

The Syrphidae of Puerto Rico^{1,2}

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One cannot state with certainty when the first syrphid was collected from Puerto Rico and adjacent islands. Fabricius described a number of

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⁴ While this paper was in galley proof, the important and comprehensive publication, "A contribution to a generic revision of the Neotropical Milesinae (Diptera: Syrphidae)", *Arq. Zool. S. Paulo* 23(2): 73–215, 1972 by F. Cristian Thompson came to my attention. Although the milesines comprise only 17 of the 58 species occurring in Puerto Rico, this group is widely represented in the Neotropics, especially South and Central America. Any serious student of Neotropical Syrphidae should refer to this valuable paper. Dr. Thompson has made some drastic nomenclatural changes in some groups. For example, *Copestylum* Macquart is now recognized for all of the New World species of *Volucella* Geoffroy except *bombylans* (L.) and *Eristalis* Latreille is partitioned into *Eristalis* s.s., *Eoseristalis* Kanervo and *Palpada* Macquart. Good generic keys have long been needed for the Neotropical genera and Dr. Thompson's contribution fills this void.

species from the West Indies as early as 1781 (35). Von Roeder (78) published the first extensive list of Diptera from Puerto Rico, including several species of syrphids, based upon the collections of the Cuban naturalist, Dr. Juan Gundlach. Later workers who have contributed to our knowledge of the Puerto Rican syrphid fauna are Curran, Fluke, and especially Hull. Four publications are especially important: Curran (16) "Insects of Porto Rico and Virgin Islands"; Wolcott (107) "The Insects of Puerto Rico"; Fluke (45,46) "Catalog of the Family Syrphidae in the Neotropical Region", and Maldonado and Navarro (72) "Additions and Corrections to Wolcott's 'Insects of Puerto Rico'".

As a result of synonymy, additional records and descriptions of four new species (*Baccha (Ocyptamus) medina*, *B. (Ocyptamus) vockerothi*, *B. (Baccha) marotelli*, and *B. (Baccha) neoparvicornis*), 58 species are now recorded from the island. Undoubtedly this list could be substantially increased if extensive collecting were continued. The present study was based largely upon the collection of the Department of Entomology at the Agricultural Experiment Station, University of Puerto Rico, Río Piedras, P.R. and to a lesser extent, on the collection of the Department of Biology, Mayagüez Campus, Mayagüez, P.R.

The collection at the Department of Entomology, Agricultural Experiment Station, in Río Piedras, was substantially increased by intensive Malaise trapping by myself and Mr. Silverio Medina Gaud during a 6-month period from September 1968 to March 1969. The island was systematically collected and most of the typical ecological communities were sampled.

Additional records were obtained from Dr. George Drury of the U.S. Atomic Energy Commission, El Verde, Puerto Rico, from the collections of the U.S. National Museum of Natural History (USNM), the American Museum of Natural History (AMNH), and from the Canada National Collection (CNC). Unless otherwise stated all specimens are deposited in the collections of the Department of Entomology, Agricultural Experiment Station, University of Puerto Rico, Río Piedras, or in the M. T. James Entomological Collection, Washington State University, Pullman, Washington.

ECONOMIC IMPORTANCE

Of the 58 species herein recorded from the island, 41 may be aphidophagous. These include representatives of the genera *Mesograpta*, *Baccha*, *Allograpta*, *Xanthandrus*, and *Parapenium*. All of these except *Parapenium* belong to the Syrphinae. The remainder belong to the Milesiinae. The species of *Mesograpta* and *Baccha* outnumber, by far, all the other species of the family occurring on the island. It has long been assumed that most

of the subfamily Syrphinae are aphidophagous; unfortunately, life history studies have been undertaken on only a few species. When more is known we may find that some are facultative predators or that some subsist entirely upon plant food. For example, the well-known predator *Allograpta obliqua* can live on plant food during its larval stages and *Mesograpta polita* has been reared on corn pollen. Representatives of other related genera, *Melanostoma* and *Platycheirus*, (not occurring in Puerto Rico), can apparently survive on decomposing plant material as well as on insect prey.

Aphidophagous syrphids are often extremely beneficial in suppressing aphid outbreaks. A European species, *Syrphus corollae*, was observed devouring 680 aphids during its larval development (Láska, 61). The use of these predators should be more widely investigated. Unlike other insect predators such as coccinellids, syrphids produce and distribute large numbers of eggs over extensive areas even though prey density may be low. They are excellent fliers and range over extensive areas, thus can select favorable oviposition sites with developing aphid colonies (Sundy, 91). This is a considerable advantage in preventing aphid outbreaks.

KEY TO GENERA OF SYRPHIDAE OCCURRING IN PUERTO RICO

1. r-m crossvein situated before middle of cell M_2 (fig. 1)..... 2
r-m crossvein at or beyond middle of cell M_2 10
2. Humerus bare; arista usually bare; face tuberculate, usually at least partly yellow; usually with yellow abdominal bands; legs slender..... 6
Humerus pilose; either small (5-6 mm.), bluish-black with bare arista, or larger more robust species with plumose arista and face protuding downward..... 3
3. $M_1 + 2$ not recurrent distally; face protruding downward, arista moderately to densely plumose..... 4
 M_{1+2} not recurrent; face not protracted, arista bare; small (5-6 mm.), bluish-black species with short white pile.... *Parapenium*
4. Large (8-19 mm.), brightly metallic-green, blue or bluish-green or mostly black..... 5
Smaller (5-6 mm.), brown and black or black and yellow
Volucella
5. Brightly metallic-green, blue or bluish-green; face with tubercle each side of median tubercle; (8-12 mm.)..... *Ornidia*
Mostly black; basal half of wing blackish or dark-brown on anterior half; face without tubercles; large robust species; (16-19 mm.)
Volucella
6. Abdomen slender, spatulate..... *Baccha*
Abdomen broader with parallel sides..... 7

- 7. Mesonotum with anterior collar of longer hairs. *Baccha*
 Mesonotum without longer hairs anteriorly. 8
- 8. Face and scutellum entirely black or dark blue. *Xanthandrus*
 Face and scutellum partly or entirely yellow. 9
- 9. Face vertical, with obscure tubercle; mesonotum with disc shining black. *Allograpta*
 Face distinctly protruding below; mesonotum with cinereous stripe or stripes on disc. *Mesograpta*
- 10. Vein R_{4+5} deeply bent into cell R_5 ; hind femur not enlarged. 11
 Vein R_{4+5} straight or nearly so; hind femur enlarged, spinose along lower surface. 12
- 11. Yellow or gray markings on mesonotum composed of dense tomentum. *Meromacrus*

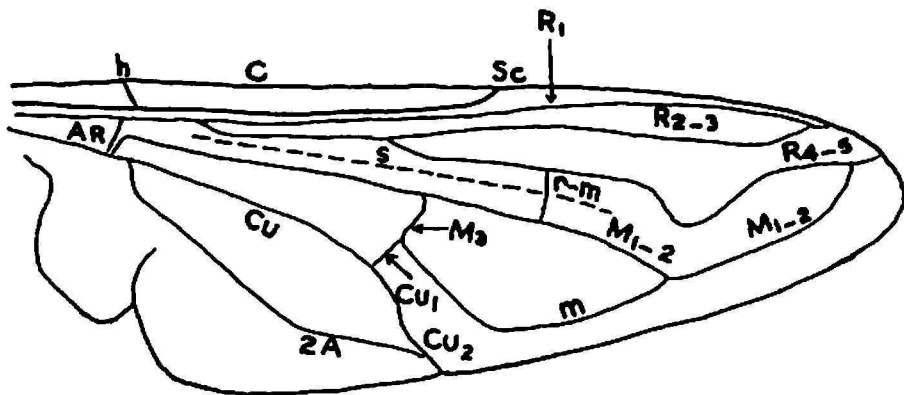


FIG. 1.—Wing of *Eristalis* showing venation.

- Yellow or gray markings of mesonotum due to either ground color or to pollen. *Eristalis*
- 12. Face concave in profile, at most weakly carinate; metasternum pilose. *Neplax*
 Face not concave, strongly carinate; metasternum pubescent or bare. *Crepidomyia*

Genus *Allograpta* Osten Sacken

Allograpta Osten Sacken 1876: 49 (76) (Type *obliqua* Say).

References: Curran (15,16,23,26); Fluke (42).

The larva are believed to be aphidophagous.

KEY TO SPECIES

- Squama mostly brown; front of male black pilose. *limbata* (Fabricius)
- Squama yellowish, at most slightly infuscated; front of male usually almost all yellow pilose. *venusta* Curran

***Allograpta limbata* (Fabricius)**

Scaeva limbata Fabricius 1805: 251, (39).

Allograpta fuscisquama Curran 1927: 4, (15) (NEW SYNONYM).

Wolcott (107) apparently was the first to suggest that Curran's *fuscisquama* was synonymous with *limbata*. Dr. J. R. Vockeroth examined two ♀ syntypes of *limbata* in Copenhagen and sent me a sketch of the abdomen of one of them. This illustration compared favorably with Curran's description of his type. In addition, Dr. Vockeroth wrote me that *limbata* keys to *fuscisquama* in a manuscript key which he prepared with Curran's types of both *fuscisquama* and *venusta* before him.

This species is fairly common. I have examined specimens from Corozal, El Verde, Aguas Buenas, Caja de Muertos Island (south of Puerto Rico), Isabela, Río Piedras, Barranquitas, Mayagüez, El Yunque, and Cayey.

***Allograpta venusta* Curran**

Allograpta venusta Curran 1927: 5, (15).

Wolcott (107) stated that C. T. Greene identified some specimens of *Allograpta* from the island as *limbata* Fabricius. The material at Río Piedras bearing Greene's label contained only one damaged specimen which resembled *venusta*. There was a series of 19 additional specimens with a single typed label of *limbata*. These also were *venusta*, not *limbata* as labelled. Additional Malaise-collected material came from Castañer, Corozal and Cayey.

Genus *Mesograpta* (Loew)

Mesogramma Loew 1866a: 157 (preoc.) (67).

Mesograpta Loew 1872: 114, (69) (Type *parvula* Loew).

Mitrosphen Enderlein 1938: 227, (33).

Antiops Enderlein 1938: 228, (33).

Hybobathus Enderlein 1938: 233, (33).

References: Williston (101,103); Curran (16,18,24); Hull (53); and Fluke (44) (Syn.).

Unfortunately little is known about the biology of this large group of syrphids. It is generally believed that the larvae are aphidophagous. However, only the feeding habits of *polita* (Say) are known and it feeds on corn pollen.

This genus is in a state of confusion, principally because taxonomists have relied too heavily upon highly variable color patterns. I have not attempted to present a key to the species. A critical study should be undertaken based upon genitalia or other morphological characters to separate the species.

***Mesograpta arcifera* Loew**

Mesograpta arcifera Loew 1866 a: 160, (67).

This species is one of the most abundant syrphids in Puerto Rico.

***Mesograpta aurulenta* Williston**

Mesograpta aurulenta Williston 1887: 102, (101).

Mesogramma ruficincla Curran 1927: 7, (15) (NEW SYNONYM).

I have compared Curran's type with a ♂ and ♀ from Williston's type series (San. Dom. Acc. 19, 702, Williston) from the USNM and I believe the two specimens are conspecific. In Curran's type the black annula are confined to the hind legs. In the Williston material the posterior leg of the ♂ appears mostly black as do the femur, tibia, and tarsus of the middle and anterior femora. In the ♀ the black coloring is less prominent, especially on the anterior femur.

This species appears to be quite rare. Wolcott (107) recorded it only from Aibonito and El Yunque. Some of his specimens from Aibonito are in the Río Piedras collection.

***Mesograpta basilaris* (Wiedemann)**

Syrphus basilaris Wiedemann 1830: 143, (100).

Mesogramma soror Schiner 1868: 350, (87).

Mesograpta variabilis Wulp 1883: 26, (108).

Mesogramma bidentata Williston 1891: 25, (103).

Mesogramma diversa Giglio-Tos 1892: 3, (48).

Mesogramma basilaris flavocuneus Hull 1940: 433, (50).

Mesogramma basilaris bifida Hull 1943a: 25, (53).

Mesogramma basilaris neotropica Hull 1943a: 14,36, (53).

A paratype ♀ of Hull's *neotropica* and a ♂ determined as *basilaris* by Hull from the USNM were examined as well as the badly damaged type in the BMNH. They closely resemble *floralis* (Fab.). It is possible that *floralis* and *basilaris* are conspecific. I saw no specimens from Puerto Rico which I could assign to this species, although Wolcott (107) stated that C. L. Metcalf determined material as this species from Coloso, Manatí and Point Cangrejos (Punta Cangrejos).

***Mesograpta boscii* (Macquart)**

Syrphus boscii Macquart 1842: 100, (70).

Syrphus gurges Walker 1852: 236, (98).

I have seen no specimens of *boscii* from Puerto Rico although Wolcott (107) quoted von Roeder as having determined this species from the island.

***Mesograpta difficilis* (Curran)**

Mesogramma difficilis Curran 1930b: 6, (18).

Curran described this species from eight specimens, from Puerto Rico (Coamo Springs, Caguas, Adjuntas, Manatí, Corozal, Aibonito) and one from Tumatumari, British Guiana. I examined one damaged ♂ paratype from Manatí (AMNH). Curran believed the species to be related to *duplicata* Wiedemann and *watsoni* Curran.

***Mesograpta duplicata* (Wiedemann)**

Syrphus duplicatus Wiedemann 1830: 142, (100).

Syrphus orchrogaster Thomson 1869: 494, (95).

This species was fairly common and frequently taken in Malaise traps. The localities include: Ciales, Guavate, Corozal, Isabelita, Gurabo, Aguas Buenas, Proyecto Vázquez, Cayey, Barranquitas, Castañer, Arecibo, Aibonito and Caguas.

***Mesograpta floralis* (Fabricius)**

Scaeva floralis Fabricius 1798: 563, (38).

Mesogramma flamminea Hull 1941: 312, (51).

This species is possibly the most common syrphid in Puerto Rico. Thousands of individuals can be taken in a few days collecting by sweeping or with a Malaise trap (fig. 2). It is highly variable in color. There may be a complex of species.

***Mesograpta laciniosa* Loew**

Mesograpta laciniosa Loew 1866a: 159, (67).

This species is well-defined and quite common.

***Mesograpta minuta* (Wiedemann)**

Syrphus minutus Wiedemann 1830: 146, (100).

I have seen no specimens from Puerto Rico. Curran (16,18,24) and Hull (53) did not mention this species. Fluke (45,46) recorded it only from Brazil and Cuba. However Wolcott (107) stated "... is listed by Dr. Gundlach as a *Mesograpta* 'rara en Puerto Rico'".

***Mesograpta musica* (Fabricius)**

Scaeva musica Fabricius 1805: 253, (39).

This species is quite common and has been collected from numerous localities.

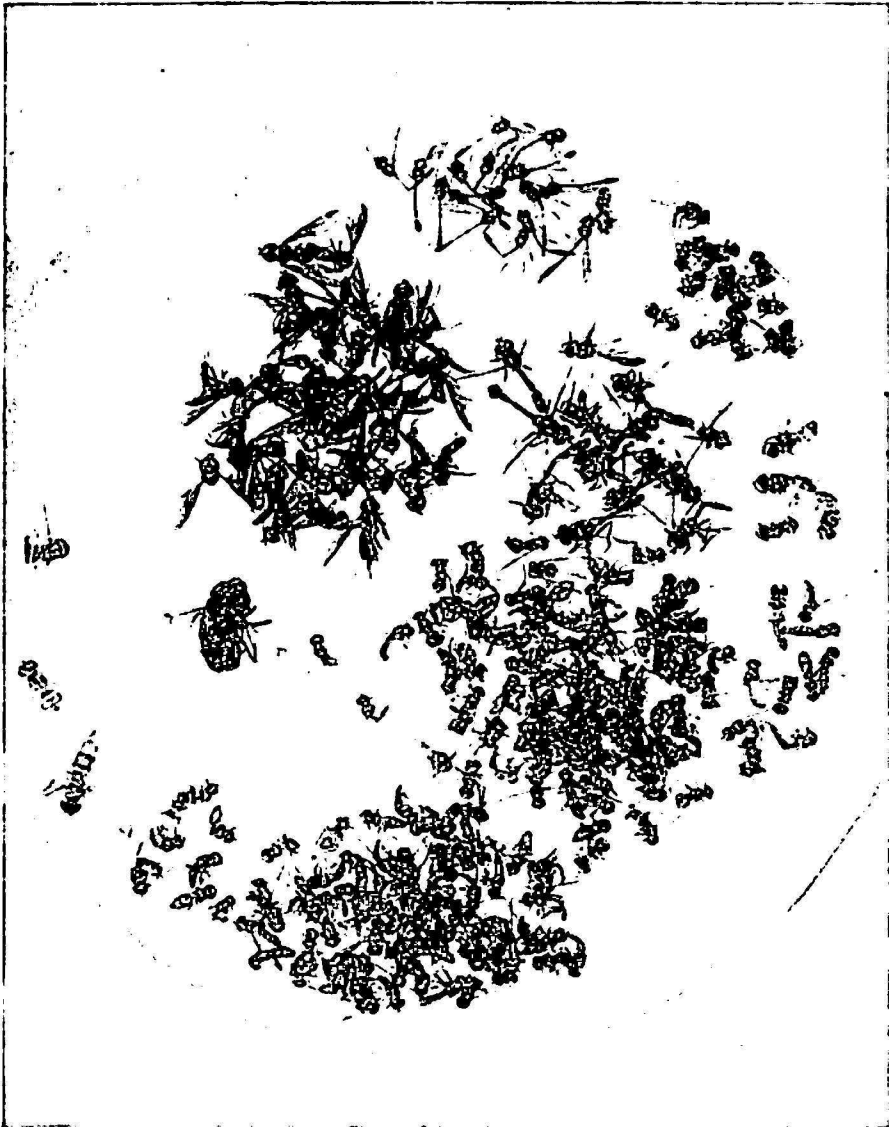


FIG. 2.—A single 24-hour collection of syrphids from a Malaise trap. Primarily *Baccha latiuscula* (Loew), *clavata* (Fab.), *deceptor* (Curran), and *Mesograpta* spp. The large specimen is *Ornidia obesa* (Fab.)

***Mesograpta picta* (Macquart)**

Syrphus pictus Macquart 1842: 99, (70).

Mesogramma poecilogastra Loew 1866a: 159, (67).

I have records from Arecibo, Mayagüez, El Verde-Caribbean National Forest, Proyecto Vázquez, Cidra, Fortuna, Gurabo, Cayey, Castañer, Isabela and Corozal.

***Mesograpta polita* (Say)**

Scaeva polita Say 1823: 88, (85).

Syrphus cingulatulus Macquart 1850: 459, (71).

Syrphus hecticus Jaenicke 1867: 398, (58).

I have records from Arecibo, Castañer, Corozal, Mayagüez, Río Piedras, Aibonito, Lajas, Guavate, Isabela, and Gurabo.

***Mesograptia rufocincta* (Curran)**

Mesogramma rufocincta Curran 1927: 7, (15).

Dr. W. W. Wirth determined this species from Puerto Rican material now in the USNM (Maldonado and Navarro, 72).

***Mesograptia subannulata* Loew**

Mesograptia subannulata Loew 1866a: 157, (67).

Although Wolcott (107) stated that this species is fairly common, I did not collect representatives nor was it represented in the collections at Río Piedras or Mayagüez. Two specimens from Arecibo and Arroyo were examined in the USNM, identified as this species by Dr. L. V. Knutson. They resemble *floralis* (Fabricius) and quite likely belong to this complex. In fact Curran (11) once believed the two were conspecific.

***Mesograptia verticalis* (Curran)**

Mesogramma verticalis Curran 1927: 6, (15).

Curran described this species from a single male from Cayey. I have seen specimens from Castañer, Arecibo, Cayey, Mayagüez, Guavate, Proyecto Vázquez, Gurabo, and Río Piedras.

***Mesograptia violacea* (Curran)**

Mesogramma violacea Curran 1926a: 103, (13).

Mesogramma luna Hull 1943a: 21 (53) (NEW SYNONYM)

This species was described by Curran from a unique ♂ from Jamaica. The type of *violacea* was loaned to me from the BMNH through the courtesy of Kenneth G. V. Smith and compared with Puerto Rican material. Hull (53) stated that this holotype of *luna* was in the USNM. However, Dr. Lloyd Knutson wrote me as follows: "... there is a male of *M. luna* in the main collection labeled 'Mango bloom, Mayagüez, P.R. Mar. 14.33; A. G. Harley Colr; San Juan no. 3816; Paratype; *Mesogramma extrapolata* Hull.' Dr. Wirth, at some time, added the following label, 'This specimen should probably be the holotype of *Mesogramma luna* Hull 1943.' I think we would be safe in assuming that the '*Mesogramma extrapolata* Hull' label got on this specimen by mistake, and that it is either the holotype of *M. luna*, or the paratype cited by Hull. Your 3 specimens... (from Puerto Rico) are certainly the same species."

A ♂ and ♀ were collected in coitu from El Verde Caribbean National Forest by Mr. Medina which clearly associates the ♀ with Curran's species. This species is quite common.

Genus *Baccha* Fabricius

Baccha Fabricius 1805: 199, (39) (Type *elongatus* Fabricius).

Bacchina Williston 1896a: 86, (105).

References: Williston (101); Curran (16,17,21,24,28,29), and Hull (54,56,57). The larvae are mostly aphidophagous but some are especially predaceous upon coccids.

KEY TO SPECIES

1. Epistoma projecting beyond antennal base; scutellum margined anteriorly and posteriorly with yellow. *clavata* (Fabricius)
Face retreating below tubercle; if tubercle lacking, face gently convex. 2
2. Wing glossy hyaline with conspicuous apical spot; mesonotum shiny-black with 3 narrow light-grey vittae; abdominal tergites 2-5 gray vittate and with oblique side spots; 4-6 mm.
ornatipes Curran
Although apical wing spot may be present, mesonotal and abdominal markings not as above. 3
3. Face tuberculate. 5
Face not tuberculate. 4
4. Wing with a definite apical spot, infuscated along costal margin and just anterior to anterior crossvein. *incompta* Austen
Wing of ♂ with light-brown uniform infuscation, wing of ♀ hyaline; front of both sexes with minute transverse striations
graciles Williston
5. Large (10-16 mm.); mesonotum with three broad yellow vittae narrowed posteriorly; R₅ vein slightly curved into R₅ cell
capitata Loew
Smaller, (5-8 mm.) not as above. 6
6. Thorax and abdomen shiny steel blue, latter flattened, subspatulate; 1st abdominal tergite with pilose, pale-yellow tubercle laterally, tergites 2, 3, 4, with narrow yellow lateral diagonal rectangular markings; 5th tergite with reduced to small lateral yellow spots
medina n. sp.
Not as above. 7
7. Mesonotum with definite anterior collar of white or yellow hairs;

- abdomen not distinctly petiolate, sides often subparallel; inner portion of 2nd antennal segment extending into 3rd segment anteriorly. 8
- Mesonotum without definite anterior row of hairs; abdomen often petiolate; antenna not as above. 14
8. Wing uniformly brownish either only at base or over almost entire wing. 9
- Wing brown with well defined hyaline maculated areas. 11
9. Scutellum dull brownish-yellow. *scutellata* (Loew)
- Scutellum black or brownish-black. 10
10. Basal half of wing uniformly brownish, outer half hyaline
dimidiata (Fabricius)
- Most or all of wing uniformly brown; abdomen metallic blue
latiuscula (Loew)
11. Face yellow grey with brownish tubercle; pleuron with long yellow-white pile. *fasciata* Roeder
- Face unicolorous, although tubercle may be slightly darker; pleuron bare or almost bare. 12
12. Face light-brown or reddish-brown. *fascipennis* Say
- Face yellow, almost translucent. 13
13. Abdominal tergites brownish; wing mostly hyaline with brown maculations. *vockerothi* n. sp.
- Abdominal tergites violaceous or steel blue; wing predominantly brown. *conformis* (Loew), *cylindrica* (Fabricius)
14. Pleuron largely yellow. 15
- Pleuron mostly black. 18
15. Wing uniformly tinged with brown, darker only along costal area. . . 16
- Wing hyaline, except brownish costal area and often with dark spot at tip. *parvicornis* Loew
16. Second abdominal tergite with broad yellow band. *rica* Curran
- With no such band. 17
17. Sternopleuron mostly brownish-black. *cubana* Hull
- Sternopleuron yellow. *neoparvicornis* n. sp.
18. Face yellowish along margins, tubercle brownish; forelegs mostly yellow; abdomen threadlike. *deceptor* Curran
- Face black; forelegs mostly black; abdomen subspatulate
martorelli n. sp.

***Baccha (Mimocalla) capitata* Loew**

Baccha capitata Loew 1863: 14, (66).

Only three specimens were examined. Two were from Vega Alta and

Comerio in the collection at Río Piedras. One from Mayagüez is in the Mayagüez collection.

***Baccha (Dioprosopa) clavata* (Fabricius)**

Syrphus clavatus Fabricius 1794: 298, (37).

Baccha babista Walker 1849: 549, (97).

Baccha facialis Thomson 1869: 504, (95).

Conops? quadrimaculatus Ashmead 1880: 70, (1).

Spazigaster bacchoides Bigot 1883: 326, (7).

This species was particularly abundant. Over 200 specimens were taken within a few days from a Malaise trap located at Isabela.

***Baccha (Ocyptamus) conformis* (Loew)**

Ocyptamus conformis Loew 1866b: 38, (68).

I have examined no specimens from Puerto Rico and there is some doubt that this species occurs here. It is omitted in Hull (54) and in Curran (16,17,24,28,29). Hull (56) mentioned *B. conformis* but did not include it in his key. However, Wolcott (107) credited Dr. Juan Gundlach and Mr. R. H. Van Zwaluwenburg as having collected it on the island. Fluke (45,46) recorded it from Cuba. This species is allied to *cylindrica*.

***Baccha (Baccha) cubana* Hull**

Baccha cubana Hull 1944: 30, (55).

This is apparently a new record for Puerto Rico. Three specimens were determined from Cayey, Arecibo and El Verde-Caribbean National Forest.

***Baccha (Ocyptamus) cylindrica* (Fabricius)**

Syrphus cylindricus Fabricius 1781: 249, (35).

Ocyptamus fascipennis Wulp 1883: 9, (108).

Ocyptamus fuscipennis Williston (in part) 1887: 119, (101).

This species is quite common. I examined specimens from Cayey, El Verde-Caribbean National Forest, Río Piedras, Proyecto Vázquez, Fortuna, Mayagüez, Mona Island (west of Puerto Rico), Salinas, Lajas, Isabela, Corozal, Guavate, Caja de Muertos Island (south of Puerto Rico), and Yauco. In addition, the Mayagüez collection contained specimens from Mayagüez, Adjuntas, Coamo, Ponce, Aguadilla, Las Marías, and Lares.

***Baccha (Baccha) deceptor* Curran**

Baccha deceptor Curran 1930a: 14, (17).

Baccha stenogaster Williston 1888: 266 (Curran), (102).

Curran (16) recorded *B. stenogaster* from Puerto Rico. Later, (21) he stated: "These (*B. deceptor*) are the specimens recorded in my paper on the 'Diptera of Porto Rico and Virgin Islands' as *B. stenogaster* Williston. A comparison with Williston's type, which was from Brazil, shows that the West Indian form is quite distinct." This is a common species collected from many localities.

***Baccha (Ocyptamus) dimidiata* (Fabricius)**

Syrphus dimidiatus Fabricius 1781: 234, (35).

Pipiza divisa Walker 1857: 156, (99).

Pipiza dolosa Walker 1857: 156, (99).

Although both Curran (15) and Wolcott (107) recorded this species from a number of localities, only four specimens from Mayagüez, Isabela, Fortuna, and Arecibo were seen. This species closely resembles *latiuscula* (Loew). Hull (56) separated the two principally on the amount of wing infuscation. The specimens from Mayagüez and Isabela showed some intergradation. If large series were examined these species may all prove to be conspecific.

***Baccha (Ocyptamus) fasciata* Roeder**

Baccha fasciata Roeder 1885: 342, (78).

There has been some confusion about the identity of this species. Wolcott (107) stated "... described from Puerto Rico by Herr Victor von Roeder (1885-342), the type collected by Dr. Gundlach..." Although *fasciata* was mentioned once by Hull (56), he did not include it in his key. Curran (16) made no reference to it. A number of specimens determined as *fasciata* were in the collection at Río Piedras. These and additional specimens collected by Mr. Medina and myself keyed down to *cylindrica* (Fab.). Dr. J. R. Vockeroth loaned me a ♂ specimen from the CNC (RS80, Puerto Rico, J. W. Boyes) which undoubtedly is this species.

***Baccha (Ocyptamus) fuscipennis* Say**

Baccha fuscipennis Say 1823: 100, (85).

Syrphus peas Walker 1849: 590, (97).

Syrphus amissas Walker 1849: 589, (97).

Syrphus radaca Walker 1849: 590, (97).

Ocyptamus longiventris Loew 1866b: 38, (68).

I have examined no specimens from the island. Wolcott (107) stated that Greene determined *fuscipennis* from material collected from Palo Seco and Dorado. Greene may have confused *fuscipennis* with *B. vockerothi* new species.

***Baccha (Leucopodella) gracilis* Williston**

Baccha gracilis Williston 1891: 34 (103).

Only one specimen was previously recorded from Puerto Rico (Curran (16)). I identified additional material from El Yunque, Cayey and El Verde-Caribbean National Forest as well as a specimen from Adjuntas (USNM).

***Baccha (Leucopodella) incompta* Austen**

Baccha incompta Austen 1893: 147, (2).

Curran (16) identified three specimens from Adjuntas. Mr. Medina and I collected additional specimens which I have identified as *incompta* from Proyecto Vázquez, El Verde-Caribbean National Forest and Aguas Buenas

***Baccha (Ocyptamus) latiuscula* (Loew)**

Ocyptamus latiusculus Loew 1866b: 39, (68).

This species was quite abundant.

***Baccha (Ocyptamus) loewi* Sedman**

Ocyptamus scutellata Loew 1866b: 39, (68) (preoc.).

Baccha (Ocyptamus) loewi Sedman 1965: 573 (in Stone et al, 1965, (90).

Maldonado and Navarro (72) stated that Wirth determined this species from material taken at Mayagüez (USNM).

***Baccha (Baccha) martorelli* new species (Fig. 3)**

This is a relatively small, delicate, shining steel blue and opaque black species with mostly clear wings, appearing infuscated only on the subcostal cell. It keys to near *shropshirei* Curran in Hull (56), but in Curran's species the basal portion of the wing is dark. Length of body of holotype, 5 mm.

Female: Head: Face steel blue, broad grey pollinose band along margin, tubercle broad, protruding to antennal base. Front, sparsely white pilose, steel blue with narrow lateral pollinose bands. Occiput grey pollinose with row of white pile projecting backward.

Thorax: Notum shiny steel blue with two vittae narrowed posteriorly spare grey pile, except definite row anteriorly, broad suboval opaque black spot anterior to scutellum, latter steel blue, almost bare; pleuron steel blue, light-grey pollinose and pilose on pteropleuron and sternopleuron; legs dark-brown, lighter at tips of femora and bases of tarsi; wing almost reaching tip of abdomen, clear except infuscated subcostal cell.

Abdomen: Broadly petiolate, tergites with suboppressed sparse grey

pile except pile erect on anterior tergites, shiny steel blue with following opaque black markings: broad band on 2d, 3d, and 4th, broadly interrupted on latter with narrow stripe between, 5th with two transverse spots divided with narrow stripe.

Male: Unknown.

Types: Holotype ♀ Castañer, P.R. Feb. 15-17, 69 Telford, Medina, Malaise trap (acc. no. 345); seven paratypes, one ♀ same data; one ♀ Cayey, P.R.-Henry Barracks, 4-20-69. S. Medina Gaud, Malaise trap; two ♀ Mayagüez, P.R. Feb. 4, 1969. Telford, Medina, Malaise trap; two ♀ Río Piedras, P.R. 10-23-69, Telford, Medina, Malaise trap; ♀ Arcibo, Cambalache Forest, Feb. 12-13-69, Telford, Medina, Malaise trap. The type and four paratypes are deposited in the M. T. James Collection,

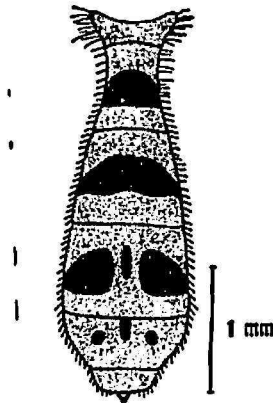


FIG. 3.—Dorsal abdominal aspect of holotype female of *Baccha (Baccha) martorelli* n. sp.

WSU, one paratype is in the CNC, and the remaining paratypes are in the Collection at Río Piedras.

This species is named for Dr. L. F. Martorell, well known Puerto Rican entomologist and naturalist.

***Baccha (Ocyptamus) medina* new species (Fig. 4)**

This is a shiny, bluish-black species, abdomen with subparallel sides and with four short, diagonal lateral yellow rectangular markings; portions of pleuron, humerus and lateral portions of 1st abdominal tergite grey pollinose. The affinity of this species is uncertain. It belongs to *Ocyptamus*, having the white pilose collar along the anterior margin of the mesonotum, but lacks the strap-like medial projection of the 2nd antennal segment. It keys to *latiusculus* and *dimidiatus* in Curran (29) and to the *gastrostactus*, *fascipennis*, *lemur* and *cylindrica* group in Hull (56). Length of body of holotype, 7.5 mm.

Female: Head: Face yellowish grey, prominently tuberculate, broad light-brown stripe covers tubercle and extends to antenna; latter brown, 3rd segment much longer than combined basal segments; front light-brown immediately above antenna with a dark shiny spot in center, broad shiny black triangle extends past ocelli to occiput, lower $\frac{2}{3}$ of front bordered with yellowish grey.

Thorax: Shiny steel blue, sparsely white pilose with following grey pollinose markings; humerus, notopleuron, posterior callus, posterior portion of pteropleuron and upper portion of sternopleuron. Wing extending slightly beyond abdomen, lightly uniformly infuscated except brown subcostal cell darker. Pro-leg and meso-legs light brown, meta-leg darker brown.

Abdomen: Shiny dark blue, subspatulate. Lateral anterior corner of 1st tergite greatly swollen, yellowish-grey with prominent yellow-white



FIG. 4.—Dorsal abdominal aspect of holotype female of *Baccha (Ocyptamus) medina* n. sp.

pile; 2nd tergite about $\frac{1}{4}$ longer than 3rd or 4th tergite with scattered short black pile and longer white pile anteriorly, lateral abbreviated rectangular spot about midway of tergite; 3rd and 4th tergites similar except shorter, lateral marking transverse and longer, situated more anterior of tergite; 5th tergite with reduced lateral yellow spot.

Types: Holotype ♀, Arecibo, Cambalache Forest, P.R. 11/15-17/69. Telford, Medina, Malaise trap (acc. no. 348), deposited in the M. T. James Collection, WSU.

This species is named in honor of Mr. Silverio Medina Gaud, Dipterist, who significantly contributed to this investigation.

Baccha (Baccha) neoparvicornis new species (Fig. 5)

This species superficially resembles *parvicornis* Loew but is distinguished from it by the brownish mesonotum. With rare exceptions *parvicornis* lacks an apical wing spot. In *neoparvicornis* it is absent. Length of body of holotype, 6.5 mm.

Male: Head: Face yellow, broadly tuberculate, sparse black pile on upper area; antenna darker yellow, 3rd segment brownish at tip. Front yellowish-brown with sparse black pile, round shiny black-brown spot immediately above antennal base, ocellar triangle dark brown.

Thorax: Mesonotal disc dark-brown; lateral margin of mesonotum, pleuron, scutellum and legs yellow. Wing lightly infuscated, darker along costal margin. Subcostal cell brown.

Abdomen: Subparallel, light-brown with darker brown markings as follows: 1st tergite all but extreme lateral margin which is dull yellow; 2nd tergite broadly at base, narrowest medially and extending to terminal brown ring; 3rd tergite terminal ring and narrow median line; 4th and 5th, similar except brown at posterior areas, broader near margins and projecting anteriorly. Prominent blackish-brown pile on lateral tergite.

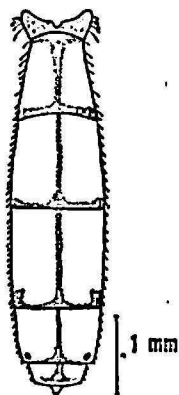


FIG. 5.—Dorsal abdominal aspect of allotype female of *Baccha* (*Baccha*) *neoparvicornis* n. sp.

Female: Similar to ♂ except brown abdominal markings less prominent, mesonotal disc with golden pollen obscuring ground color and with faint black vitta extending posteriorly to $\frac{3}{4}$ length of notum. Scutellum yellow.

Types: Holotype ♂, Arecibo, Cambalache Forest, P.R. Feb. 15–17, 1969. Telford, Medina, Malaise trap (acc. no. 346) and Allotype ♀ Cayey, Henry Barracks, P.R. 4-20-21, 1969. S. Medina Gaud, Malaise trap, deposited in the M. T. James Collection, WSU. Paratypes, one ♀, one ♂ Cayey, Henry Barracks P.R. Mar. 12–19, 1969. S. Medina Gaud, Malaise trap, in the collection at Río Piedras.

There is some variation in the abdominal and thoracic coloration. In the allotype ♀ and in the ♂ and ♀ paratypes, the mesonotum is golden pollinose.

Baccha (*Calostigma*) *ornatipes* Curran

Baccha ornatipes Curran 1927: 3, (15).

Curran (15) described this species from a single ♂ from Cayey. Mr. Medina collected a ♀ with a Malaise trap, also from Cayey.

***Baccha (Baccha) parvicornis* Loew (Fig. 7)**

Baccha parvicornis Loew 1861: 41, (65).

Wolcott (107) recorded this species from Cabo Rojo and Río Piedras. He suggested that the larvae prey upon fulgorids, white flies and mealybugs. Mr. Medina reared this species from guava heavily infested with the aleyrodid, *Metaleurodicus minimus* (Qt.) from Isabela. This species is quite common. I have seen specimens from Cayey, El Verde-Caribbean National Forest, Proyecto Vázquez, Río Piedras, Arecibo, Gurabo, Castañer, Corozal, and San Juan. In the Mayagüez collection there are specimens from Caguas, Mayagüez and Luquillo.

***Baccha (Baccha) rica* Curran**

Baccha rica Curran 1939b: 6, (28).

Maldonado and Navarro (72) recorded this species from Mayagüez

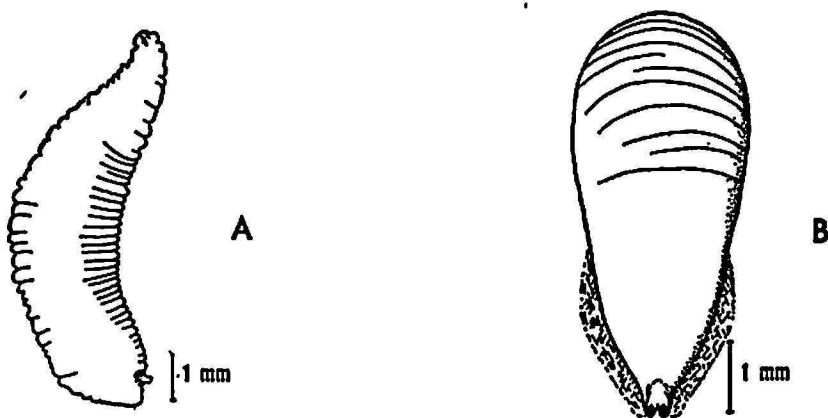


FIG. 6.—*Baccha (Baccha) parvicornis* Loew; A, Third instar larva observed feeding on aleyrodids (*Metaleurodicus minimus* (Qt.)); B, dorsal aspect of puparium.

(USNM). I examined a damaged ♂ from Corozal loaned me by the AMNH.

***Baccha (Ocyptamus) vockerothi* new species (Fig. 7)**

This is a slender, shiny brown species with infuscated wings; face, basal half of femora and sternopleuron, yellow grey. It has the anterior prothoracic collar of white pile characteristic of *Ocyptamus*. It appears related to *fuscipennis* Say but is smaller, the wing pattern less pronounced and the abdomen less broadened. Length of body of holotype, 8 mm.

Male: Head: Face grey-yellow with short black pile, tuberculate, epistoma retreating, light-brown laterally. Front black pilose, ground color shiny steel blue except grey-yellow along anterior margin; 3rd antennal segment dark-brown, longer than basal segments combined, latter lighter-brown.

Thorax: Notum shiny violaceous-brown with sparse, short grey and black pile except collar of long white pile along anterior margin. Scutellum lighter brown with sparse grey and white pile. Pteropleuron grey-yellow with sparse grey and black pile, remainder of pleuron light brown, almost bare. Legs light-brown except yellow-grey on basal half of all femora. Wings almost reaching tip of abdomen, broadly infuscated along all veins, except in axillary region. The subcostal cell entirely infuscated as are broad areas beyond discal cell and terminal portion of cell R_4 .

Abdomen: Petiolate, violaceous shiny-brown; first tergite with long white pile on edges, remaining tergites with sparse short black pile. Segments 2, 3 and 4 almost of equal length, 5th half as long as 4th.

Female: Very similar to ♂ except face is yellow, upper portion of mesopleuron pale-yellow and scutellum more brown.

Types: Holotype ♂ Arecibo, Cambalache Forest, P.R. Feb. 12-15 '69

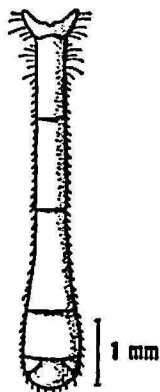


FIG. 7.—Dorsal abdominal aspect of holotype male of *Baccha (Ocyrtamus) vockerothi* n. sp.

Telford, Medina, Malaise trap (acc. no. 247); allotype ♀ Castañer, P.R. Feb. 15-17 '69 Telford, Medina, Malaise trap. Paratypes: One ♀ same data as allotype; one ♀, one ♂ same data as holotype. Holotype, allotype and one paratype deposited in the M. T. James Collection, WSU, one paratype each is deposited in the collection at Río Piedras, and CNC.

This species is named in honor of Dr. J. R. Vockeroth.

Genus *Xanthandrus* Verrall

Xanthandrus Verrall 1901: 316 (96) (Type *comptus* Harris).

Melanostoma (Xanthandrus) Shannon 1922: 34, (88).

References: Curran (21), Fluke (41,42), and Hull (57).

The larvae are aphidophagous.

KEY TO SPECIES

Thorax brassy with brownish-yellow pile.....*cubanus* Fluke
 Thorax blue with sparse grey pile.....*simplex* (Loew)

***Xanthandrus cubanus* Fluke**

Xanthandrus cubana Fluke 1936: 63, (40).

Fluke recorded this species from Puerto Rico and Cuba. One headless specimen of a *Xanthandrus*, which may have been this species, labeled "Yauco viii-9-1934" was examined in the Mayagüez collection. Fluke's ♂ paratype (Las Mesas, Porto Rico, Dec. 22, 1929, A. G. Harley) was loaned me from AMNH.

***Xanthandrus simplex* (Loew)**

Syrphus simplex Loew 1861: 40, (65).

One ♀ was examined labeled: "Arecibo, Cambalache Forest, reared in lab. Dec. 3, 1969. S. Medina Gaud." This specimen was compared with Loew's type from MCZ.

Genus *Parapenium* Collin

Parapenium Collin, 1952: 85, (9) (Type *carbonaria* Zett.).

Pipizella, authors, not Rondani.

Triglyphus, authors, not Loew.

References: Curran (10,11) (*Pipizella*).

Although little is known of the biology of this group, the species apparently are aphidophagous.

***Parapenium banksi* (Curran)**

Pipizella pulchella banksi (Curran) 1921: 349, (10).

This U.S. species was collected from Corozal, Lajas, Cayey, Gurabo, Fortuna, and Isabela, and apparently is a new record for the island.

Genus *Ornidia* Lepeletier and Serville

Ornidia Lepeletier and Serville 1828: 786 (64) (Type *obesus* Fabricius).

References: Williston (101); Curran (19).

The immature stages are poorly known. Sack (84) recorded the larvae of *obesa* (F.) from Paraguay, inhabiting decaying fruits and human excrement.

***Ornidia obesa* (Fabricius)**

Syrphus obesus Fabricius 1775: 763, (34).

This is a relatively common species. I have seen specimens from a number of localities in both Río Piedras and Mayagüez collections.

Genus *Volucella* Geoffroy

Volucella Geoffrey 1762: 540 (47) (Type *pellucens* Linnaeus).

Pterocera Meigen 1803: 275, (74).

Temnocera Lepeletier and Serville 1828: 786, (64).

- Phalacromya* Rondani 1848: 67, (80).
Glaurotricha Thomson 1869: 493, (95).
Atemnocera Bigot 1882: 114, (6).
Camerania Giglio-Tos 1892: 45, (48).

References: Williston (101,103); Curran (14,15,16,19,24,26,27,30).

The larvae of some species inhabit nests of certain social hymenoptera while others live in cacti. An excellent two-volume classical monograph on the genus, by Kunckel d'Hercule's (60), should be consulted for information on the anatomy and descriptions of immature stages.

KEY TO SPECIES

1. Large (18–20 mm.), mostly black.....*esuriens* (Fabricius)
 Smaller (6–8 mm.), yellow, yellow and black or brownish and
 violaceous..... 2
2. Pleuron with yellow spots; scutellum with mass of long black pile.... 3
 Pleuron unicolorous; abdominal tergites yellow with black or viola-
 ceous spots; scutellum with pre-apical depression..... 4
3. Femur and tibia black.....*pusilla* Macquart
 Femur and tibia brown.....*unipunctata* Curran
4. Abdominal tergites yellow with black spots.....*pallens* Wiedemann
 Abdomen with posterior margin of 2nd tergite, and tergites 3 and 4
 unicolorous, violaceous.....*tricincta* Bigot

Volucella esuriens (Fabricius)

Syrphus esuriens Fabricius 1794: 281 (37); Curran 1953: 8, (30).
Volucella rica Curran 1939a: 6, (27).

I have seen no specimens of this distinctive species from Puerto Rico but it undoubtedly occurs there. Wolcott (107) credits von Roeder as having determined it from Puerto Rican material collected by Dr. Gundlach.

Volucella eugenia Williston

Volucella eugenia Williston 1887: 139 (101); Curran 1953: 5, (30).
Volucella ingenia Curran 1930c: 4, (19).

I have not included this species in my key because I am not certain that it occurs in Puerto Rico. Wolcott (107) did not record it. However, Curran (16) included *eugenia* in his key to the species of Puerto Rico but omitted reference to locality data. This species has been recorded from the Bahamas, Jamaica and Cuba (Fluke 45,46).

Volucella pallens Wiedemann

Volucella pallens Wiedemann 1830: 204, (100).
Volucella testacea Rondani 1848: 1, (80).
Volucella sexpunctata Loew 1861: 38, (65).

I examined a number of specimens in the Mayagüez collection from Aibonito, Aguadilla, Río Piedras, Mayagüez and Ponce. The collection at Río Piedras contains specimens from El Verde-Caribbean National Forest, Cayey, Río Piedras, Barranquitas, and Arecibo.

***Volucella pusilla* Macquart**

Volucella pusilla Macquart 1842: 21, (70).

Although I saw no specimens from Puerto Rico and Curran (16) did not list it, Wolcott (107) stated "... originally described from Cuba, was listed from Puerto Rico by Dr. Gundlach, having been identified by Herr von Roeder."

***Volucella tricineta* Bigot**

Volucella tricineta Bigot 1875: 477, (4).

Kertész (59) lists "*tricineta*" Bigot and *varians* Bigot as synonyms of *purpurifera* Bigot. Fluke (46, p. 83) also lists *tricineta* as synonymous with *purpurifera*; on p. 87, however, he lists *tricineta* as a valid species as does Stone et al. (90). Seven specimens were examined from El Verde and Río Piedras. Wolcott (107) recorded it from Mayagüez and Bayamón. One ♀, USNM, was collected at light from Las Marías.

***Volucella unipunctata* Curran**

Volucella unipunctata Curran 1926b: 63, (14).

Graptomyza horvathi Szilády 1926: 610, (92) (NEW SYNONYM).

The badly damaged type (♀) of *horvathi* was loaned to me through the courtesy of Dr. H. Frankhanel, Deutsches Entomologisches Institut, Berlin. This specimen was compared with Puerto Rican material collected by Mr. Medina and me, as well as with other material identified as *horvathi* by C. T. Green and Dr. W. W. Wirth, and as *unipunctata* by Dr. H. V. Weems. I believe all to be conspecific.

A large series of this species was reared from the cactus *Opuntia dilenii* by Mr. Medina from Desecheo Island (west of Puerto Rico) and Icacos Key (east of Puerto Rico) in 1968. Additional records include San Germán, Mona Island (west of Puerto Rico), Proyecto Vázquez, Guánica and Caja de Muertos Island (south of Puerto Rico). The Mayagüez collection contains specimens from Yauco and Adjuntas. I examined material in the USNM from Mona Island and Guánica and, for verification, compared this material with Curran's paratype of *unipunctata*.

Genus *Crepidomyia* Shannon

Crepidomyia Shannon 1926: 47 (89) (Type *tricrepis* Shannon = *genuina* (Williston).)

References: Shannon (89); Hull (57) and Fluke (43).

***Crepidomyia genuina* Williston**

Xylota genuina Williston 1888: 284, (102).

Crepidomyia tricrepis Shannon 1926: 47, (89).

I have seen no specimens of this species from Puerto Rico. Dr. Vockeroth (*in litt.*) stated that one ♀ from Puerto Rico (El Yunque Sta. Luquillo Forest 10-16 VII 1969, H. and A. Howden) is deposited in the CNC. He also suggested *C. darlingtoni* Hull might be a synonym.

Genus *Neplas* Porter

Planes Rondani 1863: 9, (82) (preoc.).

Neplas Porter 1927: 96, (77) (Type *vagans* Wiedemann).

References: Williston (101); Shannon (89); Curran (24,29), and Hull (57).

The larvae probably feed upon decomposing organic matter.

***Neplas pachymera* (Loew)**

Xylota pachymera Loew 1866a: 162, (67).

I have seen no Puerto Rican specimens. However, Wolcott (107) stated that this species was collected from the island by Dr. Gundlach and identified by Victor Von Roeder. Fluke (45,46) recorded it from Cuba and Puerto Rico.

Genus *Meromacrus* Rondani

Plagiocera Macquart 1842: 59, (70) (preoc.).

Meromacrus Rondani 1848: 70, (80) (Type *ghiliani* Rondani).

Pteroptila Loew 1866a: 165, (67).

References: Williston (101,106); Sack (83); Curran (24,25) and Hull (52,57).

The larvae are little known but probably feed upon decomposing organic matter.

KEY TO SPECIES

Length 10-13 mm.; tomentose markings on mesotal suture long and narrow.....*flukei* Curran
 Length 17-19 mm.; tomentose marking on mesotal suture restricted to lateral spots.....*cinctus* (Drury)

***Meromacrus cinctus* (Drury)**

Musca cincta Drury 1770: 109, (32).

Syrphus pinguis Fabricius 1775: 763, (34).

Milesia ania Walker 1849: 54, (97).

Curran (16) and Wolcott (107) recorded this species from Hormigueros,

Río Piedras, Jayuya, Adjuntas, El Yunque and El Verde-Caribbean National Forest. Additional records were obtained, mostly by Malaise and black light traps, from Cayey, El Verde, Villalba and Mameyes. The Mayagüez collection contains specimens from Río Piedras, El Yunque, Mayagüez and Jayuya.

Meromacrus flukei Curran

Meromacrus pratorum Williston (not Fabricius) 1896b: 346, (106).

Meromacrus flukei Curran 1936a: 3, (25).

This species has been recorded from Puerto Rico as *pratorum* Fabricius by Curran (16) and Wolcott (107). However, Curran (25) later believed *flukei* to be distinct. *M. pratorum* occurs in South America. While the types of *flukei* were collected from St. Vincent and St. Thomas, this species was not represented in the collections at Río Piedras or Mayagüez.

Genus *Eristalis* Latreille

Tubifera Meigen, 1800: 34, (73), suppressed by I.C.Z.N. 1963.

Elophilus Meigen 1803: 274, (74).

Helophilus Leach in Brewster 1817: 159, (8). *Elophilus* also should be suppressed and *Helophilus* amended because of possible confusion with *Helophilus* Meigen (Stone et al., 1965), (90).

Eristalis Latreille 1804: 194, (62) (Type *tenax* Linnaeus).

Eristaloides Rondani 1844: 453, (79).

Eristalomya Rondani 1857: 38, (81).

References: Williston (101,102); Osburn (75); Hull (49); Curran (22,24); Bean (3) and Telford (93,94).

The larvae of this group are the common distinctive "rat-tailed" maggots. Their presence in water supplies is an indication of pollution. They are found usually in decomposing plant or animal material.

KEY TO SPECIES

1. Apical half of wing brown on costal portion. . . . *hortorum* (Fabricius)
Wings hyaline or at most lightly infuscated. 2
2. Posterior tibia with definite row of brownish pile on outer margin,
becoming lighter at base; foreleg usually reddish
vinetorum (Fabricius)
Posterior tibia lacking definite row of pile; foreleg usually dark-brown
or black. 3
3. Pteropleural pile entirely or mostly black. *atrimanus* Loew
Pteropleural pile pale. 4
4. Scutellum with at most a few scattered black hairs
albifrons albifrons Wiedemann
Scutellum with predominantly black pile. 5

Eristalis vinetorum (Fabricius)

Syrphus vinetorum Fabricius 1798: 526, (38).

Eristalis trifasciatus Say 1829: 165, (86).

Eristalis uwarum Walker 1849: 623, (97).

Eristalis soulouguensis Bigot 1880: 228, (5).

This is the most common *Eristalis* on the island and is well represented in the Río Piedras and Mayagüez collections.

SUMMARY

This paper presents results of a taxonomic investigation of the family Syrphidae of the order Diptera in Puerto Rico. A total of 58 species included in 11 genera are presently recorded as a result of synonymy, new records, and descriptions of the following four new species: *Baccha* (*Baccha*) *martorelli*, *Baccha* (*Ocyptamus*) *medina*, *Baccha* (*Baccha*) *neoparvicornis* and *Baccha* (*Ocyptamus*) *vockerothi*. Keys are given for the identification of the reported genera and for most of the recorded species.

RESUMEN

Este trabajo comprende un estudio taxonómico de la familia Syrphidae del orden Diptera en Puerto Rico. Se informa un total de 58 especies de sírfidos que pertenecen a 11 géneros, resultado de sinonimias, nuevos records y la descripción de 4 nuevas especies, a saber: *Baccha* (*Baccha*) *martorelli*, *Baccha* (*Ocyptamus*) *medina*, *Baccha* (*Baccha*) *neoparvicornis* y *Baccha* (*Ocyptamus*) *vockerothi*. Se incluyen varias claves, unas para la identificación de los géneros y otras para la mayoría de la especies informadas en este trabajo.

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