

V. TAXONOMIC STUDIES ON AMERICAN DROSOPHILIDAE

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This report deals with various Nearctic and Neotropical species of the dipterous family Drosophilidae. Some new taxonomic notes are presented for *Drosophila pictiventris* Duda, *thoracis* Williston, *mexicoa* Wheeler, *fragilis* Wheeler, *triangula* Wheeler, *deflecta* Malloch, and *Stegana coleoptrata* (Scopoli), and the genus *Trachyleucophenga* Hendel is reported from the United States for the first time. Finally, eight new species of the family are described, as follows:

Drosophila flavopinicola, n.sp. (pinicola group; western U.S.)

Drosophila magnaquinaria, n.sp. (quinaria group; western U.S.)

*Drosophila stalker*i, n.sp. (repleta group; Florida)

Drosophila argenteifrons, n.sp. (?tripunctata group; Mexico)

Paraliodrosophila dudai, n.sp. (Mexico, El Salvador)

Paramycodrosophila centralis, n.sp. (Texas, Florida)

Paramycodrosophila anomala, n.sp. (Texas, Mississippi)

Chymomyza wirthi, n.sp. (eastern U.S., Canada)

Unless otherwise stated, the type specimens of these new species have been placed in the *Drosophila* Type and Reference Collection of The University of Texas, Austin Texas.

DROSOPHILA Fallén

***Drosophila (Drosophila) flavopinicola*, new species.**

This is the second described member of the pinicola group, differing from *pinicola* Sturtevant mainly in its larger size, more yellowish body color, more highly colored wings, and its chromosome complement. It probably breeds in fungi.

External characters of imagines.

The following description is based upon the male since there are several features showing sexual dimorphism. Front tan, orbits and large ocellar triangle densely grayish-yellow pollinose; orbital bristles appressed, the anterior reclinate thin, not very distinct from the adjacent orbital hairs, at most nearly $\frac{1}{3}$ length of proclinate. Antennae pale tan, 3rd joint darker; arista with 3-4 dorsal and (usually) 2 ventral branches in addition to the terminal fork. Face pale tan, carina of moderate size, narrow, abruptly retreating below, not sulcate; 1st oral strong, 2nd small, $\frac{1}{4}$ length of 1st or less, the remaining oral hairs sparse. Palpi yellowish tan with 2 stronger bristles apically. Cheeks yellow to grayish-yellow, heavily pollinose, darkened around vibrissal bases; greatest cheek width about $\frac{1}{4}$ the eye height but narrower at vibrissae. Eyes dark red with pale pile.

Acrostichal hairs irregular, sometimes appearing 6-rowed, sometimes 8-rowed; no prescutellars; anterior scutellars weakly convergent. Mesonotum and scutellum rather uniformly tan but darker individuals may show a brownish median area and a faint stripe in alar region; pleura darker than mesonotum, especially over meso- and pteropleura, the sternopleura usually darkened but sometimes

paler. Halteres pale, basal segments darkened. Sterno-index about 0.6. Legs almost uniformly yellowish-tan, with the usual bristles.

Abdomen nearly uniformly pale tan but on some darker individuals taken in the wild there are apical brownish bands, fainter in midline on basal tergites.

Wings with prominent clouds over both crossveins and the blade generally darkened, most intensely so along the costal margin and becoming gradually less intense toward the hind margin. On lighter individuals only the crossvein clouds may be apparent. Costal index about 4.0; 4th vein index about 1.5; 5x index about 1.0. Third costal section with the small black bristles on its basal $2/5-1/2$.

Body length, ♂: 3.5 mm.; wing: 3.5–4.0 mm. Female, body length up to 5.0 mm.; wing: 4.5–5.0 mm.

Female: in addition to the size difference, females have the anterior reclinate orbital larger (about $1/2$ length proclinate) and the adjacent orbital hairs smaller and more sparse. The arista often has 3 branches below in addition to the fork.

Chromosomes.—The metaphase and salivary chromosomes are reported by Clayton and Ward (this bulletin): the metaphase chromosomes consist of 5 pairs of rods and one pair of dot chromosomes.

Distribution and types.—Holotype male, Prairie Creek Redwood State Park, near Crescent City, California, July 24, 1951. Paratypes as follows: 6, from the type locality; 11, near Gold Beach, Oregon; 2, near Raymond, Washington; 4, Olympic National Forest about 10 miles south of Sequim, Washington. The actual number of individuals taken at each locality is: type locality: 36; Gold Beach: 36; Raymond: 10; Sequim: 8. All of these specimens were captured during July and August; some were taken at banana-baited traps but most of them were swept from mushrooms. The species is difficult to maintain in the laboratory.

***Drosophila (Drosophila) magnaquinaria*, new species.**

A large tannish-yellow member of the quinaria group with strongly clouded crossveins and reduced abdominal pattern, known only from the Pacific Northwest. It apparently breeds in the flowers of *Lysichiton camtschatcense* (L.) Schott, belonging to the Arum family and known locally as skunk cabbage.

External characters of imagines.

♂, ♀. Front light tan, dull, the orbits paler and a bit shiny, the ocellar triangle not distinct. Middle orbital minute, not much longer than the hairs in the row anteriorly along eye margin; proclinate orbital about $2/3$ length posterior reclinate; these and other head bristles stout and black. Antennae pale tan, 3rd joint darker; arista with 5–6 dorsal branches and 2–3 ventral ones in addition to the terminal fork. Carina not prominent, flattened, not sulcate; face pale tan; clypeus tan. Palpi pale with one stout bristle and many smaller hairs. Labellum with 8 pseudotracheae per side in ♂, 9 per side in ♀. Vibrissa strong, black, the 2nd oral moderately stout, about $2/3$ length 1st, the remaining oral hairs all small. Cheeks yellow, somewhat shiny, their width about $1/4$ the eye height. Eye dark red with thick, short, pale pile.

Mesonotum and scutellum yellowish-tan, moderately shining. Acrostichal hairs in 6 irregular rows; no prescutellars. Anterior dorsocentrals scarcely half

length of posterior ones; anterior scutellars divergent. Anterior sternopleural nearly $\frac{3}{4}$ length posterior one, the middle one quite small. Legs pale, with the usual bristles; fore femora with 2–3 bristles on under side apically; fore tarsi of ♂ with sparse recurved hairs on inner side, these hairs clearly longer than the tarsal diameter.

Abdomen mostly yellow, usually with tergites 3 and 4 (or 3, 4 and 5) with indistinct narrow darker apical bands, broadly interrupted medianly and fading away at margin; apical tergites usually without bands.

Wings clear, both crossveins heavily clouded; around each crossvein the cloud is stronger where it contacts the 4th vein. Third costal section with the small black bristles on its basal $\frac{1}{2}$ or slightly less. Posterior crossvein often slightly bowed at middle. Costal index about 3.2; 4th vein index about 1.6; 5x index about 1.3.

Length body, ♂: 3.0 mm.; wing: 3.5 mm. Female, body length up to 4.0 mm.; wing about 3.5 mm. The above description was prepared from living material.

Internal characters of imagines.

Testes pale yellow with $1\frac{1}{2}$ thick inner coils and about 10 thinner outer coils; ejaculatory bulb with two long diverticula, similar to those figured for *D. subquinaria* (Patterson, 1943, p. 88, fig. 22). Ventral receptacle long, tightly coiled; spermathecae rather large with brown sclerotized inner capsule. Both anterior and posterior Malpighian tubes with short common stalks; posterior tubes fused apically and with a continuous lumen.

Other characteristics, relationship, and distribution.

Eggs.—With 3 slender filaments, the middle one thick, longer.

Puparia.—Pale tan; posterior spiracles yellow, divergent; base of anterior spiracles rather black, bearing 14–16 pale branches, the entire spiracle $\frac{1}{6}$ – $\frac{1}{7}$ the pupal length.

Chromosomes.—The metaphase and salivary gland chromosomes are reported by Clayton and Ward (this bulletin); in the metaphase there are six pairs of rod-shaped chromosomes.

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

Distribution and types.—Holotype male, Kalaloch, Washington, August 1, 1951. Paratypes as follows: 23, from the type locality; 1, Prairie Creek Redwood State Park, California; 1, Gold Beach, Oregon; 1, Bogachiel, and 1, Carson, Washington. The actual number of individuals taken at each locality is: type locality: 40; Prairie Creek: 1; Gold Beach: 2; Bogachiel: 12; Carson: 1. All of these specimens were captured during July and August, 1951.

Food habits.—The 40 specimens from the type locality were taken by sweeping among the huge leaves of the plant *Lysichiton camtschatcense* (L.) Schott of the Arum family. These plants, known locally as skunk cabbage, were in a shaded, wet ravine. Many of the flies were seen on the soft, gummy spadix left on the plants after the fruits are dropped. A sample of this spadix material was examined microscopically and typical 3-filament eggs were seen; however, we were not successful in an attempt to rear adults from this material.

The host plant is said to have a rather wide distribution; the type locality is Siberia and it also occurs from Alaska to northern California and Idaho in this country.

At our other localities, most of the specimens were captured on skunk cabbage plants but a few were attracted to banana-baited traps. The species can be maintained in the laboratory with ease.

***Drosophila (Drosophila) deflecta* Malloch.**

Drosophila deflecta Malloch, 1924. Proc. Biol. Soc. Wash. 37:36.

Malloch's type female of this rare member of the quinaria group came from the District of Columbia and he has reported a specimen from Illinois. I know of no other verified records. We wish to report here the capture of three specimens of *deflecta* near Floral City, Florida (June, 1953), and to add some additional descriptive notes. The arista bears about 4 dorsal and 2 ventral branches in addition to the terminal fork; acrostichal hairs in 4 rows between the dorso-centrals, becoming 6-rowed anteriorly; two strong orals, the 2nd about $\frac{2}{3}$ length the 1st; 3rd costal section with the small black bristles on its basal $\frac{2}{3}$; the strongly bowed last section of the 4th vein is quite pronounced.

In the specific key of Sturtevant (1942:45), repeated in Patterson (1943:48), *deflecta* is keyed as having longitudinal stripes on the mesonotum; however, Malloch's description states only that the female is "shining rufous yellow" and our specimens show no evidence of longitudinal stripes. We were not able to culture this species in the laboratory.

***Drosophila (Drosophila) argenteifrons*, new species.**

A medium-sized species, brown to blackish, somewhat shiny, in which the frons appears strongly silvery pruinose on a yellowish background when viewed from an oblique angle.

External characters of imagines.

♀. Frons, seen dorsally, deep yellow, a little broader than long, dull, the orbits more shining but the ocellar triangle not differentiated although darkened. Proclinate orbital about $\frac{3}{4}$ length posterior reclinate; anterior reclinate a small hair, $\frac{1}{5}$ to $\frac{1}{6}$ length proclinate; ocellars, postverticals, and verticals strong. Frons, seen from an oblique angle, strongly silvery pruinose over the entire yellow area. Antennae pale tan, 3rd joint brownish and thickly haired; arista with about 7 dorsal and 3 ventral branches in addition to the terminal fork. Face tan, clypeus and cheeks a little darker; carina large and broad, not sulcate, ceasing well above oral margin. Cheeks narrow, barely equal to half the width of the 3rd antennal segment, and with the bristles and hairs arising from a fairly distinct ridge paralleling lower eye margin. Two strong orals, the 2nd easily $\frac{2}{3}$ length 1st. Palpi tan.

Mesonotum and scutellum unicolorous tannish-brown to darker brown, somewhat shiny, the scutellum less so. Acrostichal hairs thin, sparse, irregularly 6-rowed; no prescutellars. Anterior scutellars weakly divergent; two strong humerals. Pleura much darker than mesonotum, dark brown to blackish, including

meso-, ptero-, and sternopleura. Posterior sternopleural large, anterior one thin, 0.6 length posterior, middle one smaller, about 0.4 length posterior. Legs tannish to brown, femora darker, tarsi paler; hind metatarsus with about three black bristles near base below.

Abdomen distinctly shining; tergites, except apical ones, yellow at base and dark brown apically, the apical bands weaker near midline on basal tergites; tergites 6 and 7 of ♀ appear to be solid shining black, the ovipositor tan, pointed at apex, rather small.

Wings hyaline with a diffuse faint cloud over posterior crossvein; anterior crossvein unclouded. Third costal section with the small black bristles on its basal $\frac{1}{2}$ or a bit less; bristles at apex of 1st costal section, just before the break, rather weak, the dorsal one clearly stronger than the ventral. Costal index 5.1–5.4; 4th vein index 1.4–1.5; 5x index 1.0–1.1.

Body length, ♀ (in pinned specimen): 2.5 mm.; wing: 3.0 mm.

Male: our only ♂ specimen is teneral and badly shrunk; its major available features agree with those of the female but its pigmentation, especially of the abdomen, cannot be determined.

Distribution and types.—Holotype ♀, 1 paratype ♂, taken in a tropical forest about 19 miles east of San Andres Tuxtla, Veracruz, Mexico, June 27, 1952 (W. B. Heed); 2 paratype ♀♀, Tamazunchale, San Luis Potosi, Mexico, August 8, 1942 (G. B. Mainland). A single ♀ from El Recreo, Nicaragua (June, 1954; W. B. Heed) probably belongs to this species but since the head is damaged the specimen is not being considered a paratype. We also have a single ♂, Castanhal, Para, Brazil (Th. Dobzhansky), which is clearly related to *argenteifrons* but differs in having the frons much less strongly pruinose, the hind crossvein strongly clouded, the 2nd oral weaker, and the mesonotum less shiny.

Relationship.—We place *D. argenteifrons* in the vicinity of the tripunctata-cardini species groups. Frota-Pessoa (in press) has compared these two groups very carefully and has pointed out that several species known to him are more or less intermediate between the more “typical” members of the groups. Using his criteria for separating the two groups, our species seems to be closer to the tripunctata group, but its overall shininess, especially of the abdomen, its dark coloration, and its abdominal pattern give the general appearance of a member of the cardini group.

***Drosophila (Drosophila) fragilis* Wheeler.**

Drosophila fragilis Wheeler, 1949. Univ. Tex. Pub. 4920:191.

The original collection of this species was made near Atlixco, Puebla, Mexico; we have since seen a single ♂ from Huatusco, Veracruz, Mexico, and numerous specimens from El Salvador. A stock from the latter locality was maintained for a while and was used to determine the chromosome complement (see Clayton and Ward, this bulletin).

We may now assign *fragilis* to the tripunctata group; the following additional descriptive characters support this view: arista with about 5 dorsal and 3 ventral branches in addition to the terminal fork; a row of small peg-like bristles along hind tarsus; hind metatarsus without stronger black bristles below near base; ♂ anal plate thickly haired; 2nd oral bristle $\frac{1}{2}$ to $\frac{2}{3}$ length 1st; 3rd costal section

with the small black bristles on its basal $1/6$ to $1/3$; front with weak whitish pruinosity when seen from a strongly oblique angle.

***Drosophila (Drosophila) triangula* Wheeler.**

Drosophila triangula Wheeler, 1949. Univ. Tex. Pub. 4920:192.

The original collection of this species was made near Morelia, Michoacan, Mexico; we take this occasion to report the capture of a female near Chapulhuacan, Hidalgo, Mexico, June, 1952 (W. B. Heed). A few larvae were secured and were used to determine the chromosome complement (see Clayton and Ward, this bulletin).

We may now assign this species to the tripunctata group; it seems very similar in most morphological features to *Drosophila bandeirantorum* Dobzhansky and Pavan. We also wish to record the capture of a single male at Chapulhuacan which we are unable to distinguish from *bandeirantorum*.

The following additional descriptive characters will aid in the future identification of *triangula*: a row of small peg-like bristles along hind tarsus; hind metatarsus with two stronger black bristles below near base; middle metatarsus with a single black bristle near base, placed just beneath the large apical tibial bristle; ♂ anal plate thickly long-haired; apical bristles of last three tergites rather long and prominent.

***Drosophila (Drosophila) stalker*, new species.**

This new member of the repleta species group, mulleri subgroup, is rather similar, morphologically, to *D. meridiana* Patterson and Wheeler. Our stock of this species was originally collected by Dr. Harrison Stalker at St. Petersburg, Florida. We are naming the species in his honor.

External characters of imagines.

♂, ♀. Arista with 4 dorsal and 2 ventral branches in addition to the terminal fork; front dark tan, ocellar area and orbits lighter, pollinose, darkened at the bristle bases and with a blackened area anteriorly on orbits on which the small orbital hairs stand; intrafrontal hairs rather regularly arranged in a V-shaped pattern with about 4 bristles on each side. Proclinate orbital $5/6$ length posterior reclinate; anterior reclinate thin, about $1/3$ length of proclinate. Antennae dark tan, 3rd joint a little darker. Face, cheeks, and palpi pale tan, the cheeks darkened at vibrissal bases; carina broader below, sulcate along its length; clypeus narrow, light brown. One strong oral, 2nd $1/3$ length 1st. Cheeks about $2/3$ width of a 3rd antennal segment.

Mesonotum dark tan, the hairs and bristles arising from darker brown spots which are only slightly fused; spots at bases of scutellar bristles larger, black. Acrostichal hairs rather irregular but usually appearing 8-rowed; no prescutellars; anterior scutellars convergent. Pleura tan with three diffuse dark brown longitudinal stripes: 1, just below notopleural suture; 2, from propleura across middle of mesopleura and pteropleura; 3, along upper part of sternopleura; the limits of these stripes are not well defined. Knob of haltere pale, the anterior surfaces of two basal segments darkened. Anterior sternopleural 0.7 length pos-

terior. Legs pale yellowish, with fairly evident black bands apically on femora and basally on tibiae, the bands of 1st legs fainter. Fore tarsi of ♂ with sparse recurved hairs, their length about equal the tarsal diameter.

Wings clear, apex of 1st costal section moderately blackened; crossveins dark but without clouds. Third costal section with the small black bristles on its basal $1/3-2/5$. Costal index about 3.0; 4th vein index about 1.8; 5x index about 1.4.

Abdominal tergites with dark apical bands interrupted in middle, the bands broader next to the interruption and expanded at the angle of the tergite; the lateral view of the abdominal pattern is shown in Figure 1.

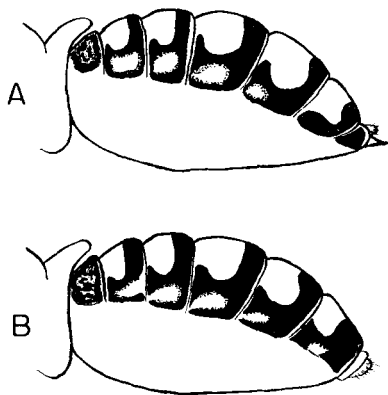


FIG. 1. *Drosophila stalker*, n.sp. Abdominal pattern from lateral view. A, female. B, male.

Body length, ♂ (in live specimen): 3.0 mm.; wing: 2.7 mm. Female body length about 3.5 mm.; wing: 2.8 mm. The above description was prepared from living material.

Internal characters of imagines.

Ventral receptacle with 15–18 coils, clearly thicker on the basal $1/4$; spermathecae large with very small, non-sclerotized, hemispherical centers. Testes lemon yellow, with about $2\frac{1}{2}$ pale yellow inner coils, and about $1\frac{1}{2}$ thicker, darker outer coils. Ejaculatory sac with two short, blunt diverticula, similar to those figured for *D. ritae* by Patterson (1943, p. 141, fig. 43). Male genitalia with large clasper bearing a primary row of 10 teeth followed by about 4 longer, slender, pale bristles; no secondary teeth.

Other characteristics, relationship, and distribution.

Eggs.—With four long slender filaments, from $1\frac{1}{2}$ to 2 times the egg length, the filaments often bent or twisted at the tip.

Puparia.—Tan, not noticeably darker at base of branches of anterior horn; posterior spiracles pale, closely appressed; anterior horns long, the horn plus its branches about 0.7 the length of the puparium; each anterior spiracle with about 12–13 branches.

Chromosomes.—The metaphase configuration shows five pairs of rods and one pair of dots; these, and the salivary chromosomes, are discussed by Clayton and

Ward (this bulletin) and the inversions characteristic of this species are discussed by Wasserman (this bulletin).

Distribution and types.—Holotype ♂ and 15 paratypes, all descendants of the original flies collected by Dr. Harrison Stalker at St. Petersburg, Florida, December, 1952–January, 1953. No other reports of this species are known to us.

***Drosophila (Hirtodrosophila) pictiventris* Duda, new subg. comb.**

Drosophila pictiventris Duda, 1925. Ann. Mus. Nat. Hung. 22:211.

Duda's description was based upon a female from Costa Rica; we have now seen the species from the following localities: San Andres Tuxtla, Vera Cruz (June, 1952; W. B. Heed), and Nochistlan, Oaxaca (Sept., 1947; M. R. Wheeler), Mexico; Soledad, Cienfuegos, Cuba (Sept., 1950; J. I. Townsend); and El Salvador (W. B. Heed). We have successfully maintained cultures from Vera Cruz and El Salvador, and this material has been used to prepare the additional descriptive notes below and to determine the chromosome complement (see Clayton and Ward, this bulletin).

We feel that *pictiventris* is most logically placed in the subgenus *Hirtodrosophila*. The ovipositor bears the stout apical teeth characteristic of most species of this subgenus; there is a well developed apical bristle only on 2nd tibia and a preapical only on 3rd; the 3rd antennal joint is thickly haired but the hairs are not exceptionally long; the carina is absent below; the arista, as in *duncani*, bears two ventral branches basal to the terminal fork; the distal costal break bears a weak dorsal bristle, the ventral one being scarcely evident; the anterior scutellars are convergent; costal index about 2.6; 3rd costal section with the small black bristles on its basal $\frac{1}{2}$. In its general appearance, *pictiventris* strongly simulates *Paramycodrosophila costaricana* and *P. centralis* (these are discussed later in the present article).

Eggs with 4 slender filaments, each about $\frac{3}{4}$ the egg length; puparia with short anterior spiracles, the spiracle plus its branches about $\frac{1}{9}$ the length of the puparium; anterior spiracle with about 10 major branches and several very short ones, the branches black and radially arranged; posterior spiracles pale, tightly appressed. Ventral receptacle loosely wound back and forth; spermathecae nearly black, hemispherical. Testes very pale yellow, with about $1\frac{1}{2}$ coils.

***Drosophila (Hirtodrosophila) mexicoa*, new name.**

Paramycodrosophila mexicana Wheeler, 1949. Univ. Tex. Pub. 4920:164.

Mycodrosophila mexicana, Wheeler, 1952. Univ. Tex. Pub. 5204:191.

not *Drosophila mexicana*, Macquart, 1842. Dipt. Exot. 2; 3:259.

The writer was in error in placing this species in the genus *Paramycodrosophila* and, later, in *Mycodrosophila*. Burla (private communication) first suggested that it might belong to *Drosophila*, subgenus *Hirtodrosophila*; the types were re-examined and their position in *Hirtodrosophila* verified. However, since the name *mexicana* is preoccupied in *Drosophila* by *Drosophila mexicana* Macquart, the new name, *mexicoa*, is here proposed for *mexicana* Wheeler, 1949.

The original collection of *mexicoa* was made in Michoacan, Mexico, by G. B. Mainland; we have since seen 38 additional specimens, all taken from fungus

about 1.5 miles south of Huatusco, Vera Cruz, Mexico (June, 1952; W. B. Heed). *D. mexicoa* is very similar to *D. thoracis* Williston (see discussion below).

***Drosophila (Hirtodrosophila) thoracis* Williston, new subg. comb.**

Drosophila thoracis Williston, 1896. Trans. Ent. Soc. London 1896:411

Mycodrosophila thoracis, Sturtevant, 1918. J.N.Y. Ent. Soc. 26:38.

Mycodrosophila thoracis, Sturtevant, 1921. Carn. Inst. Wash. Pub. 301:63.

Mycodrosophila thoracis, Wheeler, 1952. Univ. Tex. Pub. 5204:191.

In the University of Texas collection are 67 specimens that we identify as *thoracis*, and although there is some variability, especially in abdominal pattern, among specimens from different localities, our specimens agree very well with the original description. Dr. A. H. Sturtevant (private communication) examined Williston's material and stated that the types of *thoracis* were rubbed so that the number of dorsocentrals was not evident. Neither he nor Williston mentioned the deep costal incision and blackened lappet so characteristic of *Mycodrosophila*, and Williston's statement that *thoracis* was found "in fungi" could indicate *Hirtodrosophila* just as readily as *Mycodrosophila*.

Our specimens of *thoracis* are as follows: 2, Fordlandia, Para, Brazil (July, 1952; Th. and Sophie Dobzhansky); 13, St. Augustine, British West Indies (Aug., 1948; A. S. West); 1, San Vicente, El Salvador (Oct., 1953; W. B. Heed); 34, San Andres Tuxtla and Huatusco, Vera Cruz, Mexico (June 1952; W. B. Heed); 1, Tamazunchale, San Luis Potosi, Mexico (June, 1952; W. B. Heed); 7, Chicot State Park near Ville Platte, Louisiana (Sept., 1954; M. R. Wheeler); 16, from 14 miles east of Orlando, Florida, from fungus (June, 1953; M. R. Wheeler). A culture was established from the flies taken at Orlando, Florida; the eggs have four very short, stubby filaments; the chromosomes are described by Clayton and Ward (this bulletin).

Some of the more outstanding differences between *thoracis* and *mexicoa* are given in the following comparative table:

<i>D. thoracis</i>	<i>D. mexicoa</i>
Orbits prominent, shiny.	Orbits weakly differentiated.
Mesonotum and scutellum somewhat shiny, light to dark brown.	Mesonotum and scutellum dull, dark tannish brown.
Pleural stripe narrow, gradually fading out around wing base.	Pleural stripe broad, intense, strongly continued below wing base to halteres.
Wing hyaline with diffuse brownish cloud below distal costal break.	Wings lightly brownish throughout.
Abdominal pattern, seen dorsally: ♂: tergites 1-3 with median yellow areas, laterally black; tergite 4 yellow along base or on each side basally, and rarely apically in midline; tergites 5-7 black. On West Indies and Brazilian ♂♂ tergite 4 is yellow in middle and 5 has yellow basal areas on each side. ♀: tergites 1-4 as in ♂; tergite 5 with a pair of yellow basal spots, rest of 5 and all of 6 black. Circumanal tergite and anal plates dirty yellow to black. On West Indies and Brazilian ♀♀ tergite 4 is yellow in middle.	Abdominal pattern, seen dorsally: ♂: tergites 1-2 with yellow median areas; tergites 3-5 black, sometimes with small lateral basal yellow areas; tergites 6-7 usually all yellow but rarely base of 6 is darkened. ♀: tergite 2 with triangular median basal yellow area; tergite 3 black or with small median basal yellow area; tergites 4-6 black or showing small sublateral basal yellow spot on each side. Circumanal tergite and anal plates yellow.

Duda (1927:103) has suggested that *Drosophila pleuralis* Williston is probably a *Hirtodrosophila*, although it has long been considered as belonging to *Myco-*

drosophila. Dr. Sturtevant (private communication) examined the type of *pleuralis* and stated that there were two pairs of dorsocentrals, a condition which supports Duda's view. We have two specimens which might belong to this species but on the female (from West Indies) it is the 6th tergite which is black in the middle, rather than the 5th as stated by Williston, and on both our specimens the mesonotum is tannish brown and not "deep shining black or nearly black" as stated by Williston.

PARALIODROSOPHILA Duda

1925. Ann. Mus. Nat. Hung. 22:184.

The genotype is *P. bipartita* Duda, from Costa Rica, the only described species. The genus seems rather intermediate between *Zygothrica*, *Mycodrosophila*, and the subgenus *Hirtodrosophila* of *Drosophila*. In *Paraliodrosophila* the orbitals are rather close together, the front is broader than long, the 4th vein index is relatively high, the carina is not prominent, and the large, shining, mirror-like frontal "triangle" is trapezoidal, blunt anteriorly, and very sharply delimited. In *Zygothrica* the orbitals are usually spaced far apart, nearly equidistant from one another, the front is usually longer than broad (except in the broad-headed males of some species), the 4th vein index is low; the carina is usually bulbous and prominent, and, when a shiny frontal triangle is indicated, it is clearly narrow and pointed anteriorly, and is rarely sharply delimited. The characteristic deep costal incision and single pair of dorsocentrals found in *Mycodrosophila* are not present here. The distinctions from *Hirtodrosophila* are not pronounced, but the unusual shiny front and general shining appearance of mesonotum and abdomen are not characteristic of *Hirtodrosophila*.

Paraliodrosophila bipartita Duda.

Paraliodrosophila bipartita Duda, 1925. Ann. Mus. Nat. Hung. 22:184.

The description was based upon a male from Costa Rica; the species seems not to have been recorded since. Duda mentioned an additional female with broader, pale cheeks, etc.; we have this form also and are describing it below as *dudai* n. sp.

Of *bipartita*, we have examined 18 specimens, all presumably taken on fungus, from Huatusco and San Andres Tuxtla, Vera Cruz, Mexico (June, 1952; W. B. Heed). Our material agrees with the description very well except that the palpi are brownish (not yellow), the halteres are black at the base, and the apex of the 1st costal section, just before the distal break, is blackened (Duda says "*Flügel farblos*"). Additional features of *bipartita* are given below in the description of *dudai*.

Paraliodrosophila dudai, new species.

A species very similar to *bipartita* Duda but with the cheeks broader and more yellow, especially in the male, the 3rd antennal segment yellow in the male, pale brown in the female, the pleural stripe less extensive, and with a different abdominal pattern. The anterior reclinate orbital is microscopic in the female; in the male it is small but distinct, about $\frac{1}{6}$ length the posterior. Two sterno-

pleurals, exceptionally thin, the anterior one 0.5–0.6 length posterior. One strong vibrissa. All legs yellow; apical bristles evident only on 2nd tibia, pre-apicals only on 3rd; male fore tarsi with numerous short dorsal semi-recurved hairs.

Length body, male (in pinned specimen): about 2.0 mm.; wing: 2.0 mm. Female body length about 2.3 mm.; wing: 2.5 mm.

Additional characteristics of *dudai* are given in the following table, where they are contrasted with the corresponding traits in *bipartita*.

P. bipartita

Front black; face, clypeus, palpi, antennae brownish to black.

Arista usually with 4 dorsal, 1 ventral branches plus fork.

Cheeks blackish, becoming yellowish behind; cheek narrow, at narrowest spot about $\frac{1}{2}$ width 3rd antennal segment.

Mesonotum dark brown to black, shining; scutellum dull; acrostichals in 8 fairly regular rows.

Pleura whitish below, above with a broad dark brown band from propleura complete to postnotum; base of haltere blackened.

Wings hyaline, apex of 1st costal section blackened; costal index ca. 1.2–1.3; 4th v. index ca. 3.0–3.3; small black bristles of 3rd costal section not well differentiated, apparently present on basal 0.5–0.6.

Abdomen shining black, often with purplish reflection; terg. 1–3 with median yellow area; ♀ ovipositor tan with pale teeth; ♂ genital arch and anal plates yellow.

P. dudai

Front light brown to darker; face (♂), clypeus, palpi, antennae pale yellow; ♀ face dirty yellow to tan, antennae tan to light brown.

Arista usually with 5 dorsal, 1 ventral branches plus fork.

Cheeks (♂) yellow; in ♀, yellow but dark around base of vibrissa; cheek broader, at narrowest spot, equal or nearly equal width 3rd antennal joint.

Mesonotum light to dark brown, semi-shining with pollinosity; scutellum not much duller; acrostichals sparse, poorly 6-rowed.

Pleura mostly whitish yellow, narrowly darkened below notopleural suture, a pleural stripe evident posteriorly, beginning with diffuse brown along rear edge of mesopleura and continued over pteropleura; haltere base dirty yellow.

Wings all hyaline; costal index ca. 1.6–1.8; 4th v. index ca. 2.1–2.3; small black bristles of 3rd section not well differentiated but apparently present on about basal 0.3–0.4.

Male abdominal pattern diffuse, terg. 1–4 with median basal yellow areas, dark apically and with dark lateral areas; terg. 5–6 all or mostly yellow; terg. 7 large, triangular, black; anal plate and genitalia yellow.

Female tergites yellow basally, with dark apical bands and dark lateral areas; terg. 5 yellow with median dark line; circumanal plate yellow; ovipositor tan with black teeth.

Types and distribution.—Holotype ♂ and 15 paratypes, 1.5 miles south of Huatusco, Vera Cruz, Mexico (June, 1952); additional paratypes: 3, Huachinango, 1, Tezuitlan, Puebla, Mexico (June, 1952); 1, Xilitla, San Luis Potosi, Mexico (Dec., 1952). We also have 8 specimens from the Republic of El Salvador which we are not considering as paratypes. All of the above specimens were collected by Mr. W. B. Heed.

PARAMYCODROSOPHILA Duda

1924. Archiv. f. Naturg. 90 (A 3):191.

The interpretation of this genus has been subject to considerable confusion, for which the writer is in part responsible. The genotype is clearly *Drosophila pictula* de Meijere, the only species included in the genus by Duda in 1924.

Hendel's later designation of *P. poeciloptera* Duda as genotype was invalid. Burla and Pavan (1953) have recently discussed certain features of the genus and reassigned most of the species once included in it. The present disposition of these species may be summarized as follows:

P. pictula (de Meijere): the genotype.

P. poeciloptera Duda: is a *Drosophila* of the calloptera group; the name was preoccupied in *Drosophila* and is now *D. poecila* Burla and Pavan.

P. costaricana Duda: remains in *Paramycodrosophila*.

P. punctipennis Duda: is a *Drosophila*, belonging probably to the annulimana group.

P. tephritoptera Hendel: is a synonym of *Drosophila calloptera* Schiner.

P. mexicana Wheeler: is a *Drosophila*, subgenus *Hirtodrosophila*; the name is preoccupied in *Drosophila*, and earlier in the present article the name *mexicoa* has been proposed for this species.

Thus, only two species, *pictula* and *costaricana*, remain in the genus. Of *pictula*, I have seen three specimens, from Palau, and of *costaricana* I have a single specimen, from El Salvador. Two new species from North America are described below, and I have material of four additional undescribed species, one from El Salvador, one from northern Brazil, and two from certain islands of the Pacific.

On the basis of these various specimens, the genus can be characterized briefly as follows:

Paramycodrosophila: distal costal break exceptionally deep, the costa before the break thickened and blackened, forming a protruding lappet; two pairs of dorso-centrals; no prescutellars; mesonotal disc usually with a complex pattern of spots, bars or broken stripes; anterior reclinate orbital rather large, situated close to and beside the proclinate or a bit anterior to it; carina forming a rather narrow ridge between antennal bases, becoming obsolete below; antennae close together; arista with one, rarely two, ventral branches in addition to the terminal fork; acrostichal hairs in 4 or 6 rows; body size rarely over 2.0 mm. In the species we have seen the pleurae and legs are patterned, the costal index is 1.0–1.8, and the 3rd antennal segment is rather enlarged. In general, the genus seems more closely related to *Hirtodrosophila* than it is to *Mycodrosophila*.

It seems very probable that *Upolumyia* Malloch, with two species from Samoa, is a synonym. Malloch cites as an unusual trait of his genus the presence of a distinct bristly hair on the postero-dorsal surface of the hind tibia, but this bristle is present in *pictula* as well as the other Pacific members of *Paramycodrosophila*, and in other respects the two genera seem to coincide completely.

***Paramycodrosophila centralis*, new species.**

This species is quite similar to *P. costaricana* Duda, but has only 4 rows of acrostichals (6 rows in *costaricana*), has the posterior reclinate orbital nearly equidistant from the proclinate and the inner vertical (rather than twice as close to the proclinate), has a different abdominal pattern, etc. *P. centralis* also bears a strong superficial resemblance to *Drosophila pictiventris* Duda (discussed earlier in this article).

External characters of imagines.

♂, ♀. Arista with 6–7 dorsal and one ventral branch in addition to the terminal fork. Front tan, darker on posterior orbits and around ocelli, lighter pollinose on anterior orbits and on large frontal triangle; anterior reclinate orbital placed nearly beside proclinate, the two of about equal length and about $\frac{3}{4}$ length posterior reclinate, the latter equidistant between proclinate and inner vertical. Antennae tan, 3rd joint darker on basal half or more, large and flat, thickly long-haired. Face tan with darker brown mark medianly below carina and laterally at bases of vibrissae, the latter strong with the remaining orals all small. Cheeks pale except at vibrissal bases, about $\frac{1}{4}$ the eye height. Palpi brown with a single strong apical bristle.

Disc of mesonotum with a complex pattern of tan and dark brown marks; of these marks the most distinct are a pair of longitudinal dark stripes just within dorsocentral rows which fuse just before the level of the anterior dorsocentrals, then continue posteriorly as a pair of weaker stripes to scutellum; these posterior stripes are closer together than are the anterior ones. There are several darker marks between the described stripes and the pleura. Dorsocentrals and scutellars arising from small blackish spots, those of scutellum more or less fused with the darkened lateral margin.

Acrostichal hairs in 4 rows; no prescutellars; anterior scutellars convergent. Anterior dorsocentrals $\frac{3}{5}$ length posterior ones, these and other thoracic bristles quite thin. Disc of scutellum dark tan, darker on sides. Pleura with about three dark brown longitudinal stripes; 1, below notopleural suture; 2, over sternopleura; 3, below wing, over pteropleura, this one continued in variable fashion forward onto mesopleura where it is indistinctly separated from the one below notopleural suture. Halteres whitish yellow.

Legs banded; fore coxae brown, all femora with broad median brown area, otherwise yellowish; tibiae weakly browned basally; tarsi pale.

Wings with a faint cloudiness throughout; distal costal incision deep, the lappet black. Costal index 1.3–1.5; 4th vein index 2.5–2.8; 5x index 2.7–3.0. Third costal section with the small black bristles on its basal 0.5–0.6.

Abdomen of ♂ subshining; tergite 1 dirty yellow in center, blackened on extreme edge; 2 with large apical dark band, fainter in midline, ceasing at the angle, then yellow up to a narrow dark mark along margin; 3 about as on 2 but the marginal dark spot is more triangular; 4 with the apical dark band about half width of tergite, expanded toward base in midline and at the angle, ceasing here and not connected with the triangular black mark on edge; 5 as on 4 but the apical band is more or less connected with the marginal dark mark; 6th tergite yellow with (rarely without) a small dark area in midline, and with a small lateral mark; 7 with a prominent dark area in middle, yellow laterally; anal plates yellow; sternites pale. Abdomen of ♀ about as in ♂, but 6th tergite with a dark triangular median spot, and the circumanal tergite seems to be wholly dark; ovipositor with stout apical teeth as in *Hirtodrosophila*.

Body length, ♂ (pinned specimen): 2.0 mm.; wing: 1.7. Female slightly larger than the male.

Types and distribution.—Holotype ♂, Austin, Texas, Oct. 15, 1950, taken by the writer. Three paratypes from 14 miles east of Orlando, Florida, June 27, 1953, captured by the writer on fungus. In addition we have two badly damaged specimens from El Salvador which seem to agree with the types, but which are too incomplete to be certain of this.

***Paramycodrosophila anomala*, new species.**

The systematic position of this species is not certain but it seems best placed in this genus. In life, the red eyes showed a narrow transverse band of greenish-yellow iridescence across the middle; when viewed from the proper angle, even on pinned specimens, it is apparent that the pile is much shorter in this stripe which forms the band (see Fig. 2).

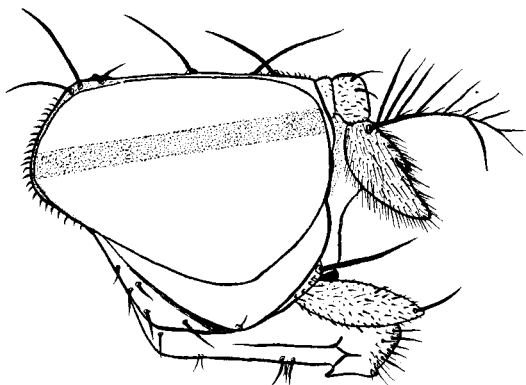


FIG. 2. *Paramycodrosophila anomala*, n.sp. Profile of head.

External characters of imagines.

♂, ♀. Front large and flat or a bit sunken in middle, broader behind, pale tan except for orbits and triangle; the gray pollinose orbits extend nearly to anterior margin of front and are connected posteriorly with the gray pollinose triangle. Ocellars and postverticals of nearly equal size; inner and outer verticals equalling orbitals in size; all three orbitals of about the same size, the anterior reclinate well in front of the proclinate and a bit lateral to it, closer to anterior margin of front than to posterior reclinate. Second antennal segment pale yellow with 2 dorsal bristles and thick short hairs on inner side; 3rd segment thickly short-haired, somewhat pointed at tip, yellowish along upper basal corner and blackish beyond this; shape of 3rd segment unusual in having the upper edge a bit incised at about $\frac{1}{3}$ from apex so that the basal part extends over the incision a bit as a very tiny projection. Bases of antennae close together. Arista with about 7 dorsal and 1 ventral branches in addition to the terminal fork.

Face mostly flat but with a thin carina just below and between antennae; carina blackened, foveae browned, the face below this pale whitish except for a definite black mark at base of vibrissa which extends to eye; behind this mark the cheek is pale to well behind the eye. A single stout vibrissa followed by a few hairs; cheek narrowest just behind vibrissa, broader behind, the width at

narrowest point about $\frac{1}{4}$ vertical diameter of eye; eyes clearly longer than high. Palpi black, protruding with a long subterminal bristle. Clypeus small, black, retracted in our specimens. Proboscis pale whitish yellow. Figure 2 shows a profile of the head.

Mesonotum with a spotted pattern, the general color being dark bluish-gray with dark brown spots at bases of hairs and bristles; scutellum more yellowish, without spots; on the δ there are two yellowish areas far anteriorly on mesonotum, one on each side of the four median acrostichal rows. Two dorso-centrals; no prescutellars; anterior scutellars convergent; acrostichal hairs irregular, sparse, in about 4 rows between dorsocentrals and roughly 6-rowed in front of them. Pleura with a moderately broad black longitudinal stripe from above base of fore coxa, across upper meso- and pteropleura, continued over base of haltere and coinciding with the dark lateral marks of abdominal tergites. Below the pleural stripe the color is pale whitish, including legs, except for a diffuse brownish area on upper sternopleura. Posterior sternopleural strong, the anterior one small and thin, not quite $\frac{1}{3}$ length posterior. Halteres mostly darkened.

Abdomen of δ rather shiny, mostly dark brown with yellow areas; as seen dorsally, tergites 1-2 are yellow in middle; 3 is faintly paler in midline basally; 4 has a slightly paler spot on each side just before the angle; on 5th there is a larger yellow spot on each side well before the angle; basal half of 6th yellow, brown apically; 7th and anal plates are yellow. From a lateral view one can see that near the margin the dark bands bend anteriorly to the base of the previous segment, leaving triangular yellow areas on extreme margins. Abdomen of η seems to agree but is largely obscured from view on our specimen.

Wings faintly brownish throughout; distal costal incision quite deep, the lapet black and without obvious apical bristles. Third costal section with the small black bristles on its basal $\frac{2}{3}$; anal vein strong but failing to reach the margin. Costal index 1.8-1.9; 4th vein index about 2.1; 5x index 2.6-2.7.

Types and distribution.—Holotype δ , Austin, Texas, Oct. 14, 1950. Paratype η , Austin, Texas, Oct. 25, 1950. These specimens were taken by sweeping tree trunks in the wooded area of Aldrich dairy farm; at the time of collection banana-baited traps and fungus-baited traps were available in the area but it is certain that these specimens were not taken at the traps. Paratype δ , Big Biloxi Recreation Area, De Soto National Forest, near Saucier, Mississippi, Sept. 3, 1954, taken by sweeping tree trunks.

In addition to the above we have ten specimens from El Salvador (W. B. Heed) which agree in general with the above specimens but which probably represent three additional undescribed species. They agree in having the pile-less band across the middle of the eye, the incised third antennal segment, the spotted mesonotal pattern, the deep costal incision, etc.

CHYMOMYZA Czerny

1903. Zeits. Hym. Dipt. 3:199.

The males of the new species described below are the same as *Chymomyza* "species A" of the writer's earlier key to the North American species of the genus (Wheeler, 1952:180).

Chymomyza wirthi, new species.

This species strongly simulates *C. procnemis* (Williston), but on the male all the legs are yellow while on the female the front legs are largely black. The description was made from living material.

External characters of imagines.

♂, ♀. Front tan, ocellar triangle and orbits gray pollinose; entire front with thin grayish pollen when viewed from the side. Antennae pale tan, 3rd joint a bit darker; arista with about 3 dorsal and 2 ventral branches in addition to the terminal fork. Face of ♀ tan but the cheeks, palpi, clypeus and entire proboscis are whitish yellow; ♂ face as above except that the ridge along the oral margin is nearly black. Row of oral bristles strong, the 2nd oral about $\frac{3}{4}$ length 1st; cheek very narrow at vibrissa, wider behind.

Disc of mesonotum light tannish brown, faintly shining, the scutellum darker brown; notopleural area often a little darkened, remainder of pleura pale tan. Acrostichal hairs irregularly 8–10 rowed; anterior scutellars convergent; one strong humeral; anterior sternopleural thin, about $\frac{2}{3}$ length posterior. Halteres pale with two basal joints darker on anterior surfaces.

Legs of ♂ all yellow; front femora with a row of about 8 slender bristly hairs whose length is greater than tibial diameter, and with a parallel row of shorter hairs. Legs of ♀: fore coxae and bases of fore femora pale, as are all of 2nd and 3rd legs; remainder of fore femora, tibiae and tarsi black, but the apical tarsal joints become gradually paler so that the last one or two are usually more yellowish than blackish. Front femur of ♀ without long hairs on inner side, but front femora of both sexes with a single bristle at about $\frac{3}{5}$ from base on the upper, outer side.

Abdomen uniformly subshining black, only the 1st tergite yellowish in middle; ♀ anal plates protruding, pale yellow; last two sternites of ♀ blackish, others paler; male sternites are mostly gray.

Wings clear with the costal cell and costa black, and with the wing apex milky white. Third costal section with the small black bristles on its basal $\frac{5}{6}$. Costal index 1.9–2.0; 4th vein index 2.7–2.8; 5x index 2.5–2.7.

Body length, ♀: 3.0 mm.; wing: 2.5 mm.; males are a little smaller.

Chromosomes.—The metaphase chromosomes are the same as that reported for other species of the genus. They are described by Clayton and Ward (this bulletin).

Types and distribution.—Dr. W. W. Wirth and Dr. C. Sabrosky found this species to be rather common at Falls Church, Virginia, in June and July, 1952. Most of their specimens were taken at windows in a partially constructed house. Dr. Wirth sent some live specimens to the writer and this stock has been maintained in the laboratory with ease. We may also record one specimen, Algonquin, Ill., which the writer (Wheeler, 1952:175) listed among specimens of *procnemis*, and two specimens, Timagami, Ontario, listed as “species A.”

Holotype ♂, Falls Church, Virginia, July, 1952; 34 paratypes from the same locality (or descendants from them), 14 placed in the collection of the University

of Texas, 10 in the collection of Dr. Wirth, and 10 in the collection of Dr. Sabrosky.

STEGANA Meigen

1830. Syst. Besch. 6: 79.

Dr. W. W. Wirth has brought to the writer's attention an apparent error appearing in my earlier discussion of this genus (Wheeler, 1952:211); I take this occasion to correct it.

***Stegana coleoptrata* (Scopoli).**

Musca coleoptrata Scopoli, 1763. Ent. Carniol. 338.

In my previous treatment of *Stegana* (Wheeler, *op. cit.*: 211–212) three Nearctic species were reported: *vittata* (Coq.), *?coleoptrata* (Scop.), and “*Species A*.” The tentative identification of *coleoptrata* was an error, the species referred to being almost certainly undescribed; known localities for this species are New York, Virginia, and Maryland; Malloch's record from Illinois is unverified.

On the other hand, the species termed “*Species A*” does, in fact, seem to be *coleoptrata*—judging from the redescription appearing in Lindner's “*Fliegen der Palaearktischen Region*.” The species is probably Holarctic, the verified U.S. records being Maine, Vermont, New Hampshire, New York, Virginia, Michigan, and Washington. A brief diagnosis of *coleoptrata* is as follows: palpi yellowish; 3rd antennal segment short, blackened; face with a dark transverse band above oral margin; mesonotum varying from yellowish-brown with some degree of longitudinal stripes to almost uniformly brownish-black; scutellum without a median light area; legs typically brownish on distal halves of mid and hind femora and on adjacent tibial bases, the front legs sometimes with similar bands or, rarely, all legs somewhat paler.

TRACHYLEUCOPHENGHA Hendel

1917. Deutsch. Ent. Zeit., 1917:44.

Hendel erected the genus for his new species *T. flavocostata* from Aracataca, Colombia. Duda (1927) studied the type and added some additional descriptive notes. There seem to be no records of later captures of this species nor have any other species been described in the genus.

It is of special interest, then, to report the capture of a single male of this genus near Eunice, Louisiana, in June, 1953. There are several differences between this specimen and the description of *flavocostata* but it does not seem wise to describe this male as new at this time. The genus is close to *Rhinoleucophenga*, and our specimen will key to that genus in the generic key of Wheeler (1952). It differs from *Rhinoleucophenga* mainly in having the front finely pitted to rugulose and in the stronger development of prescutellar bristles.

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