

## PARACACOXENUS, NEW GENUS, WITH NOTES ON CACOXENUS INDAGATOR LOEW (DIPTERA: DROSOPHILIDAE)<sup>1</sup>

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### ABSTRACT

*Cacoxenus* Loew is redefined on the basis of the type species, *C. indagator*, which is redescribed (including characteristics of the genitalia) and for which a lectotype

is selected. **PARACACOXENUS** Hardy, type *P. guttatus* Hardy and Wheeler (Washington and Oregon), is allied to *Cacoxenus*, *Gitona*, and *Gitonides*.

In studying the affinities of *Gitonides perspicax* Knab from Hawaii, comparisons were made with several species of *Gitona*, with the European *Cacoxenus indagator*, and with the undescribed species of *Cacoxenus* reported from North America by Wheeler (1952). These studies have shown that *Gitonides* and *Cacoxenus* are distinct, and that the American form is generically distinct from both of them. In addition to describing it as a new genus and species, we also take this occasion to report on the type series of *indagator*, the type species of *Cacoxenus*.

### *Cacoxenus* Loew

1858. Weiner Ent. Monatschr. 2: 216. Type species: *C. indagator* Loew, by monotypy.

The genus was located in the Agromyzidae by Becker, and in the Milichiidae by Loew and Schiner. Collin (1911) pointed out that it could not possibly belong to the Agromyzidae, saying, "...it seems to resemble in many ways the genera at the commencement of the Drosophilidae such as *Acletoxenus*, *Leucophengu* and *Phortica*, and may ultimately have to be located there, but at present I leave it in the Milichiidae..." Kröber (1912) assigned the synonymous *Paragitona* to the Drosophilidae, and Hendel (1917) placed *Cacoxenus* in the Drosophilidae. This arrangement has been followed by Duda (1924, 1926, 1934) and later authors.

*Cacoxenus* is clearly a drosophilid, related to *Gitona* and *Gitonides*, all of which possess strong prescutellar bristles, small postverticals, divergent basal scutellars, bare or rarely short-plumose arista, and small sutural bristles. The described species are as follows:

*Cacoxenus indagator* Loew 1858, Weiner ent. Monatschr. 2: 218. This has been reported from a number of European localities, but comparisons of the male genitalia of the type series with specimens from Great Britain and Germany indicate that several species may be going under this name.

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*Cacoxenus semiluteus* Loew 1869, Berliner ent. Zeitschr. 13: 51. Loew described this species from Cuba, placing it in the Agromyzidae. Wheeler (1952) has indicated that this is probably not a drosophilid.

*Cacoxenus obscurus* (Kröber 1912), Zeitschr. wiss. Insektenbiol. 8: 235. Originally described as *Paragitona obscura*. Kröber later published a note in the same volume (p. 329) making *Paragitona* a synonym of *Cacoxenus*, and *obscura* a synonym of *indagator*. The type should be re-examined before accepting this synonymy.

*Cacoxenus exiguus* Duda 1924, Arch. Naturgesch. 90A(3): 225. Reported only from Silesia.

*Cacoxenus punctatus* Duda 1924, op. cit. 225. Described from Formosa. The present status of this species is uncertain. Duda (1926) used the combination "*Phortica (Cacoxenus) punctatus*," making *Cacoxenus* a subgenus of *Phortica* Schiner, but later (1934) he treated *Cacoxenus* as a valid genus. Hendel (1933) placed *punctatus* as a synonym of *Gitonides perspicax* Knab, but Hennig (1941) retained it as a valid species of *Cacoxenus*.

*Cacoxenus argyreator* Frey 1932, Notul. Ent. 12: 84. Known only from Finland and Norway.

*Cacoxenus inquilinus* Hendel 1933, Deutsch. ent. Zeitschr. 1933: 46. Known only from Australia.

### *Cacoxenus indagator* Loew

(Figs. 1a-c)

The senior author has had an opportunity to study a good series of specimens of this, the type species, thanks to loans made by Harold Oldroyd, British Museum (Natural History), Willi Hennig, Deutsches Entomologisches Institut, Berlin, and Fritz Peus, Zoological Museum, Berlin. Loew's cotype series, consisting of one male and two females labelled "Silesia, 5, 1858 (H. Loew)" was received from Dr. Peus. The male specimen bearing the name label in Loew's handwriting has now been designated as the lectotype and is located in the Zoological Museum, Humboldt University, Berlin.

The description given by Duda (1934) appears to be adequate except that the statement "*a. r. orb dicht hinter den p. orb*" does not seem to be correct since the anterior reclinate bristle is placed

well behind the proclinate one, about one-third to two-fifths the distance between the proclinate and the posterior reclinate bristles (fig. 1a).

The following description, including the male genitalial characters which have not been described or figured, supplements that of Duda.

The front of the male is predominantly opaque black, lightly gray pollinose; it is about one-half longer than wide and is slightly narrowed an-

teriorly. In the female the front is distinctly gray pollinose and is about one-third longer than wide. The thorax is rather densely gray pollinose, the mesonotum very densely setose with 15 to 20 irregular rows of acrostichal setae. Each sternopleuron has a strong posteroventral bristle and several inconspicuous hairs arranged in a vertical row. Duda's wing figure is good; however, in the specimens examined the last

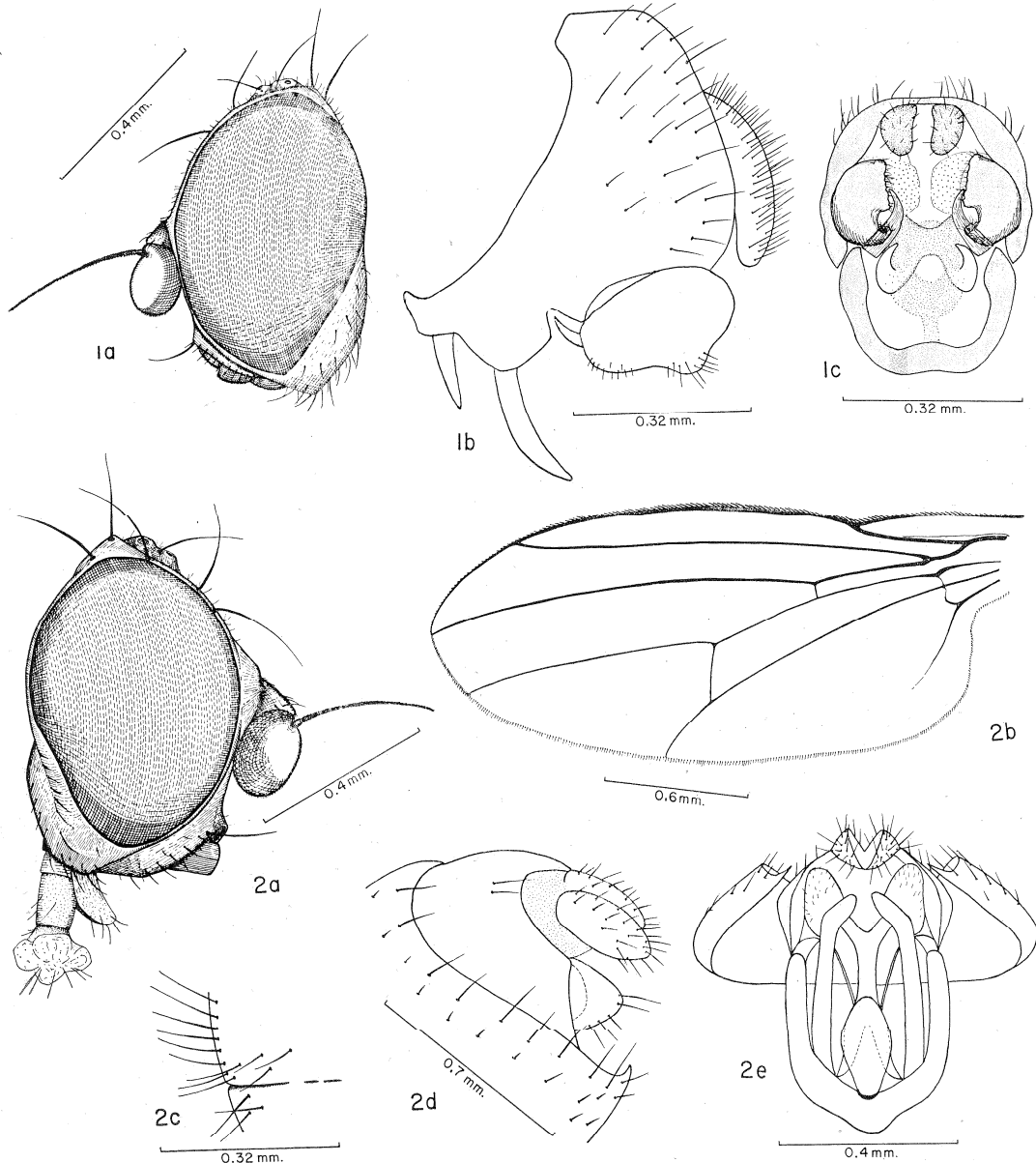


FIG. 1.—*Cacozenus indagator* Loew. a, Head, lateral view. b, Male genitalia, lateral view. c, Male genitalia, internal view.

FIG. 2.—*Paracacozenus guttatus* n. sp. a, Head, lateral view. b, Wing. c, Posteroventral corner of sternopleuron. d, Male genitalia, lateral view. e, Male genitalia, internal view.

section of vein  $M_{1+2}$  is slightly longer than is shown in his figure, typically appearing to be about 2.5 times longer than the pentultimate section. The costal fringe thins out gradually beyond the apex of vein  $R_{2+3}$  and  $R_{4+5}$ . The costa extends a short distance beyond the tip of vein  $R_{4+5}$  with just a slight indication of a vein around the margin beyond this point; the fourth costal section is about one-third as long as the third. The r-m crossvein (anterior) is situated at the middle of cell 1st  $M_2$ .

The abdomen is subshining brown, lightly gray pollinose, and more distinctly gray along the apices of the segments. The ninth tergum of the male is comparatively broad as seen in direct lateral view, but it is narrowed on the dorsal median part (best viewed dorsally). The claspers are broad and blunt, about one-half higher than long, and as seen in both lateral and ventral views each has a blunt setose development in the middle of the inner margin (fig. 1b). The ninth sternum is rather ornate with a strong spur-like process developed on each side; the parameres are large and hook-like (fig. 1c).

Length: Body and wings, 3.2-4 mm.

#### *Paracoxenus* Hardy, new genus

The species from the United States reported by Wheeler (1952) appears to fit the characteristics of the genus *Coxenus* in most details. It differs, however, in many respects from typical *Coxenus*, based upon *indagator* Loew, and on the basis of the comparison of just the two species it appears to represent a distinct genus.

In the description of *Paracoxenus* and the comparisons with *Coxenus indagator*, it should be noted that some of the characteristics given may be specific and may not be of generic importance. The male genitalia are very strikingly different in the two as is shown in figures 1c and 2e, and also as brought out in the descriptions which follow. *Paracoxenus* may be characterized by the following details: Male claspers rather small and broadly cone-shaped with a few conspicuous setae at the apices. Ninth tergum rather broad on the dorsal portion and attenuated ventrally; sixth tergum terminating in a strong spine at each posterior corner (fig. 2d). Mesonotum spotted, with a small brown spot at the base of each seta. Inner postalar and presuturals poorly developed, scarcely differentiated from the surrounding setae. Each sternopleuron with a comb-like row of about 10 long hairs extending from the ventral margin to about the middle over the hind portion of the sclerite, the ventral bristle not differentiated from these hairs (fig. 2c). Dorsal bristles lacking on the middle coxae.

Front of male about as wide as long. Mesonotum rather sparsely setose as compared with typical *Coxenus*, with only 8 to 10 rows of acrostichal setae present. Costa apparently extending to the apex of vein  $M_{1+2}$  although it is

hyaline and rather faint in the fifth costal section (between the apices of veins  $R_{4+5}$  and  $M_{1+2}$ ). The extended mouthparts are scarcely one-third as long as the eye height.

In typical *Coxenus*, based upon *indagator* Loew, the male genitalia are quite different in development (fig. 1c): the claspers are large and shaped as in figure 1b, the ninth tergum is narrowed medianly and the sixth tergum does not terminate in a spine at each posterior corner. The mesonotum is densely gray pollinose, not spotted, and is rather densely setose with 15 to 20 rows of acrostichal setae. The postalar and presutural bristles are moderately strong. Each sternopleuron has a moderately strong posteroventral bristle, plus a vertical row of inconspicuous short hairs. Each middle coxa has two strong posterodorsal bristles. The male front is one-half longer than wide. The costa ends at or slightly beyond the tip of vein  $R_{4+5}$ . The extended mouth parts are about equal to two-thirds the height of the head.

Type of the genus: *Paracoxenus guttatus* Hardy and Wheeler, new species.

#### *Paracoxenus guttatus* Hardy and Wheeler, new species (Figs. 2a-e)

Differing from all known related flies by the generic characters given above; however, some of these characters are probably specific for *guttatus* and may not be of generic value.

**MALE. Head:** About one-half higher than long; eyes oval in shape; upper half of occiput very narrow, the back part of the head distinctly concave; lower portion of occiput about equal in width to the gena (fig. 2a). Front rather broad, almost as wide as long, densely brownish gray pollinose; proclinate orbital bristles situated just slightly below the middle of the front, the anterior reclines situated about two-fifths the distance between the proclimates and the posterior reclines. Face, genae and clypeus brownish yellow in ground color, densely gray pollinose; a thin black line extending along the lower margin of each gena onto the lower portion of each facial depression; face slightly carinate down the median portion. Palpi and mouthparts yellow, tinged lightly with brown around the apices; each palpus with several black setae around the apex but without distinct bristles. Mouthparts short, the portion extended beyond the oral margin equal to less than one-third the head height (fig. 2a). One strong bristle and about six black setae present in each vibrissal row. Antennae brown, tinged lightly with yellow, the second segment with one moderately stout dorsal bristle, the third segment rounded, just slightly longer than wide. Arista densely pubescent, just slightly over two times longer than the third antennal segment.

**Thorax:** Densely gray pollinose, with indis-

tinct longitudinal streaks of brown extending down the mesonotum, and with a small brown spot at the base of each seta on the mesonotum; disc of scutellum brownish gray, gray around the margins. Three faint vittae extending longitudinally across each pleuron, one at upper edge of each mesopleuron, one through median portion of each mesopleuron, and one across upper portion of each sternopleuron. Anterior sternopleural bristle equal in size to the posterior bristle; posteroventral portion of the sternopleuron as in figure 2c. Two pairs of dorsocentral bristles present, both situated on the posterior fourth of the mesonotum, the anterior bristles short, about half as long as the posterior ones and situated distinctly behind a line drawn between the posterior supraalars. Inner postalar bristles small and poorly developed, equal in size to the setae of the mesonotum; a pair of strong prescutellar acrostichals present, equal to or greater in size than the anterior dorsocentrals. Only one humeral bristle present, about three-fourths as long as the anterior notopleural bristle; presutural bristle very small, scarcely differentiated from the surrounding setae. Halteres yellow, faintly tinged with brown around the apices.

*Legs:* Yellow, tinged lightly with brown, the segments moderately slender and without ornamentation; hind basitarsus about two-fifths as long as the tibia, and slightly longer than the combined lengths of the next two tarsal segments.

*Wings:* Hyaline; third costal section 2.8 times longer than the fourth; last section of vein  $M_{1+2}$  about 2.18 times longer than the penultimate section. Crossvein r-m situated at the middle of cell 1st  $M_2$ . Apical section of vein  $M_{3+4}$  just slightly longer than the m crossvein. Costal fringe thinning out rather gradually so that the termination of the fringe is not distinct, extending at least one-third the distance between the apices of veins  $R_{2+3}$  and  $R_{4+5}$ . The costal vein appears to extend to the apex of vein  $M_{1+2}$ , although that portion in the fifth costal section is hyaline (fig. 2b).

*Abdomen:* Opaque brown, gray at apices of segments. The genitalia are very elaborate and the homologies of the parts are not clearly understood. The general details have been discussed above under the generic characters. The ninth sternum is divided on each side into a pair of elongate slender lobes, the median pair being capitate at their apices. The aedeagus is Y

shaped at its apex and a rather complicated, heavily sclerotized structure fits dorsad to and around the sides of the aedeagus, terminating in a strong black ventral point on each side and having a long slender, almost bristle-like lobe extending posteriorly down each side of the aedeagus. The other details are as shown in figures 2d and 2e and as mentioned above under the generic discussion.

Length: Body and wings, 3.0-3.2 mm.

Female unknown.

*Collection records:* 4, Dungeness Fork Forest Camp, Olympic National Forest near Sequim, Washington; 17, Glacier View Forest Camp, Wenatchee National Forest near Wenatchee, Washington; 3, Tyee Springs Forest Camp, Pinchot National Forest near Carson, Washington; 1, Polally Forest Camp, Mt. Hood National Forest south of the city of Hood River, Oregon. All specimens were males, collected by the junior author in August, 1951.

Holotype male and three paratypes from Olympic National Forest near Sequim, Washington; thirteen paratypes from near Wenatchee, Washington. Type and six paratypes deposited in the U. S. National Museum. The remainder of the paratypes are in the following collections: *Drosophila* Type and Reference Collection, The University of Texas; British Museum (Natural History); and the University of Hawaii.

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