Tumbling Flower Beetles (Coleoptera: Mordellidae) of the Virgin Islands with Descriptions of New Species

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ABSTRACT Eight species of tumbling flower beetles in 4 genera (Coleoptera: Mordellidae) occur in the Virgin Islands: *Mordella atrata* Melsheimer, *M. summermanae* Ray, *Tolidomordella leucocephala* (Quedenfeldt) comb. nov., *T. basifulva* (Quedenfeldt) comb. nov., *Glipostenoda guana* sp. nov. (18° 29′ N, 64° 34′ W, Guana Island, British Virgin Islands), *Falsomordellistena danforthi* (Ray) comb. nov., *Mordellistena irfianorum* sp. nov. (18° 19′ N, 64° 43′ W, St. John, U.S. Virgin Islands), and *M. lineata* Ray. Males of *T. leucocephala* and females of *T. basifulva* are described for the first time, as are the male genitalia of *M. summermanae, T. leucocephala, T. basifulva, F. danforthi,* and *M. lineata.* Species of *Mordella, Tolidomordella,* and *Falsomordellistena* are new records from the Virgin Islands. Range extension of *M. summermanae* to Jamaica is reported. A key to the species is provided.

KEY WORDS Mordellidae, tumbling flower beetles, Virgin Islands, West Indies, genitalia

MOST OF THE Virgin Islands, about a hundred isles, cays, and vegetated rocks, both British and American, lie on the Puerto Rico Bank and were united with Puerto Rico at glacial maxima (Lazell 1995). An American outlyer, St. Croix, with several small coastal cays, is on a separate bank and is often thought to be more closely allied biologically to the Lesser Antilles (Lazell 1972). We report known mordellid beetle faunas from the islands on both banks (Fig. 1).

In the West Indies (*sensu* Bond 1985, excluding continental shelf islands), *Glipa* and *Conalia* each had a species and *Mordella* had 7 in Blackwelder (1945). In his work on Puerto Rico, Ray (1937) listed 14 species of *Mordellistena.* Ray (1939) added another West Indian species to that genus. With an original description by Champion (1896), there was a total of 16 species of *Mordellistena* in Blackwelder (1945) from the West Indies. Maklin (1875, original description not read by authors) described *Mordellistena marginicollis* from Brazil, and Ray (1937) implied its presence in Puerto Rico by including it in his key (Wolcott 1950). Blackwelder (1945) did not list *M. marginicollis* from the West Indies and we have no evidence that it exists on the Puerto Rico Bank.

There has been no previous systematic work on tumbling flower beetles of the Virgin Islands. *Mordellistena ferruginea* (non-*Mordella ferruginea* F. 1775 or 1801) and *M. lineata* Ray were the only mordellids recorded nominally and anecdotally from the Virgin Islands (Miskimen and Bond 1970, Lazell 1995). Among the 7 *Mordella* species, *M. leucocephala* and *M. basifulva* were described by Quedenfeldt (1886). Since then, no one has applied these names to known populations (Wolcott 1950), not even in Ray's extensive work of 1939. However, Wolcott (1936) listed host plants for adults of both species and implied that specimens other than the types from Puerto Rico had been determined by E. A. Schwarz. We believe Quedenfeldt's description of *M. leucocephala* was based only on females and *M. basifulva* only on males. Here we describe the male of *M. leucocephala.* It is possible that the female of *M. basifulva* is represented by specimens from Puerto Rico. These species are placed in *Tolidomordella* in today's nomenclature (Ermisch 1949-1950, Jackman 1991).

Fabricius named 2 species "*Mordella ferruginea.*" The 1st, *Mordella ferruginea* F. (1775) was moved to *Rhipiphorus* by Fabricius (1801). The 2nd, *Mordella ferruginea* F. (1801) is based on a type in Copenhagen labeled Essequibo, which is in Guyana, South America. The type specimen differs from the Puerto Rico Bank specimens in being larger, in having metallic reflection on the head, in having the antenna serrate, and in having a longer and narrower tibia with 4 transverse lateral ridges (examined by the junior author). Therefore, we believe *Mordella ferruginea* F. (1801) is not conspecific with the form from the Puerto Rico Bank. However, beginning with Quedenfeldt (1886), the name "*Mordella ferruginea,*" transferred to *Mordellistena,* was used consistently by most authors for the Puerto Rico Bank species described herein.

The South American form named *Mordella ferruginea* by Fabricius (1801) is a primary junior homonym of *Mordella ferruginea* F. (1775). The situation is further complicated by the description of a European species, *Glipostenoda ferruginea* Horak (1995), which may be a congener. A solution to this problem is beyond the scope of this work.

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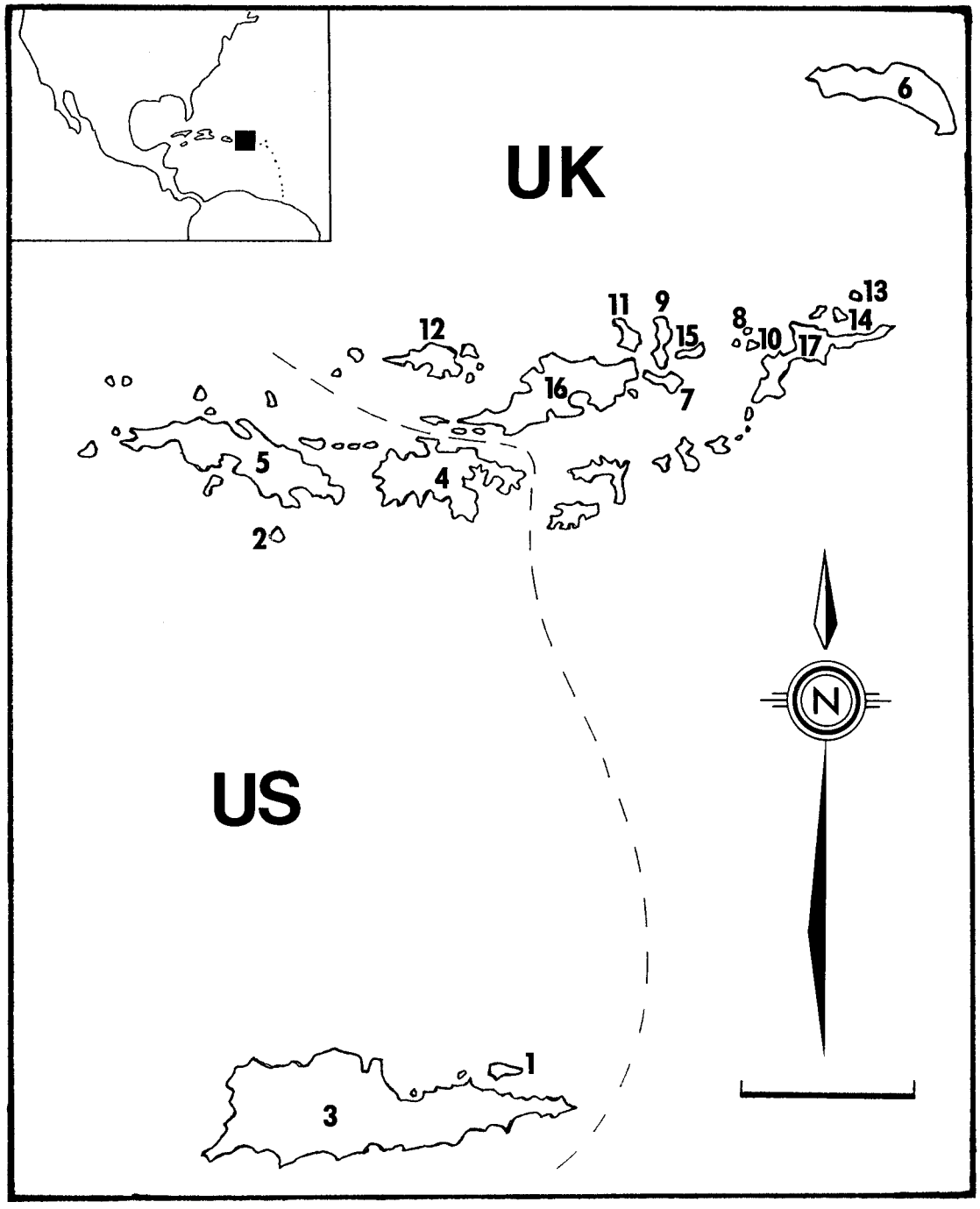

Fig. 1. The Virgin Islands. U.S. (American). 1, Buck. 2, Great St. James. 3, St. Croix. 4, St. John. 5, St. Thomas. UK (British). 6, Anegada. 7, Beef. 8, George Dog. 9, Great Camanoe. 10, Great Dog. 11, Guana. 12, Jost Van Dyke. 13, Necker. 14, Prickly Pear. 15, Scrub. 16, Tortola. 17, Virgin Gorda. Inset shows position, east of Puerto Rico and west of the Leeward Islands. Scale bar = 20 km.

There are some Fabrician names that might originate from the Virgin Islands but are not included above: *Mordella vittata* F. (1801) was not listed in Blackwelder (1945) under Mordellidae. *Mordella bifasciata* F. (1801), *M. hemorrhoidalis* F. (1801), *M. hamata* F. (1801), and *M. marmorata* F. (1801) were retained in this genus by Blackwelder (1945).

Because some descriptions are simplistic, contain errors, or provide no genitalic information, we redescribe most species or add to existing descriptions,

following the guidelines of Franciscolo (1957), with emphasis on the genitalia. Length of a species is given as a range between the smallest and the largest (eye sighted) specimens measured in lateral view from the front edge of the pronotum to the tip of the elytron in an unaltered specimen. Elytral width is the maximum width across both elytra. Eye color varies among specimens because of different preserving materials and light angles; apical setae of the middle and posterior legs, as well as ridges and carinae on the posterior legs, are always black or much darker than the dermal color. Therefore, we do not mention these traits throughout this article. Tarsal ratios are the proportion of tarsomeres given from basal to apical segments and from anterior to posterior legs, respectively, but the legs are not scaled inter se, contra Franciscolo (1957). Observations using scanning electronic microscope (SEM) and genitalic terminology follow that of Lu et al. (1997). We deposited most specimens and the holotypes of *Glipostenoda guana* sp. nov. and *Mordellistena irfianorum* sp. nov. in the Department of Entomology, Montana State University (MTSU). Specimens that are in W.L.'s collection will eventually go to the U.S. National Museum of Natural History (USNM), or the Museum of Comparative Zoology, Harvard (MCZ).

Key to Species of Mordellid Beetles from the Virgin Islands

1. Posterior tibia with only a subapical ridge on outer face parallel to apical ridge; no other ridge on posterior tarsus 2
   Posterior tibia either with a fine carina along dorsal outer edge or some oblique lateral ridges on outer face other than the subapical ridge 3
2. Black, suboval, small, pygidium very short, flat at base . . . . . *Mordella summermanae* Ray
   Black, cuneiform, large, pygidium twice as long as hypopygium . . *Mordella atrata* Melsheimer
3. Posterior tibia with a fine carina along dorsal outer edge in addition to subapical ridge; such carina also indicated on basitarsus 4
   Posterior tibia with some oblique ridges on outer face in addition to subapical ridge; such oblique ridges also indicated on tarsal segments 5
4. Female head and a semicircular spot on anterior pronotum yellow, elytron with 2 small anterior yellow spots and 1 large posterior yellow spot; male black with 1 large yellow spot on elytron before middle, another behind middle. . . . . *Tolidomordella leucocephala* (Quedenfeldt) comb. nov.
   Female head yellow, elytron with 2 small anterior yellow spots and 1 large posterior yellow spot; male black with a ferruginous humeral vitta covering the 2 small anterior yellow spots but not the large posterior yellow spot . . . . . *Tolidomordella basifulva* (Quedenfeldt) comb. nov.
5. Head and pronotum black 6
   Derm generally ferruginous, at least pronotum so 7
6. Elytron black; 2 ridges on outer face of posterior tibia other than the subapical 1; 2 each on basal and 2nd segments of posterior tarsus. . . . . *Mordellistena irfianorum* sp. nov.
   Elytron with a flavous stripe running from base to apex, leaving suture and margin black; 2 ridges on outer face of posterior tibia other than the subapical 1; 2 on 1st segment, 1 on 2nd segment of posterior tarsus . . . . . *Mordellistena lineata* Ray.
7. Head sometimes fuscous, otherwise totally ferruginous, including antenna . . . . . *Glipostenoda guana* sp. nov.
   Head and thorax flavous; elytron fuscous with a flavous vitta at base, tapering caudad; at least 7 apical segments of antenna fuscous . . . . . *Falsomordellistena danforthi* (Ray) comb. nov.

Mordella atrata Melsheimer (Fig. 2)

Mordella scutellaris F. Leng and Mutchler 1917, Ray 1939, Blackwelder 1945 (non-Fabricius 1801).
Mordella atrata Melsheimer, 1846; Liljeblad 1945.

Type Locality. Pennsylvania, USA.

Type. Not listed (Bright 1986). Ray (1939) used *M. scutellaris* F. (1801) for this species from Puerto Rico; Liljeblad (1945) pointed out that *M. scutellaris* was originally described as bicolored, and *atrata* was the oldest available name for the black mordellid otherwise resembling *scutellaris.* We compared our material with MCZ specimens determined by Liljeblad and follow Liljeblad (1945).

Length: 3.2–4 mm. Cuneiform, more robust in female than in male. Derm entirely black, often iridescent under light; pubescence on upper surface brownish, on scutellum cinereous; underside and basal pygidium with longer cinereous hairs.

Liljeblad (1945) has adequately redescribed the species except for the following characters: Middle tibia as long as its tarsus; penultimate segments of anterior and middle tarsi slightly enlarged and notched at apex. Posterior tibia with a short subapical ridge, parallel to apical margin, no continuous dorsal carina but with small granules scattered in an irregular line on dorsum; the same dorsal granules weakly indicated on basitarsus, much less so on 2nd segment of posterior tarsus. Outer spur of posterior tibia ⅓ (female) or ¼ (male) shorter than inner one. Tarsal ratios: 4-2-2-3–5, 3-2-2-4–8, 2-2-3-6. Pygidium long and stout, twice as long as hypopygium; hypopygium about twice as long as penultimate segments. Urosternites and genitalia as in Lu et al. (1997).

Previous Records. Cuba (Leng and Mutchler 1917), Puerto Rico, North, Central, and South Americas (Blackwelder 1945).

Material Examined. BRITISH VIRGIN ISLANDS: Guana, Quail Dove Ghut, 600 feet, 1, 20–25.IV.1993, flight intercept trap, W. P. Liao; Guana, 3, 10.X.1994, on sea grape blossoms, *Coccoloba uvifera*, W. Lu

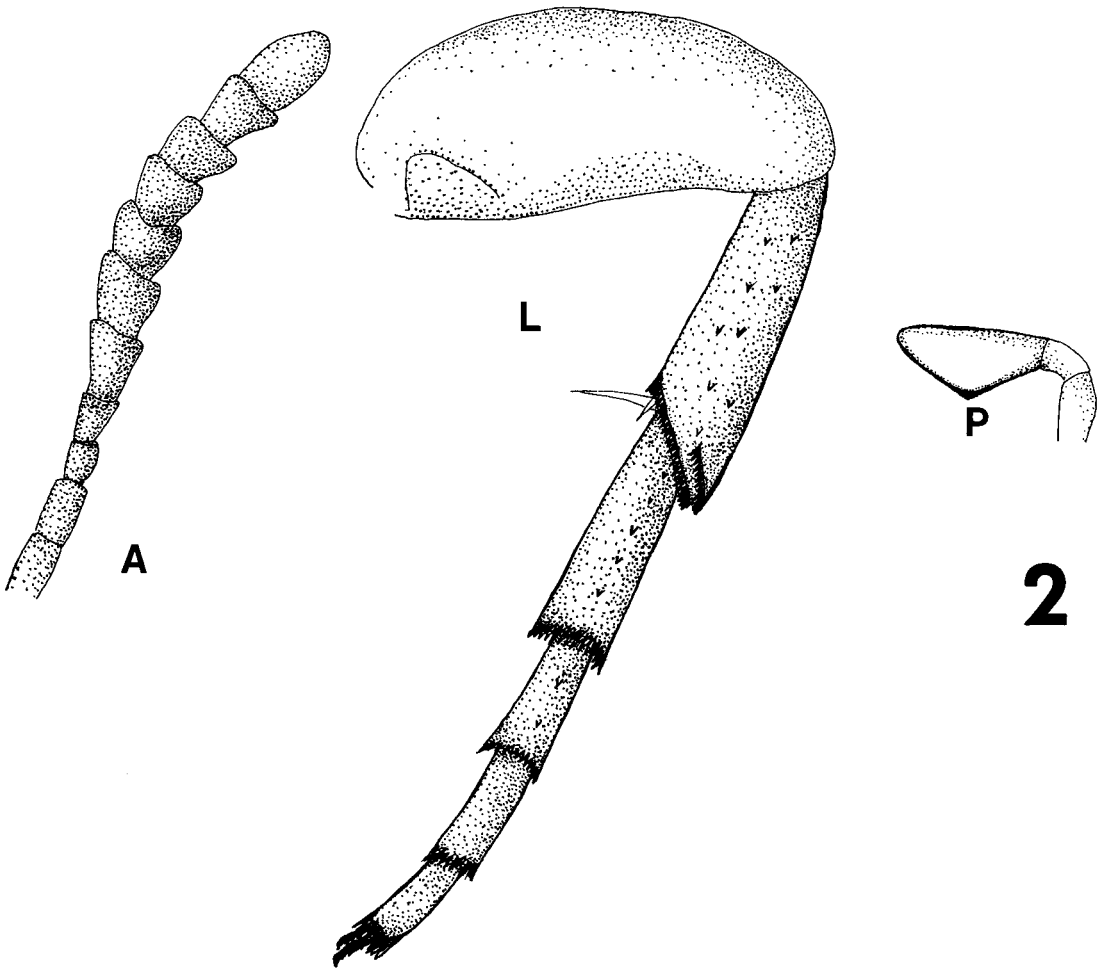

Fig. 2. A, antennae; L, posterior leg; P, maxillary palpus; 8 and 9m, male 8th and 9th sternites.

(MTSU); Guana, Muskmelon Bay, 1, 5.X.1995, sweeping on *Lantana involucrata*, W. Lu (W.L.).

Remarks. Champion (1889) and Liljeblad (1945) both mentioned that the 3rd segment of the antenna was a little longer than the 4th. We find that the 2 segments are of the same length. They did not mention the granules on the dorsum of the posterior tibia. All North American specimens in USNM and MCZ examined by W.L. have these granules.

Ray (1939) reported 5 *M. scutellaris* from Puerto Rico. W.L. was able to locate and examine these 5 specimens at USNM. Although Blackwelder (1945) made *atrata* a synonym of *scutellaris*, Ray's specimens are totally black instead of bicolored as in *scutellaris* sensu stricto. Despite the fact that many early workers called the all-black form *scutellaris*, most authors today accept Liljeblad's arrangement and so do we.

Mordella summermanae Ray (Figs. 3 and 10 A–C)

Mordella summermanae Ray, 1939.

Type Locality. Constanza, Dominican Republic.

Holotype. A unique female, 22.v.1927, A. Wetmore; USNM 52928. We could not locate this specimen, but we compared our material with specimens from the Dominican Republic that fundamentally fit Ray's (1939) description.

Length: 1.7–2.2 mm. Form short, suboval, elongate, broadest near base of pronotum. Derm fuscous to black, spurs of posterior tibia flavous; basal 4 segments of antenna less so; apical segments of antenna and legs (except for posterior tibia) fuscous. Upper surface covered with yellowish brown pubescence, hairs of underside cinereous.

Head big, as broad as pronotum; eye oval (pear-shaped, narrower anteriorly), reaching occiput, finely granulated with sparse short hairs; distance between eyes on vertex wider than 2 eyes combined. Antenna shorter than head and pronotum combined, scarcely reaching base of pronotum; segments 1 and 2 subequal, 3 and 4 subequal, shorter and narrower; 5 triangular, ⅓ longer than 4, and 3 times as broad at apex; 6–10 strongly serrate, twice as broad as long, each slightly shorter than 5; 11 rounded to apex, a little longer than

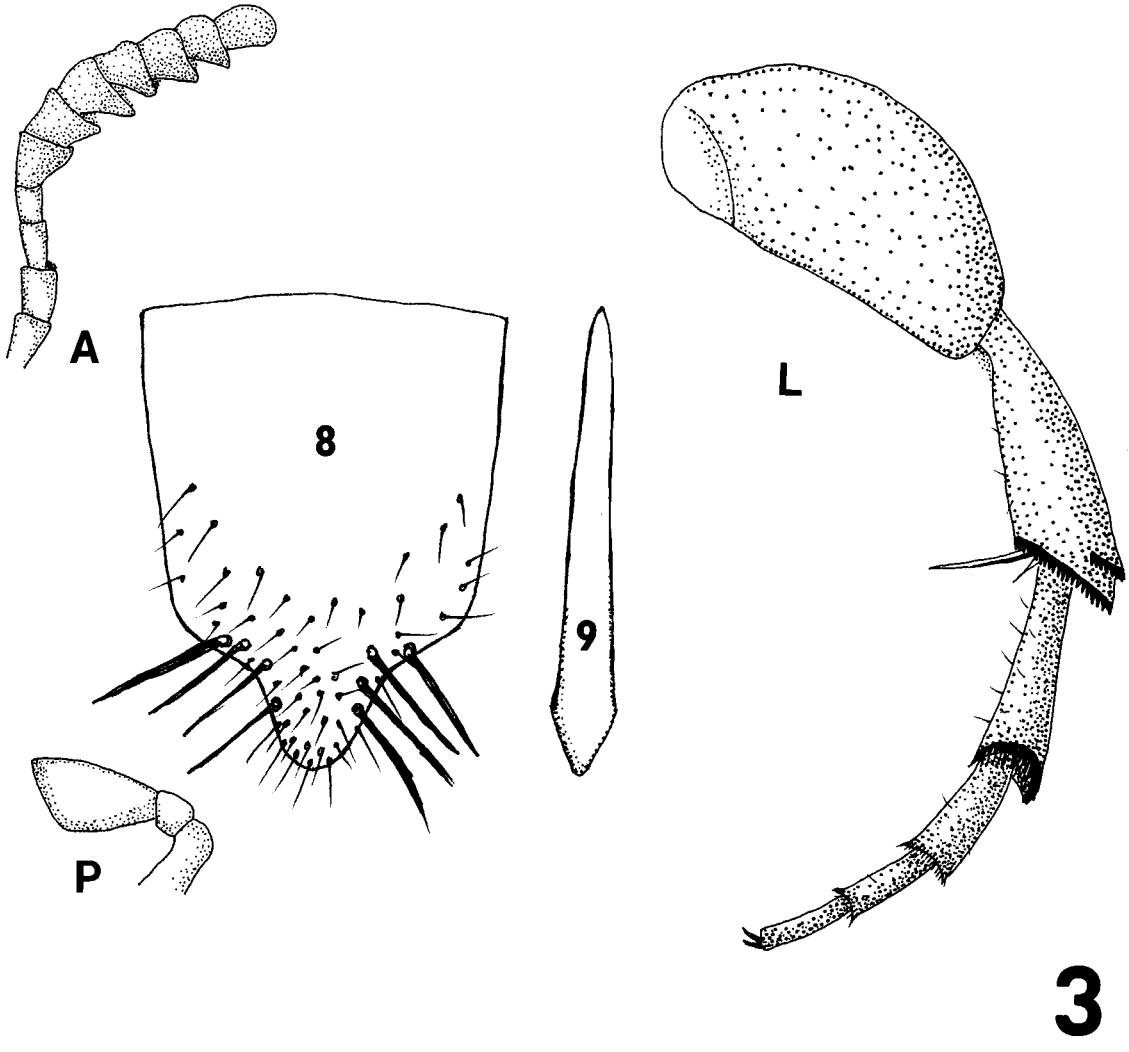

Fig. 3. *M. summermanae.* (8) *M. lineata* with ridge variation. (9) *M. irfianorum.* A, antennae; L, posterior leg; P, maxillary palpus; 8 and 9m, male 8th and 9th sternites.

10. Distal segment of maxillary palpus isosceles triangular with outer side longer, almost equilateral in males.

Pronotum broader than long, widest subbasally, sides parallel; basal angles almost reticulate angles, base arcuate, basal lobe short, but broadly rounded. Scutellum very small, broadly triangular, apical angle rounded. Elytra about twice as long as broad, widest subbasally, attenuate apically; apices individually rounded with fine but distinct margin.

Middle tibia slightly longer than its tarsus or as long; penultimate segments of anterior and middle tarsi slightly enlarged and notched at apex. Posterior tibia with a short subapical ridge, parallel to apical margin. Outer spur of posterior tibia ⅓ as long as inner one. Tarsal ratios: 3-1-1-2–4, 3-1-2-3–8, 2-2-3-6.

Pygidium flat, short, but a quarter longer than hypopygium, very broad at base, but ⅓ longer than broad in dorsal view; sides straight, apex truncate; hypopygium 1.5–2 penultimate segments. Urosternites equal in length; furca twice as long as tube, tube as long as paramera, furca one and a half times as long as epimere; epimere wide and elliptical, twice as long as left parameron or one and a half times as long as right parameron; penis ≈4.5 as long as epimere with a simple pointed tip.

Left parameron (Fig. 10B) short and flattened with a medial branch (Lu et al. 1997) apically; a dent at base of medial branch (Fig. 10A). Right parameron typical of type B (Fig. 10C) with an insignificant basal ridge (Lu et al. 1997); its ventral branch extremely long and thickened from base on, comparable to those of *Glipa* and *Hoshihananomia* (Lu et al. 1997), with a small prong (Fig. 10C, arrow).

Previous Records. Dominican Republic: Constanza (Ray 1939).

Material Examined. U. S. VIRGIN ISLANDS: St. Thomas, Est. Nazareth, 1, 27.VII.-19.X.1994, 40 feet flight intercept trap, M. A. and L. L. Ivie (MTSU). BRITISH VIRGIN ISLANDS: Guana, 8, 2–10.X.1994, sweeping on sea grape blossoms, *Coccoloba uvifera*, W. Lu (MTSU). JAMAICA: St. Catherine Parish, Little Goat Island, 5, 1.III.1995, W. Lu; Trelawny Parish, Good Hope, 1, 4.III.1995, sweeping on composite blossoms, W. Lu; Manchester Parish, 2.25 miles northwest Mandeville, Marshall's Pen, 2, 26.II.1995, W. Lu (W.L.). DOMINICAN REPUBLIC: Peravie, 17 km east San Jose de Ocoa, 1, 8.VIII.1979, G. B. Marshall; Peravie, 21 km northwest San Jose de Ocoa, 1, 9.VIII.1979, C. W. O'Brien (MTSU).

Remarks. In Ray's (1939) description the lighter color of the basal 4 segments of the antenna was not mentioned, and the width of segments 5–10 were said to be only "as broad as long." We have also observed that the frons, the mouthparts except the tip of the mandibles, and the anterior femur are often flavous. The right parameron embraces the left one, its small prong of the ventral branch articulates with the dent at the base of the medial branch of the left parameron.

The species is not often collected, but is occasionally numerous. This is the 1st record of it from the Virgin Islands and Jamaica.

Tolidomordella leucocephala (Quedenfeldt) comb. nov. (Figs. 4 and 10 D and F)

Mordella leucocephala Quedenfeldt, 1886.

Type Locality. 18° 29′ N, 64° 34′ W, Guana Island, British Virgin Islands.

Neotype. Quedenfeldt (1886) did not give any locality for his specimens and stated that the specimen given to him by C. Krug did not have locality data. His material was given to Obenthur who might have deposited it in France or Germany. Curators in the Humboldt Museum, Berlin, and the National Museum of Natural History, Paris, have not been able to locate his specimens. Because he described only the female, and the male characters are usually more important in identification for this group of beetles, we herein designate a male as the neotype, collected by W. Lu, 5.X.1996, on Guana Island, and deposited in MTSU.

Length: 1.9–2.7 mm. Form elongate, subparallel, broadest before base of pronotum. Male derm castaneous to black with frons, antenna, palpus, legs, and often apical pygidium fulvous; elytron with 2 large and transverse yellow spots: 1 occupying most of the basal 3rd of elytron, almost reaching base, the other behind middle; both spots not reaching sutural and side margins. Female head and a semicircle on anterior pronotum light yellow, leaving pronotum a large black basal margin; elytron with 2 small anterior yellow spots before middle: 1 round, near suture a little below base, the other transverse, lower down close to side margin; elytron with another large posterior yellow spot behind middle: transverse and oblong, not reaching suture but often touching side margin. Surface covered with pubescence partaking distinctly of ground colors.

Head small, slightly narrower than pronotum; eye oval, reaching occiput, moderately granulated with dense setae-like hairs. Antenna shorter than head and pronotum combined, not reaching base of pronotum; segment 3 distinctly small, triangular, not much longer than broad, 4 ≈⅓ wider at apex and slightly longer than 3; segments 5–7 subserrate, slightly increasing in width and length, 5 twice as long and broad as 3; 8–10 subequal, each as long as 7 and ⅓ longer than broad; 11 suboval, ⅓ longer and slightly broader in middle than 10. Distal segment of maxillary palpus boat-shaped or hammer-shaped in male, with apical side much less sclerotized; scalene triangular in female with outer side longer and rounded, apical side slightly shorter than inner side.

Pronotum ⅓ broader than long, widest in middle, evenly rounded to apex; basal angles obtuse, base arcuate, basal lobe broadly rounded. Scutellum small, triangular, rounded at apex. Elytra at least twice as long as broad, slightly narrower at base than pronotum, subparallel on basal two-thirds, then attenuate apically; apices individually rounded with fine but distinct margin.

Middle tibia as long as its basal 4 tarsal segments; penultimate segments of anterior and middle tarsi bilobed. In addition to a subapical ridge halfway across outer face and parallel to apical ridge, posterior tibia with a fine carina along dorsal outer edge, interrupted halfway to genu; another such carina, but more than halfway along dorsal outer edge on basitarsus. Outer spur of posterior tibia very short, ⅕ as long as inner one. Tarsal ratios: 2-1-1-1–4, 2-1-1-3–8, 3-4-5-10.

Pygidium conical, stout at basal two-thirds, then sharply attenuate to apex, curved down a little from side view, 2.5 times as long as hypopygium. Eighth sternite with a median protuberance long and rounded at apex, and a lateral lobe on each side; 9th sternite slender, with apical portion enlarged. Epimere 1.5 times as long as paramera, furca as long as tube, with furcal arms strongly thickened and hooked apically. Penis short, as long as pygidium, twice as long as epimere; its apical first third greatly flattened and enlarged, terminating in a round fleshy lobe.

Left parameron (Fig. 10D) bearing a highly developed and flap-like dorsal branch with setae all over inner surface, and a bare, blunt, and strongly sclerotized medial branch (Lu et al. 1997); inner surfaces of dorsal and medial branches normal to each other instead of in the same plane. Right parameron (Fig. 10E) bearing a dorsal branch highly developed, long, and flap-like with setae all over the inner surface, and a short, bare, truncate, strongly sclerotized ventral branch; basal angle of ventral branch with a sharp and long extension (Fig. 10 E and F, arrows); no setae on the outer surface (Fig. 10F).

Previous Records. Probably Puerto Rico (Quedenfeldt 1886) because the specimen's donor, C. Krug, was a resident there and Wolcott (1950) implied that the types were collected there by J. Gundlach. Puerto Rico (Leng and Mutchler 1914, Wolcott 1936).

Material Examined. Male: U.S. VIRGIN ISLANDS: St. John, Lameshur Bay, 1.III.1984, malaise trap, M. B.

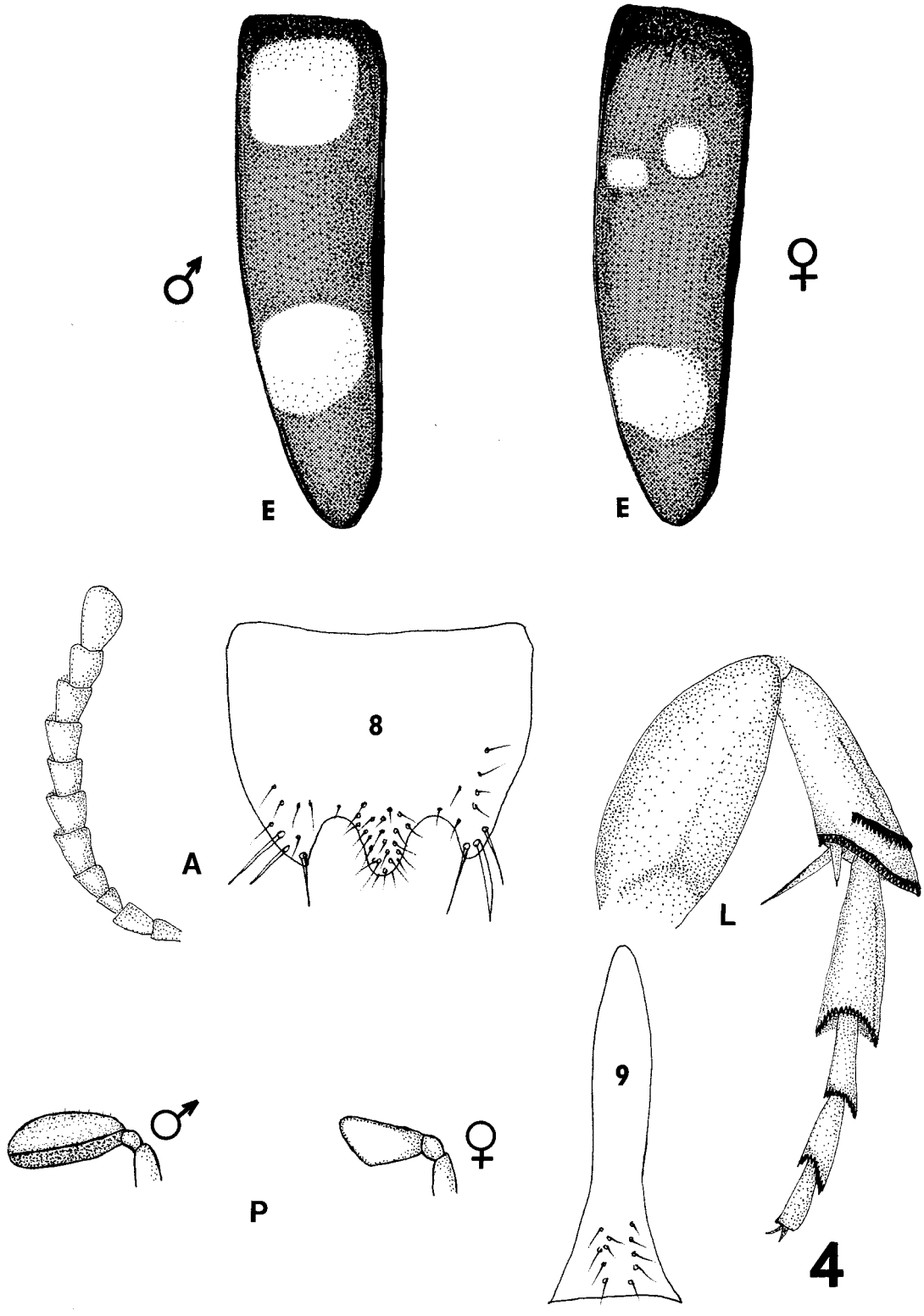

Fig. 4. *T. leucocephala* with sexual dimorphism in elytral patterns indicated. (8) *M. lineata* with ridge variation of posterior leg indicated. (9) *M. irfianorum.* A, antennae; E, left elytron pattern; L, posterior lerg; P, maxillary palpus; 8 and 9m, male 8th and 9th sternites.

Muchmore; St. John, Lameshur Bay, 1, 21–28.VII.1994, UV light trap, M. S. Becker (MTSU). St. Thomas, East Botany Bay; 1, 29.VII–15.X.1994, M. A. and L. L. Ivie (MTSU). BRITISH VIRGIN ISLANDS: Necker, 1, 22–25.VII.1988, C. O'Connell (MTSU). Guana (in addition to neotype) – Sugarloaf Trail, 100–800 feet, 1, 9.X.1994, M. A. and L. L. Ivie; 0–80 m, 1, 10–25.VII.1988, S. E. Miller and C. O'Connell; 3, 1–14.VII.1984, S. E. Miller and P. M. Miller; 1, 16.X.1993, C. Bartlett and J. Cryan; 1, 19.X.1993, malaise trap, C. Bartlett and J. Cryan; 1, 18–19.X.1993, C. Bartlett and J. Cryan; 3, 10.X.1994, W. Lu; North Beach, 1, 11–16.X1992, malaise trap, R. R. Snelling; plantation area, malaise trap, 2, 16–20.X.1992, R. R. Snelling (MTSU); Iguana Trail, 2, 4.X.1996, W. Lu; Liao Weiping Trail, 7, 5.X.1996, W. Lu; Guail Dove Ghut, 2, 7.X.1996, W. Lu; Long Man's Point, 1 9.X.1996, W. Lu; Lower Iguana Trail, 2, 12.X.1996, W. Lu; Pyramid, 2, 13.X.1996, W. Lu (W.L.). PUERTO RICO: Ponce, Torres Finca, 1, 24.VIII.1933, *Ocotea* sp., R. G. Oakley (USNM).

Female. BRITISH VIRGIN ISLANDS: Guana – 1, 1–14.VII.1984, S. E. and P. M. Miller; Bigelow Road, 1, 17.VII.1994, at night, S. A. Bucklin (MTSU); Liao Weiping Trail, 2, 5.X.1996, W. Lu; Iguana Trail, 1, 6.X.1996, W. Lu; Quail Dove Ghut, 3, 7.X.1996, W. Lu; Long Man's Point, 1, 9.X.1996, W. Lu; Lower Iguana Trail, 1, 12.X.1996, W. Lu (W.L.). Great Camanoe, 2, 12.X.1996, W. Lu (W.L.).

Remarks. The colors of the head and thorax in the male can vary from fulvous to black, as can abdominal segments and legs in both sexes. W.L. examined and compared specimens totally fulvous, totally black, and intermediates. There are no differences in male genitalia and wing venation. We believe the difference in dermal color is because of age of the live animals. The elytral yellow spots of the male (Fig. 4) are about equal in size; the 1 posterior to the middle is as long as or slightly longer than the last apical portion of the elytron; the black band between the 2 yellow spots is at least as long as or longer than any other black band and a yellow spot combined. The head and a semicircle on the anterior pronotum are sometimes flavous in the male. This form is scarce but recorded from the islands of St. John, St. Thomas, Guana, and Great Camanoe.

Most specimens collected by W.L. during 1996 were on blossoms of pigeonberry, *Bourreria succulenta* (Boraginaceae), fiddlewood, *Citharexylum fruticosum* (Verbenaceae), and on leaves of dogwood, *Piscidia carthagenensis* (Leguminosae). A few were on blossoms of yellow cedar, *Tecoma stans* (Bignoniaceae) and tourist tree, *Bursera simaruba* (Burseraceae).

Tolidomordella leucocephala closely resembles *T. discoidea flaviventris* (Smith) from Florida and Texas in the male genitalia, wing venation, and male elytral pattern. However, *T. d. flaviventris* is not sexually dimorphic like *T. leucocephala*, and sometimes has a flavous humeral dash on the elytron, and the basal angle of the ventral branch of the right parameron does not have the sharp and pointed extension (Lu et al. 1997) of male *T. leucocephala.* Because of the basal angle extension, the base of the right parameron of *T. leucocephala* is very wide (Fig. 10 E and F).

Tolidomordella basifulva (Quedenfeldt) comb. nov. (Fig. 5)

Mordella basifulva Quedenfeldt, 1886.

Type Locality. 18° 00′ N, 66° 37′ W, Ponce, Puerto Rico.

Neotype. Quedenfeldt (1886) did not give any locality for his specimens. Wolcott (1950) implied that the types were collected by J. Gundlach in Puerto Rico. Because we could not locate Quedenfeldt's specimens, for reasons noted above, we herein designate a male as the neotype, collected by R. G. Oakley, 11.IX.1933, Ponce, Torres Finca, on *Ficus*, and deposited in USNM.

Length as in *T. leucocephala* but slightly narrower. Male similar to female *T. leucocephala* except for the following: Head fulvous with a dark cloud on vertex; pronotum with a large black spot on disc leaving marginal edges fulvous; elytral color various from fulvous to black, a wide humeral vitta fulvous all the way toward elytral suture, at least half way down the elytron, overwhelming the 2 small anterior yellow spots in the same location as in female *T. leucocephala;* basal 4 segments of antenna, underside of thorax, and legs lighter than elytra, from flavous to fulvous. Distal segment of maxillary palpus boat-shaped.

Median protuberance of 8th sternite long and pointed; 9th sternite elongate, with apical portion enlarged and strongly asymmetrical. Epimere twice as long as paramera, furca twice as long as tube, with furcal arms hooked but not thickened. Penis long, 3 times as long as epimere; its basal 2nd quarter slightly enlarged, but apical 1st quarter greatly enlarged, apical termination as in *T. leucocephala.*

Paramera similar to those of *T. discoidea flaviventris* (Lu et al. 1997); for right parameron, its ventral branch shorter than that of *T. leucocephala*, with a basal angle sharp but no extended root as in *T. leucocephala;* middle of dorsal branch of right parameron with some very short setae.

Previous Records. Puerto Rico (Quedenfeldt 1886, Leng and Mutchler 1914, Wolcott 1936).

Material Examined. U.S. VIRGIN ISLANDS: St. John, Estate Caneel Bay, Lind Point, 1, 2.I.1993, leaf litter (MTSU). BRITISH VIRGIN ISLANDS: Guana, Quail Dove Ghut, 1 male, 7.X.1996, *Acacia*, W. Lu (W.L.). Tortola, Sage Mountain, 450 m, 2 males, 4.X.1996, W. Lu (W.L.). PUERTO RICO (in addition to neotype): Mayaguez, 1 male, 21.VII.1933, coffee leaf, no collector, but the handwriting is R. G. Oakley's (USNM).

Remarks. All specimens of this type are males. Quedenfeldt (1886) did not mention the sex of his specimens but apparently named *T. basifulva* based on male specimens only. The fulvous humeral vitta on the elytron is so strong that the 2 anterior small yellow spots are sometimes merely suggestive. Four specimens from Puerto Rico – Ponce, 1, 11.IX.1933, *Ficus*, R. G. Oakley; Ponce, R. B. Noise F., 1, 12.I.1933, coffee,

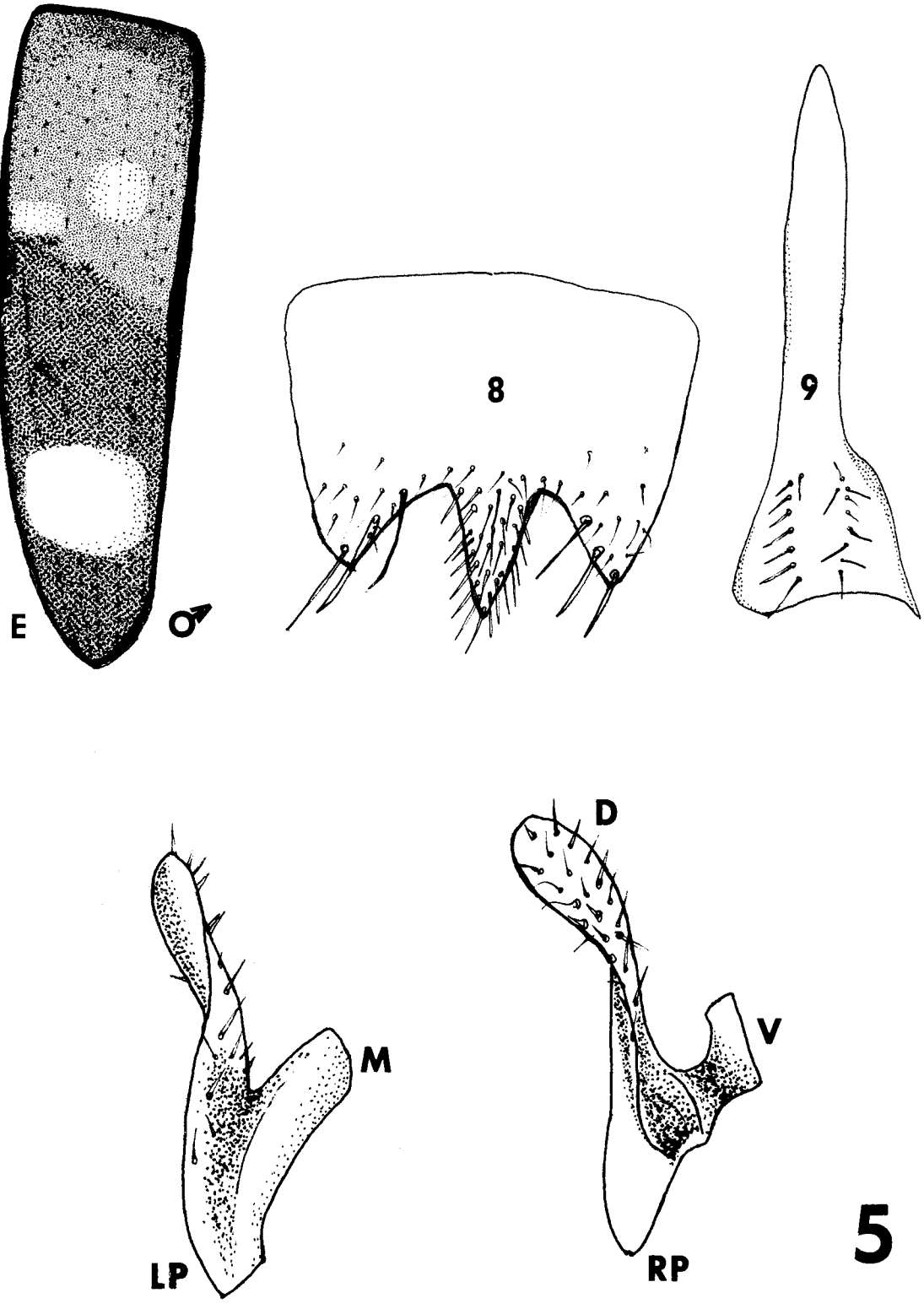

Fig. 5. *T. basifulva.* E, left elytron pattern; LP, left parameron; RP, right parameron; D, dorsal branch; V, ventral branch; (8) *M. lineata* with ridge variation; (9) *M. irfianorum.* A, antennae; M, medial branch.

R. G. Oakley (USNM); Naricao Forest Reserve, 1, 26.VII.1979, G. B. Marshall (MTSU); Maricao Forest, 2–3,000 feet, 1, 30.V–2.VI.1938, Darlington (MCZ) – have a yellow head as in female *T. leucocephala*, but the pronotum is entirely black, missing the anterior yellow semicircle characteristic of female *T. leucocephala.* The elytra are similar to those of female *T. leucocephala.* All specimens of this form are females; one of them was collected in the same locality, on the same date, on the same host plant, and by the same collector as the neotype. We thus believe that this form may be the female of *T. basifulva.* It appears that in the Virgin Islands *T. basifulva* is outnumbered by *T. leucocephala* and thus it is not surprising that we have not collected female specimens of *T. basifulva* there.

Glipostenoda guana sp. nov.

Mordellistena ferruginea F. Quedenfeldt 1886; Leng and Mutchler 1914, 1917; Wolcott 1936, 1950 (non-*Mordella ferruginea* Fabricius 1775 or 1801).

Mordellistena ferruginea (F.). Ray 1937, Miskimen and Bond 1970, Lazell 1995 (non *Mordella ferruginea* Fabricius 1775 or 1801).

Type Locality. 18° 29′ N, 64° 34′ W, Guana Island, British Virgin Islands.

Holotype. Male, collected by W. Lu, 10.X.1996, on Guana Island, and deposited in MTSU.

Length: 2.1–3.3 mm. Form elongate, narrow, sides subparallel, attenuate and rounded gradually caudad from apical quarter of elytra. Derm ferruginous; head and pronotum sometimes with fuscous clouds; basal segments of antenna, maxillary palpus, anterior and middle legs lighter (flavoferruginous), underside darker. Surface covered with fine pubescence partaking of ground color.

Head small and convex; eye large, hairy, and coarsely granulated, reaching occiput, emarginate behind antenna; eye width greater than its length, distance between eyes on vertex <2 eyes combined. Antenna filiform and long, antennal segments of males more slender than those of females, longer beyond base of pronotum, segment 5 shorter than 3 and 4 combined, segments 5–10 slightly decreasing in length and increasing in width, each segment ranging 2.5–2 times as long as broad in sequence. Antennal segments of females more stout, segment 5 as long as 3 and 4 combined, 5–10 obviously decreasing in length and increasing in width, each segment ranging 2–1 times as long as broad in sequence. Segment 11 slightly longer than 10, sides straight, apex rounded. Distal segment of maxillary palpus scalene triangular, inner side a little longer than apical side and shorter than outer side, apical side and angle rounded.

Pronotum a little broader than long, broadest at base; basal angles barely obtuse or nearly rectilinear, base arcuate, basal lobe short and broadly rounded. Scutellum triangular, sides straight, apical angle rounded. Elytra at least 2.5 times as long as broad, sides subparallel on basal 3 quarters, thence broadly rounded to apex; apices individually rounded. Metasternal plate with a transverse suture (TSM, Franciscolo 1962).

Middle tibia as long as its tarsus; penultimate segments of anterior and middle tarsi enlarged and emarginate at apex. In addition, to a short subapical ridge, posterior tibia with 2 long oblique ridges, extending halfway across outer surface; basitarsus with three 2nd tarsal segment with 2, short oblique ridges; basal ridge on basitarsus sometimes rudimentary. Outer spur of posterior tibia a quarter length of inner one. Tarsal ratios: 1-1-2-3–6, 1-1-2-3–6, 3-3-4-8.

Pygidium long, at least 2.5 as long as hypopygium in male, slightly shorter in female, conical, slender, and attenuate to apex. A small area in median protuberance of the 8th sternite without setae, and a large area in the basal two-thirds of 8th sternite less sclerotized; tube of phallobase short, as long as right parameron, furca longer than epimere; thus phallobase as long as paramera and epimere combined; epimere twice as long as right paramera. Penis slightly >3 times as long as epimere, and terminating in a simple lobe with a lateral flange (Fig. 10G, arrow) on each side.

Paramera typical of type D (Franciscolo 1957): mitten-like and more or less symmetric by branching dorso-ventrally. Dorsal branch of left parameron strongly sclerotized, thickened and triangular in apical cross section, longer by half than ventral branch, which is thin, sharp, bare, but sclerotized (Fig. 10H); basal prominence of dorsal branch blunt (Fig. 10H). Right parameron shorter and stouter than left, branching from basal ½ with a flap-like dorsal branch and a ventral branch shorter, bare, but strongly sclerotized (Fig. 10I).

Previous Records (as *Mordellistena ferruginea*). Puerto Rico (Quedenfeldt 1886, Leng and Mutchler 1914, Ray 1937). U. S. Virgin Islands: St. Thomas (Quedenfeldt 1886, Leng and Mutchler 1914, Wolcott 1950, Blackwelder 1945), St. Croix (Miskimen and Bond 1970). British Virgin Islands: Necker (Lazell 1995). A record for U. S. (Blackwelder 1945) has no known source. Quedenfeldt (1886) mentioned specimens from Columbia, South America.

Material Examined. We have collected and examined numerous specimens (now in MTSU + W.L.) from the Virgin Islands and only give island records (number of specimens) as follows. U. S. VIRGIN ISLANDS: St. Croix (8), St. John (37), St. Thomas (15). BRITISH VIRGIN ISLANDS: Guana (55+63), Jost Van Dyke (4), Necker (7+15), Virgin Gorda (4+2), Great Dog (+1), George Dog (+2), Great Camanoe (+19), Scrub Island (+1). PUERTO RICO: Ponce, 1 male, 1933–34, R. B. Oakley; Guanica, 1 female, 25.IX.1947, Caldwell; Rincon, 3, 1963, J. Maldonado; Rincon, 3, IV.1964, J. Maldonado (USNM); Mona Island, 7–13.XI.1992, 1, Snelling and Torres; Pico Atalaya, 1, 3.VII.1958, M. W. Sanderson; Guanica Forest Reserve, 1, 26.IX.1987, M. A. Ivie; Hwy. 371, 10 km, 25.VII.1979, G. B. Marshall; Maricao Forest Reserve, 1, 26.VII.1979, G. B. Marshall; Abajo Forest Reserve, 1, 27.VII.1979, G. B. Marshall; Guajataca Forest Reserve, 2, 27.VII.1979, G. B. Marshall; Toro Negro, 1, 22.VII.1979, C. W. O'Brien et al.; Maricao Forest Re-

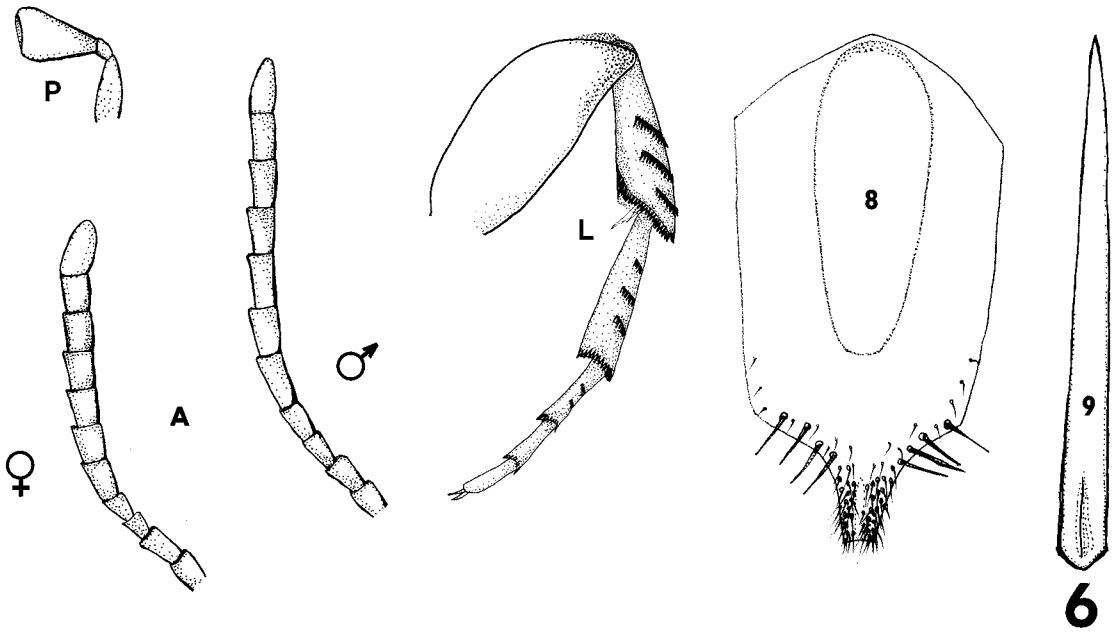

Fig. 6. *G. guana* with sexual dimorphism in antennae indicated. (8) *M. lineata* with ridge variation of posterior leg indicated. (9) *M. irfianorum.* A, antennae; L, posterior leg; P, maxillary palpus; 8 and 9m, male 8th and 9th sternites.

serve, 1, 25.VII.1979, B. O. O'Brien; Maricao Forest Reserve, 1, 26.VII.1979, B. O. O'Brien; Rio Abajo Forest Reserve, 24.VII.1979, B. O. O'Brien; Maricao Forest Reserve, 2, 25.VII.1979, C. W. O'Brien (MTSU).

Paratypes. The remaining 54 MTSU specimens listed above from Guana Island.

Etymology. Named for Guana Island as a noun in apposition.

Remarks. This is a very abundant species, can be found on blossoms of *Lantana*, *Acacia*, *Citharexylum fruticosum*, and various leguminous plants. The ridges on the posterior tibia and tarsus vary among individuals. An extremely small individual from St. John has only 1 long oblique ridge on the posterior tibia, in addition to the short subapical one; it has only 2 ridges on the basitarsus and 1 on the 2nd segment of the right tarsus, and a rudimentary 2nd on the 2nd segment of the left tarsus. The posterior tibia and basitarsus rarely show a rudimentary 4th ridge. The ferruginous color in this specimen and other small specimens collected on Guana and Virgin Gorda is so pale that it appears almost yellow. Newly emerged adults also are pale.

All 4 specimens from Jost Van Dyke are entirely black-headed. Their antennal segments 3 and 4 are short and narrow so that 5 is as long as 3 and 4 combined. Similar individuals were collected on St. John and Guana. There is a range of color variation on the head from flavoferruginous, fuscous, to entirely black, all with the same type of antennae, on the latter 2 islands. We observed no difference in the male genitalia and regard this color form on Jost Van Dyke as interisland variation.

Falsomordellistena danforthi (Ray) comb. nov. (Fig. 7)

Mordellistena danforthi Ray, 1937; Wolcott 1950.

Type Locality. Villalba, Puerto Rico.

Holotype. Male, 21.VI.1934, C. M. Matos; USNM 51599. We examined both the holotype and allotype.

Length: 2.0–2.8 mm. Form elongate, sides subparallel. Derm flavous; elytron fuscous with a flavous, broad, humeral spot along base to suture, narrowing caudad to basal ⅓ of elytron; eye, apical 7 segments of antenna, posterior ventral abdominal segments, and pygidium fuscous. Surface densely covered with fine golden pubescence.

Ray (1937) has adequately described the species except for the following characters: Metasternal plate without TSM. Middle tibia as long as its basal 4 tarsal segments; penultimate segments of anterior and middle tarsi enlarged and slightly emarginate at apex. In addition to a short subapical ridge, posterior tibia with 2 long oblique ridges, extending halfway across outer surface; posterior basitarsus with three 2nd segment with 2, short oblique ridges; basal ridge on basitarsus sometimes rudimentary. Outer spur of posterior tibia ¼ as long as inner one. Tarsal ratios: 2-1-2-3–4, 3-2-3-4–9, 3-4-5-9.

Pygidium long, 2.5–3 times as long as hypopygium, shorter in females, conical, slender, and attenuate to apex. Median protuberance of 8th sternite appearing bifurcate due to setae and a less sclerotized area all the way to base, 9th sternite twice as long as 8th; furca twice as long as tube or paramera, and as long as epimere; epimere twice as long as right parameron;

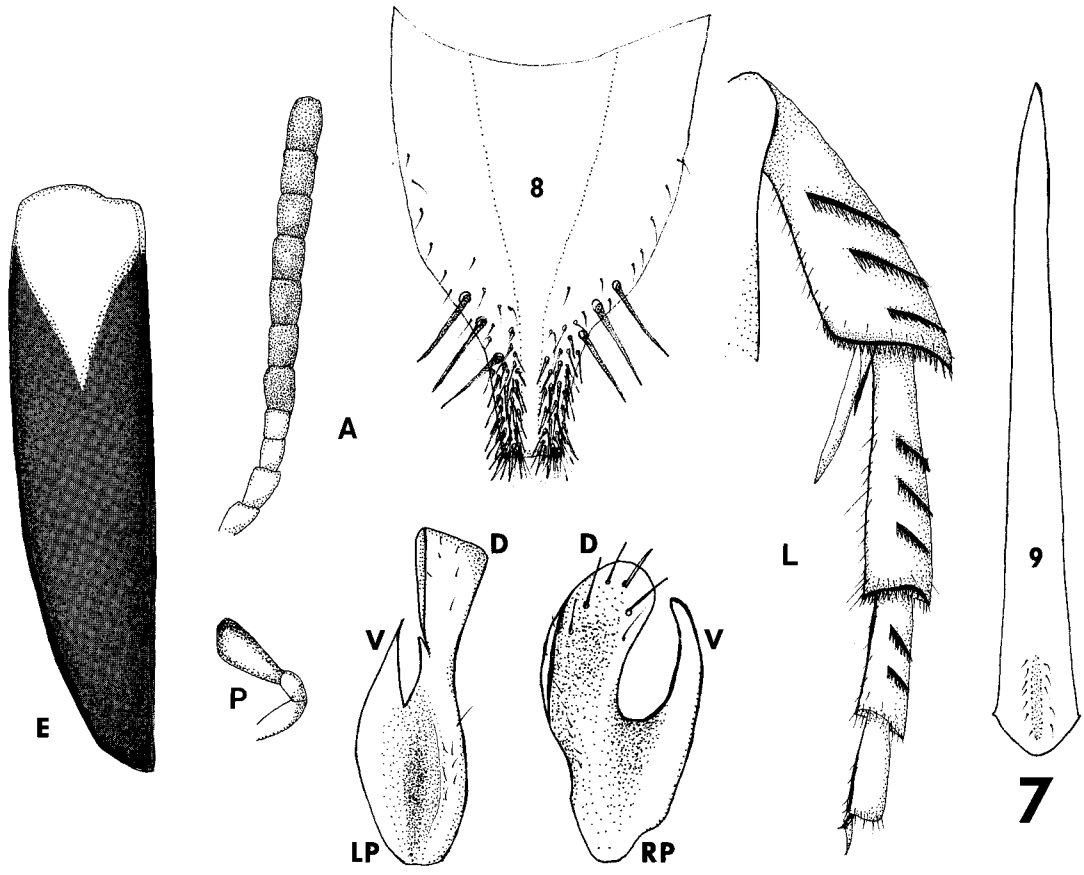

Fig. 7. *F. danforthi.* (8) *M. lineata* with ridge variation of posterior leg indicated. (9) *M. irfianorum.* A, antennae; E, left elytron pattern; L, posterior leg; P, maxillary palpus; 8 and 9m, male 8th and 9th sternites; LP, left parameron; RP, right parameron; D, dorsal branch; V, ventral branch.

ventral branch of left parameron extremely narrow and pointed, basal prominence set off its dorsal branch by a split. Penis 4 times as long as epimere with a simple pointed tip, apical 1st and 3rd quarters enlarged with a constriction on apical 2nd quarter.

Previous Records. Puerto Rico (Ray 1937, Wolcott 1950).

Material Examined. U. S. VIRGIN ISLANDS: Great St. James, 1, 20.X.1994, M. A. Ivie (MTSU). St. John, 2, 15.VII.1994, beating at night, M. S. Becker; St. John, 1, 21–28.VII.1994, UV light, M. S. Becker (MTSU). BRITISH VIRGIN ISLANDS: Virgin Gorda, 1, 14.IV.1956, J. F. Clarke (USNM). Prickly Pear Island, 1, 6.IV.1958, J. F. Clarke (USNM). Guana, 1, 1–14.VII.1984, S. E. and P. M. Miller; 5, 4–10.X.1994, W. Lu (MTSU). Necker, 4, 30.IX.1996, *Citharexylum fruticosum*, W. Lu (W.L.). George Dog, 1 female, 30.IX.1996, *Lantana*, W. Lu (W.L.).

Remarks. One specimen from St. John (MTSU) has an additional rudimentary ridge on both the posterior tibia and the basitarsus. According to Ray (1937), the scutellum, apical two-thirds of the pygidium, and only 3 abdominal ventral segments were fuscous, but he also stated that "the abdominal segments of the female (except pygidium) lack the fuscous coloration of the male, and the general castaneous color is lighter." We have observed variation in the abdominal ventral segments from totally fuscous to totally flavocastaneous. The pygidium may be as he described or totally fuscous. We see no variation in the color of the scutellum, which is as flavous as the front part of the body or the humeral spots on the elytra. Ray (1937) described the eyes as "emarginate behind antennae." We find the eye is in fact almost rounded, but tapers acutely toward the antennal base; the width and length of the eye are about equal. In comparison, the width is longer than the length in *G. guana.* In other words, the distance between the eyes on vertex is about the width of the eyes combined in *F. danforthi.* We have also observed variation in elytral color in specimens from Guana. One has the humeral flavous spot on the elytron extending narrowly to the midpoint, then widening to the apex. Some have the flavous, broad, humeral spot covering the whole elytron; in this case, the appearance is very similar to *G. guana*, but the antennae remain diagnostically bicolored, the eyes are not broader than long, and *F. danforthi* lacks the TSM.

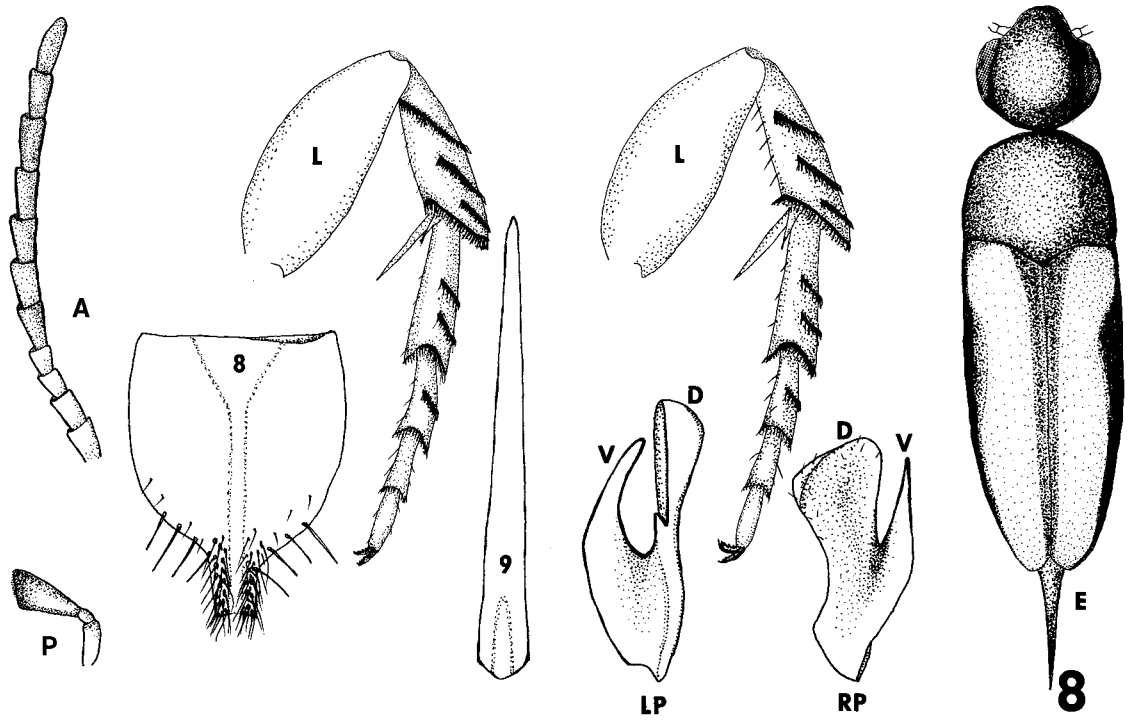

Fig. 8. *M. lineata* with ridge variation of posterior leg indicated. (8) *M. lineata* with ridge variation of posterior leg indicated; (9) *M. irfianorum.* A, antennae; E, left elytron pattern; L, posterior leg; P, maxillary palpus; 8 and 9m, male 8th and 9th sternites; LP, left parameron; RP, right parameron; D, dorsal branch; V, ventral branch.

Mordellistena lineata Ray (Fig. 8)

Mordellistena lineata Ray, 1937.

Type Locality. Guanica, Puerto Rico.

Holotype. Male, 26.VI.1934, C. M. Matos; USNM 51601. We examined both the holotype and allotype.

Length: 1.6–2.2 mm. Form elongate, narrow, sides subparallel, attenuate, and rounded gradually caudad from apical 3rd of elytra. Derm castaneous to black; frons of head, basal 4 segments of antenna, maxillary palpus, anterior and middle legs, and posterior leg other than femur flavocastaneous; a broad median stripe on each elytron flavocastaneous, reaching base of humerus, often narrowed in middle of elytral side margin, and extending to apex, leaving a narrow black line on each elytral side margin and a black sutural line. Surface covered with fine cinereous pubescence, except in the flavocastaneous area, where it partakes of the ground color.

Liljeblad (1945) has adequately redescribed the species except for the following characters: Metasternal plate with TSM. Middle tibia as long as its tarsus; penultimate segments of anterior and middle tarsi slightly enlarged and emarginate at apex. In addition to a short subapical ridge, posterior tibia with 2 long, oblique ridges, extending at least halfway across outer surface, basal ridge usually longer than the 2nd, sometimes extending entirely across outer surface to genu. Posterior basitarsus with two, 2nd with 1, short oblique ridges; basal ridge on basitarsus sometimes rudimentary. Outer spur of posterior tibia ⅓ as long as inner one. Tarsal ratios: 3-2-3-4–6, 2-1-2-3–6, 3-3-4-6.

Pygidium long, almost 3 times as long as hypopygium, shorter in female, conical, attenuate to apex. Median protuberance of 8th sternite appearing bifurcate due to setae and a less sclerotized area all the way to base, 9th sternite twice as long as 8th with a less sclerotized area at apex; furca twice as long as tube or paramera, and as long as epimere; epimere twice as long as right parameron; ventral branch of right parameron narrowly branched out, basal prominence of left parameron set off its dorsal branch by a split. Penis 3 times as long as epimere with apical 1st and 3rd quarters enlarged, its apex terminating in a finger-like lobe with a lateral flange on each side as *Glipostenoda ambusta* (LeConte) (Lu et al. 1997).

Previous Records. Puerto Rico. Guanica (Ray 1937), Mona Island (Wolcott 1950). British Virgin Islands: Necker Island (Lazell 1995).

Material Examined. U.S. VIRGIN ISLANDS: Buck Island (9), St. Croix (3), St. John (29), St. Thomas (3) (MTSU). BRITISH VIRGIN ISLANDS: Anegada (2), Beef Island (4+3), Guana (74+85), Necker (4+6), Tortola (1+1), Great Camanoe (+5), Great Dog (+1), George Dog, 2, 30.IX.1996, *Lantana,* W. Lu (W.L.). PUERTO RICO: Mona Island, Casuarina plantation, 1, 7–13.XI.1992, malaise trap, Snelling and Torres (MTSU).

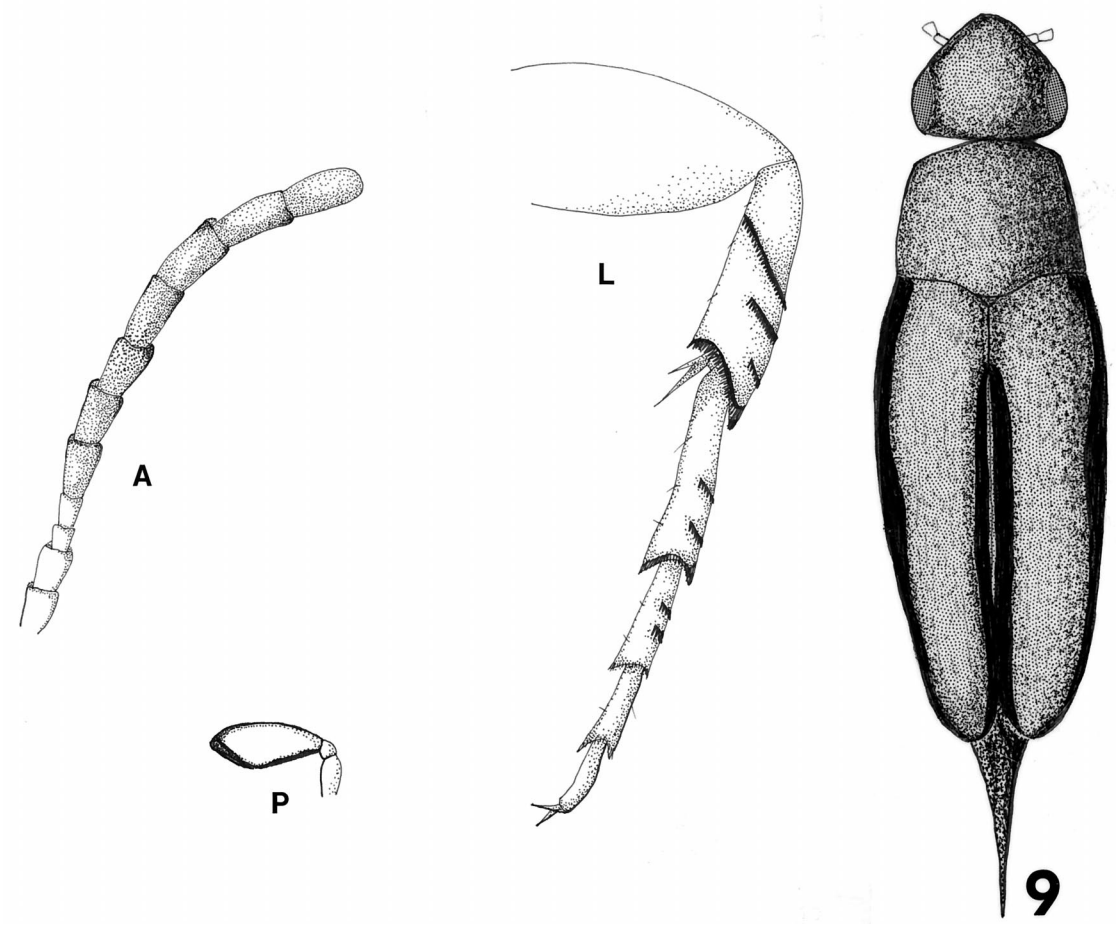

Fig. 9. *M. irfianorum.* A, antennae; L, posterior leg; P, maxillary palpus; 8 and 9m, male 8th and 9th sternites.

Remarks. The slightly enlarged and emarginate penultimate segments of anterior and middle tarsi are a giveaway character that this species does not belong to *Mordellistena.* The closest genus would be *Mordellina,* but the eyes are coarse and big in that genus, and the penultimate segments of anterior and middle tarsi should be the same as in *Mordellistena.* We retain this species in *Mordellistena* until we have a better understanding of the genera worldwide.

This species superficially resembles *Mordellistena angustiformis* Ray (1939), but the antenna is different from that species. In his original description, Ray stated, in an apparent lapse, that "7 apical segments of antennae" were flavocastaneous, lighter than basal segments. The reverse is true of all specimens we have examined, including the type. Ray also stated that the basal oblique ridge on the posterior tibia was "entirely across outer face." We find this character variable. Fewer than half the specimens examined are as described, all males. Most specimens have the basal ridge on the posterior tibia halfway across the outer surface or more, but not entirely, including both sexes. Occasionally the dermal color of some specimens is much lighter than black (probably newly emerged), but the even lighter stripes on elytra remain diagnostic. This is a very abundant species on flowers and dense vegetation, especially on leguminous *Acacia* species.

Mordellistena irfianorum sp. nov. (Fig. 9)

Type Locality. 18° 19′ N, 64° 43′ W, St. John, U.S. Virgin Islands.

Holotype. Female, collected by M. Becker and S. Bucklin, 6–27.VII.1994, flight intercept trap, East Hope, Bordeaux Mountain, 900 feet, St. John, and deposited in MTSU.

Length: 2.2 mm. Form elongate, sides subparallel. Derm castaneous to black; mouthparts, maxillary palpus, basal 4 segments of antenna, anterior leg, tibiae and tarsi of middle and posterior legs testaceous. Surface covered with long whitish pubescence, slightly golden on scutellum and on elytra, but pubescence on side and sutural margins partaking dermal color from basal ⅕ on, leaving most side and sutural margins black, widened slightly in middle of side margin; underside pubescence longer.

Head small; eye hairy, and moderately granulated, reaching occiput, suboval, not emarginate behind an-

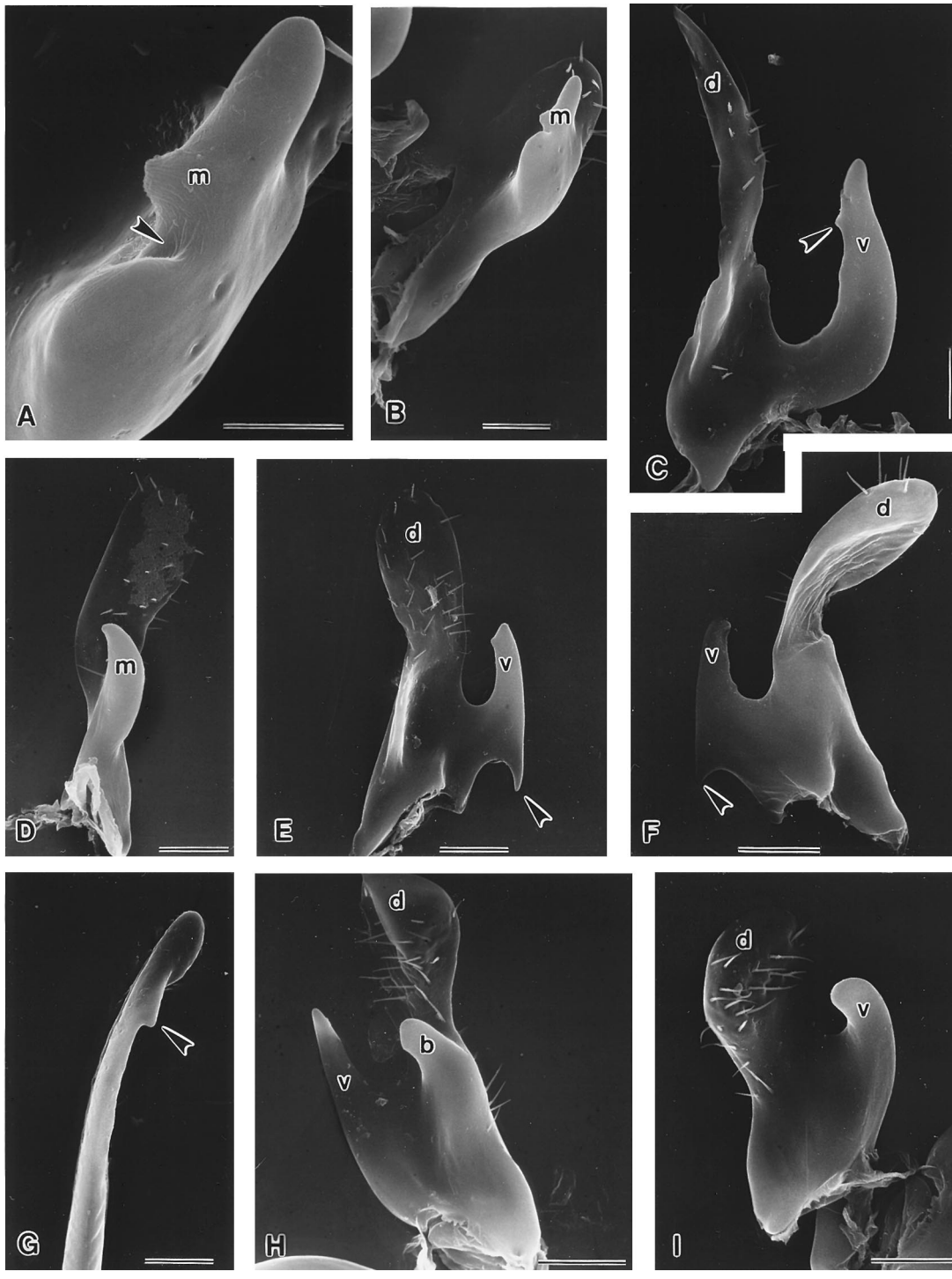

Fig. 10. SEM of genitalic. *M. summermanae:* A and B, LP with arrow showing a dent on medial branch; C, RP with arrow showing a prong on ventral branch. *T. leucocephala:* D, LP; E and F, inner and outer surfaces of RP with arrows showing a sharp basal angle of ventral branch. *G. guana:* G, lateral view of tip of penis with arrow showing a lateral flange; H, LP; I, RP. Scale bars A = 10 μm; B, C, and G = 30 μm; all others = 50 μm. b, basal prominence; d, dorsal branch; v, ventral branch; m, medial branch; otherwise as above.

tenna. Antenna filiform and long, reaching base of pronotum; segments 1 and 2 subequal, 3 and 4 shorter and narrower, four ≈⅓ longer than 3; 5–10 each as long as 3 and 4 combined, increasing in width, 11 apically rounded, slightly longer than 10. Distal segment of maxillary palpus elongate-triangular, apical side slightly shorter than inner side.

Pronotum ≈¼ broader than long, sides rounded; basal angles acute, base arcuate, basal lobe conspicuous, rounded. Scutellum small, triangular. Elytra at most 2.5 times as long as broad, sides narrower at base than in middle, broadly rounded to apex; apices individually rounded. Metasternal plate with TSM.

Middle tibia as long as its tarsus; penultimate segments of anterior and middle tarsi emarginate (but not bilobed) at apex. In addition, to a short subapical ridge, posterior tibia with 2 long oblique ridges, basal 1 extending entirely across outer surface; basal and 2nd tarsal segments each with 2 short oblique ridges. Inner spur of posterior tibia ⅔ length of basitarsus, outer spur short, ¼-⅕ length of inner one. Tarsal ratios: 1-1-1-2–3, 3-3-4-8–16, 3-4-5-9. Pygidium long, 3 times as long as hypopygium, conical, slender, and attenuate to apex.

Material Examined. U.S. VIRGIN ISLANDS: St. John, East Hope, Bordeaux Mountain., 900 feet, 1 female, 6–27.VII.1994, flight intercept trap, M. Becker and S. Bucklin (MTSU). PUERTO RICO: Cambalache, 1 female, 7.XI.1947, J. S. Caldwell (USNM).

Paratype. The remaining specimen from Puerto Rico.

Etymology. The Island Resources Foundation of St. Thomas, IRF, has provided support. We name this species for IRF in the genitive neuter pleural.

Remarks. This species looks very much like *M. lineata* at 1st glance and we have the same difficulty in placing it in any other known genus as we do for *M. lineata.* The 2 ridges on posterior 2nd tarsus and the entirely black elytra distinguish it from *M. lineata.* The specimen from Puerto Rico is mutilated, missing antennae as well as tibiae and tarsi of most legs.

Acknowledgments

This article is dedicated to the memory of M. S. Collins, whose advice and encouragement were invaluable to this project and the career of W.L. We are indebted to P. W. Johnson (University of Rhode Island) for SEM work. This project was funded in part by Island Resources Foundation, The Conservation Agency, Rhode Island Agricultural Experiment Station, contribution number 3724, and Montana State University. Without a Smithsonian Institution Short-Term Visitor Award to W.L. and the support of T. L. Erwin, this work would not have been completed.

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