

III. Thirteen New Species in the Genus *Drosophila* from the Neotropical Region

WILLIAM B. HEED¹ AND MARSHALL R. WHEELER

INTRODUCTION

The species described here were collected mainly by the senior author in four trips to the Neotropical Region from 1952 to 1956. He was assisted part of this time by his wife, Sarah, Drs. Hampton L. Carson and Marvin Wasserman and also by Mr. Hugo Hoenigsberg. The metaphase chromosome preparations were analyzed by Drs. Frances E. Clayton, Marvin Wasserman, and Lawrence E. Mettler.

Ten of the species belong to the tripunctata group of the subgenus *Drosophila*; they are listed below according to their respective subgroups as established by Frota-Pessoa (1954). Two species belong in the cardini group of the subgenus *Drosophila* and one species is unclassified. The new species of the tripunctata group are as follows:

Subgroup I. *D. setula*, n. sp.

Subgroup II. *D. facialba*, n. sp., *D. mediodelta*, n. sp.

Subgroup III. *D. converga*, n. sp., *D. mediopictoides*, n. sp., *D. trapeza*, n. sp.

Subgroup IV. *D. mediodiffusa*, n. sp., *D. medioparva*, n. sp., *D. spinatermina*, n. sp., *D. tristriata*, n. sp.

As noted previously (Heed, this bulletin) the tripunctata group replaces the repleta group as the dominant species group in the Neotropical Region south of the desert plateau of central Mexico. Frota-Pessoa (*op. cit.*) lists 31 members of the group, and points out that *D. metzii* and *D. albirostris* may also belong here rather than in the cardini group. We have examined a type specimen of *metzii* (described by Sturtevant from Cuba) and a type specimen of *albirostris* (described by Sturtevant from Panama) and believe them to be conspecific with two species which we have collected widely in Central America and northern South America. We believe, also, that *D. albicans* Frota-Pessoa, of the tripunctata group, may be synonymous with *albirostris* but further confirmation is necessary. Both *albirostris* and *metzii* clearly belong in the tripunctata group.

In our opinion *D. campestris* Burla is probably synonymous with *D. crocina* Patterson and Mainland, but this is still unconfirmed. This still leaves 31 species in the group, with the addition of *metzii* and *albirostris*, and the presumed synonymy of *albicans* and *campestris*.

Three other previously described forms belong in this group: *D. triangula* Wheeler, *D. fragilis* Wheeler, and *D. paramediotriata* Townsend and Wheeler. The genitalia of *fragilis* are very similar to that of *trifilum* Frota-Pessoa and the species may thus be placed in subgroup III. Finally, *D. trifiloides* Wheeler, described as new elsewhere in this bulletin, belongs in the tripunctata group. With the addition of this species, the ten species described in this report, the three species named above, and the 31 forms previously placed in the group, there are thus a total of 45 forms at present placed in the tripunctata group. There remain,

¹ Zoological Laboratory, Univ. Pennsylvania, Philadelphia.

however, many more species from Central and South America yet to be described. Our types are in The University of Texas collection.

DESCRIPTION OF NEW SPECIES

Drosophila setula Heed and Wheeler, new species.

External characters of imagines.

♂, ♀. Arista with 6–7 dorsal and 3 ventral branches in addition to the terminal fork. Front dull brown with few frontal hairs; face and cheeks paler. Carina prominent, broader below, not sulcate. One strong oral bristle. Proclinate orbital about $\frac{7}{8}$ length posterior reclinate; anterior reclinate $\frac{1}{4}$ – $\frac{1}{3}$ proclinate. Greatest cheek width about $\frac{1}{6}$ greatest diameter of eye; cheek very narrow directly below eye; eye large, dark red with a magenta cast dorsally and light colored pile. Palpi with 3–4 long bristles on antero-lateral margin and 14–18 shorter bristles on ventral surface.

Acrostichal hairs in 6 rows; no prescutellars. Anterior scutellars divergent. Mesonotum and scutellum semi-shining brown; pleura, halteres and legs lighter. One pair of low-lying bristles anterior to suture, in dorsocentral row, about $\frac{3}{4}$ length of anterior dorsocentrals. Anterior sternopleural about $\frac{1}{2}$ length posterior; mid-sternopleural about $\frac{1}{2}$ anterior. Fore femur with 3–4 long bristles on lateral extensor surface and 4–5 long bristles on flexor surface; bases of fore and mid metatarsi with a single strong black bristle; base of hind metatarsus with three. Hind metatarsus not exceptionally wide; recurved hairs on fore tarsus and tibia. Apical bristles on 1st and 2nd tibiae, preapicals on all three.

Wings with a slight grayish cast; posterior crossvein clouded. Costal index about 4.0; 4th vein index about 1.4; 5x index about 1.0; 4c index about 0.6. Third costal section with heavy bristles on the basal $\frac{1}{3}$ – $\frac{1}{2}$. One prominent bristle at apex of first costal section.

Abdomen shining brownish yellow with posterior black bands on all tergites which fade at the angle of the tergite and sometimes continue to the lateral margin as a thin line. The bands are narrowly or incompletely interrupted mid-dorsally on tergites 2–5. Band of 6th with a mid-dorsal extension that reaches $\frac{1}{2}$ the distance to the preceding tergite. Abdominal pattern of both sexes similar.

Body length (etherized) about 3.0 mm. in ♂, 3.5 mm. in ♀; wing length about 3.0 mm. (♂), 3.0 mm. (♀).

Internal characters of imagines and genitalia.

Anterior Malpighian tubes branched basally near gut; posterior tubes apposed without a continuous lumen. Testes with about 6–7 yellowish white outer coils and 3–4 white, thicker inner coils. Sperm pump diverticula about four times length of pump. Lower tip of anal plate with a finger-like projection that bears a row of 4–6 bristles at its base. Forceps narrow with 7–9 primary teeth in an irregular S-shaped row, and with 3–6 marginal bristles that come on to upper surface. Toe very closely associated with forceps, with 3–4 bristles. Hypandrium broad with one long bristle and 1–2 thinner bristles only $\frac{1}{3}$ – $\frac{1}{2}$ length of former. Head of penis with no special processes, the extreme tip with a pair of slightly toothed plates.

Spermathecae chitinized, elongate (about 0.1 mm. wide and 0.16 mm. long);

inner duct funnel-shaped with a basal constriction followed by a bulb-like expansion just before leaving spermatheca. Ventral receptacle with about 40 coils. Ovipositor plate long and slender, with 23–27 teeth.

Other characteristics, relationship, and distribution.

Eggs. With 2 pairs of thin filaments, longer than the egg.

Larvae. Do not skip; posterior spiracles yellow.

Puparia. Red-brown; anterior spiracles with 19–20 pale branches; horns, including spiracles, about $\frac{1}{3}$ length puparium. Posterior spiracles yellow, parallel and rather long, nearly $\frac{1}{5}$ length of puparium.

Chromosomes. Determination of the metaphase chromosome complement from larval brain cells was unusually difficult; there appear to be either 3 or 4 pairs of rods, one pair of V-s, and a pair of dots. The X and Y chromosomes could not be identified. The analysis was made by Dr. Wasserman using stocks No. H81.15 from Barro Colorado, Canal Zone, and No. H187.9 from El Recuerdo, Colombia.

Relationship. Belongs in subgroup I of the tripunctata group of the subgenus *Drosophila*; it is most similar to *platitarsus* Frota-Pessoa from which it is distinguished by the normal width of the hind metatarsus, the pair of bristles anterior to the transverse suture, and the finger-like projection on lower tip of anal plate.

Distribution. Collected by the senior author in 1955 in Costa Rica and Panama (Oct.), Colombia (Nov., Dec.) and Trinidad (Dec.); this trip is designated as (a). Further collections were made in company with Drs. Wasserman and Carson in 1956 in Costa Rica (July, Aug.) and Panama and Colombia (Aug.); this trip is designated as (b). Localities are: *Costa Rica*: San José 3000' (a, b); Turrialba, 2000' (a, b); La Lola, 128' (b); San Isidro de General, 2000' (b); *Panama*: Barro Colorado Island (a, b) and Cerro La Campana, 2700' (b); *Colombia*: Fusagasuga, 5700' (a) and El Recuerdo in the Sierra Nevada Mts., 3000' (a, b); *Trinidad*: many localities including Arima Valley and Sangre Grande (a).

Types. Holotype male and 2 male, 4 female paratypes from stock No. H95.14 from Fusagasuga, Colombia.

***Drosophila facialba* Heed and Wheeler, new species.**

External characters of imagines.

♂, ♀. Arista with 6–7 dorsal and 3 ventral branches in addition to the terminal fork. Carina prominent, broader below where it slopes to the oral margin; face and oral margin white. Front tan with few frontal hairs. Third antennal joint whitish tan. Proclinate orbital $\frac{5}{8}$ length posterior reclinate; anterior reclinate about $\frac{1}{3}$ length proclinate and closer to eye margin. Two long thin orals of equal length. Greatest cheek width about $\frac{1}{6}$ greatest diameter of eye; cheek width directly below eye about $\frac{1}{12}$. Eyes bright red with silvery pile. Palpi with 4–5 long bristles on lateral margin and 20–30 shorter bristles on posterior surface and lateral margin.

Acrostichal hairs in 6 rows; no prescutellars. Anterior scutellars divergent. Mesonotum and scutellum subshining brown; pleura and legs whitish tan. An-

terior sternopleural about $\frac{1}{2}$ posterior; mid-sternopleural $\frac{1}{2}$ – $\frac{5}{8}$ anterior. Flexor surface of fore femur with 2 long bristles; lateral extensor surface with 4 long bristles. A few recurved hairs on fore tarsus. Apical bristles on 1st and 2nd tibiae, preapicals on all three.

Wings fuscous; anterior and posterior crossveins clouded. Costal index about 4.7; 4th vein index about 1.5; 5x index about 1.1; 4c index about 0.5. One strong and one weak bristle at apex of 1st costal section. Third costal section with heavy bristles on the basal $\frac{1}{2}$.

Abdomen of male shining yellow with posterior black bands extending slightly beyond the angle of the tergite on all segments. The bands are interrupted mid-dorsally on 2nd tergite, expanded to posterior half of dorsal region on 3rd, expanded to a heavy mid-dorsal triangle on 4th, and forming heavy mid-dorsal rectangles on 5th and 6th tergites. Abdomen of female similar to that of male but 5th and 6th tergites with narrow light mid dorsal stripes with little or no banding.

Body length (etherized) about 2.4 mm. (♂), 3.0 mm. (♀); wing length about 2.4 mm. (♂), 3.0 mm. (♀).

Internal characters of imagines and genitalia.

Anterior Malpighian tubes branched at basal $\frac{1}{5}$; posterior tube with a continuous lumen. Testes with about 5 thin outer and 3 thicker inner coils, all white. Sperm pump diverticula about $\frac{3}{4}$ greatest diameter of pump. Anal plate with a tuft of about 6 hairs on lower tip. Toe with 3–4 short apical bristles. Forceps with 7–9 primary teeth in a row which curve inward on last two posterior teeth; about 13 marginal bristles which come around to upper surface. Spermathecae lightly chitinized, oval; inner duct broadly funnel-shaped in upper half. Ventral receptacle with over 25 coils. Ovipositor plate with 19–20 teeth.

Other characteristics, relationship, and distribution.

Eggs. With two pairs of thin filaments.

Larvae. Posterior spiracles pale; do not skip.

Puparia. Red-brown, posterior spiracles pale. Each anterior spiracle with about 16 yellow branches, the horn, including spiracles, about $\frac{1}{3}$ length of puparium.

Chromosomes. Determined by Dr. Mettler from stock H67.5 from El Salvador: 3 pairs of rods, 1 pair of V's (but see below), and a small pair of dots. The X chromosome is about twice the length of the autosomes, and the latter are about equal to the length of one arm of the V. There are satellites on the centromere end of the X and on one pair of small rods. The Y is the same length as the X and also has a satellite; it is uncertain whether it is a rod or is J-shaped.

Dr. Clayton examined another stock from El Salvador (H26.2a) and determined the V as being two rods. She reports that the salivary chromosomes show 5 arms and the dot, with a large mass of heterochromatin associated with the X.

Relationship. Belongs to subgroup II of the tripunctata group of the subgenus *Drosophila*. This is the first member of this subgroup with a distinctly white face.

Distribution. Restricted to the highlands of southern Mexico and Central America. Collected by the senior author as follows: *Mexico*: 19 miles east of San

Andres Tuxtla, Veracruz, 1700', July 1952 (with M. Wasserman); *El Salvador*: Volcan El Boqueron and Volcan Santa Ana, 5000–6000', throughout the year, 1953–54, and Oct. 1955; *Nicaragua*: Hacienda Santa Maria de Ostuma, 7 miles north of Matagalpa, 4000', June 1954; *Costa Rica*: San José, 3000', Oct. 1955.

Types. Holotype male and 1 male, 3 female paratypes, all descendants from stock No. H67.5 from Volcan El Boqueron, El Salvador.

Notes. This species has been found feeding on fermenting coffee berries and on the sweet white pulp of pepete pods (*Inga spuria* H. and B.) in El Salvador. It is difficult to maintain stocks on banana medium.

Drosophila mediodelta Heed and Wheeler, new species.

External characters of imagines.

♀, ♂. Arista with 7–8 dorsal and 3–4 ventral branches in addition to the terminal fork. Face and antennae brown; front brown with few frontal hairs. Carina extending nearly to level of 1st oral. Proclinate orbital $\frac{5}{8}$ length posterior reclinate; anterior reclinate $\frac{1}{3}$ length proclinate. Three strong orals (usually); cheek and area below eye narrow; eye large, red with pale pile. Male palpi with one long subapical bristle and 4–6 progressively shorter bristles on outer margin. One bristle at apex about equal to length of first few on outer margin. Female palpi usually with 2 long bristles on antero-lateral margin and 6–8 shorter ones.

Acrostichal hairs in 8–10 irregular rows; no prescutellars. Anterior scutellars widely divergent. Mesonotum and scutellum dull dark brown except on a small central area directly behind head which appears paler on pinned specimens. Halteres, pleura and legs lighter brown. Anterior and middle sternopleurals equal in length, about $\frac{3}{7}$ length posterior one. Numerous recurved hairs on fore tarsi, a few on hind tarsi. Fore femora with 2 prominent bristles on posterior flexor surface and usually with 3 on lateral extensor surface. Several long yellow bristles at base of hind metatarsus. Apical bristles on 1st and 2nd tibiae, preapicals on all three.

Wings with brownish cast; posterior crossvein clouded. Costal index about 4.3; 4th vein index about 1.3; 5x index about 1.0; 4c index about 0.5. Two strong bristles at apex of 1st costal section; 3rd section with heavy bristles on the basal $\frac{1}{2}$.

Abdomen brownish yellow with black apical bands on tergites 2–4, interrupted dorsally, the interruptions becoming progressively wider posteriorly. Band of 4th tergite sometimes with paramedian extensions leading anteriorly (usually on females). Tergite 5 usually with a thin interrupted apical band with paramedian extensions that fuse anteriorly into a central delta-shaped spot, but this spot is sometimes quite faint and isolated, with no apical band and sometimes the fusion is incomplete so that no spot is formed. Tergite 6 with a median rectangular to triangular black spot. Females are usually more heavily marked on all tergites.

Body length (pinned) about 3.0–3.5 mm. (♂), 4.0–4.5 mm. (♀); wing length about 3.0 mm. (♂), 3.8 mm. (♀).

Internal characters of imagines and genitalia.

Posterior Malpighian tubes apposed but apparently without continuous lumen. Testes yellowish white with about 4 outer and 4 inner thicker coils. Sperm pump

diverticula short, about $\frac{1}{2}$ diameter of pump. Forceps with 7–9 primary teeth in a slightly curved row and 8–12 marginal bristles. Toe without bristles; 1–2 long bristles on genital arch near point of attachment of forceps (*lingueta* of Salles, 1947). Lower tip of anal plate with about 10 loosely grouped small bristles. Head of penis divided, with a small "tooth," bearing 3–4 notches, extending from the tip of each division; there are also a pair of pointed plate-like processes extending back toward the apodeme and which are notched along both inner and outer borders. Spermathecae about 0.13 mm. long and 0.09 mm. wide; inner duct wide with a slight constriction at about the middle. Ovipositor plate with 29–30 teeth.

Other characteristics, relationship, and distribution.

Eggs. Two pairs of filaments, the anterior pair thin and about equal to egg length, posterior pair thicker and longer.

Puparia, larvae, and chromosomes. Unknown.

Relationship. Belongs to subgroup II of the tripunctata group of the subgenus *Drosophila*; it appears to be close to *mediopunctata* and to *unipunctata*.

Distribution. Collected during 1954–56 by the senior author in the following localities: *El Salvador*: Volcan El Boqueron, 5000', Oct., Feb., May, July; Volcan Santa Ana, 5000', July; San Salvador, 2000', Aug.; *Nicaragua*: Santa Maria de Ostuma, about 7 miles north of Matagalpa, 4000', June; *Costa Rica*: San Isidro de General, 2000', Aug.; *Colombia*: El Recuerdo, about 15 miles southeast of Santa Marta, 4000', Aug.

Types. Holotype male and 1 paratype male, El Recuerdo, Colombia (No. H186.19); 1 ♂ and 2 ♀ paratypes from El Salvador.

Notes. In general, very few individuals were collected at any one time except on Volcan Santa Ana where *D. mediodelta* was by far the dominant species (18% of 2,056 flies); here it was found feeding on fruits of *Citharexylum donnell-smithii* Greenman (Verbenaceae). The species does not breed well on laboratory food. Diagnostic characters are: the large eyes, 3 strong orals, dull mesonotum, delta-shaped spot connecting with the apical band on tergite 5, large size, high altitude preference, and characteristic processes of the male genitalia.

***Drosophila converga* Heed and Wheeler, new species.**

External characters of imagines.

♂, ♀. Arista with 5, rarely 6, dorsal branches and 3 ventral branches in addition to the fork. Face, antennae and cheeks brown; front lighter brown. Carina short, not sulcate. Proclinate orbital about $\frac{5}{8}$ length posterior reclinate; anterior reclinate minute; proclinate and large reclinate set rather close together. Two orals, the second usually shorter. Greatest width of cheek about $\frac{1}{6}$ greatest diameter of eye. Eye orange red with a light magenta cast dorsally and with light pile. Palpi with one bristle at apex and 4–5 marginal bristles that decrease in size posteriorly; ventral surface with about 9 shorter bristles.

Acrostichal hairs in 6 rows; no prescutellars. Anterior scutellars convergent. Mesonotum and scutellum brown, very shiny; pleura and legs light brown. Anterior sternopleural usually $\frac{1}{2}$ posterior; mid-sternopleural usually $\frac{1}{2}$ anterior, but the anterior and middle bristles are sometimes weaker and of equal length, in

which case they are about $\frac{1}{3}$ length posterior one. Numerous recurved hairs on fore tarsus, a few on hind tarsus. A row of 11–13 peg-like bristly spines on inside edge of fore femur. First and 2nd metatarsi each with a single black bristle at base, hind metatarsus with three such bristles. Apical bristles on 1st and 2nd tibiae, preapicals on all three.

Wings with darkened posterior crossvein and a very slight cloud. Costal index about 3.0; 4th vein index about 1.7; 5x index about 1.2; 4c index about 0.9. One prominent bristle at apex of 1st costal section; 3rd section with heavy bristles on the basal $\frac{1}{2}$.

Abdomen shining brownish yellow with black apical bands on most tergites. On males the bands fade at the angle of the tergite except on 4th (and sometimes on 5th) where the band nearly reaches lateral margin. The bands are sometimes faintly and incompletely interrupted mid-dorsally on tergites 2–4. Tergites 5–6 with very narrow bands, usually with slight midline extensions. Female usually with no markings on last two tergites; tergites 2–4 frequently with incompletely interrupted bands.

Body length (etherized) about 2.0 mm. (♂), 2.5 mm. (♀); wing length about 2.0 mm. (♂), 2.3 mm. (♀).

Internal characters of imagines and genitalia.

Anterior and posterior Malpighian tubes branched basally near gut; posterior tube with apposed ends but without continuous lumen. Testes with 4–5 yellow outer coils and 3 whitish inner coils. Sperm pump diverticula long, about 10 times length of pump. Forceps with 6–7 primary teeth, 5–8 long stout secondary teeth and 7–10 long marginal bristles that come around on upper surface. Toe rounded with 1–3 bristles; genital arch, just behind toe, with 2–4 bristles that are sometimes continuous with those of the toe. Gonopophysis with 2 long bristles immediately adjacent to each other. Head of the penis rounded, the neck region with a pair of narrow, lateral, saw-toothed, fringed plates. Basal to the plates and extending distally and dorsally, nearly reaching the head of the penis, is a pair of narrow, curved, sword-like projections.

Spermatheca pear-shaped, brown; inner duct funnel-shaped. Ventral receptacle with 40 or more coils. Ovipositor plate with 22–25 teeth.

Other characteristics, relationship, and distribution.

Eggs. With 2 pairs of thin filaments.

Larvae. Posterior spiracles tan; do not skip.

Puparia. Yellow-brown; anterior spiracle with 20–24 yellow filaments; horns, including spiracles, about $\frac{1}{3}$ length of puparium.

Chromosomes. Metaphase preparations show 5 pairs of rods and a pair of dots. One pair of rods is short, and one long pair possesses satellites on the centromere end. The preparations were made by Dr. Mettler using stock No. H180.2 from San José, Costa Rica.

Relationship. Belongs in subgroup III of the tripunctata group of the subgenus *Drosophila*. It is closely related to *crocina*, *mediostriata*, and *mesostigma* which also possess peg-like bristles on the fore femur.

Distribution. A widely distributed, but uncommon, species of the Neotropical region. Collectors from the Texas laboratory (1954–56) have taken it at various

localities in *El Salvador, Honduras, Nicaragua, Costa Rica, Panama, Colombia* and *Trinidad* at elevations from sea level to 4000 feet.

Types. Holotype male, 2 ♂ and 2 ♀ paratypes, stock No. H180.2, from San José, Costa Rica.

Notes. The only great concentration of *converga* was found at Lancetilla, Honduras in April where it made up 53% of a micropopulation of 266 individuals collected over mangosteen fruits (*Garcinia*), an Asiatic tree. Stocks are difficult to establish but can be maintained on banana medium.

D. converga can be separated from the three closely related species by the following combination of characters: small, very shiny, anterior scutellars convergent, posterior crossveins only slightly clouded, and the characteristic genitalia.

***Drosophila mediopictoides* Heed and Wheeler, new species.**

External characters of imagines.

♂, ♀. Arista with 5 dorsal and 3 ventral branches in addition to the fork. Front tan with a few minute frontal hairs arranged in a V; face and cheeks paler. Oral margin of male sometimes whitish. Carina rounded, short; two strong orals, the 2nd slightly shorter. Proclinate orbital $\frac{7}{8}$ length posterior reclinate; anterior reclinate minute. Greatest cheek width $\frac{1}{5}$ – $\frac{1}{6}$ greatest diameter of eye. Eye red with light pile. Palpi with one strong subapical bristle, one slightly shorter bristle and two bristles about half length of first two on outer margin; ventral side with about 10 shorter bristles.

Acrostichal hairs in about 6 rows; no prescutellars. Anterior scutellars divergent. Mesonotum semi-shining light brown; pleura, legs and halteres somewhat lighter. Anterior sternopleural $\frac{3}{7}$ posterior; middle bristle about $\frac{1}{2}$ anterior. Fore femur with 2–3 long bristles on flexor surface, 2 distal and 3–4 thinner, more basal bristles on lateral extensor surface. Fore tarsus, especially of male, with numerous recurved hairs. Base of fore metatarsus with 1–2 strong bristles; base of hind metatarsus with 3 strong yellow bristles. Apical bristles on 1st and 2nd tibiae, preapicals on all three.

Wings clear, the posterior crossvein with very slight clouding. Costal index about 4.2; 4th vein index about 1.4; 5x index about 1.2; 4c index about 0.6. Two prominent bristles at apex of 1st costal section; 3rd section with heavy bristles on the basal $\frac{2}{5}$.

Abdomen shining tannish-yellow with thin, indistinct, brownish to grayish posterior bands on tergites 2–6, interrupted mid-dorsally except on 2nd and 3rd where the bands are sometimes merely narrowed. On some individuals the bands may nearly reach the lateral margin as a thin line except on 6th tergite, this one sometimes without markings.

Body length (etherized) about 2.5 mm. (♂), 2.9 mm. (♀); wing length about 2.4 mm. (♂), 2.8 mm. (♀).

Internal characters of imagines and genitalia.

Anterior Malpighian tubes branched at the basal $\frac{1}{4}$; posterior tubes apposed without a continuous lumen. Testes with about 5 yellowish outer coils and 3 whitish thicker inner coils. Sperm pump diverticula about as long as the pump. Forceps with 6–8 primary teeth in a straight row, 8–15 secondary teeth and 11–

13 marginal bristles. Most of the secondary teeth are arranged into two rows when they are numerous, but when few then about 5 teeth are arranged in a posterior row. Toe rounded with 4 long subapical bristles; lower tip of anal plate with a dense tuft of bristles. Hypandrium with a long and a short bristle; head of penis large and complex, with 2 chitinized processes, sawtoothed along their outer margin, extending posteriorly from the apodeme.

Spermatheca chitinized, distinctly rounded, about 0.15 mm. in both width and length; upper $\frac{2}{3}$ of inner duct funnel-shaped, narrowing abruptly to a constriction followed by a slight bulblike expansion before the point of exit. Ventral receptacle with about 50 coils; ovipositor plate with 20–24 teeth, not broad apically.

Other characteristics, relationship, and distribution.

Eggs. With 2 pairs of thin filaments, as long as the egg.

Larvae. Posterior spiracles develop a burnt brown color in older larvae; do not skip.

Puparia. Red-brown; anterior spiracles with 17–18 branches; horns, including spiracles, about $\frac{1}{4}$ length of puparium.

Chromosomes. Metaphase preparations show 5 pairs of rods and a pair of large V's; 4 rod pairs are about equal in length and about $\frac{3}{4}$ as long as one arm of the V; the 5th rod pair is half the length of the others and in one cell this pair occupied the "dot position" in the center. No differences were seen in male and female. Salivary chromosomes showed 5 long arms and a dot; the X is a single arm and has much heterochromatin; one heterozygous inversion was seen in an autosome. The analysis was made by Dr. Mettler using stock No. H73.12 from Turrialba, Costa Rica.

Relationship. Belongs in subgroup III of the tripunctata group of the subgenus *Drosophila*; it is very similar to *mediopicta* Frota-Pessoa from which it is distinguished by the lack of any central markings on tergites 5–6, and by the smaller, rounded spermathecae; male genitalia of the two species are quite similar.

Distribution. Collected by the senior author in 1955 at Turrialba, *Costa Rica*, 2000', Oct., and Facultad de Agronomia, Medellin, *Colombia*, 5000', Nov. Collectors in 1956 included Wasserman, Carson and Hoenigsberg; localities are: *Costa Rica*: Turrialba, Aug.; La Lola, 128', Aug.; San Isidro de General, 2000', Aug.; San José, 3000', Aug.; *Panama*: Cerro La Campana, 2700'; *Colombia*: El Recuerdo, Sierra Nevada Mts., 3000'.

Types. Holotype male, 4 ♂ and 4 ♀ paratypes, from stock No. H73.12 from Turrialba, Costa Rica.

***Drosophila trapeza* Heed and Wheeler, new species.**

External characters of imagines.

♂, ♀. Arista with 6 dorsal and 3 ventral branches in addition to the fork. Front tan, face and cheeks somewhat paler. Carina not sulcate, reaching nearly to level of vibrissae. Proclinate orbital about $\frac{5}{8}$ posterior reclinate; anterior reclinate about $\frac{1}{4}$ proclinate. Two strong orals, the second shorter than the first. Greatest cheek width $\frac{1}{5}$ – $\frac{1}{7}$ greatest diameter of eye. Eyes bright red with

light pile. Palpi usually with 2 long bristles on antero-lateral margin followed by 2 thinner ones; ventral surface with 11–17 shorter bristles.

Acrostichal hairs in 6 rows; no prescutellars. Anterior scutellars divergent. Mesonotum brown, semi-shining; pleura and legs lighter. Pleura with a faint brown notopleural stripe and with faint brown spots on pteropleura and upper posterior corner of sternopleura. Anterior sternopleural about $\frac{1}{3}$ length posterior; middle bristle about $\frac{3}{4}$ length of anterior one. Front tarsus with numerous recurved hairs; base of fore and mid-metatarsus with a strong bristle, base of hind tarsus with 3 strong bristles. Apical bristles on 1st and 2nd tibiae, preapicals on all three.

Wings with posterior crossvein clouded; costal index about 3.5; 4th vein index about 1.7; 5x index about 1.7; 4c index about 0.75. One prominent bristle at apex of 1st costal section; 3rd section with heavy bristles on the basal $\frac{1}{4}$. Vein 2L bends to the costa at its end.

Abdomen of male shining yellow; tergites 2–5 with narrow posterior black bands that fade at the angle. The bands are incompletely interrupted on tergites 2–3, and completely interrupted on 4–5. Sixth tergite with a large central trapezoidal black spot that almost reaches the base of the tergite. Strains from Palmira and Medellín, Colombia are more strongly marked, all bands are interrupted in the midline, the 5th and sometimes the 4th bands are expanded into paramedian spots or triangles, and the trapezoidal spot on the 6th usually reaches the anterior margin.

Female abdomen as in the male except that the thin band of 5th tergite is more often broken into apical spots; 6th with a pair of small delicate, paramedian triangles. The more heavily marked form from Colombia has the bands on the 5th and sometimes the 4th expanded into paramedian spots or triangles; 6th with a pair of large paramedian triangles or spots which are sometimes partly fused and reach posterior margin.

Body length (etherized) about 2.3 mm. (♂), 2.7 mm. (♀); wing length about 2.0 mm. (♂), 2.3 mm. (♀).

Internal characters of imagines and genitalia.

Anterior Malpighian tubes branched basally near gut; posterior tubes apposed without continuous lumen. Testes with about 8 very pale yellow outer coils and 4–5 white inner coils. Sperm pump diverticula short, about half greatest diameter of pump. Forceps with 6–8 primary teeth, 5–6 strong secondary teeth on upper surface and 6–8 marginal bristles. Toe usually with 3 long bristles; 2–6 bristles on genital arch in back of toe, sometimes continuous with toe bristles. Head of penis arrow-head shaped with 2 horn-like processes pointing back toward the apodeme. Shells of hypandrium very narrow.

Spermathecae pear-shaped, about 0.13 mm. long, yellow brown in color; inner duct funnel-shaped. Ventral receptacle with about 60 coils. Ovipositor plate with about 19–21 teeth, apex rounded.

Other characteristics, relationship, and distribution.

Eggs. With 2 pairs of thin filaments.

Larvae. Posterior spiracles not black; do not skip.

Puparia. Red-brown; anterior spiracle with about 12 gray branches, the horn, including spiracles, about $\frac{1}{4}$ length of puparium.

Chromosomes. Five pairs of rods and one pair of large dots. The longest rod pair represents the X chromosomes; the Y is a rod about $\frac{2}{3}$ the length of the X. Salivary preparations show 5 long arms and the dot chromosome. Determinations are by Dr. Clayton, using stock No. H29.16 from San Salvador, El Salvador, and by Dr. Mettler, using stock No. H167.1 from La Lola, Costa Rica.

Relationship. Belongs in subgroup III of the tripunctata group of the subgenus *Drosophila*.

Distribution. A widely distributed but relatively uncommon species of the Neotropical region. Collected by the senior author and other Texas collectors (1952–56) in Vera Cruz, Mexico, El Salvador, Honduras, Costa Rica, Nicaragua, Colombia, Venezuela and Trinidad at elevations from sea-level to 5000 feet; also collected at the Agricultural Experiment Station, Río Piedras, Puerto Rico, and at Kingston, Jamaica, B.W.I., in Feb., 1956.

Types. Holotype male, 2 ♂ and 3 ♀ paratypes, from stock No. H167.1 from La Lola, Costa Rica.

Notes. *D. trapeza* is attracted to banana bait but it is never found in great quantities in any collection. The largest number taken on any day was 22 individuals (4.8% of the total collection) collected over zapote fruits (*Calocarpum*) at San Salvador in May. It has been reared in El Salvador from the following plants: *Helosis* (Balanophoraceae), *Inga preussii* Harms (Leguminosae), *Castilla gummifera* Pittier (Moraceae), and *Brosimum terrabanum* Pittier (Moraceae).

Distinguishing characters are: the typical trapezoidal mark on 6th tergite of males, the small delicate paramedian triangles on 6th tergite of females, and the slight markings of the pleura. In general view, the head seems somewhat too small for the size of the body.

***Drosophila mediodiffusa* Heed and Wheeler, new species.**

External characters of imagines.

♂. Arista with 5–6 dorsal and 3 ventral branches in addition to the fork. Antennae and front brown; few frontal hairs. Proclinate orbital about $\frac{5}{8}$ length posterior reclinate; anterior reclinate $\frac{1}{4}$ proclinate. Only one strong oral, the 2nd about $\frac{1}{3}$ as long. Carina prominent, a bit longer than 3rd antennal segment. Face whitish but not strikingly so. Greatest width of cheek about $\frac{1}{8}$ greatest diameter of eye, extremely narrow directly below the eye. Eyes scarlet with silvery pile. Palpi with 8–10 strong bristles on lateral margin and 30–40 shorter bristles ventrally.

Acrostichal hairs in 6 rows; no prescutellars. Anterior scutellars straight or slightly divergent. Mesonotum shining brown, scutellum darker. Pleura very light tan to nearly whitish. Anterior sternopleural about 0.3 length posterior, the middle bristle usually shorter than anterior. Legs tan; numerous recurved hairs on fore tarsi; flexor and lateral extensor surfaces of fore femur with several long bristles; several strong bristles near base of hind metatarsus. Apical bristles on 1st and 2nd tibiae, preapicals on all three.

Wings grayish, posterior crossvein clouded, anterior crossvein dark or slightly

clouded. Costal index about 3.3; 4th vein index about 1.7; 5x index about 1.2; 4c index about 0.8. Two prominent bristles at apex of 1st costal section; 3rd section with heavy bristles on the basal $\frac{1}{3}$. Vein 2L bends to costa near its tip.

Abdomen shining tan with grayish shading dorsally which is darker on tergites 2 and 3. Body length (etherized) about 2.1 mm.; wing, 2.0 mm.

Female. Palpi with 4–5 strong bristles on lateral margin and about 12 shorter bristles on ventral surface. A few recurved hairs on fore tarsi. Abdomen shining tan with a diffuse gray band as broad as the tergite on 2nd and 3rd segments which terminate at the angle; the remainder of the abdomen varies from a grayish dorsum with a slight clear midstripe, to shining tan. Body length (etherized) about 2.5 mm.; wing, 2.3 mm.

Internal characters of imagines and genitalia.

Anterior Malpighian tubes branched at about the basal $\frac{1}{10}$; posterior tubules with a continuous lumen. Testes with 3 pale yellow outer coils and 2 white inner coils. Sperm pump diverticula slightly longer than greatest diameter of the pump. Forceps with 6–8 primary teeth in a straight row, 4–6 long bristles on upper surface and 4–9 short marginal bristles. No bristles on toe; head of penis with 2 prominent horn-like processes extending back toward the apodeme. Spermatheca chitinized, brown, the width about equalling the length; inner duct usually with uniform diameter but sometimes the distal portion is widened into a cup. Ventral receptacle with only about 6 irregular coils. Ovipositor plate with 23–28 teeth.

Other characteristics, relationship, and distribution.

Eggs. With 2 pairs of thin filaments.

Puparia. Red-brown; anterior spiracle with 15–16 white branches, the horns, including spiracles, about $\frac{1}{4}$ length of puparium.

Larvae. Posterior spiracles yellow; do not skip.

Chromosomes. Five pairs of rods and one pair of dots; the X is about twice as long as the autosomes and as the Y; one autosomal pair has satellites on the centromere end. The Y is a rod and the dot pair is very small. The analysis was made by Dr. Mettler using stock No. H130.6 from Puerto Rico.

Relationship. Belongs in subgroup IV of the tripunctata group of the subgenus *Drosophila*; it is most similar to *albescens* and *tristriata*.

Distribution. Collected by the senior author in January and February, 1956, in *Haiti*, *Jamaica*, and *Puerto Rico*. Mrs. Marta Breuer also collected the species in *Cuba* in January, 1956.

Types. Holotype male and 6 paratypes of both sexes, descendants of stock No. H129.16 from El Yunque Resort Area, Caribbean National Forest, Puerto Rico at about 2000 feet elevation.

Notes. *D. mediodiffusa* comes readily to fruit baits and is easily cultured on banana medium. The species is named for the diffuse, indistinct abdominal pattern.

***Drosophila medioparva* Heed and Wheeler, new species.**

External characters of imagines.

♂, ♀. Arista with 7 dorsal and 3 ventral branches in addition to the fork. Face white; carina reaching nearly to level of vibrissae, rounded at tip, not sulcate.

Antennae, cheeks and front brown. Proclinate orbital about $\frac{5}{8}$ length posterior reclinate; anterior reclinate about $\frac{1}{4}$ length proclinate. One strong oral; greatest cheek width about $\frac{1}{8}$ greatest diameter of eye, extremely narrow directly below eye. Eyes red with pale pile. Palpi with about 4 long bristles along antero-lateral margin, gradually decreasing in size posteriorly.

Acrostichal hairs in 6 rows; no prescutellars. Anterior scutellars divergent. Mesonotum and scutellum semi-shining brown; pleura and legs paler. Anterior and mid-sternopleurals about $\frac{1}{2}$ length posterior one. Fore femur usually with 5 prominent bristles on lateral extensor surface and 3 on flexor surface. Several recurved hairs on fore tarsus. No heavy black bristles at base of hind metatarsus. Apical bristles on 1st and 2nd tibiae, preapicals on all three.

Wings with grayish cast; posterior crossvein clouded. Costal index about 4.0; 4th vein index about 1.5; 5x index about 1.4; 4c index about 0.6. One prominent bristle at apex of 1st costal section; 3rd section with heavy bristles on the basal $\frac{1}{2}$.

Abdomen brownish yellow with black apical bands on tergites 2–4 which are incompletely interrupted on 2–3 and usually completely interrupted on 4th. The widest band is on the 3rd tergite where it is about half the tergite width. All bands fade at the angle of the tergites. Tergite 5 usually without markings, but rarely with a pair of faint, small, paramedian spots. Tergite 6 with a large round median spot that extends almost the width of the tergite. Sexes similar.

Body length (pinned specimens) about 2.2 mm.; wing length about 2.3 mm. (all measurements made on males).

Internal characters of imagines and genitalia.

Posterior Malpighian tubes apposed but apparently without a continuous lumen. Testes with 8–9 outer yellowish coils and 3–4 inner coils. Sperm pump diverticula short, about $\frac{3}{4}$ length of pump. Forceps with 8 primary teeth in a curved row, and 12 marginal bristles that come around onto upper surface. Toe large with about 8 bristles. Gonapophysis without conspicuous bristle. Basal part of anal plate with a straight row of about 6 small, well-spaced bristles.

Spermathecae elongate, about 0.18 mm. long and 0.1 mm. wide; inner duct tubular with a median constriction. Ventral receptacle with about 40 coils. Ovipositor plate with 21 teeth, the apex rounded.

Other characteristics, relationship, and distribution.

Eggs. With 2 pairs of thin filaments.

Larvae. Posterior spiracles black.

Puparia and chromosomes. Unknown.

Relationship. Belongs in subgroup IV of the tripunctata group of the subgenus *Drosophila*. It is quite similar to *D. albicans* in the male genitalia, but the two species are easily distinguished on other features.

Distribution. Collections were made by the senior author and Drs. Carson and Wasserman in July and August, 1956, as follows: *Costa Rica*: Turrialba, 2000'; La Lola, 128'; *Panama*: Cerro La Campana, 60 klm. southwest of Panama City, 2700'; *Colombia*: El Recuerdo, 24 klm. southeast of Santa Marta, 4000'. Mr. Hoenigsberg assisted in the last locality.

Types. Holotype male and 3 paratype males, No. H154.10, from Turrialba, Costa Rica.

Notes. Collected over hule fruits (*Castilla*) in Costa Rica and on rotting celery cabbage in Panama. It was not common in any collection. Two males were reared by Dr. Wasserman from fruit of *Anthurium* (Araceae). We have been unable to raise this species on banana medium as yet.

The species may be recognized by its small size, white face, large round spot on 6th tergite, rather large eye, and semi-shining mesonotum. The only striking difference in male genitalia from *albicans* is the arrangement of small bristles along the base of the anal plate, since in *albicans* these are formed into a closely-set row of 10 or more bristles.

Drosophila spinatermina Heed and Wheeler, new species.

External characters of imagines.

♂, ♀. Arista with 5–6 dorsal and 2–3 ventral branches in addition to the terminal fork. Face and 3rd antennal joint tan; front dull brown with paler areas at bases of orbitals and in ocellar triangle, the latter extending as a thin line to anterior margin. Proclinate orbital about $\frac{4}{5}$ length posterior reclinate; anterior reclinate about $\frac{1}{4}$ proclinate. Two strong orals of equal length. Carina prominent with rounded edges, not sulcate. Greatest cheek width about $\frac{1}{4}$ greatest diameter of eye, about $\frac{1}{6}$ directly below eye. Eyes bright red with light pile. Palpi with 2–3 long bristles on antero-lateral margin and about 20 shorter ones on ventral surface and margin.

Acrostichal hairs in 6 rows; no prescutellars. Anterior scutellars divergent. Mesonotum and scutellum subshining brown; pleura brown. Anterior sternopleural about $\frac{1}{2}$ length posterior; middle bristle about half length anterior one. Legs light brown; a few recurved hairs on fore tarsus. Lateral extensor surface of fore femur with 4 long bristles; flexor surface with 3 long bristles. Apical bristles on 1st and 2nd tibiae, preapicals on all three.

Wings clear; posterior crossvein clouded. Tip of 3L usually with slight shading. Costal index about 2.7; 4th vein index about 1.7; 5x index about 1.5; 4c index about 0.9. Two prominent bristles at apex of 1st costal section; 3rd section with heavy bristles on the basal $\frac{1}{2}$. Vein 2L bends toward costa at its tip, and 3L usually bends toward 4th at its tip, the apex of the wing appearing rounded.

Abdomen shining yellow with very narrow dark brown posterior bands on 2nd and 3rd tergites that are interrupted in the midline and which extend to the angle of the tergite. Remainder of abdomen without marks.

Body length (etherized) about 2.0 mm. (♂), 2.4 mm. (♀); wing length about 1.9 mm. (♂), 2.1 mm. (♀).

Internal characters of imagines and genitalia.

Anterior Malpighian tubes branched at about the basal $\frac{1}{10}$; posterior tubes with continuous lumen. Testes with about 7 thin outer coils and 4 thicker inner coils; white. Sperm pump diverticula about half length of pump itself. Anal plate with a single prominent spine on lower tip; toe with 4 bristles; forceps with a row of 8–9 primary teeth, 5–8 secondary teeth and 8–9 marginal bristles which continue around to upper surface. Head of penis rather large and complex, in a filiform envelope. Spermathecae dark brown, oval, the greatest width $\frac{3}{4}$ the length; inner duct broadly funnel-shaped, narrowing gradually to a constriction

near base with a slight bulblike expansion just before the point of exit. Ventral receptacle with over 50 coils. Ovipositor plate with 15–17 teeth, the tip somewhat blunt.

Other characteristics, relationship, and distribution.

Eggs. With 4 thin filaments, the apical pair thinner and shorter than the basal pair.

Larvae. Posterior spiracles yellow; do not skip.

Puparia. Red-brown; anterior spiracle with 24–26 thin yellow branches; horns, including spiracles, about $\frac{1}{3}$ length of puparium.

Chromosomes. Three pairs of rods, one pair of V's and one pair of dots. One rod pair is longer than the other two, and longer than the arms of the V. Determination made by Dr. Mettler on stock No. H106.1 from Port of Spain, Trinidad.

Relationship. A rather atypical member of subgroup IV the tripunctata group of the subgenus *Drosophila*. It resembles *tripunctata* in some respects, including the low costal index, darkening at apex of 3L, small size, and shape of ovipositor plate. It resembles members of the cardini group in having a spine on the lower tip of the male anal plate and large secondary teeth on the forceps.

Distribution. Known from two individuals (and their descendants) collected by the senior author while sweeping terrestrial aroids near the Queen's Savannah, Port of Spain, *Trinidad* in December, 1955.

Types. Holotype male, 3 ♂ and 4 ♀ paratypes, descendants from stock No. H106.1 from Port of Spain, Trinidad.

Notes. Some individuals from the stock show a doubling of ocellar bristles on one or both sides, and a few females have the proclinate and posterior reclinate bristles doubled on one side or the other. Such abnormalities were found in about 30% of the 52 individuals examined.

***Drosophila tristriata* Heed and Wheeler, new species.**

External characters of imagines.

♂, ♀. Arista with 5–6 dorsal and 3 ventral branches in addition to the fork. Antennae and front brown; few frontal hairs. Proclinate orbital $\frac{3}{4}$ posterior reclinate; anterior reclinate $\frac{1}{4}$ proclinate. One strong oral, 2nd about half length 1st. Carina widened below, not sulcate. Face whitish in females, tan to whitish in males; on pinned specimens the face turns rather brownish. Greatest cheek width about $\frac{1}{7}$ greatest diameter of eye; cheek exceedingly narrow directly below eye. Eyes red with silvery pile. Male palpi with about 8–10 strong bristles on lateral margin and 15 shorter bristles on ventral surface. Female palpi with 4–6 strong bristles on lateral margin and about 9 shorter bristles on ventral surface.

Acrostichal hairs in 6 rows; no prescutellars. Anterior scutellars slightly divergent. Mesonotum and scutellum shining brown; pleura whitish. Anterior sternopleural $\frac{1}{3}$ – $\frac{1}{2}$ posterior; middle one $\frac{1}{4}$ – $\frac{1}{2}$ anterior. Legs whitish tan; recurved hairs on fore tarsi. Flexor surface and lateral extensor surface of fore femur with 3–5 long bristles each. Several long yellow bristles present on base of hind metatarsus. Apical bristles on 1st and 2nd tibiae, preapicals on all three.

Wings grayish; posterior crossvein clouded, anterior crossvein dark to slightly clouded. Costal index about 3.2; 4th vein index about 1.6; 5x index about 1.3; 4c index about 0.7. One prominent bristle at apex of 1st costal section; 3rd section with heavy bristles on the basal $\frac{1}{2}$ or slightly less. Vein 2L bends to costa at its tip and is slightly darkened apically.

Abdomen shining yellow with posterior black bands on 2nd and 3rd tergites that fade at the angle and are usually diffusely interrupted medianly, but sometimes with diffuse mid-dorsal extensions. Tergites 4–6 in male with median longitudinal stripes that usually extend the length of the tergite; last 3 segments sometimes with narrow posterior bands in male, quite variable in females, sometimes with median stripes as in males, or with only median dots, or without markings. A narrow posterior band usually present on 4th when median markings are present.

Body length (etherized) about 2.0 mm. (δ), 2.5 mm. (φ); wing length about 2.0 mm. (δ), 2.2 mm. (φ).

Internal characters of imagines and genitalia.

Anterior Malpighian tubes branched basally near gut; posterior tubes with continuous lumen. Testes with 3 outer yellow coils and 2 inner white coils. Sperm pump diverticula about $\frac{3}{4}$ greatest diameter of the pump. Genital arch with well developed anterior process; forceps with 8–9 primary teeth in a straight row, usually 6 long pale bristles on upper surface and 6 long marginal bristles. Toe with 1–2 bristles subapically; lower tip of anal plate with a loose tuft of about 10 hairs. Head of penis rounded, with a lateral pair of short rounded chitinized processes (ventral view). The median hornlike projection connecting the arms of the hypandrium, between the forceps, unusually narrow.

Spermatheca round, brown; inner duct with uniform diameter. Ventral receptacle with about 15 irregular coils. Ovipositor plate with 22–27 teeth, the apex fairly broad.

Other characteristics, relationship, and distribution.

Eggs. With 2 pairs of thin filaments.

Larvae. Posterior spiracles yellow; do not skip.

Puparia. Yellowish brown; anterior spiracle with about 16 whitish branches; horns, including spiracles, about $\frac{1}{4}$ length of puparium.

Chromosomes. Five pairs of rods and one pair of dots; one rod pair is nearly twice the length of the others and bears satellites; two pairs of shorter rods also bear satellites. The X and Y were not recognized. The analysis was made by Dr. Wasserman using stock No. H109.22 from Port of Spain, Trinidad.

Relationship. Belongs in subgroup IV of the tripunctata group of the subgenus *Drosophila* and is most similar to *albescens* and *mediodiffusa*. It may be distinguished from *mediodiffusa* by the presence of a rather strong 2nd oral, abdominal stripes (when present) and characteristic genitalia. *D. albescens* differs from the other two by the nearly transparent mesonotum and absence of sperm pump diverticula, and from *mediodiffusa* by the absence of prominent hornlike processes on the head of the penis; it differs from *tristriata* also in the absence of bristles on the toe, and the lack of an unusually narrowed connection between the forceps.

Distribution.—Collected by the senior author in *El Salvador*: San Salvador, throughout the year, 1953–54; *Honduras*: La Lima, April 1954; *Trinidad*: Port of Spain, Dec. 1955; *Puerto Rico*: Río Piedras Experiment Station, Jan. 1956; and *Jamaica*: Bath and Kingston, Feb. 1956.

Types.—Holotype male, 3 ♂ and 7 ♀ paratypes, from collection No. H109.22 from the vicinity of Port of Spain, Trinidad.

Notes.—Near Port of Spain, Trinidad the species was collected in a cacao finca on the fallen red flowers of *Erythrina micropteryx* Poepp. (Leguminosae) where, on Dec. 24, 1955, the species made up 7.5% of the collection of 374 flies, and on Dec. 26, 1955, this species accounted for 6.5% of the 369 flies collected.

***Drosophila neomorpha* Heed and Wheeler, new species.**

This new member of the cardini group is most similar to *polymorpha* and *parthenogenetica*; it occurs in both a dark and a light form.

External characters of imagines.

♂, ♀. Arista with 5 dorsal and 2 ventral branches in addition to the fork. Face, cheeks and antennae light tan; two orals of equal length; carina fairly broad, reaching below 3rd antennal joint, not sulcate. Proclinate orbital equal to length of posterior reclinate; anterior reclinate about $\frac{1}{5}$ the other two. Front tan; base of orbitals and ocellar triangle shining, the latter extending forward to level of orbital bases. Few frontal hairs present. Greatest width of cheek about $\frac{1}{5}$ greatest diameter of eye; eye red with light colored pile. Palpi of male with 2–3 long bristles on antero-lateral margin and 25–30 only slightly shorter ones ($\frac{3}{4}$ length long ones) on anterior and ventral surfaces. Palpi of female with one strong bristle subapically and about 16 shorter ones ($\frac{1}{3}$ length of long bristle) on anterior and ventral surface.

Acrostichal hairs in 6 rows; no prescutellars. Anterior scutellars convergent. Mesonotum, scutellum and pleura shining yellowish-brown; legs and halteres lighter. Anterior sternopleural about $\frac{3}{8}$ posterior; mid-sternopleural about $\frac{1}{3}$ anterior.

Fore femur with one prominent bristle on basal lateral extensor surface; flexor surface with 1–2 prominent bristles about equal to greatest width of femur in length and 1–2 shorter bristles about $\frac{1}{2}$ – $\frac{3}{4}$ length of longer ones in addition to several still shorter ones. Posterior surface of fore femur fairly densely haired, especially in male. Numerous recurved hairs on fore tibia and tarsus; fore metatarsus with one, sometimes two, prominent bristles at base. Apical bristles on 1st and 2nd tibiae, preapicals on all three.

Wings clear, crossveins not clouded. Costal index about 3.2; 4th vein index about 1.7; 5x index about 1.5; 4c index about 0.8. One strong and one weak bristle at apex of 1st costal section, this area slightly darkened; 3rd costal section with heavy bristles on the basal $\frac{1}{2}$.

Abdomen shining brownish yellow with polymorphic pattern. The light and dark forms of both sexes will be described, but several grades of intermediates exist.

Light form, male: narrow posterior black bands on tergites 2–4, interrupted medianly, fading at the angle; 5–6 sometimes without markings or with 5th

segment only with a suggestion of a posterior band; 6 with a pair of small paramedian spots at posterior border. Genital arch darkened.

Dark form, male: tergites 2–4 with shining black posterior bands, interrupted medianly and extended basally to preceding tergite at the angle but failing to reach lateral margin; 5 shining black except for a narrow dorsal interruption, a central narrow area along edge of preceding segment and a narrow area along lateral margin; 6 shining black except along lateral margin.

Light form, female: tergites 2–4 with medianly interrupted black bands about $\frac{1}{3}$ width of tergite; the bands stop rather abruptly at the angle and continue toward but fail to reach lateral margin as a much narrower line or band. Interrupted band of tergite 5 very narrow, almost reaching lateral margin; 6 with only a suggestion of a band. Segments 3–6 with an extra narrow mark on anterior border slightly beyond the angle. Genital arch darkened.

Dark form, female: bands become progressively wider posteriorly until segments 5–6 where they are slightly more than half the width of the tergite; at the angle the bands of tergites 3–6 extend forward to basal border; 6 with non-interrupted band with paramedian extensions that reach base; area around anal plates darkened.

Body length (etherized) about 2.5 mm. (δ), 2.8 mm. (φ); wing length about 2.1 mm. (δ), 2.4 mm. (φ).

Internal characters of imagines and genitalia.

Anterior Malpighian tubes branched at their distal $\frac{1}{6}$; posterior tubes apposed, without a continuous lumen. Testes with about 6 outer yellow coils and 3 thicker inner white coils. Sperm pump diverticula about twice the greatest diameter of the pump. Forceps with 7–8 primary teeth, 8–10 strong secondary teeth and about 8 marginal bristles that come around onto upper surface. Lower tip of anal plate with 3 strong spine-like bristles that are thicker and shorter than the usual anal plate bristles. Hypandrium with one long bristle; base of genital arch with 1–2 long bristles. Spermatheca vase-shaped, the inner duct broadly funnel-shaped in its upper $\frac{3}{4}$. Ventral receptacle with about 70 coils. Ovipositor plate with 18–22 teeth.

Other characteristics, relationship, and distribution.

Eggs.—With 2 pairs of thin filaments.

Larvae.—The larvae skip.

Puparia.—Reddish brown; anterior spiracle with about 18 grayish branches; horns, including spiracles, about $\frac{1}{3}$ length of puparium.

Chromosomes.—Two pairs of V's, one pair of rods, and a pair of dots. One V-pair has slightly unequal arms; the X is a rod with a satellite on the centromere end and is slightly longer than an arm of the metacentric V. The Y is slightly shorter than the X and lacks a satellite. Salivary chromosomes show 5 long arms and the dot; the X has much heterochromatin at the centromere end. No inversions were seen in 5 preparations. Analysis made by Dr. Mettler using stock No. H80.8 from Barro Colorado Island, Canal Zone.

Relationship.—Belongs to the cardini group of the subgenus *Drosophila* and is most similar to *D. parthenogenetica* and *D. polymorpha*.

Distribution.—Collected at Chapulhuacan, Hidalgo, Mexico (Wasserman and

Heed, June 1952); Lancetilla, *Honduras* (Heed, April 1954); Barro Colorado Island, *Canal Zone* (Heed, Oct. 1955) (Heed, Wasserman, Carson, Aug. 1956); Cerro La Campana, *Panama* (Heed, Wasserman, Carson, Aug. 1956); Arima Valley, *Trinidad* (Heed, Dec. 1955).

Types.—Holotype male, 2 ♂, 2 ♀ paratypes, descendants from stock No. H80.8 from Barro Colorado Island, Canal Zone; 1 ♂, 1 ♀ paratype from stock No. H107.21 from Arima Valley, Trinidad.

Notes.—*D. neomorpha* may be distinguished from *polymorpha* and *parthenogenetica* by the following combination of characters: long bristles on flexor surface of fore femur, strong spine-like bristles on lower tip of male anal plate, and long secondary bristles on palpi.

Dr. Harrison D. Stalker, Washington University, St. Louis, Missouri, tested this species for parthenogenetic tendencies; a total of 14,278 eggs was examined from 40 virgin females. Seven eggs began development but died before hatching; a single larva hatched from the egg but died within 24 hours. No adults were produced by parthenogenesis.

Drosophila nigrodunni Heed and Wheeler, new species.

External characters of imagines.

♂. Arista with 5 dorsal and 2–3 ventral branches in addition to the fork. Front dull brown; bases of orbitals and ocellar triangle shining brown; few frontal hairs. Proclinate orbital equal to length of posterior reclinate; anterior reclinate $\frac{1}{3}$ other two. Two moderately strong orals of equal length. Carina prominent, $\frac{2}{3}$ as broad as 3rd antennal joint, fused to mouth margin. Face brown; greatest cheek width about $\frac{1}{5}$ greatest diameter of eye, about $\frac{1}{7}$ directly below eye. Eyes garnet with short, pale pile. Palpi with 6–8 strong bristles on anterior distal margin and about 20–25 shorter bristles on ventral surface.

Acrostichal hairs in 6 rows; no prescutellars. Anterior scutellars convergent. Mesonotum subshining grayish brown, darker on scutellum and pleura. Anterior sternopleural about $\frac{2}{5}$ posterior; middle bristle $\frac{1}{2}$ length anterior one. Legs tan; numerous recurved hairs on fore tarsus. Flexor surface of fore femur with 2–4 long bristles; lateral extensor surface with 1–3 long bristles. Apical bristles on 1st and 2nd tibiae, preapicals on all three.

Wings clear; posterior crossvein dark but not clouded. Costal index about 3.2; 4th vein index about 1.8; 5x index about 1.6; 4c index about 0.8. Two prominent bristles at apex of 1st costal section; 3rd section with heavy bristles on the basal half. Vein 2L bends to costa at apex.

Abdomen generally shining brownish black with a tan pattern dorsally. Tergite 2 with a faint posterior gray band vaguely interrupted, and a tan spot anteriorly at the angle; 3–4 with darker wide posterior bands, usually interrupted, and with narrow paramedian extensions reaching basal border. Entire lateral area from angle of tergite brownish black. The pattern thus obtained is a pair of dorsal rectangular tan areas on 3–4; 5–6 shining black. Body length (etherized) about 2.2 mm.; wing, 2.0 mm.

♀. Palpi with 4–6 strong bristles on anterior distal margin and about 10–16 shorter bristles on ventral surface; few recurved hairs on fore tarsus. Abdomen with shining black bands with definite brownish cast on 2–3. Paired rectangular

dorsal tan areas sometimes on all tergites. Posterior half of 5th and all of 6th usually entirely black. Body length about 2.5 mm.; wing, 2.1 mm.

Internal characters of imagines and genitalia.

Anterior Malpighian tube branched at its distal $\frac{1}{6}$; posterior tubes apposed without a continuous lumen. Testes white, with 5 outer and 3 inner coils. Sperm pump diverticula slightly longer than greatest diameter of pump. Forceps with 6–7 primary teeth in a straight row, 5–8 secondary teeth and 8–10 marginal bristles. Spermathecae chitinized dark brown with a slight indentation at distal tip; inner duct funnel-shaped. Ovipositor plate with 18–21 teeth.

Other characteristics, relationship, and distribution.

Eggs.—With 2 pairs of thin filaments.

Larvae.—The larvae skip

Puparium.—Brown, redder with age; anterior spiracle with 9–10 branches; horns including spiracles, about $\frac{1}{5}$ length of puparium.

Chromosomes.—Two pairs of V's, one pair of rods and one pair of dots. The rods are slightly longer than an arm of the V's. Analysis made by Dr. Mettler using stock No. H119.4 from Barbados.

Relationship.—Belongs to the cardini group of the subgenus *Drosophila* and is most similar to *D. dunni*.

Distribution.—*Barbados*, British West Indies. Collected by the senior author over fruit bait in Turner's Hall Woods, and in several orchards.

Types.—Holotype male, 4 ♂, 3 ♀ paratypes, descendants from stock No. F119.4 collected Jan. 1956, at Grant's Castle, Barbados.

***Drosophila aracea* Heed and Wheeler, new species.**

This interesting new species cannot, as yet, be assigned to any of the established subgenera of *Drosophila*.

External characters of imagines.

♂, ♀. Arista with 3 dorsal and 2 ventral branches of moderate length in addition to the terminal fork. Face, cheeks and antennae brown; carina of moderate length, rounded. One strong oral, 2nd much weaker, lateral to 1st rather than ventral to it. Front brown, about as broad as long; frontal hairs present. Base of orbitals and ocellar triangle shining brown. Proclinate and posterior reclinate orbitals usually nearly of equal length but somewhat variable; anterior reclinate about $\frac{1}{4}$ proclinate and laterad of the other two. Postverticals about $\frac{4}{5}$ (sometimes equal) length of two long orbitals. Eye castillian red with light colored pile; eyes round. Cheeks wide, the greatest width about $\frac{3}{8}$ diameter of eye. Palpi with 3 long bristles on antero-lateral margin; numerous shorter bristles on ventral surface.

Acrostichal hairs in about 6 irregular rows; no prescutellars. Anterior scutellars convergent; posterior scutellars usually directed upwards at a 45° angle. Usual anterior dorsocentrals about $\frac{5}{8}$ length posterior ones and placed rather far forward ($\frac{1}{4}$ – $\frac{1}{5}$ distance from transverse suture to scutellum), the distance between anterior dorsocentrals equalling that from anterior to posterior pair so that the two pairs form a square. Anteriorly in each dorsocentral row, immediately behind transverse suture, there is a shorter bristle, a little larger than acrostichal

hairs and about half length of anterior dorsocentrals. Other hairs in the dorso-central row may sometimes be enlarged and bristle-like. Mesonotum, scutellum and pleura shining light brown; halteres and legs paler brown. No middle sternopleural; anterior one about $\frac{1}{3}$ posterior. Fore femur with 5 prominent bristles on flexor surface and 4 prominent bristles on lateral extensor surface. Recurved hairs on all tibiae and tarsi. First 4 segments of all tarsi with 2–3 stouter and longer apical bristles; distal tarsal joint of all legs somewhat enlarged, with large empodium and pulvilli. Hairs and bristles on all legs somewhat elongated. Apical bristle developed on 2nd tibia only, preapicals on all three.

Wings clear, veins yellow. Costal index about 3.0; 4th vein index about 1.5; 4c index about 0.8; 5x index about 1.1. One prominent bristle at apex of 1st costal section; 3rd section with heavy bristles on the basal $\frac{1}{4}$ or less. The double row of recurved hairs along costa enlarged more than usual in the genus, giving the wing a pectinate appearance.

Abdomen considerably wider than thorax, brownish yellow with black apical bands that are widest at the angle of the tergite and fade away just before reaching lateral margins. Bands of tergites 2–5 usually with slight mid-dorsal extensions, also sometimes incompletely interrupted here. Sixth tergite with a faint, incomplete band. Posterior borders of tergites 5–6 lined with long thin bristles. Sexes similar.

Body length (etherized) about 3.1–3.5 mm.; wings, 2.8 mm.

Internal characters of imagines and genitalia.

Anterior and posterior Malpighian tubes branched basally near gut, the latter with continuous lumen. Testes with 10–15 bright yellow outer coils and 1–2 thicker white inner coils. Sperm pump diverticula long, about 8–10 times the length of the pump. Anal plates fused ventrally by a strong chitinized bow; forceps with 8–10 primary teeth, 5 marginal bristles and 3–6 bristles on upper surface. Toe short and wide, the surface thickly covered with hairs. Base of genital arch with an extended thin pitted shell of about the same size and shape as the hypandrium shell, and which overlies the toe and forceps. Arch of hypandrium short, not extending beyond shells, these with one median bristle. Head of penis acuminate, without special processes.

Spermathecae lightly chitinized, almost round. Ventral receptacle with about 120 tight coils. Ovipositor plate with one row of 23–24 teeth, broad until the very tip where a small extended apex bears the first 5 teeth, a long bristle between teeth 6–7.

Other characteristics, relationship, and distribution.

Eggs.—With 2 pairs of flattened filaments which taper to a point and which are equal in length and equal to egg length.

Larvae.—Posterior spiracles yellow; do not skip.

Puparium.—Red-brown; horns, including spiracles, about $\frac{1}{3}$ length of puparium; each anterior spiracle with 22–24 yellow branches.

Chromosomes.—There are 3 pairs of chromosomes: one pair of rods with a subterminal constriction, one pair of large J's, and one pair of V's. Salivary chromosomes show 5 long arms and a dot chromosome; several inversions were seen. The chromocenter is small and very little heterochromatin is present.

Determined by Dr. Clayton using stocks No. H46.28 (El Salvador) and H57.69 (Nicaragua).

Relationship.—Of uncertain relationship in the genus *Drosophila*.

Distribution.—Collected by the senior author as follows: *El Salvador*: near San Salvador, 2000', Oct. 1953, Feb., May, June and Aug. 1954; San Marcos Lempa, 150', May 1954; *Honduras*: La Lima, 100', March 1954; *Nicaragua*: Santa Maria de Ostuma, 11 km. north of Matagalpa, 4500', July 1954; *Costa Rica*: San José, 3000', Oct. 1955.

Types.—Holotype male, 5 ♂, 4 ♀ paratypes, descendants from stock No. H57.69 from Santa Maria de Ostuma, Nicaragua.

Notes.—*D. aracea* has been collected only from inside the white spathes of aroid flowers (Araceae), where they were feeding and laying eggs on the sticky yellow gynecium at the base of the spadix. A total of 49 individuals has been reared from flowers of the genus *Xanthosoma* and 10 came from flowers of *Syn-gonium* in El Salvador. The species seems to prefer fresh water swamps where "elephant ears" (*Xanthosoma*) are abundant, but it has also been taken in a wet cloud forest in Nicaragua from aroid flowers.

In both flowers and laboratory culture vials, individuals have a habit of "flocking" together in one place; the species is reared fairly readily on banana medium. Distinguishing characters are: forward position of anterior dorsocentrals; small pair of additional dorsocentral bristles; elongated recurved hairs on costa; enlarged terminal tarsal segment, empodium and pulvilli; flower feeder.

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