing 2.3 mm.

P u p a r i u m — Posterior spiracles black, parallel. Horn index 3.3.

L a r v a do not skip.

E g g with four filaments.

Notes — Difficult to breed in the agar-banana medium.

Types and distribution — Holotype male from Vila Atlântica (State of São Paulo) col. Pavan IX-1951. Paratypes 5 male from Vila Atlântica, col. Pavan IX-1951, 5 male and 5 female from Distrito Federal col. Prota-Pessoa V-1953. The species occurs also in several localities of State of São Paulo, and in Montes Claros (Minas Gerais).

R e l a t i o n s h i p — Very close to *D. prosimilis* and *D. mediosignata*.

21. *Drosophila nigricincta* sp. n.

Male. Head — Antennae tannish yellow, margin of third joint darker. Arista with 10 branches. Front yellowish tan, dull, orbital plates a little lighter, subshining; space between ocelli brownish. Anterior orbital 0.7 posterior; middle orbital 0.5 anterior. Face tannish yellow, carina large, with the inferior border low. Two prominent orals of almost equal size. Cheek index 14. Palpus with 3-4 prominent hairs. Eyes red; eye index 1.3.

Thorax tan, subshining, pleurae lighter. Acrostichals in 6 rows. Anterior scutellars divergent. Sterno index 0.6; middle sternopleural 0.8 anterior. Legs tannish yellow. One black bristle on base of anterior tarsus and two black bristles on base of hind tarsus. Wing (fig. 101, Pl. XXIII) slightly fuscous. Posterior crossvein almost invisibly clouded. Apex of first costal section with two bristles, the lower weak. Heavy

bristles on 0.4-0.5 of third costal section. Costal index 4.5; 4 th vein index 1.5; 5 x index 1.3.

A b d o m e n yellow, shining. 2 nd-3 rd tergites with posterior bands narrowed or narrowly interrupted in the middle, ending on reaching the lateral regions. 4 th-5 th tergites with bands interrupted in the middle, narrowing laterally and extending to the sides, without reaching the lateral margins. The band of the 5 th tergite is sometimes reduced on the sides to a narrow border and always ends before the band of 4 th tergite. 6th tergite with a very great shining spot of dark brown to black color and rectangular in shape, occupying the entire tergite except the final part of lateral regions. The spot is about three times broader than high.

G e n i t a l i a (fig. 14, Pl. XV) — Anterior process of genital arch small. Toe small, rounded, with one bristle; lateral part of genital arch with 4 more bristles. Anal plate with a bundle of small hairs on lower tip. Forceps with a row of 5 primary teeth, the foremost of the teeth standing outward the row of the others, so that the whole forms an open L; 5-7 short and thick bristle, of which three are tooth-like on the upper surface and 8 marginal bristles. Gonapophysis with a bristle.

I n t e r n a l c h a r a c t e r s — Testes pale yellow with 7 outer and 3 inner coils, the latter very thick.

D i m e n s i o n s — Length body 3.1 mm; wing 2.7 mm.

T y p e s — Holotype male and 2 paratype male from Cantareira (São Paulo city), col. Magalhães & Prota-Pessoa II-1953.

R e l a t i o n s h i p — The great rectangular spot on the 6 th tergite distinguish this species clearly from *D. mediopicta* and other species which seem related to it.

22. *Drosophila mediopicta* sp. n.

Male and Female. **H e a d** — Antennae tan. Arista with 10-11 branches. Front tan, space between ocelli brownish, frontal lines with golden reflexes, orbital plates grayish yellow. Anterior orbital 0.7 posterior; Middle orbital minute, 0.2 anterior. About 4 orbital and 6 minute frontal hairs. Face tan, back of the carina and median clypeal area lighter. Carina of median size, rounded if viewed from the side. Two prominent orals, the third 0.5 anterior. Cheek index 11. Palpus with 4 prominent hairs. Eyes light red; eye index 1.2.

T h o r a x tan, dull, pleurae slightly lighter. Acrostichals in 6 rows. Anterior scutellars divergent. Sterno index 0.65;

middle sternopleural as long as anterior. Legs tannish yellow. Two bristles on base of anterior tarsus and on apex of each of its four proximal joints. Three black bristles (sometimes tannish yellow) on the base of posterior tarsus. Wing (fig. 102, Pl. XXIII) fuscous. Posterior crossvein clouded. Apex of first costal section with two bristles, the lower one weaker. Heavy bristles on 0.2-0.3 of third costal section. Costal index 4.0-4.7; 4th vein index 1.4-1.7; 5x index 1.2-1.6.

A b d o m e n (fig. 15, Pl. XV; 70, Pl. XIX), yellow, subsining. 2nd-3rd tergites with posterior bands narrowed or interrupted in the middle; 4th-5th tergites with bands more or less widely interrupted in the middle; band of 5th tergite sometimes with paramedian widenings (fig. 70, Pl. XIX). 6th tergite without band, with median squared spot (fig. 70, Pl. XIX), that may reach the posterior border. Distal sternites as in fig. 15, Pl. XV.

G e n i t a l i a (fig. 6, Pl. XIV; 68, 70, 71, 72, Pl. XIX) — Toe rounded with 4-5 bristles. Anal plate (fig. 68, Pl. XIX) with a bundle of hairs on the lower tip. Forceps with a row of 7 primary teeth, 10 secondary teeth, among which 6 teeth form a posterior row perpendicular to the row of primary teeth. Gonapophysis with one bristle. Penis (fig. 6, Pl. XIV; 72, Pl. XIX) complicated. Ejaculatory apodeme as in fig. 50. Ovipositor plate (fig. 33, Pl. XVII) with about 20 teeth.

I n t e r n a l c h a r a c t e r s — Tips of posterior Malpighian tubes apposed, without continuous lumen. Testes white with 6 outer and 3 inner coil. Sperm pump with a pair of diverticles with about half length of the pump. Spermatheca (fig. 66, Pl. XVIII) elliptical; sperm duct widening slightly toward the tip. Ventral receptacle with about 55 coils, the 20 last ones tight.

D i m e n s i o n s — Length body 2.2-2.6 mm; wing 2.4-2.5 mm.

E g g with four filaments.

T y p e s — Holotype male from Mogi das Cruzes (State of São Paulo), col. Pavan V-1950. Paratypes: 3 male, 1 female of the same locality and collector, 1 male from Cantareira (near S. Paulo city), col. Magalhães & Frota-Pessoa II-1953, 1 female from Rio de Janeiro (D. F.) reared from *Datura* flowers.

R e l a t i o n s h i p — *D. mediopicta* seems related with *D. mediostriata*, *D. nigricincta* and *D. tripunctata*

23. *Drosophila pruinafacies* sp. n.

Female. Head — Antennae tannish yellow, third joint brownish. Arista with 11 branches. Front yellow, space between ocelli darker. Anterior orbital 0.8 posterior; middle orbital 0.4 anterior. About 7 orbital and 8 frontal hairs. Face yellowish with white pollinosity. Two prominent orals almost equal, the third 0.5 first. Cheek index 14. Palpus with 3 prominent hairs. Eyes red; eye index 1.2.

Thorax tannish yellow, dull. Acrostichals in 6 rows. Anterior scutellars divergent. Sterno index 0.5; middle sternopleural 0.8 anterior. Legs tannish yellow. Two black bristles on base of hind tarsus. Wing (fig. 103, Pl. XXIII) fuscous. Posterior crossvein clouded. Apex of first costal section with two bristles, the lower one thinner. Heavy bristles on 0.3 of third costal section. Costal index 3.9; 4th vein index 1.4; 5x index 1.2.

Abdomen yellow, shining. 2nd-4th tergites with narrow posterior bands entire or narrowly interrupted in the middle. 5th tergite with the band reduced to points on the bases of the bristles and sometimes with irregular paramedian markings. 6th tergite without posterior band, with an elliptical median spot that sometimes reaches the anterior and posterior margins.

Genitalia — Ovipositor plate (fig. 43, Pl. XVII) wide on apex, with about 25 teeth.

Internal characters — Spermatheca (fig. 51, Pl. XVIII) pear-shaped, with oblique ridges on the base; sperm duct with median constriction.

Dimensions — Length body (pinned specimen) 2.5 mm; wing 3.2 mm.

Egg with four filaments, the proximal ones as long as the egg, the distal ones shorter.

Types — Holotype female and 1 paratype female from Mogi das Cruzes (State of São Paulo) col. Pavan VIII-1950.

Relationship — *D. pruinafacies* seems related to *D. tripunctata*.

24. *Drosophila trifilum* sp. n.

Male and Female. Head — Antennae yellow, third joint darker. Arista with 11-13 branches. Front yellow. Anterior orbital 0.6-0.8 posterior; middle orbital 0.4-0.5 anterior.

About 7 orbital and 14 frontal hairs. Face whitish; carina large. Two prominent orals of equal length, the third about 0.5 first. Cheek index 16. Palpus with 4 prominent hairs. Eyes red; eye index 1.4.

Thorax tannish yellow, subshining, pleurae lighter. Acrostichals in 6 rows. Anterior scutellars divergent. Sterno index 0.6-0.7; middle sternopleural 0.7-0.8 anterior. Legs tannish yellow. Wing (fig. 104, Pl. XXIII) fuscous. Posterior crossvein clouded, anterior slightly clouded. Apex of first costal section with one bristle. Heavy bristles on 0.4-0.5 of third costal section. Costal index 4.4; 4th vein index 1.4-1.6; 5x index 1.0-1.2.

Abdomen yellow, subshining. 2nd and 3rd tergites with posterior bands widened in the middle, on 3rd tergite sometimes reaching the anterior margin; the bands end on reaching the lateral regions. 4th tergite with the band widened in the middle or with a very reduced band and a rounded median spot. 5th-6th tergites without posterior bands, with large circular or semicircular median spots. In female, 2nd-4th tergites with posterior bands interrupted in the middle, the band of 4th tergite with small paramedian widenings.

Genitalia (fig. 16, Pl. XV; 20, Pl. XVI; 34, Pl. XVII; 52, 58, Est. XVIII) — Anterior process of genital arch large. Toe small, with 2 bristles. Anal plate with a bunch of small hairs on lower tip. Forceps with a straight row of 9 primary teeth that begins close to the posterior margin, about 10 marginal bristles and 6 bristles on upper surface. Gonapophysis conical, with one little bristle on the tip. Ovipositor plate (fig. 34, Pl. XVII) reddish tan with 33 teeth, apex triangular.

Internal characters — Tips of posterior Malpighian tubes fused, lumen, continuous. Testes very light yellow with 6 outer and 2 inner coils. Spermatheca (fig. 52, Pl. XVIII) weakly chitinized, long, its length 2.5-3.0 width; sperm duct a narrow funnel. Ventral receptacle with about 60 coils.

Dimensions — Length body 3.8 mm; wing 2.4-3.2 mm.

○ **Egg** (fig. 58, Pl. XVIII) with an apical pair of tapering filaments of 0.7 egg length, and a single proximal filament which results from the fusion of two filaments and is split on

its apical fourth, its length about the same of egg. The apical plate of the egg and the proximal filament, except its split apex are yellow and more sclerotized than the other parts.

Types — Holotype female from Mogi das Cruzes (State of São Paulo), col. Pavan IV-1952. Paratypes: 1 male and female from Mogi das Cruzes col. Pavan VIII-1951, 1 female from Pirassununga (State of São Paulo) col. Pavan VI-1951. The species occurs also in Distrito Federal.

Relationship — *D. trifilum* do not seem closely related to any other species in the group. It presents, however, some affinity with *D. bipunctata*, has a white face like *D. albicans*, and a tendency to reduced number of egg filament like *D. bifilum* and *D. bandeirantorum*.

25. *Drosophila mediopunctata* DOBZHANSKY & PAVAN

Drosophila mediopunctata DOBZHANSKY & PAVAN 1943:23, 66, fig. 50, 53, 120 (original description, key, fig. chromosomes, spermatheca).

- PAVAN & CUNHA 1947:42 (key).
- PATTERSON & WHEELER 1949:223 (citation).
- FREIRE-MAIA & PAVAN 1950:22, 59 (species included in *tripunctata* group, key).
- PAVAN 1950:31 (key).
- PATTERSON & STONE 1952:27 55, 60, 140 (citation, distribution, chromosomes).
- PAVAN 1952:15 (citation).

The original description may be completed as follows:

Male and Female. **Head** — Anterior orbital 0.7 posterior; middle orbital 0.4-0.6 anterior. Face tannish yellow, whitish in some specimens. Palpus with about 4 prominent hairs in female and 6 in male.

Thorax — Acrostichals in 6-8 rows. The bristle on base of hind tarsus mentioned by DOBZHANSKY & PAVAN is not black, but tannish yellow (fig. 86, Pl. XXI) and is not comparable to the black bristles of some other species (fig. 84, 85, 87, Pl. XXI) on the same position. It seems more convenient to consider it merely as an enlarged hair. Wing (fig. 105, Pl. XXIII): Costal index 4.0-4.9; 4th vein index 1.1-1.5; 5 x index 0.9-1.2.

Abdomen — Besides the specimens having the abdominal patterns described by DOBZHANSKY & PAVAN, there occur also males and females having the 4th tergite with narrow posterior band widened in the middle to triangle, or without a clear band, with median irregular or triangular spot. When the 4th tergite has median markings, the 5th-6th tergites have always median spots. There occur also males and females that make transitions between these heavy spotted

individuals and the unspotted ones. As a rule, males tend to have greater spots than females, and the specimens with two or three spotted tergites are more common among males than among 2 females.

Genitalia (fig. 3, Pl. XIII; 69, Pl. XIX) — Toe broad, quadrangular, covering the base of forceps, with one bristle. Forceps with 8-9 primary teeth, and about 10 marginal bristles. Gonapophysis with a little bristle. Penis with a very great head. Ovipositor plate (fig. 42, Pl. XVII) long and slender, with about 20 teeth.

Internal characters — Spermatheca (fig. 53, Pl. XVIII) pear-shaped; sperm duct widening gradually to form a funnel on the apical half.

Puparium with black parallel posterior spiracles.

Larva — Cephalo pharyngeal apparatus as in fig. 81, Pl. XX.

Distribution — State of São Paulo: Itanhaem, Mogi das Cruzes, Vila Atlântica, Pirassununga, Campos do Jordão, São Paulo. State of Rio Grande do Sul: Feliz, Ponta Grossa. State of Paraná: Lamberdor. State of Bahia: Distrito Federl.

Variation — In a sample of 50 males and 50 females from Cantareira (near São Paulo city) col. Pavan III-1953 the following variation was observed:

	Branches of arista:					Prominent hairs on palpi:				Row of acrostichals			
	11	12	13	14	15	16	4	5	6	7	6	7	8
Females	3	15	22	9	1	—	12	3	5	—	9	19	22
Males	—	4	17	19	9	1	1	4	14	1	11	13	26

	Length of body in mm:		Sterno index:	
	range	mean	range	mean
Females	2.7-3.7	3.10 ± 0.003	0.45-0.060	0.53 ± 0.02
Males	2.2-3.5	2.83 ± 0.03	0.45-0.055	0.53 ± 0.01

	Color patterns of tergites:			
	No spots	Spot only on 6 th	Spot on 5 th-6 th	Spot on 4 th-6 th
Females	24	17	7	2
Males	8	22	14	6

Relationship — *D. medijopunctata* is a typical member of the tripunctata group, and is close to *D. mediosignata*, *D. medionotata* and *D. unipunctata*.

26. *Drosophila bandeiratorum* DOBZHANSKY & PAVAN

- Drosophila bandeiratorum* DOBZHANSKY & PAVAN 1943:30, 67, fig. 25, 26, 28, 104 136 (original description, key, fig. chromosomes, spermatheca, egg).
 — PAVAN & CUNHA 1947:43 (key).
 — HSU 1949:111, plate XIV-6 (genitalia, fig. genitalia).
 — WHEELER 1949:186 (species included in *cardini* group).
 — PATTERSON & WHEELER 1949:218 (citation).
 — FREIRE-MAIA & PAVAN 1950:59 (key).
 — PAVAN 1950:32 (key).
 — PATTERSON & STONE 1952:39, 72 (citation, distribution).

The description of the species may be completed as follows:

Thorax — Wing as in fig. 106, Pl. XXIII.

Abdomen — Besides of the marking pattern described by the authors, there are males without spots on 5th or 5th-6th tergites, and females with spots on 6th tergite. The size of the spots varies in both sexes from minute to very large, with all the intermediate conditions, but males tend to have greater spots than females, and unspotted individuals are more common among females than among males.

Genitalia (fig. 21, Pl. XVI) — Genital arch with large anterior process. Toe small, with 3-5 bristles; there are no other bristles on the genital arch, but its dorsal area is covered with black pile. Anal plate with a group of about 20 short bristles on lower tip. Forceps with a row of 10-12 primary teeth, 14-20 secondary teeth on upper surface, longer and weaker than the primary ones, and 7-12 marginal bristles. Gonapophysis with a little bristle. Penis with the apex very complicated, with fringes and notches.

Relationship — *D. bandeiratorum* has two characters that approaches it to the *cardini* group, viz. The forceps with many secondary teeth and the color pattern of the tergites. However, several other characters tend to show that it is better to place it in the *tripunctata* group.

27. *Drosophila curvapex* sp. n.

Male and Female. Head — Antennae tannish yellow, third joint tan. Arista with 9-10 branches. Front tannish yellow, space between ocelli darker. Anterior orbital 0.7 posterior; middle orbital 0.5 anterior. About 7 orbital and 14 frontal hairs. Face tannish yellow; carina large and long.

Two prominent orals of almost equal length. Cheek index 14. Palpus with 3 prominent hairs. Eyes red; eye index 1.2.

T h o r a x tan, dull; pleurae slightly lighter. Acrostichals in 6 rows. Anterior scutellars divergent. Sterno index 0.6; middle sternopleural 0.7 anterior. Legs tan. Two black bristles on base of hind tarsus (fig. 87, Pl. XXI). Wing (fig. 107, Pl. XXIII) fuscous. Posterior crossvein slightly clouded. Apex of first costal section with one bristle. Costal index 4.3; 4 th vein index 1.3; 5 x index 1.3.

A b d o m e n tannish yellow, subshining. 2 nd-4 th tergites with narrow posterior bands widely interrupted in the middle. In female, 2 nd tergite with the band just faint in the middle, 3 rd tergite with the band slightly widened in the paramedian regions. 5 th tergite with the band reduced to a narrow border interrupted in the middle. 6 th-7 th tergite unmarked.

G e n i t a l i a (fig. 18, Pl. XV; 22, Pl. XVI) — Genital arch with large anterior process. Toe with 3 bristles on its base and 4 more bristles on the lateral extremity of the genital arch. Genital arch covered with pile. Anal plate with a bunch of small hairs on lower tip. Forceps with a sinuous row of 10-11 primary teeth and some bristles on upper surface. Gonapophysis with a little bristle. Penis with an apical notch. Ovipositor plate (fig. 36, Pl. XVII) with 27 teeth and with a very broad rounded apex.

I n t e r n a l c h a r a c t e r s — Tips of posterior Malpighian tubes fused, forming a continuous lumen. Testes light greenish yellow, with about 12 outer and 5 inner coils. Spermatheca (fig. 54, Pl. XVIII) large, yellow; sperm duct very broad. Ventral receptacle with about 250 coils.

D i m e n s i o n s — Length body (pinned specimen) 3,8 mm; wing 4,0 mm.

Egg with 4 filaments.

T y p e s — Holotype female, 1 paratype male and 1 paratype female, all from Feliz (State of Rio Grande do Sul), col. Cordeiro VIII-1951.

R e l a t i o n s h i p — This species is not very close to any other in the group. It shows, however, some similarities with *D. morena*, *D. aguda* and *D. bandeirantorum*.

27. *Drosophila bipunctata* PATTERSON & MAINLAND

Drosophila bipunctata PATTERSON & MAINLAND 1943:194, (original description).

- PATTERSON 1943:30 (distribution).
- PATTERSON & MAINLAND 1944:24, 50, 78, 79, 95, plate XII (key, citation, distribution, fig. adult.).
- WHEELER 1940:191 (citation).
- PATTERSON & WHEELER 1949:219 (citation).

No specimen examined.

Distribution — Mexico.

Relationship — This species was unclassified regarding to grouping until now. Two characters mentioned in the original description do not fit well in the concept of the *tripunctata* group here proposed: the broad cheek (cheek index 3, measured by STURTEVANT's method) and the missing of black pile on upper part of eyes. On the other hand, the color pattern of the tergites and several other features are typical of the *tripunctata* group. It may be that the species was not assigned to this group so far because of its having only two egg filaments. As *D. bifilum* has also two egg filaments, this character is no longer contradictory to our notion of the *tripunctata* group. Therefore *D. bipunctata* is tentatively included in this group.

29. *Drosophila tripunctata* LOEW

- Drosophila tripunctata* LOEW 1862:231 (original description) nec *D. tripunctata* Becker 1908:155, 497.
- Drosophila modesta* STURTEVANT 1916:333 (original description).
- Drosophila tripunctata* — STURTEVANT 1921:82 (re-description).
- STURTEVANT 1942:30, 45 (citation, key).
 - DUDA 1924:247, 264 (citation).
 - DUDA 1927:122, 140, 191 (key, citation).
 - PATTERSON 1943:15-18, 19, 21-22, 108-109, fig. 28, plate V (key, redescription, fig. reproductive systems, puparium, egg, adult).
 - PATTERSON & WAGNER 1943:228-229, 263 (distribution).
 - WARTON 1943:286, 311, plate 7 (chromosomes, fig. chromosomes).
 - PATTERSON & MAINLAND 1944:35 (comparison with *D. erocina*).
 - HSU 1949:103, 121, plate X-7 (genitalia, relationship, fig. genitalia).
 - WHEELER 1949:180 (citation).
 - PATTERSON & WHEELER 1949:212, 228 (distribution, citation).
 - FREIRE-MAIA & PAVAN 1950:22 (citation).
 - BURLA 1951:123 (comparison with *D. histrio*).
 - PATTERSON & STONE 1952:27-28, 55, 60, 97, 140 (citation, distribution, chromosomes).
 - PAVAN 1953:15 (citation).

The former descriptions may be completed as follows:

Male and female. H e a d — Arista with 10-12 branches.

Anterior orbital 0.69-0.92 posterior; middle orbital 0.23-0.42 anterior. About 4 orbital and 9 frontal hairs. Distance between posterior orbital and inner vertical 1.7 the distance between posterior orbital and anterior orbital. Carine with lower tip rounded. Cheek index 16. Palpus with 4 prominent hairs not forming a straight row. Eyes light red; the darkening of dorsal part of eye by black pile less pronounced than in most other species of the group; eye index 1.3.

Thorax — Sterno index 0.52-0.68; middle sternopleural 0.47-0.85 anterior. One bristle on base of fore and mid-tarsus. Two black weak bristles on base of hind tarsus. Wing (fig. 108, Pl. XXIII): Heavy bristles on 0.3-0.4 of third costal section. Costal index 2.6-3.9 (about 4.3 according to Sturtevant, 1921); 4th vein index 1.4-1.8; 5x index 0.8-1.3.

Abdomen — 2nd-3rd tergites with broad posterior bands interrupted in the middle, (or nearly so narrowing toward the sides, ending abruptly on reaching the lateral regions. 4th tergite with the band reduced to a narrow border widely interrupted in the middle, with a large elliptical spot in the middle. 5th-6th tergites without bands with median spots a little smaller than the spot of 4th tergite.

Genitalia (fig. 17, Pl. XV) — Anterior process of genital arch slightly developed. Toe small, with 4-6 bristles. Forceps with about 10 primary teeth, 10 marginal bristles on the upper surface. Anterior part of hypandrium narrow. Gonapophysis with a little bristle and a dense pile on the margin. Penis with an apical notch and a pair of narrow ventral processes. Ovipositor plate (fig. 35, Pl. XVII) with about 20 teeth, and rounded apex.

Internal characters — Tips of posterior Malpighian tubes fused, lumen continuous. Spermatheca (fig. 64, Pl. XVIII) elliptical, tannish at apex; sperm duct with a little median bulb.

Dimensions — Length body 2.0-2.8 mm; wing 2.0-2.7.

Puparium — Posterior spiracles yellowish brown, slightly divergent and, as rule, turned upward. Horn index 4-5.

Notes — This species is easily bred in laboratory conditions.

Variation — In a stock from Florida (U.S.A.) sent by Dr. Marshall R. Wheeler, the following wing variation (10 wings measured for each sex) was observed:

	Length of wing	Costal index	4 th vein index	5 x index
Females	2.30 ± 0.07	3.50 ± 0.07	1.57 ± 0.03	0.98 ± 0.03
Males	2.10 ± 0.04	3.07 ± 0.09	1.67 ± 0.04	1.16 ± 0.04

With 10 individuals of each sex measured the following values were obtained:

Branches of arista: females 10.23; males 10.62.

Anterior orbital/posterior orbital: females 0.75; males 0.80.

Middle orbital/anterior orbital: females 0.34; males 0.30.

Length body: females 2.51 ± 0.07 mm; males 2.29 ± 0.06.

In 14 measures of both sexes the mean sterno index was 0.61.

Relationship — *D. tripunctata* seems related to *D. mediovitata*.

30. *Drosophila unipunctata* PATTERSON & MAINLAND

- Drosophila unipunctata* PATTERSON & MAINLAND 1943:182, (original description, species included in immigrans group).
 — PATTERSON 1943:27, 28, 30 (distribution).
 — PATTERSON & WAGNER 1943:238 (distribution).
 — WHARTON 1943:289, 317, plate XIII (chromosomes, fig. chromosomes).
 — PATTERSON & MAINLAND 1944:20, 34, 69, 70, 90, plate XVI (key, citation, included in tripunctata group, distribution, fig. of adult).
 — HSU 1949:103, 121 plate X-8 (genitalia, relationship, fig. genitalia).
 — WHEELER 1949:180 (citation).
 — PATTERSON & WHEELER 1949:212, 228 (citation, distribution).
 — PATTERSON & STONE 1952:27, 55, 60, 140 (citation, distribution, chromosomes).
 — PAVAN 1952:15 (citation).

No specimen examined.

Distribution — Mexico, in both nearctic and neotropical regions.

Relationship — From the description, *D unipunctata* seems very close to *D. mediopunctata* and *mediosignata*.

31. *Drosophila medioimpressa* sp. n.

Male and Female. H e a ♂ — Antennae brownish yellow. width of third article 0.7 its length. Arista with 9-11 branches. Front brownish yellow. Anterior orbital 0.8 posterior; middle orbital 0.4-0.5 anterior. About 5-9 orbital and 15-20 frontal hairs. Face brownish yellow. Carina broad. Two prominent orals, the third less than 0.5 anterior. Cheek

index 13. Palpus with 4-5 prominent hairs. Eyes red; eye index 1.3.

T h o r a x brownish yellow, dull, pleurae lighter. Acrostichals in 6 rows, sometimes with indication of two more rows. Anterior scutellars divergent. Sterno index 0.5; middle sternopleural 0.8 anterior. Legs yellowish. Wing slightly fuscous. Posterior crossvein clouded. Apex of first costal section with one strong bristle, the lower one weak. Heavy bristles on 0.3-0.4 of third costal section. Costal index 4.7-5.3; 4 th vein index 1.4-1.5; 5 x index 1.1-1.2.

A b d o m e n (fig. 79, 80, Pl. XX) yellow, subshining. 2 nd-3 rd tergites with posterior bands narrowed or interrupted in the middle, seldom broadened on the third tergite. 4 th tergite with posterior band interrupted in the middle, sometimes projected forward in paramedian regions, especially in males. 5 th-6 th tergites without bands, with very large median spots in males, and with small elliptical median spots in females.

G e n i t a l i a (fig. 24, Pl. XVI — Toe with 3-4 bristles. Forceps with an almost straight row of 9-10 primary teeth, about 8 marginal bristles and 7 more on the upper surface. Penis large, with a pair of acute processes on the head. Ovipositor plate (fig. 41, Pl. XVII) with about 28 teeth.

I n t e r n a l c h a r a c t e r s — Tips of posterior Malpighian tubes fused, lumen continuous. Testes white or yellowish, with 4 outer and 2 inner coils. Sperm pump with a pair of diverticles, smaller than the pump. Spermatheca (fig. 55, Pl. XVIII) long, brownish yellow, with brown apex; sperm duct with a basal constriction. Ventral receptacle with about 50 coils.

D i m e n s i o n s — Length body 2.5-3.5 mm; wing 2.5-3.1 mm.

P u p a r i u m reddish brown, posterior spiracles brownish yellow. The horns are often retracted. Horn index about 4.0 Horn with about 13 branches.

E g g with 4 filaments.

T y p e s — Holotype male and 1 paratype female from Montes Claros (Minas Gerais), col. A. Brito da Cunha, 30-IV-1953; 4 paratypes males and 4 females from a culture started with the wild paratype.

R e l a t i o n s h i p — *D. medioimpressa* is very close to *D. mediopunctata*, but their male genitalia are very different one to the other. The abdominal pattern is less variable and its sexual dimorphism is more pronounced in *D. medioimpressa* than in *D. mediopunctata*.

ACKNOWLEDGEMENTS

I am indebted to many persons for their courtesy in sending material for this work. To my colleague Dr. H. Burla my thanks are especially due for the critical reading of the manuscript, for valuable suggestions and aid during routine work. To Prof. C. Pavan of the Faculdade de Filosofia, Ciências e Letras de São Paulo, I owe most of the material here studied, including some species already recognised as new by himself. From Dr. Marshall R. Wheeler of the University of Texas I received a stock of *D. tripunctata*. My colleagues Dr. Chana Malogolowkin and Dr. H. Burla kindly communicated me unpublished data on the genitalia of other species groups of the subgenus *Drosophila*. From Professor Th. Dobzhansky of the Columbia University I received kind approval for starting and performing the work and valuable suggestions. To Professor A. G. Lagden Cavalcanti, director of the Centro de Pesquisa de Genética, where this paper was worked out, I am very much obliged for his constant interest in the work and the facilities he provided me.

SUMÁRIO

No presente trabalho se faz a revisão do grupo *tripunctata* do subgênero *Drosophila*, o qual, atualmente, é o grupo de maior número de espécies da fauna brasileira de *Drosophila*. Nele são incluídas 25 espécies, além das 6 que o integravam. O grupo é redefinido, descrito, e dividido em 4 subgrupos; suas relações com os outros grupos são estudadas. Apresenta-se uma chave para determinação de suas 31 espécies, descrevem-se 15 espécies novas e completam-se as descrições de algumas das espécies já conhecidas.

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PLATE XIII

Fig. 1 — *Drosophila mesostigma* n. sp.Fig. 2 — *Drosophila mediotriata* Duda.Fig. 3 — *Drosophila mediopunctata* Dobzhansky & Pavan.

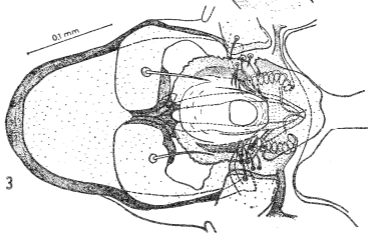
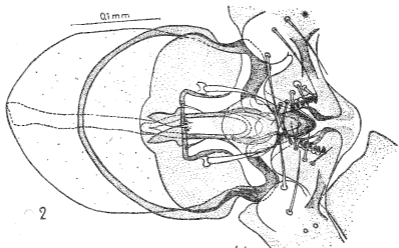
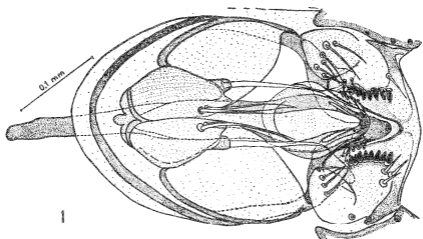


PLATE XIV

Fig. 4 — *Drosophila angustibuca* Duda.

Fig. 5 — *Drosophila angustibuca* Duda.

Fig. 6 — *Drosophila medlopecta* n. sp.

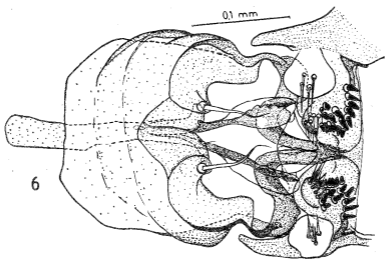
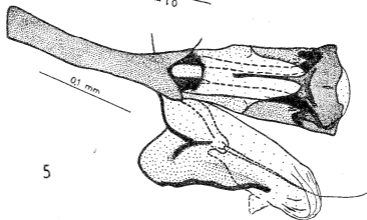
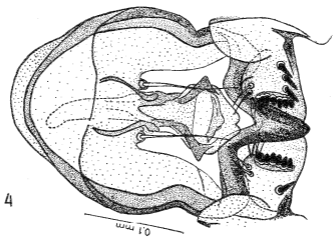


PLATE XV

- Fig. 7 — *Drosophila campestris* Burla.
Fig. 8 — *Drosophila mediovittat* n. sp.
Fig. 9 — *Drosophila albescens* n. sp.
Fig. 10 — *Drosophila albicans* n. sp.
Fig. 11 — *Drosophila bifilum* n. sp.
Fig. 12 — *Drosophila medesignata* Dobzhansky & Pavan.
Fig. 13 — *Drosophila medianotata* n. sp.
Fig. 14 — *Drosophila nigricincta* n. sp.
Fig. 15 — *Drosophila mediopicta* n. sp.
Fig. 16 — *Drosophila trifilum* n. sp.
Fig. 17 — *Drosophila tripunctata* Loew.
Fig. 18 — *Drosophila curvapex* n. sp.



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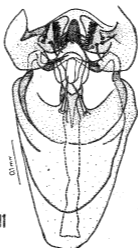
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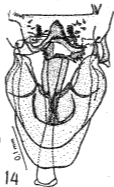
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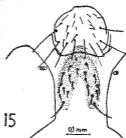
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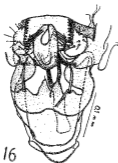
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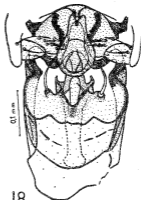
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PLATE XVI

Fig. 19 — *Drosophila platitarsus* n. sp.

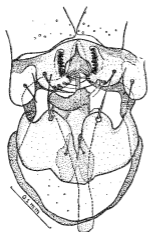
Fig. 20 — *Drosophila trifilum* n. sp.

Fig. 21 — *Drosophila bandeirantorum* Dobzhansky & Pavan.

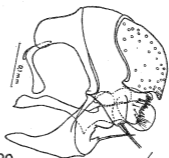
Fig. 22 — *Drosophila curvapex* n. sp.

Fig. 23 — *Drosophila mediotriata* Duda.

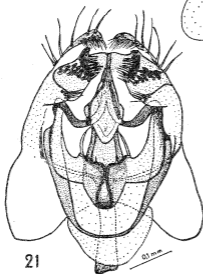
Fig. 24 — *Drosophila medioimpressa* n. sp.



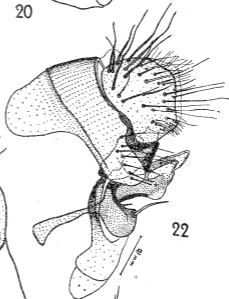
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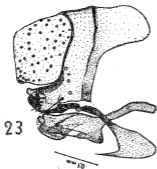
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PLATE XVII

- Fig. 25 — *Drosophila mediostriata* Duda.
Fig. 26 — *Drosophila campestris* Burla.
Fig. 27 — *Drosophila mediocris* n. sp.
Fig. 28 — *Drosophila albicans* n. sp.
Fig. 29 — *Drosophila albicans* n. sp.
Fig. 30 — *Drosophila morena* n. sp.
Fig. 31 — *Drosophila bifilum* n. sp.
Fig. 32 — *Drosophila mediosignata* Dobzhansky & Pavan.
Fig. 33 — *Drosophila mediopicta* n. sp.
Fig. 34 — *Drosophila trifilum* n. sp.
Fig. 35 — *Drosophila tripunctata* Loew.
Fig. 36 — *Drosophila curvapex* n. sp.

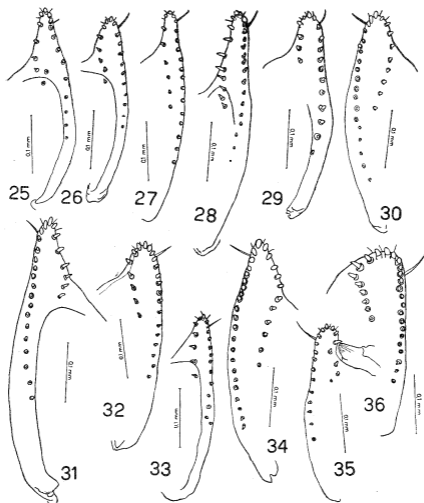


PLATE XVII

- Fig. 37 — *Drosophila mesostigma* n. sp.
Fig. 38 — *Drosophila angustibuca* Duda.
Fig. 39 — *Drosophila mediovitata* n. sp.
Fig. 40 — *Drosophila albescens* n. sp.
Fig. 41 — *Drosophila mediompressa* n. sp.
Fig. 42 — *Drosophila mediopunctata* Dobzhansky & Pavan.
Fig. 43 — *Drosophila pruinifacies* n. sp.

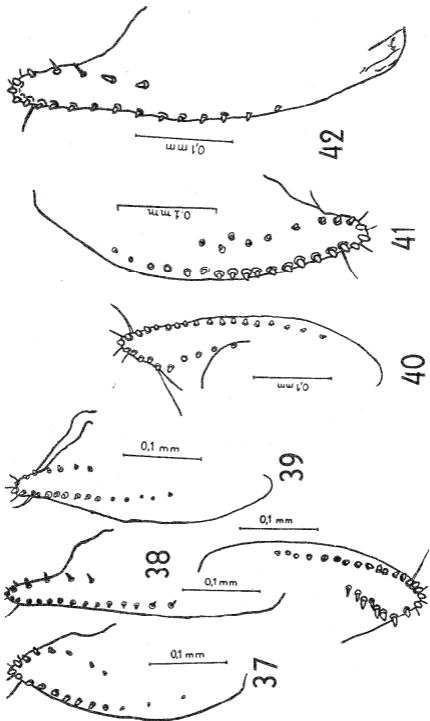


PLATE XVIII

- Fig. 44 — *Drosophila mesostigma* n. sp.
Fig. 45 — *Drosophila mediostriata* Duda.
Fig. 46 — *Drosophila campestris* Burla.
Fig. 47 — *Drosophila mediocris* n. sp.
Fig. 48 — *Drosophila angustibuca* Duda.
Fig. 49 — *Drosophila morena* n. sp.
Fig. 50 — *Drosophila bifilum* n. sp.
Fig. 51 — *Drosophila pruinafacies* n. sp.
Fig. 52 — *Drosophila trifilum* n. s.
Fig. 53 — *Drosophila mediopunctata* Dobzhansky & Pavan.
Fig. 54 — *Drosophila curvapex* n. sp.
Fig. 55 — *Drosophila medioimpressa* n. sp.
Fig. 56 — *Drosophila bifilum* n. sp.
Fig. 57 — *Drosophila angustibuca* Duda.
Fig. 58 — *Drosophila trifilum* n. sp.

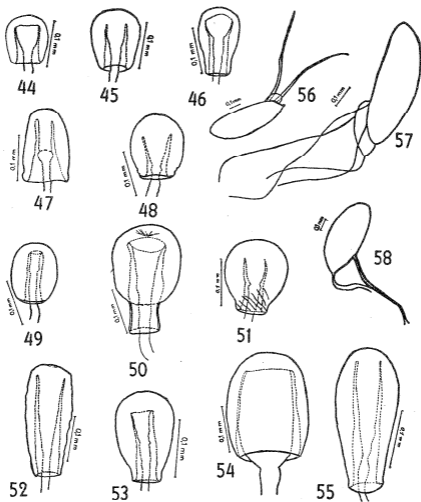


PLATE XVIII

- Fig. 59 — *Drosophila platitarsus* n. sp.
Fig. 60 — *Drosophila albescens* n. sp.
Fig. 61 — *Drosophila mediosignata* Dobzhansky & Pavan.
Fig. 62 — *Drosophila medlevittata* n. sp.
Fig. 63 — *Drosophila albicans* n. sp.
Fig. 64 — *Drosophila tripunctata* Loew.
Fig. 65 — *Drosophila medionota* n. sp.
Fig. 66 — *Drosophila mediopicta* n. sp.

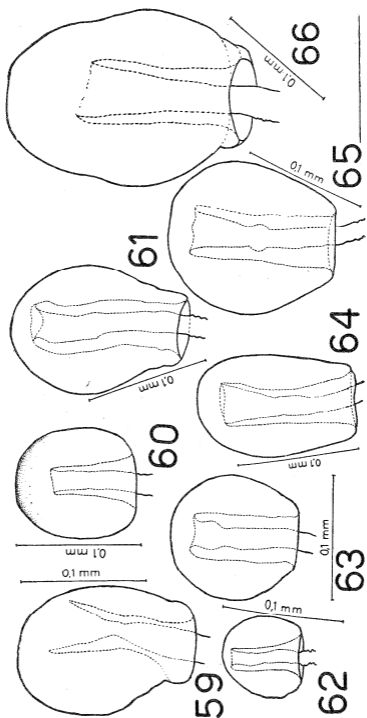


PLATE XIX

Fig. 67 — *Drosophila angustibucca* Duda.

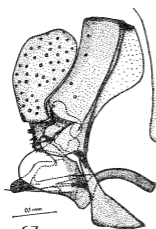
Fig. 68 — *Drosophila mediopicta* n. sp.

Fig. 69 — *Drosophila mediopunctata* Dobzhansky & Pavan.

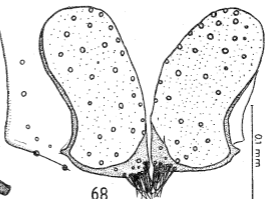
Fig. 70 — *Drosophila mediopicta* n. sp.

Fig. 71 — *Drosophila mediopicta* n. sp.

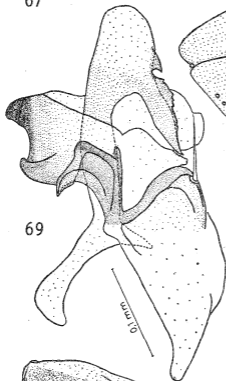
Fig. 72 — *Drosophila mediopicta* n. sp.



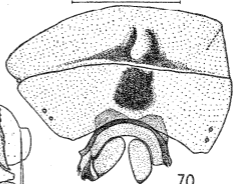
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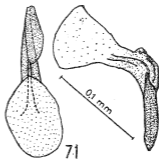
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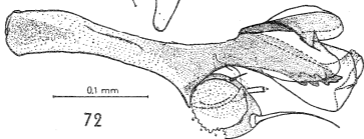
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PLATE XX

- Fig. 73 — *Drosophila mediosgnata* Dobzhansky & Pavan.
Fig. 74 — *Drosophila mediosignata* Dobzhansky & Pavan.
Fig. 75 — *Drosophila mediosignata* Dobzhansky & Pavan.
Fig. 76 — *Drosophila mediosignata* Dobzhansky & Pavan.
Fig. 77 — *Drosophila mediestriata* Duda.
Fig. 78 — *Drosophila mediestriata* Duda.
Fig. 79 — *Drosophila medioimpresa* n. sp.
Fig. 80 — *Drosophila medioimpresa* n. sp.
Fig. 81 — *Drosophila medio punctata* Dobzhansky & Pavan.
Fig. 82 — *Drosophila mediestriata* Duda.

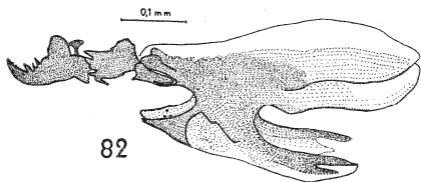
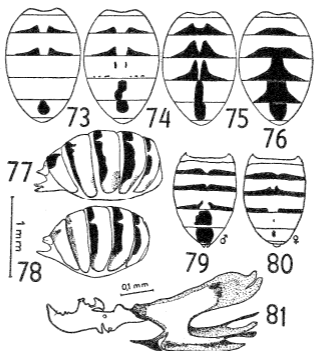


PLATE XXI

- Fig. 83 — *Drosophila mesostigma* n. sp. (anterior leg).
Fig. 84 — *Drosophila platitarsus* n. sp. (posterior leg).
Fig. 85 — *Drosophila angustibuca* Duda (posterior leg).
Fig. 86 — *Drosophila mediopunctata*, Dobzhansky & Pavan (posterior leg.).
Fig. 87 — *Drosophila curv apex* n. sp. (posterior leg.).
Fig. 88 — *Drosophila bifilum* n. sp. (egg).



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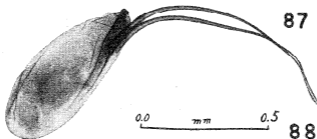
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0.0 mm 0.5

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PLATE XXII

Fig. 89 — *Drosophila mesostigma* n. sp.

Fig. 90 — *Drosophila campestris* Burla.

Fig. 91 — *Drosophila mediostrata* Duda.

Fig. 92 — *Drosophila medioeris* n. sp.

Fig. 93 — *Drosophila platitarsus* n. sp.

Fig. 94 — *Drosophila angustibucca* Duda.

Fig. 95 — *Drosophila mediovitata* n. sp.

Fig. 96 — *Drosophila albescens* n. sp.

Fig. 97 — *Drosophila albicans* n. sp.

Fig. 98 — *Drosophila bifilum* n. sp.

1 mm



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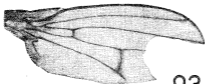
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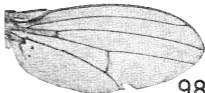
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PLATE XXIII

- Fig. 99 — *Drosophila mediosignata* Dobzhansky & Pavan.
Fig. 100 — *Drosophila medionotata* n. sp.
Fig. 101 — *Drosophila nigracincta* n. sp.
Fig. 102 — *Drosophila medlepicata* n. sp.
Fig. 103 — *Drosophila pruinfacies* n. sp.
Fig. 104 — *Drosophila trifilium* n. sp.
Fig. 105 — *Drosophila medleopunctata* Dobzhansky & Pavan.
Fig. 106 — *Drosophila bandeiranthorum* Dobzhansky & Pavan.
Fig. 107 — *Drosophila curvapex* n. sp.
Fig. 108 — *Drosophila tripunctata* Loew.

