Shore Flies of the Belizean Cays (Diptera: Ephydridae)

WAYNE N. MATHIS

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ABSTRACT

Mathis, Wayne N. Shore Flies of the Belizean Cays (Diptera: Ephydridae). *Smithsonian Contributions to Zoology,* number 592, 77 pages, 258 figures, 6 tables, 1997.—Shore flies (Diptera: Ephydridae) from the Belizean cays are reviewed, including the description of one new genus (*Garifuna*) and five new species (*Discocerina* (*Discocerina*) *juniori, Polytrichophora reginae, Guttipsilopa* (*Nesopsilopa*) *dianneae, Paralimna* (*Paralimna*) *fellerae,* and *Garifuna sinuata*). Although the known shore-fly fauna of these cays is relatively diverse, comprising 56 species in 31 genera, none of the species is thought to be endemic, i.e., the species are introductions from the mainland. The subfamily Gymnomyzinae has greatest species diversity on the cays, especially the tribe Discocerinini, which has 12 species in three genera.

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Contents

Shore Flies of the Belizean Cays (Diptera: Ephydridae)

Wayne N. Mathis

Introduction

The Smithsonian Institution has conducted and sponsored research on the cays of Belize, especially those in the Stann Creek District, since 1972. These studies have mostly dealt with various aspects of the marine fauna and flora, but since 1984 there also has been a concerted effort to study the terrestrial biota. With funding from the Caribbean Coral Reef Ecosystems Program (CCRE), field work has been conducted on the mangrove habitats of Twin Cays, with reconnaissance and survey work on several nearby cays as well.

On seven field trips to these cays, I made special effort to collect specimens of the family Ephydridae, more commonly known as shore flies. Fifty-six species were collected and are reported herein, including five new species. Many of these species will eventually be incorporated in revisionary studies, but to facilitate other studies that will be completed before these revisions, it is necessary that the new species be described and the identities of the previously described species be documented; these are the primary objectives of this paper.

Prior to this field work in Belize, which resulted in this and other studies (Mathis, 1989, 1990, 1991, 1993a, 1993b, 1994, 1995a; Mathis et al., 1993), virtually nothing was known of the Ephydridae from Belize. The most recent catalog for the family that covers the Neotropical fauna (Wirth, 1968) lacks even a single record from Belize or British Honduras in the distributional data for the included species. Although no species had been recorded, several were expected, especially as the then known distributions for many species included records from one or all of the adjacent countries. Thus the goal, to an extent, was to verify and document the expected fauna.

Not all of the findings, however, could be categorized as "expected." A few surprises are typical of most studies in biological systematics, and, in this work, several taxa were discovered that were either new or unanticipated. In the latter case, several discoveries represent major extensions in the known distributions for these species.

The diversity of shore-fly species occurring on Belizean cays was likewise unforeseen. Before beginning this project, I had estimated the fauna to comprise a dozen to 20 species, primarily because most of the wetland habitats are saline, at least brackish and sometimes hypersaline, and the size of the cays is comparatively small, usually less than a football or soccer field. Obviously, shore flies are considerably more tolerant of saline conditions than was first appreciated, and the proximity of the cays to the mainland, not their small size, coupled with habitat availability are important factors that influence species diversity. The cays sampled along the barrier reef or in the lagoon are between 15 and 20 km from the mainland. In addition, the shore flies from three atoll-like islands groups beyond the barrier reef were sampled for comparative purposes. These islands groups are Glover's Reef, Lighthouse Reef, and Turneffe Islands.

METHODS AND MATERIALS.—The majority of specimens for this project were collected with an aerial net, but a few were collected in Malaise traps, and even fewer were attracted to and collected from black-light traps. Although the sampling was strictly qualitative, some notion of relative abundance can be measured from the number of specimens caught. In all, 3,342 specimens were examined, and except for primary types of previously described species, all specimens were collected since 1984, when this field work in Belize began. Unless otherwise stated, all specimens are deposited in the collections of the former United States National Museum (USNM) now in the National Museum of Natural History (NMNH), Smithsonian Institution.

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For each species treated, the following data, as available, are provided: a brief synonymy (original reference plus any others containing significant information); locality data from the Belizean cays in a "Specimens Examined" section; the general "Distribution" for the species; notes on the "Natural History," as available; a "Diagnosis" in which key characters for identification are noted; and a "Remarks" section as needed for other comments. Keys to the appropriate higher categories of shore flies, subfamily to genus, are furnished to facilitate their recognition and to augment the species diagnoses in identifying a specimen; keys are also provided for species of genera with more than one species.

The descriptive terminology, with the exceptions noted in Mathis (1986b), follows that published in the *Manual of Nearctic Diptera* (McAlpine, 1981). For new species, the descriptive format follows Mathis (1986a, 1986b), with descriptions being composite, not based solely on holotypes. Two venational ratios are used commonly in the descriptions and are defined here (all ratios are averages of three specimens). Costal-vein ratio is the straight line distance between the apices of veins R_{2+3} and R_{4+5}/distance between the apices of R_1 and R_{2+3}. M-vein ratio is the straight line distance along M between crossvein dm-cu and r-m/distance apicad of crossvein dm-cu.

ACKNOWLEDGMENTS.—For reviewing a draft of this paper, I thank W.W. Wirth and I.C. Feller. I am also grateful to David Challinor, former Assistant Secretary for Research, Smithsonian Institution, for financial support to conduct field work through grants from the Research Opportunity Fund. Field work in Belize was facilitated through grants from the Caribbean Coral Reef Ecosystems Program, Klaus Rützler, director, and Marsha Sitnik, administrator. Carrie Bow Cay served as the base for most of the field work in Belize, and I am appreciative of the thoughtful and considerate contributions by numerous station managers on Carrie Bow Cay and Michael R. Carpenter in Washington, D.C. I also thank I.C. Feller, H.B. Williams, and N.D. Mathis, for able assistance and pleasant companionship in the field, and Regina Lewis, former matriarch of Carrie Bow, for her culinary delights and island wisdom. Susann Braden and Victoria Godwin assisted with the preparation of the scanning electron micrographs, and Victor Krantz assisted with production of the photographs. The pen and ink illustrations were inked by Elaine R.S. Hodges. T. Zatwarnicki was particularly helpful in interpreting the structures of the male terminalia of *Garifuna*.

The process of identifying species frequently required direct comparison with primary types. Many of these had to be borrowed, and I thank the following curators and their institutions for allowing me to study this valuable material: Donald Azuma, Academy of Natural Sciences of Philadelphia, Pennsylvania (ANSP); David G. Furth, Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts (MCZ).

Special thanks are extended to Philip J. Clausen, Richard S. Zack, and D.L. Deonier for their efforts to identify species within groups for which they have particular expertise (*Hyadina, Zeros,* and *Hydrellia* respectively).

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Island and Habitat Descriptions

Stoddart et al. (1982a) provided an overview of the cays of the Belizean barrier reef and lagoon. In the summary of this paper, the authors recognized and described 11 types of islands. We sampled the shore-fly fauna from three of these island types, all within the Stann Creek District. The island types and the cays that we sampled are as follows: mangrove cays with dry sand area (Coco Plum Cay, Elbow Cay, Man of War Cay, Wee Wee Cay), overwash mangrove cays (Bread and Butter Cay, Ragged Cay, Saddle Cay, Tobacco Range, Twin Cays), and vegetated sand cays (South Water Cay and Carrie Bow Cay). Below is a brief description of these cays with notes on the major shore-fly habitats found on them. The above-cited work and others that will be noted in the text should be consulted for further details. The cays of the atoll-like islands groups (Glover's Reef, Lighthouse Reed, and Turneffe Islands) are treated together at the conclusion of this section.

Bread and Butter Cay (16°46'N, 88°12'W; Figure 9).—These two small islets, separated by a narrow and fairly shallow channel, are situated west of Wee Wee Cay. Both islets are primarily overwash mangrove cays with a short length (about 12 m) of elevated, sand shore on the channel shore of the northern islet. With the exception of a few black mangrove trees (*Avicennia germinans* (L.)) on the southern islet, red mangrove (*Rhizophora mangle* L.) predominates, and the most abundant plant species comprising the ground cover is *Batis maritima* L., or pickle-weed. Most shore-fly species occur along the strand line of the sandy shore or secondarily on the peat around the pneumatophores of black mangrove. This site was sampled once, in March 1988.

Carrie Bow Cay (Ellen Cay) (16°48'N, 88°05'W; Figures 1–5).—Carrie Bow is a highly disturbed, vegetated, sand cay that is built mostly of sand and some beach rock. The island is small (100 by 40 m), and its beaches have retreated considerably from erosion, especially during hurricanes. The decades of the 1960s and 1970s, for example, saw a decrease in the exposed area of the island from 5,450 sq m (1960) to 3,940 sq m (1972). Beach retreat and erosion, especially at the northern and southern ends, continues, with seasonal sand spits occurring at these ends. The native woodland was cleared, and coconut palms (*Cocos nucifera* L.) were planted, although seedlings of many other plant species continue to germinate. Twenty-two plant species have been recorded, including a few that have been introduced. The beaches at the high-tide mark

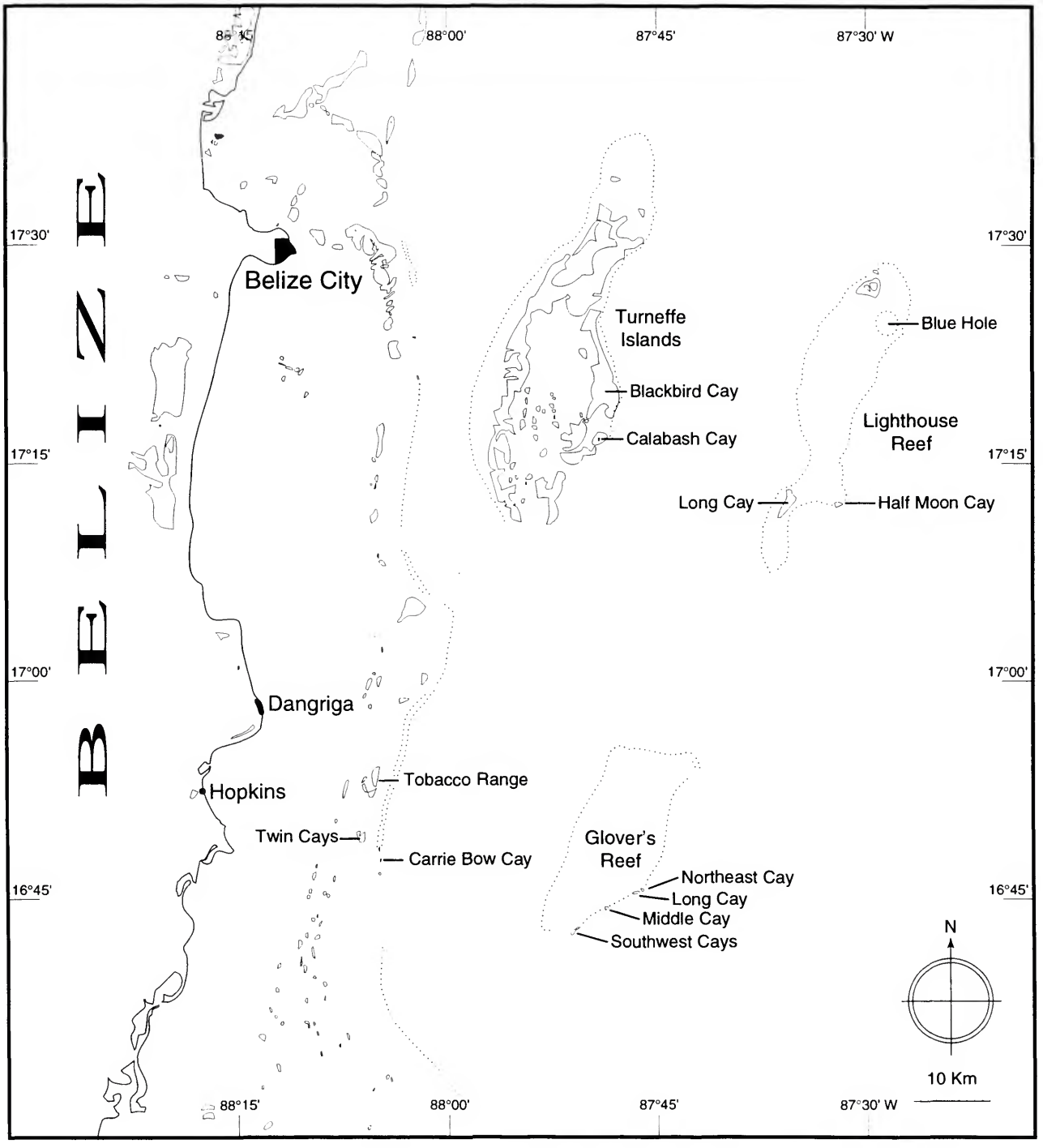


FIGURE 1.—Map of Belizean coast, barrier reef, and atolls between 16°30'N and 17°45'N.

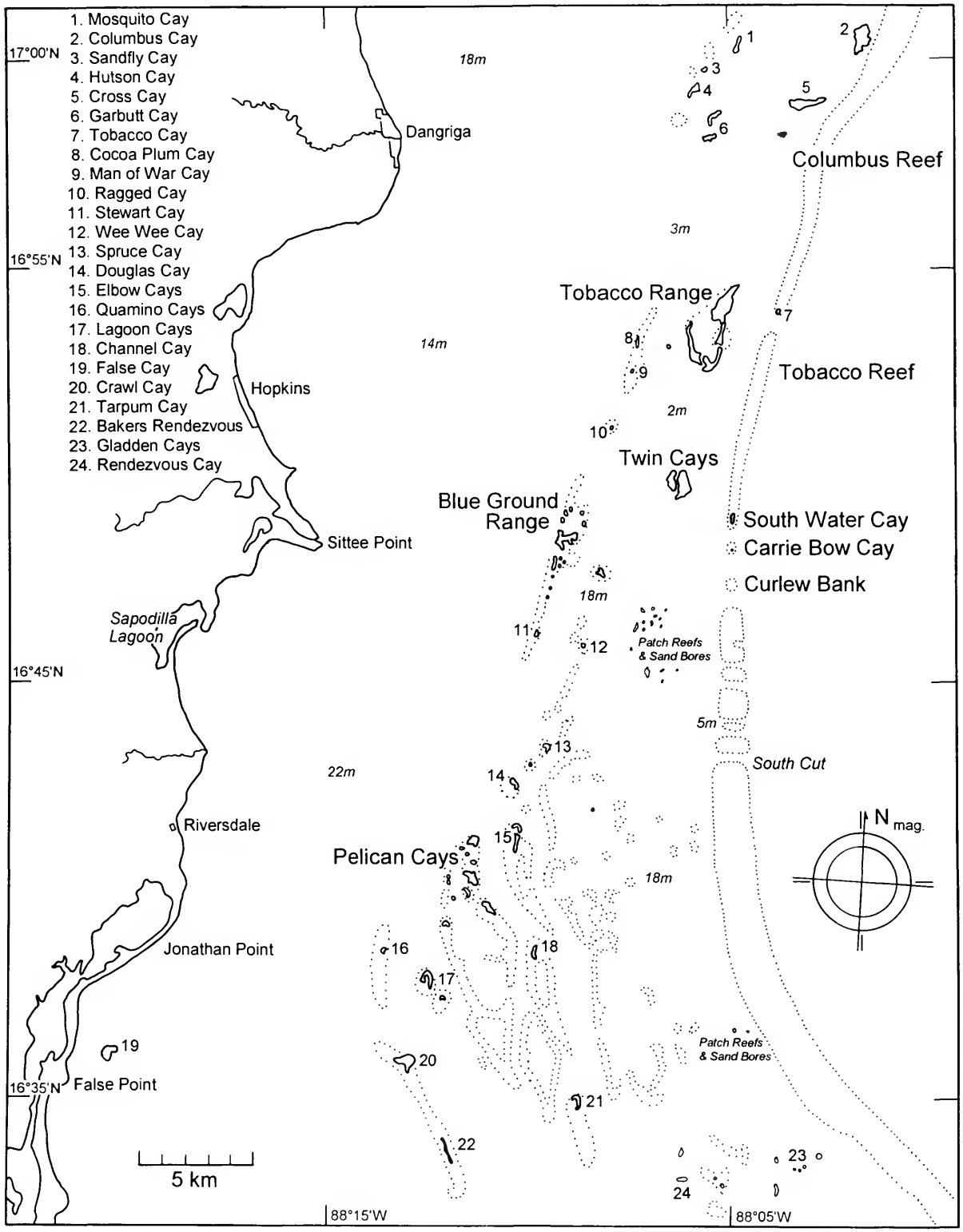


FIGURE 2.—Map of Belizean coast and barrier reef between 16°33'N and 17°01'N.

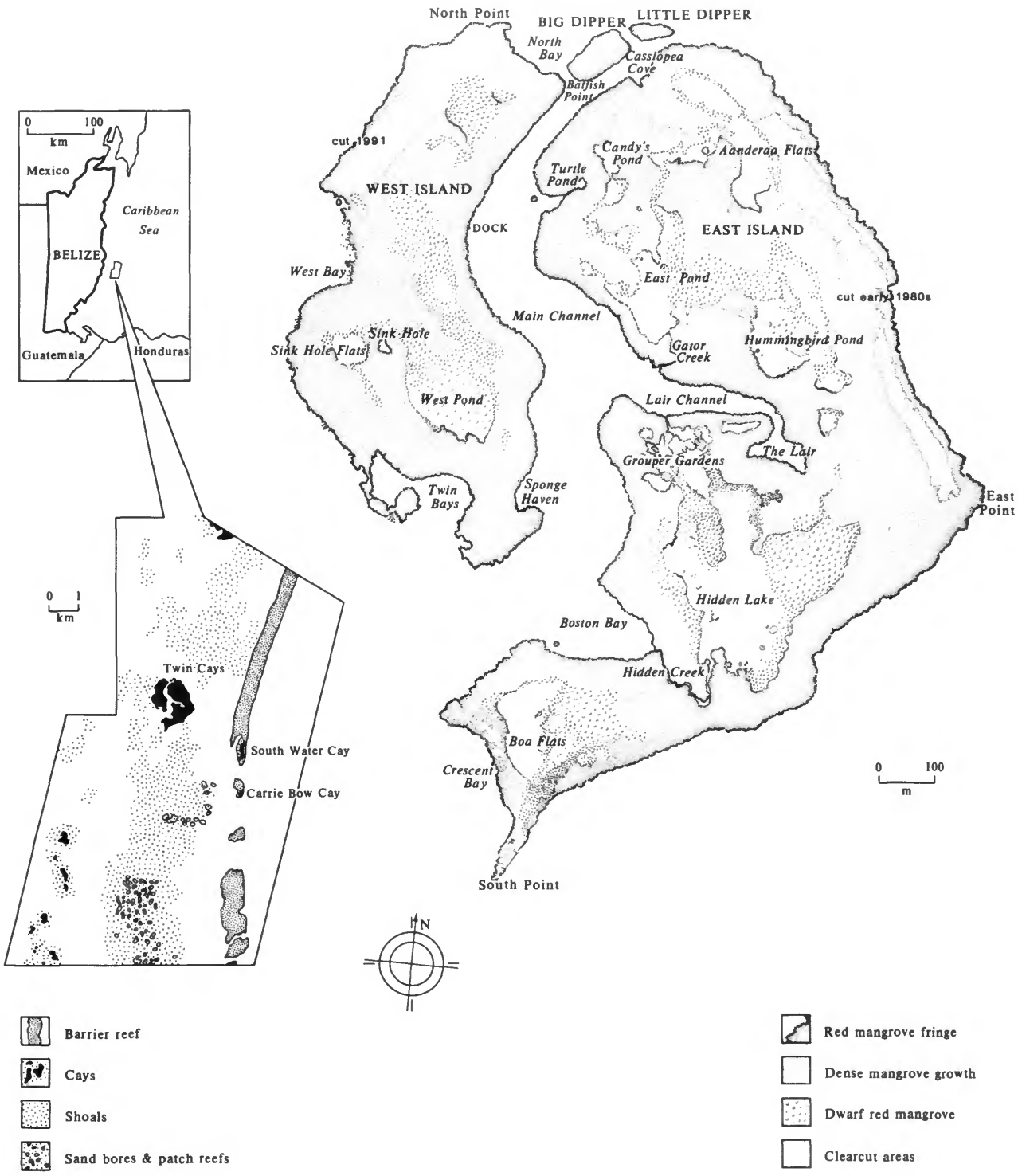
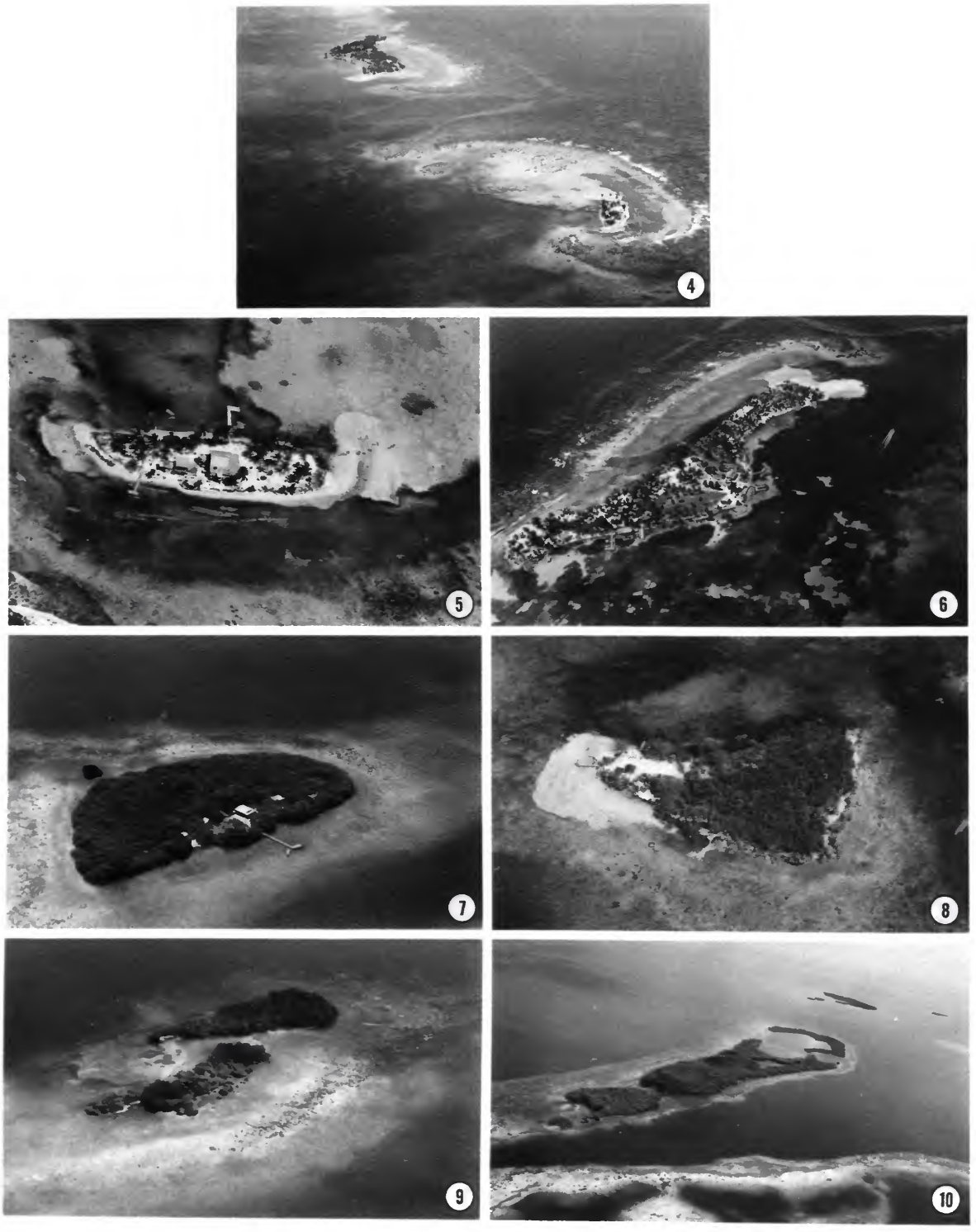
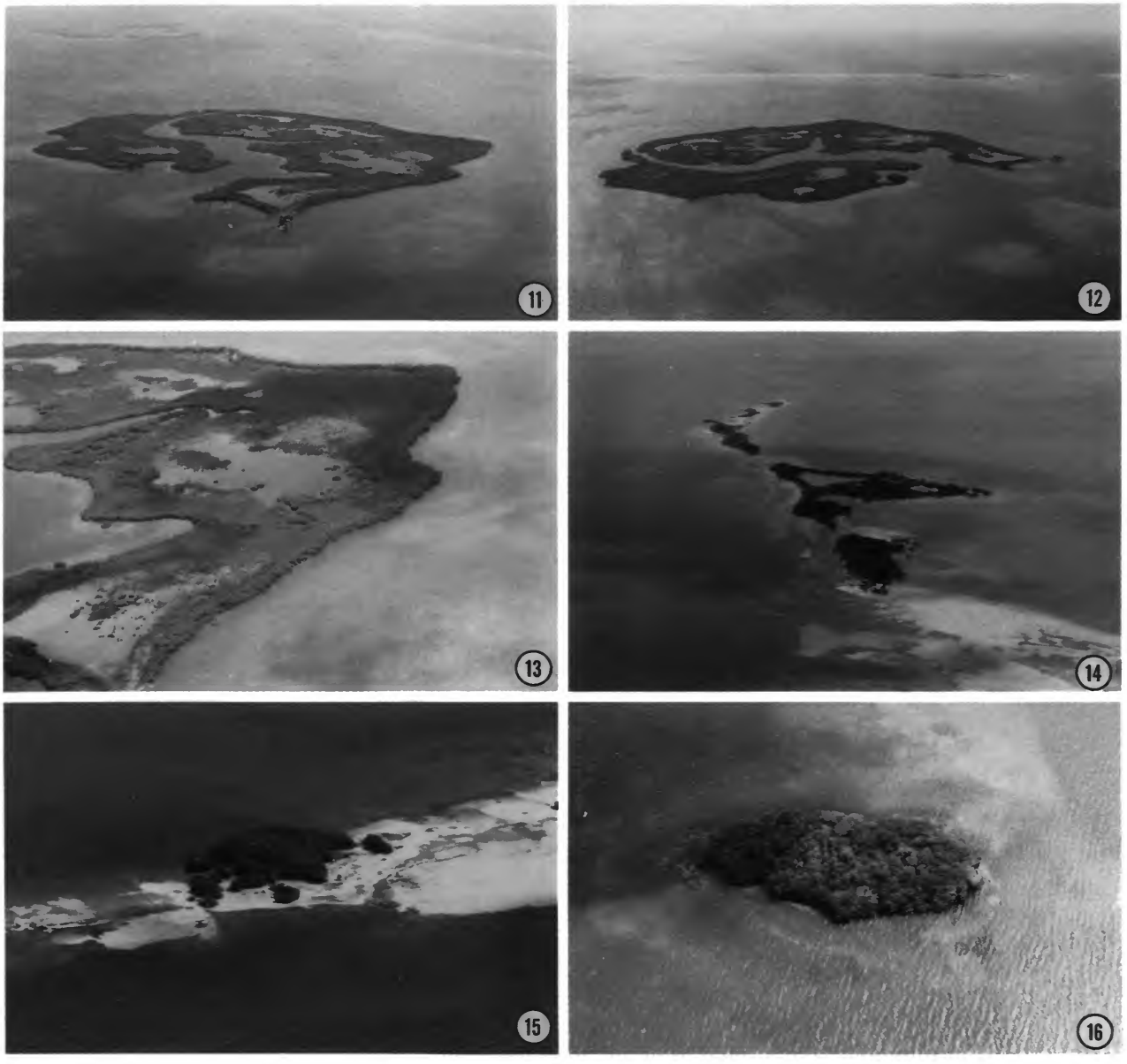


FIGURE 3.—Map of Twin Cays.



FIGURES 4–10.—Aerial photographs of some Belizean Cays from which shore flies were sampled: 4, South Water Cay (left back), Carrie Bow Cay (right front); 5, Carrie Bow Cay; 6, South Water Cay; 7, Wee Wee Cay; 8, Stewart Cay; 9, Bread and Water Cay; 10, Elbow Cay.



FIGURES 11–16.—Aerial photographs of some Belizean Cays from which shore flies were sampled: 11, Twin Cays (southwestern view); 12, Twin Cays (eastward view); 13, East Point of Twin Cays; 14, Coco Plum Cays; 15, Ragged Cay; 16, Man of War Cay.

are frequently littered with a strand line of sea grass and marine algae (*Thalassia* and *Turbinaria* are usually abundant). The species of Ephydridae occurring on Carrie Bow are mostly intertidal and psammophilous, although *Ceropsilopa coquilletti* Cresson is found commonly on a patch of *Suaeda linearis* (Elliott) Moquin, suggesting the possibility that this plant species is a host of this shore fly.

The Smithsonian Institution leases and maintains a biological field station on this cay (established in 1972), which has served as the springboard for field work on Belizean cays. Carrie Bow has become a familiar habitat to many field biologists. Additional details on Carrie Bow are found in a volume dedicated to the natural history of this island and the surrounding marine habitat (Rützler and Ferraris, 1982). The Diptera of Carrie Bow were sampled on numerous occasions on each trip to Belize.

Coco Plum Cay (also known as Cocoa Plum Cay); 16°53′N, 88°07′W; Figure 14).—This linear cay, with a north-south orientation, was divided into three islets by Hurricane Hattie (1961). The leeward side is mostly an elevated, vegetated, sand shore that is relatively xeric. The windward shore is mostly overwash red mangrove with an accumulation of organic and man-made debris, usually as a windrow of sea grass. Seventeen plant species have been recorded from this cay. Three collections were made on Coco Plum Cay: March 1988, July 1989, and June 1990.

Man of War Cay (16°52.5′N, 88°07′W; Figures 2, 16).—This cay is a protected bird rookery where Brown Boobies (*Sula leucogaster* (Boddaert)), magnificent frigate birds (*Fregata magnificens* Mathews), and several other species nest. It is small (120 by 40 m) and is a mangrove cay with a partially dry, sandy berm on the leeward side and a shallowly depressed, peat interior. Vegetation is comparatively luxuriant, as would be expected with the additional nutrients (guano), but only six species of plants have been recorded from the cay. The fringe of the island is mostly red mangrove, but the interior is predominantly black and white mangrove (*Laguncularia racemosa* (L.) Gaertn.f.). Numerous microhabitats occur on Man of War, and the fauna of shore flies, with 20 species, is comparatively rich. This cay was sampled five times: June 1985, November 1987, March 1988, July 1989, and June 1990.

Ragged Cay (Round Cay) (16°53′N, 88°07′W; Figures 2, 15).—This cay lies near the southern tip of Coco Plum Cay (the two are separated by a small channel) and is primarily an overwash mangrove cay with a short section of sandy shore in a small cove on the windward side. The cove, which is somewhat protected, has a windrow of *Thalassia,* such as described under Twin Cays. This cay is a rookery for several species of birds. It was sampled once, in March 1988.

Elbow Cay (Saddle Cay) (16°44′N, 88°08.5′W; Figures 2, 10).—This is a linear mangrove cay located in the central lagoon of the barrier reef. The cay has a north-south orientation and is approximately 0.65 km in length. On the northern one-third is a fairly deep lagoon. We sampled the sand ridge and shore within a small inlet that is located at the northern tip. The wrecked hull of a wood/fiberglass boat had washed ashore and was partially buried in the sand. Considerable organic debris had accumulated around and in the hull. I am not aware of any botanical survey of this cay. This cay was sampled twice: March 1988 and July 1989.

South Water Cay (16°49′N, 88°05′W; Figures 2–4, 6).—This cay, with an area of nearly 6.5 ha, is the largest inhabited sand cay of the barrier reef. It is much longer than wide (~650 by 50 to 175 m) and has a north-south orientation. Like Carrie Bow, the island is highly disturbed, although considerably more vegetation remains, especially as ground cover, and over 75 species of plants have been recorded. The cay was sampled once, in June 1985.

Stewart Cay (16°47′N, 88°10′W; Figures 2, 8).—This cay lies off the southern tip of the Blue Ground Range and is a mangrove cay with a dry and elevated sand perimeter. The shallowly depressed interior, which mostly comprises a muddy-peat substrate, has a layer of blue-green algae and is the primary habitat for species of shore flies. The cay was sampled twice: November 1987 and March 1988.

Tobacco Range (16°53′N, 88°05′W; Figure 2).—Tobacco Range comprises an elliptical array of several overwash mangrove islands around a shallow central lagoon. Some of the islands have a seaward sand ridge. The range is approximately 4.8 km long on a north-south axis and 1.8 km wide. Stoddart et al. (1982a) surveyed the largest northeastern island in 1972 and recorded 30 species of plants. We sampled shore flies on one visit from a single mangrove island near the middle on the seaward side, where we found an exposed and bare sand spit and a small but well-protected inlet that had an accumulation of organic debris, primarily decomposing leaves from the surrounding red and white mangrove trees. This cay was sampled once, in July 1989.

Twin Cays (Water Range) (16°50′N, 88°06′W; Figures 1–3, 11–13).—The shore-fly fauna of the islets comprising Twin Cays was the primary focus of this study and was sampled more extensively than the others. Twin Cays are covered mostly with mangrove, with red mangrove the dominant species. The fringe of most of the islets is entirely red mangrove, and the interior woodland is a mixed mangrove swamp (scrub red mangrove with patches of white and black mangrove) around shallow, interior lagoons or ponds. A sand patch, measuring approximately 100 by 18 m, is located at the southern end of the east or seaward islet, and a fisherman's camp has been established there. Twenty plant species have been recorded from Twin Cays. Like Carrie Bow Cay, Twin Cays was sampled numerous times on each visit to Belize.

Although numerous shore-fly habitats exist on Twin Cays, three are exceptional in the diversity and abundance of shore flies that are associated with them and are more completely described here. The first habitat is at the eastern margin of Aanderaa Flats (Figure 3; weather station), around the shore of the brackish-water pool. The exposed mud banks there are covered with a comparatively thick mat of blue-green algae. The longest bank, some 50 m in length, is at the extreme southeastern shore and, depending on the tide, has a width of three to five meters. The other bank is at the easternmost margin and is approximately 25 m in length and five to eight meters in width. The surface of the mud is broken by deep cracks that have divided the bank into irregularly shaped, mud plates 15–25 cm in diameter. The edges of the larger plates are slightly upturned. The vegetation immediately behind and extending a short distance onto the mud bank is pickle-weed; behind the pickle-weed is red mangrove.

The second shore-fly habitat occurs along the southern margin of West Pond (Figure 3; interior of southern half of

West Island). There, algal mats have accumulated in the calmer, more protected coves or against large obstacles near the shoreline, such as fallen trunks of trees. The mats are apparently ephemeral, being rather easily broken by the wind, especially when the wind drives the mats against the slender branches and prop roots of the scrub red mangrove. Leaf debris from red mangrove is sometimes intermixed within the mats.

The third habitat is found at West Bay (Figure 3; West Island) along the somewhat protected northwestern shore. A large windrow of dead sea grass, primarily *Thalassia,* has accumulated at the high-tide level. The windrow is approximately 60 m in length and has a width of three to six meters. The accumulation, especially the material below the surface, has begun to decompose and possibly to ferment, and the site probably attracts shore flies that are seeking food and ovipositional sites. The size of the decomposing sea grass varied from whole leaves to very finely ground particles. The latter comprised more than one-half of the windrow.

Wee Wee Cay (16°46′N, 88°08.5′W; Figures 2, 7).—Wee Wee Cay, which is approximately 6.5 km southwest of South Water Cay, is situated within the barrier reef lagoon of the Belize Barrier Reef (Caribbean). It is roughly triangular with sides 90–140 m long (Stoddart et al., 1982a). The fringe of the cay is a dense stand of red mangrove, especially the eastern fringe, but the tallest vegetation just inside the red mangrove fringe is a large stand of buttonwood mangrove (*Conocarpus erectus* L.) and a few coconut, with the southern one-fourth of the island extensively covered by black mangrove. The interior of the northern one-half of the cay has been cleared of vegetation and toward the northern end is a large area (30 m in diameter) of moist to muddy substrate covered with a mat of blue-green algae. After heavy rains a shallow pool of fresh water covers the area. This habitat has been decimated (drained, dried, and covered by a layer of sand) with development of this cay as a biological field station. Previously the cay was used occasionally as a fishing camp. Wee Wee was sampled four times: January and November 1987, March 1988, and July 1989.

Glover's Reef (16°45′N, 87°50′W; Figure 1).—Stoddart et al. (1982b) most recently described the cays of Glover's Reef, and most of the information provided here was extracted from that paper. The site is an elongate, rectangular atoll, about double the distance from the mainland as the Belizean barrier reef. The sea on the eastern side of Glover's falls sharply to a depth of over 1000 m, but on the western side, between the atoll and the barrier reef, the sea floor comprises shallow saddles at depths of 300–400 m. The surface reefs stand on a subsiding base (1–2 cm/1000 yr) of fault-block structures. The reef has an area of 260 sq km and is up to 32 km long and 12 km wide. The lagoon that is enclosed by the reefs contains some 700 patch reefs, and six small cays, the only extant islands on the atoll, are on the southeastern reefs. Only five of these islands are sizeable, 360 to 600 m in length, and we visited four of them (Northeast Cay, Long Cay, Middle Cay, and Southwest Cay I) in July of 1989. The fifth island, Southeast Cay II, was recently developed into a fishing and diving resort and is now highly disturbed. The cays are similar in usually having the seaward shore more elevated and covered with rubble from the reef, whereas the lagoon shore is lower and more sandy. Frequently the interior of the islands and sometimes the south side is lower and has mudholes (Northeast Cay) or a swamp (Middle Cay and Southwest Cay II). The number of plant species recorded from the islands varies between 22 and nearly 45, with greater diversity on cays that are not regularly inhabited (Northeast Cay, Middle Cay, and Southwest Cay I). Coconuts have been cultivated on some of the cays, Long Cay in particular, and most of the islands are partially to mostly covered with coconut woodlands. Only Middle Cay and Southwest Cay have any remaining stands of red mangrove.

Lighthouse Reef (17°07′–17°28′N, 87°27′–87°36′W; Figure 1).—Stoddart (1962) provided the most recent information on Lighthouse Reef (Figure 1) and Turneffe Islands (Figure 1), although his review is now over 30 years old. As Stoddart noted, the flora and fauna of these island groups are very "imperfectly known." Lighthouse Reef is located directly east of Turneffe Islands (separated by a channel of about 25 km) and is the smallest of the atoll-like island groups of Belize with a maximum length of 35 km and a width that varies between three and seven and one-half kilometers. The group covers an area of approximately 78.5 square miles. Field work on Lighthouse Reef was limited to Half Moon Cay (17°12′N, 87°31′W), where I spent less than two hours. The eastern one-third of Half Moon Cay is a narrow peninsula that has been cleared of native vegetation and planted with coconut. The western two-thirds remains high forest, including a dozen species of trees and shrubs, with *Cordia sebestena* L. being the dominant tree. Half Moon Cay is now a protected rookery, especially for boobies, and is presently administered by the Audubon Society.

Turneffe (17°09′–17°38′N, 87°44′–87°57′W; Figure 1).—This site is a lens-shaped, atoll-like group of islands that covers approximately 205 square miles and is the largest such group beyond the barrier reef of Belize. Its maximum length is 49 km, and its width is between eight and 10 km, with a greatest width of 16 km. The eastern or windward side is mostly a dry sand ridge and was the only side that was sampled. The sand ridge has a height of one to two meters, is relatively sparsely vegetated, dominated by planted coconuts, and has a maximum width of 200 m. The ridge gradually sinks westward with the coconuts giving way to mostly tall red mangrove and some black mangrove, with the former eventually forming a broad belt in standing water. Collections of shore flies were mostly from Blackbird (17°19′N, 87°48′W) and Calabash (17°17′N, 87°48′W) cays, with brief stops, usually less than two hours, to sample the fauna on Soldier (17°20′N, 87°47′W), Pelican (17°24′N, 87°48′W), and Rope Walk (17°13′N, 87°51′W) cays.

Systematics

Key to Subfamilies of Ephydridae

1. Fronto-orbital setae lateroclinate [Figures 242–243]; median facial area and lower facial margin usually setose, the latter often with long setae [Figures 249–250, 256]; insertions of facial series of setae convergent above. Subcranial cavity large and cavernous . . . . . **EPHYDRINAE** Zetterstedt

   Fronto-orbital setae reclinate and/or proclinate [Figures 57–59]; median facial area and lower facial margin without setae; facial setae inserted in more or less vertical series, parallel with parafacial. Subcranial cavity small to large 2

2. Presutural or sutural dorsocentral seta inconspicuous or absent [Figures 22, 25, 92] . . . . . **GYMNOMYZINAE** Latreille

   Presutural or sutural dorsocentral seta present, conspicuous [Figures 210, 212, 244] 3

3. Fronto-orbital setae conspicuous, well developed, mostly reclinate and/or proclinate [Figures 205, 206, 221–223]. Prescutellar acrostichal setae present, well developed [Figures 227, 228] . . . . . **HYDRELLIINAE** Robineau-Desvoidy

   Fronto-orbital setae either lateroclinate and inconspicuous, or lacking [Figures 234, 235]. Prescutellar acrostichal setae lacking [Figure 236] . . . . . **ILYTHEINAE** Cresson

Subfamily GYMNOMYZINAE Latreille

Key to Tribes and Genera of Gymnomyzinae Occurring on Belizean Cays

1. Arista bare to macropubescent, if pectinate, hairs shorter than 1/2 width of 1st flagellomere 2

   Arista pectinate dorsally, hairs longer than 1/2 width of 1st flagellomere 6

2. Posterior margin of gena sharply angulate; body extensively shiny black, although with some gray to whitish microtomentum on dorsum; a single notopleural seta, inserted near posterior angle (GYMNOMYZINI, in part) 3

   Posterior margin of gena broadly rounded onto occiput; body densely invested with microtomentum, generally dull colored; usually with 2 notopleural setae, posterior seta inserted at level above anterior seta (LIPOCHAETINI) 4

3. Forefemur unarmed, lacking row of stout setae along posteroventral surface on apical 1/4; outer vertical seta absent; mesonotum with several setae in oblique row between postalar seta and base of scutellum . . . . . ***Placopsidella*** Kertész

   Forefemur bearing 5–10 stout setae along posteroventral surface at apical 1/3 [Figure 38]; both inner and outer vertical setae present; mesonotum lacking setae between postalar seta and base of scutellum . . . . . ***Mosillus*** Latreille

4. Antennae in deep cavities, separated by almost twice their length; arista rudimentary, truncate; inner and outer vertical setae indistinguishable . . . . . ***Lipochaeta*** Coquillett

   Antennae at most in shallow cavities, separated from one another by much less than their length; arista normal; inner and outer vertical setae distinct 5

5. Eye pyriform, strongly narrowed below [Figure 86] . . . . . ***Glenanthe*** Haliday

   Eye round to oval . . . . . ***Paraglenanthe*** Wirth

6. Foreleg raptorial, with forefemur greatly enlarged and foretibia ended in a large spur (OCHTHERINI) . . . . . ***Ochthera*** Latreille

   Foreleg normal, forefemur slender, foretibia not ended in a large spur 7

7. Posterior margin of gena sharply angulate; gena with fine pale setulae 8

   Posterior margin of postgena meeting occiput at obtuse and broadly rounded angle; postgena usually with coarse black setulae 9

8. Scutellum with 2 pairs of marginal setae; body mostly shiny black (GYMNOMYZINI, in part) . . . . . ***Athyroglossa*** Loew

Scutellum with 3 pairs of marginal setae; body mostly dull, whitish to grayish (HECAMEDINI, in part) . . . . . ***Hecamede*** Haliday

9. Posterior notopleural seta inserted much farther dorsad from notopleural suture than anterior seta 10

Anterior and posterior notopleural setae both inserted near ventral notopleural suture 13

10. Wing at tip of vein R_{4+5} slightly pointed; area immediately adjacent to crossvein dm-cu infuscate (ATISSINI, in part) 11

Wing rounded at apex; crossvein dm-cu lacking infuscation (HECAMEDINI, in part) 12

11. Face conically prominent well above lower facial margin, bearing submedian pair of anaclinate setae . . . . . ***Ptilomyia*** Coquillett

Face most prominent very near lower facial margin, lacking submedian pair of anaclinate setae . . . . . ***Atissa*** Haliday

12. Shiny, black species; face with silvery spots and lines . . . . . ***Diphuia*** Cresson

Dull, microtomentose species; face not maculate . . . . . ***Allotrichoma*** Becker

13. Prescutellar acrostichal setae small (about 1/2 to 2/3 length of posterior dorsocentral seta), close together (distance between them about 1/2 that between prescutellar acrostichal seta and posterior dorsocentral seta on same side) and aligned even with or behind intra-alar seta; reclinate fronto-orbital seta usually inserted slightly anterior to larger, proclinate fronto-orbital seta (DISCOCERININI) 14

Prescutellar acrostichal setae large (subequal to posterior dorsocentral seta), widely separated (distance between them subequal to that between prescutellar acrostichal seta and posterior dorsocentral seta on same side) and usually anterior to level of intra-alar seta; reclinate fronto-orbital seta usually inserted behind larger, proclinate fronto-orbital seta 16

14. Face with secondary series of dorsolaterally inclined setae laterad to primary series . . . . . ***Polytrichophora*** Cresson

Face with secondary series of setae lacking or suggested only by medially inclined setulae 15

15. Gena and lower part of parafacial broad; lateral margin of abdomen usually with gray to whitish microtomentose areas, these usually wedge shaped . . . . . ***Hydrochasma*** Hendel

Gena and parafacial rather narrow; abdomen lacking wedge-shaped, light-colored areas laterally . . . . . ***Discocerina*** Macquart

16. A postsutural supra-alar seta present, size subequal to presutural supra-alar seta (DISCOMYZINI, in part) 17

A postsutural supra-alar seta much reduced (size subequal to surrounding setulae) or absent 18

17. Mesofrons bearing strong pair of interfrontal setae inserted well in front of ocellar setae; fronto-orbital setae comprising 1 large and 1 small, posterior, lateroclinate setae and 2 large proclinate anterior setae . . . . . ***Paratissa*** Coquillett

Mesofrons lacking interfrontal setae; fronto-orbital setae proclinate and reclinate, but not lateroclinate . . . . . ***Guttipsilopa*** Wirth

18. Pseudopostocellar seta moderately well developed, slightly less than 1/2 as long as ocellar seta (DISCOMYZINI, in part) . . . . . ***Clasiopella*** Hendel

Pseudopostocellar seta very weak, at most 1/3 as long as ocellar seta (PSILOPINI) 19

19. Antenna with pedicel long, gradually conical, broader apically, without dorsoapical lobe, with dorsoapical spine weak and at most 1/3 as long as 1st flagellomere; 1st flagellomere from two to four times as long as wide . . . . ***Ceropsilopa*** Cresson

Antenna with pedicel short and subtriangular, with dorsoapical lobe, with dorsoapical spine strong and at least 1/2 as long as 1st flagellomere; 1st flagellomere at most two times as long as wide . . . . . ***Leptopsilopa*** Cresson

Tribe GYMNOMYZINI Latreille

Genus *Athyroglossa* Loew

Athyroglossa Loew, 1860:12 [type species: *Notiphila glabra* Meigen, 1830, by monotypy].

1. *Athyroglossa (Athyroglossa) glaphyropus* Loew

FIGURES 17–27

Athyroglossa glaphyropus Loew, 1878:197.—Wirth, 1968:3 [Neotropical catalog]; 1970:318 [review].

Ochtheroidea glaphyropus.—Thaxter, 1917:680–681 [generic combination, parasite: *Stigmatomycetes compressus* Thaxter].—Cresson, 1918:61 [review].—Cresson, 1922:340–341 [revision].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Man of War Cay, Nov 1987, Mar 1988, W.N. and D. Mathis (17♂, 6♀); Wee Wee Cay, Mar 1988, W.N. Mathis (1♂, 6♀).

DISTRIBUTION.—Nearctic: USA (AL, DC, FL, GA, IA, IL, LA, MD, NY, PA, SC, TX, VA). Neotropical: Argentina, Belize, Bolivia, Brazil, Costa Rica, Guatemala, Guyana, Mexico (COL, NAY, SLP, TAB), Panama, Peru, Trinidad, West Indies (Jamaica, Puerto Rico, St. Croix, St. Vincent).

NATURAL HISTORY.—All specimens from Man of War Cay were collected by sweeping immediately above multiple layers of leaf debris from red mangrove. The debris had accumulated at the strand line just above the high tide zone.

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: halter pale, mostly whitish; face (Figure 20) narrow, evenly arched in lateral view, smooth and shiny; foreleg (Figure 26), except tarsomeres, black; all femora black; mid and hind tibiae yellowish to ochraceous; wing hyaline, immaculate.

Genus *Mosillus* Latreille

Mosillus Latreille, 1804:196 [type species: *Mosillus arcuatus* Latreille, 1805 (= *Syrphus subsultans* Fabricius, 1794), by subsequent monotypy, Latreille, 1805:390].

2. *Mosillus stegmaieri* Wirth

FIGURES 28–44

Mosillus stegmaieri Wirth, 1969:147 [key, figures].—Mathis et al., 1993:11–15 [revision].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Carrie Bow Cay, Jun 1985, Mar 1988, Jul 1989, Jun 1990, W.N. Mathis, H.B. Williams (35♂, 77♀); Coco Plum Cay, Jul 1989, W.N. Mathis (1♂, 1♀); Man of War Cay, Jun 1990, H.B. Williams (1♂, 2♀); Round Cay (near Coco Plum Cay), Mar 1988, W.N. Mathis (1♂, 2♀); Twin Cays (south end of East Island), Mar 1988, Jul 1989, W.N. Mathis, H.B. Williams (6♂, 2♀); Wee Wee Cay, Mar 1988, W.N. Mathis (7♂, 2♀).

DISTRIBUTION.—Nearctic: Bermuda, USA (AL, FL, GA, NC, NJ, TX). Neotropical: Bahamas, Belize, Ecuador, Mexico (CHI, NAY, SIN, YUC), Venezuela, West Indies (Barbuda, Dominican Republic, Grand Cayman, Jamaica, Puerto Rico, Virgin Islands).

NATURAL HISTORY.—The sites where this species occurs are primarily associated with people, especially man-made debris; perhaps this species could serve as an indicator of this type of disturbance and pollution.

DIAGNOSIS.—Three species of *Mosillus* are known from the Western Hemisphere, and this species differs from the other two by the following combination of external characters: face (Figures 28, 33), including antennal grooves, extensively microtomentose; parafacial (Figure 34) with one vertically elongate microtomentose area that is acutely pointed ventrally, length of microtomentose area much greater than antenna; posterodorsal portion of anepisternum (Figure 37) densely microtomentose, whitish gray; scutellum (Figure 35) with only two setae on each side that arise from basal tubercles; fifth tergite with dorsomedial area densely microtomentose.

Genus *Placopsidella* Kertész

Placopsidella Kertész, 1901:424 [type species: *Placopsidella cynocephala* Kertész, by monotypy].

3. *Placopsidella cynocephala* Kertész

FIGURES 45, 46

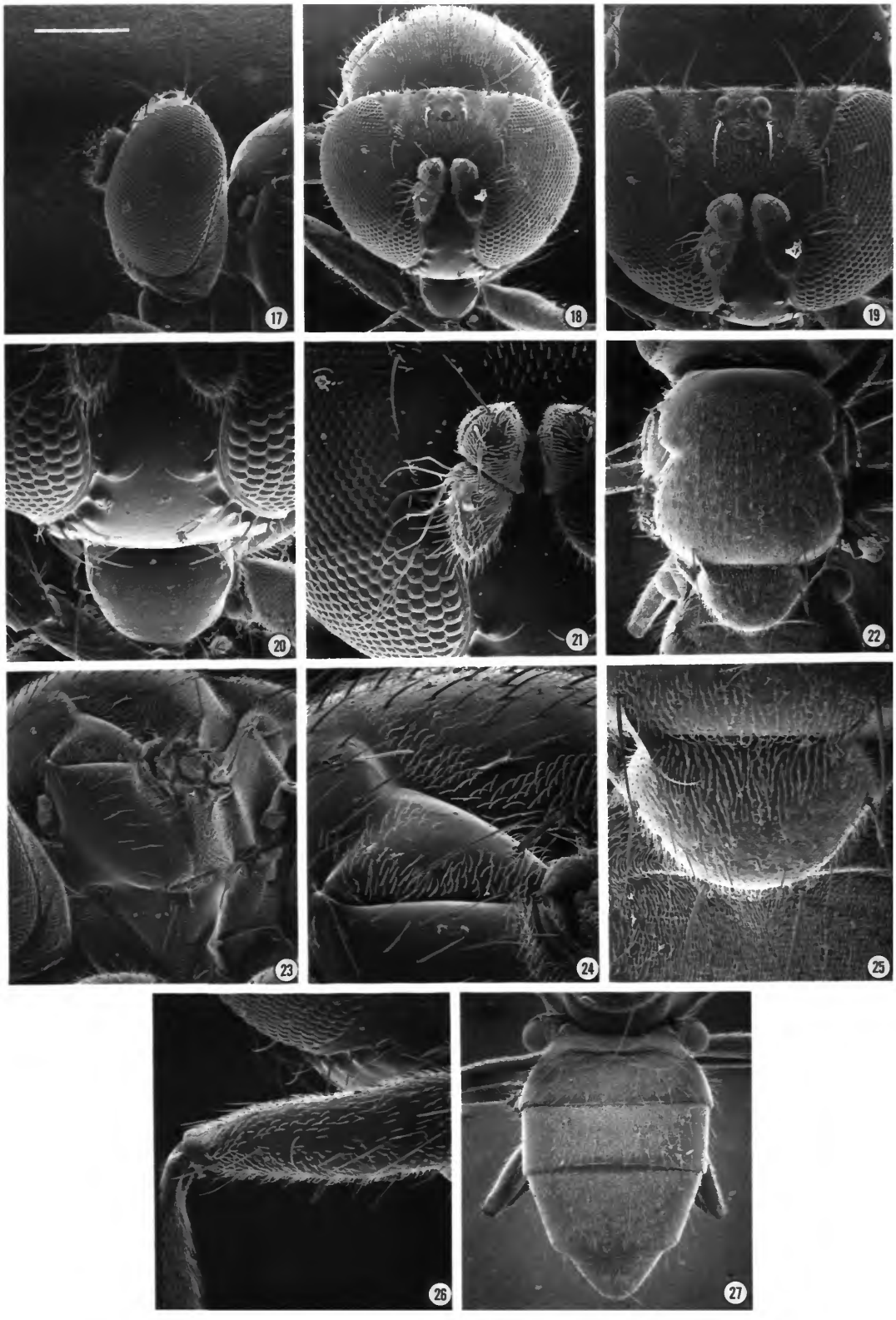
Placopsidella cynocephala Kertész, 1901:425.—Kirk-Spriggs, 1986:481–485 [puparium, biology].—Mathis, 1986b:8–11 [revision].

SPECIMENS EXAMINED.—BELIZE. Belize District: Lighthouse Reef: Half Moon Cay (17°12'N, 87°31'W), Mar 1992, W.N. Mathis (2♂, 1♀).

DISTRIBUTION.—Australasian/Oceanian: Australia (QLD), Belau, Gilbert Island, Guam, Kiribati, Micronesia, Papua New Guinea (Bismarck Archipelago, New Guinea). Neotropical: Belize, Tobago, West Indies (Dominican Republic, Grand Cayman, Puerto Rico). Oriental: Indonesia (Java, Simeulue), Malaysia, Philippines.

DIAGNOSIS.—This is the second species of *Placopsidella* now known from the Western Hemisphere, the first being *P. grandis* (Cresson). The former is distinguished from congeners, especially *P. grandis*, by the following combination of characters: larger size (1.9–3.2 mm); elongate facial carina (not tuberculate); position of the ocellar setae (inserted immediately

FIGURES 17–27.—Scanning electron micrographs of *Athyroglossa (Athyroglossa) glaphyropus* (Belize, Stann Creek District, Man of War Cay; scale length in parenthesis; scale bar for all photographs = Figure 17): 17, head, lateral aspect (250 μm); 18, same, anterior aspect (250 μm); 19, frons, anterodorsal aspect (176 μm); 20, face, anteroventral aspect (100 μm); 21, antenna, anterior aspect (100 μm); 22, mesonotum, dorsal aspect (0.27 mm); 23, pleura, lateral aspect (200 μm); 24, notopleuron, lateral aspect (86 μm); 25, scutellum, dorsal aspect (120 μm); 26, forefemur, anterior aspect (100 μm); 27, abdomen, dorsal aspect (0.30 mm).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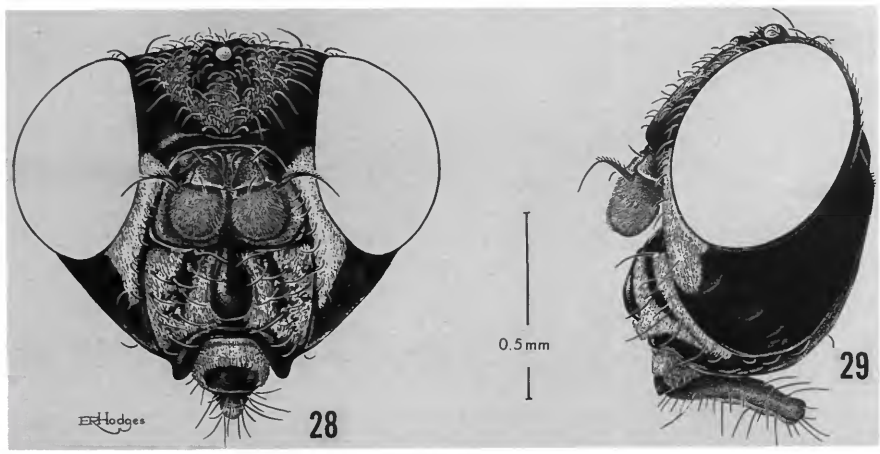
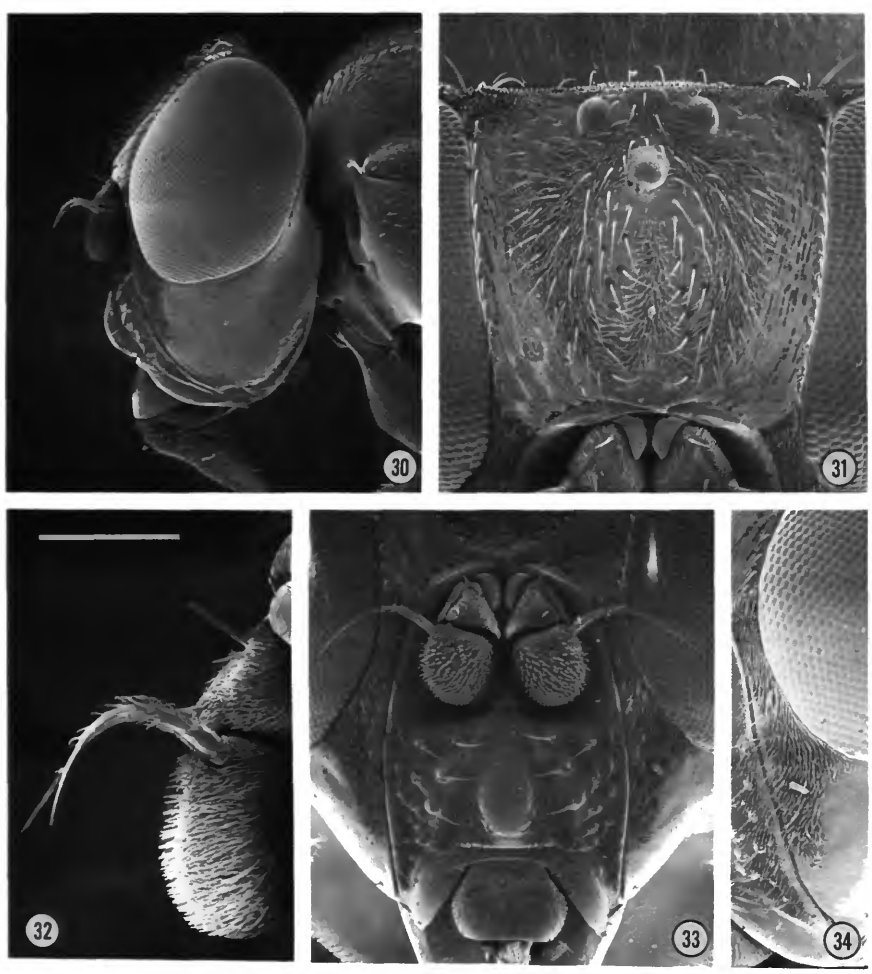
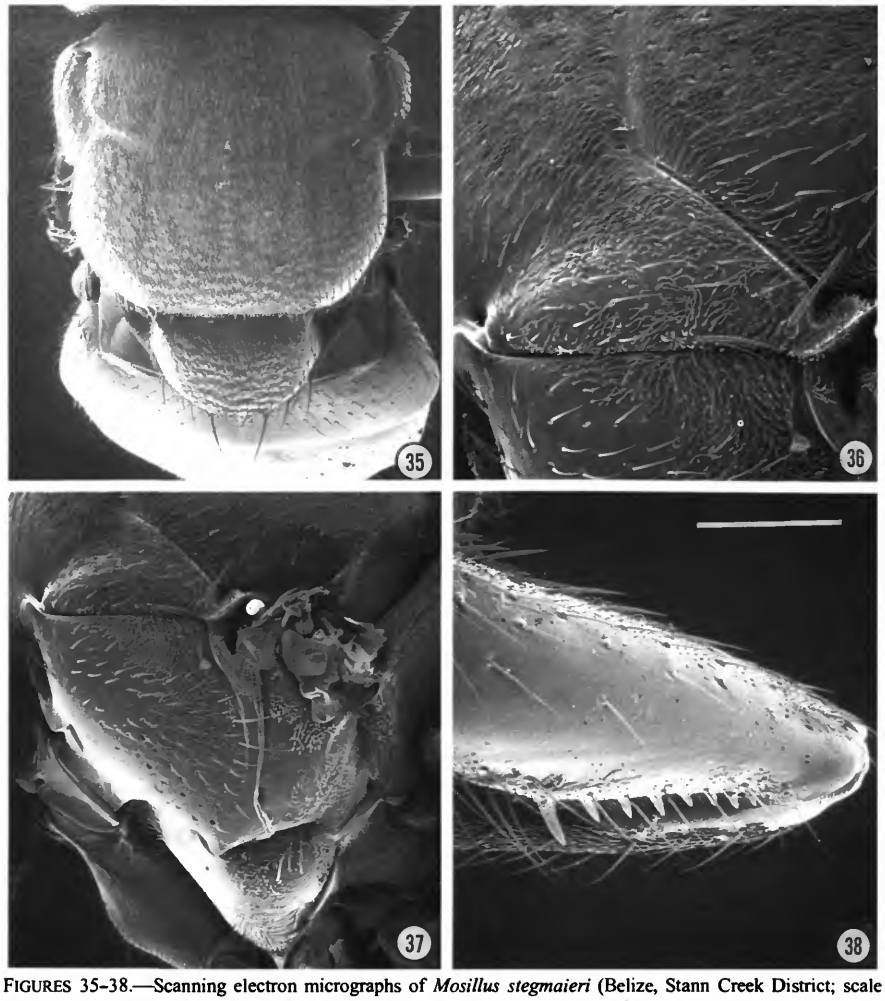


FIGURES 28, 29.—*Mosillus stegmaieri:* 28, head, anterior aspect; 29, same, lateral aspect.



FIGURES 30–34.—Scanning electron micrographs of *Mosillus stegmaieri* (Belize, Stann Creek District; scale length in parenthesis; scale bar for all photographs = Figure 32): 30, head, lateral aspect (0.38 mm); 31, frons, dorsal aspect (200 μm); 32, antenna, lateral aspect (100 μm); 33, face, anterior aspect (250 μm); 34, parafacial, anterior aspect (231 μm).



FIGURES 35–38.—Scanning electron micrographs of *Mosillus stegmaieri* (Belize, Stann Creek District; scale length in parenthesis; scale bar for all photographs = Figure 38): 35, mesonotum, dorsal aspect (0.43 mm); 36, notopleuron, lateral aspect (150 μm); 37, pleura, lateral aspect (0.27 mm); 38, forefemur, posterior aspect (136 μm).

in front of the anterior ocellus, not far forward, beyond anterior one-half of frons); uniformly and moderately dense microtomentum on the forefemur (not with anterior one-half distinctly more densely microtomentose); pleural areas uniformly microtomentose, lacking distinct patches or stripes; the wide scutellum (as wide or wider than long); and the distinctive conformation of the male terminalia (Figures 45, 46).

REMARKS.—The discovery of this species on Half Moon Cay (Lighthouse Reef) was a surprise, and undoubtedly its occurrence there is adventive, perhaps as a recent introduction. It was known previously only from the Oriental and Australasian/Oceanian regions.

Its occurrence on Belizean cays was unanticipated because *Placopsidella* is essentially an Old-World genus, with all known species occurring there. The only species also in the New World, apparently by introduction, are *P. grandis* in Panama and the United States (coastal Maryland and Virginia; Mathis, 1986b, 1988) and now *P. cynocephala* in Belize.

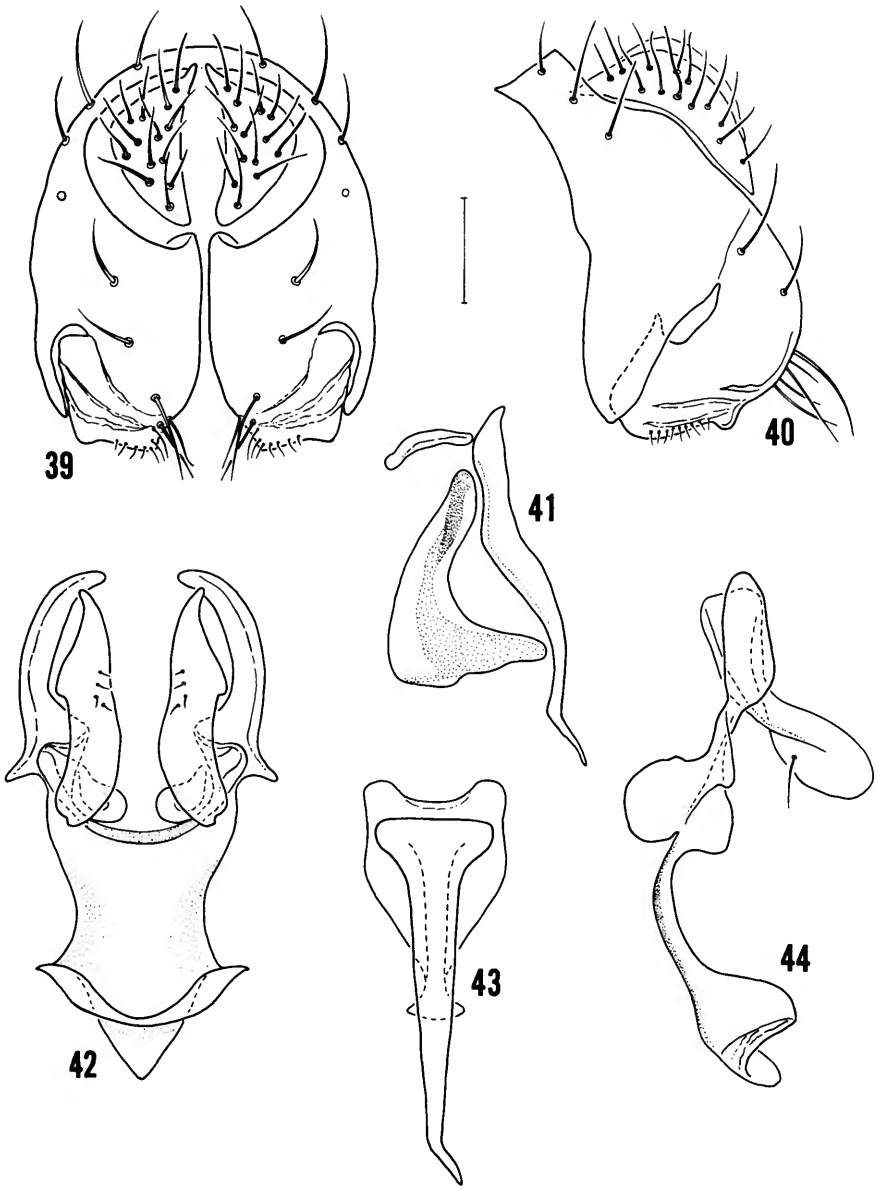
Tribe GASTROPINI Cresson

Genus *Gastrops* Williston

Gastrops Williston, 1897:3 [type species: *Gastrops niger* Williston, 1897, by monotypy].

4. *Gastrops niger* Williston

Gastrops niger Williston, 1897:3.—Bokerman, 1957:231–232 [host: egg cluster of frog *Physalaemus cuvieri* Fitzinger (Leptodactylidae)].—Wirth, 1958:249–250 [review]; 1968:19 [Neotropical catalog].—Lizarralde de Grosso, 1984:72 [review].

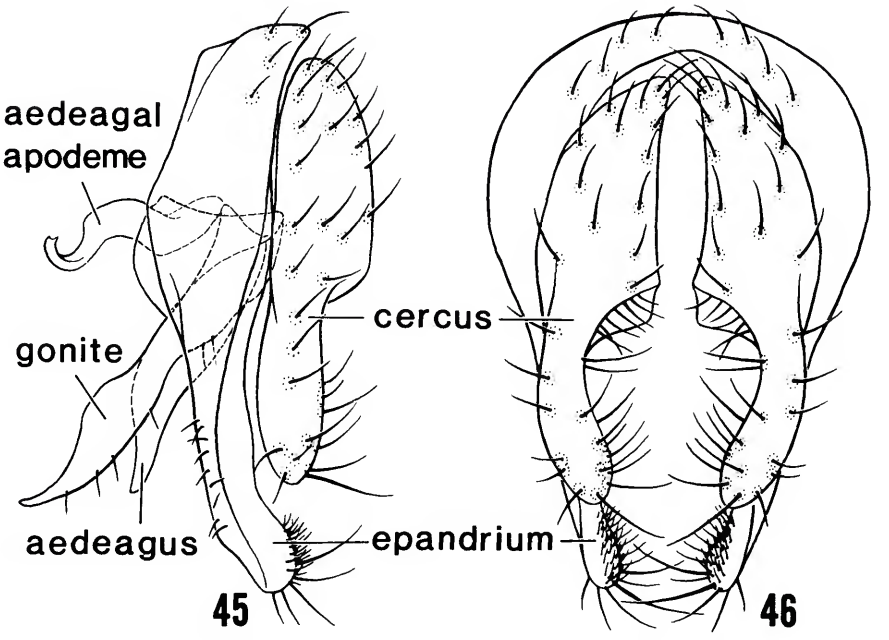


FIGURES 39–44.—*Mosillus stegmaieri:* 39, external structures of the male terminalia (epandrium, cerci, surstyli), posterior aspect; 40, external structures of the male terminalia (epandrium, cerci, surstyli), lateral aspect; 41, aedeagal apodeme, ejaculatory apodeme, and aedeagus, lateral aspect; 42, gonites and hypandrium, posterior aspect; 43, aedeagus and aedeagal apodeme, posterior aspect; 44, gonite and hypandrium, lateral aspect. Scale bar = 0.1 mm.

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Twin Cays (dock area), Mar 1984, Jan 1987, W.N. Mathis (3♂, 1♀).

DISTRIBUTION.—Neotropical: Argentina, Belize, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Mexico (OXA), Nicaragua, Panama, Peru, Trinidad, Venezuela, West Indies (Dominica, Grenada).

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: relatively small (wing length 2–3 mm); wing largely hyaline to uniformly lightly infumate, but lacking a distinct pattern; femora black; tibiae uniformly dark, brownish to reddish black; and setae and setulae on mesonotum and abdomen short, not dense and suberect.



FIGURES 45, 46.—*Placopsidella cynocephala:* 45, male terminalia, lateral aspect; 46, same, posterior aspect.

REMARKS.—The occurrence of this species on Belizean cays is surprising and remains somewhat enigmatic. The larvae of *Gastrops* are only known to occur in the foam nests of frogs, particularly those of the families Leptodactylidae and Hylidae (Bokerman, 1957:231–232; Lacey, 1980:755–758; Villa, 1980:55). The larvae feed on the frog eggs. As no amphibians are known from the cays, the discovery of specimens of *Gastrops* on Twin Cays may not represent established and breeding populations. Specimens, however, were found on different years at the same locality, and their occurrence may mean that either amphibians occur there and have gone undetected or that the fly is not an obligate predator in foam nests of frogs.

Even though *Gastrops* was reviewed twice in the last half century (Wirth, 1958; Lizarralde de Grosso, 1984), our understanding of the genus remains unsatisfactory, and some of these deficiencies became apparent to me while studying Belizean specimens. Resolution will require a thorough species-level revision, which is beyond the scope of this study, but it is appropriate here to indicate the nature of the problem, mainly the identity of primary types, which were not studied as part of the reviews, and the limits of intraspecific variation, especially in characters of the male terminalia.

Although I have applied the name *G. niger* to the only known species from the Belizean Cays, I am unsure of its determination. The tibiae of specimens from the cays tend to be dark colored, blackish orange on some surfaces, but not nearly as dark as the black femora. This character has been used in the reviews to distinguish specimens of *G. niger* (reddish orange tibiae) from *G. auropunctatus* Hendel (black tibiae). I borrowed and studied the syntypes of *G. auropunctatus* and discovered that the tibiae of these specimens are reddish orange, typical of the species here called *G. niger* and perhaps indicating conspecificity with the latter. Certainly *G. auropunctatus* has been misidentified. There is considerable variation in this character in specimens determined as *G. niger,* with the tibiae varying from reddish orange to slightly blackish orange. The males from the cays are within this variation.

Structures of the male terminalia may be very similar. Specimens from the cays, for example, differ from those on the mainland as follows: basal lobe on the dorsal surface of the surstylus is lacking; the surstyli are positioned more or less parallel to each other, not cruciate; and the divided fifth sternites have the basal margins nearly straight, not deeply rounded. The significance of these differences is undetermined, but herein I recognize the specimens from the cays as *G. niger,* which more or less follows traditional interpretations.

Tribe OCHTHERINI Dahl

Genus *Ochthera* Latreille

Ochthera Latreille, [1802]:462 [type species: *Musca manicata* Fabricius, 1794, by subsequent designation, Latreille, 1810:444].

5. *Ochthera loreta* Cresson

Ochthera loreta Cresson, 1931:168.—Wirth, 1968:21 [Neotropical catalog].—Clausen, 1977:508–509 [revision]; 1980:208 [key].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Wee Wee Cay, Nov 1987, Mar 1988, W.N. and D. Mathis (3♂, 2♀).

DISTRIBUTION.—Widespread in the northern neotropics: Nearctic: USA (FL). Neotropical: Bahamas, Belize, Brazil, Ecuador, Mexico, Panama, Trinidad and Tobago, West Indies (Cuba, Dominican Republic, Haiti, Jamaica, Puerto Rico).

DIAGNOSIS.—This species is similar to *O. dasylenos* Clausen, especially the face, but is distinguished from it and from other congeners by the following combination of characters: facial pattern of microtomentum and bare areas (central spot black and not dome-like; lateral margins of face with black bars), face narrow, distance between compound eyes 0.25–0.30 mm; prementum short, 0.30–0.35 mm; basitarsus and second tarsomere of male foreleg lacking sensory structures; body length 3.15–3.2 mm.

Tribe ATISSINI Cresson

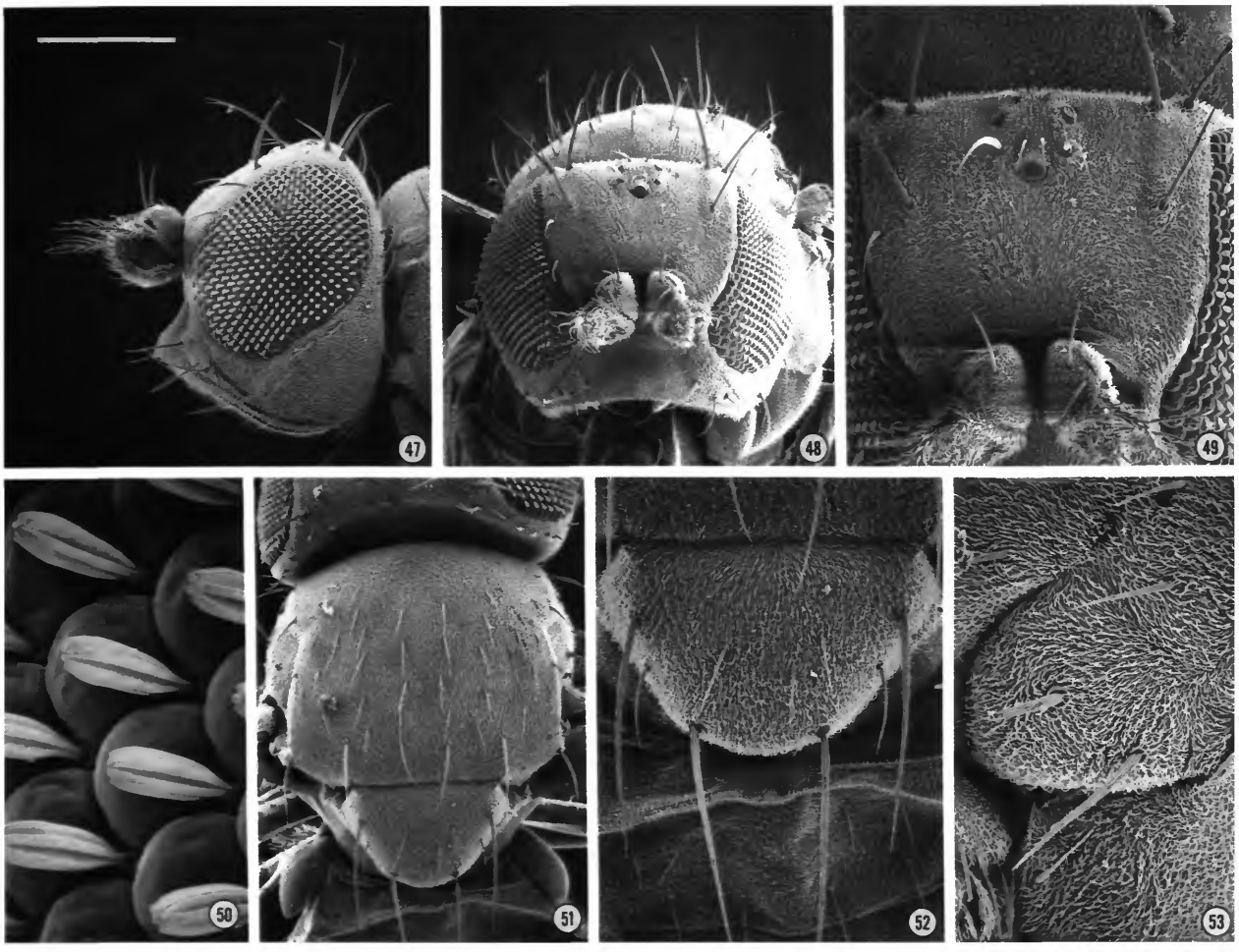
Genus *Atissa* Haliday

Atissa Haliday in Curtis, 1837:281 [published in synonymy, first used for a taxon by Haliday, 1839:401. Type species: *Ephydra pygmaea* Haliday, 1833, by monotypy].

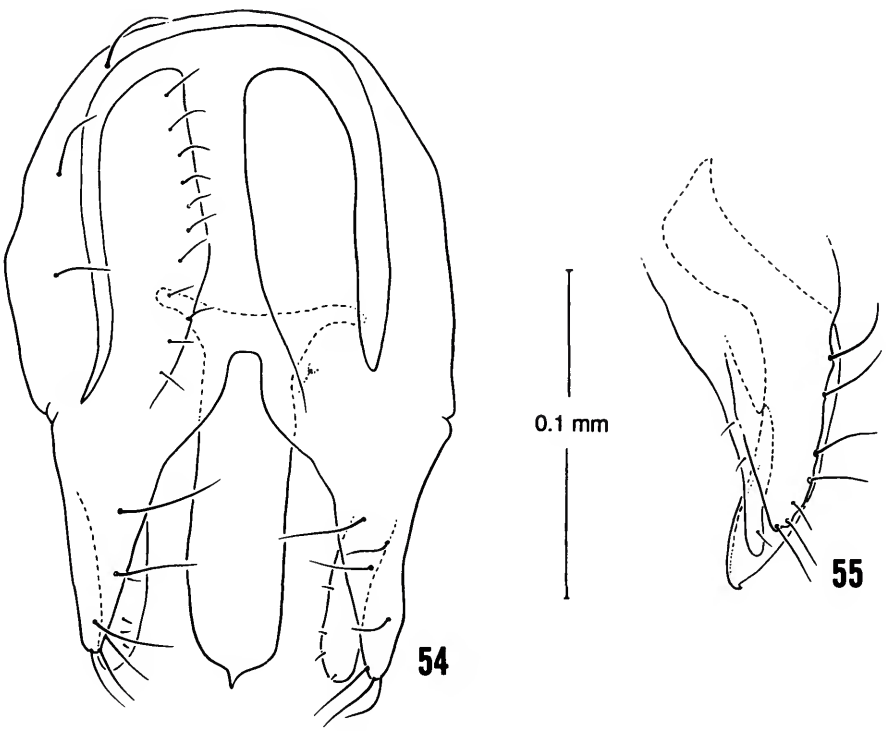
6. *Atissa luteipes* Cresson

FIGURES 47–55

Atissa luteipes Cresson, 1944:2.—Wirth, 1968:4 [Neotropical catalog].



FIGURES 47–53.—Scanning electron micrographs of *Atissa luteipes* (Belize, Stann Creek District, Twin Cays; scale length in parenthesis; scale bar for all photographs = Figure 47): 47, head, lateral aspect (136 μm); 48, same, anterior aspect (150 μm); 49, frons, anterodorsal aspect (86 μm); 50, ommatidia and interfacetal setae of compound eye, lateral aspect (8.6 μm); 51, mesonotum, dorsal aspect (150 μm); 52, scutellum, dorsal aspect (75 μm); 53, notopleuron, lateral aspect (50 μm).



FIGURES 54, 55.—*Atissa luteipes:* 54, male terminalia, posterior aspect; 55, same, lateral aspect.

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Coco Plum Cay, Mar 1988, W.N. Mathis (1♀); Round Cay (near Coco Plum Cay), Mar 1988, W.N. Mathis (1♀); Tobacco Range, Jul 1989, W.N. Mathis, H.B. Williams (1♀); Twin Cays (West Bay), Jan 1987, Mar 1988, Jul 1989, W.N. Mathis, C. Feller, H.B. Williams (17♂, 29♀); Wee Wee Cay, Nov 1987, Mar 1988, Jul 1989, W.N. and D. Mathis (18♂, 32♀).

DISTRIBUTION.—Nearctic: Bermuda, USA (FL). Neotropical: Belize, Galápagos Islands, Honduras, West Indies (Dominica, Dominican Republic, Jamaica, Puerto Rico, St. Vincent).

NATURAL HISTORY.—Despite extensive sampling on the cays, this species was only found at the localities noted above. Specimens were abundant at West Bay on a large windrow of *Thalassia* that had accumulated there. The habitat on Coco Plum and Round Cays was similar to that found at West Bay.

DIAGNOSIS.—This species is distinguished from congeners by the following characters: genal height less than width of first flagellomere; crossvein dm-cu lightly infuscate; acrostichal setulae (Figure 51) in four rows, setulae in each row sparse, usually six or fewer; disc of scutellum (Figure 52) either lacking setulae or sparse, 1–2; femora and tibiae gray.

REMARKS.—I examined the holotype of this species, and although I am confident that it is conspecific with the series from Belize, I noted some differences that merit discussion. First, the holotype is a female. Cresson was unsure of its gender, listing it as a "Female ?" Second, the specimen is generally pale colored and has the appearance of being unnaturally faded, perhaps from undue exposure to the sun. It may also be slightly teneral. The paler of the specimen obscures some characters that have been used in the past to distinguish species in this genus, especially the color of legs. The specimens from Belize and elsewhere have darker colored legs, usually gray to dark gray, which is probably their natural color.

Genus *Ptilomyia* Coquillett

Ptilomyia Coquillett, 1900a:261 [type species: *Ptilomyia enigma* Coquillett, 1900, by original designation].

Key to Species of *Ptilomyia* Occurring on Belizean Cays

1. Wing with sub-basal, medial, and subapical, somewhat irregular, transverse stripes . . . ***P. mabelae*** (Cresson)
   Wing mostly hyaline, at most with infuscation over crossvein dm-cu 2
2. Body generally densely microtomentose, dull, coloration light brown to whitish gray, generally darker dorsally, lighter laterally; usually a presutural dorsocentral seta well developed, subequal in length to prescutellar

acrostichal setae; abdomen with tergites 3–4 with posterior margin whitish gray, especially laterally . . . . . ***P. lobiochaeta*** Sturtevant and Wheeler

Mesonotum and dorsum of abdomen generally sparsely microtomentose, subshiny, blackish brown; lacking a presutural, well-developed dorsocentral seta; abdominal tergites lacking whitish gray posterior margins . . . . . ***P. parva*** (Williston)

7. *Ptilomyia lobiochaeta* Sturtevant and Wheeler

Ptilomyia lobiochaeta Sturtevant and Wheeler, 1954:254.—Wirth, 1965:736 [Nearctic catalog]; 1968:4 [Neotropical catalog].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Carrie Bow Cay, Mar 1988, W.N. Mathis (1♂); Man of War Cay, Nov 1987, Jul 1989, W.N. and D. Mathis, H.B. Williams (1♂, 1♀); Saddle Cay, Jul 1989, W.N. Mathis, H.B. Williams (1♂); Stewart, Mar 1988, W.N. Mathis (1♂); Wee Wee Cay, Nov 1987, Mar 1988, Jul 1989, W.N. and D. Mathis (6♂, 11♀). Glover's Reef (Middle Cay), Jul 1989, W.N. Mathis (2♂, 4♀).

DISTRIBUTION.—Nearctic: USA (AZ, CA, TX). Neotropical: Belize, El Salvador.

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: a well-developed, presutural, dorsocentral seta that is subequal in length to the prescutellar, acrostichal setae; the absence of transverse wing bands; the infuscation area over crossvein dm-cu; the heavy investment of gray to tan microtomentum over much of the body; and the whitish gray posterior margins of abdominal tergites three and four, especially laterally.

REMARKS.—The specimens from Glover's Reef lacked the well-developed dorsocentral seta and may represent another species.

8. *Ptilomyia parva* (Williston)

Hydrellia parva Williston, 1896:399.
Ptilomyia enigma Coquillett, 1900a:262.—Wirth, 1968:4 [synonymy].
Ptilomyia parva.—Wirth, 1968:4 [generic combination, Neotropical catalog].—Mathis and Edmiston, 1991:823–824 [discussion].

SPECIMENS EXAMINED.—BELIZE. Belize District: Turneffe Islands: Calabash Cays (17°17′N, 87°48′W), Mar 1993, W.N. Mathis (16♂, 14♀). Stann Creek District: Man of War Cay, Nov 1987, W.N. and D. Mathis (3♂, 3♀); Stewart Cay, Mar 1988, W.N. Mathis (1♂); Twin Cays (Aanderaa Flats), Mar 1988, W.N. Mathis (1♀); Wee Wee Cay, Nov 1987, Mar 1988, W.N. and D. Mathis (14♂, 25♀). Glover's Reef (Northwest Cay), Jul 1989, W.N. Mathis (1♂, 2♀).

DISTRIBUTION.—Nearctic: USA (AK, FL, GA, MO, NM, OH, SC, TX, VA). Neotropical: Bahamas, Belize, Bolivia, Costa Rica, Ecuador, El Salvador, Mexico, Panama, Trinidad, West Indies (Grenada, Dominica, Dominican Republic, Puerto Rico, St. Vincent).

DIAGNOSIS.—This species is distinguished by the following combination of characters: lack of a well-developed, presutural, dorsocentral seta; mostly hyaline wing (lacking transverse bands but with crossvein dm-cu infuscate); sparsely microtomentose mesonotum and abdomen, which are dark brown and subshiny; and larger dorsocentral and acrostichal setae at the sutural level.

9. *Ptilomyia mabelae* (Cresson)

Atissiella mabelae Cresson, 1926:253.
Ptilomyia mabelae.—Sturtevant and Wheeler, 1954:255 [generic combination].—Wirth, 1968:4 [Neotropical catalog].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Stewart Cay, Mar 1988, W.N. Mathis (1♀); Wee Wee Cay, Mar 1988, W.N. Mathis (7♂, 7♀)

DISTRIBUTION.—Nearctic: USA (AL, FL, GA, MD, NC, PA, TX). Neotropical: Belize, Ecuador, Mexico (SIN), Panama, West Indies (Jamaica).

DIAGNOSIS.—This species is easily distinguished from congeners by the maculation pattern of the wing (see key). In addition, the lateral margins of abdominal tergites three through five have a white, microtomentose spot, and there is no well-developed, presutural, dorsocentral seta.

Tribe HECAMEDINI Mathis

Genus *Allotrichoma* Becker

Allotrichoma Becker, 1896:121 [type species: *Hecamede lateralis* Loew, 1860, by original designation].

Key to Species of *Allotrichoma* Occurring on Belizean Cays

Mesonotum, notopleuron, and dorsal 1/2 of anepisternum concolorous, lacking a distinctive stripe from postpronotum through ventral portion of notopleuron . . . . . ***A. adustum*** Mathis

Thorax with silver to grayish stripe extended from postpronotum through ventral portion of notopleuron . . . . . ***A. abdominale*** (Williston)

10. *Allotrichoma* (*Pseudohecamede*) *adustum* Mathis

FIGURE 56

Allotrichoma (*Pseudohecamede*) *adustum* Mathis, 1991:17–19 [key, figures].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Coco Plum Cay, Jul 1989, W.N. Mathis (1♂); Tobacco Range, Jul 1989, W.N. Mathis (1♂, 2♀); Twin Cays (Aanderaa Flats, south end of East Island), Nov 1987, Mar 1988, Jul 1989, D. Mathis, W.N. Mathis (4♂, 3♀).

DISTRIBUTION.—Nearctic: USA (FL). Neotropical: Bahamas, Belize, Ecuador, West Indies (Grand Cayman, Jamaica).

NATURAL HISTORY.—All Belizean specimens of this species that I have collected occurred sympatrically with *A. abdominale*. Although they are readily distinguished from the latter on the basis of morphological characters, how they partition the habitat is unknown. Most specimens were taken from the mud flat at Aanderaa Flats.

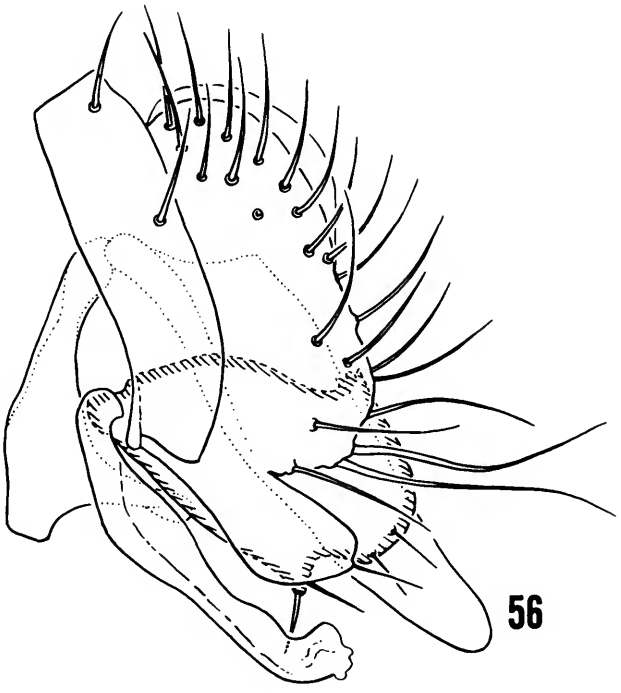


FIGURE 56.—*Allotrichoma adustum:* 56, male terminalia, lateral aspect.

DIAGNOSIS.—Externally this species is very similar to *A. fasciale* Hendel in lacking a gray- to silver-colored stripe through the postpronotum and notopleuron and in the thoracic coloration, which is generally chestnut brown. It differs from *A. fasciale* in having the abdominal tergites mostly silvery gray; at most with basal two terga slightly brownish gray.

11. *Allotrichoma* (*Pseudohecamede*) *abdominale* (Williston)

FIGURES 57–63

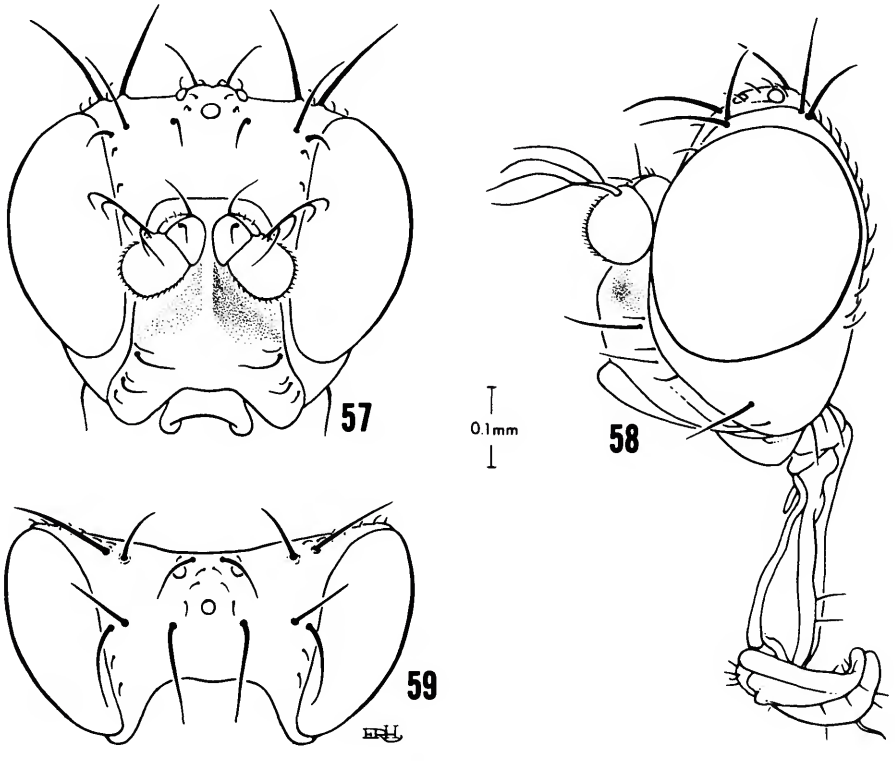
Hecamede abdominalis Williston, 1896:398.

Allotrichoma abdominale.—Williston, 1897:4 [generic combination, Brazil].—Coquillett, 1900a:260 [Puerto Rico].—Cresson, 1918:54 [Costa Rica, figure of head]; 1942:109 [list].—Hendel, 1930:135 [Bolivia].—Mathis, 1991:8–14 [revision].—Mathis and Edmiston, 1991:823 [discussion].

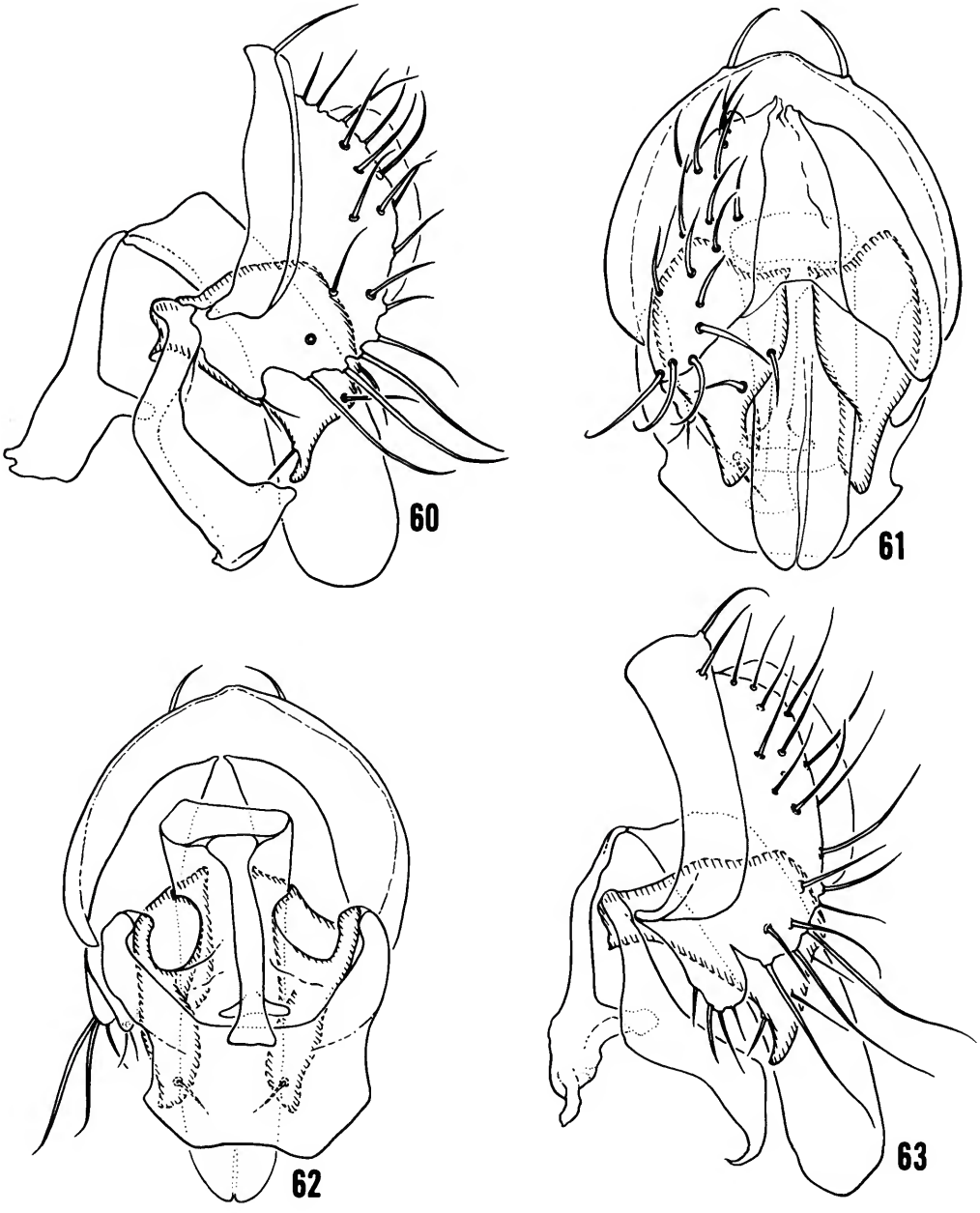
Pseudohecamede abdominalis.—Hendel, 1936:106 [generic combination, Paraguay].—Wirth, 1965:737 [Nearctic catalog]; 1968:5 [Neotropical catalog].—Runyan and Deonier, 1979:123–137 [figures of male terminalia, puparium, egg, discussion].

Allotrichoma longirostre Hendel, 1930:135 [Bolivia].—Wirth, 1968:5 [synonymy].

SPECIMENS EXAMINED.—BELIZE. Belize District: Turneffe Islands: Blackbird Caye (17°19′N, 87°48′W), Mar 1993, W.N. Mathis (9♂); Rope Walk Cay (17°13′N, 87°51′W), Mar 1993, W.N. Mathis (4♂); Soldier Cay (17°20′N, 87°47′W), Mar 1993,



FIGURES 57–59.—*Allotrichoma abdominale:* 57, head, anterior aspect; 58, head, lateral aspect; 59, head, dorsal aspect.



FIGURES 60–63.—*Allotrichoma abdominale:* 60, male terminalia (West Indies: Dominica), lateral aspect; 61, male terminalia, posterior aspect; 62, male terminalia, anterior aspect; 63, male terminalia (West Indies: Dominica), lateral aspect.

W.N. Mathis (1♂, 2♀). Stann Creek District: Bread and Butter Cay, Mar 1988, W.N. Mathis (3♂, 5♀); Carrie Bow Cay, Jun 1984, Jun 1985, Jan 1987, Jul 1989, Jun 1990, W.N. Mathis, C. Feller, H.B. Williams (40♂, 35♀); Coco Plum Cay, Jul 1989, W.N. Mathis (6♂, 2♀); Man of War Cay, Jun 1985, Nov 1987, Jul 1989, Jun 1990, W.N. and D. Mathis, H.B. Williams (70♂, 37♀); Saddle Cay, Mar 1988, W.N. Mathis (2♂); Stewart Cay, Mar 1988, W.N. Mathis (5♂, 1♀); Tobacco Range, Jul 1989, W.N. Mathis, H.B. Williams (4♂, 8♀); Twin Cays (Aanderaa Flats, West Bay, Dock area, east shore of East Island, south end of West Island), Mar 1984, Jan 1987, Jul 1989, Jun 1990, W.N. and. D. Mathis, C. Feller, H.B. Williams (85♂, 64♀); Wee Wee

Cay, Nov 1987, Jul 1989, W.N. and D. Mathis (6♂, 6♀). Glover's Reef (Long Cay, Middle Cay, Northeast Cay, Southwest Cay), Jul 1989, W.N. Mathis (13♂, 18♀).

DISTRIBUTION.—Nearctic: USA (AL, AR, AZ, CA, FL, GA, MD, OH, TX, VA, WA). Neotropical: Argentina, Bahamas, Belize, Bolivia, Brazil, Costa Rica, Ecuador, El Salvador, Mexico, Paraguay, Trinidad, Venezuela, West Indies (Dominica, Dominican Republic, Guadaloupe, Jamaica, Puerto Rico, St. Vincent).

NATURAL HISTORY.—On Belizean cays, this species occurs mostly in the littoral zone, especially where organic debris has accumulated. On Man of War Cay, specimens were abundant on a partially decayed carcass of a Brown Booby.

DIAGNOSIS.—This species is very similar to *A. baja* and *A. ecuadorensis* in having the distinctive, silvery gray, horizontal stripe from the postpronotum through the ventral portion of the notopleuron. The ventral half of the anepisternum and katepisternum is brown, mostly unicolorous in this species.

Genus *Diphuia* Cresson

Diphuia Cresson, 1944:3 [type species: *Diphuia anomala* Cresson, 1944, by original designation].

12. *Diphuia nasalis* Wirth

FIGURES 64–80

Diphuia nasalis Wirth, 1956:3; 1968:5 [Neotropical catalog].—Mathis, 1990:750–754 [revision].

SPECIMENS EXAMINED.—BELIZE. Belize District: Turneffe Islands: Blackbird Caye (17°19'N, 87°48'W), Mar 1993, W.N. Mathis (11♂, 11♀); Calabash Cays (17°17'N, 87°48'W), Mar 1993, W.N. Mathis (2♂); Pelican Cay (17°24'N, 87°48'W), Mar 1993, W.N. Mathis (1♂). Stann Creek District: Bread and Butter Cay, Mar 1988, W.N. Mathis (5♂, 1♀); Man of War Cay, Nov 1987, Mar 1988, W.N. and D. Mathis (11♂, 4♀); Twin Cays (West Bay), Mar 1988, W.N. Mathis (1♂, 1♀); Wee Wee Cay, Mar 1988, Jul 1989, W.N. Mathis (5♂). Glover's Reef (Long Cay, Middle Cay, Northeast Cay, Southwest Cay), Jul 1989, W.N. Mathis (29♂, 12♀).

DISTRIBUTION.—Nearctic: Bermuda, USA (FL). Neotropical: Bahamas, Belize, West Indies (Dominican Republic, Grand Cayman).

NATURAL HISTORY.—The vast majority of specimens was swept from exposed mangrove peat in areas that were virtually always in deep shade.

DIAGNOSIS.—This species is distinguished from congeners, especially *D. anomala* Cresson, by the following combination of characters: mesofrons mostly but thinly microtomentose; mesonotum subshiny, very sparsely microtomentose; and anepisternum with shiny anteroventral one-third to one-half (Figure 71). Several characters of the male postabdomen and terminalia (Figures 73–80) also distinguish this species (see Mathis, 1990).

Genus *Hecamede* Haliday

Hecamede Haliday in Curtis, 1837:281 [published in synonymy, first used for a taxon by Haliday, 1839:221, 224. Type species: *Notiphila albicans* Meigen, 1830, by monotypy].

13. *Hecamede (Hecamede) brasiliensis* Cresson

FIGURES 81–85

Hecamede brasiliensis Cresson, 1938:24.—Wirth, 1968:5 [Neotropical catalog].—Cogan, 1976:108 [discussion, list, St. Helena, Ascension Isles].—Mathis, 1993b:8–11 [revision].

SPECIMENS EXAMINED.—BELIZE. Belize District: Turneffe Islands: Blackbird Caye (17°19'N, 87°48'W), Mar 1993, W.N. Mathis (6♂, 1♀); Calabash Cays (17°17'N, 87°48'W), Mar 1993, W.N. Mathis (4♂); Soldier Cay (17°20'N, 87°47'W), Mar 1993, W.N. Mathis (1♂). Stann Creek District: Carrie Bow Cay, Jul 1989, Jun 1990, W.N. Mathis, H.B. Williams (51♂, 27♀); Coco Plum Cay, Jul 1989, W.N. Mathis, H.B. Williams (1♀); Man of War Cay, Jun 1990, H.B. Williams (1♂); Twin Cays (south end of East Island), Jul 1989, W.N. Mathis, H.B. Williams (1♂, 2♀).

DISTRIBUTION.—Afrotropical: Cameroon, Saint Helena, Senegal, Sierra Leone. Neotropical: Belize, Brazil (Ceará, Rio de Janeiro), Galápagos Islands, West Indies (Dominican Republic, Grand Cayman, Puerto Rico, St. Lucia).

NATURAL HISTORY.—Except for the female specimen from Coco Plum Cay, all others from the Belizean cays occurred on decaying leaves of cabbage or a discarded fish head that was at the high tide mark on wholly sandy beaches or sandy beaches with some beach rock. The female from Coco Plum was collected on a protected and bare sandy beach that was about 30 m from a fishing cabin.

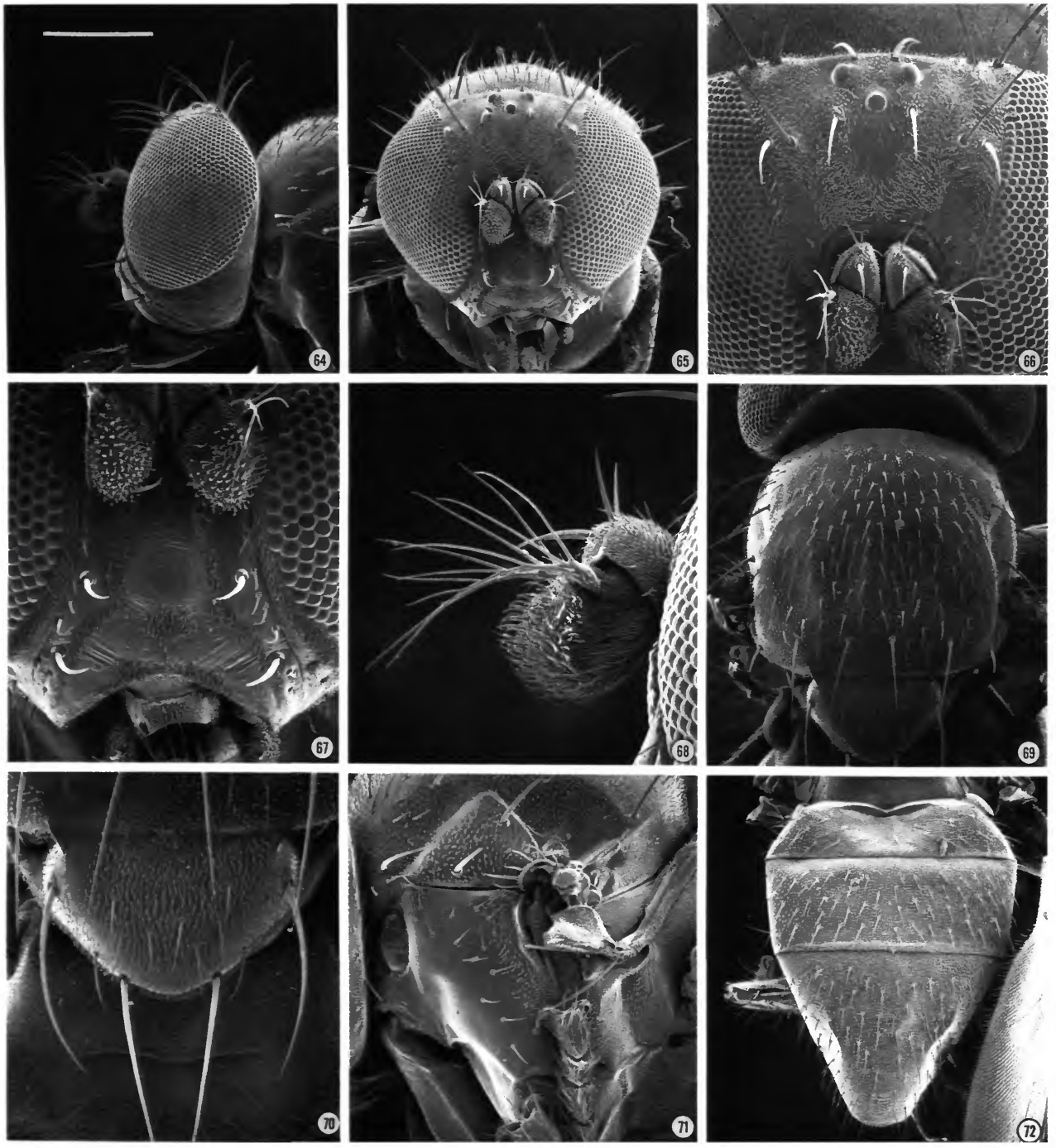
DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: fronto-orbital setae two, proclinate (most species have one) (Figures 81–83), both inserted in front and slightly laterad of the reclinate seta; facial setae three (Figures 81, 82); facial prominence only partially bare (Figure 81), slightly pale colored, yellowish (concolorous with anterior margin of frons); genal seta one, inserted near middle of gena (Figure 82); gena high, subequal to eye height (Figure 82).

REMARKS.—Despite careful sampling on Carrie Bow Cay between the years 1984–1989, this species was only recently collected (1989, 1990). When discovered, though, it was found in abundance, and apparently it occurs on several of the cays. I suspect that this species was recently introduced, perhaps in 1989 and probably through commerce on organic debris.

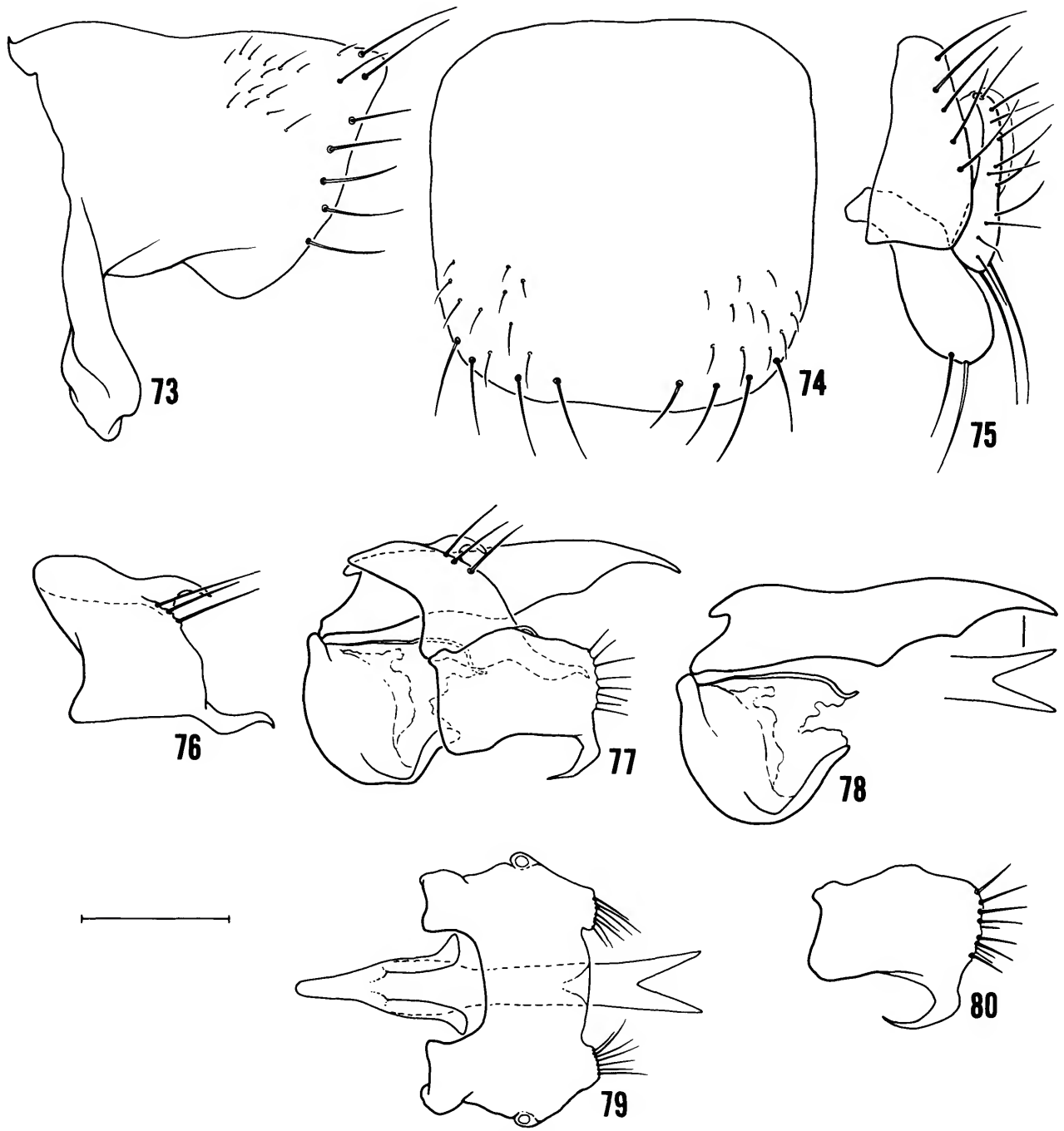
Tribe LIPOCHAETINI Becker

Genus *Glenanthe* Haliday

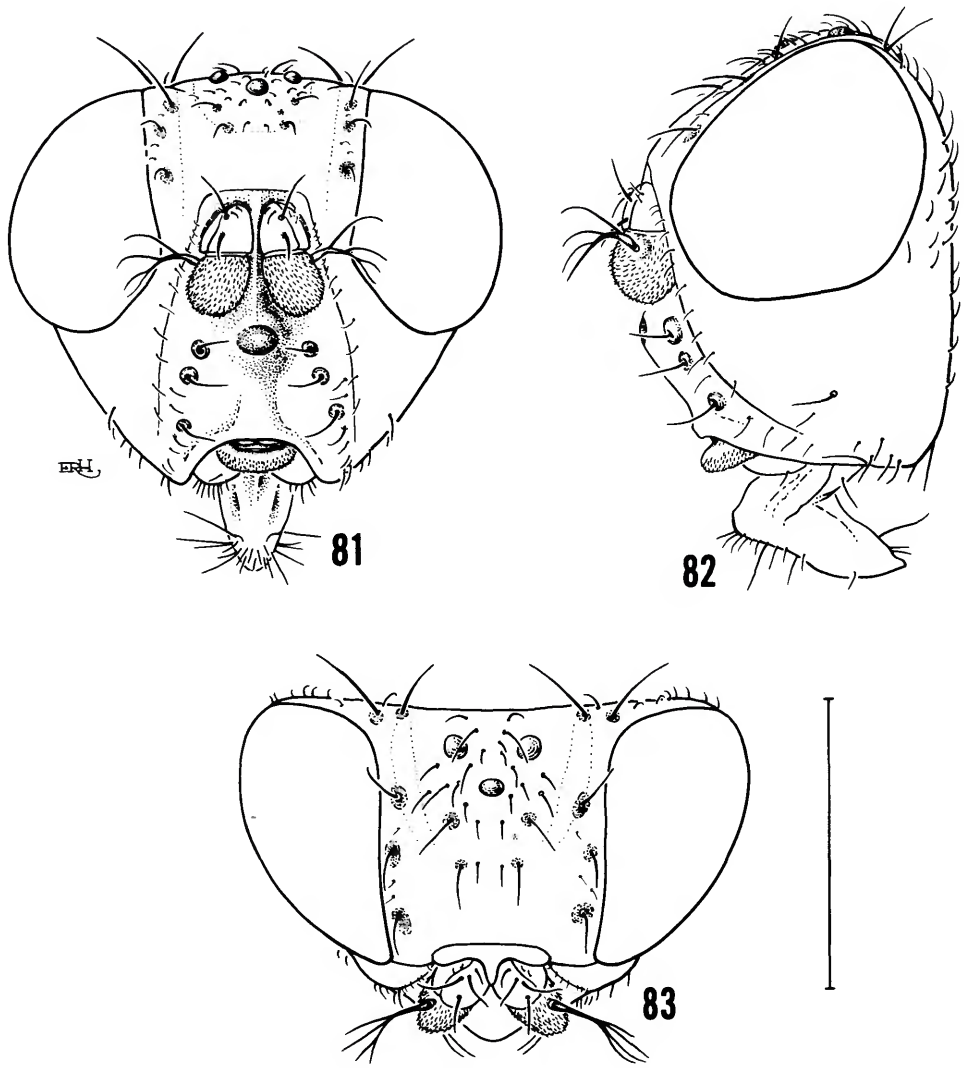
Glenanthe Haliday, 1839:404 [as a subgenus of *Hydrellia;* type species: *Hydrellia ripicola* Haliday, 1839, by monotypy].



FIGURES 64–72.—Scanning electron micrographs of *Diphuia nasalis* (Belize, Stann Creek District, Glover's Reef, Southwest Cay; scale length in parenthesis; scale bar for all photographs = Figure 64): 64, head, lateral aspect (214 μm); 65, same, anterior aspect (214 μm); 66, frons, anterodorsal aspect (120 μm); 67, face, anterior aspect (94 μm); 68, left antenna, lateral aspect 75 μm); 69, mesonotum, dorsal aspect (200 μm); 70, scutellum, dorsal aspect (107 μm); 71, pleura, lateral aspect (136 μm); 72, abdomen, dorsal aspect (231 μm).



FIGURES 73–80.—*Diphuia nasalis:* 73, fifth tergite and sternite, lateral aspect; 74, fifth tergite, dorsal aspect; 75, male terminalia (epandrium, cercus, surstyli), lateral aspect; 76, gonite, lateral aspect; 77, internal male terminalia (gonite, hypandrium, aedeagal apodeme, aedeagus), lateral aspect; 78, aedeagus and aedeagal apodeme, lateral aspect; 79, hypandrium, aedeagal apodeme, and aedeagus, ventral aspect; 80, hypandrium, lateral aspect. Scale bar = 0.1 mm.



FIGURES 81–83.—*Hecamede* (*Hecamede*) *brasiliensis:* 81, head, anterior aspect; 82, same, lateral aspect; 83, head, dorsal aspect. Scale bar = 0.5 mm.

Key to Species of *Glenanthe* Occurring on Belizean Cays

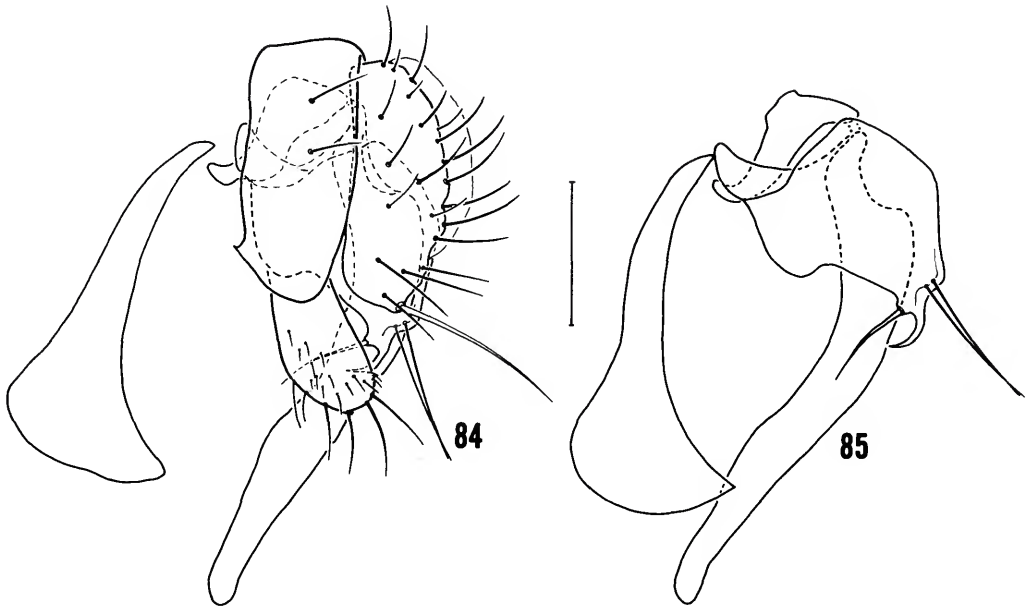
1. Palpus yellowish; 1st flagellomere yellowish orange anteroventrally . . . . . ***G. caribea*** Mathis
   Palpus and antenna dark colored 2
2. Forebasitarsus of male normally developed, lacking distinct row of setae; face whitish gray, contrasted with darker brown frons . . . . . ***G. litorea*** Cresson
   Forebasitarsus of male with closely set row of longer setae; face variable . . . . . ***G. ruetzleri*** Mathis

14. *Glenanthe ruetzleri* Mathis

FIGURES 86–101

Glenanthe ruetzleri Mathis, 1995a:20.

SPECIMENS EXAMINED.—BELIZE. Belize District: Turneffe Islands: Blackbird Caye (17°19′N, 87°48′W), Mar 1993, W.N. Mathis (5♂, 2♀); Soldier Cay (17°20′N, 87°47′W), Mar 1993, W.N. Mathis (1♀); Rope Walk Cay (17°13′N, 87°51′W), Mar 1993, W.N. Mathis (1♂). Stann Creek District: Carrie Bow



FIGURES 84, 85.—*Hecamede* (*Hecamede*) *brasiliensis*: 84, male terminalia, lateral aspect; 85, internal structures of the male terminalia, lateral aspect. Scale bar = 0.1 mm.

Cay, Mar 1988, W.N. Mathis (1♂); Round Cay (near Coco Plum Cay), Mar 1988, W.N. Mathis (1♂); Stewart Cay, Mar 1988, W.N. Mathis (11♂, 3♀); Tobacco Range, Jul 1989, W.N. Mathis, H.B. Williams (2♀); Twin Cays (Aanderaa Flats, south end of East Island, north of Lair Channel, south end of West Island, West Bay, West Pond), Jan, Nov 1987, Mar 1988, Jul 1989, W.N. and D. Mathis, C. Feller, H.B. Williams (112♂, 73♀); Wee Wee Cay, Nov 1987, W.N. and D. Mathis (22♂, 20♀). Glover's Reef (Middle Cay, Southwest Cay), Jul 1989, W.N. Mathis, H.B. Williams (23♂, 1♀).

DISTRIBUTION.—Nearctic: USA (FL). Neotropical: Belize, Costa Rica, Curação, Ecuador (mainland and Galápagos Islands), El Salvador, Mexico (CHI, SIN, TAB), Trinidad, and West Indies (Dominican Republic, Grand Cayman, Puerto Rico, St. Lucia).

NATURAL HISTORY.—Specimens of *G. ruetzleri* were most abundant in habitats on Twin Cays and Wee Wee Cay where algal mats overlaid the muddy shore just above the water line. Collecting numerous specimens was easily accomplished by sweeping just above the matted algae. Other Ephydridae that were collected from the algal mat included species of the tribe Discocerinini (*Discocerina* and *Polytrichophora*) and the genus *Paralimna*. The eggs, larvae, and puparia of *G. ruetzleri* probably occur in the algae and moist substrate beneath the algal mat.

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: wing unpatterned; palpus and antenna dark colored; lack of a gray stripe through the postpronotum, notopleuron, and alar region; male forebasitarsus bearing a unique comb of setulae; and abdomen microtomentose, dull colored.

15. *Glenanthe caribea* Mathis

FIGURES 102–110

Glenanthe caribea Mathis, 1995a:12.

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Wee Wee Cay, 21 Jul 1989, W.N. Mathis (11♂, 12♀).

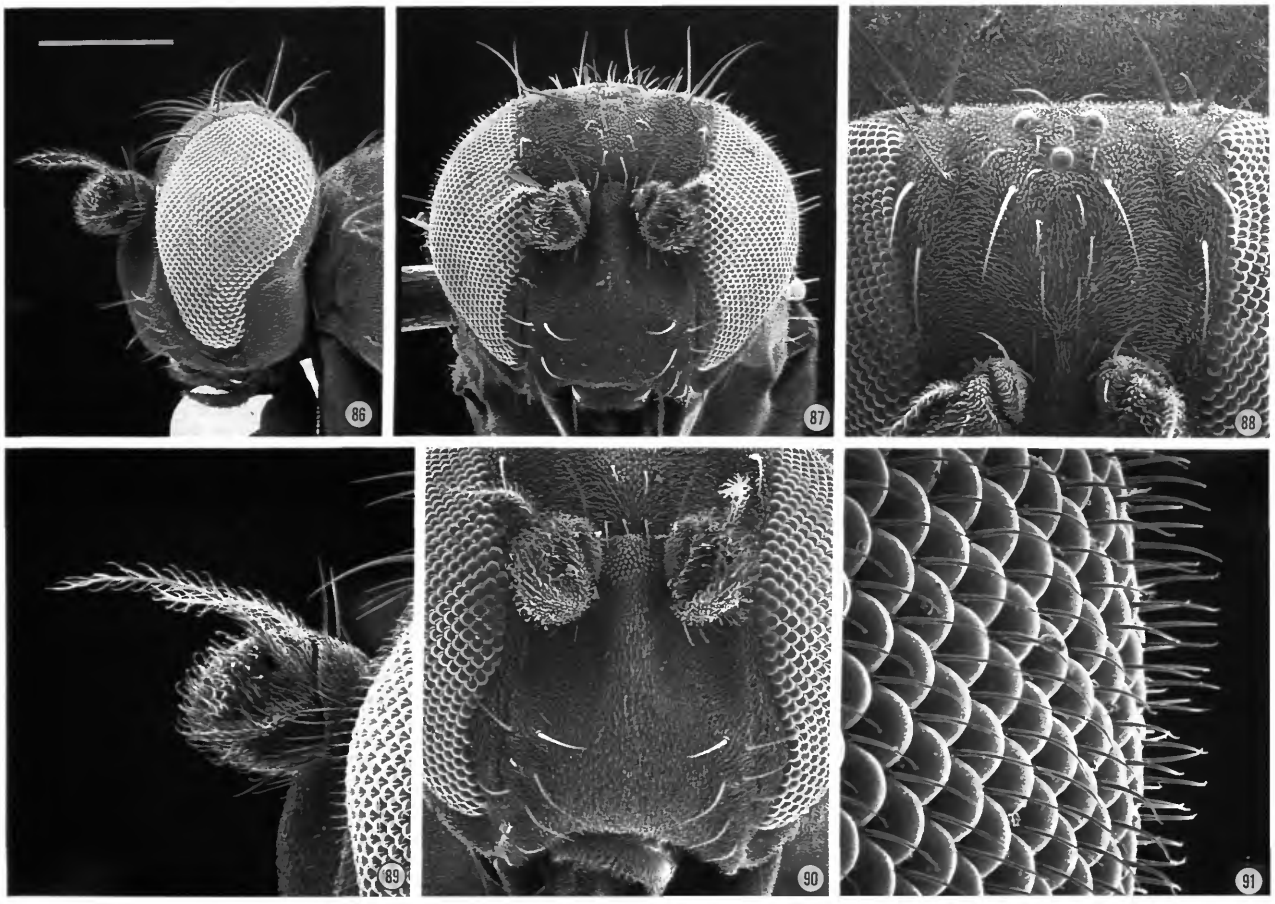
DISTRIBUTION.—Probably circumcaribbean; Neotropical: Belize, Panama, Trinidad, West Indies (Dominica, Grand Cayman, Jamaica, St. Vincent).

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: wing unpatterned; palpus almost completely yellow, antenna partially yellowish; lack of a gray stripe through the postpronotum, notopleuron, and alar region; male forebasitarsus unadorned; and abdomen dull, densely microtomentose.

16. *Glenanthe litorea* Cresson

Glenanthe litorea Cresson, 1925a:166; 1942:107 [review].—Sturtevant and Wheeler, 1954:249 [review].—Wirth, 1965:737 [Nearctic catalog]; 1968:6 [Neotropical catalog].—Mathis, 1995a:9–12 [revision].

SPECIMENS EXAMINED.—BELIZE. Belize District: Turneffe Islands: Blackbird Caye (17°19'N, 87°48'W), Mar 1993, W.N.



FIGURES 86–91.—Scanning electron micrographs of *Glenanthe ruetzleri* (Belize, Stann Creek District; scale length in parenthesis; scale bar for all photographs = Figure 86): 86, head, lateral aspect (200 μm); 87, same, anterior aspect (176 μm); 88, frons, anterodorsal aspect (107 μm); 89, antenna, lateral aspect (86 μm); 90, face, anterior aspect (120 μm); 91, left compound eye and interfacetal setulae, anterior aspect (20 μm).

Mathis (6♂, 8♀); Rope Walk Cay (17°13′N, 87°51′W), Mar 1993, W.N. Mathis (9♂, 8♀).

DISTRIBUTION.—Nearctic: Canada (NB), USA (CT, DE, MA, NJ, NY, TX). Neotropical: Bahamas, Belize, El Salvador, Panama, West Indies (Anguilla, Grand Cayman).

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: wing unpatterned; palpus blackish brown; antenna mostly dark, black, first flagellomere blackish brown; postpronotum, notopleuron, and alar area lacking a gray stripe; forebasitarsomere of male unadorned; abdomen densely microtomentose, gray.

Genus *Lipochaeta* Coquillett

Lipochaeta Coquillett, 1896:220 [type species: *Lipochaeta slossonae* Coquillett, 1896, by original designation].

17. *Lipochaeta slossonae* Coquillett

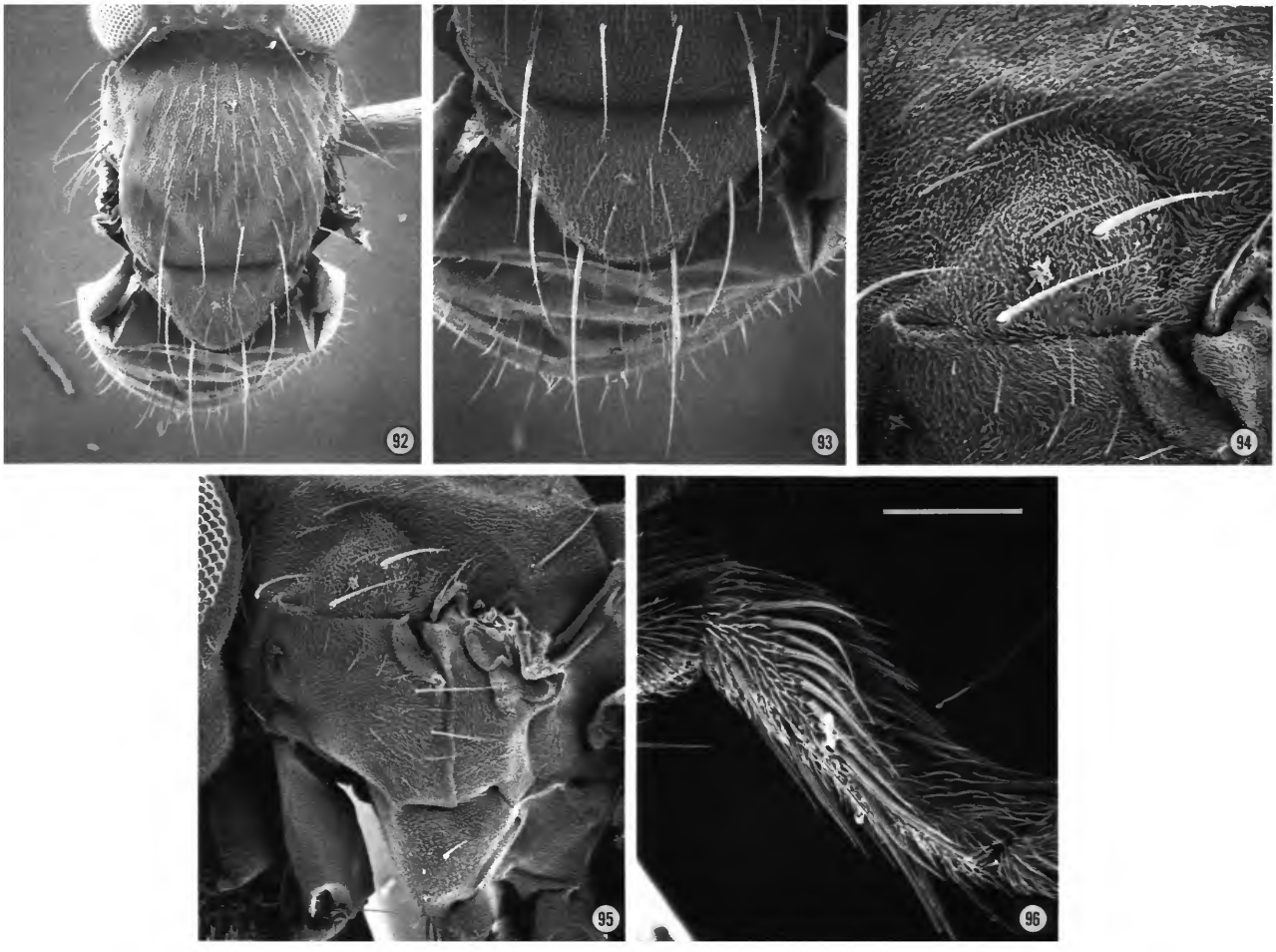
Lipochaeta slossonae Coquillett, 1896:220.—Wirth, 1968:22 [Neotropical catalog].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Carrie Bow Cay, May 1985, W.N. Mathis (2♂, 4♀).

DISTRIBUTION.—Nearctic: USA (CA, FL, GA, MA, NJ, OK, TX). Neotropical: Bahamas, Belize, Galápagos Islands, Mexico (BCN, CHI), Panama, West Indies (Cuba, Dominican Republic, Grand Cayman, Puerto Rico).

NATURAL HISTORY.—This species occurs on the bare surface of wet, sandy beaches. Although this habitat is primarily coastal, it also occurs inland, such as in Oklahoma, where this species also has been found.

Cheng and Lewin (1974) reported on the peculiar "fluidisation" of the substrate as part of the feeding behavior of this



FIGURES 92–96.—Scanning electron micrographs of *Glenanthe ruetzleri* (Belize, Stann Creek District; scale length in parenthesis; scale bar for all photographs = Figure 96): 92, mesonotum, dorsal aspect (250); 93, scutellum, dorsal aspect (136 μm); 94, notopleuron, lateral aspect (75 μm); 95, thoracic pleural area, lateral aspect (150 μm); 96, forebasitarsus, posterior aspect (38 μm).

species. From observations in both the field and laboratory, they discovered that this species fluidizes the wet sand on the beach through a shaking motion that apparently loosens the interstitial microflora, which is then imbibed as a kind of soup.

DIAGNOSIS.—*Lipochaeta* is a monotypic genus and is readily distinguished by the modified conformation of the body (weakened setae or their absence, antennae that are within deep, well-separated, facial grooves, grayish to grayish brown coloration) that has been adapted to a psammophilous habitat.

Genus *Paraglenanthe* Wirth

Paraglenanthe Wirth, 1956:6 [type species: *Paraglenanthe bicolor* Wirth, 1956, by original designation].

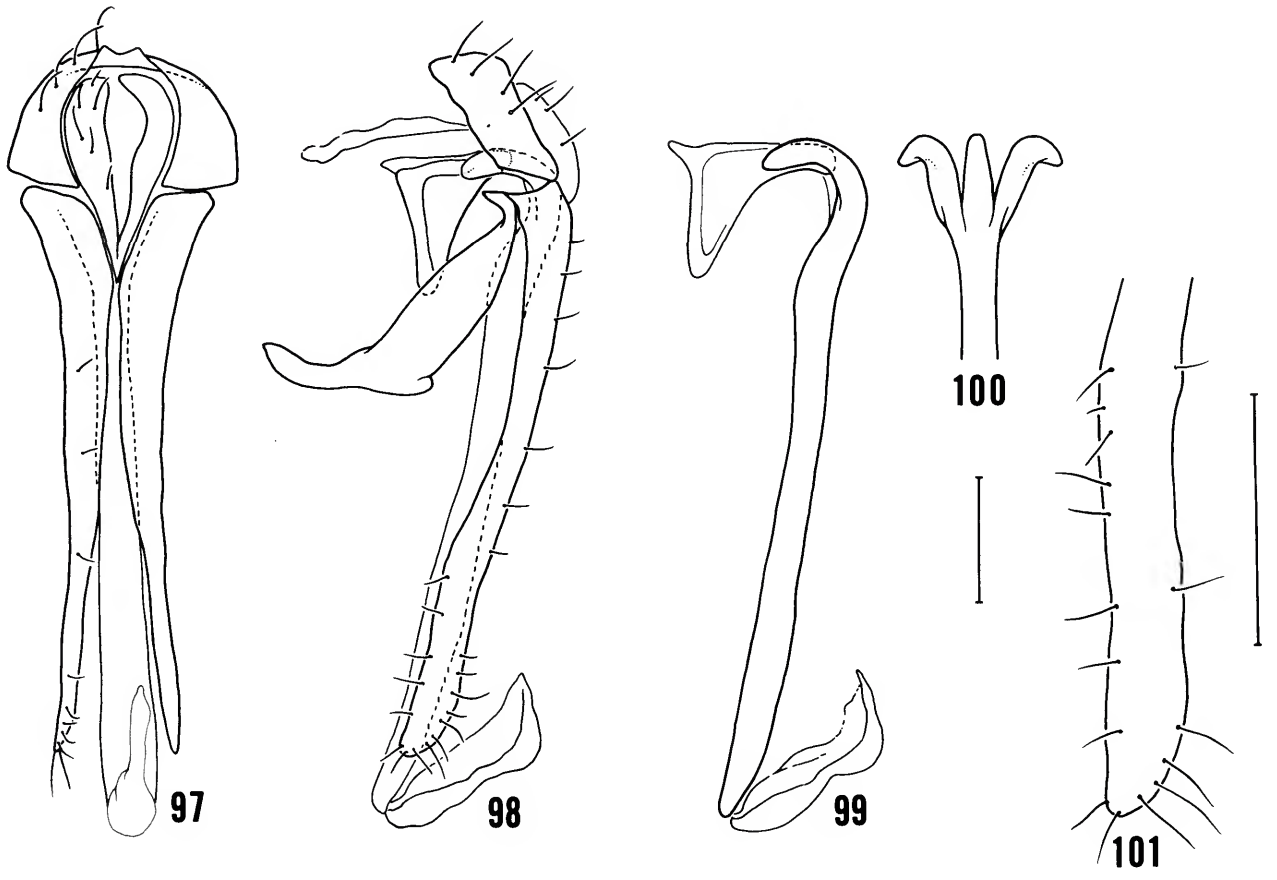
19. *Paraglenanthe bahamensis* Wirth

Paraglenanthe bahamensis Wirth, 1956:8; 1968:6 [Neotropical catalog].

SPECIMENS EXAMINED.—BELIZE. Belize District: Turneffe Islands: Blackbird Caye (17°19′N, 87°48′W), Mar 1993, W.N. Mathis (9♂, 2♀); Soldier Cay (17°20′N, 87°47′W), Mar 1993, W.N. Mathis (11♂, 3♀). Stann Creek District: Tobacco Range, Jul 1989, W.N. Mathis, H.B. Williams (7♂, 5♀); Wee Wee Cay, Nov 1987, W.N. and D. Mathis (7♂, 8♀). Glover's Reef (Southwest Cay), Jul 1989, W.N. Mathis (4♂).

DISTRIBUTION.—Neotropical: Bahamas, Belize, West Indies (Dominican Republic, Grand Cayman, Jamaica, Puerto Rico).

NATURAL HISTORY.—All of the specimens from Wee Wee Cay were collected by sweeping very slowly just over the



FIGURES 97-101.—*Glenanthe ruetzleri:* 97, structures of the male terminalia (epandrium, cerci, surstyli, aedeagus), posterior aspect; 98, structures of the male terminalia (epandrium, cerci, surstyli, aedeagus, aedeagal apodeme, hypandrium), lateral aspect; 99, aedeagus, aedeagal apodeme, lateral aspect; 100, base of aedeagus, posterior aspect; 101, apex of surstylus, lateral aspect. Scale bars = 0.1 mm.

blue-green algal mat on the habitat described under Wee Wee Cay. On Tobacco Range, the specimens occurred on a small, bare sand spit that was in a protected cove.

DIAGNOSIS.—Only three species are known in the genus *Paraglenanthe,* and this species is distinguished from its congeners by the following combination of characters: body entirely whitish to whitish gray, microtomentose, lacking distinctly contrasted dark brown, broad stripe on notopleuron and anepisternum; gena short, eye-to-cheek ratio averaging 0.40; head generally shorter and broader in comparison with height, making facial carina between antennal bases more prominent.

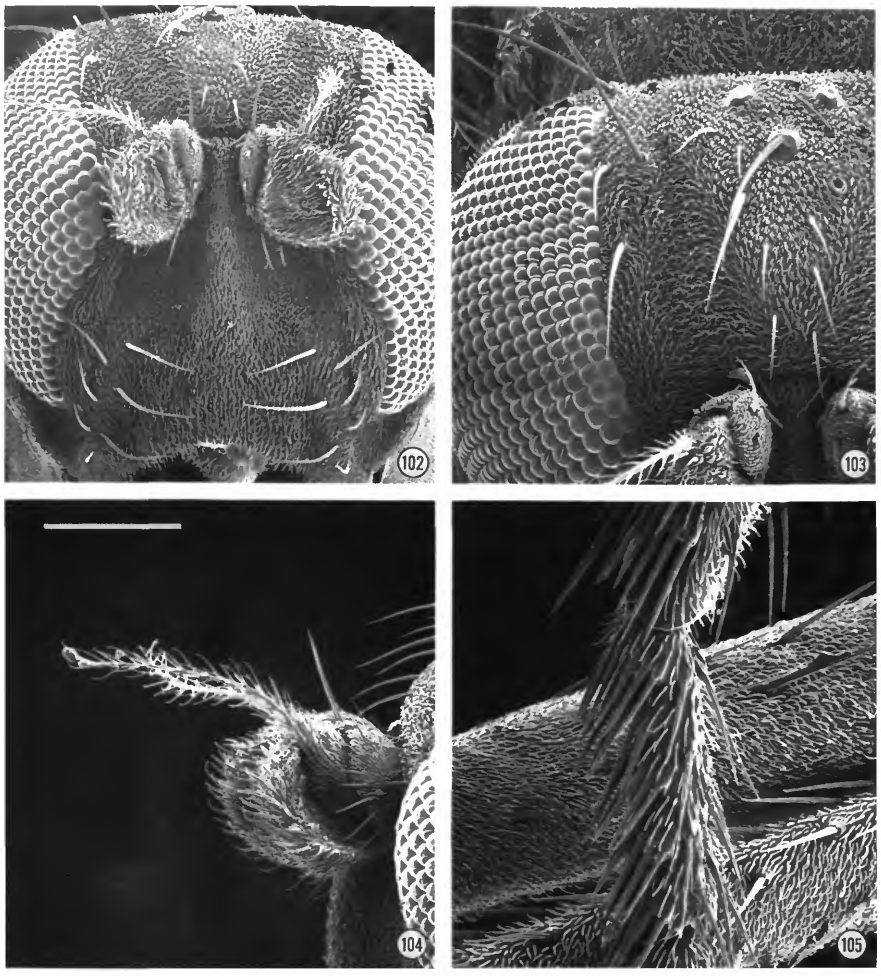
Tribe DISCOCERININI Cresson

Genus *Discocerina* Macquart

Discocerina Macquart, 1835:527 [type species: *Notiphila pusilla* Meigen, 1830 (= *Notiphila obscurella* Fallén, 1813), by subsequent designation, Cresson, 1925b:253].

Key to Species of *Discocerina* Occurring on Belizean Cays

1. Parafacials bearing setulae; tibiae mostly yellowish, usually tawny (subgenus *Discocerina* Macquart) 2
   Parafacials lacking setulae; tibiae black (subgenus *Lamproclasiopa* Hendel) 4
2. Forecoxa mostly pale, yellowish; face and parafacials appearing concolorous, facial microtomentum yellowish gray . . . . . ***D. flavipes*** Cresson
   Forecoxa dark colored, mostly brown to blackish brown; facial and parafacial microtomentum whitish to silvery white, sometimes not concolorous 3
3. Antenna mostly yellow, although with dorsal surfaces of pedicel and 1st flagellomere blackish; anterior margin of frons just above antennae reddish . . . . . ***D. obscurella*** (Fallén)
   Antenna mostly black; frons entirely dark colored, dark brown to black, anterior margin blackish . . . . . ***D. juniori,*** new species



FIGURES 102–105.—Scanning electron micrographs of *Glenanthe caribea* (Belize, Stann Creek District; scale length in parenthesis; scale bar for all photographs = Figure 104): 102, head, anterior aspect (100 μm); 103, frons, right side, anterodorsal aspect (75 μm); 104, antenna, lateral aspect (75 μm); 105, forebasitarsus, posteroventral aspect (38 μm).

4. Parafacial densely microtomentose, silvery white, contrasted with mostly black face; face with three vertical stripes, lateral ones slightly irregular . . . . . ***D. nitida*** Cresson

   Parafacial and face at most sparsely microtomentose; face black . . . . . ***D. mera*** Cresson

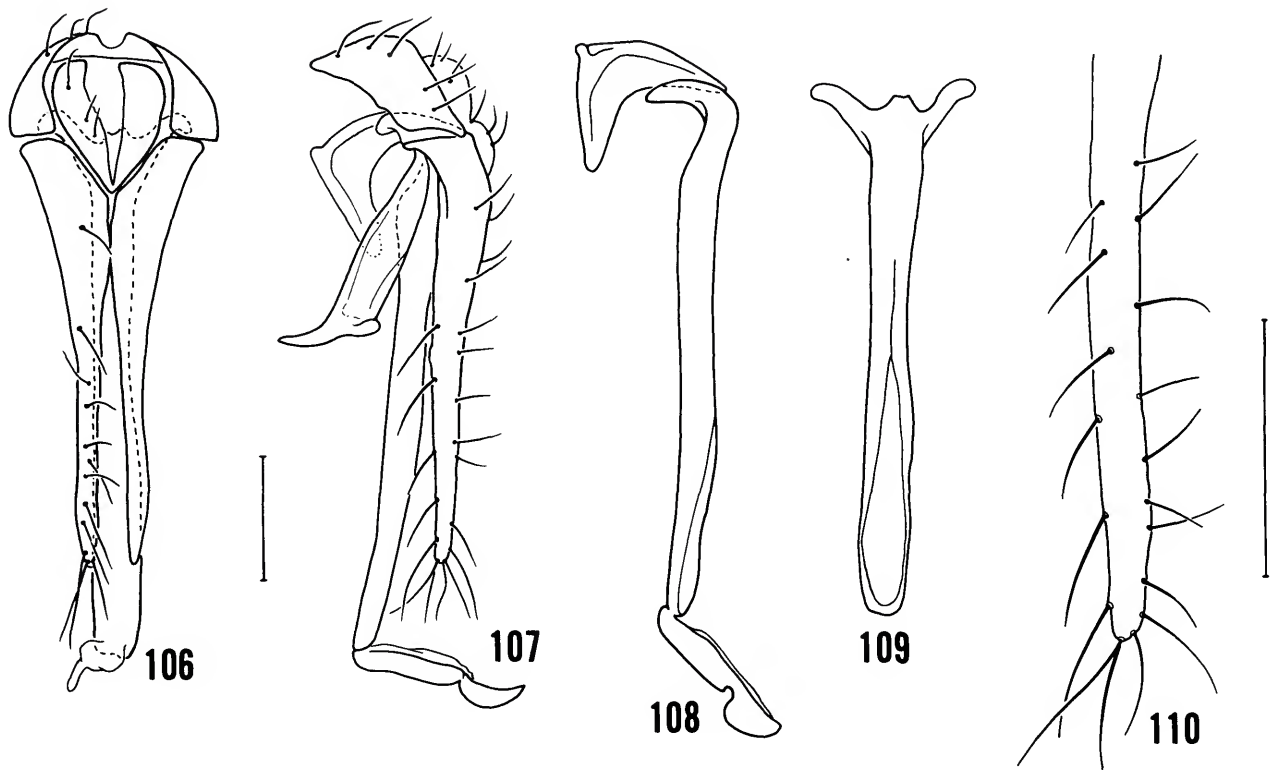
18. *Discocerina (Discocerina) flavipes* Cresson

Discocerina flavipes Cresson, 1941:35; 1946a:144–145, 150 [list, discussion, key].—Wirth, 1968:6 [Neotropical catalog].

SPECIMENS EXAMINED.—BELIZE. Belize District: Turneffe Islands: Rope Walk Cay (17°13′N, 87°51′W), Mar 1993, W.N. Mathis (2♀). Stann Creek District: Carrie Bow Cay, Jun 1985, W.N. Mathis (2♂); Coco Plum Cay, Mar 1988, W.N. Mathis (2♀); Man of War Cay, Jun 1985, Mar 1988, Jul 1989, W.N. Mathis, H.B. Williams (28♂, 10♀); Round Cay (near Coco Plum Cay), Mar 1988, W.N. Mathis (8♂, 3♀); Twin Cays (south end of East Island, West Bay), Malaise trap, Jun 1985, Jan 1987, Mar 1988, W.N. Mathis, C. Feller (9♂, 12♀); Wee Wee Cay, Jan 1987, Nov 1987, Mar 1988, Jul 1989, W.N. and D. Mathis, C. Feller (6♂, 6♀). Glover's Reef (Northwest Cay), Jul 1989, W.N. Mathis (19♂, 12♀).

DISTRIBUTION.—Widespread in the neotropics; Nearctic: USA (AZ, CA). Neotropical: Argentina, Belize, Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Mexico, Panama, Paraguay, Peru, Venezuela, West Indies (Dominica, Dominican Republic, Puerto Rico, St. Thomas).

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: specimens mostly



FIGURES 106–110.—*Glenanthe caribea:* 106, structures of the male terminalia (epandrium, cerci, surstyli, aedeagus), posterior aspect; 107, structures of the male terminalia (epandrium, cerci, surstyli, aedeagus, aedeagal apodeme, hypandrium), lateral aspect; 108, aedeagus and aedeagal apodeme, lateral aspect; 109, base of aedeagus, posterior aspect; 110, apex of surstylus, lateral aspect. Scale bars = 0.1 mm.

pale colored, yellowish to tan; facial series of setae three or more; face microtomentose, grayish yellow, lacking stripes; gena short; parafacial bearing a series of ventroclinate oriented setulae; postsutural supra-alar seta present; anterior notopleural seta inserted in anterior notopleural angle; and the forecoxa, femora, and tibiae pale, mostly yellowish.

20. *Discocerina (Discocerina) obscurella* (Fallén)

Notiphila obscurella Fallén, 1813:251.

Discocerina obscurella.—Haliday, 1839:224 [generic combination].—Foote and Eastin, 1974:401–408 [preimaginal stages].

Psilopa (Clasiopa) obscurella.—Stenhammar, 1844:160 [generic combination].

Clasiopa obscurella.—Schiner, 1864:57 [generic combination].

SPECIMENS EXAMINED.—BELIZE. Belize District: Turneffe Islands: Calabash Cays (17°17'N, 87°48'W), Mar 1993, W.N. Mathis (51♂, 11♀); Rope Walk Cay (17°13'N, 87°51'W), Mar 1993, W.N. Mathis (14♂, 6♀). Stann Creek District: Round Cay (near Coco Plum Cay), Mar 1988, W.N. Mathis (1♂); Twin Cays (south end of East Island, West Bay), Jan 1987, Mar 1988, W.N. Mathis, C. Feller (2♀); Wee Wee Cay, Jan, Nov 1987, Mar 1988, W.N. and D. Mathis, C. Feller (11♂, 18♀).

DISTRIBUTION.—Afrotropical: Cape Verde Islands, Kenya, Rodriguez Islands, Zaire. Nearctic: Canada (NF, ON, QB), USA (AK, AL, AR, AZ, CA, CT, DC, FL, GA, IA, IL, IN, KS, LA, MA, MD, ME, MI, MO, NC, ND, NE, NH, NJ, NM, NV, NY, OH, OR, PA, SC, SD, TN, TX, UT, VA, WA). Neotropical: Argentina, Bahamas, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Guatemala, Mexico (VRC), Panama, Paraguay, Peru, Venezuela, West Indies (Cuba, Dominica, Dominican Republic, Jamaica, Puerto Rico, St. Thomas). Palearctic: Algeria, Austria, Azores, Belgium, Bulgaria, Canary Islands, Croatia, Czech Republic, Estonia, Finland, France, Germany, Great Britain, Hungary, Iran, Italy, Macedonia, Morocco, Netherlands, Poland, Romania, Russia (European Territory, Far East), Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Yugoslavia.

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: antenna mostly yellowish although dorsal surface of pedicel and first flagellomere blackish; facial vertical series of setae three or more; face lacking vertical stripes, entirely silvery microtomentose; parafacial bearing setulae, microtomentum creamy whitish,

slightly contrasted in coloration with facial microtomentum; frons mostly microtomentose, lacking metallic blue or green stripes; forecoxa mostly dark colored, brownish to blackish brown; mesonotum sparsely microtomentose, subshiny; postsutural supra-alar seta present; and anterior notopleural seta inserted in anterior notopleural angle.

REMARKS.—This is apparently a very widespread species, occurring in most zoogeographic regions. The widespread distribution, however, may be an artifact, reflecting our lack of knowledge on the systematics of this species. For example, there are no recent taxonomic studies on the European species of *Discocerina,* and the older literature lacks sufficient detail, such as structures of the male genitalia, to facilitate reliable and accurate identifications.

21. *Discocerina (Discocerina) juniori,* new species

FIGURES 111, 112

DESCRIPTION.—Small shore flies, length 1.15–1.75 mm.

Head: Frons mostly microtomentose, dark colored, anterior margin blackish with sparse, gray, microtomentum, lacking metallic blue or green stripes. Antenna mostly dark colored, but faintly yellowish orange on medial surface of pedicel and 1st flagellomere at base. Face with vertical series of 4 setae, 3 above oral margin; face lacking vertical stripes, entirely microtomentose, silvery white, with some bluish black background coloration dorsally; parafacial bearing setulae, microtomentum silvery white, concolorous with face. Eye-to-cheek ratio 0.13.

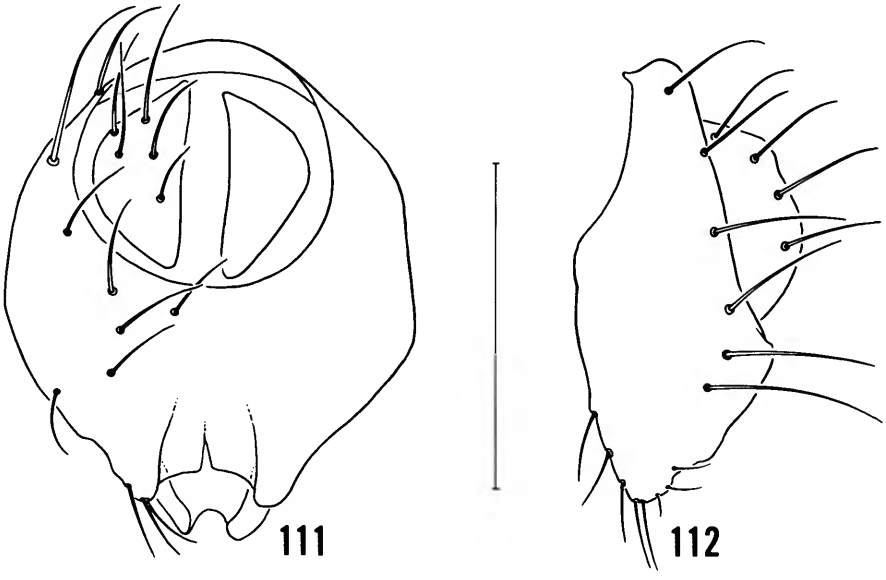
Thorax: Mesonotum densely microtomentose, but with faint subshiny luster, mostly grayish brown to brown, becoming grayer laterally; postsutural supra-alar seta present; anterior notopleural seta inserted in anterior notopleural angle. Wing hyaline; costal-vein ratio 0.6; M-vein ratio 0.6. Forecoxa mostly dark colored, brownish to blackish brown; forefemur with short row of 3–5 short, peg-like setae toward apex along posteroventral margin.

Abdomen: Male with sternites 3–5 similar, rectangular, longer than wide, moderately setulose. Male terminalia (Figures 111, 112): epandrium in posterior view narrowed ventrally, ventral margin produced as 2 short projections with a membranous, relatively shallow emargination between projections, projections bearing setulae subapically and apically; hypandrium shallowly concave, more so anteriorly, anterior margin broadly rounded, posterior margin shallowly emarginate.

TYPE MATERIAL.—The holotype male, allotype female, and three paratypes (1♂, 2♀) are labeled "BELIZE. StannCreek District: WeeWeeCay[,] 24 January 1987[,] W. Mathis and C.Feller." The holotype is double mounted (minute nadel in block of plastic elastomer), is in excellent condition, and is deposited in the NMNH.

ETYMOLOGY.—It is a pleasure to name this species after Earl David-Reynolds, better known locally as "Junior," in recognition of his assistance while conducting field work on Belizean cays.

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: antenna mostly



FIGURES 111, 112.—*Discocerina juniori,* new species: 111, male terminalia, posterior aspect; 112, same, lateral aspect. Scale bar = 0.1 mm.

black; vertical series of facial setae three or more; face lacking vertical stripes, entirely microtomentose, microtomentum silvery; parafacial bearing setulae, microtomentum silvery white, concolorous with facial microtomentum; frons mostly microtomentose, dark colored, anterior margin blackish, lacking metallic blue or green stripes; forecoxa mostly dark colored, brownish to blackish brown; mesonotum densely microtomentose, subshiny; postsutural supra-alar seta present; and anterior notopleural seta inserted in anterior notopleural angle.

22. *Discocerina* (*Lamproclasiopa*) *nitida* Cresson

Discocerina (*Lamproclasiopa*) *nitida* Cresson, 1918:57; 1946a:148, 151 [list, discussion, key].—Wirth, 1968:7 [Neotropical catalog].

SPECIMENS EXAMINED.—BELIZE. Belize District: Turneffe Islands: Calabash Cays (17°17'N, 87°48'W), Mar 1993, W.N. Mathis (4♂, 4♀). Stann Creek District: Twin Cays (east shore of East Island), Jan 1987, W.N. Mathis (1♀).

DISTRIBUTION.—Widespread throughout most of the neotropics; Neotropical: Argentina, Belize, Brazil, Colombia, Costa Rica, Ecuador, El Salvador, Mexico, Panama, Paraguay, Peru, Venezuela.

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: generally black; vertical series of facial setae three or more; face with three niveous, microtomentose, vertical stripes, medial stripe regular, lateral ones irregular, with two to three slightly widened areas; parafacials lacking setulae but with silvery white microtomentum that contrasts with black face; frons mostly microtomentose, lacking metallic blue or green stripes; legs, including coxae, black except for yellowish tarsi; mesonotum sparsely microtomentose, subshiny; postsutural supra-alar seta present; and anterior notopleural seta inserted in anterior notopleural angle.

23. *Discocerina* (*Lamproclasiopa*) *mera* Cresson

FIGURES 113-121

Discocerina mera Cresson, 1939:6.
Discocerina peculiaris Miyagi, 1977:15.—Zatwarnicki, 1991:303 [synonymy].

SPECIMENS EXAMINED.—BELIZE. Belize District: Turneffe Islands: Pelican Cay (17°24'N, 87°48'W), Mar 1993, W.N. Mathis (1♂). Lighthouse Reef: Half Moon Cay (17°12'N, 87°31'W), Apr 1993, W.N. Mathis (2♂, 2♀). Stann Creek District: Bread and Butter Cay, Mar 1988, W.N. Mathis (7♂, 6♀); Carrie Bow Cay, Mar 1988, W.N. Mathis (1♀); Coco Plum Cay, Mar 1988, W.N. Mathis (2♂, 2♀); Elbow Cay, Jul 1989, W.N. Mathis (2♂); Man of War Cay, Jun 1985, Nov 1987, Mar 1988, W.N. and D. Mathis (18♂, 10♀); Round Cay (near Coco Plum Cay), Mar 1988, W.N. Mathis (10♂, 11♀); Saddle Cay, Jul 1989, W.N. Mathis, H.B. Williams (2♀); South Water Cay, Jun 1985, W.N. Mathis (1♂); Stewart Cay, Mar 1988, W.N. Mathis (1♂, 1♀); Tobacco Range, Jul 1989, W.N. Mathis, H.B. Williams (12♂, 16♀); Twin Cays (Aanderaa Flats, mud flat near Lair Channel, north of Lair Channel, south end of East Island, south end of West Island, West Bay, West Pond), Jun 1985, Jan, Nov 1987, Mar 1988, Jul 1989, W.N. and D. Mathis, C. Feller, H.B. Williams (62♂, 36♀); Wee Wee Cay, Jan 1987, Jul 1989, W.N. Mathis, C. Feller (4♂, 1♀). Glover's Reef (Middle Cay), 28 Jul 1989, W.N. Mathis, H. Williams (11♂, 8♀).

DISTRIBUTION.—Australasian/Oceanian: Australia (NSW, QLD), Caroline Islands, Eniwetok Atoll, Fiji, Gilbert Islands, Guam, Hawaiian Islands, Marianas Islands, Marshall Islands, Papua New Guinea (Papua New Guinea, Bismarck Archipelago), Society Islands, Solomon Islands, Tahiti. Neotropical: Belize, West Indies (Dominican Republic, Grand Cayman, Puerto Rico, St. Lucia). Oriental: Malaya, Ryukyu Islands, Taiwan (type locality of *D. mera*), Thailand, Vietnam. Palearctic: Japan (Shikoku, type locality of *D. peculiaris*).

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: generally black except for tarsi; vertical series of facial setae three or more (Figures 113, 114, 117); face entirely black, lacking vertical stripes, sparsely invested with whitish microtomentum; parafacials (Figure 117) narrow, lacking setulae, black, concolorous with face; frons (Figure 115) black but with sparse investment of whitish microtomentum, especially on anterior margin, lacking metallic blue or green stripes; legs, including coxae, black except for yellowish tarsi; mesonotum sparsely microtomentose, subshiny; postsutural supra-alar seta present; and anterior notopleural seta (Figure 121) inserted in anterior notopleural angle.

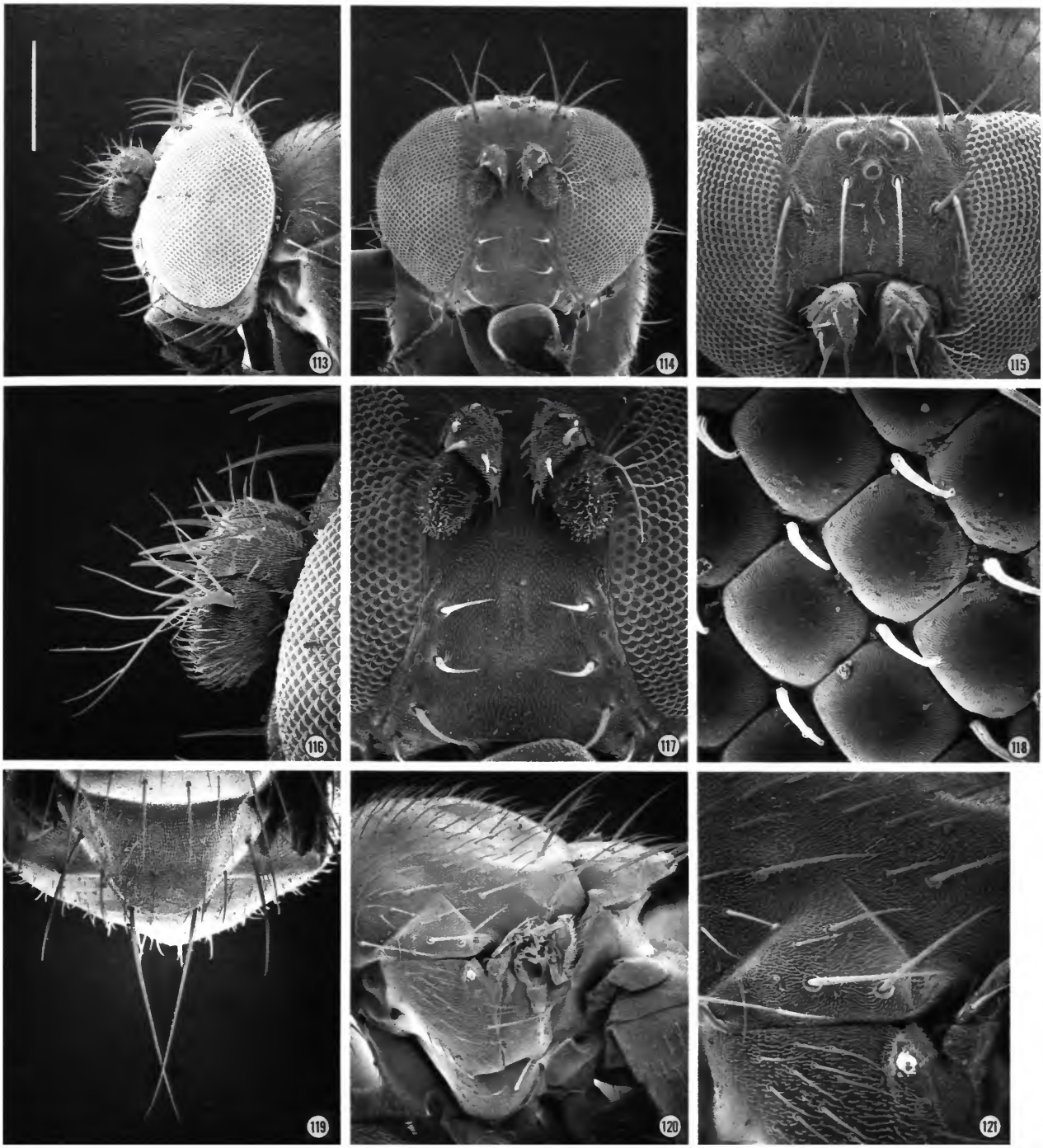
REMARKS.—This species was originally described from specimens collected in the Orient (Taiwan and Japan), and collection of it as part of this study provided the first records of its occurrence in the Western Hemisphere (Zatwarnicki, 1991:304) and constitutes a rather remarkable range extension for any shore-fly species. Its occurrence on St. Lucia (West Indies) and Belize, at the eastern and western margins of the Caribbean, makes me suspicious that this species will be found throughout the Caribbean and perhaps in the New World generally. I further suspect that its occurrence in the New World is an introduction.

Genus *Hydrochasma* Hendel

Hydrochasma Hendel, 1936:101 [type species: *Hydrochasma zernyi* Hendel, 1936 (= *Discocerina faciale* Williston, 1896), by monotypy].

Key to Species of *Hydrochasma* Occurring on Belizean Cays

1. Forefemur with anteroventral, comb-like row of setulae . . . . . ***H. fasciale*** (Williston)
   Forefemur lacking anteroventral row of closely set setulae 2



FIGURES 113–121.—Scanning electron micrographs of *Discocerina mera* (Belize, Stann Creek District, Tobacco Range; scale length in parenthesis; scale bar for all photographs = Figure 113): 113 head, lateral aspect (250 μm); 114, same, anterior aspect (250 μm); 115, frons, anterodorsal aspect (150 μm); 116, antenna, lateral aspect (100 μm); 117, face, anterior aspect (120 μm); 118, ommatidia and interfacetal setae of compound eye, lateral aspect (10 μm); 119, scutellum, dorsal aspect (176 μm); 120, thorax, lateral aspect (231 μm); 121, notopleuron, lateral aspect (100 μm).

2. Antenna mostly yellowish; parafacial silvery white, contrasted with mostly yellowish face; face yellowish, extreme lateral margins brownish black; abdomen with wedge-shaped, silvery gray microtomentose areas laterally on tergite 4 and sometimes on tergite 3 . . . . . ***H. incisum*** (Coquillett)

Antenna mostly black; parafacial and face concolorous, silvery white; tergites generally lacking wedge-shaped areas laterally, only 5th tergite silvery gray . . . . . ***H.*** species

24. *Hydrochasma incisum* (Coquillett)

Discocerina incisa Coquillett, 1902:182.

Hydrochasma incisum.—Cresson, 1942:113 [generic combination].—Wirth, 1968:8 [Neotropical catalog].

SPECIMENS EXAMINED.—BELIZE. Belize District: Turneffe Islands: Calabash Cays (17°17'N, 87°48'W), Mar 1993, W.N. Mathis (40♂, 17♀). Stann Creek District: Man of War Cay, Nov 1987, W.N. and D. Mathis (2♂); Twin Cays (south end of East Island, West Bay), Jan 1987, Mar 1988, W.N. Mathis, C. Feller (2♂, 3♀); Wee Wee Cay, Jan, Nov 1987, Mar 1988, W.N. and D. Mathis, C. Feller (36♂, 26♀).

DISTRIBUTION.—Nearctic: USA (FL). Neotropical: Belize, Bolivia, Brazil, Mexico, Panama, West Indies (Dominica, Grand Cayman, Jamaica, Puerto Rico, St. Vincent).

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: antenna mostly yellowish, at most with dorsal surface of pedicel and first flagellomere dark; parafacial silvery white, distinctly contrasted with mostly yellowish face; forefemur lacking a comb-like row of stout setulae along anteroventral surface; tibiae mostly gray; and abdomen with wedge-shaped silvery gray areas laterally on tergite four and sometimes three.

25. *Hydrochasma faciale* (Williston)

Discocerina faciale Williston, 1896:396.

Hydrochasma zernyi Hendel, 1936:103.—Wirth, 1968:8 [synonymy].

Hydrochasma capax Cresson, 1938:26.—Wirth, 1968:8 [synonymy].

Hydrochasma faciale.—Wirth, 1968:8 [generic combination; Neotropical catalog].—Mathis and Edmiston, 1991:825–826 [discussion].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Twin Cays (south end of East Island), Mar 1988, W.N. Mathis (1♂).

DISTRIBUTION.—Nearctic: USA (AZ, CA, TX). Neotropical: Argentina, Belize, Brazil, Ecuador, Guatemala, West Indies (Dominica, Dominican Republic, Puerto Rico, St. Vincent).

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: antennal coloration nearly evenly divided between yellowish and dark gray, dorsal and anterior surfaces of pedicel and first flagellomere extensively dark gray; parafacial silvery white, concolorous with facial coloration; forefemur bearing a distinctive, comb-like row of stout setulae along anteroventral surface; tibiae mostly gray; and abdomen lacking wedge-shaped silvery gray areas.

26. *Hydrochasma* species

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Twin Cays (Aanderaa Flats, West Bay), Mar 1988, W.N. Mathis (1♂, 1♀).

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: antenna mostly dark gray; parafacial silvery white, concolorous with facial coloration; forefemur lacking a distinctive, comb-like row of stout setulae along anteroventral surface; tibiae mostly gray; and abdomen lacking wedge-shaped silvery gray areas.

REMARKS.—This species is represented by a single male and female, and for lack of an adequate type series, I defer describing it until additional specimens are available.

Genus *Polytrichophora* Cresson

Polytrichophora Cresson, 1924:161 [type species: *Polytrichophora agens* Cresson, 1924, by original designation].

Key to Species of *Polytrichophora* Occurring on Belizean Cays

1. Parafacial silvery white, distinctly contrasted with yellowish face . . . . . ***P. pulchra*** Cresson

   Parafacial and face concolorous 2
2. Forefemur with comb-like row of stout, anteroventral setulae . . . . . ***P. conciliata*** Cresson

   Forefemur lacking comb-like row of anteroventral setulae 3
3. Tibiae heavily invested with gray microtomentum, mostly concolorous with femora; gena high, height nearly equal to combined length of pedicel and 1st flagellomere; large species, length 2.3–2.9 mm . . . . . ***P. agens*** Cresson

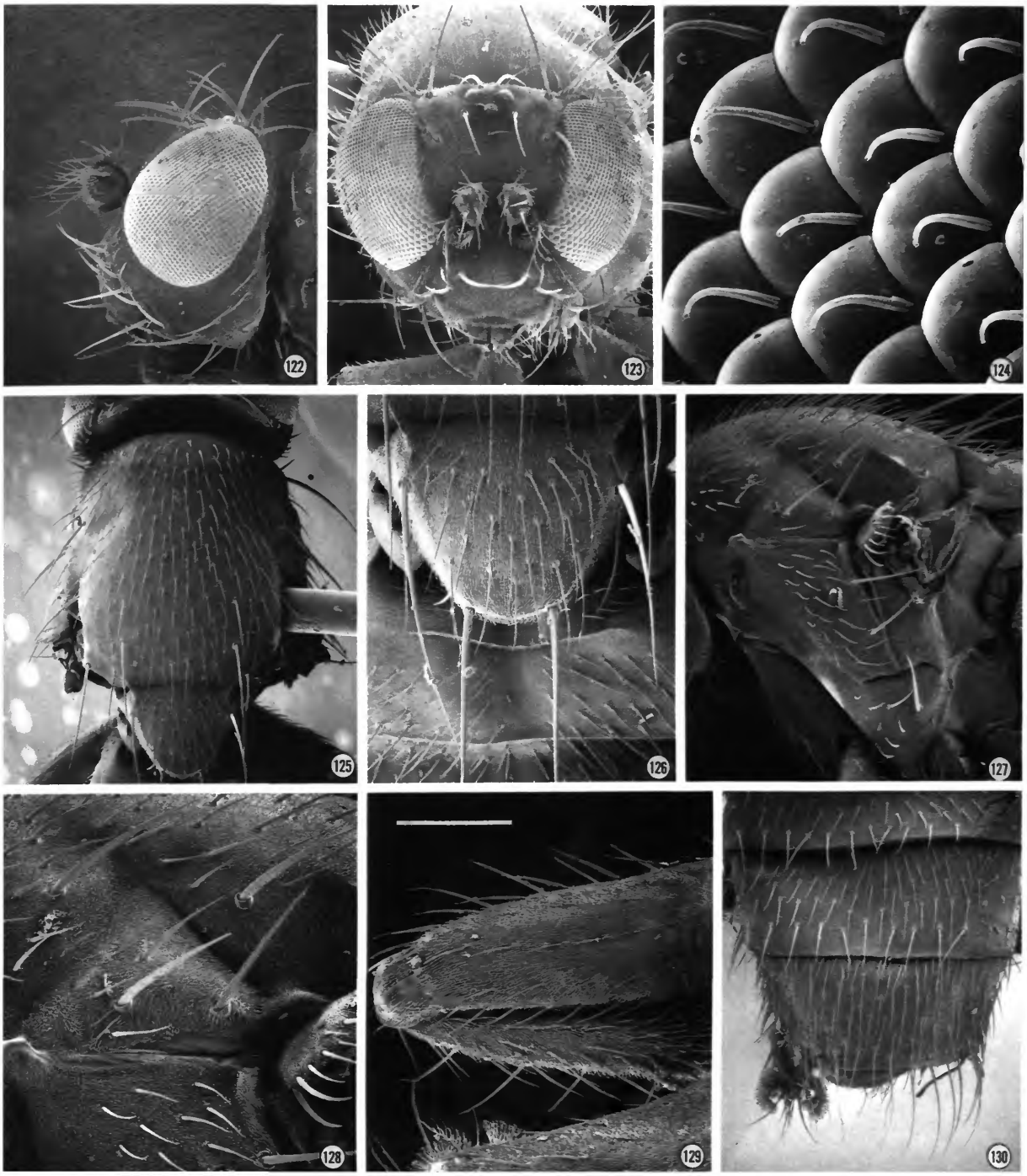
   Tibiae yellowish, contrasted with gray femora; gena short, height barely equal to length of 1st flagellomere; small species, length 1.70–2.15 mm . . . . . ***P. reginae,*** new species

27. *Polytrichophora agens* Cresson

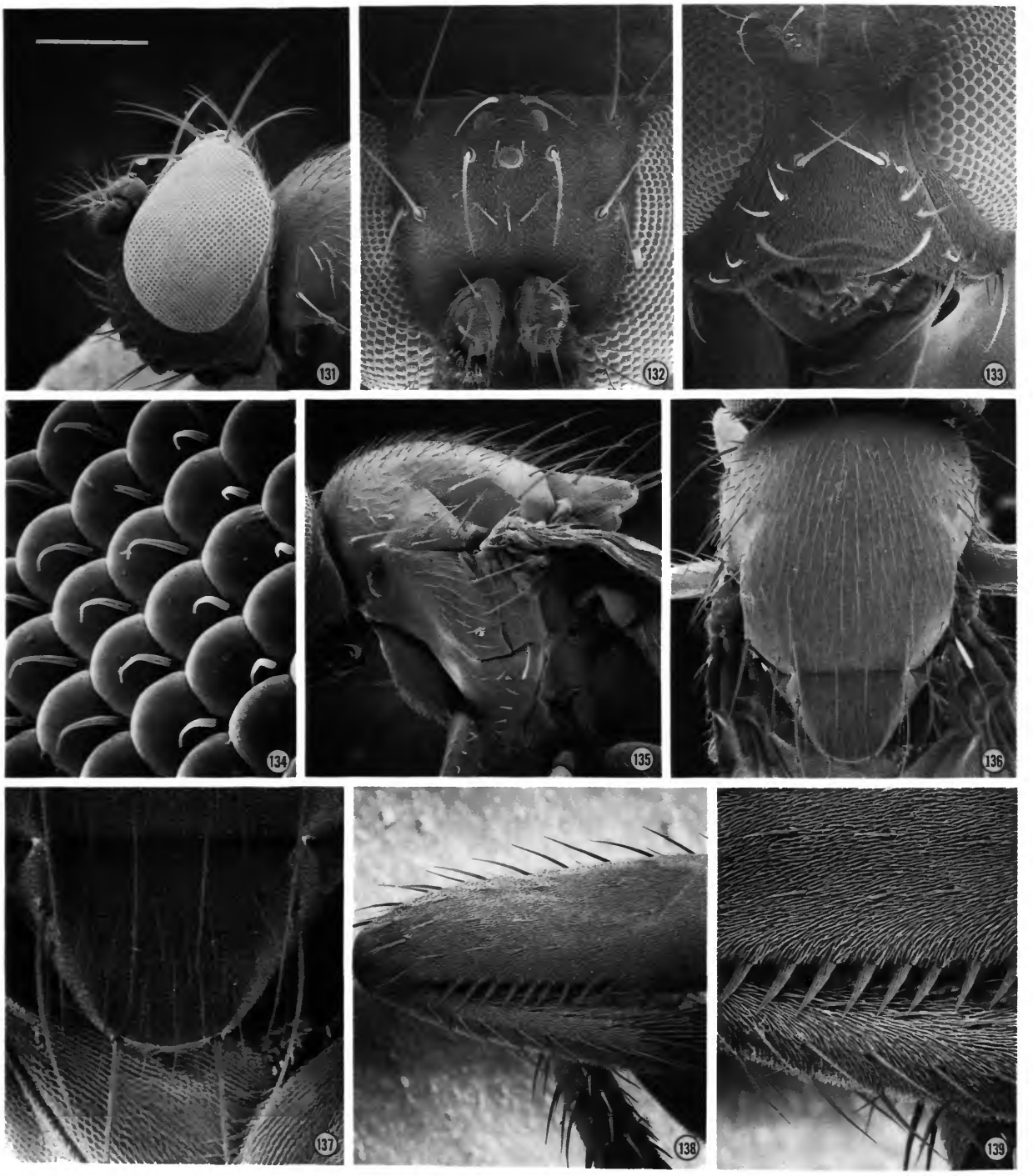
FIGURES 122–130

Polytrichophora agens Cresson, 1924:161.—Wirth, 1968:8 [Neotropical catalog].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Bread and Butter Cay, Mar 1988, W.N. Mathis (1♀); Man of War Cay, Nov 1987, W.N. and D. Mathis (1♀); Round Cay (near Coco Plum Cay), Mar 1988, W.N. Mathis (1♂, 1♀); Twin Cays (Aanderaa Flats, north of Lair Channel, south end of West Island, West Pond), Nov 1987, Mar 1988, W.N. and D. Mathis (35♂, 29♀); Wee Wee Cay, Nov 1987, Mar 1988, W.N. and D. Mathis (2♂, 1♀).



FIGURES 122–130.—Scanning electron micrographs of *Polytrichophora agens* (Belize, Stann Creek District, Twin Cays (Aandreaa Flats); scale length in parenthesis; scale bar for all photographs = Figure 129): 122, head, lateral aspect (0.30 mm); 123, same, anterior aspect (0.30 mm); 124, ommatidia and interfacetal setae, lateral aspect (12 μm); 125, mesonotum, dorsal aspect (0.38 mm); 126, scutellum, dorsal aspect (176 μm); 127, thorax, lateral aspect (0.30 mm); 128, notopleuron, lateral aspect (136 μm); 129, forefemur, posterior aspect (120 μm); 130, abdomen, dorsal aspect (0.27 mm).



FIGURES 131–139.—Scanning electron micrographs of *Polytrichophora conciliata* (Belize, Stann Creek District, Wee Wee Cay; scale length in parenthesis; scale bar for all photographs = Figure 131): 131, head, lateral aspect (250 μm); 132, frons, anterodorsal aspect (150 μm); 133, face, anterior aspect (150 μm); 134, ommatidia and interfacetal setae of compound eye, lateral aspect (15 μm); 135, thorax, lateral aspect (0.30 mm); 136, mesonotum, dorsal aspect (0.27 mm); 137, scutellum, dorsal aspect (120 μm); 138, forefemur bearing comb-like row of setae along anteroventral surface, anterior aspect (100 μm); 139, same, enlargement of setae (50 μm).

DISTRIBUTION.—Primarily coastal; Nearctic: Maine to Texas (type locality is Galveston, Texas). Neotropical: Bahamas, Belize, West Indies (Dominican Republic, Grand Cayman, Puerto Rico).

DIAGNOSIS.—This species can be distinguished from congeners by the following combination of characters: large specimens, length 2.3–2.9 mm; parafacial color not markedly different from that of middle of face; parafacial becoming much wider ventrally; gena high, height about equal to combined length of pedicel and first flagellomere; forefemur lacking a row of 9–10 short, stout setulae along apical one-half of anteroventral surface; fifth tergite of male not markedly narrowed posteriorly; and conformation of the structures of the male terminalia, especially the ventral one-third of the epandrium, which is strongly curved anteriorly, tapered, forming a beak-like process.

28. *Polytrichophora conciliata* Cresson

FIGURES 131–139

Polytrichophora conciliata Cresson, 1924:161; 1942:114 [review].—Johnson, 1925:271 [list, Maine, Massachusetts]; 1930:153 [list, Massachusetts].—Wirth, 1965:740 [Nearctic catalog].

SPECIMENS EXAMINED.—BELIZE. Belize District: Turneffe Islands: Rope Walk Cay (17°13′N, 87°51′W), Mar 1993, W.N. Mathis (1♀). Stann Creek District: Man of War Cay, Nov 1987, Jul 1989, Jun 1990, W.N. and D. Mathis, H.B. Williams (19♂, 24♀); Round Cay (near Coco Plum Cay), Mar 1988, W.N. Mathis (4♂, 5♀); Saddle Cay, Mar 1988, W.N. Mathis (3♂, 4♀); Stewart Cay, Mar 1988, Jul 1989, W.N. Mathis, H.B. Williams (4♂, 14♀); Tobacco Range, Jul 1989, W.N. Mathis, H.B. Williams (4♂, 4♀); Twin Cays (Aanderaa Flats, dock area, east shore of East Island, mud flat near Lair Channel, south end of West Island, West Bay), Jan 1987, Mar 1988, Jul 1989, Jun 1990, W.N. Mathis, C. Feller, H.B. Williams (61♂, 84♀); Wee Wee Cay, Jan, Nov 1987, Mar 1988, Jul 1989, W.N. and D. Mathis, C. Feller (11♂, 25♀). Glover's Reef (Southwest Cay), Jul 1989, W.N. Mathis (7♂, 3♀).

DISTRIBUTION.—Nearctic: Canada (QB), USA (AL, CA, FL, GA, LA, MA, MD, MI, MO, MS, NC, NJ, NY, OK, TX, VA). Neotropical: Argentina, Belize, Bolivia, Colombia, Ecuador, El Salvador, Costa Rica, Mexico, Trinidad and Tobago, West Indies (Dominica, Grand Cayman).

DIAGNOSIS.—This species can be distinguished from congeners by the following combination of characters: parafacial color not markedly different from that of middle of face, usually silvery white; forefemur with anteroventral row of 9–10 short, stout setae on apical one-half; anterior margin of wing lacking large, spine-like setae; and conformation of the male terminalia, especially the ventral one-third of the epandrium, which in lateral view is curved anteriorly, more or less parallel sided, digitiform.

REMARKS.—This is the first report of this species from the neotropics; however, the species is widespread there.

The male terminalia, especially the apex of the epandrium (= fused surstylus ?), vary in shape, perhaps clinally. Males from the Atlantic coast of the United States have the apex of the epandrium in lateral view more or less parallel sided, sometimes slightly enlarged apically, whereas this structure in males from the neotropics is gradually tapered toward a more acutely pointed apex.

29. *Polytrichophora pulchra* (Cresson)

Discocerina pulchra Cresson, 1918:56.

Polytrichophora pulchra.—Cresson, 1946a:143, 151 [list, key].—Wirth, 1968:8 [Neotropical catalog].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Man of War Cay, Nov 1987, W.N. and D. Mathis (1♂, 1♀); Twin Cays (south end of West Island), Jan 1987, W.N. Mathis, C. Feller (1♂); Wee Wee Cay, Jan 1987, W.N. Mathis, C. Feller (1♀).

DISTRIBUTION.—Neotropical: Belize, Colombia, Costa Rica, Ecuador, Honduras, Panama, Peru, West Indies (Dominica).

DIAGNOSIS.—This species is readily distinguished from congeners by the following combination of characters: parafacial color contrasted sharply with much darker middle face; parafacial with little or no dilation ventrally; middle face with gray to yellowish gray vertical vitta extended from oral margin to antennal bases, sharply contrasted with darker, lateral margins of middle face; mesonotum at most subshiny, grayish brown to brown.

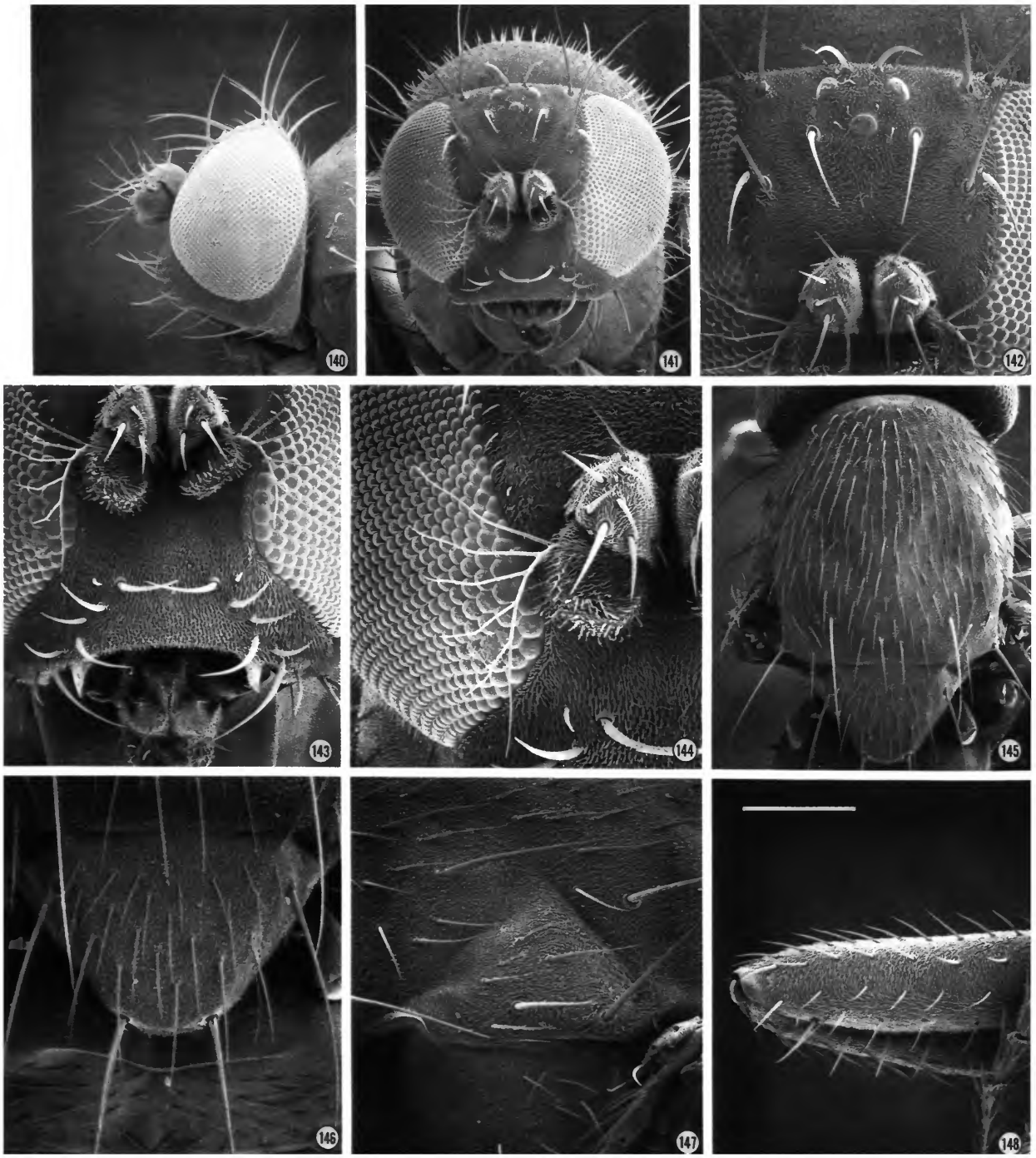
30. *Polytrichophora reginae*, new species

FIGURES 140–150

DESCRIPTION.—Small to moderately small shore flies, length 1.7–2.15 mm.

Head: Frons dull, heavily microtomentose, 2-toned, mostly tan with some faint golden reflections on posterior two-thirds, anterior one-third (from level of fronto-orbital setae anteriad), gray. Antenna mostly yellow to yellowish orange, anterior portion of pedicel and basodorsal area of 1st flagellomere with some blackish coloration; arista with 5 dorsal rays. Face at narrowest point about equal to combined length of pedicel and 1st flagellomere; face densely microtomentose, microtomentum with shiny to pearly luster, mostly white but with considerable gold coloration in antennal grooves and extended laterally onto parafacial; parafacials not markedly differing from middle of face in color, more golden dorsally, becoming whiter ventrally; parafacials with slight to considerable ventral dilation; parafacials 2–3 times wider ventrally than dorsally; gena relatively short, less than one-fourth eye height; eye-to-cheek ratio averaging 0.13.

Thorax: Mesonotum mostly dull, densely microtomentose, concolorous with posterior two-thirds of frons; pleural area blackish gray. Anterior margin of wing lacking spine-like setae; costal-vein ratio averaging 0.43; M-vein ratio averaging

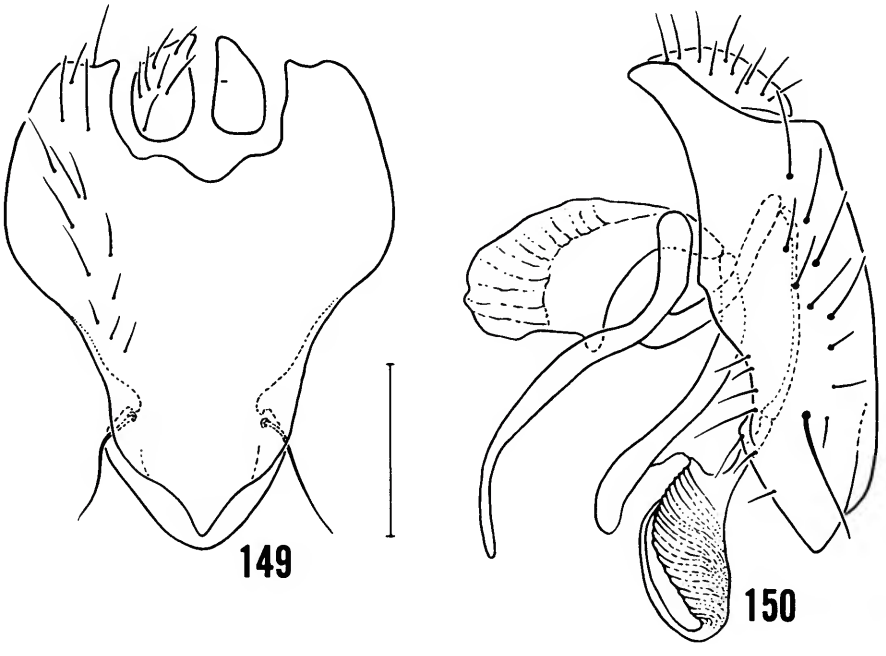


FIGURES 140–148.—Scanning electron micrographs of *Polytrichophora reginae,* new species (Belize, Stann Creek District, Wee Wee Cay; scale length in parenthesis; scale for all photographs = Figure 148): 140, head, lateral aspect (231 μm); 141, same, anterior aspect (231 μm); 142, frons, anterodorsal aspect (120 μm); 143, face, anterior aspect (120 μm); 144, antenna, anterior aspect (15 μm); 145, mesonotum, dorsal aspect (250 μm); 146, scutellum, dorsal aspect (120 μm); 147, notopleuron, lateral aspect (100 μm); 148, forefemur, anterior aspect (100 μm).

0.57. Forefemur lacking row of 9–10 short, stout setae along apical one-half of anteroventral surface; forefemur with a row of 7–9, well-developed, evenly spaced posteroventral setae, each equal to width of femur; tibiae mostly yellowish; basal tarsomeres yellow, apical 1–2 brown.

Abdomen: Tergites dull to subshiny, gray to blackish brown; tergites 1–4 bicolored, mostly blackish brown dorsally, gray lateroventrally; tergites 3–4 of male subequal, 4th not unusually longer, 3rd tergite not produced ventrolaterally; dorsum of 5th tergite of male not darker than preceding tergites and usually with distinct, semicircular, grayish areas laterally; 5th tergite of male in dorsal view blunt, bearing row of 6–10, distinctly larger setae along extreme posterior margin with posterodorsal orientation; 5th tergite of male also gray on posterior one-half to one-third; 4th and 5th sternites of male with dense row of setulae along posterior margin. Male terminalia (Figures 149, 150): epandrium not connected dorsally above cerci (Figure 149), in posterior view tapered ventrally to an acutely pointed apex under which lies cordate-shaped, laterally flanged anterior margin (Figure 149); epandrium in lateral view slightly curved anteroventrally, pointed apically, and with subapical ledge that also ends ventrally in a point, bearing a large, subapical seta laterally (Figure 150); gonite in lateral view rod-like, shallowly curved (Figure 150); aedeagus in lateral view shallowly sinuous, bifurcate apically, anterior process sclerotized, posterior process longer, wider, membranous, apex complicated with gill-like folds laterally, apex slender, recurved anterodorsally giving appearance of rounded apex (Figure 150); aedeagal apodeme with extended flange fan-like (Figure 150); hypandrium in lateral view sinuous (Figure 150), in posterior view deeply Y-shaped.

TYPE MATERIAL.—The holotype male, allotype female, and 15 paratypes (3♂, 12♀; USNM) are labeled "BELIZE.StannCreek Dist: Wee Wee Cay, 6–9 November 1987[,] W.N. and D. Mathis/HOLOTYPE Polytrichophora reginae ♂ W.N.Mathis USNM [species name and gender handwritten, red]." A female paratype is from the same district in Belize as follows: Twin Cays (Aanderaa Flats), Nov 1987, W.N. and D. Mathis (1♀; USNM). The holotype is double mounted (minuten in a block of plastic), is in excellent condition, and is deposited in the NMNH. Other paratypes are as follows: PERU. Cuzco: Paucartambo, Atalaya (400 m), Rio Alto Madre de Dios, 4 Sep 1988, W.N. Mathis (2♂; USNM). Huánuco: Huánaco (10 km N), Rio Huallaga, 4 Feb 1984, W.N. Mathis (2♂, 1♀; USNM). Madre de Dios: Manu, Cocha Salvador (240 m) Rio Manu, 14 Sep 1988, W.N. Mathis (1♂, 1♀; USNM); Manu, Diamante (400 m, 12°25′S, 70°57′W), Rio Alto Madre de Dios, 7 Sep 1988, W.N. Mathis (2♂, 1♀; USNM); Pakitza, Rio Manu (250 m, 12°7′S, 70°58′W), 9–23 Sep 1988, W.N. Mathis (4♂, 4♀; USNM); Manu, Romero, Rio Manu, 8 Sep 1988, W.N. Mathis (1♀; USNM). WEST INDIES. *St. Lucia.* Marquis (1.5 km S, 14°01′N, 60°55′W), 17 Jun 1992, W.N. and D. Mathis (2♂, 3♀; USNM).



FIGURES 149, 150.—*Polytrichophora reginae,* new species: 149, male terminalia, posterior aspect; 150, same, lateral aspect. Scale bar = 0.1 mm.

OTHER SPECIMENS EXAMINED.—BOLIVIA. El Beni: Huachi, Sep, W.M. Mann (1♂, 1♀; USNM); Rosario Lake, Rogagua, 28 Oct–9 Nov 1921, W.M. Mann (1♀; USNM). ECUADOR. El Oro: Pasaje (6 km E), 13 Jan 1978, W.N. Mathis (1♂, 6♀; USNM). Guayas: Gala, Dec 1955, J.R. Levi-Castillo (5♀; USNM). Loja: Catamayo, Dec 1955, J.R. Levi-Castillo (4♂, 1♀; USNM). Manabí: Pichincha, Aug 1955, J.R. Levi-Castillo (6♀; USNM). MEXICO. Chiapas: Finca Esperanza, 26 Aug 1956, R. Nettel F. (1♂; USNM); Puenta Macalapa (light trap), 22 May 1964, F.S. Blanton (7♂, 5♀; USNM). San Luis Potosi: Tamazunchale, 23 Nov 1946, F.E. Skinner (1♂, 1♀; USNM). Veracruz: Fortin de las Flores (light trap), Jun 1964, F.S. Blanton (3♂; USNM). PANAMA. Panama: Canal Zone, Gamboa, Pipeline Road, Jul 1967, W.W. Wirth (1♂; USNM); Canal Zone, Pedro Miguel, R.C. Shannon (1♂; USNM); Tocumen, 13 Feb 1953, F.S. Blanton (1♂; USNM). PERU. Huánuco: Tingo Maria (1 km S), 6 Feb 1984, W.N. Mathis (3♀; USNM). WEST INDIES. *Jamaica.* Wag Water River, 25 Feb 1969, W.W. Wirth (1♀; USNM).

DISTRIBUTION.—Neotropics: Belize, Bolivia, Ecuador, Mexico, Panama, Peru, West Indies (Jamaica, St. Lucia).

ETYMOLOGY.—It is a pleasure to name this species after Regina Lewis, frequent matriarch of Carrie Bow Cay and whose many culinary skills made our visits to Carrie Bow Cay so pleasurable.

DIAGNOSIS.—This species is readily distinguished from congeners by the following combination of characters: parafacial concolorous with middle face; parafacial with little or no dilation ventrally; face unicolorous; mesonotum at most subshiny, grayish brown to brown; forefemur lacking comb-like row of stout, anteroventral setulae; tibiae yellowish; and fifth tergum of male in dorsal view blunt, bearing 6–10 distinctly larger setae along posterior margin with posterodorsal orientation.

Tribe PSILOPINI Cresson

Genus *Ceropsilopa* Cresson

Ceropsilopa Cresson, 1917:340 [type species: *Ceropsilopa nasuta* Cresson, 1917, by original designation].

Key to Species of *Ceropsilopa* Occurring on Belizean Cays

1. Thorax, legs, and basal segments of abdomen whitish yellow; face, anterior 1/2 of frons, and mesonotum densely, whitish microtomentose . . . ***C. costalis*** Wirth
   Thorax and abdomen black, subshiny to shiny; face, frons, and mesonotum mostly black, face at most sparsely microtomentose 2
2. Legs, including coxae, entirely yellow; 1st flagellomere about two times length of pedicel; arista with about 8 dorsal rays; lateral margins of face with silvery white microtomentum . . . . . ***C. coquilletti*** Cresson
   Coxae and mid and hind femora dark, sometimes black; 1st flagellomere about three times length of pedicel; arista bearing about 11 dorsal rays; face entirely shiny, deep purplish black . . . . . ***C. nasuta*** Cresson

31. *Ceropsilopa coquilletti* Cresson

Ceropsilopa coquilletti Cresson, 1922:136; 1946a:157, 162 [list, key].—Wirth, 1968:11 [Neotropical catalog].

SPECIMENS EXAMINED.—BELIZE. Belize District: Turneffe Islands: Blackbird Caye (17°19'N, 87°48'W), Mar 1993, W.N. Mathis (13♂, 7♀); Calabash Cays (17°17'N, 87°48'W), Mar 1993, W.N. Mathis (1♀). Lighthouse Reef: Half Moon Cay (17°12'N, 87°31'W), Apr 1993, W.N. Mathis (1♂, 1♀). Stann Creek District: Bread and Butter Cay, Mar 1988, W.N. Mathis (7♂, 3♀); Carrie Bow Cay, Jun 1984, Jan 1987, Jul 1989, W.N. Mathis, C. Feller, H.B. Williams (22♂, 44♀); Stewart Cay, Mar 1988, W.N. Mathis (1♂); Twin Cays (south end of East Island), Jul 1989, W.N. Mathis, H.B. Williams (1♀). Glover's Reef (Long Cay, Middle Cay, Northwest Cay, Southwest Cay), Jul 1989, W.N. Mathis, H.B. Williams (16♂, 20♀).

DISTRIBUTION.—Widespread, mostly in the neotropics; Australasian/Oceanian: Hawaiian Islands (Hawaii, Maui, Molokai, Kauai, Oahu). Nearctic: Bermuda, USA (CA, FL, MD). Neotropical: Argentina, Bahamas, Belize, Colombia, Grand Cayman, Mexico, Panama, Trinidad, Venezuela, West Indies (Haiti, Puerto Rico).

NATURAL HISTORY.—This species occurs commonly in association with *Suaeda linearis* (Elliott) Moquin (Chenopodiaceae), and I suspect that the larvae are miners of this plant.

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: face shiny, narrow, wrinkled and with a longitudinally obtuse carina, lateral margins immediately adjacent to parafacial microtomentose, silvery white; first flagellomere about twice length of pedicel; pedicel bearing small to minute seta; arista bearing approximately eight dorsal rays; coxae, femora, and tibiae pale, yellowish.

32. *Ceropsilopa costalis* Wirth

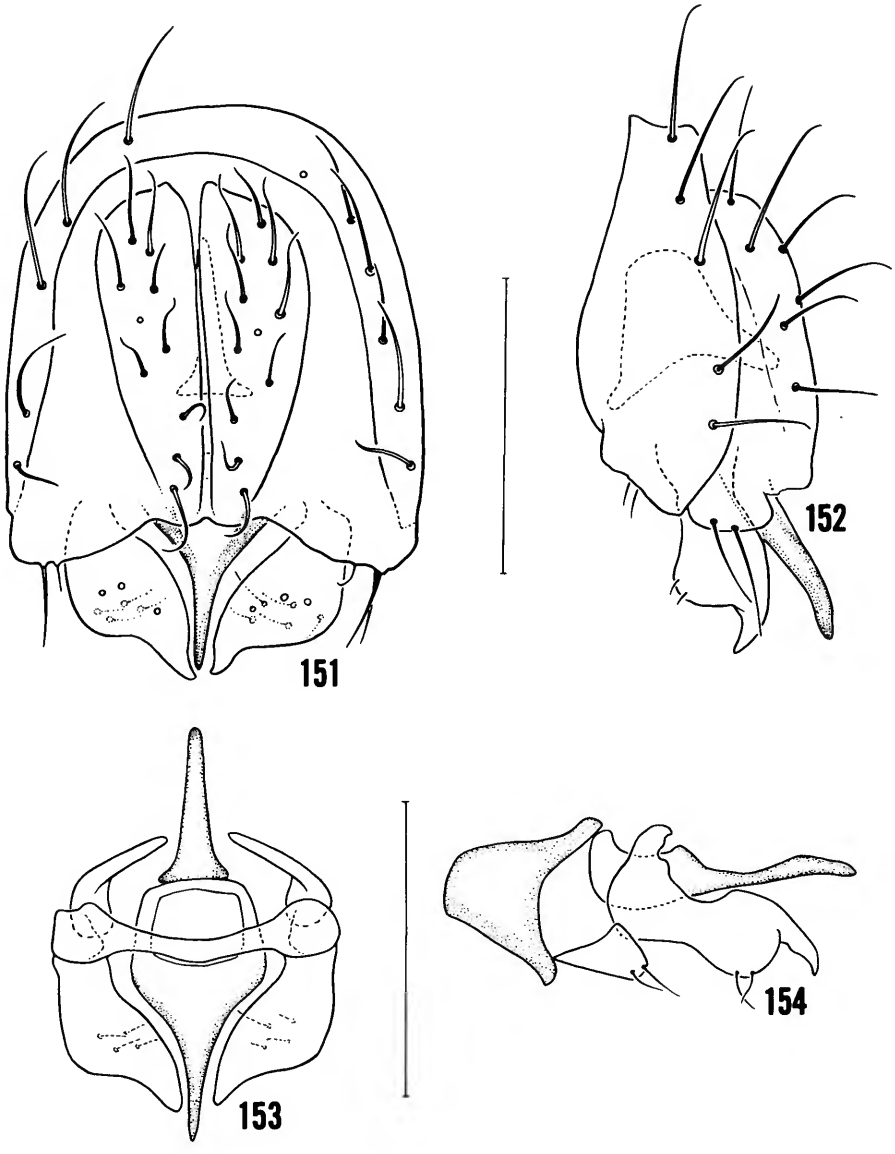
FIGURES 151–154

Ceropsilopa costalis Wirth, 1956:12; 1965:742 [Nearctic catalog]; 1968:11 [Neotropical catalog].

SPECIMENS EXAMINED.—BELIZE. Belize District: Turneffe Islands: Blackbird Caye (17°19'N, 87°48'W), 27–30 Mar 1993, W.N. Mathis (3♂, 5♀; USNM).

DISTRIBUTION.—Nearctic: USA (FL, VA). Neotropical: Bahamas, Belize, West Indies (Grand Cayman, Jamaica).

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: coloration generally pale with distinctly white microtomentum on much of the dorsum. Only the apical segments of the abdomen are dark



FIGURES 151–154.—*Ceropsilopa costalis:* 151, external male terminalia, posterior aspect; 152, same, lateral aspect; 153, internal structures of male terminalia, ventral aspect; 154, same, lateral aspect. Scale bars = 0.1 mm.

colored. The darkened costal margin of the wing is also distinctive.

33. *Ceropsilopa nasuta* Cresson

Ceropsilopa nasuta Cresson, 1917:341; 1946a:158, 163 [list, key].—Wirth, 1968:11 [Neotropical catalog].

SPECIMENS EXAMINED.—BELIZE. Belize District: Turneffe Islands: Blackbird Caye (17°19'N, 87°48'W), Mar 1993, W.N. Mathis (1♀). Stann Creek District: Bread and Butter Cay, Mar 1988, W.N. Mathis (1♂); Man of War Cay, Jun 1985, W.N. Mathis (4♀); Twin Cays (dock area, south end of West Island), Jan 1987, W.N. Mathis, C. Feller (1♂, 1♀).

DISTRIBUTION.—Nearctic: USA (FL). Neotropical: Belize, Brazil, Trinidad, West Indies (Cuba, Puerto Rico).

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: first flagellomere elongate, about three times length of pedicel; pedicel small to

minute; arista bearing about 11 dorsal rays; face narrow, obtusely carinate, prominent above facial setae, entirely shiny purplish black; frons not depressed; coxae and mid and hind femora blackish basally, forefemur dark on basal one-third; tibiae pale.

Genus *Leptopsilopa* Cresson

Leptopsilopa Cresson, 1922:136 [type species: *Psilopa similis* Coquillett, 1900, by original designation].

34. *Leptopsilopa similis* (Coquillett)

Psilopa similis Coquillett, 1900b:33.
Leptopsilopa similis.—Cresson, 1938:31 [generic combination]; 1946a:155 [review].—Wirth, 1968:10 [Neotropical catalog].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Wee Wee Cay, Mar 1988, W.N. Mathis (3♂, 3♀).

NATURAL HISTORY.—All of the specimens were collected on Wee Wee Cay in association with the freshwater transient pool that sometimes occurs in the slight depression toward the northwestern end of the island (see description of Wee Wee Cay, p. 9). A large algal mat covers the mud substrate when the water has receded. At the eastern margin of the pool/algal mat, which is shaded most of the day by large buttonwood trees, some patches of sedges and grasses occur, and sweeping an aerial net through this vegetation resulted in the specimens of this species.

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: face with transverse striae and bearing one large seta that is inserted at midfacial height; all coxae and femora pale, yellowish; infuscation of wing as three spots: over crossveins r-m and dm-cu and at the apex of vein R_{4+5} (spot over crossvein dm-cu largest).

Genus *Clasiopella* Hendel

Clasiopella Hendel, 1914:109 [type species: *Clasiopella uncinata* Hendel, 1914, by original designation].

35. *Clasiopella uncinata* Hendel

FIGURES 155–174

Clasiopella uncinata Hendel, 1914:110.—Cresson, 1946a:152, 162 [list, key].—Wirth, 1968:11 [Neotropical catalog].—Mathis, 1994:457–463 [revision].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Carrie Bow Cay, May 1985, Mar 1988, W.N. Mathis (2♂, 3♀); Man of War Cay, Nov 1987, Jul 1989, W.N. and D. Mathis, H.B. Williams (27♂, 29♀); Twin Cays (dock area, east shore of East Island), Jan 1987, W.N. Mathis, C. Feller (4♂, 3♀); Wee Wee Cay, Jan 1987, W.N. Mathis, C. Feller (1♀).

DISTRIBUTION.—Afrotropical: Kenya, Madagascar. Australasian/ Oceanian: Australia (QLD), Guam, Hawaiian Islands (Hawaii, Midway Island, Molokai, Oahu), Northern Marianas. Nearctic: USA (FL). Neotropical: Belize, Colombia, Galápagos Islands, Mexico (TAB), Tobago, West Indies (Dominica, Dominican Republic, Grand Cayman, Jamaica, Puerto Rico). Oriental: Philippines, Taiwan.

NATURAL HISTORY.—The large series from Man of War Cay was collected from two habitats. The first habitat was comprised of mostly damp leaf litter from red mangrove that had accumulated just above the high-tide zone. The second habitat was a damp to wet peat/mud area that before drying was a small pool of brackish water. Along the margins of the pool were numerous pneumatophores of black mangrove.

DIAGNOSIS.—Externally this species is distinguished from *C. austra* Mathis by the following combination of characters: legs mostly yellow (only the apical 1–2 tarsomeres are dark brown) and by the comparative difference in color and density of the microtomentum on the face versus that on the frons. The frons in this species is comparatively thinly invested, and the microtomentum on the face gradually becomes denser, appearing more whitish. The structures of the male terminalia are also distinctive (see Figures 169–174).

Genus *Guttipsilopa* Wirth

Guttipsilopa Wirth, 1956:9 [type species: *Guttipsilopa haydeni* Wirth, 1956, by original designation].—Mathis and Wirth, 1977:63–74 [review].

Key to Species of *Guttipsilopa* Occurring on Belizean Cays

Surstyli narrowly developed, gradually becoming narrower ventrally, ventral apex acutely pointed, especially in posterior view . . . . . ***G. dianneae,*** new species

Surstylus more broadly developed, gradually becoming broader ventrally, ventral margin wide, especially in posterior view . . . . . ***G. umbrosa*** (Loew)

36. *Guttipsilopa* (*Nesopsilopa*) *dianneae,* new species

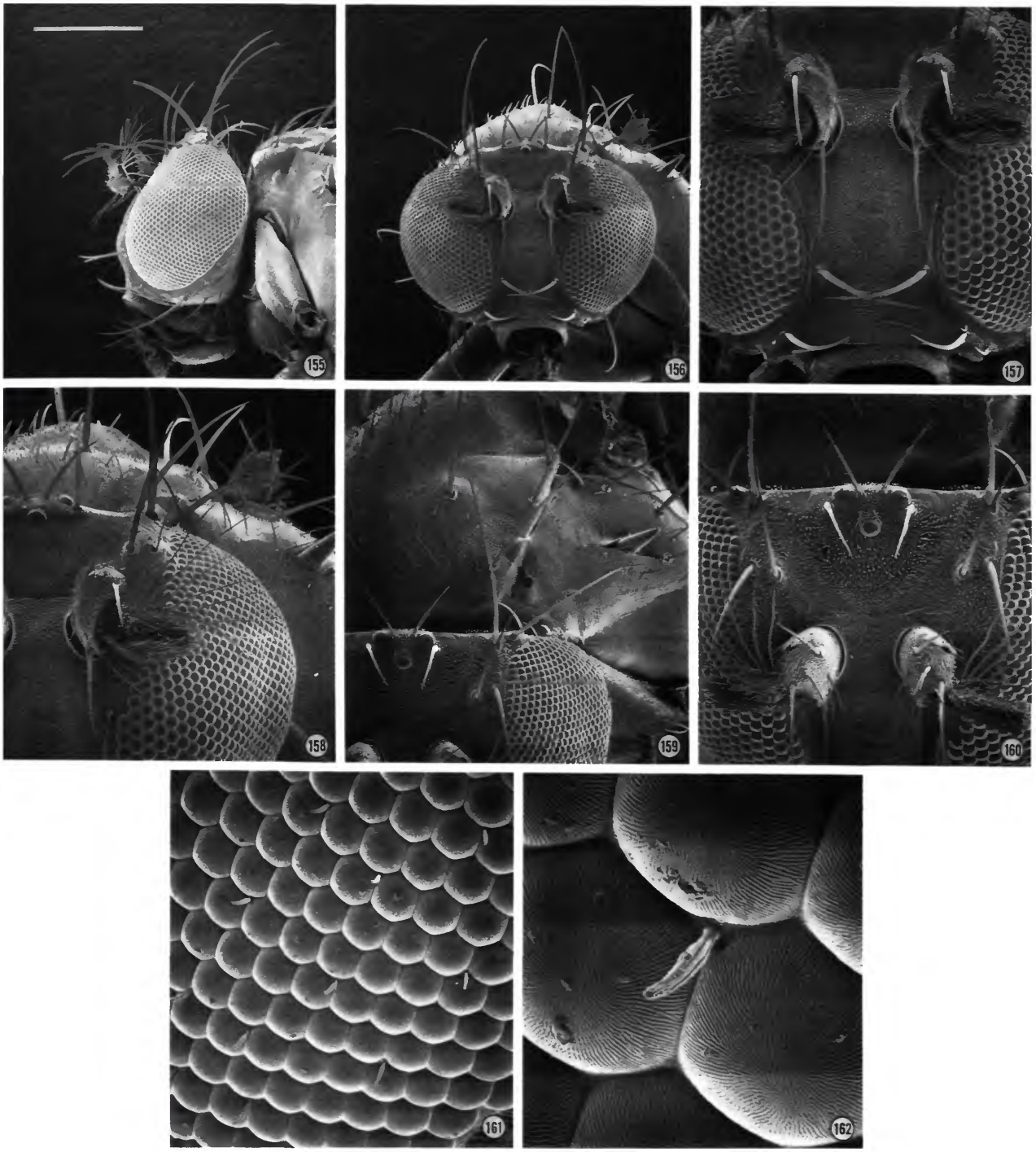
FIGURES 175–177

DESCRIPTION.—Moderately small- to medium-sized shore flies, length 2.2–3.6 mm.

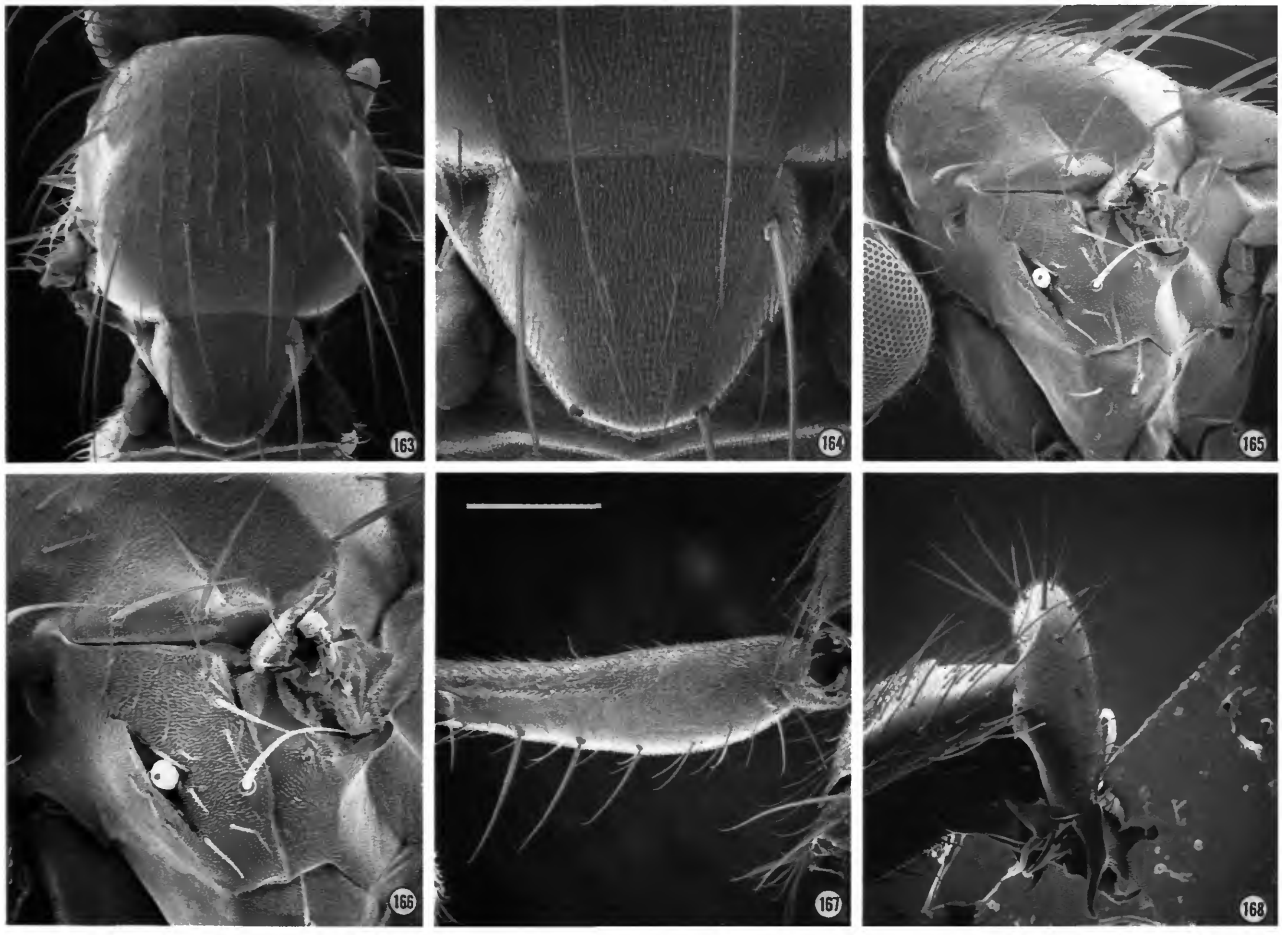
Head: Ocellar seta inserted very slightly cephalad of alignment of anterior ocellus; face comparatively wide, face-width to head-width ratio 0.38; arista bearing 4–5 dorsal branches.

Thorax: Scutellum with dorsal surface similar in color to that of scutum, at most, very slightly grayer. Wing generally lightly infuscate, anterior margin conspicuously darker brown, area along veins and crossveins slightly darker, transition from dark anterior margin to lighter coloration gradual but limited to a narrow zone; costal-vein ratio 0.62; M-vein ratio 0.83.

Abdomen: Dorsum subshiny to shiny, brownish black to black, with tergites 1–2 moderately invested with brown microtomentum, appearing more brownish black, brown



FIGURES 155–162.—Scanning electron micrographs of *Clasiopella uncinata* (Belize, Stann Creek District, Wee Wee Cay; scale length in parenthesis; scale bar for all photographs = Figure 155): 155, head, lateral aspect (0.27 mm); 156, same, anterior aspect (0.27 mm); 157, face, anterior aspect (136 μm); 158, left antenna, anterodorsal aspect (136 μm); 159, vertical setae, anterodorsal aspect (176 μm); 160, frons, anterodorsal aspect (136 μm); 161, compound eye and interfacetal setulae, lateral aspect (30 μm); 162, same, enlargement of an interfacetal setula, lateral aspect (6 μm).



FIGURES 163–168.—Scanning electron micrographs of *Clasiopella uncinata* (Belize, Stann Creek District, Wee Wee Cay; scale length in parenthesis; scale bar for all photographs = Figure 167): 163, mesonotum, dorsal aspect (250 μm); 164, scutellum, dorsal aspect (120 μm); 165, thorax, lateral aspect (231 μm); 166, notopleuron and anepisternum, lateral aspect (150 μm); 167, left forefemur, posterior aspect (136 μm); 168, male genitalia, lateral aspect (200 μm).

microtomentum becoming progressively sparser on more posterior tergites, tergite 5 entirely black; sternite 5 of male deeply U-shaped with arms parallel and oriented posteriorly along sides of hypandrium. Male terminalia (Figures 175–177): surstylus (Figures 175, 176) in posterior view long, narrow, slightly sinuate, gradually tapered toward ventral apex, which is acutely pointed, in lateral view shallowly angulate posteriorly.

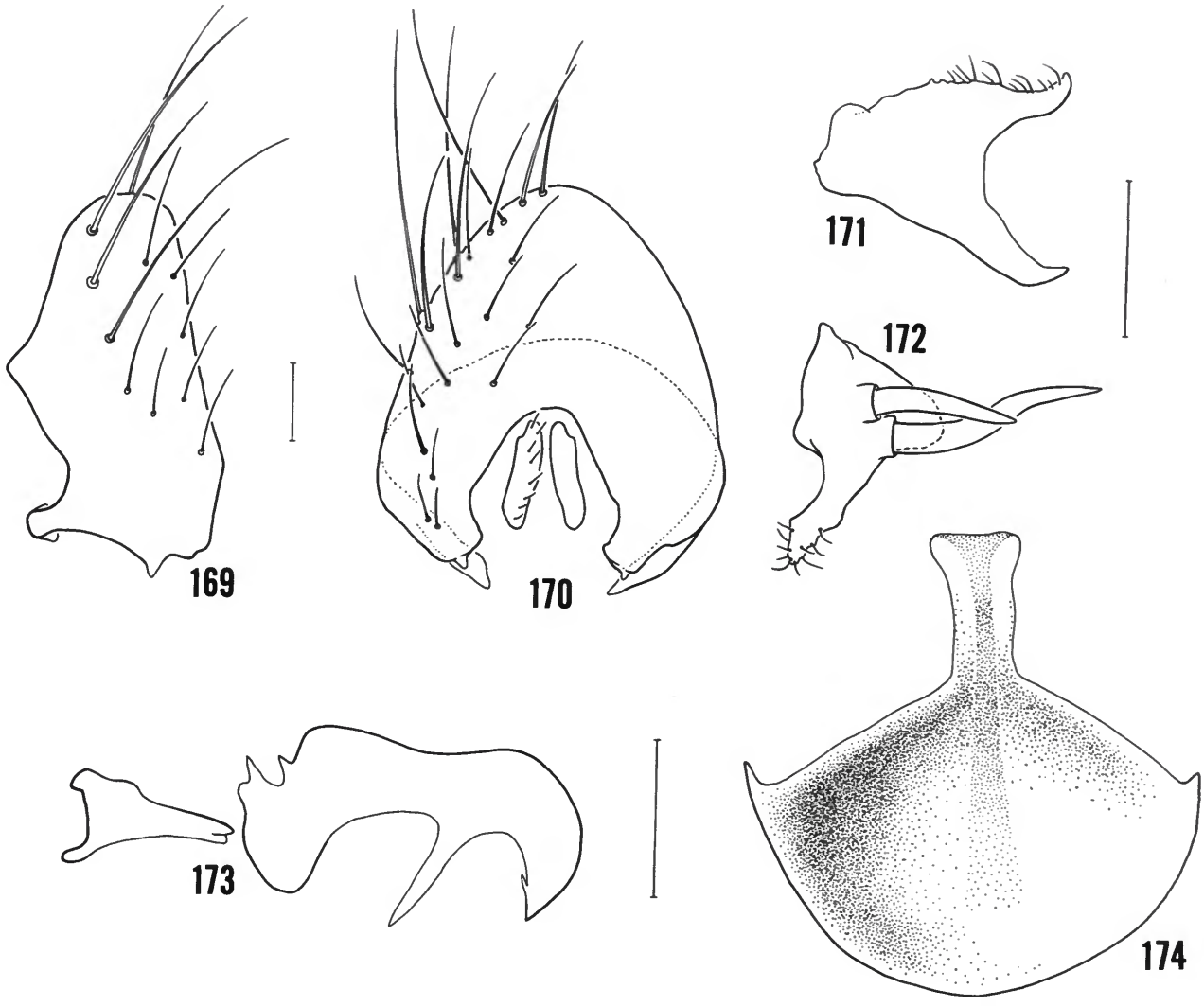
TYPE MATERIAL.—The holotype male is labeled "BELIZE. Stann Cr[ee]k. Dist[rict]. Twin Cays (Aanderaa Flats) 17–21 March 1988 Wayne N. Mathis." Paratypes are as follows: BELIZE. Stann Creek District: Coco Plum Cay, 23 Mar 1988, W.N. Mathis (1♀; USNM); Stewart Cay, 9 Nov 1987, W.N. Mathis (1♂). The holotype is double mounted (minute nadel in a plastic elastomere block), is in excellent condition, and is deposited in the USNM.

DISTRIBUTION.—Thus far, this species is known only from the type series, which is from the Belizean cays of the Stann Creek District. Undoubtedly the range of this species will be found to be more extensive with better sampling of the shore-fly fauna from adjacent and other localities.

NATURAL HISTORY.—All specimens of the type series were collected by sweeping low-level to shruby vegetation immediately adjacent to the shore.

ETYMOLOGY.—The specific epithet, *dianneae,* is a genitive patronym to recognize the collecting efforts of my wife, Dianne, while she helped conduct field work in Belize. Her support in general has contributed significantly to my studies of Diptera.

DIAGNOSIS.—This species is very similar to *G. umbrosa* but can be distinguished by the following combination of characters: fifth sternite more deeply notched, U-shaped with parallel



FIGURES 169–174.—Structures of the male genitalia of *Clasiopella uncinata:* 169, epandrium, lateral aspect; 170, epandrium and cerci, posterior aspect; 171, surstylus, lateral aspect; 172, clasper, lateral aspect; 173, aedeagus and aedeagal apodeme, lateral aspect; 174, hypandrium, ventral aspect. Scale bars = 0.1 mm.

sides (the emargination of the fifth sternite in *G. umbrosa* extends less than one-half the length of the sternite, and the sides are tapered to a narrower anterior margin); and surstylus gradually tapered toward the ventral apex, which is acutely pointed, rather than becoming broader, as in *G. umbrosa.*

37. *Guttipsilopa* (*Nesopsilopa*) *umbrosa* (Loew)

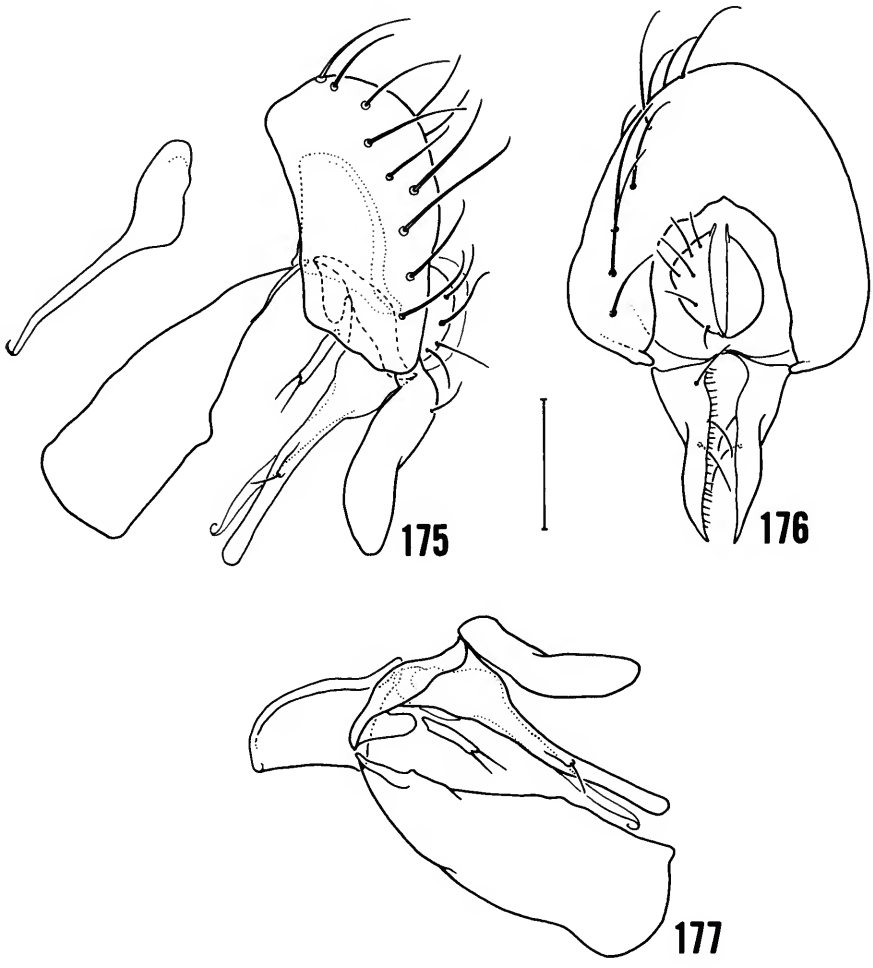
FIGURES 178–181

Psilopa umbrosa Loew, 1862:143.
Rhysophora unbrosa [sic].—Cresson, 1946a:152 [generic combination].
Nesopsilopa umbrosa.—Mathis and Wirth, 1977:69 [generic combination].
Guttipsilopa (*Nesopsilopa*) *umbrosa.*—Mathis and Zatwarnicki, 1990:899 [generic combination].

SPECIMENS EXAMINED.—BELIZE. Belize District: Turneffe Islands: Blackbird Caye (17°19′N, 87°48′W), 27–30 Mar 1993, W.N. Mathis (12♂, 9♀; USNM).

DISTRIBUTION.—Nearctic: USA (FL). Neotropical: Bahamas, Belize, West Indies (Cuba).

DIAGNOSIS.—This species closely resembles *G. dianneae* and *G. wirthi* Mathis and Freidberg but is distinguished by the following combination of characters: body length 2.7–3.10 mm; ocellar setae inserted slightly anterior of anterior ocellus; arista with three to six dorsal branches; face (Figure 178) wide, head-width to face-width ratio averaging 0.4; lower half of face slightly protuberant; three to four large facial setae, dorsal seta inserted just below middle of face; parafacial narrow; gena



FIGURES 175–177.—*Guttipsilopa dianneae*, new species: 175, male terminalia, lateral aspect; 176, same, posterior aspect; 177, internal structures of male terminalia. Scale bar = 0.1 mm.

short, eye-to-cheek ratio 0.20; wing (Figure 179) infuscate in cells R_1 and R_2; costal-vein ratio 0.67; M-vein ratio 0.68; abdomen subshiny to shiny, blackish brown; male terminalia as in Figures 180, 181.

Genus *Paratissa* Coquillett

Paratissa Coquillett, 1900b:36 [type species: *Drosophila pollinosa* Williston, 1896, by original designation].

Key to Species of *Paratissa* Occurring on Belizean Cays

Surstylus from posterior view with ventromedial projection narrowly developed, shallowly sinuate, apex rounded; ventral spur with oblique, ventromedial orientation, forming a distinct V-shaped (angle acute) pocket between spur and posteroventral projection; spur narrowly tapered to bluntly rounded apex; base of aedeagus, at juncture with narrow, parallel-sided apex, with sides angulate, forming a distinct shoulder on each side . . . . . ***P. neotropica*** Mathis

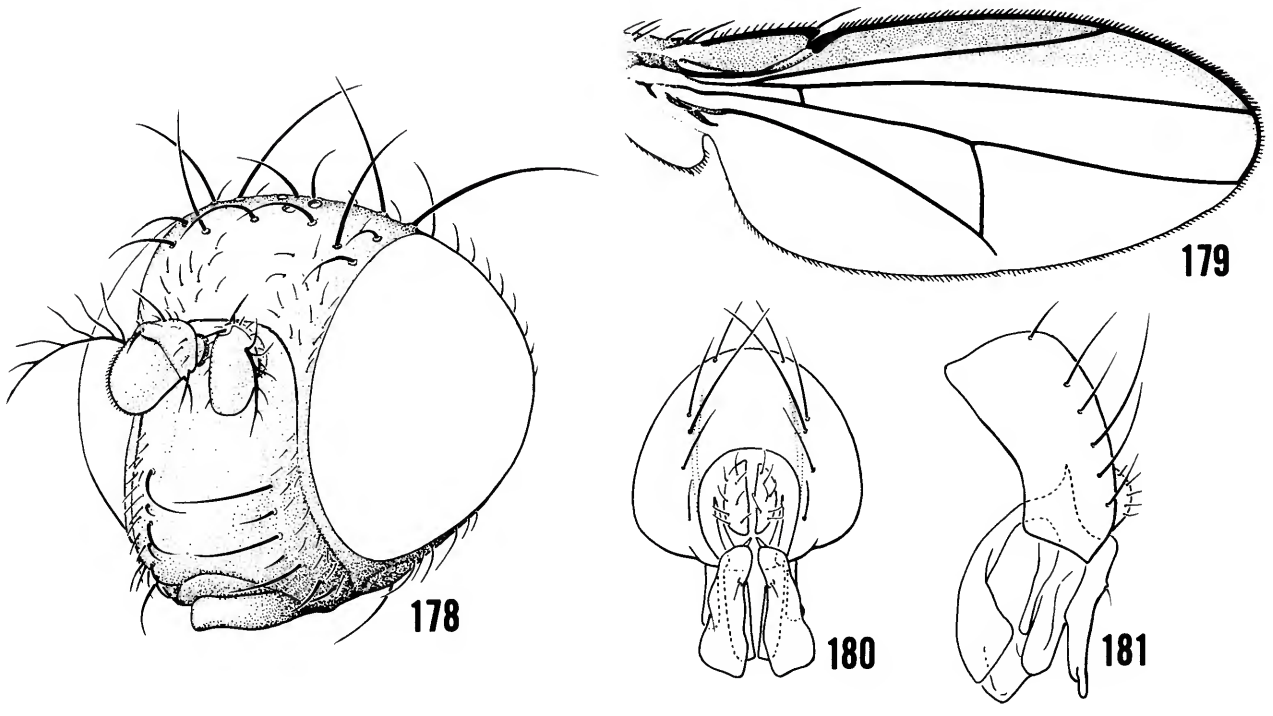
Surstylus from posterior view with ventromedial angle relatively broad, bluntly rounded; ventral spur from posteroventral view forming nearly a right angle with plane of ventromedial angle, conspicuously narrower than the latter, appearing digitiform and more or less parallel sided; base of aedeagus, at juncture with narrow, parallel-sided apex, with sides sloping . . . . . ***P. semilutea*** (Loew)

38. *Paratissa neotropica* Mathis

FIGURES 182–198

Paratissa neotropica Mathis, 1993a:34.

SPECIMENS EXAMINED.—BELIZE. Belize District: Lighthouse Reef: Half Moon Cay (17°12'N, 87°31'W), Apr 1993, W.N. Mathis (13♂, 5♀). Stann Creek District: Carrie Bow Cay,



FIGURES 178–181.—*Guttipsilopa umbrosa:* 178, head, anterolateral aspect; 179, wing, dorsal aspect; 180, male terminalia, posterior aspect; 181, same, lateral aspect.

15 Jan–30 Jul 1984–1990, R.A. Faitoute, C. Feller, D. Mathis, W.N. Mathis, P.J. Spangler, H.B. Williams (98♂, 50♀; USNM). Glover's Reef (Long Cay, Southwest Cay), Jul 1989, W.N. Mathis (3♂, 4♀).

DISTRIBUTION.—Neotropical: Belize, Mexico (QNR), West Indies (Anguilla, Grand Cayman, St. Martin).

NATURAL HISTORY.—This is one of the most abundant shore flies occurring on the Belizean cays. The species is found in the littoral zone, especially where organic debris, usually algae and sea grass, has accumulated, and I found specimens to be most abundant on *Turbinaria* that had washed ashore on the west and north shores of Carrie Bow Cay.

DIAGNOSIS.—I can distinguish this species from congeners only by reference to characters of the male terminalia (Figures 194–198), especially the shape of the surstylus. The surstylus, from the posterior view, has the ventromedial angle that is acutely pointed; and the ventral spur is long, narrow, and has an oblique, ventromedial orientation.

39. *Paratissa semilutea* (Loew)

FIGURES 199–201

Cacoxenus semilutea Loew, 1869:51.

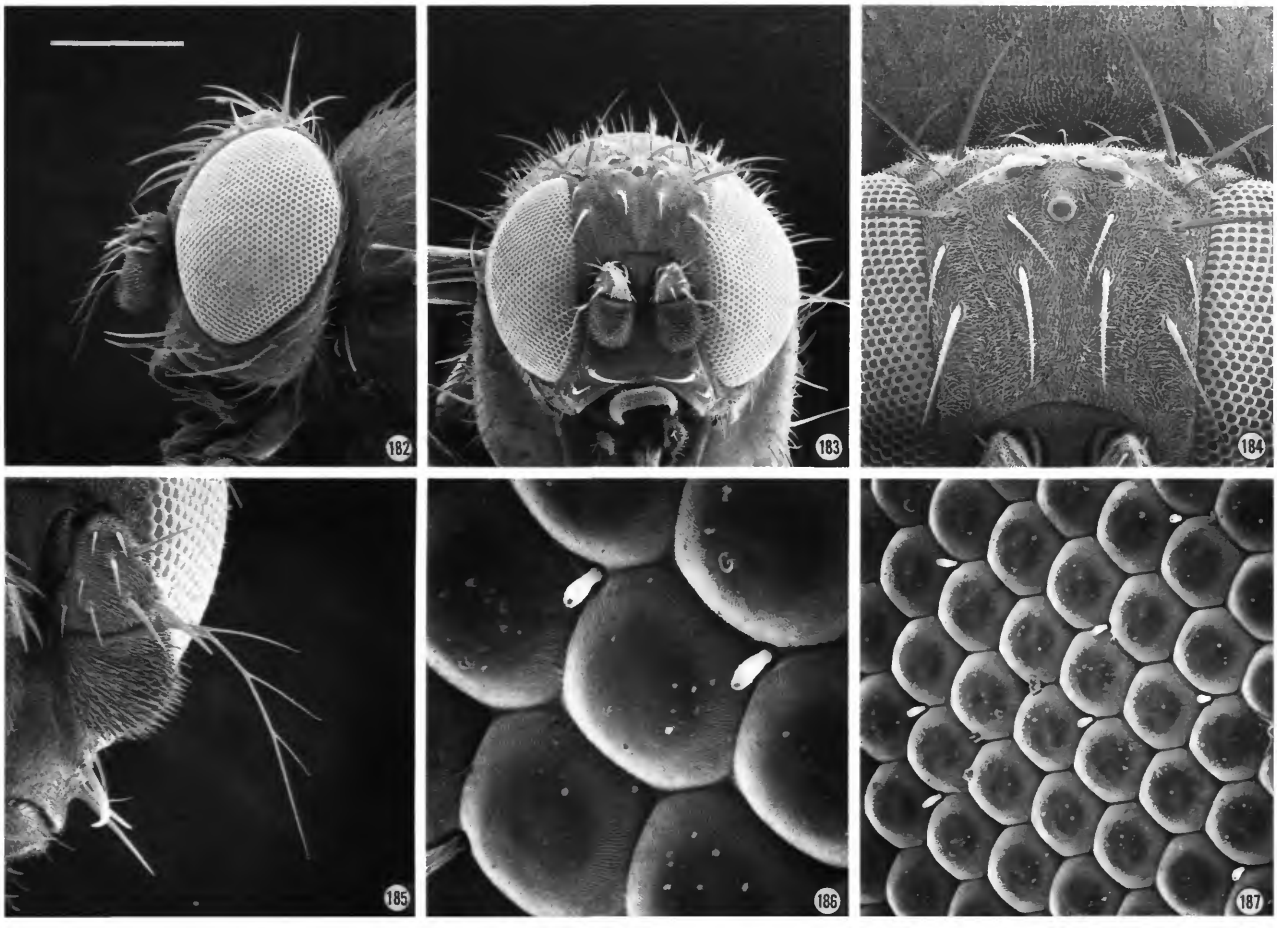
Paratissa semilutea.—Wirth, 1965:740 [generic combination]; 1968:9 [Neotropical catalog].—Mathis, 1993a:42–45 [revision].

Paratissa pollinosa.—Sturtevant and Wheeler, 1954:251 [review; misidentification in part].

SPECIMENS EXAMINED.—BELIZE. Belize District: Turneffe Islands: Blackbird Caye (17°19′N, 87°48′W), Mar 1993, W.N. Mathis (14♂, 21♀); Calabash Cays (17°17′N, 87°48′W), Mar 1993, W.N. Mathis (6♂, 4♀); Soldier Cay (17°20′N, 87°47′W), Mar 1993, W.N. Mathis (2♀). Stann Creek District: Bread and Butter Cay, Mar 1988, W.N. Mathis (2♂, 1♀; USNM); Carrie Bow Cay, 15 Jan–17 May 1984–1988, R.A. Faitoute, I.C. Feller, P.J. Spangler, W.N. Mathis (22♂; USNM); Coco Plum Cay, Mar–Jun 1988, 1990, C. Feller, W.N. Mathis, H.B. Williams (9♂, 25♀; USNM); Man of War Cay, 2 Jun–Nov 1985, 1987, 1989, W.N. and D. Mathis, H.B. Williams (26♂, 17♀; USNM); South Water Cay, Jun 1985, W.N. Mathis (1♂; 5♀; USNM); Tobacco Range, Jul 1989, W.N. Mathis, H.B. Williams (1♂, 14♀; USNM); Twin Cays (Aanderaa Flats, dock area, east shore of East Island, south end of East Island, south end of West Island, West Bay), 18 Jan–1 Jun 1985, 1987, 1988, C. Feller, W.N. Mathis (42♂, 57♀; USNM); South Water Cay, 1 Jun 1985, W.N. Mathis (1♂, 3♀; USNM). Wee Wee Cay, 24 Jan 1987, W.N. Mathis, C. Feller (2♀; USNM).

DISTRIBUTION.—Circumcaribbean: Nearctic: Bermuda, USA (FL). Neotropical: Bahamas, Belize, Bermuda, Galápagos Islands, Mexico (QNR), Panama, Tobago, West Indies (Anguilla, Antigua, Barbuda, Cuba, Dominica, Grand Cayman, Jamaica, Puerto Rico, Virgin Islands).

DIAGNOSIS.—This species is distinguished from the previous one and from other congeners by characters of the male



FIGURES 182–187.—Scanning electron micrographs of *Paratissa neotropica* (Belize, Stann Creek District, Carrie Bow Cay; scale length in parenthesis; scale bar for all photographs = Figure 182): 182, head, lateral aspect (0.27 mm); 183, same, anterior aspect (0.30 mm); 184, frons, anterodorsal aspect (150 μm); 185, antenna, medial aspect (120 μm); 186, eye, ommatidia, and occasional setulae, lateral aspect (23.1 μm); 187, same, enlargement (10 μm).

terminalia (Figures 199–201), especially the shape of the surstylus. These characters are as follows: surstylus from posterior view with ventromedial angle relatively broad, bluntly rounded; ventral spur from posteroventral view forming nearly a right angle with plane of ventromedial angle, conspicuously narrower than the latter, appearing digitiform and more or less parallel sided; base of aedeagus, at juncture with narrow, parallel-sided apex, with sides sloping.

Subfamily HYDRELLIINAE Robineau-Desvoidy

Key to Tribes and Genera of Hydrelliinae Occurring on Belizean Cays

1. Eye bearing short, dense setulae; ocellar setae seldom as strong as pseudopostocellar setae, usually much weaker; postsutural supra-alar seta usually short, not longer than posterior notopleural seta (HYDRELLIINI) . . . . . ***Hydrellia*** Robineau-Desvoidy

   Eye appearing bare; ocellar setae stronger than the weak pseudopostocellar setae; postsutural supra-alar setae strong, longer than posterior notopleural seta 2

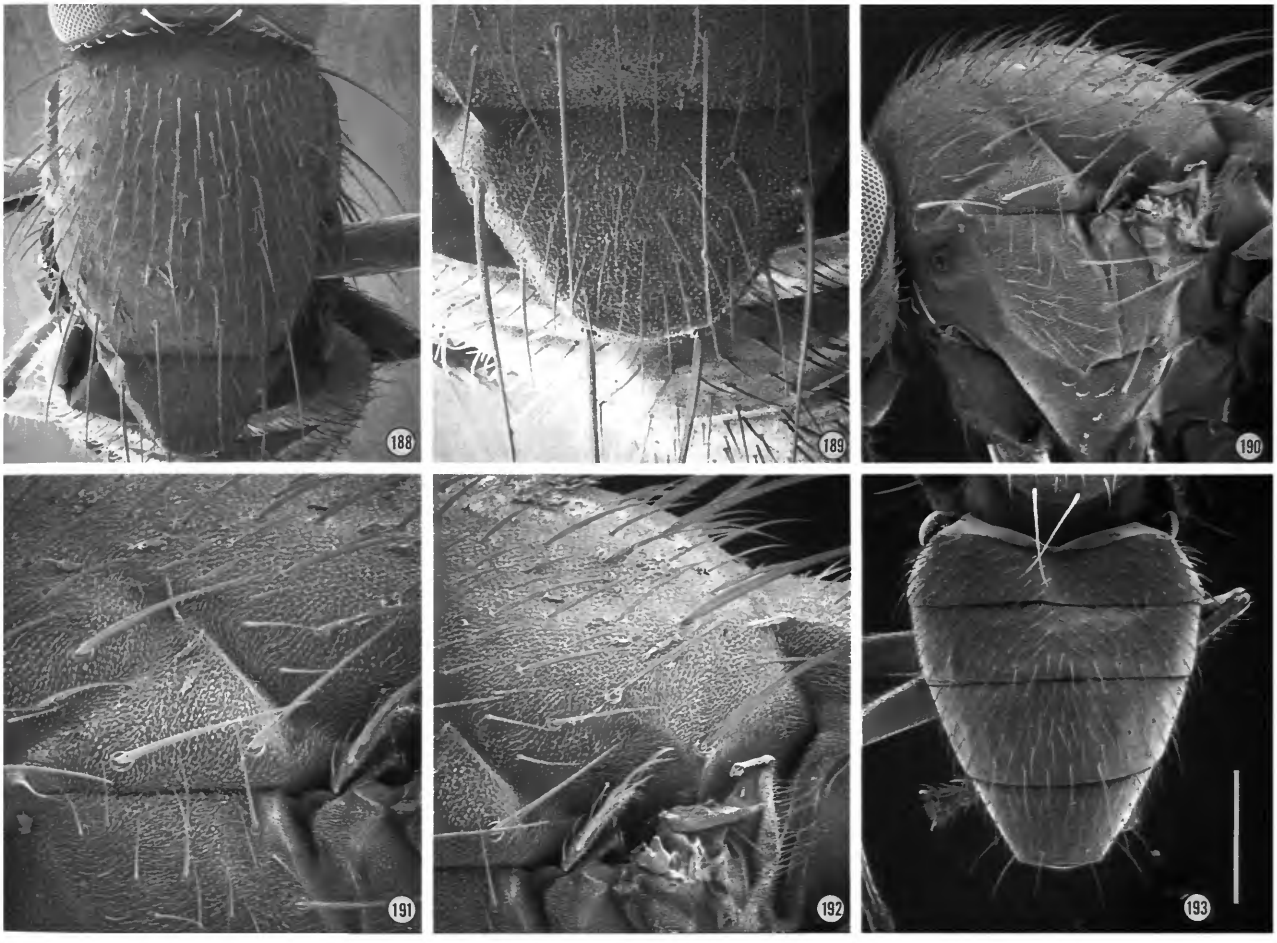
2. Costa long, extended to vein M; dorsocentral setae 3 (1+2) (DRYXINI) . . . . . ***Paralimna*** Loew

   Costa short, extended to vein R_{4+5}; dorsocentral setae 2 (1+1) (NOTIPHILINI) . . . . . ***Notiphila*** Fallén

Tribe HYDRELLIINI Robineau-Desvoidy

Genus *Hydrellia* Robineau-Desvoidy

Hydrellia Robineau-Desvoidy, 1830:790 [type species: *Notiphila griseola* Fallén, 1813, by subsequent designation, Duponchel in d'Orbigny, 1845:743].



FIGURES 188–193.—Scanning electron micrographs of *Paratissa neotropica* (Belize, Stann Creek District, Carrie Bow Cay; scale length in parenthesis; scale bar for all photographs = Figure 193): 188, mesonotum, dorsal aspect (0.33 mm); 189, scutellum, dorsal aspect (150 μm); 190, pleural area, lateral aspect (0.30 mm); 191, notopleuron, lateral aspect (136 μm); 192, supra-alar area and postalar area of mesonotum, lateral aspect (150 μm); 193, abdomen, dorsal aspect (0.38 mm).

40. *Hydrellia cavator* Deonier

Hydrellia cavator Deonier, 1971:49.

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Twin Cays (south end of West Island), Jan 1987, W.N. Mathis, C. Feller (1♂).

DISTRIBUTION.—Nearctic: USA (FL). Neotropical: Belize.

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: palpus moderate yellow; 4–6 aristal rays; parafrons densely microtomentose, appearing velvety black; first flagellomere moderate yellow; scutum and dorsum of abdomen dark brown medially; and male terminalia as in Deonier's (1971) Figure 54.

Tribe NOTIPHILINI Bigot

Genus *Notiphila* Fallén

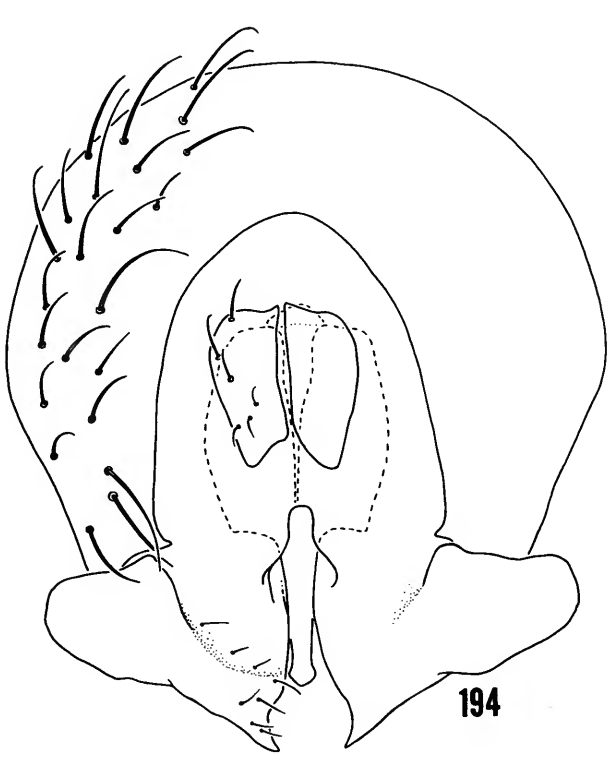
Notiphila Fallén, 1810:22 [type species: *Notiphila cinerea* Fallén, 1813, by subsequent designation of Westwood, 1840:153].

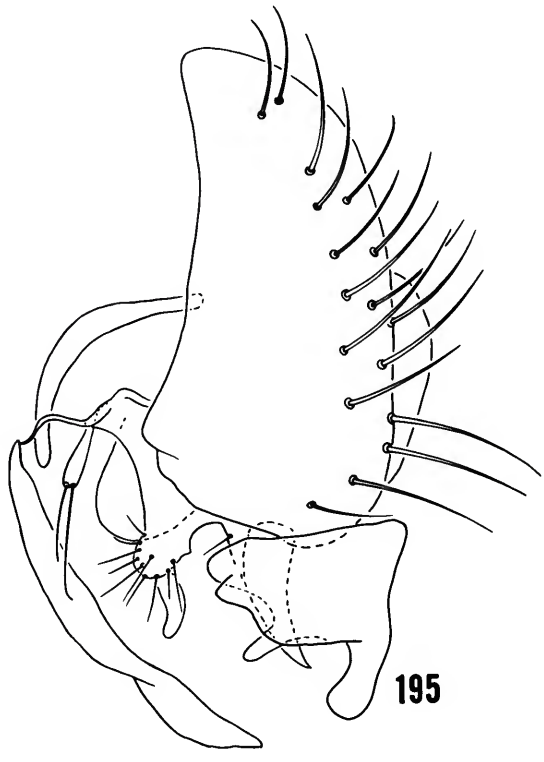
41. *Notiphila* (*Notiphila*) *erythrocera* Loew

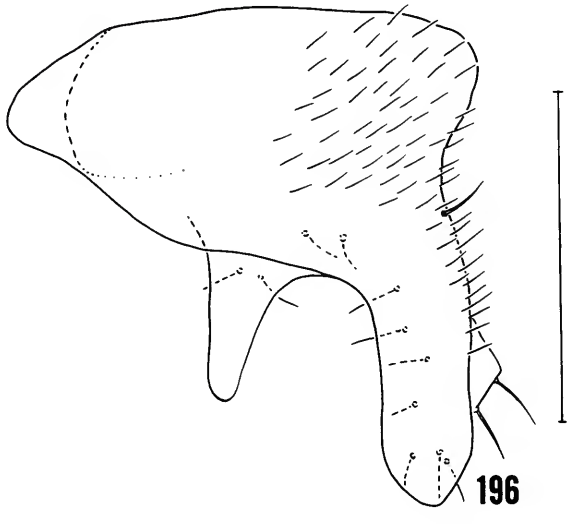
FIGURES 202–204

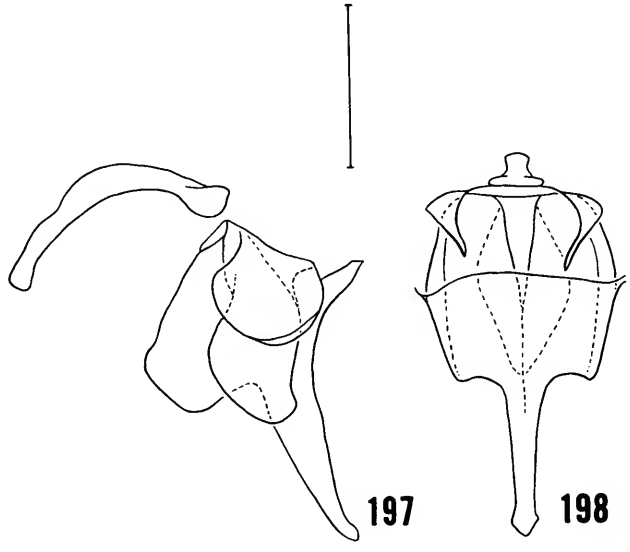
Notiphila erythrocera Loew, 1878:194.—Cresson, 1947:57–58, 60 [review, key].—Wirth, 1968:13–14 [Neotropical catalog].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District:

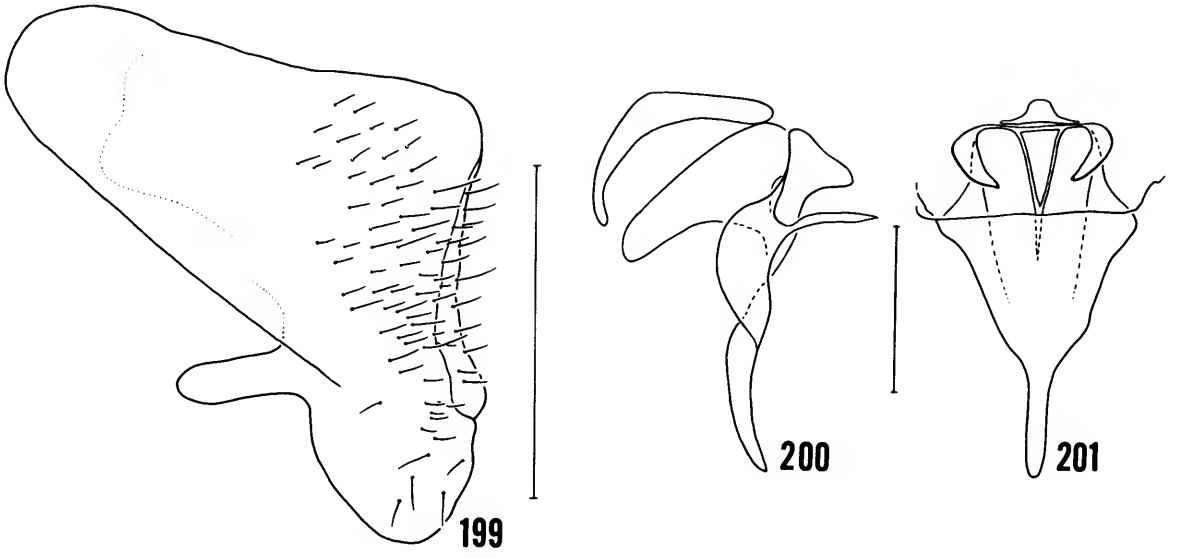








FIGURES 194–198.—Male terminalia of *Paratissa neotropica:* 194, epandrium, cerci, and surstyli, posterior aspect; 195, epandrium, cercus, surstylus, postgonite, and hypandrium, lateral aspect; 196, surstylus, posteroventral aspect; 197, aedeagus and aedeagal apodeme, lateral aspect; 198, same, dorsal aspect. Scale bars = 0.1 mm (larger scale is for Figure 196 only).



FIGURES 199–201.—*Paratissa semilutea:* 199, surstylus, posteroventral aspect; 200, internal structures of male terminalia, lateral aspect; 201, aedeagal apodeme and aedeagus, dorsal aspect. Scale bars = 0.1 mm.

Twin Cays (east shore of East Island), Jan 1987, W.N. Mathis (1♀).

DISTRIBUTION.—Widespread in the Western Hemisphere; Nearctic: USA (AL, AZ, CA, CO, DA, FL, GA, LA, MD, NE, NJ, NM, NV, OR, SC, TX, UT, WY). Neotropical: Belize, Brazil, Ecuador, Panama, West Indies (Cuba, Dominica, Grand Cayman, Puerto Rico, St. Vincent).

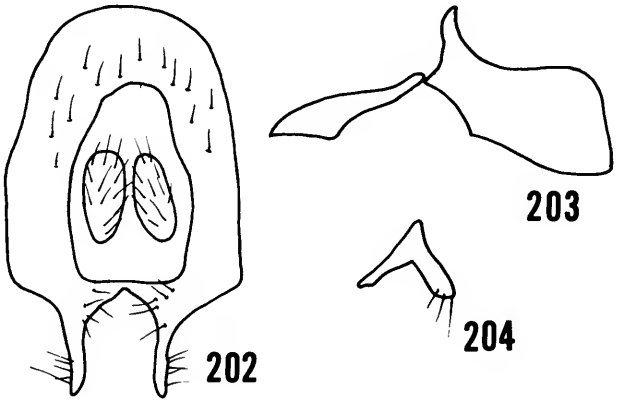
DIAGNOSIS.—This is one of the more variable species of *Notiphila* and could easily be confused with similar congeners. Specimens, however, may be distinguished by the following combination of characters: body length 3.0–4.25 mm; antenna pale orange to brownish orange, although scape and pedicel often with some darker areas, especially dorsally; arista bearing 11–12 dorsal branches; facial setae three to four, well developed, subequal to genal seta; coloration variable but generally tan to ochraceous with some dark brown maculations on the abdomen; tibiae and tarsi pale; surstyli (Figure 202) setulose, projected ventrally from epandrium without basal development, forming a broad, deep, U-shaped pocket; pregonite (Figure 204) short (less than length of surstyli) and bearing few apical setulae.

REMARKS.—This is the most widespread species of *Notiphila* in the New World, occurring in temperate areas as well as in the tropics.

Tribe DRYXINI Zatwarnicki

Genus *Paralimna* Loew

Paralimna Loew, 1862:138 [type species: *Paralimna appendiculata* Loew, 1862 (= *Notiphila punctipennis* Wiedemann, 1830), by monotypy].



FIGURES 202–204.—*Notiphila* (*Notiphila*) *erythrocera:* 202, male terminalia, posterior aspect; 203, aedeagal apodeme and aedeagus, lateral aspect; 204, pregonite, lateral aspect.

Key to Species of *Paralimna* Occurring on Belizean Cays

1. Body generally dark colored, dark brown to grayish brown; eye distinctly higher than wide; gena short, usually slightly less than length of 1st flagellomere (*Phaiosterna*) 2

   Body coloration contrastingly bicolored, silvery white to gray and dark brown; eye round, about as wide as high; gena high, height usually greater than length of 1st flagellomere (*Paralimna*) 3

2. Abdomen subshiny to shiny, sparsely microtomentose; aedeagus in posterior view higher than wide, narrow . . . . . ***P. obscura*** Williston

   Abdomen appearing dull, microtomentose, tannish gray; aedeagus in posterior view wider than high . . . . . ***P. decipiens*** Loew

3. Anepisternum and katepisternum concolorous, lightly yellowish gray; body generally more light colored; face light yellowish white, somewhat lustrous, at most with light, yellowish gold spots . . . . . ***P. multipunctata*** Williston

   Katepisternum and ventral margin of anepisternum black, contrasted with mostly grayish dorsal 2/3 of anepisternum; body generally more dark colored; face with a dorsomedial and 2 slightly lateral golden spots on an otherwise mostly light gray face . . . . . ***P. fellerae,*** new species

42. *Paralimna (Paralimna) multipunctata* Williston

Paralimna multipunctata Williston, 1896:390.

Paralimna (Paralimna) multipunctata.—Wirth, 1968:15 [Neotropical catalog; listed as valid in the subgenus *Paralimna*].—Mathis and Edmiston, 1991:832 [discussion].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Wee Wee Cay, Jan, Nov 1987, Mar 1988, W.N. Mathis, C. Feller (8♂, 10♀).

DISTRIBUTION.—Nearctic: USA (CA, FL, TX). Neotropical: Bahamas, Belize, Brazil, Costa Rica, Mexico, Nicaragua, Panama, Venezuela, West Indies (Cuba, Dominica, Grand Cayman, Grenada, Jamaica, Puerto Rico, St. Thomas, St. Vincent).

NATURAL HISTORY.—All specimens of this species came from Wee Wee Cay and were collected from the large muddy area with a covering mat of blue-green algae that is more fully described under *Glenanthe ruetzleri.*

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: body generally bicolored, dorsum mostly brown to dark brown, lateral surfaces mostly gray, sometimes silvery white; eye round, about as wide as high; gena high, height subequal to length of first flagellomere; anepisternum and katepisternum concolorous, light yellowish gray; forefemur with anteroventral, comb-like row of flattened setae; and posteroventral surface of forefemur at basal one-half bearing irregular but distinct linear patch of setae.

REMARKS.—I made direct comparison, including structures of the male terminalia, of Belizean specimens with recently collected material from St. Vincent to confirm the identity of this species. I also have examined two of Williston's syntypes of this species from the Snow Entomological Collection (KU).

43. *Paralimna (Paralimna) fellerae,* new species

FIGURES 205–220

DESCRIPTION.—Moderately small- to medium-sized shore flies, length 2.2–3.3 mm; body generally bicolored, dark brown dorsally, lateral surfaces mostly gray, sometimes blackish gray.

Head (Figure 205): Frons mostly brown to dark brown with linear, silvery white spots at lateral margins of ocellar triangle in front of anterior ocellur and on fronto-orbits between proclinate fronto-orbital setae, and in some specimens just above antennal bases; lower fronto-orbitals and upper parafacial with 2 black spots laterad of antenna, separated by silvery white spot. Antenna (Figure 207) black with some gray microtomentum medially; arista (Figure 207) with 11 long, dorsal rays. Face, parafacial, and gena mostly silvery gray; face with 3 spots of golden brown microtomentum, a single, linear area between antennal bases and paired spots mediad of largest facial seta; clypeus darker gray than face. Eye round, about as wide as high. Gena high, height subequal to length of 1st flagellomere; eye-to-cheek ratio averaging 0.35.

Thorax (Figures 211–216): Mesonotum generally brown, at most slightly lighter in color than frons; with some silvery gray areas, usually along setal tracks, becoming more gray laterally through postpronotum and notopleuron; scutellar margins gray, apex blackish brown; anepisternum and anepimeron mostly gray with some brown spots; ventral one-fourth of anepisternum, all of katepisternum, and forecoxa blackish brown, contrasted distinctly with mostly gray dorsal portion of anepisternum. Legs generally dark colored; femora and tibiae blackish brown; tarsi lighter with some yellowish orange coloration, especially ventrally; forefemur with anteroventral, comb-like row of flattened setae (Figures 214, 215), setae short, length less than width of femur; and posteroventral surface of forefemur bearing some setae but not as a distinct linear patch at basal one-half.

Abdomen: Terga distinctly bicolored, dark brown along anterior one-half and medially, otherwise gray. Male terminalia (Figures 217–220): epandrium simple, band-like, unadorned; cerci subelliptical; surstylus bifurcate, with horizontal process long, slender, parallel sided, shallowly curved, extended medially, basoventral process short, wide, length less than one-fourth horizontal process; clasper complex, widest medially with median, anteriorly produced wide lobe, ventral margin pointed, bifurcate from posterior view; aedeagus with lateral lobe less than one-half length of aedeagus in lateral view, slightly curved, bluntly rounded; aedeagus gradually tapered to membranous apex; aedeagal apodeme broadly triangular in lateral view; hypandrium deeply concave, pouch-like.

TYPE MATERIAL.—The holotype male is labeled "**BELIZE.** StannCreek District: Glover's Reef,Middle Cay[,] 28 July 1989, W.N. Mathis, H.Williams." The allotype female and 42 paratypes (30♂, 12♀; USNM) bear the same label data as the

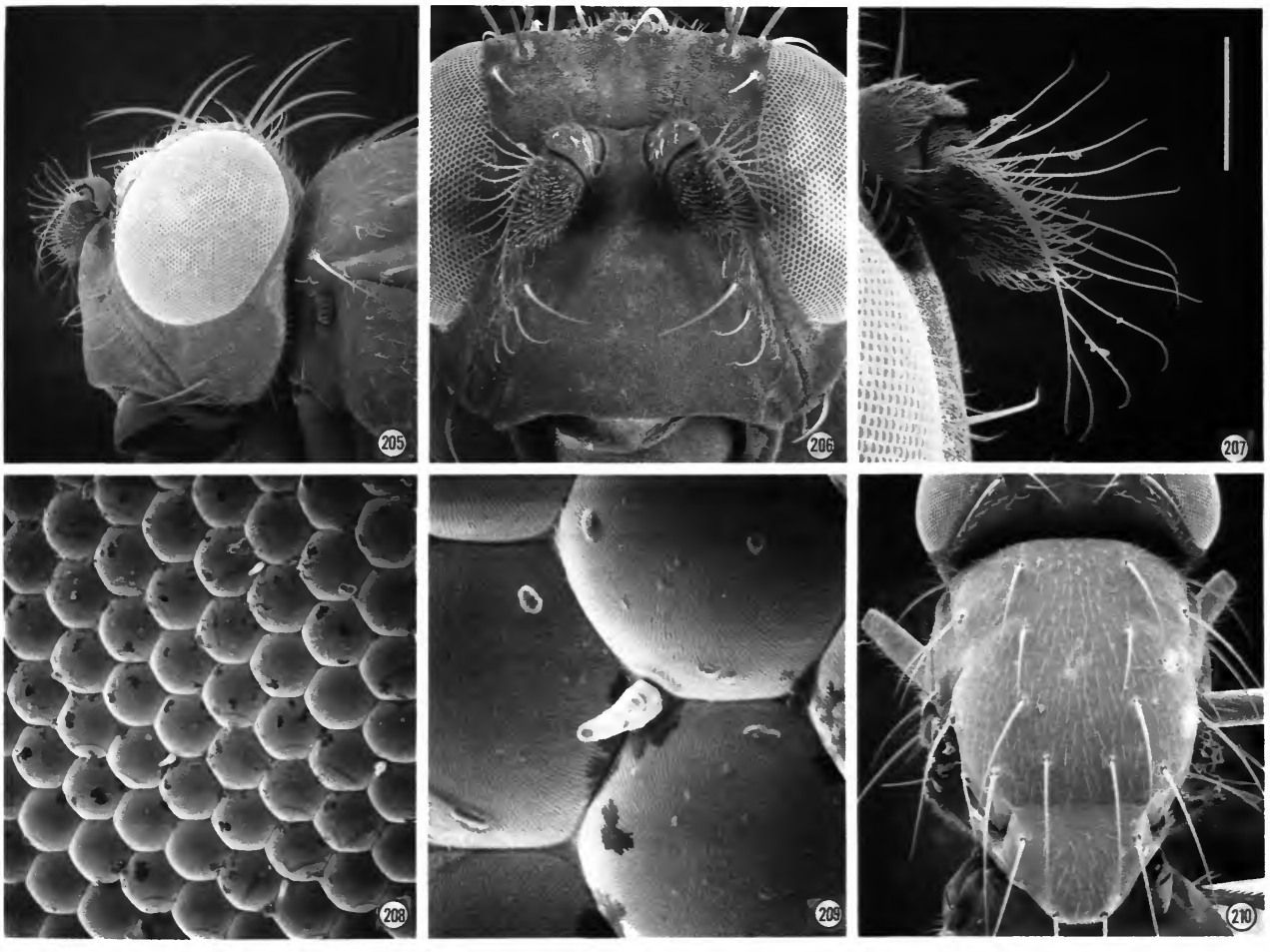
holotype. The holotype is double mounted (minute nadel in a block of plastic elastomer), is in excellent condition, and is depoisted in the NMNH. Other paratypes are as follows: BELIZE. Belize District: Turneffe Islands: Calabash Cays (17°17'N, 87°48'W), Mar 1993, W.N. Mathis (2♂). Stann Creek District: Wee Wee Cay, Nov 1987, Mar 1988, W.N. Mathis, C. Feller (1♂, 1♀).

DISTRIBUTION.—Although this species is now known only from the type locality in Belize, I suspect that it will be found to be more widespread.

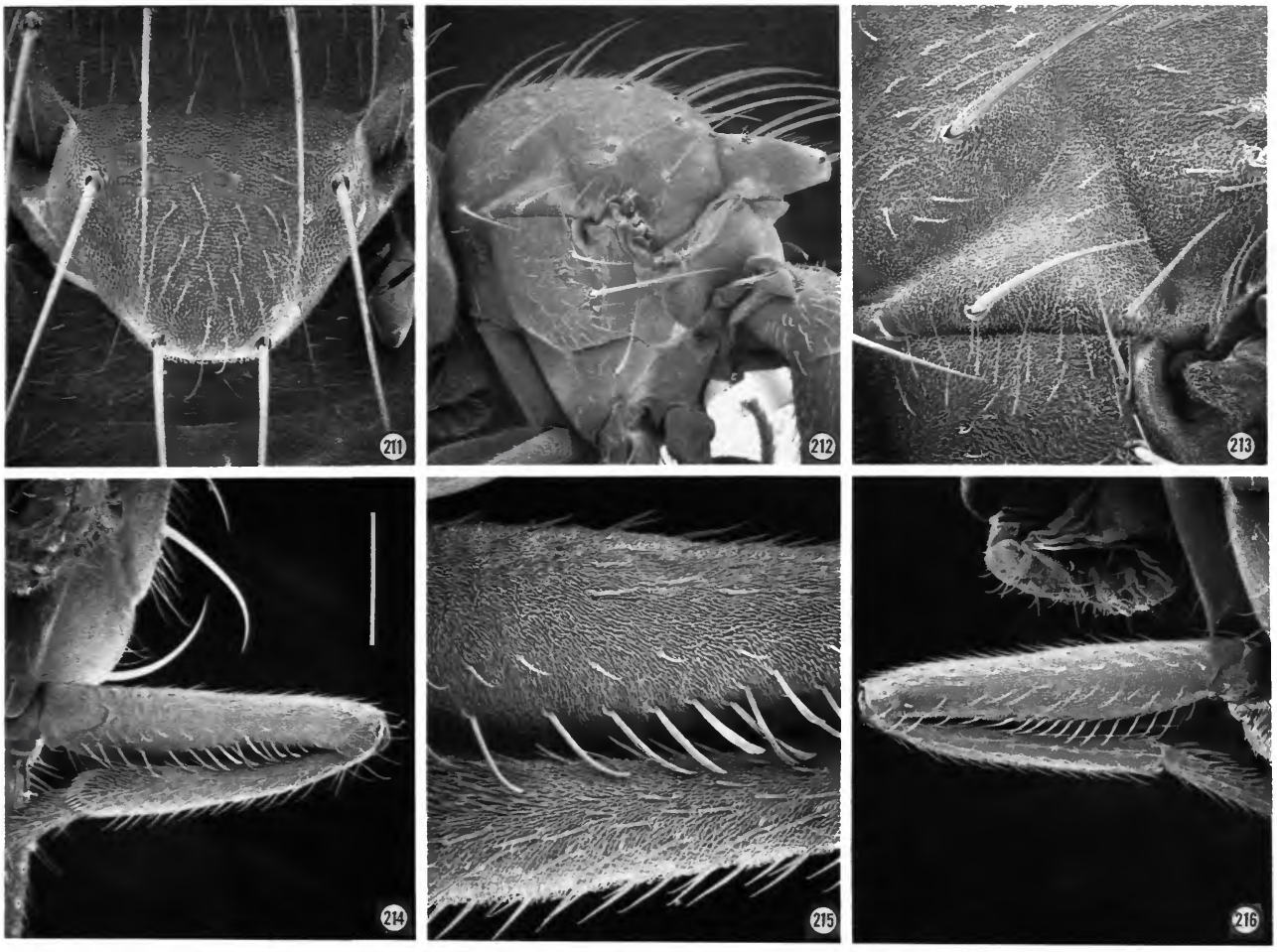
NATURAL HISTORY.—All specimens of this species came from Wee Wee Cay and were collected from the large muddy area with a covering mat of blue-green algae that is more fully described under *Glenanthe ruetzleri.*

ETYMOLOGY.—The species epithet, *fellerae,* is a genitive patronym to recognize the work and addictive enthusiasm that I.C. Feller has devoted to the study of insects of mangrove.

DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: body generally bicolored, dorsum mostly brown to dark brown, lateral surfaces mostly gray, sometimes blackish gray; eye round, about as wide as high; gena high, height subequal to length of first flagellomere; ventral one-fourth of anepisternum and all of katepisternum blackish brown, contrasted distinctly with mostly gray dorsal portion of anepisternum; forefemur with anteroventral, comb-like row of flattened setae; and posteroventral surface of forefemur bearing some setae but not as a distinct linear patch at basal one-half.



FIGURES 205–210.—Scanning electron micrographs of *Paralimna* (*Paralimna*) *fellerae,* new species (Belize, Stann Creek District, Glover's Reef; scale length in parenthesis; scale bar for all photographs = Figure 207): 205, head, lateral aspect (0.43 mm); 206, face, anterior aspect (0.30 mm); 207, antenna, lateral aspect (150 μm); 208, ommatidia and occasional interfacetal setae of compound eye, lateral aspect (30 μm); 209, enlargement of same, lateral aspect (6.0 μm); 210, mesonotum, dorsal aspect (0.50 mm).



FIGURES 211–216.—Scanning electron micrographs of *Paralimna* (*Paralimna*) *fellerae,* new species (Belize, Stann Creek District, Glover's Reef; scale length in parenthesis; scale bar for all photographs = Figure 214): 211, scutellum, dorsal aspect (231 μm); 212, pleural sclerites, lateral aspects (0.50 mm); 213, notopleuron, lateral aspect (167 μm); 214, left foreleg, anterior aspect (250 μm); 215, enlargement of same, anterior aspect (86 μm); 216, left foreleg, posterior aspect (0.27 mm).

44. *Paralimna* (*Phaiosterna*) *obscura* Williston

FIGURES 221–231

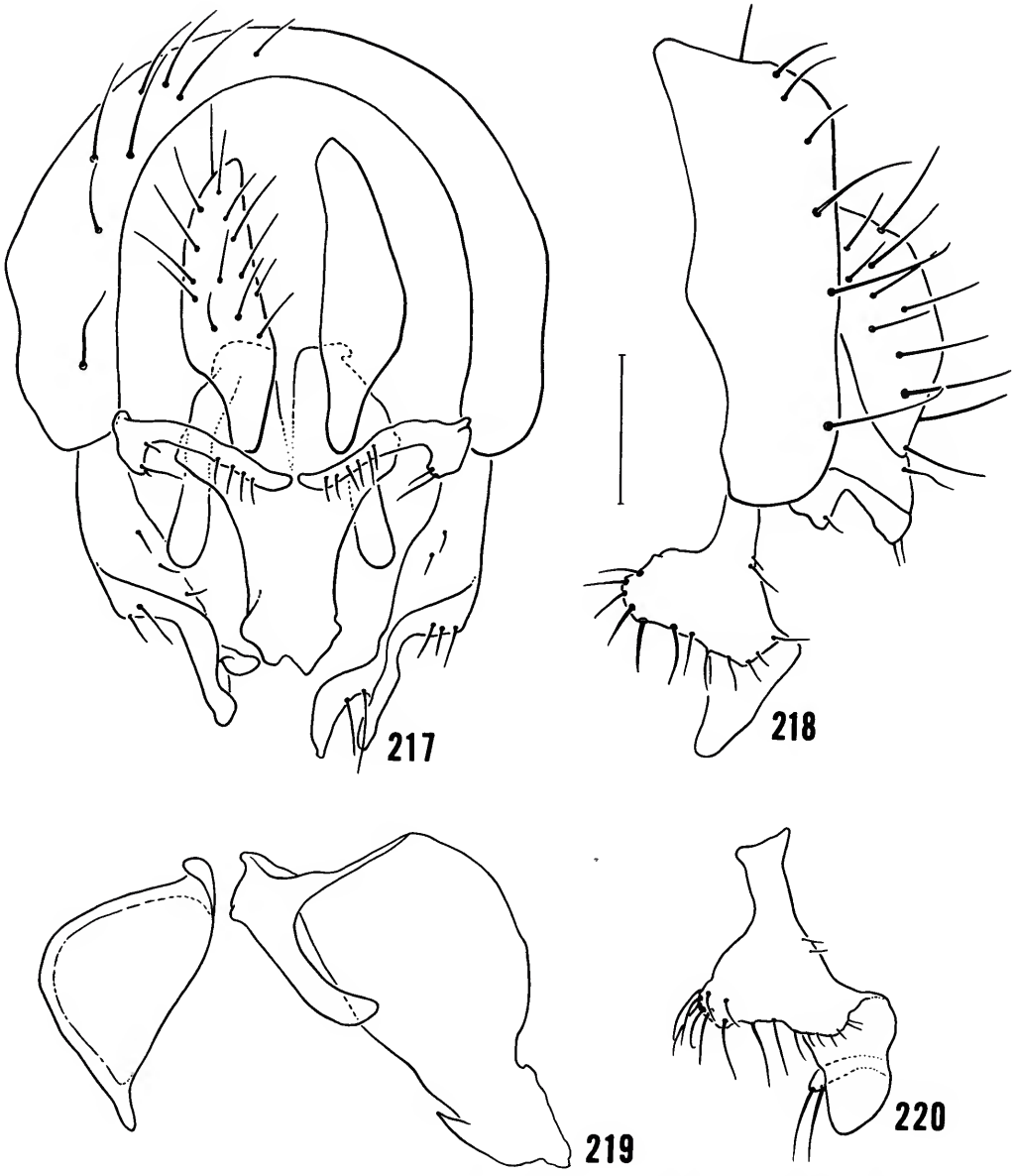
Paralimna obscura Williston, 1896:391.—Cresson, 1947:54–55 [review].—Wirth, 1968:16 [Neotropical catalog].—Mathis and Edmiston, 1991:832–834 [discussion].

SPECIMENS EXAMINED.—BELIZE. Belize District: Lighthouse Reef: Half Moon Cay (17°12′N, 87°31′W), Apr 1993, W.N. Mathis (1♂, 3♀). Stann Creek District: Bread and Butter Cay, Mar 1988, W.N. Mathis (1♀); Man of War Cay, Nov 1987, W.N. and D. Mathis (10♂, 1♀); Stewart Cay, Mar 1988, W.N. Mathis (1♂, 1♀); Twin Cays (Aanderaa Flats), Mar 1988, W.N. Mathis (3♂, 6♀); Wee Wee Cay, Jan, Nov 1987, Mar 1988, W.N. and D. Mathis, C. Feller (9♂, 1♀).

DISTRIBUTION.—Nearctic: Bermuda, USA (FL). Neotropical: Argentina, Belize, Bolivia, Brazil, Costa Rica, Ecuador, Mexico, Panama, Paraguay, West Indies (Cuba, Grenada, Jamaica, Puerto Rico, St. Vincent, Virgin Islands).

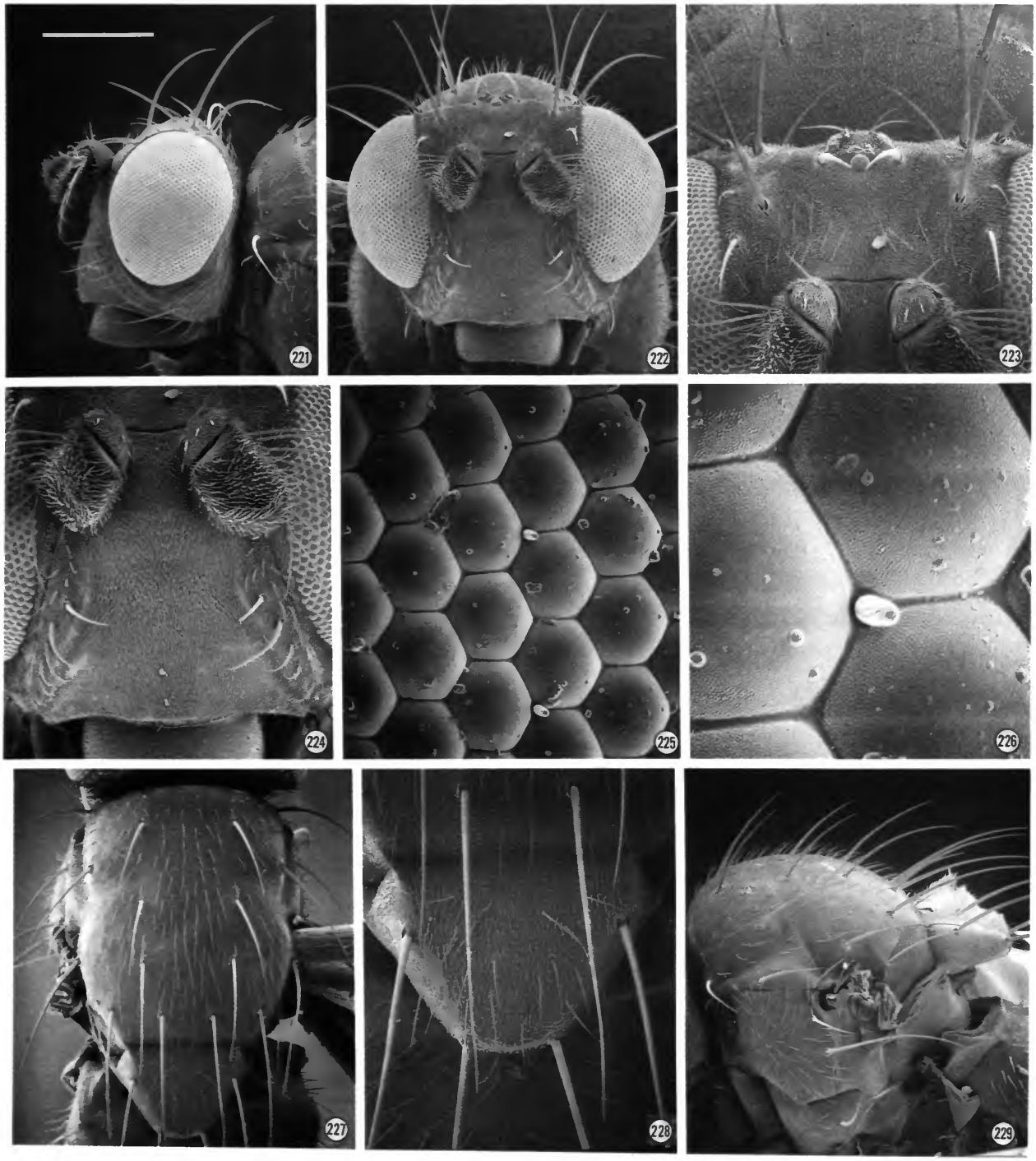
NATURAL HISTORY.—The large series from Man of War Cay was collected almost exclusively from a peat/mud area that before drying was a shallow pool of brackish water. Along the margins of the area were numerous pneumatophores of black mangrove. This species is apparently somewhat tolerant of saline conditions.

DIAGNOSIS.—This species is similar to *P. decipiens* but may be distinguished by being generally darker and shinier externally, especially the abdomen, which is subshiny. These

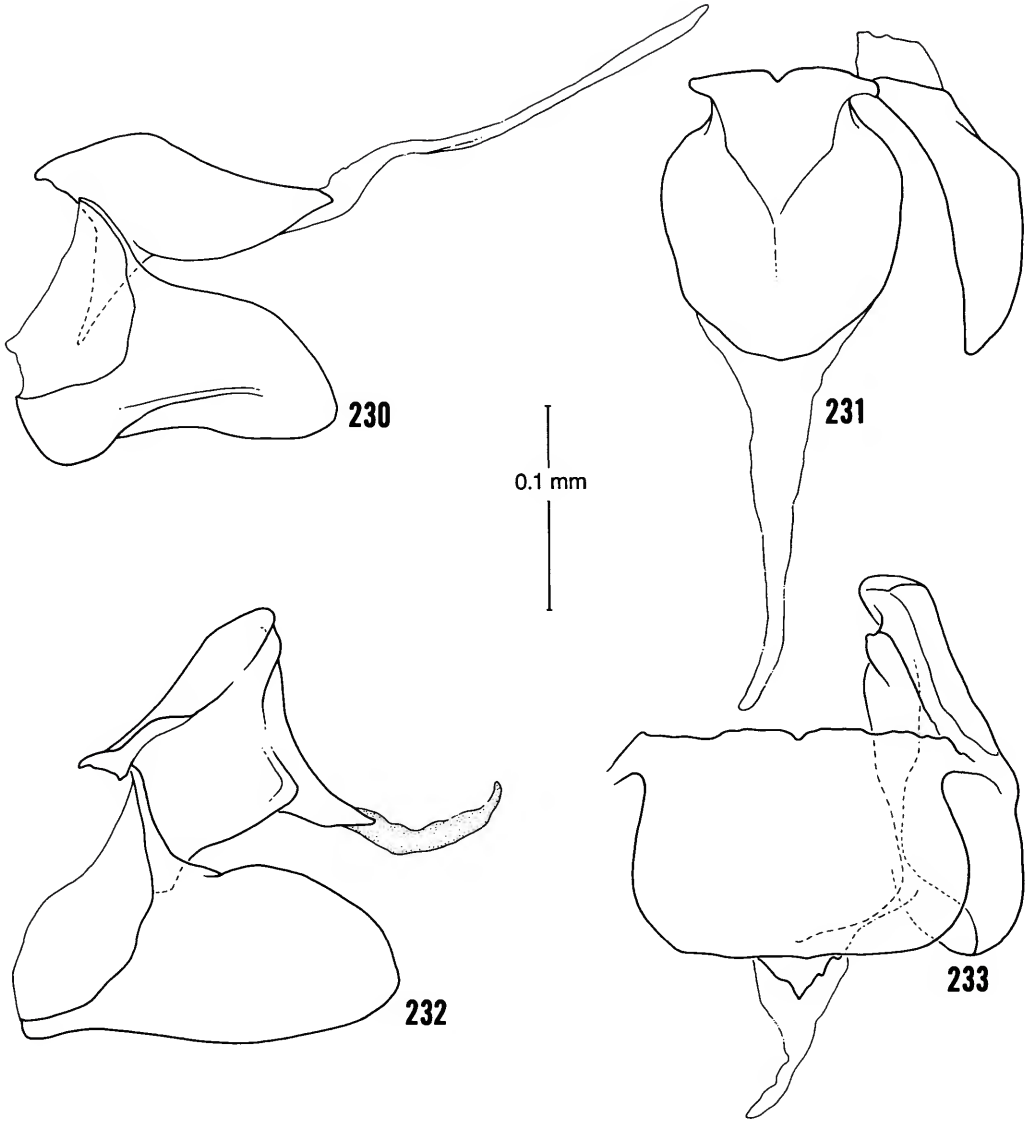


FIGURES 217–220.—*Paralimna* (*Paralimna*) *fellerae*, new species: 217, male terminalia, posterior aspect; 218, same, lateral aspect; 219, aedeagal apodeme and aedeagus, lateral aspect; 220, gonite, lateral aspect. Scale bar = 0.10 mm.

characters are difficult to use because of intraspecific variation, however, especially without access to reliably determined specimens for comparative purposes. To make an unambiguous determination may require examination of the aedeagus, which is very distinctive and readily provides characters to separate the two species. The aedeagus in *P. obscura* (Figures 230, 231) is narrow from dorsal view, slightly longer than wide, and the distal end of the sclerotized portion, especially in lateral view, is distinctly pointed. The aedeagus in *P. decipiens* (Figures 232, 233) is much broader than long in dorsal view, somewhat rectangular with the distal angles rounded, and in lateral view the distal aspect of the sclerotized portion is slightly concave and with the actual apex of the aedeagus as a pointed process that is extended from an anteroventral angle. Both *P. decipiens* and *P. obscura* occur on Belizian Cays and, at times, were collected in the same swing of an aerial net.



FIGURES 221–229.—Scanning electron micrographs of *Paralimna* (*Phaiosterna*) *obscura* (Belize, Stann Creek District, Wee Wee Cay; scale length in parenthesis; scale bar for all photographs = Figure 221): 221, head, lateral aspect (0.33 mm); 222, head, anterior aspect (0.30 mm); 223, frons, anterodorsal aspect (176 μm); 224, face, anterior aspect (176 μm); 225, ommatidia of compound eye, lateral aspect (17.6 μm); 226, enlargement of interfacetal seta, lateral aspect (6.0 μm); 227, mesonotum, dorsal aspect (0.38 mm); 228, scutellum, dorsal aspect (176 μm); 229, thorax, lateral aspect (0.38 mm).



FIGURES 230–233.—Male terminalia: 230, *Paralimna obscura,* aedeagus and lateral aedeagal process, lateral aspect; 231, same, posterior aspect; 232, *Paralimna decipiens,* aedeagus and lateral aedeagal process, lateral aspect; 233, same, posterior aspect. Scale bar = 0.1 mm.

45. *Paralimna (Phaiosterna) decipiens* Loew

FIGURES 232, 233

Paralimna decipiens Loew, 1878:195.—Cresson, 1947:54–55 [review].—Wirth, 1968:16 [Neotropical catalog].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Man of War Cay, Nov 1987, W.N. and D. Mathis (1♂); Stewart Cay, Mar 1988, W.N. Mathis (1♀); Wee Wee Cay, Mar 1988, W.N. Mathis (5♂, 3♀).

DISTRIBUTION.—Nearctic: USA (CA, FL, TX). Neotropical: Bahamas, Belize, Galápagos Islands, Mexico, West Indies (Cuba, Dominica, Grand Cayman, Jamaica, Puerto Rico, St. Lucia, St. Vincent).

DIAGNOSIS.—This species and *P. obscura* are closely related and are very similar in appearance. Externally I have difficulty in distinguishing between them due to variation in coloration and microtomentum. Both species can be somewhat dark or light colored, with the darker specimens usually shinier as a result of less microtomentum. There is a tendency for specimens of *P. decipiens* to be lighter and duller (more

microtomentose) but with considerable variation, sometimes overlapping with *P. obscura*. Accurate identification may require examination of the aedeagus and gonites (see "Diagnosis" for *P. obscura*, p. 56, for additional comments and details).

REMARKS.—Because specimens of *P. decipiens* are similar to and frequently occur sympatrically with those of *P. obscura*, I have designated a lectotype for the former to keep nomenclatural issues at the same level of resolution as our understanding of the zoology.

Subfamily ILYTHEINAE Cresson

Key to Tribes and Genera of Ilytheinae Occurring on Belizean Cays

1. Arista at most with small hairs, none longer than aristal width at base; anterior and posterior notopleural setae inserted equidistant from notopleural suture (HYADININI) . . . . . ***Hyadina*** Haliday
   Arista bearing numerous, long, dorsally branching rays; posterior notopleural seta inserted much farther from notopleural suture than anterior seta; wing spotted . . 2
2. Fronto-orbital setae present, conspicuous, mostly reclinate and proclinate (ILYTHEINI) . . . . . ***Zeros*** Cresson
   Fronto-orbital setae lacking (PHILYGRIINI) . . . . . ***Garifuna,*** new genus

Tribe ILYTHEINI Cresson

Genus *Zeros* Cresson

Zeros Cresson, 1943:10 [type species: *Ilythea obscura* Cresson, 1918, by original designation].

Key to Species of *Zeros* Occurring on Belizean Cays

1. Abdomen lacking investment of microtomentum, shiny black . . . . . ***Z. flavipes*** (Williston)
   Abdomen with dense investment of microtomentum, mostly appearing dull, brownish gray. 2
2. Vein R_{2+3} nearly straight; cell R_3 with 3 infuscate spots or bars . . . . . ***Z. obscurus*** (Cresson)
   Vein R_{2+3} undulated; cell R_3 with 4 infuscate spots or bars . . . . . ***Z. fenestralis*** (Cresson)

46. *Zeros fenestralis* (Cresson)

Ilythea fenestralis Cresson, 1918:51.

Zeros fenestralis.—Cresson, 1943:12 [generic combination]; 1947:45 [review].—Wirth, 1968:18 [Neotropical catalog].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Wee Wee Cay, Mar 1988, W.N. Mathis (13♂, 11♀).

DISTRIBUTION.—Nearctic: Bermuda, USA (FL). Neotropical: Argentina, Belize, Brazil, Ecuador, El Salvador, Costa Rica, Galápagos Islands, Panama, Uruguay, West Indies (Cuba, Puerto Rico).

DIAGNOSIS.—The most evident distinguishing character for this species is the undulated vein R_{2+3}. Other characters that distinguish this species from congeners are cell R_3 with four infuscate spots or transverse bars, crossvein dm-cu present, and abdomen microtomentose, at most subshiny.

47. *Zeros flavipes* (Williston)

Ilythea flavipes Williston, 1896:403.

Zeros flavipes.—Cresson, 1943:14 [generic combination]; 1947:45 [review].—Wirth, 1968:18 [Neotropical catalog].—Mathis and Edmiston, 1991:834 [discussion].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Wee Wee Cay, Mar 1988, W.N. Mathis (1♂, 1♀).

DISTRIBUTION.—Afrotropical: Zaire. Nearctic: Bermuda, Canada (ON), USA (IA, FL, OH, TX, VA). Neotropical: Argentina, Belize, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, Mexico (SIN, SON, TAM), Panama, West Indies (Cuba, Jamaica, Puerto Rico, St. Vincent).

DIAGNOSIS.—This is the only species of *Zeros* that has a shiny black abdomen. This species also may be distinguished from congeners by the following combination of characters: vein R_{2+3} nearly straight, not distinctly undulated; cell R_3 with three infuscate spots or transverse bars; and crossvein dm-cu present.

48. *Zeros obscurus* (Cresson)

Ilythea obscura Cresson, 1918:52.

Zeros obscurus.—Cresson, 1943:14 [generic combination]; 1947:45 [review].—Wirth, 1968:18 [Neotropical catalog].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Wee Wee Cay, Mar 1988, W.N. Mathis (1♀).

DISTRIBUTION.—Nearctic: USA (AZ, NM). Neotropical: Belize, Costa Rica, Guatemala, Mexico (CHI), West Indies (Puerto Rico).

DIAGNOSIS.—This species may be distinguished from congeners by the following combination of characters: vein R_{2+3} nearly straight, not undulated; cell R_3 with three infuscate spots or transverse bars; crossvein dm-cu present; and abdomen microtomentose, at most subshiny.

Tribe HYADININI Phillips et al.

Genus *Hyadina* Haliday

Hyadina Haliday in Curtis, 1837:282 [published in synonymy, first used for a taxon by Haliday, 1839:404. Type species: *Notiphila guttata* Fallén, 1813, by subsequent designation of Westwood, 1840:153].

Key to Species of *Hyadina* Occurring on Belizean Cays

Fourth sternite of male as 2 sclerites, each bearing a long, slender, posteriorly curved, pointed process; 4th tergite of male with lateral margins extended and angulate anteriorly and posteriorly . . . . . ***H. bulbosa*** Clausen

Fourth sternite of male a single sclerite, not bearing long, slender processes; 4th tergite of male with lateral margins similar to 3rd, not extended or angulate . . . . . ***H. flavipes*** Sturtevant and Wheeler

49. *Hyadina bulbosa* Clausen

Hyadina bulbosa Clausen, 1989:18.

SPECIMENS EXAMINED.—BELIZE. Belize District: Turneffe Islands: Calabash Cays (17°17'N, 87°48'W), Mar 1993, W.N. Mathis (3♂, 4♀). Stann Creek District: Wee Wee Cay, Nov 1987, Mar 1988, W.N. and D. Mathis (17♂, 25♀).

DISTRIBUTION.—Neotropical: Belize, Costa Rica, Ecuador, El Salvador, Mexico (CHI, DF, GUE, JAL, MIC, NAY, TAB, VRC), Panama, West Indies (Grenada).

NATURAL HISTORY.—Specimens of this species were collected by sweeping just above a blue-green algal mat on Wee Wee Cay. I suspect that the immatures and possibly the adults feed on the algae.

DIAGNOSIS.—Externally this species is very similar to several congeners, especially *H. flavipes,* and I can only distinguish it by characters of the male terminalia (see key and figures in Clausen, 1989) as follows: surstylus digitiform, bluntly rounded apically, not bearing long setulae; gonite with apex recurved posteriorly; hypandrium pocket shaped.

50. *Hyadina flavipes* Sturtevant and Wheeler

Hyadina flavipes Sturtevant and Wheeler, 1954:212.—Wirth, 1968:19 [Neotropical catalog].
Hyadina furva flavipes.—Clausen, 1983:219 [revision].

SPECIMENS EXAMINED.—BELIZE. Belize District: Turneffe Islands: Calabash Cays (17°17'N, 87°48'W), Mar 1993, W.N. Mathis (3♂). Stann Creek District: Wee Wee Cay, Nov 1987, W.N. and D. Mathis (1♂).

DISTRIBUTION.—Nearctic: USA (AZ, CA). Neotropical: Belize, Mexico (JAL, MEX, NAY).

NATURAL HISTORY.—This species, like the previous one, occurs on the blue-green algal mat.

DIAGNOSIS.—Externally this species is very similar to several congeners, especially *H. bulbosa,* and I can only distinguish it by characters of the male terminalia (see key and figures in Clausen, 1983) as follows: surstylus broadly produced posteriorly, apex bearing two to three long setulae; gonite scythe shaped, shallowly curved anteriorly; hypandrium a narrow, transverse band.

Tribe PHILYGRIINI Lizarralde de Grosso

Garifuna, new genus

TYPE SPECIES.—*Garifuna sinuata,* new species.

DESCRIPTION.—Small shore flies, between 1–2 mm, generally dull colored, microtomentose; wing patterned.

Head: Fronto-orbital setae lacking; inner vertical seta slightly curved inward; outer vertical seta lacking. Arista conspicuously pectinate with dorsally branching rays; flagellomere 1 with rounded anterodorsal angle. Face relatively flat and narrow. Eye large, higher than wide, narrowed slightly ventrally, distictly and densely setulose. Gena short, lacking a prominent seta. Oral opening moderately small.

Thorax: Acrostichal setulae in 2 rows, better developed anteriorly, and lacking a well-developed prescutellar pair; dorsocentral setae 3 (1+2), anterior seta inserted just before transverse suture, insertion of posterior seta displaced laterally; postpronotal, presutural, and postsutural supra-alar setae lacking; 2 scutellar setae, basal seta slightly smaller; notopleural setae 2, anterior seta reduced, posterior seta well developed, inserted at much higher level than anterior seta; postalar seta 1; anepisternal seta 1, inserted along posterior margin; katepisternal seta 1. Wing patterned; costa extended to vein M; vein R_{2+3} short, apical one-half markedly sinuous. Halter pale, brownish yellow. Legs lacking prominent setae.

Abdomen: Uniform in color and vestiture. Second and third tergites short, subequal, fourth tergite longer, fifth tergite conspicuously longer, length subequal to combined length of second and third tergites.

ETYMOLOGY.—The generic name, *Garifuna,* is feminine and is derived from the name given to the descendants of the Black Caribs who were deported from St. Vincent (West Indies) in 1797 and who eventually settled, beginning in 1823, in several villages and towns along the southern coast of Belize.

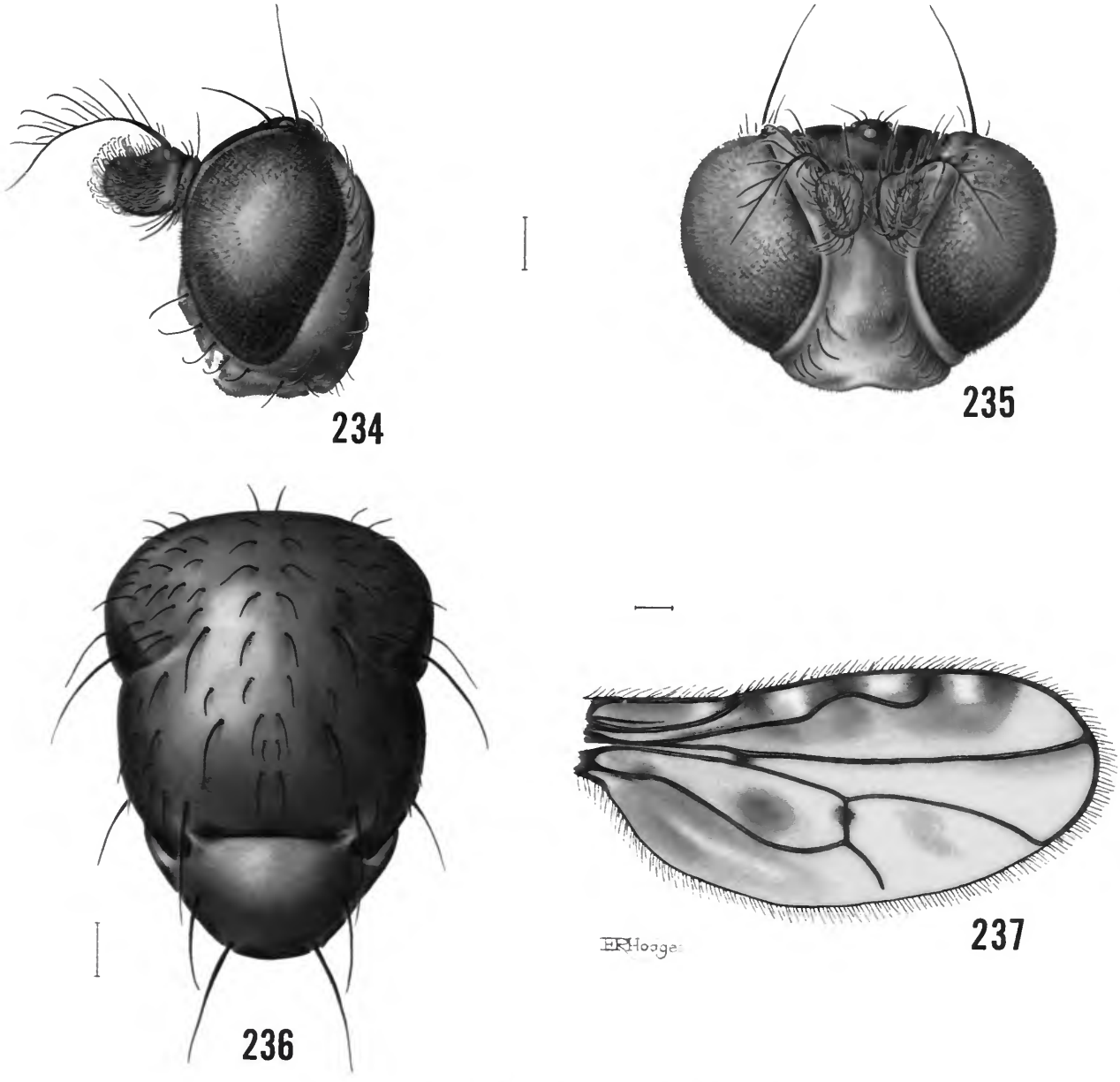
DIAGNOSIS.—This genus is placed in the tribe Philygriini, subfamily Ilytheinae, and is similar and apparently closely related to *Lemnaphila* Cresson, *Philygria* Stenhammar, and especially to *Nostima* Coquillett. This relationship is evidenced by the well-developed dorsocentral setae and elevated insertion of the posterior notopleural seta. It is distinguished from other genera of Philygriini by the peculiar wing pattern and venation, especially the sequence of dark and light spots along the anterior margin of the wing and the short and markedly sinuous apical one-half of vein R_{2+3}. In addition, the arista is conspicuously pectinate (like *Lemnaphila* and *Nostima* but unlike *Philygria*), with eight to nine dorsally branching rays that are subequal in length to the width of the first flagellomere. Like *Philygria* but differing from *Nostima,* the anterior dorsocentral seta is inserted just anteriad of the transverse suture.

51. *Garifuna sinuata,* new species

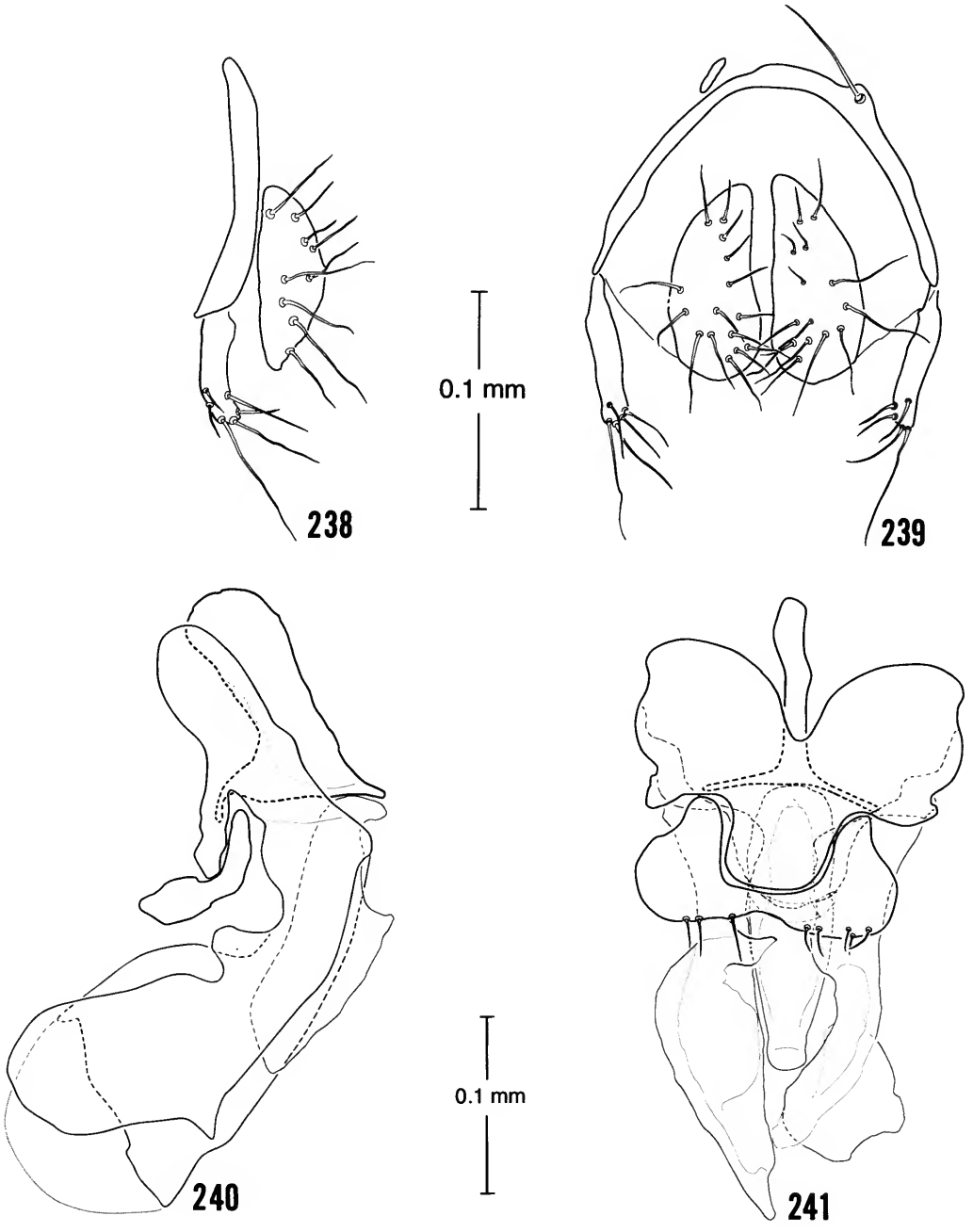
FIGURES 234–241

DESCRIPTION.—Small shore flies, length 1.6–1.8 mm; generally microtomentose but lacking any areas of dense microtomentum on head or thorax that appear velvety; generally appearing slightly to mostly dull, yellowish brown to brown.

Head (Figures 234, 235): Frons twice as wide as long, moderately densely microtomentose; mesofrons distinct, slightly narrowed anteriorly, dark brown, surface appearing microsculptured, subshiny, distinct from yellow to yellowish brown fronto-orbits and anterior margin. Antenna mostly yellow; flagellomere 1 becoming darker, brownish apically; anterodorsal angle of flagellomere 1 rounded; arista conspicuously pectinate, bearing 8–9 dorsal rays, length of rays subequal to width of flagellomere 1. Face moderately densely microtomentose, silvery white, especially ventrally, slightly



FIGURES 234–237.—*Garnifuna sinuata:* 234, head, lateral aspect; 235, same, anterior aspect; 236, mesonotum, dorsal aspect; 237, wing, dorsal aspect. Scale bars = 0.1 mm.



FIGURES 238–241.—*Garnifuna sinuata:* 238, epandrium, cercus, and surstylus, lateral aspect; 239, same, posterior aspect; 240, aedeagal apodeme, aedeagus, and gonites, lateral aspect; 241, same, ventral aspect.

yellowish dorsally just below antennae; bearing 4–6 setulae in vertical row adjacent to parafacial. Eye height-to-width ratio 0.68; gena short, eye-to-cheek ratio 0.20, lacking prominent setae.

Thorax (Figure 236): Mesonotum brown, with some golden microtomentum; pleural areas lighter brown dorsally, becoming darker, blackish brown ventrally. Scutellum rounded ventrally. Wing (Figure 237) with pattern of dark and light spots, especially along anterior margin, on a slightly infumate, hyaline background; dark spots located at apex of vein R_1, in cell r_1 between apices of veins R_1 and R_{2+3}, at R_{2+3}, and in cell r_3 toward margin and between apices of veins R_{2+3} and R_{4+5};

light brown spot near middle of discal cell; vein R_{2+3} relatively short, with third costal section relatively long, nearly equalling second, costal-vein ratio 0.85; apical one-half of vein R_{2+3} markedly sinuous, apical portion merged with costal vein at nearly right angle; vein R_{4+5} shallowly bowed posteriorly; vein M arched anteriorly on portion apicad of crossvein dm-cu, M-vein ratio 0.56; vein CuA_1 before crossvein dm-cu bowed posteriorly, apical portion (beyond crossvein dm-cu) forming 90° angle with basal portion, extended straight to wing margin. Halter yellowish brown. Legs yellow to brownish yellow and lacking any prominent setae.

Abdomen: Uniformly blackish brown, moderately microtomentose, appearing dull; second and third tergites subequal in length, fourth longer, fifth of male considerably longer, subequal to combined length of second and third; fifth sternite short, wide, broadly U-shaped, each arm robustly developed, especially near rounded angles of U, bearing numerous setulae. Male terminalia (Figures 238–241): epandrium reduced, a narrow, arched band with an irregular posterior margin, largely lacking setae; cerci semicircular, longer than wide, narrowed dorsally, regularly developed, unattached ventrally; surstylus comparatively reduced, a simple, narrow, shallowly curved posteriorly, finger-like process bearing 4–5 apical setulae, 2–3 setulae long; aedeagus pointed apically, widest sub-basally, slipper-like in lateral view, length subequal to that of aedeagal apodeme; aedeagal apodeme in lateral view nearly parallel sided, longer than wide; gonite greatly enlarged, asymmetrical, right gonite more spatulate and more evenly rounded, left gonite with subapical tooth along posterior margin, generally more narrowly developed; hypandrium longer than wide, somewhat rectangular with rounded angles, situated between arms of fifth sternite.

TYPE MATERIAL.—The holotype male is labeled "**BELIZE.**Belize Dist: Turneffe Islands, Rope Walk Cay (17°13'N, 87°51'W)[,] 31 Mar1993, W.N.Mathis." The allotype and one other paratype are from Panama. Canal Zone: Balboa, Feb 1958, M.R. Wheeler (1♂, 1♀; USNM).

DISTRIBUTION.—Neotropical: Central America (Belize, Panama).

ETYMOLOGY.—The species epithet, *sinuata,* refers to the sinuous apical one-half of vein R_{2+3}.

NATURAL HISTORY.—The holotype was collected about 150 meters from the mangrove-covered shore around a small pool of fresh water that had accumulated in a depression made by a heavy piece of equipment that had been clearing the area. The pool margins were encrusted with algae. Other shore-fly species occurring at this site were *Glenanthe ruetzleri, Allotrichoma abdominale,* and *Discocerina obscurella.*

REMARKS.—The patterned wing readily characterizes this species and will undoubtedly distinguish it from congeners, if any, that may be discovered. Characters of the male terminalia, especially the asymmetrical gonites, also will probably be diagnostic.

Subfamily EPHYDRINAE Zetterstedt

Key to Tribes and Genera of Ephydrinae Occurring on Belizean Cays

1. Three to four pairs of postsutural dorsocentral setae. Disc of proepisternum with few to many fine setulae (EPHYDRINI) 2
   Two pairs of postsutural dorsocentral setae, both pairs equally strong. Disc of proepisternum usually bare (SCATELLINI) 3
2. Aristal rays short, at most 1/2 as long as width of pedicel; hind femur of male conspicuously swollen and bearing a short row of 4–5 stout setae along anteroventral surface; hind tibiae of male bearing ventroapical tuft of setulae . . . . . ***Cirrula*** Cresson
   Aristal rays long, subequal in length to width of pedicel; hind femur of male not differing markedly from mid- or forefemur, lacking stout setae as above; hind tibia of male lacking tuft of setulae . . . . ***Dimecoenia*** Cresson
3. Gena usually with a distinct seta much longer and stronger than other genal setulae, but if distinct seta is lacking, then presutural dorsocentral seta absent. Wing with distinct to obscure pale spots . . . . . ***Scatella*** Robineau-Desvoidy
   Gena lacking a distinct seta; presutural dorsocentral seta present; wing lacking pale spots . . . . . ***Haloscatella*** Mathis

Tribe EPHYDRINI Zetterstedt

Genus *Cirrula* Cresson

Cirrula Cresson, 1915:70 [type species: *Cirrula gigantea* Cresson, 1915, by monotypy].

52. *Cirrula austrina* (Coquillett)

FIGURES 242–248

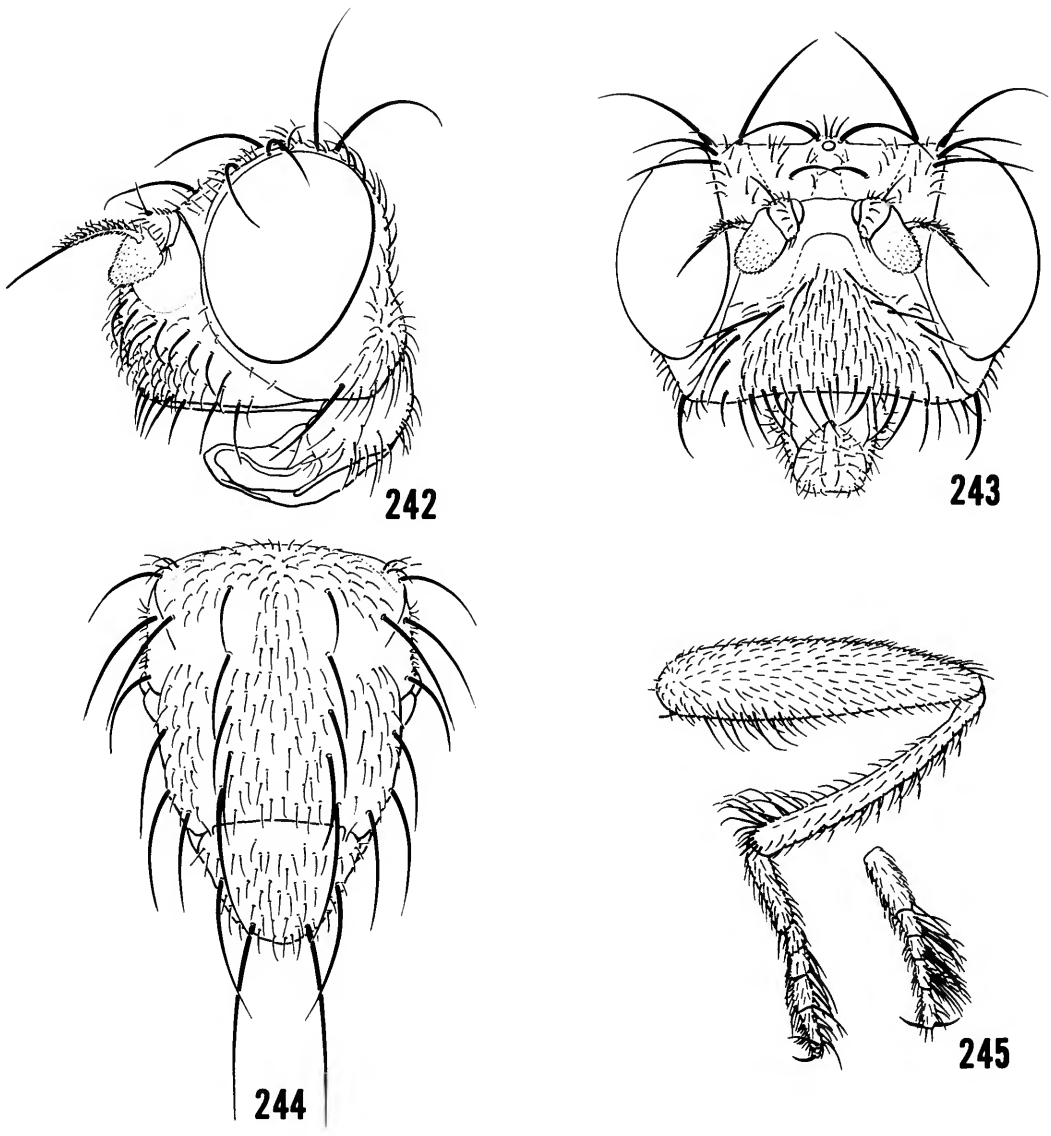
Ephydra austrina Coquillett, 1900b:36.
Dimecoenia austrina.—Cresson, 1916:152 [generic combination].
Cirrula austrina.—Mathis and Simpson, 1981:9–21 [generic combination, revision].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Carrie Bow Cay, Mar 1988, W.N. Mathis (1♂, 2♀); Stewart Cay, Mar 1988, W.N. Mathis (1♀); Twin Cays (Aanderaa Flats, West Pond), Mar 1988, W.N. Mathis (2♂, 19♀).

DISTRIBUTION.—Nearctic: Bermuda, USA (CA, FL, MD, TX, VA). Neotropical: Belize, Mexico (NAY, SON).

NATURAL HISTORY.—As elsewhere (Mathis and Simpson, 1981:19–21), this species occurs in Belizean cays on mats of filamentous algae in salt marshes. The species seems to be more abundant when the habitat is partially dried, leaving the mats firmer and the substrate more solid.

DIAGNOSIS.—Although somewhat similar to *C. gigantea* Cresson, the only other congener, this species can be



FIGURES 242–245.—*Cirrula austrina:* 242, head, lateral aspect; 243, same, anterior aspect; 244, mesonotum, dorsal aspect; 245, hind leg of male, lateral aspect and dorsal aspect of tarsi.

distinguished by the following combination of characters: five pairs of dorsocentral setae, presutural seta, and crucinate intrafrontal setae well developed, conspicuously larger than surrounding setulae; face lacking dense patch of long setae subdorsally; parafrons brownish, microtomentose; foretarsi of male cylindrical, similar to those of middle leg.

Genus *Dimecoenia* Cresson

Dimecoenia Cresson, 1916:152 [type species: *Coenia spinosa* Loew, 1864, by original designation].

53. *Dimecoenia spinosa* (Loew)

FIGURES 249–255

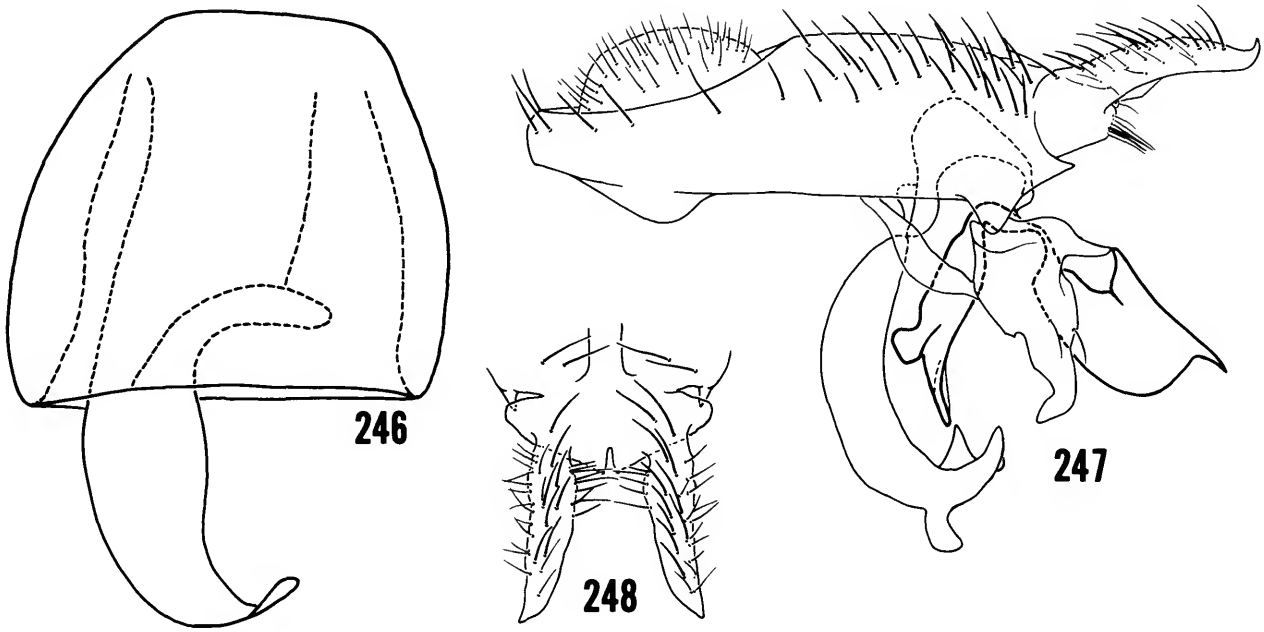
Coenia spinosa Loew, 1864:99.

Caenia [sic] *spinosa*.—Osten Sacken, 1878:204 [generic combination].

Dimecoenia spinosa.—Cresson, 1916:152 [generic combination].—Mathis and Simpson, 1981:30–42 [revision].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Twin Cays (West Pond), Nov 1987, Mar 1988, W.N. and D. Mathis (4♀).

DISTRIBUTION.—Nearctic: Canada (NB, NS), USA (CA, CT,



FIGURES 246–248.—*Cirrula austrina:* 246, female ventral receptacle, lateral aspect; 247, male terminalia, lateral aspect; 248, ventral margin of epandrium and surstyli, posterior aspect.

DE, FL, GA, LA, ME, MD, MA, MS, NH, NJ, NY, NC, RI, TX, VA). Neotropical: Belize, Mexico (BCN, QNR), West Indies (Jamaica).

DIAGNOSIS.—This species is very similar to *D. fuscifemur* Steyskal but may be distinguished by the following combination of characters: legs stramineous to yellow, at most with dorsum of femora grayish; fronto-orbital setae nearly parallel with each other, both oriented obliquely posterolaterad; crossvein dm-cu distinctly arched, concave basally; face between antennal bases with broad, bronzish band.

Tribe SCATELLINI Wirth and Stone

Genus *Haloscatella* Mathis

Haloscatella Mathis, 1979:6 [as a subgenus of *Lamproscatella;* type species: *Lamproscatella arichaeta* Mathis, 1979, original designation].—Olafsson, 1991:42 [revised status].

54. *Haloscatella muria* (Mathis)

FIGURES 256–258

Lamproscatella (*Haloscatella*) *muria* Mathis, 1979:12.

Haloscatella muria.—Mathis and Zatwarnicki, 1995:255 [generic combination].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Round Cay (near Coco Plum Cay), Mar 1988, W.N. Mathis (2♂); Stewart Cay, Nov 1987, W.N. and D. Mathis (1♀); Twin Cays (Aanderaa Flats), Nov 1987, Mar 1988, W.N. and D. Mathis (2♀).

DISTRIBUTION.—Nearctic: Bermuda, Canada (AB, MB, NS), USA (AL, AZ, CA, CT, DE, FL, GA, IA, ID, KS, MA, ME, MI, MN, MS, MT, NH, NJ, NM, NY, NC, ND, OH, OR, RI, UT, VA, WA, WY). Neotropical: Belize, Mexico (BCN, JAL, MEX), West Indies (Grand Cayman).

NATURAL HISTORY.—All specimens from Wee Wee Cay were collected from the large muddy area with a covering mat of blue-green algae that is more fully described under *Glenanthe ruetzleri.*

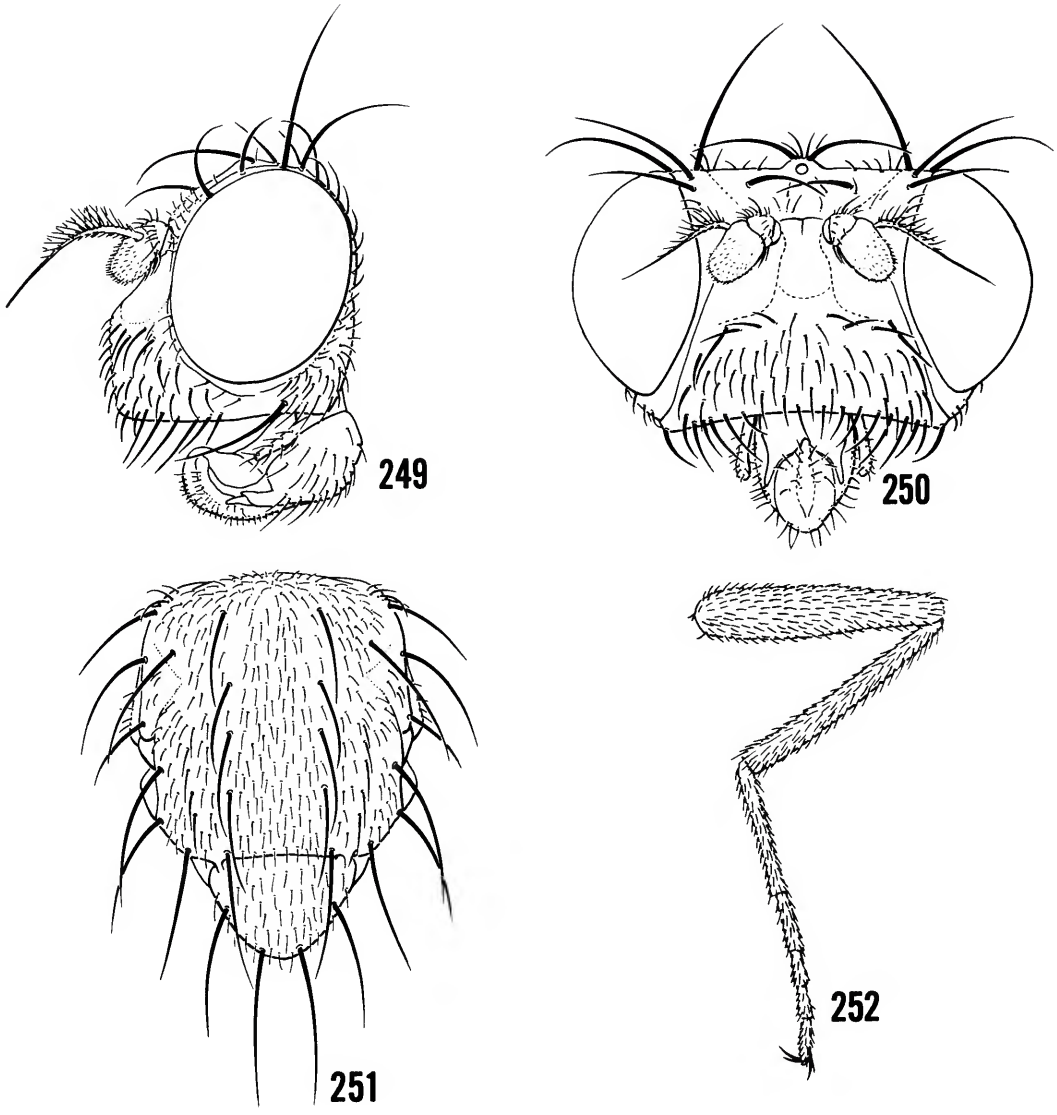
DIAGNOSIS.—This species is distinguished from congeners by the following combination of characters: length less than 2.0 mm; mesofrons subshiny to shiny, lateral margins distinctly narrowed anteriorly; third fronto-orbital seta large, at least one-half length of first, inserted only slightly closer to second fronto-orbital seta than to fourth, orientation lateroclinate.

Genus *Scatella* Robineau-Desvoidy

Scatella Robineau-Desvoidy, 1830:801 [type species: *Scatella buccata* Robineau-Desvoidy, 1830 (= *Ephydra stagnalis* Fallén, 1813), by subsequent designation of Coquillett, 1910:603].

Key to Species of *Scatella*

Wing with conspicuous spots; coloration mostly brownish; gena short, less than 1/3 eye height . . . . . ***Scatella obscura*** Williston



FIGURES 249–252.—*Dimecoenia spinosa:* 249, head, lateral aspect; 250, same, anterior aspect; 251, mesonotum, dorsal aspect; 252, hind leg of male, lateral aspect.

Wing mostly hyaline, spots very obscure to nonexistent; coloration brown dorsally but gray to whitish gray on pleurae; gena high, nearly 1/2 eye height . . . . . ***Scatella favillacea*** Loew

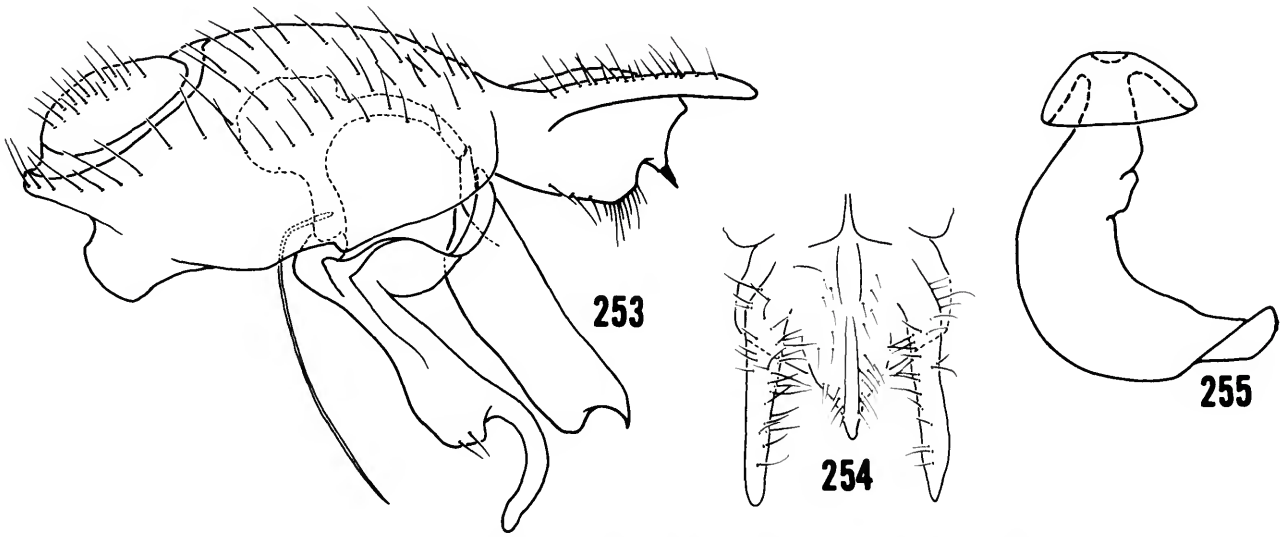
55. *Scatella (Scatella) obscura* Williston

Scatella obscura Williston, 1896:403.—Wirth, 1968:26 [Neotropical catalog].—Mathis and Edmiston, 1991:836–837 [discussion].

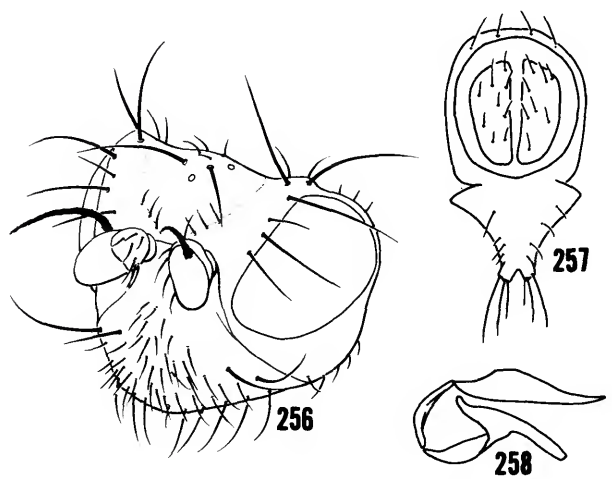
SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Man of War Cay, Nov 1987, W.N. and D. Mathis (5♂, 5♀); Round Cay (near Coco Plum Cay), Mar 1988, W.N. Mathis (1♀); Stewart Cay, Mar 1988, W.N. Mathis (6♂, 11♀); Tobacco Range, Jul 1989, W.N. Mathis, H.B. Williams (1♀); Twin Cays (Aanderaa Flats, south end of East Island), Mar 1988, W.N. Mathis (1♂, 6♀); Wee Wee Cay, Nov 1987, Mar 1988, W.N. and D. Mathis (10♂, 12♀). Glover's Reef (Middle Cay), Jul 1989, W.N. Mathis, H.B. Williams (1♂, 2♀).

DISTRIBUTION.—Nearctic: USA (FL). Neotropical: Argentina, Bahamas, Belize, Brazil, Costa Rica, Ecuador (mainland and Galápagos Islands), El Salvador, Panama, Paraguay, West Indies (Dominica, Puerto Rico, St. Vincent).

NATURAL HISTORY.—All specimens from Wee Wee Cay



FIGURES 253–255.—*Dimecoenia spinosa:* 253, male terminalia, lateral aspect; 254, ventral margin of epandrium and surstyli, posterior aspect; 255, female ventral receptacle, lateral aspect.



FIGURES 256–258.—*Haloscatella muria:* 256, head, lateroblique aspect; 257, male terminalia, posterior aspect; 258, internal structures of male terminalia, lateral aspect.

were collected from the large muddy area with a covering mat of blue-green algae. The habitat is more fully described under *Glenanthe ruetzleri.*

DIAGNOSIS.—This species is distinguished from related congeners by the following combination of characters: general coloration brown; mesofrons partially microtomentose, subshiny; gena low, height less than one-third eye height; wing infuscate and with several pale spots; both notopleural setae inserted at about same level.

56. *Scatella (Scatella) favillacea* Loew

Scatella favillacea Loew, 1862:170.—Wirth, 1968:25 [Neotropical catalog].

SPECIMENS EXAMINED.—BELIZE. Stann Creek District: Man of War Cay, Nov 1987, W.N. and D. Mathis (1♀).

DISTRIBUTION.—Nearctic: Canada (ON, SK, QB), USA (FL, IA, MA, MD, NJ, OH, TX, VA). Neotropical: Belize, Costa Rica, Ecuador.

DIAGNOSIS.—This species is closely related to *S. paludum* (Meigen) but is distinguished from it and other congeners by the following combination of characters: mesofrons shiny with metallic luster, bare of microtomentum, rounded laterally and broadly, reaching to anterior margin; gena high, over one-half eye height; face, lateral margins of mesonotum, and pleurae silvery gray; posterior notopleural seta inserted at level conspicuously above anterior seta; wing hyaline, lacking prominent spots.

Discussion and Summary of Shore-Fly Diversity and Island Zoogeography

Among terrestrial organisms that occur on Belizean cays, the Ephydridae, with 56 known species, exhibit exceptional diversity (Table 1). Based on data presently available, no other family of plants or animals approaches this degree of species richness, although few groups, insects in particular, have been collected as thoroughly as the Ephydridae. Other families that have been well sampled for comparative purposes are ants (Formicidae), with 34 species (Lynch, pers. comm., 1993), and long-horned beetles (Cerambycidae), with 20 species (Chem-

sak, 1983; Chemsak and Feller, 1988; Feller, pers. comm., 1993).

The diversity of species, as measured within the higher classification of shore flies (Table 1), is greatly skewed toward the subfamily Gymnomyzinae, with 38 of 56 species or two-thirds of the known shore-fly fauna on the Belizean cays. The species of Gymnomyzinae that occur on the cays are distributed among nine tribes and 21 genera. The remaining three subfamilies and their included species are as follows: Hydrelliinae with six species among three tribes and three genera; Ilytheinae with six species in three tribes and three genera; and Ephydrinae with five species in two tribes and four genera.

The number of species and genera within the classification just presented needs further consideration within a broader context to be more meaningful. For greater perspective, the distribution of shore flies on the Belizean cays is compared with the Neotropical shore-fly fauna as a whole (Table 2) and then more specifically with shore flies from the Caribbean and Gulf of Mexico (Table 3). This is done to determine whether the fauna is relatively harmonic or disharmonic with the nearby continental fauna (Hubbell, 1968; other authors prefer the terms "in" or "out of balance"). To make the numbers more comparable, I have cited the number of species in each tribe and then determined their proportion as a percentage of the entire shore-fly fauna for that area.

When compared with the fauna of the neotropics generally (Table 2), the shore flies of the Belizean cays are relatively harmonic or in balance, with species representing 17 of the 20 tribes occurring in the neotropics. The three tribes that are missing are Typopsilopini, Dagini, and Parydrini, and none of these is particularly rich in species even on the mainland (each is five percent or less of the entire Neotropical fauna).

Although most Neotropical tribes occur on the cays, their representation is not always in the same proportions. Major discrepancies (50% or greater) are evident in eight of the remaining 17 tribes, including 32 of 56 species. In four of these tribes, Atissini, Lipochaetini, Discocerinini, and Ilytheini, the percentage of insular fauna on the cays is more than double the percentage for the neotropics generally. In three tribes, Philygriini, Hyadinini, and Scatellini, the relationship is reversed, with a much greater percentage occurring in the neotropics generally than on the cays. The primary reason is probably the kinds of habitats and their availability on the cays, specifically the almost total lack of freshwater habitats but with a diverse array of saline ones. Closely correlated to habitat availability is the degree to which taxa are adapted to saline or brackish-water conditions. Although many species of "Ephydridae are pre-eminently successful at this ... physiological ability to withstand the osmotic pressure of salt water without losing too much water through the skin ... and colonize salt-marshes and salt-pans all over the world" (Oldroyd, 1964:186), none is more successful as a tribe than those of Atissini and Lipochaetini, and, to a lesser degree, Gymnomyzini and Discocerinini. The natural history of most atissine and lipochaetine species is characterized in part by their tolerance to saline or alkaline environments (Cheng and Lewin, 1974; Simpson, 1976; Mathis, 1984a, 1984b) as exemplified by numerous species in these tribes that live in coastal maritime environments or inland saline and alkaline habitats, such as along the shores of the Great Salt Lake (Utah) or the Dead Sea (Israel). Because shore-fly habitats on the cays are mostly coastal marine and the water associated with them is at least brackish, those species that are tolerant or adapted to these conditions would be expected to prevail, and the sampling indicates just that. I suspect that the reverse is the reason why species of Typopsilopini, Philygriini, Hyadinini, Dagini, Parydrini, and Scatellini are either not represented on the cays or are found there in lesser proportions. The Scatellini will be considered separately.

When the comparison is restricted to shore flies of the Caribbean and Gulf of Mexico (Table 3) versus those of the Belizean cays, the same general patterns are evident that were demonstrated for the neotropics generally but with some exceptions. The faunal percentages of the tribes Gymnomyzini, Lipochaetini, and Hyadinini on the cays are not significantly different from those on the nearby mainland, but Ochtherini and Ephydrini are significantly greater, and for the tribe Scatellini, the relationship is reversed, with this taxon comprising a greater percentage of insular fauna than it does within the Caribbean and Gulf of Mexico. The explanation is again related to the kinds of habitats making up the surrounding mainland or source pool. The more adjacent source pools, the western coast of the Caribbean, have a greater diversity of saline habitats and fewer freshwater ones. Commensurate with these habitats, there is greater richness in salt-tolerant shore flies and fewer species of freshwater ephydrids. Thus differences among salt-tolerant taxa are expected to be less pronounced, and, among freshwater taxa, the differences should be greater. Both predictions are indicated (Table 3), viz., salt-tolerant taxa such as Hecamedini fall below the 50% difference, and there are even less differences among Lipochaetini and Discocerinini. Freshwater groups are mixed, with either no change, such as among Philygrini, or there is a reversal, as in Scatellini and Ephydrini, with greater representation on the cays than from the mainland source pool.

Sampling error, as a factor, should not be discounted. The source pool on the mainland has not been collected comparatively, and better sampling may alter these data.

Part of the explanation for the variable status of Scatellini is also linked with the distribution and general climatic preferences of this tribe. The tribe has far greater diversity in temperate zones generally, not tropical ones. In the neotropics, for example, much greater species diversity within Scatellini, as documented in the most recent catalog (Wirth, 1968), is found in the Andes for those countries near the Equator or is

TABLE 1.—Shore-fly species and their distribution on Belizean cays (X = present on one or more islands; O = present on only one island).

Taxon	*Bread and Butter Cay*	*Carrie Bow Cay*	*Coco Plum Cay*	*Round Cay*	*Man of War Cay*	*Saddle Cay*	*South Water Cay*	*Stewart Cay*	*Tobacco Range*	*Twin Cays*	*Wee Wee Cay*	*Glover's Reef*	*Turneffe Islands*	*Lighthouse Reef*
GYMNOMYZINAE														
GYMNOMYZINI														
1. *Athyroglossa glaphyropus*			X								X			
2. *Mosillus stegmaieri*		X	X	X	X			X		X				
3. *Placopsidella cynocephala*														O
GASTROPSINI														
4. *Gastrops niger*									O					
OCHTHERINI														
5. *Ochthera loreta*											O			
ATISSINI														
6. *Atissa luteipes*			X		X				X	X	X			
7. *Ptilomyia lobiochaeta*		X		X		X		X			X	X		
8. *Ptilomyia parva*				X				X	X		X	X	X	
9. *Ptilomyia mabelae*								X			X			
HECAMEDINI														
10. *Allotrichoma adustum*			X						X	X				
11. *Allotrichoma abdominale*	X	X	X	X		X	X	X	X	X	X	X		
12. *Diphuia nasalis*	X			X					X		X	X	X	X
13. *Hecamede brasilensis*		X	X	X					X				X	
LIPOCHAETINI														
14. *Glenanthe ruetzleri*		X	X	X			X	X	X	X		X		
15. *Glenanthe caribea*											O			
16. *Glenanthe litorea*													O	
17. *Lipochaeta slossonae*		O												
18. *Paraglenanthe bahamensis*										X	X		X	
DISCOCERININI														
19. *Discocerina flavipes*		X	X	X	X				X		X	X	X	
20. *Discocerina obscurella*					X				X		X		X	
21. *Discocerina juniori*											O			
22. *Discocerina nitida*										X				X
23. *Discocerina mera*	X	X		X	X	X	X	X	X	X	X	X	X	X
24. *Hydrochasma incisum*				X					X		X		X	
25. *Hydrochasma faciale*										O				
26. *Hydrochasma* species									O					
27. *Polytrichophora agens*	X	X	X				X		X					
28. *Polytrichophora conciliata*			X	X	X		X	X	X	X	X	X		
29. *Polytrichophora pulchra*				X					X		X			
30. *Polytrichophora reginae*									X		X			
PSILOPINI														
31. *Ceropsilopa coquilletti*	X	X						X				X	X	X
32. *Ceropsilopa costalis*													O	
33. *Ceropsilopa nasuta*	X			X			X					X		
34. *Leptopsilopa similis*											O			
DISCOMYZINI														
35. *Clasiopella uncinata*		X		X					X		X			
36. *Guttipsilopa dianneae*			X					X	X					
37. *Guttipsilopa umbrosa*													X	
38. *Paratissa neotropica*			X									X		X
39. *Paratissa semilutea*	X		X	X			X		X	X	X		X	

TABLE 1.—Continued.

Taxon	Bread and Butter Cay	Carrie Bow Cay	Coco Plum Cay	Round Cay	Man of War Cay	Saddle Cay	South Water Cay	Stewart Cay	Tobacco Range	Twin Cays	Wee Wee Cay	Glover's Reef	Turneffe Islands	Lighthouse Reef
HYDRELLIINAE														
HYDRELLIINI														
40. *Hydrellia cavator*										O				
NOTIPHILINI														
41. *Notiphila erythrocera*									O					
DRYXINI														
42. *Paralimna multipunctata*											O			
43. *Paralimna fellerae*											X	X	X	
44. *Paralimna obscura*	X			X				X	X		X			X
45. *Paralimna decipiens*				X				X			X			
ILYTHEINAE														
ILYTHEINI														
46. *Zeros fenestralis*											O			
47. *Zeros flavipes*											O			
48. *Zeros obscurus*											O			
HYADININI														
49. *Hyadina flavipes*												O		
50. *Hyadina bulbosa*											X		X	
PHILYGRIINI														
51. *Garifuna sinuata*													O	
EPHYDRINAE														
EPHYDRINI														
52. *Cirrula australis*		X						X	X					
53. *Dimecoenia spinosa*									O					
SCATELLINI														
54. *Haloscatella muria*					X			X	X					
55. *Scatella obscura*					X	X			X	X	X	X	X	
56. *Scatella favillacea*				O										

more generally abundant in countries farther to the south, such as Argentina and Chile, which have more temperate climates. This pattern also holds for faunal regions elsewhere in the world, i.e., scatellines are rich in the Holarctic and Australian Regions, which are primarily temperate, but are comparatively depauperate in the Orient and Afrotropics. Because the Caribbean, including the Belizean cays, is subtropical to tropical, marked species diversity in Scatellini was neither expected nor found. Moreover, the three species occurring on the cays were anticipated, as they are exceptional scatellines in being comparatively cosmopolitan in lowland neotropical habitats that are often found in proximity to saline habitats.

The essentially harmonic shore-fly fauna of the Belizean cays was also expected, especially when distance from the mainland and principal source pool is considered. The cays are relatively close to the mainland and are more typical of continental islands. Most of the cays we sampled are associated with the barrier reef and are at most approximately 18 km from the mainland. In time, many if not most shore-fly species could possibly bridge that gap as aerial plankton (Glick, 1939; Guilmette et al., 1970; Gressitt, 1974). Double that distance, however, such as the distance from the mainland to the cays of Glover's Reef, apparently does pose a more significant barrier. Of the 12 species found on Glover's Reef (Table 5), all but three (*Paraglenanthe bahamensis, Paratissa neotropica,* and *Paralimna fellerae*) are among the most widespread species occurring on Belizean cays. Among species that occur on one-half or more of the cays (Table 6), over one-half (eight of 13 species) are found on Glover's Reef (Table 5). This probably indicates differential vagility among these species, at least for distances beyond 30 km from the mainland or over 15 km from the nearest barrier reef cays.

The proximity of the barrier-reef cays to the mainland, however, has almost assuredly been a contributing factor to the

TABLE 2.—Number and percentage (in parenthesis) of genera and species in the neotropics generally compared with those on Belizean cays.

Subfamily and tribe	Neotropical catalog				Belizean cays			
	Genera		Species		Genera		Species	
	No.	%	No.	%	No.	%	No.	%
GYMNOMYZINAE								
GYMNOMYZINI	3	(5)	11	(3)	3	(10)	3	(5)
GASTROPSINI	2	(3)	9	(2)	1	(3)	1	(2)
OCHTHERINI	1	(2)	13	(3)	1	(3)	1	(2)
ATISSINI	2	(3)	9	(2)	2	(6.5)	4	(7)
HECAMEDINI	3	(5)	14	(4)	3	(10)	4	(7)
LIPOCHAETINI	3	(5)	8	(2)	3	(10)	5	(9)
DISCOCERININI	4	(6)	29	(8)	3	(10)	12	(21)
PSILOPINI	7	(11)	28	(7)	2	(6.5)	4	(7)
DISCOMYZINI	7	(11)	19	(5)	3	(10)	4	(7)
HYDRELLIINAE								
HYDRELLIINI	2	(3)	9	(2)	1	(3)	1	(2)
TYPOPSILOPINI	2	(3)	8	(2)	0	(0)	0	(0)
NOTIPHILINI	1	(2)	8	(2)	1	(3)	1	(2)
DRYXINI	2	(3)	23	(6)	1	(3)	4	(7)
ILYTHEINAE								
PHILYGRIINI	3	(5)	18	(5)	1	(3)	1	(2)
ILYTHEINI	2	(3)	8	(2)	1	(3)	3	(5)
HYADININI	4	(6)	43	(11)	1	(3)	2	(4)
EPHYDRINAE								
DAGINI	4	(6)	18	(5)	0	(0)	0	(0)
PARYDRINI	1	(2)	16	(4)	0	(0)	0	(0)
EPHYDRINI	7	(11)	28	(7)	2	(6.5)	2	(4)
SCATELLINI	6	(9)	64	(17)	2	(6.5)	3	(5)
Total	66		383		31		56	

exceptional diversity of shore flies on these islands. Almost without exception, the species of shore flies known from the Belizean cays also occur on the nearby mainland, and it is likely that most if not all species are introductions to the cays from source pools on the mainland through various means of introduction and dispersal. As the species occurring on the cays are macropterous and presumably quite vagile, most, perhaps all, probably arrived on the cays through either active or passive mechanisms (i.e., their own powers of flight combined with prevailing winds) or a combination of them. Those species that are specifically associated with certain plants, such as *Ceropsilopa coquilletti* on *Suaeda linearis,* may have arrived on the cays with the introduction of their host plants.

Although shore flies are unusually diverse on the cays, additional species undoubtedly await discovery. Only a few cays within the Stann Creek District were sampled (see section on "Islands and Habitats"), and these represent a small fraction of the total number of Belizean cays. Moreover, my experience from conducting field work on Belizean cays indicates that other species will be discovered. For example, each of the first few field trips resulted in several additional species, especially when sampling took place during different seasons. Even though fewer additional species were found in recent years, only two in 1989 and none in 1990, others will almost certainly be discovered, perhaps as introductions.

Introductions are likely to increase as commerce and trade expand in the western Caribbean. In 1989, for example, *Hecamede brasiliensis* was discovered in abundance on several cays, and each of these cays had been intensively collected for the previous five years without any indication of this species. Its rather sudden occurrence and apparent establishment are likely to have resulted from an introduction. This same species was just recently found on the Galápagos Islands, and its occurrence there is also adventive (Mathis, 1995b).

A second species that was probably introduced is *Discocerina mera,* which occurs throughout the study area. This species was first collected in 1985 and has been found on all subsequent field trips. The records of its occurrence in Belize, however, are the first in the Western Hemisphere (Zatwarnicki, 1991). Elsewhere the species occurs throughout the Australasian and southern Oceanian regions and into the Oriental (Thailand to the Ryukyu Islands) and Palearctic (Japan) regions.

Earlier, Cresson (1946a:152) suggested that a third species, *Clasiopella uncinata,* is also an introduction in the Caribbean

TABLE 3.—Number and percentage (in parenthesis) of genera and species in the Caribbean compared with those on Belizean cays.

Subfamily and tribe	Neotropical catalog (Caribbean taxa only)				Belizean cays			
	Genera		Species		Genera		Species	
	No.	%	No.	%	No.	%	No.	%
GYMNOMYZINAE								
GYMNOMYZINI	3	(6)	7	(4)	3	(10)	3	(5)
GASTROPSINI	2	(4)	6	(3)	1	(3)	1	(2)
OCHTHERINI	1	(2)	11	(6)	1	(3)	1	(2)
ATISSINI	2	(4)	6	(3)	2	(6.5)	4	(7)
HECAMEDINI	3	(6)	9	(5)	3	(10)	4	(7)
LIPOCHAETINI	3	(6)	7	(4)	3	(10)	5	(9)
DISCOCERININI	4	(8)	20	(11)	3	(10)	12	(21)
PSILOPINI	6	(12)	23	(13)	2	(6.5)	4	(7)
DISCOMYZINI	6	(12)	14	(8)	3	(0)	4	(7)
HYDRELLIINAE								
HYDRELLIINI	2	(4)	5	(3)	1	(3)	1	(2)
TYPOPSILOPINI	1	(2)	3	(2)	0	(0)	0	(0)
NOTIPHILINI	1	(2)	6	(3)	1	(3)	1	(2)
DRYXINI	2	(4)	12	(7)	1	(3)	4	(7)
ILYTHEINAE								
PHILYGRIINI	3	(6)	16	(9)	1	(3)	1	(2)
ILYTHEINI	2	(4)	5	(3)	1	(3)	3	(5)
HYADININI	2	(4)	6	(3)	1	(3)	2	(4)
EPHYDRINAE	4	(8)	12	(7)	0	(0)	0	(0)
DAGINI								
PARYDRINI	1	(2)	3	(2)	0	(0)	0	(0)
EPHYDRINI	3	(6)	3	(2)	2	(6.5)	2	(4)
SCATELLINI	1	(2)	3	(2)	2	(6.5)	3	(5)
Total	52		177		31		56	

region and in Florida. Cresson's suggestion was based on several interceptions of this species on airplanes that were sampled during World War 11 (Cresson, 1945, 1946a, 1946b). The airplanes were from such widespread sites as Midway Island, the Caribbean, and Kenya.

The fourth species that was likely to have been introduced is *Placopsidella cynocephala,* which was found on Half Moon Cay (Lighthouse Reef). Prior to its discovery on Belizean Cays, this species was known only from the Oriental and Australasian/Oceanian regions. This is the second species of *Placopsidella* that is apparently adventive to the New World. Previously *P. grandis* was reported from Panama and coastal Maryland and Virginia (Mathis, 1986b, 1988).

Shore-fly species richness on the Belizean cays results from complex biotic and abiotic interactions over an extended period of time, perhaps millennia. Some of the factors contributing to the complexity were discussed above, i.e., habitat availability, tolerance or intolerance to saline habitats, climatic factors, distance from possible source pools, and introductions through commerce.

Shore flies, as the vernacular name for the Ephydridae suggests, are primarily associated with shorelines in aquatic and to a lesser degree in coastal marine ecosystems. These habitats, coastal marine ones in particular, are diverse on the cays. Although terrestrial habitats on the cays are much more restricted than those on the mainland, several are quite suitable for shore flies. Habitats where greatest numbers of species were collected were described earlier in the section dealing with "Island and Habitat Descriptions."

On the basis of diversity per island, Wee Wee Cay and Twin Cays have by far the greatest richness (Table 4). Even with a bias due to the more intensive sampling on Twin Cays, there is probably greater diversity there because of the variety of habitats and greater size of the islands. On Wee Wee Cay, however, which is a small cay that was not sampled as intensively, the marked diversity in shore flies is attributable to the freshwater habitat, even though it may be ephemeral. Of the 33 species found on Wee Wee Cay, nine were exclusive within the cays to that island and are primarily freshwater species.

Another aspect of shore-fly biogeography on Belizean cays is the occurrence of a particular species on different islands (Table 4). Sorting species by this criteria indicates that 21 of 56 species (38%) occur on a single island and that only *Discocerina mera* was found on each of the 13 islands (Table 6). Moreover, only eight species (14%) are known to occur on one-half or more of the cays that were sampled (Table 6).

A further consideration that contributes to the richness of shore flies on the cays is the life-style strategy of many shore flies. In addition to being diverse, most of the habitats that are exploited are comparatively ephemeral, especially the freshwater habitat on Wee Wee Cay. The shore flies using these habitats are typically r-strategists, i.e., they are able to quickly find and exploit a short-lived microhabitat and demonstrate minimal behavior in dealing with each other and/or the habitat. R-strategists usually emphasize high fecundity and quick and effective dispersal mechanisms. Given the rapid change in habitats that frequently occurs on the cays, mostly due to climatic factors, shore flies ought to be well accommodated. Their life style as r-stragetists, coupled with a tolerance for saline conditions, which significantly reduces competition, are at least partial explanations for their occurrence and marked diversity on Belizean cays.

Eighteen percent of the fauna treated herein (10 of 56 species) represents undescribed species that were collected as part of field work for this study and described recently or in this paper. Endemism, however, should be considered an uncharacteristic phenomenon on the cays, with most or perhaps all of the new taxa also occurring on the nearby mainland or elsewhere in the Caribbean. Why endemism is a remote possibility seems fairly evident, although lacking empirical confirmation. First, as was discussed earlier, the cays are close to the mainland, and the relatively narrow gap could easily be spanned by shore flies, most likely as aerial plankton. Second, the cays are comparatively young on a geologic time scale (7,000 bp; Shinn et al., 1982) with insufficient time for isolation and localized speciation. Third, the cays are small and low lying, with a relatively limited niche capacity and topography. Fourth, the cays are subject to rapid, sometimes catastrophic physiographic change. Carrie Bow Cay, to cite just one example, lost approximately 30% of its surface area during a single hurricane

TABLE 4.—Diversity and unique occurrences by Belizean island.

Belizean distribution	*Bread and Butter Cay*	*Carrie Bow Cay*	*Coco Plum Cay*	*Round Cay*	*Man of War Cay*	*Saddle Cay*	*South Water Cay*	*Stewart Cay*	*Tobacco Range*	*Twin Cays*	*Wee Wee Cay*	*Glover's Reef*	*Turneffe Islands*	*Lighthouse Reef*
Species diversity by island	8	11	10	20	10	4	2	15	30	10	33	12	21	6
Species occurring only on this island	0	1	0	1	0	0	0	0	6	0	9	0	3	1

TABLE 5.—Shore-fly species occurring on Glover's Reef and their cumulative occurrence on other Belizean cays.

Species	Number of islands
1. *Ptilomyia lobiochaeta*	5
2. *Ptilomyia parva*	6
3. *Allotrichoma abdominale*	11
4. *Diphuia nasalis*	7
5. *Paraglenanthe bahamensis*	3
6. *Discocerina flavipes*	8
7. *Discocerina mera*	13
8. *Polytrichophora conciliata*	9
9. *Ceropsilopa coquilletti*	6
10. *Paratissa neotropica*	3
11. *Paralimna fellerae*	3
12. *Scatella obscura*	7

TABLE 6.—Shore-fly species occurring on one-half or more of the Belizean islands sampled.

Species	Number of islands
1. *Discocerina mera*	13
2. *Allotrichoma abdominale*	11
3. *Polytrichophora conciliata*	9
4. *Paratissa semilutea*	8
5. *Glenanthe ruetzleri*	8
6. *Discocerina flavipes*	8
7. *Diphuia nasalis*	7
8. *Scatella obscura*	7
9. *Mosillus stegmaieri*	6
10. *Ptilomyia lobiochaeta*	6
11. *Ptilomyia parva*	6
12. *Ceropsilopa coquilletti*	6
13. *Paralimna obscura*	6

in 1974 (Hurricane Fifi; Rützler and Ferraris, 1982). For these reasons, endemism was neither foreseen nor found, and its plausibility in the future remains untenable.

The proximity of the cays to the mainland, the availability of suitable habitats, and the vagility of most shore flies are probably sufficient to account for most species on the cays. Not all of the species we found on the cays, however, may represent established breeding populations. Because most of the samples from the cays are based on adults with little work on the immature stages, the criteria for determining whether a sample represents a breeding population are mostly drawn from inferences, such as abundance of a species, occurrence on more than one cay, or maintenance of a population from season to season or year to year. Applying these criteria, nine of 56 species (*Gastrops niger, Discocerina nitida, Hydrochasma faciale, Hydrochasma* species, *Hydrellia cavator, Notiphila erythrocera, Zeros obscurus, Hyadina flavipes,* and *Scatella favillacea*) or 16% may possibly represent nonbreeding populations on the cays. For most of these species, we collected single specimens, and it would be reasonable to assume that they are occasional migrants to the cays. I have deliberately used noncommittal language in this section, however, as sampling error is undoubtedly a major contributing factor.

Among terrestrial animals, few have demonstrated the adaptive ability to exploit saline habitats like the ephydrids. Moreover, this family, more than other acalyptrate groups of Diptera, has adapted to numerous and often remarkably diverse habitats, prompting Oldroyd (1964:188) to comment:

> Clearly, then, Ephydridae are nothing if not versatile.... Evidently we are seeing in the Ephydridae a family of flies in the full flower of its evolution, and as such they offer attractive material for study, not only to the dipterist, but also to the student of insect physiology and behaviour.

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