

## A Review of the Genus *Pseudiastata* Coquillett (Drosophilidae, Diptera)

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The members of the genus *Pseudiastata* are allied to the genus *Gitonides* Knab because of the pubescent arista; the large bare eyes; the presence of three pairs of strong orbital bristles; the presence of pre-scutellar acrostichals; by having the two pairs of dorsocentral bristles rather close together on the hind portion of the mesonotum; by the concave occiput; by the densely setose mesonotum; and by the short, broad scutellum. Also, like *Gitonides*, all of the known species of *Pseudiastata* are mealybug predators, and are of considerable importance as biological control agents. *Pseudiastata* differ from *Gitonides* by lacking brown spots over the mesonotum and front; by lacking a distinct crossvein between cells 1st M2 and M; by the maculated wings (figs. 1A and 2A); by having the third section of the costa five to six times longer than the fourth section; and by the very different male genitalia. The male genitalia of *Pseudiastata* lack claspers and the ninth tergum is usually distinctly lobate at ventral apices (figs. 1E and 2B). In *Gitonides* well developed, heavily spined claspers are present, and the ninth tergum is broad and not lobate. In *Pseudiastata* the postocellar and pre-scutellar bristles are also much more strongly developed than in *Gitonides*. The wings are marked with transverse brown to black marks in *Pseudiastata* (figs. 1A and 2A), whereas the wings of *Gitonides* are hyaline.

*Pseudiastata* specimens were purposely introduced into the Hawaiian Islands between 1924 and 1937 in an attempt to establish natural enemies of pineapple mealybugs (*Dysmicoccus brevipes* (Cockerell)). Refer to Fullaway (1933, HAWAII. FOR. AGRIC. 30:57), Carter (1935, JOUR. ECON. ENT. 28:1039-40). Specimens were introduced by the Pineapple Research Institute and by the Hawaiian Board of Agriculture and Forestry from the Panama Canal Zone, Guatemala, British Guiana, and Brazil. These were all treated in the literature as *P. nebulosa* Coquillett, but actually none was this species. As pointed out by Sabrosky (1951, BULL. ENT. RES.

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41 (3) :625), the specimens from Panama were *P. pseudococcivora* Sabrosky. He also said the latter "may also have been the species reported by Carter (1935) as very abundant throughout Guatemala except in the highlands, feeding voraciously on the same species of mealybug" (*Dysmicoccus brevipes*). I have studied this material and the specimens from Guatemala are *P. pseudococcivora*, as also are some of the specimens from Brazil. Most of the specimens from Brazil were *P. brasiliensis* Costa Lima. The specimens introduced from British Guiana were apparently *P. vorax* Sabrosky, which has been previously known only from Trinidad. Dr. Walter Carter, Pineapple Research Institute, said the specimens from British Guiana failed to establish a colony in the laboratory and they were not released in the field.

To date, all of the known species of *Pseudiastata*, except for the type of the genus, *P. nebulosa* Coquillett, and *P. armata* Wheeler, have been recorded preying only upon pineapple mealybugs. J. W. Beardsley, Hawaiian Sugar Planters' Association, is convinced that what has been treated in the literature as *Dysmicoccus brevipes* (Cockerell) may actually represent a complex of species (he has thus far demonstrated two species from Micronesia and Hawaii) and this may possibly account for the failure to establish these flies in Hawaii, although other mealybug predators, such as *Gitonides perspicax* Knab, are general mealybug feeders showing no specificity.

*Pseudiastata* are robust flies, predominantly yellow to rufous in ground color, dusted with gray. All of the bristles are yellow; two strong bristles are present on the upper portion of each sternopleuron. The mesonotum is densely setulose; the acrostichals are arranged in ten to twelve rows. The labella are small and are densely covered with long yellow hairs. The palpi are short and broad and lack strong bristles. The patterns of the wing maculations are of two distinct types: *P. brasiliensis* Costa Lima is readily differentiated from other species by the presence of numerous transverse marks through cells R5 and 1st M2 (fig. 1A). All of the other known species appear to have nearly identical wing venation and wing markings, as in figure 2A, and can be differentiated only by the characteristics of the male genitalia. The male genitalia are distinctively developed in *Pseudiastata*. The anal plates are large and densely haired. The ninth tergum is lobate ventrally, except in *brasiliensis* which has the ventral margins of the tergum evenly rounded (fig. 1B). The shape and development of the ventral aspects of the tergum is useful for separating the species. The posterolateral margins of the ninth sternum each have a pair of lobes of varying shapes, depending upon the species, and the median margin is developed into a pair of slender lobes. The latter are paramere-like in appearance but they arise from the sternum. These lobes extend ventrad to the aedeagus and reach almost to the apices of the ventral lobes of the tergum. The presence or absence, and also the arrangement, of setae on the ninth sternum is also of diagnostic import-

ance, as brought out in the key and figures below.

KEY TO KNOWN SPECIES OF PSEUDIASTATA

1. Wings with three irregular transverse streaks of brown as in figure 2A. Ninth tergum of male lobate ventrally ..... 2  
Cells R5 and 1st M2 with numerous streaks of brown as in figure 1A. Ventral aspects of ninth tergum broad, rounded, not distinctly lobate (fig. 1B). Ninth sternum as in figure 1C. (Brazil) ..... **brasiliensis** Costa Lima
2. Base of vein R4 + 5 bare ..... 3  
Base of vein R4 + 5 setose. (Panama)..... **armata** Wheeler
3. Ninth sternum of male with three bristles on each side, the posterolateral lobes not divided ..... 4  
Ninth sternum devoid of bristles, each posterolateral lobe divided at the apex (fig. 2C). Lobes of ninth tergum as wide as long (fig. 2B) (Panama, Guatemala, Mexico, and Brazil—probably widespread over the Neotropical region).  
..... **pseudococcivora** Sabrosky
4. Bristles on the ninth sternum situated near the apices of the posterolateral lobes (fig. 1E). Ventral aspects of ninth tergum rounded apically and curved upward (fig. 1D). (Eastern North America) ..... **nebulosa** Coquillett  
Bristles of ninth sternum extending to below middle of segment (fig. 2E). Ventral aspects of sternum pointed apically and not curved (fig. 2D). (Trinidad, British Guiana) ..... **vorax** Sabrosky

**Pseudiastata armata** Wheeler

*Pseudiastata armata* Wheeler, 1957, UNIV. OF TEXAS PUB. 5721:111.

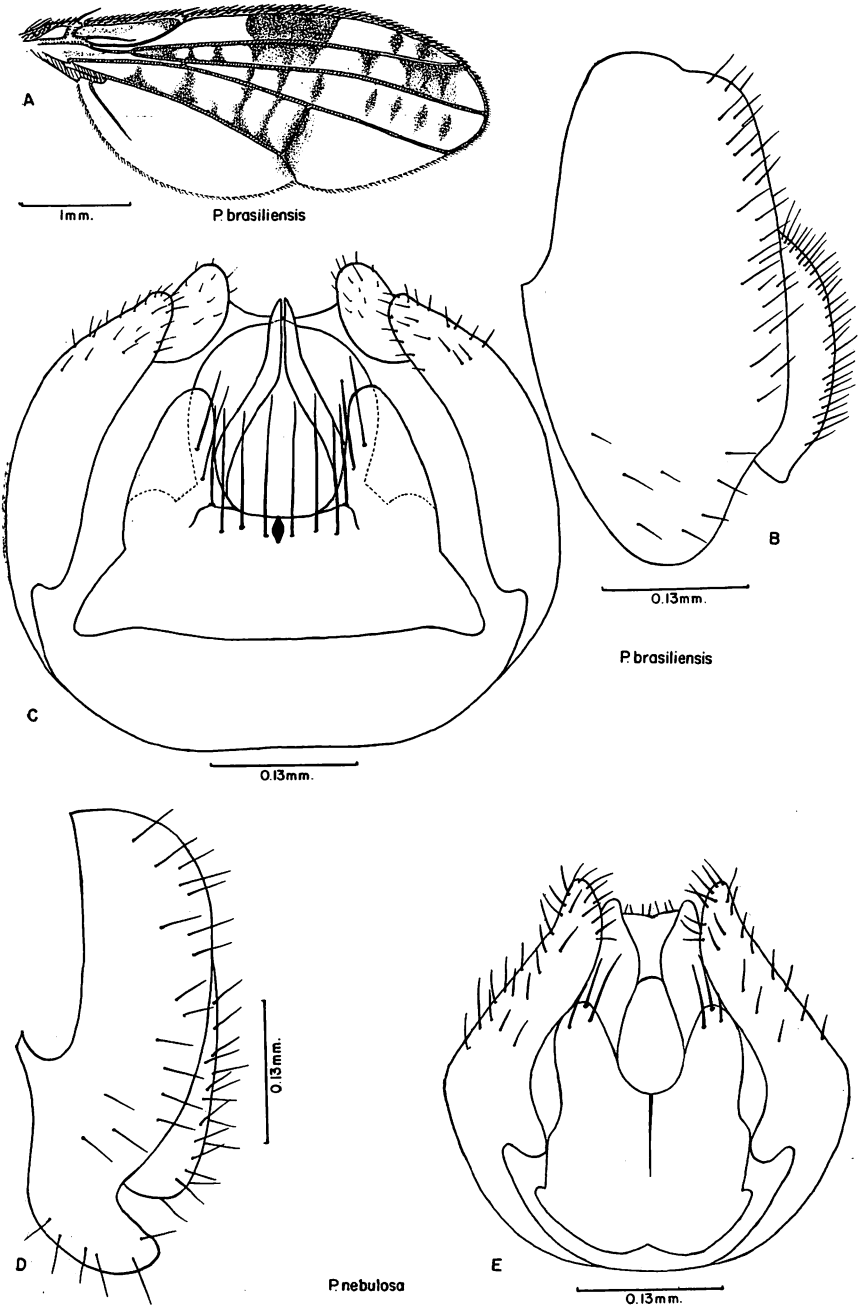
Known only from the type female and one female paratype collected at Mojinga Swamp, Ft. Sherman, Canal Zone. I have not seen this species.

Type in the U. S. National Museum.

This species is readily differentiated from other known *Pseudiastata* by having the basal section of vein R4 + 5 setose. The original figure of the

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Fig. 1. A-C, *Pseudiastata brasiliensis* Costa Lima: A. wing; B. male genitalia, lateral view; C. male genitalia, ventral view.  
D-E, *P. nebulosa* Coquillett: D. male genitalia, lateral view; E. male genitalia, ventral.



wing (*loc. cit.* fig. 25) shows setae along the basal section of the radial sector, but Dr. Wheeler has informed me that this is incorrect and that the setae are present on vein  $R4 + 5$  between the forking of Rs and the r-m crossvein.

***Pseudiastata brasiliensis* Costa Lima (figs. 1A-C)**

*Pseudiastata brasiliensis* Costa Lima, 1937, CHACARAS e QUINTAES 55 (2):179-182.

Known only from Brazil (type locality, state of Rio de Janeiro). Specimens have been studied from Recife, Brazil, June 1937 (C. T. Schmidt).

Type in the Museu Nacional, Rio de Janeiro.

In lateral view the ninth tergum of the male is broad and rounded on the ventral margins, not distinctly lobate (fig. 1B). The ninth sternum is characterized by having a transverse row of four to six strong bristles across the median portion and three bristles on each of the posterolateral lobes. The latter lobes are broadly rounded at apices (fig. 1C). The submedian lobes on the posterior margin of the sternum are long and slender. The numerous transverse streaks of brown through cells 1st M2, R5 and R3 (fig. 1A) make the wing distinctive from all other known *Pseudiastata*.

***Pseudiastata nebulosa* Coquillett (figs. 1D-E)**

*Pseudiastata nebulosa* Coquillett, 1908, PROC. ENT. SOC. WASH. 9:148.

Previously recorded from Maryland (type locality, Plummer's Island) and Perry, Georgia (Sabrosky, *loc. cit.*, p. 624). Two specimens have been studied from the U. S. National Museum collection, one from College Park, Md., VI-9-35 (C. T. Greene) and one from Charlottesville, Va. Aug. 31, 1945. Lot No. 46-12046, No. 2007 (D. W. Clancy). The latter was reared from a larva associated with *Pseudococcus* sp. in a scar on the trunk of an oak tree.

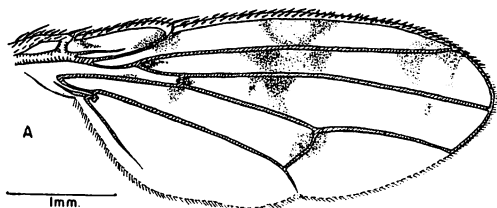
Type in the U. S. National Museum.

In lateral view the ninth tergum of the male is rather narrow and the ventral aspects are developed into slightly up-curved lobes (fig. 1D). Both the lateral and the submedian lobes on the hind margin of the ninth sternum are rather broad and rounded at apices; the former have three bristles located near the apices (fig. 1E).

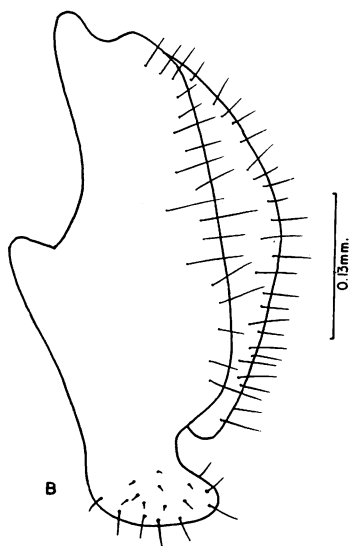
***Pseudiastata pseudococcivora* Sabrosky (figs. 2A-C)**

*Pseudiastata pseudococcivora* Sabrosky, 1951, BULL. ENT. RES. 41 (3): 624.

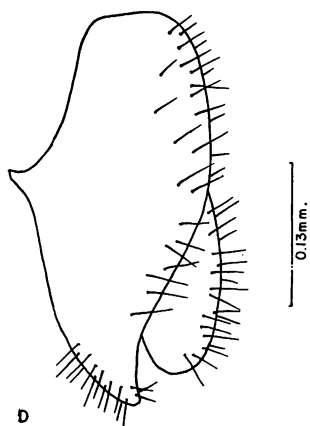
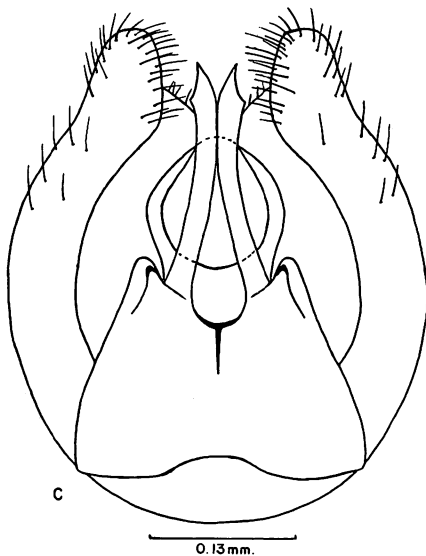
Fig. 2. A-C, *P. pseudococcivora* Sabrosky: A. wing; B. male genitalia, lateral; C. male genitalia, ventral.  
D-E, *P. vorax* Sabrosky: D. male genitalia, lateral; E. male genitalia, ventral.



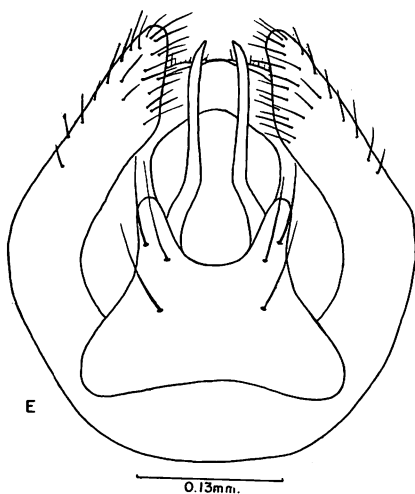
*P. pseudococcivora*



*P. pseudococcivora*



*P. vorax*



Previously recorded from Panama Canal Zone (type locality) and Mexico. Specimens are on hand from Guatemala, Nov.-Dec. 1932 and Jan. 1937 (W. Carter and E. G. Salas); Recife, Brazil, June 1937 (C. T. Schmidt); Bahia Brazil, Nov. 1946 (W. Carter) and "With shipment of mealybugs from Brazil", Nov. 1936 (C. T. Schmidt). I have also studied paratypes from Panama.

Type in the U. S. National Museum.

From lateral view the ventral lobes of the ninth tergum are slightly enlarged and are about as wide as long (fig. 2B). The ninth sternum is devoid of bristles and the posterolateral lobes are divided (fig. 2C). The submedian lobes are slender and are pointed at apices.

***Pseudiasata vorax* Sabrosky (figs. 2D-E)**

*Pseudiasata vorax* Sabrosky, 1951, BULL. ENT. RES. 41 (3) :625.

Previously recorded from River Estate, Trinidad, West Indies (type locality). Specimens on hand from British Guiana, Nov. 23, 1936 (E. G. Sales) apparently belong to this species.

Type in the U. S. National Museum.

From a lateral view the ninth tergum of the male is rather evenly tapered to an acute point on each ventral margin (fig. 2D). The ninth sternum has three rather widely spaced bristles in an irregular row longitudinally down each side. The posterolateral lobes are rounded apically and are separated by a broad 'U'-shaped concavity. The submedian lobes on the hind margin of the sternum are very slender and extend parallel to one another (fig. 2E).