

III. DESCRIPTION OF NEW SPECIES OF THE SUBGENERA  
HIRTODROSOPHILA AND DROSOPHILA

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## INTRODUCTION

In writing up the descriptions of the new species we have followed, in the main, a "model description" prepared by Professor Sturtevant. This model includes as items for description various external and internal characters of the adult fly, and, in addition, certain features of the egg, puparium and chromosomes. The relationship of each species to other members of the subgenus and genus and its distribution are also included.

The color of the eyes, testes and puparia is given for each species, and is followed by references in parentheses to a standard work on colors. The publication referred to is the "Dictionary of Color" by Maerz and Paul. Since color varies with age, efforts were made to use flies which were approximately of the same age—about three days old. Exceptions were cases of wild-type flies which failed to breed in the laboratory, and consequently the exact age could not be determined. All color determinations were made by the artist, Mrs. Sarah Brooks Martin.

All of the descriptions are based on a study of living specimens, and the species are arranged under a scheme of classification recently proposed by Sturtevant (1939), and more fully developed in the first article of this publication. He has divided the genus *Drosophila* into six subgenera. All of the forms described in this article belong to his subgenera *Hirtodrosophila* and *Drosophila*. We have also followed, with a few minor exceptions, his plan of arranging within the subgenus *Drosophila* the various species into groups. These groups vary in size from those represented by a single known species to one which has over twenty known species. The latter is the complex *repleta* group, which eventually will be divided into several sub-groups. We have already separated off six species from this complex into a sub-group called the *mulleri* group. At the end of the article are three species which as yet have not been assigned to any of the groups. Of the thirty-seven forms described in this article, thirty-one are new, while six (including the subspecies) have been described briefly in the literature, but are here given a fuller description.

We are grateful to Professor Sturtevant for suggesting several of the new names and for other valuable suggestions, and to him and Professor Spencer for supplying certain stocks which otherwise would not have been available to us. Credit for these will be found among the descriptions. We are indebted to Dr. L. C. Rosenblad for use of his unpublished manuscript which covers the dissections and descriptions of the reproductive systems of some thirty-six species, of which nine are included in the present article. These are, *D. aldrichi*, *D. carbonaria*, *D. hamatofila*, *D. longicornis*, *D. meridiana*, *D. micromelanica*, *D. nigromelanica*, *D. polychaeta*, and *D. texana*. We are under very great obligation to Mrs. Martin who dissected all of the other new species and made detailed drawings of the entire group. Finally, we are grateful to Dr. A. B. Griffen and Miss Linda T. Wharton for the care they have taken in determining the metaphase chromosome numbers from smear preparations of the larval brain cells.

## DESCRIPTION OF SPECIES

### ***Drosophila orbospiracula*, sp. nov.**

#### **External characters of imagines.**

♂. Arista with about 9 branches, only one below in addition to terminal fork. Antennae yellowish tan, third joint darker. Front tan, orbits slightly yellowish. Middle orbital  $\frac{1}{4}$  other two. First oral bristle large and prominent; second minute, not more than  $\frac{1}{6}$  length of first. Carina rather short, but much broader below, rounded, not sulcate. Palpi clear in color, with one prominent bristle. Cheeks light yellow, their greatest width about  $\frac{1}{4}$  greatest diameter of eyes. Eyes brilliant red (Pl. 1-F 12), with short yellow pile.

Acrostichal hairs irregular, but usually in 8 rows; no prescutellars. Anterior scutellars divergent. Thorax light tannish brown, shining and without markings. Sterno-index about .43. Legs light yellow, nearly clear; a dark line down ventral surface of fore coxae. Apical bristles on first and second tibiae, those on first small; preapicals on all three, those of first and second small.

Abdomen yellow, each segment with a rather narrow brown band, widest in mid-line, narrowing towards margin but failing to reach it.

Wings clear. Costal index about 3.0; 4th vein index about 1.83; 5x index about 2.0; 4c index about .83. Two prominent bristles at apex of first costal section. Third costal section with heavy bristles on its basal  $\frac{1}{3}$ .

Length body 2.6 mm. (in live specimen); wings 2.7 mm.

♀. Abdominal bands widest medianly, narrowed toward margin, reaching it as a narrow line at least on basal segments.

#### **Internal characters of imagines.**

Testes light pink (Pl. 1-G 1), with one large and 3 small inner coils, and five outer coils or gyres.

Spermathecae large, spherical and chitinized. Ventral receptacle with about 12 loose coils and 7 flattened, closely appressed loops, arranged in the following sequence: 4 coils, 3 loops, 3 coils, 4 loops and 5 coils; the whole structure lies flat against the ventral surface of the uterus.

#### **Other characteristics, relationship, and distribution.**

*Eggs*.—4 rather thick filaments, each with a slight but noticeable waviness.

*Puparia*.—Orange brown color (Pl. 10-I 10). Each anterior spiracle with about 8 short, pointed branches arranged radially with one at center of circle; horn-index about 20.0.

*Chromosomes*.—Metaphase plate of female shows 5 pairs of rods and a pair of dots; each X chromosome has a dot-like element attached at end. Male plate shows 4 pairs of rods, a pair of dots and an unpaired X.

*Relationship*.—Belongs to the subgenus *Hirtodrosophila*.

*Distribution*.—Only record, male and female collected along Upper Oak Creek, Chisos Mountains, Brewster County, Texas, on August 13, 1941.

***Drosophila longala*, sp. nov.**

**External characters of imagines.**

♂, ♀. Arista with about 8 branches, only one below in addition to terminal fork. Antennae light tan, third joint darker. Front reddish brown. Middle orbital about  $\frac{1}{4}$  other two. Only one prominent oral bristle. Palpi dark, one prominent and several smaller bristles. Carina only moderately wider below, lower portion of face widening from lower end of carina. Cheeks almost clear, darker towards face; their greatest width about  $\frac{1}{4}$  greatest diameter of eyes. Eyes very dark red (Pl. 4—L 6), with dark pile.

Acrostichal hairs in 8 rows; no prescutellars. Anterior scutellars divergent. Sterno-index .33. Thorax tannish brown, pollinose; four faint brown longitudinal stripes, darkest anteriorly, one in each dorsocentral row and two in acrostichal rows. Legs pale yellow. Apical and preapical bristles of first tibiae very small; preapical of second tibiae very small if present at all, apical present; preapical only on third tibiae.

Abdomen yellowish brown, the entire apical margin dark brown, with darker brown projections medianly to anterior margin; inter-segmental areas creamy yellow. A small dark area at the angle of the tergite of the first complete segment.

Wings clear. Costal index about 2.88; 4th vein index about 1.56; 5x index about 1.33; 4c index about .78. Two well-developed bristles at apex of first costal section; third costal section with heavy bristles on its basal  $\frac{1}{2}$ .

Length body 2.6 mm. (in live specimen); wings 3.0 mm. Females slightly larger.

**Internal characters of imagines.**

Testes pale yellow (Pl. 9—G 1), with 4 inner and 4 outer coils or gyres.

Spermathecae spherical, chitinized. Ventral receptacle has 6 loops each with irregular coils at each end, the whole structure lying flat against the ventral surface of the uterus.

**Other characteristics, relationship, and distribution.**

*Eggs*.—4 filaments; determined by dissection of the ovary.

*Relationship*.—Belongs to the subgenus *Hirtodrosophila*.

*Distribution*.—Only record is a pair of flies collected in October, 1941, at White Water Camp, Gila National Forest near Glenwood, New Mexico.

*Notes*.—The pair of flies were kept in the laboratory for nearly a month, but during this time the female laid no eggs.

***Drosophila cinerea*, sp. nov.**

**External characters of imagines.**

♀. Arista with about 8 branches, only one below basal to terminal fork. Antennae brownish, third joint dark brown with black hairs and very large. Front dark gray. Middle orbital about  $\frac{1}{3}$  first. Palpi brownish

black. Face light gray. Cheeks light gray, their greatest width about  $\frac{1}{4}$  greatest diameter of eyes. Eyes orange-red (Pl. 1-I 12).

Acrostichal hairs in 6 rows; no prescutellars. Anterior scutellars straight. Mesonotum gray with bluish-gray stripe just inside dorso-central row, median region light gray. Pleurae gray. Four bluish-gray stripes located as follows: One from edge of mesonotum to presutural bristle; one from humerus to base of wing, bending dorsally to post-alar bristle; one from anterior edge of pteropleura to ventral angle of metanotum; one along entire dorsal edge of sternopleura. Scutellum gray. Legs grayish-brown, each segment darker near its joint. Apical bristles on first and second tibiae, those of first small; preapicals on all three, those on first and second small.

Abdomen yellowish gray, each segment with a bluish-gray band without median interruption, and wider in mid-line.

Wings dusky gray, veins grayish-brown. Costal index about 2.25; 4th vein index about 2.29; 5x index about 2.43; 4c index about 1.14. Apex of first costal section black, with two well-developed bristles. In the specimen described a partially developed, extra crossvein was present between the 4th and 5th longitudinal veins, about half way between anterior and posterior crossveins.

Body length 2.05 mm. (in live specimen) ; wings 2.65 mm.

**Relationship and distribution.**

*Relationship.*—Belongs to the subgenus *Hirtodrosophila*.

*Distribution.*—Two records: (1) a female trapped in a fungus patch near Hemphill in east Texas, (2) a second female was taken in a trap at Walnut Creek and Cameron Road about nine miles north of Austin, Texas. The first was taken on August 14, 1940, the second on September 15, 1940. The description is based on the Hemphill specimen.

***Drosophila grisea*, sp. nov.**

**External characters of imagines.**

♂. Arista with about 8 branches, only one below in addition to terminal fork. Antennae yellowish brown, third joint somewhat darker. Front blackish brown, pollinose; anterior portion brownish orange. Middle orbital  $\frac{1}{3}$  other two. One large oral bristle, the second not more than  $\frac{1}{5}$  length of first. One prominent palpal bristle; palpi dark. Carina very narrow between antennae, broad near middle, narrowed again below. Face yellowish brown. Angle of cheeks grayish yellow, brown on either side, their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes dark red (Pl. 5-L 12), with light colored pile.

Acrostichal hairs in 6 rows; no prescutellars. Anterior scutellars divergent. Thorax dark gray, a darker area running down the mid-line; two lighter pollinose areas extending down between dorsocentral rows. Scutellum pollinose. Sterno-index about .53. Legs light brownish yellow. Apical bristles on first and second tibiae, those of first small; preapicals on all three, those of first and second small.

Each abdominal segment with an apical light grayish, brown band, which has an anterior projection in the median line separating two small basal yellow areas; before the angle of the tergites, the bands widen to include the entire segment, forming solid lateral areas. Entire abdomen is somewhat pollinose.

Wings clear, crossveins slightly clouded. Costal index about 3.1; 4th vein index about 1.6; 5x index about 1.45; 4c index about .74. Two prominent bristles at apex of first costal section, dorsal one twice the length of ventral. The third costal section with heavy bristles on its basal  $\frac{1}{2}$ .

Length body 3.0 mm. (in live specimen); wings 3.0 mm.

♀. Abdominal bands lighter brown, pollinose; median projection to anterior margin as in male, but the small basal areas which they interrupt are light brown.

#### Internal characters of imagines.

Testes burnt-orange (Pl. 10—J 10), with 4 small inner and 5 outer coils or gyres.

Spermathecae chitinized. Ventral receptacle with 5 basal coils followed by 5 large, flattened, closely appressed loops; the whole structure lies flat against the ventral side of uterus.

#### Relationship and distribution.

*Relationship.*—Belongs to the subgenus *Hirtodrosophila*.

*Distribution.*—The only record is from Rustler's Park, Chiricahua Mountains, Arizona, where several specimens were captured.

*Notes.*—We were not able to breed this species in the laboratory. Eggs dissected out from the ovaries had 4 rather short filaments, which were flakey in appearance.

### ***Drosophila texana* Patterson, Stone and Griffen 1940. *Genetics* 26:164.**

#### External characters of imagines.

♂. Arista with about 8 branches. Antennae brownish amber, third joint darker. Front brown. Middle orbital  $\frac{1}{2}$  anterior and  $\frac{1}{3}$  posterior. Second oral bristle about  $\frac{3}{4}$  first; third also large. Palpi with one prominent bristle. Carina broadest below, sulcate; somewhat sulcate along its entire length. Cheeks grayish yellow, their greatest width about  $\frac{1}{4}$  greatest diameter of eyes. Eyes deep vermilion-like (Pl. 1—L 12), with dense pile.

Acrostichal hairs in 6 rows; no prescutellars. Anterior scutellars divergent. Sterno-index about .90. Mesonotum tannish brown, pollinose; darker down acrostichal rows. Pleurae tannish brown, sternopleurae blackish. Scutellum brown. Legs amber colored, tibiae and basal portion of femora darker, especially on third legs. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen dark grayish black, one or two basal segments lighter in mid-line.

Wings slightly dusky, veins brown; posterior crossveins clouded. Costal index about 2.7; 4th vein index about 1.75; 5x index about 1.2; 4c index about 1.0. Apex of first costal section with two enlarged bristles. Third costal section with heavy bristles on its basal  $\frac{3}{4}$ .

Length body 3.0 mm. (in live specimen); wings 2.7 mm.

♀. Length body 3.3 mm.; wings 2.9 mm.

**Internal characters of imagines.**

Testes bright orange (Pl. 9-G 10), with 3 inner and 5 outer coils or gyres.

Spermathecae chitinized. Ventral receptacle spiral with about 50 coils.

**Other characteristics, relationship, and distribution.**

*Eggs.*—4 filaments, anterior pair very thin and frequently break off.

*Puparia.*—Burnt-orange (Pl. 11-B 11). Each anterior spiracle with about 14 branches; horn-index about 15.0, with stem nearly absent. The puparia show anal pore of larval stage, a conspicuous character present in the puparia of all members of the group.

*Chromosomes.*—Metaphase plate shows 3 pairs of rods, one pair of V's and a pair of dots. The arms of the V-shaped element correspond to chromosomes 3 and 4 of *D. virilis*.

*Relationship.*—Belongs to the virilis group of the subgenus *Drosophila*; closely related to *D. americana*.

*Distribution.*—This species has been collected at several points in central and northeastern Texas, and in eight other states as follows: Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, Oklahoma, and Tennessee. Type material developed from single fertile female collected at Georgetown, Texas, in September, 1938.

***Drosophila novamexicana* Patterson 1941. Amer. Nat., 75:535.**

**External characters of imagines.**

♂. Arista with about 7 branches. Antennae tannish, third joint darker. Front tannish brown. Middle orbital about  $\frac{1}{2}$  anterior,  $\frac{1}{4}$  posterior. Second oral bristle about  $\frac{3}{4}$  first, third slightly enlarged. Palpi yellow with one large bristle. Carina somewhat wider below, sulcate along its length. Face yellowish. Cheeks grayish yellow, their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes dark tomato-red (Pl. 3-K 12), with dense pile.

Acrostichal hairs in 6 rows; no prescutellars. Anterior scutellars divergent. Sterno-index .84. Mesonotum rusty brown, pollinose; darker brown stripe in acrostichal region, lighter, pollinose, down mid-line. Mesopleural and pteropleural sclerites burnt brown. Scutellum yellowish brown. Legs brownish yellow, tibiae and tarsi slightly darker than femora. Apical bristles on first and second tibiae, preapicals on all three.

Abdominal segments very dark gray, or appearing almost black at times, each segment interrupted medianly, the interruptions becoming narrower posteriorly.

Wings slightly dusky, veins brown; posterior crossveins clouded. Costal index about 3.0; 4th vein index about 1.7; 5x index about 1.0; 4c index about .81. Two well-developed bristles at apex of first costal section. Third costal section with heavy bristles on its basal  $\frac{2}{3}$ .

Length body 3.0 mm. (in live specimen); wings 2.8 mm.

**Internal characters of imagines.**

Testes translucent, deep orange (Pl. 11–H 11), with 3 inner and 5 outer coils or gyres.

*Chromosomes.*—Metaphase plate shows 5 pairs of rods and a pair of dots, as in *D. virilis*, but the salivary chromosomes of the two species differ in respect to several inversions.

**Relationship and distribution.**

*Relationship.*—Belongs to the virilis group of the subgenus *Drosophila*.

*Distribution.*—A single record of a male trapped near Silver City, New Mexico, in November, 1940. The description is based on males from a derived stock which arose from a cross between *D. americana* females and the original male.

***Drosophila montana*, sp. nov.**

**External characters of imagines.**

♂. Arista with about 7 branches. Antennae tannish brown, third joint very much darker, almost black. Front dark brown, darker posteriorly. Middle orbital slightly less than  $\frac{1}{2}$  anterior,  $\frac{1}{3}$  posterior. First oral bristle long, second slender, about  $\frac{1}{4}$  length of first. Palpi tannish, darker near tip, with one prominent bristle. Carina broad below, rounded, very shallowly sulcate. Face brownish. Cheeks dark grayish yellow, their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes dark tomato-red (Pl. 3–K 12), with dense pile.

Acrostichal hairs in 6 rows; no prescutellars. Anterior scutellars divergent. Sterno-index about .82. Thorax dark blackish brown, pollinose, a brownish black stripe down entire acrostichal region, a lighter pollinose area in mid-line. Pleurae burnt brown; scutellum brown. Legs brownish, coxae a little darker; distal tarsal joints blackish. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen grayish brown, at least basal segment lighter in mid-line.

Wings somewhat dusky, veins brown; posterior crossveins clouded. Costal index about 3.3; 4th vein index about 1.5; 5x index about 1.0; 4c index about .7. Two well-developed bristles at apex of first costal section. Third costal section with heavy bristles on slightly more than the basal  $\frac{1}{2}$ .

Length body 3.2 mm. (in live specimen); wings 3.2 mm.

♀. Length body 3.4 mm.; wings 3.3 mm.

**Internal characters of imagines.**

Testes brilliant dark orange for the 3 inner and first outer coils (Pl. 9–L 12), outer 3 and  $\frac{1}{2}$  coils or gyres same color but transparent.



Spermathecae ovoid, heavily chitinized. Ventral receptacle spiral with about 38 fine coils.

**Other characteristics, relationship, and distribution.**

*Eggs.*—4 filaments.

*Puparia.*—Basic color deep brownish-orange (Pl. 13-A 12) with black markings. In some strains and under optimum food conditions, the older puparia turn nearly black. Each anterior spiracle has about 14 branches; horn-index about 11.0.

*Chromosomes.*—Metaphase plate shows 4 pairs of rods, one pair of small V's and a pair of dots. The V-shaped element is not the result of fusion of rods, but is due to an inversion or insertion in chromosome 2 which has placed the centromere near the middle of the euchromatic arm.

*Relationship.*—Belongs to the virilis group of the subgenus *Drosophila*.

*Distribution.*—We have collected this species at the following places: Estes Park, Colorado; Grand Teton and Yellowstone Parks, Wyoming; Ogden, Salt Lake City, Junction, and Zion National Park, Utah; Glenwood, New Mexico. It lives at elevations of from 4,500 to 10,000 feet, and is usually found at or above 6,500 feet. Type material from Grand Teton National Park.

*Notes.*—This species has two color phases, light and dark. The description is based on the darker form. The light form has a color pattern similar to that of *D. novamexicana*, but it has the same metaphase configuration of chromosomes as the darker form. This species is the most nearly isolated of any member of the group.

***Drosophila macrospina limpiensis*, Mainland 1941. Genetics, 27:155.**

**External characters of imagines.**

♂, ♀. Arista with about 9 branches. Antennae light brown, third joint darker. Front light brown. Middle orbital  $\frac{1}{3}$  anterior,  $\frac{1}{4}$  posterior. Second oral bristle  $\frac{3}{4}$  length of first. Palpi pale yellow, with three prominent bristles. Carina rather small, narrow above, broader below, rounded. Face brownish tan. Cheeks light tannish gray, their greatest width about  $\frac{1}{5}$  greatest diameter of eyes. Eyes scarlet-red (Pl. 1-K 12), with fine, light colored pile.

Acrostichal hairs in 8 rows; two median rows diverging somewhat just above level of posterior dorsocentrals. No prescutellars. Anterior scutellars convergent. Sterno-index about .58. Thorax light brown, shining; a slightly darker brown stripe in mid-acrostichal region, dividing somewhat at the level of the anterior dorsocentrals and, in general, following the diverging acrostichal hairs. Scutellum brown. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen blackish brown, shining, with median interruptions on all but about the last two segments; two or three basal segments with proximal brownish yellow areas extending to about the angle of the tergites. Spine of the genitalia tends to be somewhat straighter than in *D. m. macrospina*.

Wings clear, veins brown. Costal index about 2.87; 4th vein index about 1.35; 5x index about 1.1; 4c index about .74. Two well-developed bristles at apex of first costal section, dorsal one about twice the length of the ventral. Third costal section with heavy bristles on its basal  $\frac{2}{5}$ .

Length body 2.8 mm. (in live specimen); wings 2.7 mm. Females average slightly longer in body length.

**Internal characters of imagines.**

Testes sandy-yellow (Pl. 10-K 7), with 4 inner coils of large diameter, and 7 smaller outer coils or gyres. Ejaculatory sac has two posterior diverticula.

Spermathecae bell-shaped, lightly chitinized. Ventral receptacle with about 45 coils, last 30 coils very fine and in a tangled mass.

**Other characteristics, relationship, and distribution.**

*Eggs*.—4 filaments; posterior pair slightly heavier than anterior.

*Puparia*.—Dark amber (Pl. 10-K 11). Each anterior spiracle with about 13 branches; horn-index about 5.6.

*Chromosomes*.—Metaphase plate shows 5 pairs of rods and a pair of very small dots; in male the Y is shorter than the X and has a dot-like element attached at end.

*Relationship*.—Belongs to the macrospina group of the subgenus *Drosophila*.

*Distribution*.—This new subspecies was first collected in Limpia Canyon of the Davis Mountains in west Texas, in July, 1939. Since then we have collected a large series of strains from the following places: Radium Springs, Silver City, and Glenwood, New Mexico; Chiricahua and Huachuca Mountains, Patagonia, and San Bernardino, Arizona; Zion National Park, Utah; Punta de Agua, Magdalena, and Hermosillo, Sonora, Mexico. Type material from Limpia Canyon, Texas.

***Drosophila melanopalpa*, sp. nov.**

**External characters of imagines.**

♂. Arista with about 7 branches. Antennae dark brown, third joint blackish. Front black, anterior and middle orbitals arising from a silvery pollinose spot, posterior orbital from a brown spot, with a silvery area between it and the verticals. Middle orbital nearly  $\frac{1}{2}$  anterior,  $\frac{1}{3}$  posterior. Second oral about  $\frac{1}{4}$  first. Palpi nearly black, with several prominent bristles. Carina broad below, moderately sulcate. Face brownish black. Cheeks grayish yellow at their angles, darker on both sides; their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes dark red (Pl. 4-L 10), with short black pile.

Acrostichal hairs in 8 rows; no prescutellars. Anterior scutellars convergent. Sterno-index about .83. Halteres pale, basal segments, especially second, with a dark brown area laterally. Thorax dark brown, bristles arising from blackish, brown spots, irregularly fused and leaving grayish pollinose, unspotted areas. Pleurae dark brown, an indefinite blackish

stripe from base of halteres to fore coxae. Scutellum very dark brown, grayish areas alternating with bristles, a small pollinose area in the mid-basal region. Legs pale with a smoky cast, fore coxae and femora blackish; black bands near bases of tibiae; all tibiae somewhat blackened; distal ends of femora blackish. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen pale yellow, each segment with a dark brown apical band, interrupted medianly, continued anteriorly somewhat at edge of interruption and reaching the anterior margin at the angle of the tergite, terminating there. Apical corners with triangular areas connected to central bands by narrow apical bands except on first complete segment on which there is a basal but no apical connection.

Wings clear, veins brown; apex of first costal section black with two large bristles. Costal index about 2.8; 4th vein index about 1.5; 5x index about 1.0; 4c index about .83. Third costal section with heavy bristles on its basal  $\frac{1}{2}$ .

Length body 3.0 mm. (in live specimen); wings 2.7 mm.

♀. Banding on abdomen as in male, apical connections on bands and lateral areas broader.

**Internal characters of imagines.**

Testes sulphur-yellow (Pl. 9-K 1), with 8 inner and 8 outer coils or gyres.

Spermathecae oval-shaped, chitinized. Ventral receptacle spiral with about 116 coils.

**Other characteristics, relationship, and distribution.**

*Eggs*.—4 filaments; posterior pair thicker than anterior and occasionally split at end.

*Puparia*.—Reddish-orange (Pl. 3-E 12). Each anterior spiracle with about 12 branches; horn-index about 3.4.

*Chromosomes*.—Metaphase plate shows 5 pairs of rods and a pair of V's; in male Y is much shorter than X.

*Relationship*.—Belongs to the repleta group of the subgenus *Drosophila*; very closely related to *D. neorepleta*.

*Distribution*.—We have collected eight specimens of this species at Cave Creek, Chiricahua Mountains, Arizona, in August, 1941.

***Drosophila neorepleta*, sp. nov.**

**External characters of imagines.**

♂. Arista with about 6 branches. Antennae brown. Front dark brownish black, posterior orbits lighter, pollinose; anterior orbits black. Middle orbital about  $\frac{1}{2}$  other two. Second oral bristle fine, not more than  $\frac{1}{4}$  first. Palpi pale, with several bristles. Carina evenly broadened from base, forming an elongate triangle, sulcate. Face brown. Cheeks gray, their greatest width about  $\frac{1}{4}$  greatest diameter of eyes. Eyes deep red (Pl. 3-L 6), with short dark pile.

Acrostichal hairs in 8 rows; no prescutellars. Anterior scutellars convergent. Sterno-index about .74. Halteres clear, basal segment with brown spots laterally. Thorax brownish black, bristles arising from black spots, unspotted areas pollinose; very little fusion of spots. Pleurae dark brown. Legs amber, fore coxae and femora darkened somewhat; black bands near bases of tibiae, blackish areas near distal ends of femora. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen yellow, each segment with a dark brown, apical band, interrupted medianly; bands reach the anterior margin at the angle of the tergite and terminate there, leaving yellow areas between the bands and the triangular brown lateral areas in the apical corners of the tergites; in the last one or two segments there is a small, indefinite apical connection between the band and the lateral area.

Wings clear, veins brown; apex of first costal section darkened, with two heavy bristles. Costal index about 2.7; 4th vein index about 1.68; 5x index about 1.2; 4c index about .9. Third costal section with heavy bristles on its basal  $\frac{1}{2}$ .

Length body 2.9 mm. (in live specimen); wings 2.5 mm.

♀. Abdominal bands connected apically with lateral areas on all but the first complete segment. Length body 3.0 mm.; wings 2.8 mm.

#### Internal characters of imagines.

Testes pale yellow (Pl. 10-G 1), with 4 inner and 6 or 7 outer coils or gyres.

Spermathecae oval-shaped, slightly chitinized. Ventral receptacle spiral with about 107 coils.

#### Other characteristics, relationship, and distribution.

*Eggs*.—4 filaments.

*Puparia*.—Amber colored (Pl. 9-J 6). Each anterior spiracle with about 14 branches; horn-index about 3.4.

*Chromosomes*.—Metaphase plate shows 5 pairs of rods and a J-shaped autosomal pair; in male Y is shorter than X.

*Relationship*.—Belongs to the *repleta* group of the subgenus *Drosophila*; closely related to *D. repleta* Woll.

*Distribution*.—The stock upon which the description is based was sent to us by Dr. A. H. Sturtevant. The original flies were collected at Sacapulas, Guatemala (T. Dobzhansky).

#### *Drosophila linearepleta*, sp. nov.

##### External characters of imagines.

♂. Arista with about 8 branches. Antennae tannish brown. Front rusty brown, lighter anteriorly; posterior half of orbits, ocellar triangle and a narrow median line lighter, pollinose; center of ocellar triangle black; anterior portion of orbits darker brown. Middle orbital  $\frac{1}{2}$  anterior,  $\frac{1}{3}$  posterior. Second oral bristle fine and about  $\frac{1}{5}$  length of first.

Palpi pale yellow, with two prominent bristles distally. Carina broad and high below, moderately sulcate. Face light brown. Cheeks grayish yellow, darker posteriorly, their greatest width nearly  $\frac{1}{3}$  greatest diameter of eyes. Eyes bright blood-red (Pl. 3-L 6), with long, black pile.

Acrostichal hairs in 8 rows; no prescutellars. Anterior scutellars convergent. Sterno-index about .75. Thorax grayish brown, each bristle arising from a dark brown spot, those of the outside pairs of acrostichals fusing to form two brown stripes extending posteriorly to just above level of anterior dorsocentrals; other spots irregularly fused. Pleurae brownish black, indistinct dark stripes from base of wings to humerus, from base of wings to coxae and across sternopleurae. Legs tannish yellow, fore coxae and femora nearly black; black bands near bases of tibiae, distal ends of femora and, to a lesser extent, at bases of femora. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen dark yellow, each segment with a dark brown apical band, medianly interrupted; bands project anteriorly along interruption and at angle of the tergites, forming solid lateral areas except on first complete segment where the band is distinct from lateral area.

Wings clear, veins brown; posterior crossveins clouded, anterior slightly so. Apex of first costal section black, with two large bristles. Costal index about 2.8; 4th vein index about 1.5; 5x index about 1.2; 4c index about .83. Third costal section with heavy bristles on its basal  $\frac{1}{3}$ .

Length body 3.0 mm. (in live specimen); wings 2.7 mm.

♀. Length body 3.4 mm.; wings 2.9 mm.

#### **Internal characters of imagines.**

Testes pale lemon-yellow (Pl. 9-K 1), with 5 inner and 6 outer coils or gyres.

Spermathecae bell-shaped, chitinized. Ventral receptacle spiral with about 52 irregular coils.

#### **Other characteristics, relationship, and distribution.**

*Eggs.*—4 filaments.

*Puparia.*—Bright-orange (Pl. 10-L 12), with chrome-brown shading toward anterior end. Each anterior spiracle has about 14 branches; horn-index about 3.4.

*Chromosomes.*—Metaphase plate shows 5 pairs of rods and a pair of dots.

*Relationship.*—Belongs to the repleta group of the subgenus *Drosophila*.

*Distribution.*—The stock upon which the description is based was sent to us by Professor A. H. Sturtevant. The original flies were collected at Antigua, Guatemala (T. Dobzhansky).

#### ***Drosophila fuliginea*, sp. nov.**

##### **External characters of imagines.**

♂. Arista with about 7 branches. Antennae tannish brown, third joint darker. Front sooty black, ocellar triangle and orbits posterior to anterior orbital silvery gray; orbits anterior to the anterior orbitals tannish brown.

Middle orbital  $\frac{1}{3}$  other two. Only one prominent oral bristle, second about  $\frac{1}{4}$  length of first. Carina broad below, somewhat flattened. Palpi dirty yellow with several bristles. Face grayish black. Cheeks black, their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes maroon red (Pl. 4-L 10), with long black pile.

Acrostichal hairs very irregular, in 6-8 rows; no prescutellars. Anterior scutellars convergent. Sterno-index about .85. Pleurae black; mesonotum pollinose gray, each bristle arising from a black spot, these fusing into large, irregular splotches. Legs black, tarsi, especially those of hind legs, with slightly yellowish cast. Apical bristles on first and second tibiae, preapicals on all three.

Abdominal tergites black, with a narrow yellow interruption medially; a small, narrow basal yellowish area often visible on either side of median interruption; lateral areas solid.

Wings slightly dusky, veins somewhat dusky; apex of first costal section slightly darkened. Costal index about 3.0; 4th vein index about 1.61; 5x index about 1.16; 4c index about .77. Two well-developed bristles at apex of first costal section; third costal section with heavy bristles on its basal  $\frac{1}{3}$ .

Length body 2.8 mm. (in live specimen); wings 2.8 mm.

♀. Length body 3.1 mm.; wings 3.0 mm.

**Internal characters of imagines.**

Testes transparent lemon-yellow (Pl. 10-J 1), with 7 inner and 8 outer coils or gyres. Paragonia very large.

Spermathecae bell-shaped, heavily chitinized. Ventral receptacle spiral, with 60-65 slightly irregular coils.

**Other characteristics, relationship, and distribution.**

*Eggs.*—4 stout filaments, with rudimentary branches sometimes present.

*Puparia.*—Transparent orange (Pl. 10-I 9), the flattened anterior portion is edged with black. Each anterior spiracle has about 17 branches; horn-index about 4.3.

*Chromosomes.*—Metaphase plate shows one pair of rods, 2 pairs of large V's and a pair of small V's.

*Relationship.*—Belongs to the repleta group of the subgenus *Drosophila*.

*Distribution.*—Has been collected in considerable numbers around Silver City, Glenwood, and Capitan, New Mexico. Type material from Silver City.

***Drosophila nigrospiracula*, sp. nov.**

**External characters of imagines.**

♂, ♀. Arista with about 7 branches. Antennae light brown, third joint darker. Front dark brown, lighter anteriorly; orbits slightly pollinose, bristles of anterior orbits arising from dark spots. Middle orbital bristle  $\frac{1}{2}$  length other two. Second oral bristle  $\frac{1}{2}$  length of first. Carina evenly

broadened, sulcate. Face light brown. Cheeks yellowish gray, their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes red (Pl. 2–L 12), with long black pile.

Acrostichal hairs in 8 rows; no prescutellars. Anterior scutellars convergent. Whole thorax dark brownish gray, bristles arising from dark brownish spots, which fuse to form large dark areas surrounding lighter and smaller pollinose areas. Sterno-index .8. Legs brown, fore coxae lighter; an indistinct dark band near base of each tibia, strongest on hind leg. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen dark yellowish gray, each segment with a dark gray band almost as wide as entire segment, narrowly interrupted; bands continue to margin where they form solid lateral areas.

Wings clear. Costal index about 3.0; 4th vein index about 1.5; 5x index about 1.0; 4c index about .8. Apex of first costal section very slightly darkened, with two well-developed bristles. Third costal section with heavy bristles on its basal  $\frac{1}{2}$ .

Length body 3.0 mm. (in live specimen); wings 2.6 mm.

**Internal characters of imagines.**

Testes bright orange (Pl. 10–H 10), with 6 inner and 6 outer coils or gyres.

Spermathecae black, slightly chitinized; ventral receptacle long, loose spiral, with approximately 70 coils.

**Other characteristics, relationship, and distribution.**

*Eggs.*—4 very thin filaments, each about  $\frac{1}{3}$  longer than egg.

*Puparia.*—Orange colored (Pl. 11–I 10). Each anterior spiracle black, with about 17 branches; horn-index about 3.3.

*Chromosomes.*—Metaphase plate shows 5 pairs of rods and one pair of dots in both male and female.

*Relationship.*—Belongs to repleta group of the subgenus *Drosophila*.

*Distribution.*—First collected in September, 1940, in Sabino Canyon, Santa Catalina Mountains, and in desert ten miles from Tucson, Arizona, by G. B. Mainland. In August, 1941, our stock collectors captured nearly a thousand specimens near Magdalena, Sonora, Mexico.

*Notes.*—In Arizona and Sonora it has been found only in association with the giant cactus *Carnegiea gigantea*. However, in the latter place specimens were also found feeding on the fruit of the organpipe cactus, *Cereus Thurberi*. Type material from Tucson, Arizona.

***Drosophila leonis*, sp. nov.**

**External characters of imagines.**

♂. Arista with about 8 branches. Antennae tannish brown, third joint slightly darker. Front tannish brown, darker posteriorly; posterior half of orbits lighter, orbital bristles arising from blackish spots; ocellar triangle blackish. Middle orbital about  $\frac{1}{2}$  other two. One prominent oral

bristle, second only about  $\frac{1}{4}$  length of first. Palpi light brown with several long, thin bristles. Carina broad below, sulcate. Face tannish brown. Cheeks grayish, their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes vermilion-like (Pl. 2-K 12), with long black pile.

Acrostichal hairs in 8 rows; no prescutellars. Anterior scutellars convergent. Sterno-index about .70. Mesonotum pollinose gray, the bristles arising from blackish brown spots, these fusing into irregular splotches. Pleurae gray, an indefinite, darker band running from propleura to base of the haltere, and another, even more indistinct, from the humerus to the wing base. Scutellum dark brown, the margin pollinose gray, the scutellar bristles arising from dark brown areas. Legs tannish brown, fore coxae a little darker; a narrow black band on either side of the tibio-femoral joints, darkest on hind legs; the bands of the tibiae darker than those of the femora. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen yellow, each segment with an apical dark brown band, interrupted medianly. At the interruption the bands extend a little anteriorly, and at the angle of the tergites they extend completely to the base; lateral areas of posterior segments are solid, those of the anterior segments have an irregular yellow area in their centers.

Wings clear; anterior and posterior crossveins moderately clouded; slight darkening at tip of second longitudinal vein. Apex of first costal section dark. Costal index about 2.8; 4th vein index about 1.7; 5x index about 1.35; 4c index about .98. Apex of first costal section with two well-developed bristles. Third costal section with heavy bristles on its basal  $\frac{1}{4}$ .

Length body 2.7 mm. (in live specimen); wings 2.5 mm.

♀. Length body 3.0 mm.; wings 2.9 mm.

#### Internal characters of imagines.

Testes with 3 inner, bright orange colored coils (Pl. 9-J 9) and 2 and  $\frac{1}{2}$  outer, light cream colored coils or gyres (Pl. 9-E 2). The ejaculatory sac large with two very large posterior diverticula.

Spermathecae small, spherical, not chitinized. Ventral receptacle spiral with about 30 fine coils.

#### Other characteristics, relationship, and distribution.

*Eggs*.—4 thin filaments.

*Puparia*.—Brownish-orange (Pl. 11-E 12). Each anterior spiracle has about 7 branches; horn-index about 10.0.

*Chromosomes*.—Metaphase plate shows 6 pairs of rods; one pair of autosomes has dot-like elements attached to ends; Y is shorter than X in male.

*Relationship*.—Belongs to repleta group of the subgenus *Drosophila*.

*Distribution*.—The stock upon which the description of this new species is based was sent to us by Professor A. H. Sturtevant. The original flies were collected at San Josecito, Nuevo Leon, Mexico.



***Drosophila hydeoides*, sp. nov.****External characters of imagines.**

♂, ♀. Arista with about 7 branches. Antennae brown, third joint darker. Front dark brown, posterior section of orbits pollinose. Middle orbital bristle  $\frac{1}{3}$  other two. Second oral bristle half as long as first. Carina broad below, distinctly sulcate. Face brown. Cheeks yellowish gray, their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes wine colored (Pl. 5-L 6), with dense, short, black pile.

Acrostichal hairs in 8 rows; no prescutellars. Anterior scutellars convergent. Whole thorax dark brownish gray, bristles arising from dark brown spots which fuse into shapeless splotches that intermingle with lighter pollinose areas. Sterno-index about .88. Legs tannish yellow, fore coxae and femora light brown; a dark band near base of each tibia, an independent one near distal end of each femur; bands darkest on hind legs. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen yellow, each segment with a wide, medianly interrupted dark brown or black band, which reaches the anterior margin at the angle of the tergite, forming solid dark lateral areas.

Wings clear. Costal index about 3.5; 4th vein index about 1.7; 5x index about 1.0; 4c index about .78. Apex of first costal section slightly darkened, with two prominent bristles. Third costal section with heavy bristles on its basal  $\frac{1}{2}$ .

Length body 3.0 mm. (in live specimen); wings 2.8 mm.

**Internal characters of imagines.**

Testes translucent, tinged with yellow, with about 20 inner and 25 outer coils or gyres.

Spermathecae flask shaped, slightly chitinized. Ventral receptacle long spiral with about 330 fine coils.

**Other characteristics, relationship, and distribution.**

*Eggs*.—4 filaments.

*Puparia*.—Burnt-orange (Pl. 11-L 8). Each anterior spiracle with about 22 branches; horn-index about 4.5.

*Chromosomes*.—Metaphase plate shows 6 pairs of rods, with X and Y unequal, the Y being shorter.

*Relationship*.—Belongs to repleta group of the subgenus *Drosophila*.

*Distribution*.—Strain used in description came from flies collected at San Josecito, Nuevo Leon, Mexico, and was sent to us by Professor A. H. Sturtevant.

***Drosophila nigrohydei*, sp. nov.****External characters of imagines.**

♂. Arista with about 7 branches. Antennae tannish brown, third joint much darker. Front dark brown, posterior orbits, ocellar triangle and a narrow median line lighter, pollinose; orbital bristles arising from brown

spots; anterior orbits dark brown. Middle orbital bristle  $\frac{1}{2}$  anterior,  $\frac{1}{3}$  posterior. Only one prominent oral bristle, second about  $\frac{1}{5}$  first. Palpi pale yellow, with several prominent bristles. Carina very low and flat dorsally, broad and high below, sulcate. Face brown. Cheeks grayish yellow, their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes dark red (Pl. 5—L 6), with dark pile.

Acrostichal hairs in 8 rows; no prescutellars. Anterior scutellars convergent. Sterno-index about .83. Thorax brown, bristles arising from dark brown spots which fuse into rather large, irregular splotches; unspotted areas grayish pollinose. Pleurae burnt brown. Scutellum dark brown, grayish pollinose areas along margin anterior to each bristle. Legs amber, black bands near bases of tibiae, distal ends of femora blackish, third legs darkest; fore femora often darkened. Apical bristles on first and second tibiae, preapicals on all three. Medially directed recurved hairs on male fore tarsus of length equal to or slightly greater than width of tibial joint.

Abdomen dark yellow, each segment with a wide, dark brown apical band, interrupted medianly; the bands reach the anterior margin at the angle of the tergite forming solid lateral areas.

Wings clear, veins brown; apex of first costal section blackish, with two large bristles. Costal index about 3.3; 4th vein index about 1.6; 5x index about .94; 4c index about .8. Third costal section with heavy bristles on its basal  $\frac{1}{3}$ .

Length body 3.2 mm. (in live specimen); wings 2.9 mm.

♀. Length body 3.6 mm.; wings 3.1 mm.

#### **Internal characters of imagines.**

Testes bright chrome-yellow (Pl. 9 1—L 1), with 10 inner and 12 outer coils or gyres.

Spermathecae bell-shaped, slightly chitinized. Ventral receptacle spiral with about 340 fine, regular coils.

#### **Other characteristics, relationship, and distribution.**

*Eggs.*—4 filaments.

*Puparia.*—Reddish amber (Pl. 11—L 11). Each anterior spiracle with about 17 branches; horn-index about 6.3.

*Chromosomes.*—Metaphase plate shows 6 pairs of rods with constricture in X in female; 6 pairs of rods with Y shorter than X, in male.

*Relationship.*—Belongs to the repleta group of the subgenus *Drosophila*.

*Distribution.*—Collected at Oak Creek, Chisos Mountains, Texas, and Cave Creek, Chiricahua Mountains, Arizona. Type material from Chisos Mountains.

#### ***Drosophila bifurca*, sp. nov.**

##### **External characters of imagines.**

♂. Arista with about 9 branches. Second joint of antennae yellowish brown, third joint dark brown, covered with fine tan colored hairs. Front

dark brown, orbits lighter. Middle orbital  $\frac{1}{3}$  other two. Only one prominent oral bristle, which is about twice the length of other five. Carina sulcate. Face light brown. Cheeks yellowish brown, their greatest width nearly  $\frac{1}{3}$  greatest diameter of eyes. Eyes brick-red (Pl. 5-L 11), with thick dark pile.

Acrostichal hairs in 8 rows; no prescutellars. Anterior scutellars convergent. Mesonotum and scutellum pollinose brown, each bristle and hair arising from a dark brown dot; a faint light stripe along mid-dorsal line, and just lateral to each dorsocentral row. Pleurae pollinose brown, darker in some specimens. Sterno-index .8. Legs yellowish brown; apical and preapical bristles on first and second tibiae, preapicals on third. Last tarsal joints darker brown. Very long recurved hairs on medial side of fore tarsi in male.

Abdomen yellowish gray, each segment with a wide medially interrupted light brown band on its posterior margin; these bands nearly reach the anterior margin laterally, where they terminate in deep brownish areas.

Wings clear. Costal index about 3.6; 4th vein index about 1.3; 5x index about .8. 4c index about .6. Two well-developed bristles at apex of first costal section; third costal section with heavy bristles on its basal  $\frac{1}{3}$ .

Length body 4.5 mm. (in live specimen); wings 3.4 mm.

♀. Abdominal bands wider and darker than in male; medial interruptions narrower. Length body 4.5 mm.; wings 3.5 mm.

**Internal characters of imagines.**

Testes creamy white (Pl. 10-F 1), spiral, with about 23 small inner coils and 28 outer coils or gyres. Paragonia are tubular with distal ends twisted or coiled.

Spermathecae spherical, clear and not chitinized. The ventral receptacle is very long, finely coiled with an average of about 735 coils.

**Other characteristics, relationship, and distribution.**

*Eggs.*—4 filaments; posterior pair split for about  $\frac{1}{3}$  length, each filament with either two or three forks; anterior filaments usually not split.

*Puparia.*—Rust colored (Pl. 4-A 12); each anterior spiracle with about 23 branches; horn-index 2.8.

*Chromosomes.*—Metaphase plate shows five pairs of rods and one pair of dots; constrictions in all rod-shaped chromosomes.

*Relationship.*—Belongs to the repleta group of the subgenus *Drosophila*.

*Distribution.*—Single females collected at Eagle Pass and Ft. Worth, Texas; rather common in Limpia and Wild Rose Canyons in West Texas; three specimens collected at Tombstone Canyon, Mule Mountain, Arizona. Type material from Wild Rose Canyon.

***Drosophila pachea*, sp. nov.****External characters of imagines.**

♂. ♀. Arista with about 7 branches. Antennae light brown, third joint dark brown. Front dull brown, orbits and anterior region lighter. Middle orbital  $\frac{1}{3}$  other two. Second oral nearly  $\frac{1}{2}$  first. Carina broad below, sulcate. Palpi yellowish brown, with several bristles arising from a dark brown spot. Face light brown. Cheeks grayish yellow, their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes red (Pl. 2-K 12), with short black pile.

Acrostichal hairs in 8 rows; slightly enlarged prescutellar hairs. Mesonotum dark, dull brown, in male with a slight amber cast; very indistinct darker areas at bases of some bristles, these fusing to form very faint lighter lines along dorsocentral rows and mid-line, leaving two dark stripes in acrostichal region; striping very faint on male, more noticeable on female. Sterno-index .66. Legs light yellowish brown. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen dark brown, the two basal segments lighter or partially interrupted medially.

Wings clear, veins dark. Costal index about 3.1; 4th vein index about 1.6; 5x index about 1.21; 4c index about .85. Two heavy bristles at apex of first costal section. Third costal section with heavy bristles on its basal  $\frac{1}{3}$ .

Length body 2.3 mm. (in live specimen); wings 1.9 mm.

**Internal characters of imagines.**

Testes yellow (Pl. 9-J 5), with 16 inner transparent coils and 12-15 outer coils or gyres.

Spermathecae chitinized, with long non-chitinized stems. Ventral receptacle very tightly coiled spiral, irregularly twisted about other organs, and with about 330 coils.

**Relationship and distribution.**

*Relationship.*—Belongs to the repleta group of the subgenus *Drosophila*.

*Distribution.*—A single record of two males and two females taken by stock collectors about three miles north of Hermosillo, Sonora, Mexico, in August, 1941.

*Notes.*—We were not able to breed these flies in the laboratory, hence do not know character of egg, puparia, or chromosomes.

***Drosophila ritae*, sp. nov.****External characters of imagines.**

♂. Arista with about 7 branches. Antennae tan, third joint darker. Front tannish brown, lighter anteriorly; orbits and ocellar triangle pollinose. Middle orbital about  $\frac{1}{2}$  other two. Second oral bristle about as long as first. Carina triangular, flaring below and not rounded, sulcate.

Face tannish brown. Cheeks yellowish gray, their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes red (Pl. 2-L 11), with long black pile.

Acrostichal hairs irregular, usually in 8 rows; slightly enlarged prescutellar hairs. Anterior scutellers divergent. Thorax reddish brown, a narrow pollinose line in mid-dorsal region; bristles arising from indistinct brown spots. Sterno-index .88. Legs pale yellow, with faint, indistinct dark bands near base of tibiae and apices of femora, darkest on hind legs. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen grayish yellow, each segment with a brown band, about as wide as entire segment, interrupted medially and extending to margin on all but first two segments, forming solid lateral areas.

Wings clear. Costal index about 2.8; 4th vein index about 1.5; 5x index about 1.1; 4c index about 1.1. Apex of first section of costal vein not darkened, has two prominent bristles. Third section of costa with heavy bristles on its basal  $\frac{1}{3}$ .

Length body 2.5 mm. (in live specimen); wings 2.2 mm.

♀. Abdominal segments with interrupted bands narrower medially in female, widening to reach the anterior margin at angle of tergite and forming solid lateral areas.

Length body 3.3 mm.; wings 2.6 mm.

**Internal characters of imagines.**

Testes yellowish (Pl. 9-L 1), with 2 inner and three outer coils or gyres. Spermathecae not chitinized. Ventral receptacle with about 18 coils.

**Other characteristics, relationship, and distribution.**

*Eggs.*—4 long slender filaments.

*Puparia.*—Light orange (Pl. 10-J 8). Each anterior spiracle with about 17 branches; horn-index about 3.5.

*Chromosomes.*—Metaphase plate shows 5 pairs of rods and one pair of dots.

*Relationship.*—Belongs to repleta group of the subgenus *Drosophila*.

*Distribution.*—A strain of this species was first sent to us by Dr. A. H. Sturtevant. The original flies had been collected at Santa Rita, Arizona. We have since collected it at the following places: Wild Rose and Limpia Canyons and Chisos Mountains, Texas; Silver City and Glenwood, New Mexico; Tombstone Canyon, Mule Mountains, and Ramsey Canyon, Huachuca Mountains, Arizona. Type material from Wild Rose Canyon, Texas.

***Drosophila brevicarinata*, sp. nov.**

**External characters of imagines.**

♂. Arista with about 8 branches. Antennae tannish brown, third joint darker. Front brown, rusty brown anteriorly, posterior orbits and large ocellar triangle lighter, pollinose; anterior orbits brown. Middle orbital about  $\frac{1}{2}$  other two. One prominent oral bristle followed by an irregularly

disposed series of hairs. Palpi very pale yellow, with several prominent bristles. Carina short dorsoventrally, low dorsally, broad and high ventrally, widely sulcate. Face pale yellow. Cheeks grayish yellow, their greatest width a little more than  $\frac{1}{3}$  greatest diameter of eyes. Eyes scarlet-like (Pl. 1–L 12), with dense dark pile.

Acrostichal hairs in 8 rows, irregular; no prescutellars. Anterior scutellars convergent. Sterno-index about .83. Thorax grayish brown, pollinose, bristles arising from small dark brown spots; very little fusion of spots into splotches. Pleurae grayish yellow. Legs yellow, a black band near base of tibiae, very faint on first and second legs; distal end of third femora slightly blackened. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen yellow, each segment with a narrowly interrupted, wide brown band, each side of each band with a shallow, basal yellow concavity; bands extend laterally to form lighter but solid areas, except on first complete segment where the lateral area is separate from the band.

Wings clear, veins light brown. Costal index about 2.8; 4th vein index about 1.8; 5x index about 1.1; 4c index about .97. Apex of first costal section with two well-developed bristles. Third costal section with heavy bristles on its basal  $\frac{1}{3}$ .

Length body 2.3 mm. (in live specimen); wings 2.0 mm.

♀. Abdominal bands narrower, occupying center of segments and with narrower interruptions than in male; all segments with bands and lateral areas continuous.

Length body 2.8 mm.; wings 2.4 mm.

#### Internal characters of imagines.

Testes bright yellow (Pl. 10–L 2), with 3 inner and 3 outer coils or gyres.

Spermathecae small, spherical and not chitinized. Ventral receptacle spiral with about 25 slightly irregular coils.

#### Other characteristics, relationship, and distribution.

*Eggs*.—4 filaments.

*Puparia*.—Reddish brown (Pl. 11–G 12). Each anterior spiracle with about 9 branches; horn-index about 10.5.

*Chromosomes*.—Metaphase plate shows 5 pairs of rods and a pair of dots.

*Relationship*.—Belongs to the repleta group of the subgenus *Drosophila*; closely related to *D. ritae*, which it somewhat resembles.

*Distribution*.—The stock upon which the description is based was sent to us by Professor A. H. Sturtevant. The original flies were collected at San Josecito, Nuevo Leon, Mexico.

***Drosophila longicornis*, sp. nov.****External characters of imagines.**

♂. Arista with about 7 branches. Antennae tannish brown, third joint darker. Front chocolate brown, lighter anteriorly; orbits pollinose, with bristles arising from black spots; ocellar area and narrow median line lighter and pollinose. Middle orbital  $\frac{1}{3}$  other two. Second oral  $\frac{1}{2}$  length of first. Carina only slightly broader below, slightly sulcate. Face tannish. Cheeks pale, grayish yellow, their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes red (Pl. 1-I 12), with short black pile.

Acrostichal hairs in 8 rows; no prescutellars. Anterior scutellars convergent. Several hairs enlarged anterior to and in same row with dorso-centrals. Thorax gray, bristles arising from blackish brown spots, which fuse to form two irregular stripes along acrostichal rows. Sterno-index .8. Legs light brownish yellow; dark band near base of each tibia, fainter one near distal end of each femur. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen pale, grayish yellow, each segment with a brown band interrupted medially and in lateral area, leaving a narrow elongate brown area on the margin.

Wings clear, crossveins moderately clouded. Costal index about 3.2; 4th vein index about 1.9; 5x index about 1.3; 4c index about .9. Apex of first costal section black with two heavy bristles. Third costal section with heavy bristles on its basal  $\frac{1}{4}$ .

Length body 2.6 mm. (in live specimen); wings 2.2 mm.

♀. Bands of abdominal segments darker, with lateral areas usually solid. A small indistinct lateral interruption is sometimes visible in anterior segments. Length body 2.9 mm.; wings 2.5 mm.

**Internal characters of imagines.**

Testes empire-yellow (Pl. 9-K 3), with 2 inner and 3 outer coils or gyres.

Spermathecae very small, spherical, with chitinized inner structure enveloped by a transparent covering. Ventral receptacle elongated with about 15 loosely arranged coils.

**Other characteristics, relationship, and distribution.**

*Eggs.*—4 long slender filaments.

*Puparia.*—Jonquil color (Pl. 9-J 5). Each anterior spiracle with about 12 branches; horn-index 1.5, longest horns for any known *Drosophila*.

*Chromosomes.*—Metaphase plate shows 4 pairs of short rods, one pair of long rods and a pair of dots; in male the long pair is represented by a long and short rod, the X and Y chromosomes.

*Relationship.*—Belongs to the repleta group of the subgenus *Drosophila*.

*Distribution.*—Absent or extremely rare in north and east Texas, but very common in central and southern parts of state and ranges down into

the states of Coahuila and Nuevo Leon, Mexico. Westward, its distribution range extends into west Texas, New Mexico and Arizona. A single specimen was taken in Zion National Park, Utah. In Sonora, Mexico, specimens were trapped at Magdalena and Hermosillo. Type material from Austin, Texas.

*Notes.*—Nothing very definite is known about its food habits. The life cycle lasts for over a month, due to the long time required for the adults to mature.

### ***Drosophila hamatofila*, sp. nov.**

#### **External characters of imagines.**

♂. Arista with about 7 branches. Antennae tannish brown. Front light brown, lighter anteriorly; orbits and a small median area lighter, pollinose. Middle orbital  $\frac{1}{4}$  other two. Second oral  $\frac{1}{2}$  length of first. Carina truncate below, moderately sulcate. Face tannish yellow. Cheeks pale yellowish gray, their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes red (Pl. 1–I 12), with long black pile.

Acrostichal hairs irregular, usually in 8 rows; no prescutellars. Anterior scutellars convergent. Mesonotum gray pollinose, with slightly reddish cast; spots from which bristles arise not very prominent. Pleurae light brownish gray. Sterno-index .8. Legs pale yellow, occasionally a slightly darker band near base of tibiae, but not usually visible. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen yellow, each segment with an interrupted light brown band which fades away laterally. Margins of tergites with very faint, indistinct, light brown areas.

Wings clear. Apex of first costal section clear with two heavy bristles. Costal index 3.1; 4th vein index about 1.6; 5x index about 1.3; 4c index about .85. Heavy bristles on basal  $\frac{1}{4}$  of third costal section.

Length body 2.5 mm. (in live specimen); wings 2.3 mm.

♀. Abdominal bands darker, lateral margins solid, lighter in anterior segments. Length body 2.9; wings 2.5 mm.

#### **Internal characters of imagines.**

Testes yellowish white (Pl. 9–D 1), with 4 inner and 5 outer coils or gyres.

Spermathecae small, chitinized, with ridges radiating from center and giving a corrugated appearance. Ventral receptacle spiral with 15 fine coils.

#### **Other characteristics, relationship, and distribution.**

*Eggs.*—4 filaments, each terminating in a small hook.

*Puparia.*—Buff colored (Pl. 11–K 7). Each anterior spiracle with about 11 branches; horn-index 2.3.



*Chromosomes.*—Metaphase plate shows 4 pairs of short rods, one pair of long rods and a pair of dots; the long rods are the sex-chromosomes and in the male are represented by a long rod and a small V, the X and Y.

*Relationship.*—Belongs to the repleta group of the subgenus *Drosophila*.

*Distribution.*—Its distribution range extends from about the 95th meridian in Texas westward into New Mexico, Arizona and California. It is common in central and southwestern Texas. West of Texas it has been taken at the following places: Las Cruces and Radium Springs, Gila National Park, New Mexico; Rustler's Park and San Bernardino, Arizona; Zion National Park, Utah; Magdalena, Sonora, Mexico, and at several points in California. We have also seen one specimen from Muzquiz, Coahuila, Mexico. Type material from Round Rock, Texas.

*Notes.*—At Round Rock, Texas, it was found feeding on the fruit of the common prickly pear, *Opuntia lindheimeri*.

### ***Drosophila peninsularis*, sp. nov.**

#### **External characters of imagines.**

♂. Arista with about 8 branches. Antennae tannish brown, third joint darker; hairs of second segment arising from dark spots. Front tannish brown, orbits pollinose; posterior orbitals, verticals and hairs of anterior dorsal orbit arising from brown spots. Middle orbital  $\frac{1}{3}$  other two. Second oral bristle about  $\frac{1}{3}$  length of first. Carina broadened below, moderately sulcate. Face very light brown. Cheeks pale yellow, their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes vermilion-like (Pl. 3-K 12), with short black pile.

Acrostichal hairs in 8 rows; slightly enlarged hairs at prescutellar position. Anterior scutellars convergent. Mesonotum tannish brown, bristles and hairs arising from brown spots. Pleurae pale, grayish yellow; an indistinct gray stripe from about the base of fore coxae to base of halteres; sterno-pleurae somewhat darkened. Sterno-index about .78. Legs pale yellow, with dark band near base of tibiae, a fainter one near apex of femora. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen yellowish, each segment with an interrupted, dark grayish band, which reaches anterior margin at angle of tergites. Lateral margins with elongate dark area, those of posterior segments with an apical connection with central band.

Wings clear. Costal index about 2.5; 4th vein index about 1.6; 5x index about 1.25; 4c index about .95. Apex of first costal section dark, with two bristles. Heavy bristles on basal  $\frac{1}{2}$  of third costal section.

Length body 2.7 mm. (in live specimen); wings 2.2 mm.

♀. Length body 3.4 mm.

#### **Internal characters of imagines.**

Testes canary-yellow (Pl. 9-L 5), with 2 and  $\frac{1}{2}$  inner and 3 outer coils or gyres.

Spermathecae very slightly chitinized. Ventral receptacle arises as straight tube which terminates in about 24 irregular coils.

**Other characteristics, relationship, and distribution.**

*Eggs*.—4 long, slender, slightly wavy filaments.

*Puparia*.—Golden-orange (Pl. 9—L 9). Each anterior spiracle has about 15 branches; horn-index 3.4.

*Chromosomes*.—Metaphase plate shows 5 pairs of rods and a pair of dots; the Y is a small V.

*Relationship*.—Belongs to repleta group of the subgenus *Drosophila*.

*Distribution*.—This species has been collected in Florida only, at the following places: Lake McKethan, Avon Park, Miami, Everglades, Myakka State Park and Withlacoochee River. Type material from Lake McKethan.

*Notes*.—With the exception of three specimens collected at a produce house in Miami, it has always been found in the country.

***Drosophila mercatorum*, sp. nov.**

**External characters of imagines.**

♂. Arista with 7 or 8 branches. Antennae very light brown, bristles on second segment arising from darker spots, third joint darker brown. Front light brown, ocellar area and a narrow median area lighter and somewhat pollinose; orbits lighter and pollinose, middle and posterior orbital setae of anterior orbit arising from darker brown areas. Middle orbital about  $\frac{1}{2}$  other two. Second oral about  $\frac{1}{2}$  length of first. Carina broad below, moderately sulcate. Palpi pale yellow with several long, thin bristles. Face very light tan. Cheeks pale yellow, their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes cherry red (Pl. 2—L 12), with long black pile.

Acrostichal hairs in 8 rows; hairs of prescutellar position slightly enlarged. Anterior scutellars convergent. Sterno-index about .83. Mesonotum light pollinose brown, bristles arising from dark brown spots. Pleurae light tannish brown, an indistinct darker band from base of fore coxae to base of halteres. Legs very pale yellow, an indefinite faint, blackish band near base of each tibia, darkest on third leg. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen pale lemon-yellow, each segment with an exceedingly faint grayish band, interrupted medianly. Near angle of tergite the band tends to turn anteriorly to base. Laterally it persists only as a very faint grayish area in the apical corners of the lateral areas.

Wings clear. Costal index about 2.8; 4th vein index about 1.7; 5x index about 1.33; 4c index about .91. Apex of first costal section blackened, with two prominent bristles. Third costal section with heavy bristles on its basal  $\frac{2}{5}$ .

a narrow brown area. Length body 3.0 mm.; wings 2.8 mm.

♀. Abdominal bands as in male, but darker brown and more widely interrupted. Lateral margins of all but last one or two segments with a narrow brown area. Length body 3.0 mm.; wings 2.8 mm.

**Internal characters of imagines.**

Testes pale yellow (Pl. 9-E 1), with one and  $\frac{1}{2}$  inner and 2 and  $\frac{1}{2}$  outer coils or gyres.

Spermathecae spherical, not chitinized. Ventral receptacle arises as straight tube which terminates in about 6 coils.

**Other characteristics, relationship, and distribution.**

*Eggs.*—4 long, slender wavy filaments.

*Puparia.*—Light orange (Pl. 10-K 7). Each anterior spiracle has about 16 branches; horn-index about 5.5.

*Chromosomes.*—Metaphase plate shows 3 pairs of rods, one pair of large V's and a pair of small V's; small dot-like element attached to end of each X chromosome; Y chromosome is absent in male.

*Relationship.*—Belongs to repleta group of the subgenus *Drosophila*.

*Distribution.*—First collected at Santa Barbara and Bell, California, in 1940 by Mr. G. B. Mainland, who also captured a single specimen in a produce house in Tucson, Arizona. In June, 1941, another specimen was taken in a produce house in New Orleans, Louisiana. A slightly darker strain of this same species occurs in the Hawaiian Islands, where it has been called *D. mulleri*. Mr. E. C. Zimmerman of the University of Hawaii kindly sent us specimens collected at Honolulu. Breeding tests between strains from California and Hawaii demonstrate that the two forms belong to the same species. This species has always been taken in fruit stores or produce houses. Type material from Santa Barbara, California.

***Drosophila aldrichi* Patterson and Crow 1940. Tex. Pub., 4032: 251.****External characters of imagines.**

♂. Arista with about 7 branches. Antennae tan, third joint darker. Front tannish brown, orbits and large ocellar triangle lighter, pollinose; bristles arising from black spots. Middle orbital about  $\frac{1}{2}$  other two. Second oral bristle about  $\frac{1}{3}$  length of first. Carina broad below, sulcate. Palpi pale with several prominent bristles. Face tannish yellow, very pale. Cheeks pale yellowish gray, their greatest width about  $\frac{1}{4}$  greatest diameter of eyes. Eyes vermilion-like (Pl. 2-H 12), with dense black pile.

Acrostichal hairs in 8 rows; no prescutellars. Anterior scutellars convergent. Sterno-index .75. Mesonotum grayish brown, the bristles arising from dark brown spots. Pleurae brownish gray, a faint indistinct burnt brown stripe from base of halteres to base of coxae and one across sternopleura; both variable in intensity. Legs pale brownish yellow, a black band near base of each tibia, faint on front leg. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen pale yellow, each segment with an interrupted brown band which bends toward and reaches the anterior margin at the angle of the tergite, leaving a triangular lateral area separated from the central band except on the last two segments where there is a basal connection.

Wings clear, veins brown; apex of first costal section black. Costal index about 2.6; 4th vein index about 2.2; 5x index about 1.3; 4c index about 1.1. Two well-developed bristles at apex of first costal section; third costal section with heavy bristles on its basal  $\frac{1}{4}$ .

Length body 2.5 mm. (in live specimen) ; wings 2.2 mm.

♀. Lateral areas of abdominal bands less distinctly separated from central band than in male.

**Internal characters of imagines.**

Testes deep orange (Pl. 10–L 12), with 2 inner and 2 and  $\frac{3}{4}$  outer coils or gyres.

Spermathecae spherical, not chitinized. Ventral receptacle poorly formed, twisted and usually without distinct coiling.

**Other characteristics, relationship, and distribution.**

*Eggs*.—4 filaments; anterior pair about  $\frac{2}{3}$  length of posterior pair.

*Puparia*.—Orange-tan color (Pl. 12–L 5). Each anterior spiracle with about 9 branches; horn-index 2.3.

*Chromosomes*.—Metaphase plate shows 5 pairs of rods and a pair of dots; in male Y is shorter than X.

*Relationship*.—Belongs to the *mulleri* group of the subgenus *Drosophila*. Closely related to *D. mulleri* Sturtevant. *Mulleri* females crossed to *aldrichi* males produce a few hybrids which are completely sterile. The reciprocal cross is sterile.

*Distribution*.—This species is found scattered over most of Texas. A single male was sent to the laboratory by Dr. Albert P. Blair, who collected the specimen in the Wichita Mountains near Lawton, Oklahoma. Our stock collectors trapped 59 specimens of this species in a cactus patch near Hermosillo, Sonora, Mexico, in August, 1941.

*Notes*.—This species feeds and breeds on the common prickly pear, *Opuntia lindheimeri*. It is found in great numbers in south Texas where this species of cactus is abundant. Type material from Austin, Texas.

***Drosophila mojavensis* Patterson and Crow 1940. Tex. Pub., 4032:251.**

**External characters of imagines.**

♂. Arista with about 7 branches. Antennae tannish brown, third joint darker. Front light brown, orbits and large ocellar triangle lighter, pollinose; orbital bristles arising from light brown, non-pollinose areas. Middle orbital scarcely less than  $\frac{1}{2}$  other two. Second oral about  $\frac{1}{2}$  length of first. Carina broad below, sulcate. Palpi pale yellow, with small bristles only. Face tannish. Cheeks yellowish gray, their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes vermilion-like (Pl. 1–I 12), with dense black pile.

Acrostichal hairs in 8 rows; no prescutellars. Anterior scutellars convergent. Sterno-index about .8. Mesonotum light brownish yellow, bristles arising from medium brown spots; unspotted areas somewhat

pollinose. Legs pale yellow; exceedingly faint dark bands near base of tibiae of second and third legs; last tarsal joints brown. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen pale yellow, each segment with a faded and indefinite, interrupted brown band, tending to bend anteriorly at the angle of the tergite, but fading away; small narrow brown areas along margin of the segments, leaving lateral areas otherwise unmarked.

Wings clear, veins brown; apex of first costal section black. Costal index about 2.9; 4th vein index about 1.8; 5x index about 1.3; 4c index about .94. Two well-developed bristles at apex of first costal section; third costal section with heavy bristles on its basal  $\frac{1}{3}$ .

Length body 2.4 mm. (in live specimen); wings 2.0 mm.

♀. Bands of abdomen continuing laterally, not fading as noticeably as in male. Length body 2.6 mm.; wings 2.3 mm.

#### Internal characters of imagines.

Testes semi-transparent, bright yellow (Pl. 9-K 1), with 2 and  $\frac{1}{2}$  inner and 2 outer coils or gyres. Paragonia sometimes coiled.

Spermathecae not chitinized. Ventral receptacle with about 15 loose coils.

#### Other characteristics, relationship, and distribution.

*Eggs*.—4 filaments.

*Puparia*.—Apricot color (Pl. 10-G 7). Each anterior spiracle with about 11 branches; horn-index about 3.8.

*Chromosomes*.—Metaphase plate shows 5 pairs of rods and a pair of dots; in male Y is shorter than X.

*Relationship*.—Also closely related to *D. mulleri*. *Mulleri* females crossed to *mojavensis* males produce fertile female and sterile male hybrids. The reciprocal cross is sterile.

*Distribution*.—The stock upon which the description of this new species is based came from flies collected at Mesquite Springs, Death Valley, California, by Dr. W. P. Spencer. A second stock has been sent to us by Dr. A. H. Sturtevant. The original flies were collected by Mr. K. Mampell in the Chocolate Mountains, just east of Salton Sea, California.

*Notes*.—Professor Spencer has informed us that this species is common in the California deserts. He found it breeding in rotting barrel cactus, *Echinocactus acanthodes*. He suggested the species name.

#### *Drosophila arizonensis*, sp. nov.

##### External characters of imagines.

♂. Arista with about 7 branches. Antennae brown, third joint much darker. Front light brown, orbits and large ocellar triangle lighter, pollinose; orbital bristles and hairs of anterior orbits with basal blackish spots. Middle orbital about  $\frac{2}{3}$  length of anterior and  $\frac{1}{2}$  length of posterior. Second oral about  $\frac{1}{3}$  length of first. Carina broad below, sulcate.

Palpi pale yellow, with several bristles. Face light brownish yellow. Cheeks light gray, their greatest width about  $\frac{1}{4}$  greatest diameter of eyes. Eyes reddish (Pl. 1-D 12), with short black pile.

Acrostichal hairs in 8 rows; no prescutellars. Anterior scutellars convergent. Sterno-index .79. Mesonotum light brown, bristles arising from darker brown spots. Legs brownish yellow, indistinct black bands near bases of tibiae. Apical bristles on first and second tibiae, preapicals on all three.

Abdominal segments brownish yellow, each with an interrupted brown band which bends to the anterior margin at the angle of the tergite, leaving a small, irregularly triangular brown area in the apical corner.

Wings clear, veins brown; apex of first costal section black. Costal index about 2.4; 4th vein index about 1.7; 5x index about 1.4; 4c index about 1.0. Two well-developed bristles at apex of first costal section; third costal section with heavy bristles on its basal  $\frac{1}{3}$ .

Length body 2.3 mm. (in live specimen); wings 2.0 mm.

♀. Abdominal bands bend to anterior margin where they expand into small basal areas. Length body 2.6 mm.; wings 2.1 mm.

#### Internal characters of imagines.

Testes composed of 3 bright orange colored (Pl. 9-L 11) inner coils and 3 golden colored (Pl. 9-J 6) outer coils or gyres.

Spermathecae very slightly chitinized. Ventral receptacle with about 17 very irregular coils.

#### Other characteristics, relationship, and distribution.

*Eggs*.—4 filaments.

*Puparia*.—Chrome-orange (Pl. 9-J 7). Each anterior spiracle with about 11 branches; horn-index about 4.0.

*Chromosomes*.—Metaphase plate shows 5 pairs of rods and a pair of dots; the Y is shorter than the X in the male.

*Relationship*.—Belongs to the mulleri group of the subgenus *Drosophila*. This species is more closely related to *mojavensis* than to any other member of the mulleri species group. *Mulleri* females crossed to *arizonensis* males produce a few sterile male hybrids; reciprocal mating is cross-sterile.

*Distribution*.—Mr. G. B. Mainland collected specimens of this species in Pima County, Arizona, in September, 1940. Since then our stock collectors have taken it in southeastern Arizona, Silver City, New Mexico, and in Sonora, Mexico. Type material from Pima County, Arizona.

#### *Drosophila buzzatii*, sp. nov.

##### External characters of imagines.

♂. Arista with about 7 branches. Antennae yellowish brown, third joint slightly darker. Front dark brown, orbits and small median area pollinose; bristles arising from blackish spots. Middle orbital about  $\frac{1}{3}$

other two. Second oral about  $\frac{1}{3}$  length of first. Carina broad below, sulcate. Palpi pale yellow, with several bristles. Face yellowish brown. Cheeks grayish yellow, their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes vermilion-like (Pl. 2-K 12), with short black pile.

Acrostichal hairs in 8 rows; no prescutellars. Anterior scutellars convergent. Sterno-index about .8. Mesonotum grayish brown, bristles arising from darker brown spots; an indefinite grayish pollinose line down middle of acrostichal rows. Legs pale yellow, a narrow black band near base of each tibia, very faint on fore legs. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen grayish yellow, segments with narrowly interrupted, wide, dark brown bands, nearly complete laterally, and enclosing small, irregular yellow basal areas, often missing on posterior segments.

Wings clear, veins brown; apex of first costal section black. Costal index about 2.7; 4th vein index about 1.6; 5x index about 1.1; 4c index about .9. Two well-developed bristles at apex of first costal section; third costal section with heavy bristles on its basal  $\frac{1}{3}$ .

Length body 2.4 mm. (in live specimen); wings 2.0 mm.

♀. Enclosed yellow areas of lateral region of abdominal segments more distinct than in male. Length body 2.6 mm.; wings 2.1 mm.

#### **Internal characters of imagines.**

Testes orange-cinnamon (Pl. 11-L 12), with 3 irregular inner coils and 3 outer coils or gyres. Ejaculatory sac with two small posterior diverticula.

Spermathecae not chitinized. Ventral receptacle spiral, with about 14 irregular coils.

#### **Other characteristics, relationship, and distribution.**

*Eggs*.—4 long slender filaments.

*Puparia*.—Transparent, orange-amber (Pl. 10-H 9). Each anterior spiracle with about 14 branches; horn-index about 3.0.

*Chromosomes*.—Metaphase plate shows 5 pairs of rods and a pair of dots; in male Y is shorter than X.

*Relationship*.—Belongs to the mulleri group of the subgenus *Drosophila*. Males of this species are cross fertile with females of *D. mulleri*, producing a few abnormal sterile hybrids, which usually die in the pupa stage. These males are also cross fertile with females of *D. arizonensis*, but the hybrid larvae die in mid-larval stage.

*Distribution*.—The stock upon which the description of this new species is based was sent to us by Dr. A. Buzzati-Traverso of Pavia, Italy. It was derived from flies collected at Trapani, Sicily. A second stock came from the Cold Spring Harbor Laboratory. The original flies were collected by Dr. S. Horowitz in the Province of Cordoba, Argentina. Crosses between the two strains produce normal, fully fertile offspring, but the salivary

chromosomes of the  $F_1$  larvae show a small inversion in one of the chromosome pairs. Type material from Cordoba, Argentina.

***Drosophila meridiana*, sp. nov.**

**External characters of imagines.**

♂, ♀. Arista with about 8 branches. Antennae light yellowish brown. Front brown, light tannish anterior to line drawn between anterior orbital bristles; orbits and ocellar triangle scarcely  $\frac{1}{2}$  length of first. Carina moderately broadened, narrowed somewhat above middle, sulcate. Face light brown. Cheeks pale grayish yellow, their greatest width about  $\frac{1}{4}$  greatest diameter of eyes. Eyes dark red (Pl. 2-K 11), with short black pile.

Acrostichal hairs irregular, in about 8 rows; no prescutellars. Anterior scutellars convergent. Thorax grayish brown, bristles arising from dark brown spots. Sterno-index about .81. Legs pale yellow, black band near end of each tibia, fainter one near distal end of each femur; bands of hind legs darkest. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen yellow, each segment with an interrupted dark brown band which bends to anterior margin at angle of tergite, retaining a medium sized apical connection with a dark area on the lateral margin; connections of first and second segments broken or indistinct.

Wings clear, both crossveins slightly clouded. Costal index about 2.6; 4th vein index about 1.9; 5x index about 1.7; 4c index about 1.1. Apex of first costal section much darker, with two prominent bristles. Third costal section with heavy bristles on its basal  $\frac{2}{5}$ .

Length body 2.3 mm. (in live specimen); wings 2.2 mm.

**Internal characters of imagines.**

Testes cream colored (Pl. 9-I 5), with 2 inner and three outer coils or gyres. Ejaculatory sac has two posterior diverticula.

Spermathecae chitinized and shaped like a raisin seed. Ventral receptacle spiral with about 17 fine coils.

**Other characteristics, relationship, and distribution.**

*Eggs.*—4 long thin filaments, with anterior pair longer than posterior.

*Puparia.*—Orange colored (Pl. 10-K 9). Each anterior spiracle with about 19 branches; horn-index about 3.4.

*Chromosomes.*—Metaphase plate shows 5 pairs of rods and a pair of dots; in male Y is shorter than X.

*Relationship.*—Belongs to the mulleri group of the subgenus *Drosophila*. It is cross-sterile to all other members of the mulleri group.

*Distribution.*—This species has been collected in the following counties in Texas: Bell, Brewster, Cameron, Hidalgo, Jim Wells, Maverick, Randall, Sterling, Travis, and Williamson. It has also been taken at Morrilton, Arkansas; Cross Lake, Louisiana; Leroy Percy State Park, Mississippi; Eva and Shelby State Park, Tennessee. Type material from Austin, Texas.



**Drosophila nigromelanica, sp. nov.****External characters of imagines.**

♂. Arista with about 8 branches. Antennae brownish black, third joint black. Front dark brown. Middle orbital  $\frac{1}{3}$  other two. Second oral bristle about  $\frac{1}{3}$  length of first. Carina blackish brown, sulcate. Face blackish brown. Cheeks grayish, their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes red (Pl. 3-L 6), with dense black pile.

Acrostichal hairs in 6 rows; no prescutellars. Anterior scutellars divergent. Whole thorax dark brownish black, dull. Sterno-index about .71. Legs brownish black, tibiae darker; last tarsal joints, especially of fore legs, darker. Two apical bristles on first tibiae, one on second, pre-apicals on all three.

Abdomen deep, dull yellow, each segment with a dark brown band nearly as wide as entire segment, extending solidly to lateral margins; bands of all but last two segments have indistinct median interruptions, variable in degree.

Wings dusky, veins dark. Costal index about 3.4; 4th vein index about 1.5; 5x index about 1.1; 4c index about .74. Two large bristles at apex of first costal section. Third costal section with heavy bristles on its basal  $\frac{1}{3}$ .

Length body 2.3 mm. (in live specimen); wings 2.1 mm.

♀. Abdominal bands of mature specimens almost black, shining.

Length body 3.0 mm.; wings 2.4 mm.

**Internal characters of imagines.**

Testes orange (Pl. 9-I 12), with 3 inner and 3 outer coils or gyres. Ejaculatory sac without diverticula.

Spermathecae small and chitinized. Ventral receptacle spiral with about 18 fine coils.

**Other characteristics, relationship, and distribution.**

*Eggs.*—2 filaments, each about equal to length of egg.

*Puparia.*—Jonquil colored (Pl. 9-J 5) and clustered on inner surface of container as in *melanica*. Each anterior spiracle with about 11 branches; horn-index about 5.0.

*Chromosomes.*—Metaphase plate shows 2 pairs of rods, one pair of large V's, one pair of small V's and a pair of dots.

*Relationship.*—Belongs to *melanica* group of the subgenus *Drosophila*.

*Distribution.*—We have collected this species at the following places: Anderson, Cherokee, Hardin, Liberty, Jefferson, Nacogdoches, Sabine and Shelby Counties of East Texas; Ft. Payne, Alabama; Morrilton, Arkansas; Columbus, Mississippi; Great Smoky National Park, Eva and Memphis, Tennessee; Palatka, Florida. We have also examined strains from Anderson, Indiana; Wooster, Ohio; Sand Springs, Oklahoma; and Woods Hole, Massachusetts. Type material from Hardin County, Texas.

*Notes.*—A woods inhabiting species, which we have never found in towns or cities. In the "Big Thicket" of East Texas we have found it feeding on various kinds of fungi, both on the ground and in the hollow of an oak tree.

***Drosophila micromelanica* Patterson 1941. Proc. Nat. Acad. Sci. 27:394.**

**External characters of imagines.**

♂. Arista with about 7 branches. Antennae grayish black. Front dull blackish. Middle orbital  $\frac{1}{3}$  other two. Second oral bristle scarcely half as long as first. Carina somewhat broad, slightly sulcate. Two prominent palpal bristles. Face grayish black. Cheeks grayish black, their greatest width about  $\frac{1}{4}$  greatest diameter of eyes. Eyes bright, deep red (Pl. 2—L 12) with short, dense dark pile.

Acrostichal hairs in 6 rows; no prescutellars. Anterior scutellars convergent. Whole thorax dull blackish, pleurae grayish in some specimens. Sterno-index about .8. Legs grayish black. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen pale yellow, a gray band running centrally across each segment to lateral margins, increasing slightly in width towards margin and nearly reaching anterior edge. The band on the first segment is distinctly interrupted at the middle.

Wings clear, veins brown. Costal index 2.8; 4th vein index about 1.9; 5x index about 1.2; 4c index about .9. Two well-developed bristles at apex of first costal section. Third costal section with heavy bristles on its basal  $\frac{1}{4}$ .

Length body 2.4 mm. (in live specimen); wings 1.9. mm.

♀. Abdomen grayish yellow, segmental bands darker and wider, increasing in width laterally. Length body 2.5 mm. (in live specimen); wings 2.2 mm.

**Internal characters of imagines.**

Testes have 2 cream colored inner coils, and 3 apricot colored (Pl. 9—I 7) outer coils or gyres. Ejaculatory sac without diverticula.

Spermathecae small, spherical, almost transparent, not chitinized. Ventral receptacle arises from uterus as straight tube and then forms tangled mass without definite orientation or coiling.

**Other characteristics, relationship, and distribution.**

*Eggs.*—2 filaments, slender and tapering to distal ends.

*Puparia.*—Brownish buff (Pl. 9—H 7), arranged on inside of container in groups of 3 to 5. Each anterior spiracle has about 8 branches; horn-index about 8.5.

*Chromosomes.*—Metaphase plate shows 5 pairs of rods and a pair of dots; X chromosomes have small attached element at end.

*Relationship.*—A small fly belonging to the melanica group of the subgenus *Drosophila*. This new species has several characters in common

with other members of the group, but tests have shown that it is cross sterile to all other known species of the group.

*Distribution.*—This species was first collected by Mr. Dean R. Parker in 1934 at Austin, Texas, and also at Waco, Texas, in 1935. Since then we have collected it at about twenty other points in the State, and at nine places in other states, as follows: Chiricahua and Huachuca Mountains, Arizona; Lake McKethan, Perry, Inverness, Lake Tsala Apopka, Withlacoochee River, Florida; Silver City, New Mexico; Great Smoky National Park, Tennessee. Type material from Austin, Texas.

### ***Drosophila polychaeta*, sp. nov.**

#### **External characters of imagines.**

♂. Arista with about 9 branches. Antennae tan, third joint darker. Front yellowish brown. Middle orbital  $\frac{1}{2}$  of anterior and  $\frac{1}{3}$  posterior. Second oral bristle scarcely  $\frac{1}{2}$  first. Carina broad below, not sulcate or flattened. Face brownish yellow. Cheeks pale yellow, their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes dark red (Pl. 3–L 12), with short black pile.

Acrostichal hairs irregular but usually in 8 rows; no prescutellars. Anterior scutellars convergent. Whole thorax tannish brown, somewhat shining. One greatly enlarged bristle in each dorsocentral row just in front of the anterior dorsocentral, constituting a third pair in the series; one or two moderately enlarged hairs anterior to the extra dorsocentrals, and in the first row lateral to them. Sterno-index .8. Legs pale yellow, tibiae and tarsi a little darker. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen in newly emerged specimens dark grayish brown, solid. In older specimens the segments become tannish brown, darker posteriorly.

Wings slightly dusky. Two very large bristles at apex of first costal section. Third costal section with heavy bristles on all but the distal  $\frac{1}{10}$ . Costal index about 2.0; 4th vein index about 2.2; 5x index about 1.3; 4c index about 1.3.

Length body 2.85 mm. (in live specimen); wings 2.45 mm.

♀. Length body 3.6 mm.; wings 2.8 mm.

#### **Internal characters of imagines.**

Testes deep orange (Pl. 10–I 10), with two inner and 2 and  $\frac{1}{2}$  outer coils or gyres.

Spermathecae not chitinized. Ventral receptacle composed of about 15 coarse, loosely arranged coils.

#### **Other characteristics, relationship, and distribution.**

*Eggs.*—4 long thin filaments, the anterior pair about  $\frac{5}{6}$  of posterior pair.

*Puparia.*—Very light orange (Pl. 9–K 7). Each anterior spiracle with about 14 short branches; horn index about 10.3; anal pore visible, as in all members of the virilis species group.

*Chromosomes*.—Metaphase plate shows 2 pairs of rods, 1 pair of V's, 2 pairs of J's, and a pair of dots. X has a constriction near end.

*Relationship*.—Belongs to the polychaeta group of the subgenus *Drosophila*.

*Distribution*.—This species was first collected by Mr. Thorp Ray on the wharfs of the fruit companies of Galveston, Texas. We have also taken it there on piles of refuse bananas, which had come from southern Mexico and Central America. The flies must have been introduced from one or both of these areas, since it has never been found elsewhere than at Galveston.

*Notes*.—It breeds prolifically on the banana-agar-yeast food.

### ***Drosophila carbonaria*, sp. nov.**

#### **External characters of imagines.**

♂ Arista with about 7 branches. Antennae brown, third joint black. Front brownish black. Middle orbital almost as long as anterior, a little over  $\frac{1}{2}$  length of posterior. Carina widened below, sulcate. Face brown. Cheeks blackish gray, their greatest width about  $\frac{1}{4}$  greatest diameter of eyes. Eyes deep red (Pl. 4—L 8), with short black pile.

Acrostichal hairs in 6 rows; no prescutellars. Anterior scutellars convergent. Whole thorax black, slightly shining. Sterno-index .57. Halteres brownish yellow. Legs black, all tarsi brownish. Apical bristles on first and second tibiae, rather small on first tibia, preapicals on all three, small on second tibia.

Abdomen solid black, shining.

Wings clear. Costal index about 2.5; 4th vein index about 1.64; 5x index about 1.14; 4c index about .96. Two prominent bristles at apex of first costal section. Third costal section with heavy bristles on its basal  $\frac{2}{5}$ .

Length body 2.3 mm. (in living specimen); wings 2.0 mm.

♀. Abdominal segments shining black, with a very narrow apical, pale yellow line on basal segments. Ventral plates brownish.

Length body 2.9 mm.; wings 2.3 mm.

#### **Internal characters of imagines.**

Testes orange-red (Pl. 2—D 12), with about 5 inner coils and 3 outer coils or gyres.

Spermathecae chitinized. Ventral receptacle with about 18 loose, rather coarse coils.

#### **Other characteristics, relationship, and distribution.**

*Eggs*.—4 filaments, each equal to the length of egg.

*Puparia*.—Florida-gold (Pl. 10—L 8), surface rough. Each anterior spiracle with about 11 branches. Horn index about 7.6.

*Chromosomes*.—Not known.

*Relationship*.—Belongs to the carbonaria group of the subgenus *Drosophila*.

*Distribution.*—This species has been collected at the following places: In Texas, Austin, Beeville, Brownwood, Carrizo Springs, Davis Mountains, Dilley, Henly and Uvalde; in Arizona, Ashton Draw and William's Ranch near San Bernardino. A rare species; of the 28 specimens collected, 22 were taken in Texas and 6 in Arizona.

*Notes.*—This species has usually been collected in woods along streams. A few were taken from windfall oranges at Dilley and Carrizo Springs. It does not breed well on the banana-agar-yeast medium unless the food is rather soft. Type material from Austin, Texas. Dr. Sturtevant suggested the species name.

***Drosophila spinofemora*, sp. nov.**

**External characters of imagines.**

♂. Arista with about 10 branches. Antennae pale amber-yellow, third joint slightly darker. Front yellowish tan, orbits lighter, pollinose. Middle orbital  $\frac{1}{2}$  length of anterior,  $\frac{1}{3}$  length of posterior. Second oral more than half as long as first. Palpi pale yellow, with two prominent bristles. Carina evenly broadened below, rounded, not flat or sulcate. Face pale amber-yellow. Cheeks pale yellow, their greatest width scarcely  $\frac{1}{5}$  greatest diameter of eyes. Eyes bright orange (Pl. 1-E 12), with light colored pile.

Acrostichal hairs in 8 rows; no prescutellars. Anterior scutellars convergent. Sterno-index .53. Mesonotum amber colored, without markings. Legs pale yellow. Apical bristles on first and second tibiae, that of second tibia very large; preapicals on all three. A row of about 12 short, stout, spine-like bristles on lower apical part of fore femora.

Abdomen pale yellow, each segment with an exceedingly faint apical band, usually merely a dull yellow, sometimes slightly brownish, fading away entirely before reaching the lateral margin. Bands are vaguely interrupted in mid-line.

Wings slightly dusky, with a very slight clouding on the anterior and posterior cross veins; veins darkened. Costal index about 3.37; 4th vein index about 1.39; 5x index about 1.3; 4c index about .7. Apex of first costal section with two well-developed bristles, the dorsal one large and stout, the ventral one smaller and thin. Third costal section with heavy bristles on its basal  $\frac{1}{2}$ .

Length body 3.0 mm. (in live specimen); wings 2.4 mm.

♀. Abdomen slightly darker. Length body 3.1 mm.; wings 2.7 mm.

**Internal characters of imagines.**

Testes semi-transparent, very pale cream (Pl. 9-C 1), with 3 inner and 3 outer coils or gyres. Ejaculatory sac has two posterior diverticula.

Spermathecae large, spherical and chitinized. Ventral receptacle spiral with about 20 irregular coils.

**Other characteristics, relationship, and distribution.**

*Eggs*.—4 filaments; anterior pair thin, posterior pair heavy for about  $\frac{3}{4}$  length, with distal  $\frac{1}{4}$  either finely branched or curled.

*Puparia*.—Transparent orange (Pl. 9–I 9). Each anterior spiracle has about 18 branches; horn-index about 2.0.

*Chromosomes*.—Metaphase plate shows 2 pairs of rods, a pair of V's and a pair of dots in both sexes.

*Relationship*.—Belongs to the immigrans group of the subgenus *Drosophila*.

*Distribution*.—The stock upon which this description is based was sent to us by Mr. E. C. Zimmerman of the University of Hawaii.

The original flies were collected at Honolulu.

*Notes*.—This species has been called *D. immigrans* Sturtevant in Hawaii, but is not the cosmopolitan species, although the two forms are similar in many of their characters. Breeding tests show that the two species are cross-sterile.

***Drosophila macroptera*, sp. nov.****External characters of imagines.**

♂. Arista with about 10 branches. Antennae tan, third joint somewhat darker. Front tannish brown. Middle orbital about  $\frac{1}{4}$  other two. Second oral bristle about as long as first. Carina only slightly wider below, flat, not rounded or sulcate. Palpi light yellowish tan, with several prominent bristles. Face tannish yellow. Cheeks pale yellow, their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes red (Pl. 1–H 12), with light colored pile.

Acrostichal hairs in 6 rows, irregular; no prescutellars. Anterior scutellars divergent. Mesonotum and pleurae tannish brown, without markings, finely pollinose. Sterno-index about .6. Legs pale yellowish tan. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen dark yellow, each segment with a broad, apical brown band, extending to margin except on basal segment; each segment, except basal one, with median projection which reaches the anterior margin, becoming larger and darker in posterior segments; band of basal segment thinner and weakly interrupted medially.

Wings with anterior and posterior crossveins clouded, remainder clear. Costal index about 4.2; 4th vein index about 1.6; 5x index about 1.2; 4c index about .6. Apex of first costal section with two well-developed bristles. Third costal section with heavy bristles on its basal  $\frac{1}{3}$ .

Length body 3.2 mm. (in live specimen); wings 3.3 mm.

♀. Abdominal bands slightly narrower than those of male, and often failing to reach lateral margins.

**Internal characters of imagines.**

Testes peach colored (Pl. 10—E 5), with 2 inner and 2 and  $\frac{1}{2}$  outer coils or gyres. Ejaculatory sac with two very long, slender diverticula, which are irregularly twisted about other organs.

Spermathecae spherical with brown chitinized core. Ventral receptacle a tangled mass with about 11 irregular coils.

**Other characteristics, relationship, and distribution.**

*Eggs.*—4 slender filaments.

*Puparia.*—Orange-amber (Pl. 11—H 12). Each anterior spiracle with about 18 branches; horn-index 6.0.

*Chromosomes.*—Metaphase plate shows 5 pairs of rods and a pair of dots; in male the Y is shorter than the X.

*Relationship.*—Belongs to the subgenus *Drosophila*.

*Distribution.*—This form has been taken in Estes Park, Colorado, Zion National Park, Utah, the Chiricahua Mountains and Huachuca Mountains, Arizona, and at Glenwood and Capitan, New Mexico. Professor Th. Dobzhansky sent in specimens of this species which he had collected at Pikes Peak, Colorado, and in the Uinta Mountains, Utah. Type material from Estes Park, Colorado.

***Drosophila fulvalineata*, sp. nov.****External characters of imagines.**

♂. Arista with about 9 branches. Antennae brown. Front brownish yellow, lighter anteriorly. Middle orbital  $\frac{1}{4}$  other two. Second oral bristle little more than  $\frac{1}{3}$  length of first. Carina large, broad, with a narrow median ridge running its full length. Face pale yellowish tan. Cheeks pale yellow, their greatest width about  $\frac{1}{3}$  greatest diameter of eyes. Eyes dark red (Pl. 2—I 12), with short black pile.

Acrostichal hairs in 8 rows; no prescutellars. Anterior scutellars convergent. Mesonotum tannish brown with a darker median stripe, wider beyond middle; anterior half of stripe and narrow median line of expanded posterior half, pollinose; remainder of posterior half dark grayish brown. Areas between the median stripe and dorsocentral rows shining; adjacent areas lightly pollinose, intermingled with indefinite darker, shining areas. Pleurae tannish brown, darker stripe running from base of fore coxae to base of halteres. Transverse suture deep and prominent. Sterno-index .75. Legs pale yellow; a narrow dark band near base of each tibia, very faint in fore-legs, darkest in hind legs. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen yellow, each segment with a grayish, black band reaching only to the angle of the tergite; those of the basal segments with broad interruptions, those of posterior segments much narrower.

Wings clear. Costal index about 3.9; 4th vein index about 1.7; 5x index about 1.2; 4c index about .7. Apex of first costal section moderately darkened, with two enlarged bristles. Third costal section with heavy bristles on its basal  $\frac{1}{3}$ .

Length body 3.3 mm. (in live specimen); wings 2.9 mm.

♀. Length body 3.6 mm.; wings 3.1 mm.

**Internal characters of imagines.**

Testes sulphur-yellow (Pl. 11—L 3), with 6 inner and 6 outer coils or gyres.

Spermathecae flask-shaped, slightly chitinized. Ventral receptacle long spiral with about 60 fine coils.

**Other characteristics, relationship, and distribution.**

*Eggs*.—4 fine tapering filaments of about equal length.

*Puparia*.—Reddish orange (Pl. 4—A 12). Each anterior spiracle with about 20 branches; horn-index 6.4.

*Chromosomes*.—Metaphase plate shows 5 pairs of rods and one pair of V's, with the Y shorter than the X in the male.

*Relationship*.—Belongs to the subgenus *Drosophila*.

*Distribution*.—We have collected this species at the following places: Cave Creek, Chiricahua Mountains, Ramsey Canyon, Huachuca Mountains, Arizona; Gila River, near Silver City and Gila National Forest, Glenwood, New Mexico; Zion National Park, Utah. Type material from Cave Creek, Arizona.

*Notes*.—Very difficult to maintain in laboratory on the banana-agar-yeast food. This species has been taken on fleshy fungus in New Mexico.

***Drosophila rubrifrons*, sp. nov.**

**External characters of imagines.**

♂. Arista with about 8 branches. Antennae dark brown. Front dark velvety maroon, lighter anteriorly; posterior portion of orbits and ocellar triangle dark brown, roughly elevated. Middle orbital about  $\frac{1}{4}$  other two. Second oral bristle about as long as first. Carina flat and narrow between antennae, broad and rounded below. Palpi small, tannish brown. Face brown. Cheeks brownish yellow, their greatest width about  $\frac{1}{3}$  diameter of eyes. Eyes deep red (Pl. 4—L 12), with short dense pile.

Acrostichal hairs in 8 rows; no prescutellars. Anterior scutellars divergent. Thorax golden brown, densely pollinose; two lighter stripes just within the dorsocentral rows, leaving a dark stripe down mid-line. Stern-index about .6. Legs yellowish brown, hind femora slightly darker. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen dark yellow, each segment with a wide apical, dark brown band, narrowly interrupted medianly, except on last two segments; bands widened laterally forming solid areas to margin of segment.



Wings slightly brownish, clouded on anterior and posterior crossveins and at apex of second longitudinal vein, with slight clouding at apices of third and fourth veins. Costal index about 4.0; 4th vein index about 1.8; 5x index about 1.4; 4c index about .7. Two prominent bristles at apex of first costal section. Third costal section with heavy bristles on its basal  $\frac{1}{2}$ .

Length body 2.6 mm. (in live specimen) ; wings 2.8 mm.

♀. Length body 3.0 mm.; wings 2.9 mm.

**Internal characters of imagines.**

Testes burnt orange (Pl. 11-F 11), with 3 slightly colored inner coils and 5 outer coils or gyres. Ejaculatory sac has two posterior diverticula.

Spermathecae spherical, chitinized. Ventral receptacle with about 35 loosely arranged coils.

**Other characteristics, relationship, and distribution.**

*Eggs.*—4 filaments, as determined by dissection of ovary.

*Chromosomes.*—Not known.

*Relationship.*—Belongs to the subgenus *Drosophila*.

*Distribution.*—Specimens of this species have been taken at Rustler's Park, Chiricahua Mountains, Arizona, at an elevation of 8,300 feet. It has also been collected at White Water Camp, Gila National Forest, near Glenwood, New Mexico. Type material from Rustler's Park.

*Notes.*—We have not been able to breed this species in the laboratory. At Rustler's Park it was found feeding on fungus.

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