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Biodiversity of Heteroptera in Puerto Rico: Part III. Conspectus of Pentatomomorpha: Aradoidea, Pyrrhocoroidea, Coreoidea, and Concluding Notes on Endemism and Biogeography[1, 2]

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ABSTRACT

Superfamilies Aradoidea, Pyrrhocoroidea and Coreoidea from Puerto Rico are discussed as part of an updated account of Hemiptera: Heteroptera. In this final part, we present 48 species belonging to the three superfamilies, with six families known from Puerto Rico: Aradoidea: Aradidae (12); Pyrrhocoroidea: Largidae (1) and Pyrrhocoridae (3); and Coreoidea: Alydidae (5), Rhopalidae (7) and Coreidae (20). Taxonomic accounts presented here include synonymies, known distribution, lists of host plants and a listing of examined specimens. Taxonomical keys are also provided for the identification of all taxa included. Color plates for 43 species are included. Five species are new records for Puerto Rico: *Brachyrhynchus membranaceus* (F.), *Leptoglossus confusus* Alayo and Grillo, *Eubule scutellata* (Westwood), *Mamurius cubanus* Barber and Bruner, and *Merocoris typhaeus* (F.). Most species are widespread in the West Indies,

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with the largest number of island endemics in the Aradidae. A discussion of the origins, biodiversity, biogeography, and endemism of all Puerto Rican Pentatomomorpha is presented.

Key words: Pentatomomorpha, taxonomic keys, insects, Puerto Rico, endemism, biogeography

RESUMEN

La biodiversidad de Heteroptera en Puerto Rico: Parte III. Resumen de Pentatomomorpha: Aradoidea, Pyrrhocoroidea, Coreoidea y notas finales sobre endemismo y biogeografía

En esta parte final discutimos y ponemos al día las especies pertenecientes a las superfamilias Aradoidea, Pyrrhocoroidea, y Coreoidea (Hemiptera: Heteroptera) en Puerto Rico. Presentamos resúmenes para 48 especies pertenecientes a seis familias: Aradoidea: Aradidae (12); Pyrrhocoroidea: Largidae (1) y Pyrrhocoridae (3); y Coreoidea: Alydidae (5), Rhopalidae (7) y Coreidae (20). Cada especie aquí presentada incluye sus sinonimias, su distribución geográfica, una lista de plantas hospederas, y un listado de especímenes examinados. También incluimos claves taxonómicas para la identificación de los taxones mencionados. Incluimos fotos en aspecto dorsal para 43 especies. Cinco de las especies constituyen nuevos records para Puerto Rico: *Brachyrhynchus membranaceus* (F.), *Leptoglossus confusus* Alayo and Grillo, *Eubule scutellata* (Westwood), *Mamurius cubanus* Barber and Bruner, y *Merocoris typhaeus* (F.). La mayoría de las especies de Pentatomomorpha en Puerto Rico parecen ser de origen Antillano, con los arádidos siendo el grupo con más endemismos. Concluimos en esta tercera y última parte del Resumen con una discusión sobre la biodiversidad, los orígenes y endemismos en los Pentatomomorpha de Puerto Rico.

Palabras clave: Pentatomomorpha, claves taxonómicas, insectos, Puerto Rico, endemismo, biogeografía

INTRODUCTION

This is the third, and final part of our conspectus of the Hemipteran infraorder Pentatomomorpha in Puerto Rico. As in the first two parts of this series, our intent is to annotate Heteroptera: Pentatomomorpha species reported from Puerto Rico and other islands under its jurisdiction. Thus, the principal thrust of the series arises from the need for an updated and comprehensive regional treatise on these important groups and, where possible, to include taxonomical keys and photographs of common species. Parts I and II dealt with superfamilies Pentatomoidea and Lygaeoidea, respectively. In this final part, we present, in a fundamentally similar way, the remaining groups of Pentatomomorpha from Puerto Rico: Aradoidea, Pyrrhocoroidea, and Coreoidea. For the sake of economy, we refer you to the previous parts of the Conspectus for overall objectives, taxonomical accounts, and other relevant information. Biological materials examined belong to the historical collection of the *Museo de Entomología y Biodiversidad Tropical* of the Agricultural Experiment Station, Mayagüez Campus-University of Puerto Rico (**MEBT)**, the University of Puerto Rico-Mayagüez Invertebrate Collection (**INV-COL)**, and the private collection of José A. Ramos (**JAR**). As in Parts I and II, species accounts presented here include: basic information on taxonomical synonymy; known geographical distribution with special emphasis on the Antilles and the Caribbean; host plant collection data; a short account of relevant biological, historical or economic information; and a list of preserved material examined and housed at MEBT that includes collection label information and sex for each insect. Host plant records for Puerto Rico are those presented in Martorell (1976), unless otherwise specified.

As discussed in Parts I and II, insects belonging to the infraorder Pentatomomorpha are all terrestrial and the majority are plant feeders, consuming the fluids of many plant parts, especially flowers, seeds and fruit. Except for the Aradoidea, all other Pentatomomorpha are characterized by the presence of trichobothria, which are specialized slender sensory setae arising from spots, tubercles or pits on the head and/or abdominal venter (segments III to VII). Four to six superfamilies are recognized by different authors. We use Schuh and Slater (1995), who recognize five superfamilies inside Pentatomomorpha: Aradoidea (e.g., flat bugs), Pentatomoidea (e.g., stink bugs), Lygaeoidea (e.g., stilt and seed bugs), Pyrrhocoroidea (e.g., cotton stainers and bordered plant bugs), and Coreoidea (e.g., broad-headed bugs, leaf-footed bugs). Henry (1997) includes an additional superfamily: Ideostolidea, a very small group of species of transantarctic distribution with unique trichobothrial patterns. Except for the Ideostolidea, members of the other five superfamilies occur in Puerto Rico. A key to the Pentatomomorpha superfamilies in Puerto Rico can be found in the second part of this Conspectus (Segarra-Carmona et al., 2020).

Superfamily ARADOIDEA

Family ARADIDAE Spinola

The Flat Bugs

"Flat bugs" are among the least collected and studied members of Pentatomomorpha. Perhaps, features like the group's secretive life under leaf litter or rotting tree logs, their relatively small size (3 to 11 mm), their drab and dark coloration, and the sizeable presence of apterous species in the tropics, all contribute to their rarity in our collections. Most species are extremely flattened dorsoventrally, perhaps facilitating their movement through tight spaces in leaf litter or bark.

Their shapes are varied: elliptical, oval, rounded or rectangular. Most forms appear to feed on fungi growing under the bark of dead logs or on rotting leaves, but at least one European species, *Aradus cinnamomeus* Panzer, is known to feed on living plant sap and thus considered a minor pest (Froeschner, 1988).

Aradids are easily identified within Heteroptera, not only for their unique flattened shape, but also for having an extremely long and coiled mandibular and maxillary stylets within their cephalic cavity. Presumably, aradids use these elongated stylets to more easily reach fungal hyphae or other structures that serve as their food. These insects lack ocelli, a trait shared with Pyrrhocoroidea; but unlike other pentatomomorphans, flat bugs remarkably lack trichobothria (Schuh and Slater, 1995). A recent phylogenetic study by Yao et al. (2012) positions Aradoidea (i.e., Aradidae, and its sister Termitaphididae) basal to the rest of Pentatomomorpha (i.e., Trichophora), yet maintaining support for monophyly within the infraorder. Wing reduction and dimorphism are known in many species, some where males are macropters, while females are brachypters (Schuh and Slater, 1995; Coscarrón and Contreras, 2015). A common phenomenon, especially prevalent among tropical species, is complete wing loss (most Carventinae and some Mezirinae). As also observed by Schuh and Slater (1995), apterous aradids often have body parts grotesquely modified and are commonly covered with a coarse layer of incrustations that almost completely cover their bodies' texture and shape. This trait is quite unique to the Heteroptera. Little is known about the biology or ecology of aradids, and unhappily most information is based on occasional observations of Nearctic or Palearctic species (Coscarrón and Contreras, 2015). Most species appear to be mycetophagous, feeding on the juices found in fungal mycelia. An association of some aradids with termite nests is well documented, but flat bugs have also been reported occurring on birds' nests, rodents and galleries of wood-boring beetles (Coscarrón and Contreras, 2015).

Most authors recognize eight aradid subfamilies: Aradinae, Calisiinae, Chinamyersiinae, Isodermidae, Prosympiestinae, Aneurinae, Carventinae and Mezirinae (Schuh and Slater, 1995; Coscarrón and Contreras, 2015), with members of the last three reported from Puerto Rico. According to Coscarrón and Contreras (2015), there are over 1,900 described aradid species in approximately 233 genera worldwide. Eighty genera and 509 species are reported from the Neotropics, with six genera and 12 species reported from Puerto Rico (Coscarrón and Contreras, 2012). Finally, the late Puerto Rican entomologist Jenaro Maldonado-Capriles stands out as an early pioneer in the study of aradids, collecting specimens throughout forest habitats and describing two new species from Puerto Rico.

Key to the Aradidae of Puerto Rico (Adapted from Usinger and Matsuda, 1959)

1\. Labium arising from an open area of bucculae (atrium); anterior dorsal abdominal scent gland orifice only slightly displaced posteriorly (Aneurinae) 2

Labium arising from a closed area of bucculae, longitudinal slit opening wide anteriorly; anterior dorsal abdominal scent gland orifice displaced posteriorly to middle or posterior margin . . . 4

2 (1). Spiracles II – VII lateral, VIII terminal . . . . *Aneurus patriciae*

— At least spiracles III ventral or subventral 3

3 (2). Spiracle V lateral, visible from above . . . . *Aneurus aibonitensis*

— Spiracle V subventral, not visible from above . . . *Aneurus pisoniae*

4 (1). Metathoracic scent-gland orifice with a well-developed, channel-like, evaporatory area extending to margin of thoracic metapleuron; body usually not incrustate dorsally; usually winged, membrane present (Mezirinae) 5

— Metathoracic scent-gland orifices lacking a well-developed channel; body usually heavily incrustate; wingless (Cavertinae) . . . 7

5(4). Large dark species; deeply sinuate hind margin of the pronotum; connexivum dark, unicolorous *Brachyrrhynchus membranaceus*

— Color dark or ferruginous; slightly sinuate hind margin of the pronotum; connexivum bicolored or uniformly colored 6

6 (4). Ferruginous, larger species (9-11 mm); prothorax with two yellow tubercles near center of disc, and strongly explanate humeral angles; basal angles of scutellum with yellow tubercles; connexivum bicolored . . . . *Mezira abdominalis*

— Dark brown, smaller species (6 mm); no yellow tubercles on scutellum or prothorax, not explanate; connexivum dark . . . . *Mezira placida*

7 (4). Eyes briefly or distinctly stalked; body with short stiff hairs, especially noticeable on legs 8

— Eyes unstalked; body glabrous 11

8 (7). Head with prominent setigerous lobe behind each eye. . . . . *Aglaocoris natalii*

— Head without prominent lobe behind each eye (*Eretmocoris* spp.) 9

9 (8). Neck region with distinct prominent tubercle behind posterolateral angles of head; anterolateral angles of pronotum with slender projection that extends beyond margin of collar (7 mm) . . . .*Eretmocoris gigas*

— Neck region with no tubercle behind posterolateral angles of head 10

10 (9). Seventh abdominal segment (ventral) with prominent process directed back and extending beyond posterior of 9th segment in males . . . . *Eretmocoris prominens*

— Posterolateral angles of 7th abdominal segment not reaching margin of 9th segment in males . . . . *Eretmocoris tatei*

11 (7). Basal connexival segments II-III fused . . . . *Rhysocoris disparis*

— Males with naked glandular sub lateral areas in 7th abdominal segment. Females with slightly elevated 7th abdominal segment posteriorly . . . . *Acaricoris clausus*

Subfamily Aneurinae Douglass and Scott

Aneurines are usually small, elongate or oval, and winged flat bugs, with the labium arising from an open area of bucculae (atrium), and anterior dorsal abdominal scent gland orifice only slightly displaced posteriorly. Genus *Aneurus* contains most species in this group, and it is represented in Puerto Rico by three species.

Aneurus Curtis

Aneurus aibonitensis Kormilev (1968b: 4) [Plate II, Fig. 4]
Aneurus minutus (Bergroth) (In Barber, 1939; Wolcott, 1948)
Aneurus politus Say (misidentification, Wolcott, 1936)
Aneurus aibonitensis Kormilev
Iralunelus aibonitensis Kormilev and Froeschner

Type Locality. Aibonito, Puerto Rico.

Antillean and Caribbean Distribution. Puerto Rico.

Host Plant Record. Unknown, likely fungivorous on rotting wood.

Remarks. This species was first recorded from Puerto Rico by Barber (1939) as *Aneurus minutus* Bergroth from a male specimen collected in Adjuntas, May 3, 1934 (See Barber, 1939: 330; also, Picchi, 1977; Coscarrón and Contreras, 2012; Contreras, 2014). *Aneurus minutus* appears to be distributed in Southeastern U.S., while *A. aibonitensis* appears to be endemic. Kormilev's holotype is a female collected by Silverio Medina-Gaud in June 1961 and deposited at the United States National Museum (USNM) (Kormilev, 1968b). Likely, most MEBT specimens examined here, collected by Rivera and Medina-Gaud in 1961, belong to the same series. According to Picchi (1977), *A. aibonitensis* appears closely related to *A. neojamaicensis* (Jamaica). This species has a similar spiracle pattern as its sympatric *A. pisoniae*, but *aibonitensis* is distinguished by having a lateral spiracle V, and visible from above, a well-developed, sinuate, connexival suture, and a callous pattern on the ventral surface of abdominal segment VII (Picchi, 1977).

Material Examined. **PUERTO RICO**. *Aibonito*: Acc No. 14-61. Aibonito to Barranquitas Road Km 8.3. June 20, 1961. *Ex.* On dead log. Rivera and S. Medina Gaud. (7♀ 2♂).

Aneurus patriciae Picchi (1977: 276) [Plate II, Fig. 5]

Type Locality. Hardwar Gap, Jamaica.

Antillean and Caribbean Distribution. Cuba, Jamaica, Puerto Rico.

Host Plant Record. Unknown, likely fungivorous on rotting wood.

Remarks. Picchi (1977) reported this species from Puerto Rico. METB specimen was collected by S. Navarro from Isabela (Guajataca Forest) Sept. 25, 1999. When using Kormilev's key (1968b) this species keyed out to *A. vauriei* Kormilev. However, according to Picchi (1977), *A. vauriei* was described from a mixed type series that included two paratypes belonging to *A. patriciae.* Apparently one of these paratypes was used by Kormilev in preparing his key. Using Picchi's (1977) key, the specimen correctly keys to *patriciae*.

Material Examined. **PUERTO RICO**. *Isabela*: Guajataca Forest. Sept. 25, 1999. S. Navarro. (♂).

Aneurus pisoniae Kormilev (1968b: 6)
Aneurus pisoniae Kormilev

Type Locality. Maricao, Puerto Rico.

Antillean and Caribbean Distribution. Puerto Rico.

Host Plant Record. Unknown, likely fungivorous on rotting wood.

Remarks. This species was first described from Puerto Rico by Kormilev (1968b) from specimens collected in Maricao, Puerto Rico, by De Leon, Apr. 16, 1940 on *Pisonia subcordata* Sw. (Nyctaginaceae). According to Kormilev, *A. pisoniae* is related to *A. haitiensis* Kormilev, but is smaller, with straight lateral borders in fore lobe of pronotum, hypopygium narrowly rounded, shorter paratergites and more contrasting color: yellow brown with black membrane.

Material Examined. No specimens were found in MEBT, JAR, or INVCOL collections.

Subfamily Carventinae Usinger

Carventines are characterized by their widespread aptery, and for deep incrustations that result in bizarre body shapes and forms (Schuh and Slater, 1995). Metathoracic scent-gland orifices lack a well-developed channel. This is largely a tropical group, with approximately 60 genera, out of which only three are known to have macropterous forms. Three genera and six species, all apterous, are known from Puerto Rico; all have been collected in association with leaf litter. The group is recognized for its rich endemicity within the Caribbean, but its alpha-taxonomy within the region, at least at the generic level, is still poorly understood. For example, the last complete revision of Antillean Carventines was published almost 60 years ago by Usinger and Matsuda (1959). However, Grillo (1988) established several new generic taxa for Cuba, which contain a key that is difficult to use with Carventines elsewhere. Further, using keys by different authors is often challenging, especially when attempting to separate taxa at the generic level, as they often appear to be contradictory regarding taxon placement. For example, Usinger and Matsuda (1959) keys specimens with distinct and independent connexival segments II and III as *Rhysocoris* spp., but these segments are clearly fused in the native *Rhysocoris disparis*. It is clear that this group is overdue for a Caribbean-wide taxonomic revision.

Acaricoris Harris and Drake

Acaricoris clausus Drake and Kormilev (1958: 244)
Acaricoris clausus Drake and Kormilev

Type Locality. Mayagüez, Puerto Rico.

Antillean and Caribbean Distribution. Puerto Rico.

Host Plant Record. Unknown, likely fungivorous on rotting leaf litter.

Remarks. The species was described by Drake and Kormilev (1958) from specimens collected by Maldonado-Capriles in Mayagüez in May 1955 from forest litter by means of a Berlese funnel. This species is easily identified by its characteristic protruding eyes, prominent tubercles on the lateral side behind each eye, and the fused connexival segments III-VI. Other than the type series, no other specimens are known.

Material Examined. No specimens were found in MEBT, JAR, or INV-COL collections.

Aglaocoris Drake and Maldonado

Aglaocoris natalii Drake and Maldonado-Capriles (1955: 291)
Aglaocoris natalii Drake and Maldonado-Capriles

Type Locality. Yauco, Puerto Rico.

Antillean and Caribbean Distribution. Puerto Rico.

Host Plant Record. Unknown, likely fungivorous on rotting leaf litter.

Remarks. Drake and Maldonado-Capriles described this species from a collection in March 1955 by Antonio Natali in Yauco, Puerto Rico. Other members of the type series were collected in Mayagüez in April 1955, under the loose bark of a dead tree. These authors remark that this species, when compared with *E. tatei* and *R. disparis,* has prominently stalked eyes and is larger (5.5 to 6 mm). According to Usinger and Matsuda (1959), this genus is extremely close to *Eretmocoris,* but differs in having more conspicuous body hairs and the presence of prominently stalked eyes. Most other characters afford no differences between these genera, and the authors have suggested that these genera should, at some point, be combined. According to Coscarrón and Contreras (2015) this is an endemic West Indian genus currently with nine recognized species.

Material Examined. No specimens were found in MEBT, JAR, or INV-COL collections.

Eretmocoris Harris and Drake

Eretmocoris gigas Usinger and Matsuda (1959: 139) [Plate II, Fig. 46]
Eretmocoris gigas Usinger and Matsuda

Type Locality. Adjuntas, Puerto Rico.

Antillean and Caribbean Distribution. Puerto Rico.

Host Plant Record. Unknown, likely fungivorous on rotting logs or leaf litter.

Remarks. This is the largest known member of the genus at almost 7 mm. The species was first described by Usinger and Matsuda (1959) from a female specimen collected in Adjuntas, May 3, 1934, and held at the NMNH. Perhaps by coincidence this is the same collecting information for *Aneurus aibonitensis* (=*minutus* Bergroth) found in Barber (1939), possibly indicating that multiple species were part of the same collection effort. According to these authors, the species has a conspicuous tubercle projecting laterally in the neck region.

Material Examined. **PUERTO RICO.** *Adjuntas.* 18º 17.76N 66º 79.58W. Nov. 7, 2018. Leaf litter/Berlese. Pérez and A. Segarra-Carmona (♂); 18º 18.5N 66º 47.91W. Nov. 7, 2018. Leaf litter/ Berlese. Pérez and A. Segarra-Carmona (♀).

Eretmocoris prominens Usinger and Matsuda (1959: 136)
Eretmocoris prominens Usinger and Matsuda

Type Locality. Maricao, Puerto Rico.

Antillean and Caribbean Distribution. Puerto Rico.

Host Plant Record. Unknown, likely fungivorous on rotting leaf litter.

Remarks. Usinger and Matsuda described this species from a male collected from Maricao in 1938 and held at the NMNH. This specimen was collected in a Berlese funnel sample, but neither date nor collector is given in the original description. This species is named for having a prominent backward-directed process in abdominal segment VII, which extends beyond the posterior of segment IX.

Material Examined. No specimens were found in MEBT, JAR, or INVCOL collections.

Eretmocoris tatei Harris and Drake (1944: 131)
Eretmocoris tatei Harris and Drake (Wolcott, 1948)
Aglaocoris tatei Drake and Kormilev
Eretmocoris tatei Usinger and Matsuda

Type Locality. Lares, Puerto Rico.

Antillean and Caribbean Distribution. Puerto Rico.

Host Plant Record. Unknown, likely fungivorous on rotting leaf litter.

Remarks. This is the type species for genus *Eretmocerus* Harris and Drake. The holotype is a male collected from Lares on May 26, 1937 by H.G. Tate, then with the University of Nebraska's Agricultural Experiment Station. According to Usinger and Matsuda (1959), this species appears to be similar to *E. prominens,* but is distinct because the posterolateral angles of abdominal segment VII in *E. tatei* do not reach the margin of segment IX in males. Apparently, no other collections of this species exist. Drake and Kormilev (1958) placed this species, along with *Rhysocoris disparis,* within a redescribed *Aglaocoris* Harris and Drake for having the presence of circumcoxal tubercles. However, neither species has pedicellate eyes nor the characteristic prominent setigerous lobes behind each eye.

Material Examined. No specimens were found in MEBT, JAR or INVCOL collections.

Rhysocoris Usinger and Matsuda

Rhysocoris disparis (Drake and Maldonado-Capriles, 1955: 290) [Plate II, Fig. 7]

Eretmocoris disparis Drake and Maldonado-Capriles
Aglaocoris disparis Drake and Kormilev
Rhysocoris disparis Usinger and Matsuda

Type Locality. Mayagüez, Puerto Rico (male).

Antillean and Caribbean Distribution. Puerto Rico.

Host Plant Record. Unknown, likely fungivorous on rotting leaf litter.

Remarks. This species is frequently collected from leaf litter on the forest floor. Drake and Maldonado-Capriles (1955) originally placed this species in genus *Eretmocoris* Harris and Drake. The holotype is a male collected from leaf litter in Mayagüez in March 1955 using a Berlese funnel. Paratypes were also taken and the authors remark that nymphs of two other unidentified alate aradids (probably *Aneurus* sp.) were found in the same leaf litter batch, underscoring the likelihood of multiple species collections. Currently, placement of this species in genus *Rhysocoris* remains tentative (see Usinger and Matsuda, 1959). Drake and Maldonado-Capriles's original description indicates that connexival segments II and III are fused, as confirmed by examination of MEBT specimens (e.g., MEBT 0013574 – 0013577), which were collected and determined by Maldonado-Capriles in

1969. Usinger and Matsuda, however, characterized members of *Rhysocoris* as having separate, unfused basal connexival segments (i.e., II and III), but in their work wrote about their reservations when placing *disparis* within *Rhysocoris* because the segment VIII lobes are not spined as in the other members of this genus (i.e., type species *R. rugusus* Usinger and Matsuda).

Material Examined. **PUERTO RICO**. *Maricao*: 18°09.40N 66°59.86W. Mar. 23, 2010. *Ex. Sweeping*/beating. A. Segarra-Carmona. (♀); *Utuado*: Río Abajo Forest Road #621 Km 5.2, 335 mt. 18°18'N 66°40'W. July 1969. J. Maldonado. (2♀ 2♂).

Subfamily Mezirinae Oshanin

Mezirines constitute the largest subfamily of Aradidae, with at least 119 genera worldwide (Schuh and Slater, 1995). Coscarrón and Contreras (2012) catalogue 340 species in 42 genera for the Neotropical region. This subfamily is poorly represented in Puerto Rico with only three species in two genera. Mezirines have a well-developed metathoracic scent-gland orifice with a channel-like evaporatory area extending to the margin of the thoracic metapleuron. The subfamily has both apterous and macropterous forms. Winged forms have prominent longitudinal veins in the corium and a well-developed membrane. Their bodies are not incrustated dorsally as in the Carventinae.

Brachyrhynchus Laporte

Brachyrhynchus membranaceus (Fabricius, 1798: 526) [Plate I, Fig. 3] **New Record**

Acanthia membranacea Fabricius
Lissonotocoris membranaceus Usinger and Matsuda
Mezira (*Zemira*) *membranacea* Kormilev
Brachyrhynchus membranaceus Stål

Type Locality. Vietnam; Southeast Asia

Antillean and Caribbean Distribution. Costa Rica, Cuba, Hispaniola, Honduras, Jamaica, Panamá, Puerto Rico. Also in Oriental and South Pacific Region.

Host Plant Record. Unknown.

Remarks. This is the first record of this species from Puerto Rico. This species was first intercepted in the Neotropical Region of Panama in 1972 (Henry et al., 2013; Smith-Pardo and Beucke, 2015), and the earliest collection record in Puerto Rico is from Aguada in 1987 and was collected by retired UPR entomologist Rafael

Inglés. It is a large dark species (10 to 13 mm) with deeply sinuate hind margin of the pronotum, and a completely dark connexivum. The senior author collected a series of nymphs and adults under the bark of a rotting, but still standing, *Swietenia mahagoni* (L.) Jacq. (Meliaceae) [West Indian mahogany tree, caoba], heavily infested with *Nasutitermes* sp. wood termites. According to Henry et al. (2013) this species is an occasional pest in mushroom cultivation and is frequently attracted to lights. This attraction to light may explain their commonness in student collections.

Material Examined. **PUERTO RICO**. *Aguada*: Cerro Gordo. Aug. 23, 1987. R. Inglés. (♂); *Añasco*: Oct. 1997. W. C. Torres. (♂); *Arecibo*: Bo. Dominguito. Nov. 24, 2011. E. Pérez. (♂); *Maricao*: Aug. 15, 2013. J. Pérez López. (♂); *Moca*: Oct. 25, 2013. R. Crespo (♂); *Sabana Grande*. Bosque Susúa. Mar. 2015. A. Segarra-Carmona and Borrero under bark of rotting mahogany tree. (4♂); *San Germán*: Sept. 21, 2014. (♂); *San Sebastián*: May 4, 2009. M. Santiago. (♀); *Villalba*: Nov. 22, 2014. Y. García. (♀ ♂); *Yauco*: Bo. Quebradas. Sept. 25, 2011. G. Martínez. (♂).

Mezira Amyot and Serville

Mezira abdominalis (Stål, 1873: 144) [Plate I, Fig. 2]
Brachyrhynchus abdominalis Stål
Mezira abdominalis Barber

Type Locality. Cuba.

Antillean and Caribbean Distribution. Cuba, Hispaniola, Puerto Rico. Also, in Mexico.

Host Plant Record. Unknown, likely fungivorous on rotting logs.

Remarks. This species is the type for genus *Mezira* and was first listed from Puerto Rico by Bergroth (1886: 59), likely from specimens in Stål's collection. Barber (1939) reported specimens collected in Mayagüez (Nov. 23, 1928. Coll: Landrón). This is a large ferruginous species, 9 to 11 mm, easily distinguished by two yellow tubercles near the center of the disc of the prothorax. This species has strongly explanate humeral angles as well as more yellow tubercles in the basal angles of scutellum. Nothing is known about its biology, but it probably inhabits rotting logs.

Material Examined. **PUERTO RICO**. *Mayagüez*. Oct. 28, 1947. G. Colón (JAR).

Mezira placida Kormilev (1968a: 13) [Plate I, Fig. 1]
Mezira placida Kormilev

Type Locality. Puerto Rico. “Hugural Rd.”

Antillean and Caribbean Distribution. Hispaniola, Puerto Rico.

Host Plant Record. Unknown, likely fungivorous on rotting logs.

Remarks. Kormilev (1968a) described this species from a single female collected on April 10, 1913 by John R. Johnston, the first phytopathologist hired by the Puerto Rico Agricultural Experiment Station. The collection site, Hugural Rd., is unknown to us, and no records could be found as to its exact location. Two males and four nymphs were also collected with the holotype. This species is easily told from *M. abdominalis* by its smaller size (6 mm), no yellow tubercles on the scutellum, prothorax or explanate, and connexivum entirely dark. A subspecies, *M. placida haitiensis* Kormilev, occurs in Haiti and is apparently more testaceous in color.

Material Examined. **PUERTO RICO.** *San Juan* (Río Piedras). Apr. 4, 1944. R. Casas. (JAR).

Superfamily PYRRHOCOROIDEA

Members are moderately sized bugs (7 to 18 mm), often with bright and contrasting coloration, and absent ocelli (Schaefer, 2015). Pyrrhocoroids share their lack of ocelli with the Aradoidea, whereas unlike them, these insects possess trichobothria, a characteristic they share with Lygaeoidea, Coreoidea, and Pentatomoidea. Two families, Largidae and Pyrrhocoridae, make up this superfamily. Both are represented in Puerto Rico.

Family LARGIDAE Amyot and Serville

The bordered plant bugs

Largids, commonly referred to as “bordered plant bugs,” are a small group (15 genera and over 100 species) of medium to large bugs (Henry, 1988) that are distinguished from pyrrhocorids by their laterally rounded pronotum (not reflexed), and for their abdominal sternite VII entirely split in females (Schuh and Slater, 1995). Two subfamilies were recognized by Henry (1988): the ant-mimicking, short-winged Arhaphinae and the Larginae; whereas Schaefer (2015) recognizes only the Larginae (New World) and the Physopeltinae (Old World). Only one species of the former is reported from Puerto Rico. According to Schaefer (2015), nearly nothing is known about the habits and food plants of these insects. In general, *Largus* spp. appear to feed on seeds and fruit, but there are anecdotal accounts of them feeding on dead insects, and even on dog food (Schaefer, 2015).

Subfamily Larginae Amyot and Serville

Largus Hahn

Largus obovatus (Barber, 1923:5) [Plate III, Fig. 8]
Euryophthalmus obovatus Barber
Largus varians Stål (Martorell, 1976)
Largus obovatus Barber

Type Locality. Hispaniola (San Lorenzo); paratype, one female from Puerto Rico (Utuado).

Antillean and Caribbean Distribution. Hispaniola, Puerto Rico.

Host Plant Record. Although adults have been collected from several plant species in Puerto Rico, such as *Coffea arabica* L. (Rubiaceae) [coffee, café], *Citrus sinensis* (L.) Osbeck (Rutaceae) [sweet orange, china], *Erythrina fusca* Lour. (Fabaceae) [coral bean, bucayo], *Inga vera* Willd. (Fabaceae) [guaba] (Barber, 1939; Martorell, 1976), no records exist of finding immature stages, or other evidence of breeding host plants.

Remarks. This species was first described by Barber (1923) from an Hispaniolan holotype, and one female paratype collected from Utuado, Puerto Rico, on April 16, 1906. This is a robust black bug with red or ochraceus markings above and along the lateral margins of body. According to Schaefer and Stehlík (2013), this species is variable in corium coloration. For example, while specimens from Haiti have pale clavus and corium, specimens from Puerto Rico have darker coloration in the inner half of the clavus, and the corium is completely black.

Material Examined. **PUERTO RICO**. *Cayey*: Acc. No. 352-1922. Nov. 28, 1922. G.N. Wolcott. (♀); *Coamo*: May 18, 1967. L.F. Martorell. (♀); *Lares*: Acc. No. 417-1922. Nov. 6, 1922. F. Sein. (♀); *Maricao*: Acc. No. 36-59. Mar. 22, 1959. L.F. Martorell. (♀); *Mayagüez:* Oct. 28, 2014. R. Dávila. (♀); *Ponce*: 18º06.165N 66º35.16W. Sept. 3, 2014. A. Segarra-Carmona. (♀); *San Germán*: Nov. 8, 2014. (♂).

Family PYRRHOCORIDAE Fieber

The cotton stainers

Closely related to the Largids and commonly known as “cotton stainers,” pyrrhocorids are aposematic (i.e., with warning coloration of varying red, orange, yellow and black), and are medium-sized (7 to 30 mm) insects. Zrzavyâ and Nedveïd (1999) discuss the evolution of aposematic mimicry in the New World genus *Dysdercus*.

Unlike Largids, the lateral margins of the pyrrhocorid pronotum are reflexed slightly upwards, and their rostrum is relatively long, extending well onto their abdomen (Henry, 1988). There are at least 30 genera in this family, but only *Dysdercus* Guérin-Méneville is found in the Americas, with nearly 40 species found in the Neotropics. *Dysdercus* spp. commonly feed on the Malvales, often occurring in great conspicuous aggregations near their host plants (Schaefer, 2015). Many species are considered serious pests of cotton and other crops. In cotton, *Dysdercus* spp. attacks may cause reductions in cotton boll size or may induce boll abortion. Commonly, heavy attacks produce unsightly blemishes on the lint, primarily as the result of their puncturing the seeds in developing bolls, causing juices to exude and leave an indelible stain that reduces the value of the cotton. Three species are known from Puerto Rico.

Key to the Pyrrhocoridae of Puerto Rico (Adapted from Barber, 1939)

1. Outer border of clavus and posterior margin of corium bordered with a thin white line (resembling an “x” or white cruciform marking) .... *Dysdercus andreae*.

— Inner borders of hemelytra not bordered with white .... 2.

2 (1). Hemelytra brown (fuscous) with outer border pale yellow..... .... *D. suturellus*.

— Hemelytra bright red with clavus and corium concolorous .... *D. sanguinarius*.

Dysdercus Boisduval

Dysdercus andreae (Linnaeus, 1758: 448) [Plate III, Fig. 9; Plate V, Fig. 23-24]

Cimex andreae Linnaeus
Dysdercus (Dysdercus) andreae
Dysdercus andreae Ballou

Type Locality. Jamaica

Antillean and Caribbean Distribution. Antigua, Bahamas (Long Island, New Providence, South Bimini), Cuba, Culebra, Grand Cayman, Dominica, Guadeloupe, Hispaniola, Jamaica, Mona Island, Montserrat, Nevis, Peter Is., Puerto Rico, Saba, St. Barthelémy, St. Eustatius, St. John, St. Kitts, St. Maarten, St. Thomas, Tortola, Trinidad, Florida (USA).

Host Plant Records. Martorell (1976) lists the following host plants: *Abutilon hirtum* (Lam.) Sweet (Malvaceae) [Florida Keys indian mallow, buenos días], *Gossypium barbadense* L. var. 'Sea Island' (Malvaceae) [Sea Island cotton, algodón], *Sida* spp. (Malvaceae) [fanpetals, escoba], *Thespesia grandiflora* D.C. [Maga], *Tephesia populnea* (L.) Sol. ex Corrê (Malvaceae) [portia tree, emajaguilla], and *Ceiba pentandra* (L.) Gaertn. (Bombacaceae) [white silk cotton tree, ceiba].

Remarks. This species was first reported in Puerto Rico by O.W Barrett in 1905 (Wolcott, 1948) and later listed by Barber (1923). The common name for this species is "St. Andrew's cotton stainer". The species is easily told from congeners occurring in Puerto Rico by a most striking feature of a diagonal white "Saint Andrew's cross" on the hemelytra. Fife (1939) listed this species as a serious pest of cotton in Puerto Rico. According to Fife, *D. andreae* tends to be more numerous in the arid areas of the south coast of Puerto Rico, where it is often found feeding year-round on *Thespesia populnea,* usually in large aggregations. Fife also mentions that this species, together with *D. neglectus* (= *sanguinarius* Stål), were called "*La Unión*" in Puerto Rico as they are frequently found in copulation.

Material Examined. **CULEBRA ISLAND**. Nov. 31, 1986. E. Colón (♀); **MONA ISLAND**. 18º06.25N 67º56.40W. Sept. 6, 2013. A. Segarra-Carmona and Collazo (♂); **ST. CROIX ISLAND**. Sept. 3, 1988. M.V. Gomez, (♂); **PUERTO RICO**. *Cabo Rojo*: Aug. 22, 2013. J. Pérez. (♀); Boquerón. 18º00.16N 67º10.96W. Apr. 28, 2012. A. Segarra-Carmona. *Ex*. UV Light. (2♀); Joyuda. Oct. 16, 1987. R. Inglés. (2♀); Nov. 1991. G. Mejía. (3♀ 2♂); Nov. 18, 1991. V. González. (2♀ 2♂); *Guánica*: Santa Rita. Acc. No. 406-14. May 27, 1914. E. G. Smyth. (3♀ 3♂); Dec. 10, 1988. A. Rivera. (♀); Sept. 13, 1997. A. Correa. (♀); *Guayanilla*: Bo. Playa. Nov. 11, 1978. F. Gallardo-Covas. (2♀); Nov. 28, 1979. F. Gallardo-Covas. (6♀ 4♂); *Isabela*: Acc. No. 208-1921. Aug. 1, 1921. G.N. Wolcott. (♂); Experiment Station. Feb. 15, 1979. J.B. Mendoza. *Ex.* Cotton. (♀ ♂); *Mayagüez*:

Finca Alzamora RUM. Apr. 1, 1979. P.V. Ronda. *Ex.* Cotton. (♀ ♂); RUM. 8 Oct. 1995. L. M. Ramírez. (3♀ 2♂); Mar. 24, 2013. S. Muñiz. (♀); *Rincón*: Apr. 29, 2013. D. Martell. (♂); *Sabana Grande*: Oct. 30, 1982. M. Figueroa. (♂); *Salinas*: Aguirre. Acc. No. 50-1924. May 12, 1924. G.N. Wolcott. (♂) *San Germán*: Acc. No. 21-1923. Jan. 9, 1923. G.N. Wolcott. (2♀); Nov. 18, 1999. R. Tamayo. (♀); *Utuado*: 18º28.61.18N 66º79.32.20W. Dec. 20, 2012. N. Valentín. (♀); *Villalba*: Oct. 23, 1999. E. Martínez. (♀).

Dysdercus neglectus van Doesburg (1968: 52) [Plate III, Fig. 10]
Dysdercus jamaicensis Walker (Barber, 1923)
Dysdercus sanguinarius Stål (in Barber, 1939; Wolcott, 1948)
Dysdercus neglectus Uhler (nomen nudum. Wolcott, 1936)
Dysdercus (Dysdercus) *sanguinarius neglectus* van Doesburg
Dysdercus neglectus (elevated to species by Zrzavý and Nedvĕd, 1997).

Type Locality. Puerto Rico.

Antillean and Caribbean Distribution. Mona Island. (**NEW RECORD**), Puerto Rico.

Host Plant Record. Gossypium barbadense L. var 'Sea Island' (Malvaceae), *Thespesia grandiflora* DC., *T. populnea* (L.) Sol. ex Corrê (Malvaceae); *Sterculia apetala* (Jacq.) Karst. (Sterculiaceae).

Remarks. This is the largest member of *Dysdercus* in Puerto Rico (10 to 13 mm) and lacks the white "x" markings found in *D. andreae*. This also appears to be the most abundant species found in Puerto Rico, and according to Fife (1939), it seems to be more common in the moister northern coastal plains and can be found regularly feeding on *Thespesia grandiflora.* This species is attracted to lights, where it is often collected.

Material Examined. **MONA ISLAND**. Uvero Beach. Dec. 20, 1988. A. Segarra-Carmona and A. Pantoja (♂); **PUERTO RICO.** *Adjuntas*: 18º10.22N 66º47.72W. May 18, 2012. A. Segarra-Carmona and H. Pérez. *Ex.* Mg Vap /Blk light (4♀). Casa Pueblo. Apr. 13, 2014. F. Barreto. (♀); *Aguada*: Cerro Gordo. Aug. 19, 1987. R. Inglés. (♀); 18º20.96N 67º13.09W. Dec. 15, 2011. N. Valentín. *Ex.* UV light (♀); *Aguadilla*: Sept. 29, 2013. C. Santiago. (♀); *Barceloneta*: 18º27.04N 66º32.44W. Jan. 6, 2012. I. Rivera. (♂); *Barranquitas*: Apr. 14, 1979. M. Colón. (♂); *Cabo Rojo*: Boquerón. 18º2.64N 67º10.96W. Jan. 22, 2012. A. Segarra-Carmona. *Ex.* UV Light. (♀); Boquerón. 18º00.16N

67º10.96W. Apr. 28, 2012. A. Segarra-Carmona. *Ex*. UV Light. (2♀); *Corozal*: Agricultural Experiment Station (AES): Sept. 1, 1976. *Ex*. Light trap. (♂); Isabela: Acc. No 71-48. (♀ ♂); *Las Marías*: Apr. 5, 2013. D. Martell. (♀); *Mayagüez*: Rosario. Aug. 1991. G. Mejía. (♂); *San Germán*: Acc. No. 169-1923. May 22, 1923. G.N. Wolcott. (♀); *San Juan*: Río Piedras. May 17, 1965. J. García. *Ex.* Maga. (7♀ 8♂); *Trujillo Alto*: St. Just. Acc. No. 55-59. July 26, 1959. G. Rivera. (5♀ 9♂); *Vega Baja*: 27 Feb. 27, 1988. A. F. (2♀); *Yauco*: June 4, 1997. E. Correa. (♂); Sept. 19, 1997. E. Correa. (♀ ♂); Feb. 23, 2013. L. Torres. (♀).

Dysdercus suturellus (Herrich-Schaeffer, 1842: 76) [Plate III, Fig. 11]
Pyrrhocoris suturellus Herrich-Schaeffer
Dysdercus suturellus Herrich-Schaeffer
Dysdercus suturellus Stål (Barber, 1939)

Type Locality. North America.

Antillean and Caribbean Distribution. Bahamas, (Andros Is., Long Island, New Providence), Jamaica, Puerto Rico, Florida (USA).

Host Plant Record. According to van Doesburg (1968) this species has been reported as a pest of *Gossypium barbadense* L. (Malvaceae) in the USA and Jamaica, feeding on various other plants such as: *Carica papaya* L. (Caricaecae) [paw paw, papaya]; *Urena* (Malvaceae)*; Citrus sinensis* (L.) Osbeck (Rutaceae); and *Hibiscus* and *Solanum* (Solanaceae).

Remarks. The first report of the "cotton stainer" in Puerto Rico was published by Ballou (1906), who also reported it from Bahamas and Cuba. Barber (1939) wrote that he had not seen this species in Puerto Rico, and Wolcott (1936, 1948) thought that the original report had been a misidentification of *D. andreae* by O.W. Barrett (1905). This species, which does occur in Puerto Rico is easily distinguished from other species on the island by its brown hemelytron, with a pale-yellow outer border and a transverse medial yellow band on the pronotum. However, specimens, rarely collected, are based on recent collections available at MEBT (see below). It is considered a minor pest of cotton, especially in Southeast United States.

Material Examined. **PUERTO RICO.** *Aibonito*: Oct. 24, 1987. J. Rivera. (♀); Sec. Sierra. Oct. 11, 1991. V. González. (♀ 2♂); *Aguadilla*: Apr. 10, 1982. M. Pellot. (♀); *Corozal*: AES Oct. 3, 1976. *Ex.* Black light (♀); AES Sept. 7, 1976. (♀).

Superfamily COREOIDEA

Various authors (i.e., Schaefer, 1964; Schuh and Slater, 1995; Henry, 1997) recognize five families within the Coreoidea: Hyocephalidae, Stenocephalidae, Alydidae, Coreidae, Rhopalidae, with the latter three families present in Puerto Rico. Hyocephalids are only known from Australia, and stenocephalids are known from Africa and the Galapagos (Schuh and Slater, 1995). The superfamily is treated as monophyletic by several authors, with the Alydidae as a sister group of the Coreidae, and Rhopalidae sister to Coreidae (Henry, 1997; Hua et al., 2008). Conversely, Li et al. (2006) argues that the lack of morphological synapomorphies suggests that this group may be of polyphyletic origin. All members of this superfamily have ocelli, and their antennae are always four-segmented. Their hemelytral membrane has eight or more anastomosing veins, often in combination with closed cells, and species are rarely aposematically colored. All members have ventral, mid-lateral and lateral abdominal trichobothria, and their scutellum relatively small and not extending to apex of clavus.

Family ALYDIDAE Amyot and Serville

The broad-headed bugs

Broad-headed bugs are small to medium-sized insects (8 to 20 mm), elongate (noticeably longer that wide), with many species having disproportionally large heads. According to Panizzi and Schaefer (2015), their taxonomy has suffered several revisions since its original designation by Amyot and Serville (1843: 221), sometimes as a subfamily within Coreidae. Currently the Alydidae are accepted as a family within Coreoidea (Schaefer, 1964). Two subfamilies are currently recognized: the Alydinae, with spiny femora (tribes Alydini and Daclerini); and the Micrelytrinae with no spine in femora (tribes Leptocorisini and Micrelytrini).

The family contains 53 genera and approximately 250 species. Most members are tropical or subtropical. Twenty-one genera are known to occur in the Neotropics. Five genera, of the same number of species, are represented in Puerto Rico. Most members of the Alydidae are not considered pests, but their biology, ecology and host plants are still largely unknown (Panizzi and Schaefer, 2015). Only a few species are known to be occasional pests, with some Alydinae preferring leguminous plants, and some Micrelytrinae preferring grasses.

Key to the Alydidae of Puerto Rico (Adapted from Barber, 1939)

(1). Hind femur bearing spines; sternum V trichobothria arranged in a row (Alydinae) . . . . 2.

— Hind femur without spines; sternum V trichobothria arranged in a triangle posterior to spiracle (Micrelytrinae). . . . . 4.

2 (1). Hind tibia curved, with apical spine . . . . *Hyalymenus longispinus.*

— Hind tibia straight, without apical spine . . . . 3.

3 (2). Pronotum wider than long; stridulitrum present on anterior edge of corium; humerus without spine. . . . . *Burtinus luteomarginatus.*

— Pronotum longer than wide; stridulitrum absent on anterior edge of corium; humerus with spine. . . . . *Neomegalotomus rufipes.*

4 (1). Juga shorter than tylus, not meeting; pronotum convex sloping towards head . . . .*Lyrnessus geniculatus.*

— Juga meeting anterior to tylus; pronotum flat . . . . *Stenocoris filiformis.*

Subfamily Alydinae Amyot and Serville

Members of this subfamily have spine-bearing hind femurs and V sternum trichobothria arranged in a straight row. This subfamily contains individuals in all major zoogeographic zones. According to Panizzi and Schaefer (2015), the Alydinae prefer legumes, and some species are considered pests on leguminous crops. The subfamily also contains myrmecomorphic (i.e., ant-like) species, while other species appear to mimic wasps.

Burtinus Stål

Burtinus luteomarginatus Maldonado-Capriles (1953: 42) [Plate III, Fig. 12]

Burtinus luteomarginatus Maldonado-Capriles

Type Locality. Ponce, Puerto Rico

Antillean and Caribbean Distribution. Guana Is. (BWI), Puerto Rico, St. Kitts.

Host Plant Record. Unknown

Remarks. This species was described by Maldonado-Capriles (1953) from a male holotype collected at light in Ponce, PR, August 15, 1946, and deposited at the NMNH (Type no. 61564). According to Schaefer and Ahmad (2007), *Burtinus* closely resembles *Neomegalotomus*. However, *Burtinus* has stridulitrum in the creamy-colored costal margin of corium which *Neomegalotomus* lacks. In addition, *Burtinus* lacks the posterolateral spine of the pronotum (although this corner may be sharp); and the lateral margins of the anterior of the corium are straight in *Burtinus* but slightly concave in *Neomegalotomus.* Three specimens are found at MEBT, all collected in Guánica at light. Nothing is known of the biology of these insects. Maes and Göllner-Scheiding (1993) list *Cajanus cajan* (L.) Millsp. (Fabaceae) [pigeon pea, gandul], *Citrus* (Rutaceae), and *Coffea* (Rubiaceae) as host plants of *B. notatipennis* Stål, a Central American congener. According to Schaefer and Ahmad (2007), other members of the Alydinae prefer Leguminosae; it may appear likely that *Burtinus* species do likewise. Collection records of MEBT suggest a preference for the xerophytic habitats of Puerto Rico's southern coast.

Material Examined. **PUERTO RICO**. *Cabo Rojo*. Oct. 3, 2015. A. Lugo (♂); Nov. 16, 2015. C.E. Reyes. (♀); *Guánica*: 17°57.34N 66°51.71W. Sept. 15, 2014. *Ex*. UV and MgVap. A. Segarra-Carmona. (♀ ♂); Bosque Seco. Nov. 19, 1987. R. Inglés. (♂).

Hyalymenus Amyot and Serville

Hyalymenus longispinus Stål (1870: 213) [Plate III, Fig. 13]
Hyalymenus longispinus Stål

Type Locality. Cuba

Antillean and Caribbean Distribution. Bahamas, Cuba, Jamaica, Mona Island, Puerto Rico, St. Vincent, Florida (USA).

Host Plant Record. Elliot (1987) found this species associated with *Croton cascarilla* (L.) L. (= *linearis* Jacq.) [granny bush, romero decosta], and *Corchorus hirsutus* L. (Euphorbiaceae) [Jackswith, cadillo] in the Bahamas.

Remarks. This species was first reported from a single specimen collected on Mona Island, February 24, 1914 by F. Lutz (Barber, 1939). Little is known about the biology of this large (14 mm) and robust species. Jansen and Halbert (2016) have suggested a problematic and confusing taxonomy for this genus, suggesting the need for its revision.

Material Examined. **PUERTO RICO**. *Morovis*: Mar. 18, 1988. “M.O.” (no abdomen); One specimen no label info (♀).

Neomegalotomus Schaffner and Schaefer

Neomegalotomus rufipes (Westwood 1842: 19) [Plate III, Fig. 14; Plate V, Fig. 26]

Alydus rufipes Westwood
Alydus pallescens Stål (Gundlach, 1893)
Megalotomus rufipes Barber (1923)
Neomegalotomus rufipes Schaefer and Ahmad (2008)

Type Locality. “America Aequinox”.

Antillean and Caribbean Distribution. Antigua, Bahamas, Cuba, Grand Cayman, Grenada, Guadeloupe, Hispaniola, Jamaica, Martinique, Puerto Rico, St. Lucia, St. Martin; Florida (USA).

Host Plant Record. Leguminous crops. Wolcott (1936) records its abundance on: *Crotalaria* spp. (Fabaceae) in Mayagüez and Dorado, and also collected from *Vigna unguiculata* (L.) Walp. [blackeyed pea, frijol], and *Cajanus cajan* (L.) Millsp. (Fabaceae) [pigeon pea, gandul].

Remarks. This species was probably first recorded by Gundlach (1893) as *Alydus pallescens* Stål. Today, *A. pallescens* is a junior synonym of *Neomegalotomus parvus* (Westwood), a native of South America (Schaefer and Ahmad, 2008). These two *Neomegalotomus* species can be told apart by the shape of their scent gland auricle and the structure of the male genital capsule (Schaefer and Ahmad, 2008). Both species appear to be variable in color with darker and lighter forms. Some MEBT specimens have a large pale-yellow area in the disc of the scutellum, located between narrow dark areas behind the collar and the posterior border. This appears consistent with Stål’s description of *A. pallescens*, later synonymized by Schaefer and Ahmad (2008) to *N. rufipes*. Also, a few specimens housed in MEBT (e.g., MEBT 013507) have scent gland auricles with less noticeable separation between anterior and posterior scent gland lobes as occurs in *N. parvus*. However, close examination of male and female genitalic character show them to be *N. rufipes*. Barber (1939) remarked that he had not seen this species from Puerto Rico, and Wolcott (1948) does not list it. This species is recognized as a potential pest of legumes.

Material Examined. **PUERTO RICO**. *Aguada*: Cerro Gordo. Nov. 8, 1987. R. Inglés. (♀); *Aguadilla*: Base Ramey. Oct. 5, 1991. V. González. (♂); El Faro. 17°56.2N 67°11.7W. Oct. 24, 2014. *Ex. Sweeping* grasses. A. Segarra-Carmona and H. Pérez. (♀); *Añasco*: Central Igualdad. Sept. 3, 1981. R. Inglés. (♂); Nov. 6, 2014. A. Rodríguez. (♀); *Carolina*: Feb. 15, 1987. M. Ríos. (♂); *Coamo*: 18°02.3N 66°2.5W. Oct. 7, 2014. *Ex. Sweeping* grasses. A. Segarra-Carmona. (2♀); *Guánica*: Oct. 11, 1978. F. Gallardo-Covas. (♀); Guánica Forest. 17°57.34N 66°51.71W. Sept. 15, 2014. *Ex.* UV and MgVap. A. Segarra-Carmona. (♀); *Guayanilla*: Mogote. Rd #2. Sept. 25, 1987. R. Inglés. Bo. Jagua. Sept. 8, 1979. F. Gallardo-Covas. Oct. 6, 1979. F. Gallardo-Covas. Sept. 27, 1981. R. Inglés. (♀); *Guaynabo*: Nov. 29, 1988. W. Vargas. (♀); *Isabela*: Feb. 11, 1987. *Ex.* Weeds. Mar. 31, 1987. V. González. (♀); May 1987. R. González. (♀); Río Guajataca. Nov. 8, 1987. R. Inglés and Méndez. (♂); AES. Aug. 30, 1991. V. González. (♀ ♂); *Lajas*: Sept. 18, 1997. E. Correa. (♀); 18°01'49N 67°04'28W. May 31, 2006. A. Segarra-Carmona. (♀ ♂); Cartagena Lagoon. 18°00.61N 67°06.54W. Aug. 27, 2014. *Ex.* Mg Vap Lamp. Segarra-Carmona, A. (♂); Nov. 10, 2014. K. Martínez. (♂); *Loíza*: Acc. No. 2-1924. Jan. 20, 1924. F. Seín. (2♀); *Mayagüez*: Apr. 1, 1982. W. R. V. (♀); Finca Alzamora, RUM. Nov. 9, 1987. R. Inglés. (♀); Finca Alzamora, RUM. Nov. 11, 2014. M. Planell. (♀); *Ponce*: Sept. 9, 1978. J. Dalmau. (♀); Aug. 17, 2014. L. Rodríguez. *San Juan*: Río Piedras. Nov. 7, 1997. C. Fernández. (♂); *Vega Alta*: July 25, 2003. A. Delgado. (♂); *Vega Baja*: Acc. No. 769-1914. Bo. Algarrobo. July 26, 1914. T. H. Jones. (♂); *Yauco*: Feb. 3, 1996. E. Correa. (♀).

Subfamily Micrelytrinae Stål

Members of this subfamily are characterized by their spineless hind femur; labial segment II usually distinctly longer than III + IV; short bucculae which does not extend beyond antennal insertion; and by trichobothria in V sternum arranged in a triangle. Some species, especially nymphs, resemble ants (i.e., myrmecomorphic) while others are moderately slender (Schuh and Slater, 1995). Many species occur in association with Leguminosae (*senso lato*), or Poaceae as host plants (Schaefer and Mitchell, 1983).

Lyrnessus Stål

Lyrnessus geniculatus (Guérin-Méneville, 1857: 392) [Plate III, Fig. 15]
Leptocorisa geniculata Guérin-Méneville, in Sagra (1857)

Lyrnessus geniculatus Stål

Type Locality. Cuba

Antillean and Caribbean Distribution. Cuba, Puerto Rico; Mexico, Panama.

Host Plant Record. Unknown.

Remarks. Barber (1939) lists this species because it is mentioned in Agustin Stahl's "Catálogo del Gabinete Zoológico" but remarked that he had not seen this species from Puerto Rico. Wolcott (1948) did not list it. This is the smallest member of this family in Puerto Rico (6.5 mm), and perhaps the rarest. Only one recently collected specimen is found at MEBT and determined by the senior author as belonging to this species.

Material Examined. **PUERTO RICO**. *Mayagüez*: Sept. 11, 2014. R.A. Brau. (♂).

Stenocoris Burmeister

Stenocoris filiformis (Fabricius 1775: 727) [Plate III, Fig. 16]
Cimex filiformis Fabricius
Leptocorisa filiformis Gundlach
Stenocoris filiformis Brailovsky and Zurbia (1979)

Type Locality. America

Antillean and Caribbean Distribution. Cuba, Dominica, Grenada, Hispaniola, Jamaica,

Mona Island, Puerto Rico, St. Vincent; Florida (USA).

Host Plant Record. Oryza sativa L. (Poaceae) [rice, arroz]

Remarks. Reported in Puerto Rico by Gundlach (1893) and later listed by Barber (1923) as *Leptocorisa filiformis* (F.). Ramos (1946) lists this species as from Mona Island. This common pale brown species is the largest member of the family in Puerto Rico (12 to 16 mm). Some specimens have a greenish tint in their prothorax, while others have reddish or dark brown abdominal tergites. Martorell (1976) lists this species on *Gossypium barbadense* L. var. Sea Island (Malvaceae) [cotton, algodón], and on *Saccharum officinarum* L. (Poaceae) [sugar cane, caña de azúcar]. The species is mentioned by Panizzi et al. (2000) and is associated with rice production in other countries, but it is likely of no economic importance. The MEBT collection contains several specimens collected from rice fields, confirming this host plant association.

Material Examined. **MONA ISLAND**. Airport. 18°03.7N 67°54.21W. Sept. 6, 2013. *Ex*. UV Light. A. Segarra-Carmona. (♀); Sardinera Beach. Dec. 18, 1988. A. Segarra-Carmona and Pantoja. (♂). **PUERTO RICO**. *Aguada*: Cerro Gordo. Oct. 13, 1987. R. Inglés. *Añasco*: Oct. 1997. W.C. Torres. (♀ ♂); *Arecibo*: Acc. No. 42-83. Sept. 30, 1983. S. Medina-Gaud. (♀); Acc. No. 29-86. Cambalache. Finca de Arroz. Feb. 10, 1986. *Ex*. Rice panicle. S. Medina-Gaud and A. Pantoja. (2♂); *Cabo Rojo*: Boquerón. 18°00.16N 67°10.96W. Oct. 5-6, 2011. *Ex*. Blacklight. A. Segarra-Carmona. (♂); Boquerón. 18°00.16N 67°10.96W. Oct. 6, 2011. *Ex*. Blacklight. A. Segarra-Carmona. (♂); Combate. 17°58.3N 67°12.7W. Oct. 24, 2014. *Ex. Sweeping* grasses. A. Segarra-Carmona and H. Pérez. (2♀ 2♂); *Coamo*: 18°02.3N 66°22.5W. Oct. 7, 2014. *Ex. Sweeping* grasses. A. Segarra-Carmona. (♀); *Corozal*: Oct. 20, 1976. B. L. T. (♀); *Guayanilla*: Oct. 4, 1979. F. Gallardo-Covas. *Lajas*: Acc. No. 191-86. Rice farm. May 19, 1986. S. Medina-Gaud and Pantoja. (♀ 2♂); Acc. No. 338-86. July 8, 1986. *Ex*. Rice plant. S. Medina-Gaud, A. Pantoja and R.A. Franqui. (3♂); Cartagena Lagoon. Sept. 14, 1991. V. González. (♂); 18°01'40"N 67°04'28"W. June 8, 2006. *Ex. Sweeping*. A. Segarra-Carmona. (♀); *Manatí*: Acc. No. 44-53. Aug. 15, 1953. (♀); Acc. No. 139-86. Apr. 2, 1986. A. Pantoja and S. Medina-Gaud. (2♂); *Mayagüez*: Bo. Las Mesas. Mar. 20, 1982. O. Rivera. (♂); Sept. 2, 2003. A. Delgado. (2♀); Finca Alzamora, RUM. Nov. 9, 1987. R. Inglés; *Morovis*: Apr. 2, 1988. R. F. (♀); *San Juan*: Puerto Nuevo. Mar. 6, 1988. S. Medina-Gaud. (♂); *San Sebastián*: Bo. Cidral. Nov. 26, 1978. C. Feliciano. (♀); *Santa Isabel*: Central Cortada. June 2, 1995. *Ex. Poinsettia heterophylla*. R. Inglés. (♀); *Vega Baja*: Acc. No. 205-86. May 19, 1986. *Ex*. Rice plant. A. Pantoja and S. Medina-Gaud. (2♀); Acc. No. 526-86. Aug. 21, 1986. *Ex*. Light trap. A. Pantoja. (♂). Acc. No. 86-83. Oct. 19, 1983. *Ex*. Rice. Toledo.

Family RHOPALIDAE

The scentless plant bugs

The "scentless plant bugs" are a small family of herbivorous Heteroptera numbering approximately 200 species in 21 genera (Fowles et al., 2015). A rhopalid, *Corizus tetraspilus* Hovarth, was used by Yuan et al. (2015) to support the monophyly of each superfamily within Pentatomomorpha (i.e., Aradoidea + (Pentatomoidea + (Lygaeoidea + (Pyrrhocoroidea + Coreoidea) by using a phylogenetic analysis of its mitochondrial genome.

The Rhopalidae contains two subfamilies: the Serinethinae, with three genera; and the Rhopalinae, with six tribes and 17 genera. Schaefer (1993) argues that, given its present distribution and its phylogenetic history, the Rhopalinae likely arose in the Palearctic. Among the six rhopaline tribes, the Corizomorphini is exclusively Paleartic, the Harmostini is wholly New World, and representatives of the four remaining tribes (i.e., Maccevethini, Niesthreini, Chorosomatini, and Rhopalini) occur both in the Old and the New Worlds. Species of the latter three tribes, together with the Harmostini, occur in Puerto Rico. Rhopalids in general prefer host plants belonging to clades Asterids and Rosids (Schaefer and Chopra, 1982).

Key to the Rhopalidae of Puerto Rico
(Adapted from Barber, 1939)

1. Lateral pronotal margin of pronotum with a distinct notch delimiting collar posteriorly (Serinethinae) . . . . 2.

— Lateral margin of pronotum without a distinct notch delimiting collar (Rhopalinae) . . . . 3.

2 (1). Body with more or less extensive spotting; orange to reddish-brown; scutellum reddish; membrane pale brown . . . . *Jadera sanguinolenta*.

— Body dark; lateral portion of pronotum, connexival, eyes bright red; scutellum black; membrane black (Mona Island) . . . . *Jadera haematoloma*.

3 (1). Metafemur with strong ventral spines, thicker than other femora . . . . 4.

— Metafemur without ventral spines, not thicker than other femora . . . . 6.

4 (3). Anterolateral angle of pronotum not produced anteriorly; tylus bluntly rounded . . . .*Xenogenus picturatum*.

— Anterolateral angle of pronotum strongly produced anteriorly as acute tooth; tylus commonly acutely projected beyond juga (Harmostini) . . . . 5.

5 (4). Tylus long and acute, much longer than jugum, almost reaching apex of first antennal segment . . . . *Harmostes serratus*.

— Tylus shorter; barely longer that jugum; scarcely reaching half-length of first antennal segment . . . . *Harmostes dorsalis*.

6 (3). Pronotum with sharp transverse suture defining anterior collar; surface between collar and calli elevated, calloused, impunctate . . . . *Liorhyssus hyalinus*.

— Pronotum without a delimited anterior collar; surface between collar and calli distinctly punctate, not elevated or calloused . . . . *Niesthrea sidae*.

Subfamily Rhopalinae Amyot and Serville

Tribe Chorosomatini Fieber

Xenogenus Berg

Xenogenus picturatum Berg (1883: 253)
Xenogenus extensum Distant (See Barber 1923; 1939)
Xenogenus picturatum Göllner-Scheiding

Type Locality. Argentina and Uruguay.

Antillean and Caribbean Distribution. Cuba, Dominica, Puerto Rico, St. Vincent; also, North America, Central America and South America.

Host Plant Record. Unknown.

Remarks. This species is reported from Puerto Rico by Barber (1923) from a single collection in San Juan in August 1914. Maldonado-Capriles and Navarro (1967) also report a specimen in the former author's collection (no collection information). Also rare in Cuba (Grillo, 2012).

Material Examined. No specimens were found in the MEBT, JAR or INV-COL collections.

Tribe Harmostini Stål

Harmostes Burmeister

Harmostes dorsalis Burmeister (1835: 307) [Plate IV, Fig. 17]
Harmostes dorsalis Burmeister
Harmostes subrufus Distant syn.
Harmostes affinis Dallas (probably in error, Barber 1939) Stål

Type Locality. Brazil and Mexico.

Antillean and Caribbean Distribution. Cuba, Hispaniola, Jamaica, Puerto Rico, Trinidad; USA, Argentina, Bolivia, Brazil, Colombia, Paraguay, Uruguay, Venezuela.

Host Plant Record. There are no host plant records for Puerto Rico. Brailovsky and Soria (1980) report collections on *Palafoxia rosea* (Bush) Cory (Asteraceae) [pink Palafoxia], and on *Digitaria* Haller (Poaceae) [crabgrass].

Remarks. This rhopalid was probably first recorded by Barber (1939) as *Harmostes affinis* Dallas, today a junior synonym of *H. serratus* (F.). However, in Barber's narrative of the only specimen referred to in that publication (collected by Harold Box in Aguirre; April 1, 1925), he describes it as having "*…the tylus not so strongly projected anteriorly*", and as "*…having a finely serrated margin of pronotum*", which hints at a clear reference to *H. dorsalis* instead. The presence of this species in Puerto Rico was later confirmed by Brailovsky and Soria (1980: 134). All MEBT specimens examined key out to *H. dorsalis* using these authors' keys to the Mexican *Harmostes*. Little is known about the biology of these insects. Schaefer and Mitchell (1983) remark that North American congener *Harmostes reflexulus* (Say) feeds on green ovules of buds, on flowers or on mature seeds of *Senecio smallii* (Asteraceae) [ragwort], and that other *Harmostes* spp. also seem to prefer Asteraceae.

Material Examined **PUERTO RICO.** *Isabela*: May 1987. R. González. *Ex. Citrus sinensis*. (♀); Nov. 18, 1929. (♀ JAR); May 2, 1939. S.T. Danforth. (♂ JAR); Apr. 10, 1942. J.A. Ramos. (♂ JAR); *Mayagüez*: Nov. 3, 1946. I. Roure. (♀JAR); Finca Alzamora RUM. 18°13.1N 67°08.9W. Oct. 1, 2014. A. Segarra-Carmona. *Ex. Sweeping* weeds. (4♂).

Harmostes serratus (Fabricius, 1775: 695) [Plate IV, Fig. 18]
Acanthia serratus Fabricius
Harmostes serratus Stål
Harmostes affinis Dallas syn.

Type Locality. Unknown.

Antillean and Caribbean Distribution. Cuba, Grenada, Guadeloupe, Hispaniola, Jamaica, Puerto Rico, Saba, St. Eustatius, St. Lucia.

Host Plant Record. Only recorded from *Dahlia* sp. (Asteraceae) by Wolcott (1948).

Remarks. This species was first listed from Puerto Rico by Barber (1923) and collected as early as 1899 by Busck in Bayamón. The species is easily recognized from *H. dorsalis* by its long and acute tylus, much longer than the jugum, and almost reaching the apex of first antennal segment. As with the preceding species, almost nothing is known about its biology. Wolcott's record of a collection on *Dahlia* sp. (Asteraceae) suggests that *H. serratus* may also be oligophagous on Asteraceae as in other congeners.

Material Examined. **GUADELOUPE.** Dolé. July 19, 1937. S.T. Danforth. (JAR). **HAITI.** Kenskoff. June 20, 1938 (JAR). **PUERTO RICO.** *Arecibo*: Mar. 20, 1935. R. Cintrón. (♂ JAR); *Isabela*: Jan. 3, 1941. J. Saavedra. (♂ JAR); Dec. 25, 1985. Rosario. (♀ JAR). Nov. 8, 1987. R. Inglés. (♂); *Isla Verde*: Feb. 14, 1987. I. Rodríguez. (♂); *Jayuya*: 18°9.538N 66°36.850W. Jan. 6, 2015. A. Segarra-Carmona. *Ex. Sweeping*. (♂); *Maricao*: Aug. 31, 1946. J.A. Ramos. (♂ JAR); *Utuado*: Sept. 20, 1947. J.A. Ramos. (♂ JAR); **SABA.** Jan. 1937. S.T. Danforth. (JAR); **ST. EUSTATIUS.** Feb. 4, 1937. S.T. Danforth. (JAR). **ST. MARTIN.** North of Marigot. Dec. 22-27, 1936. S.T. Danforth. (JAR).

Tribe Rhopalini Amyot and Serville

Liorhyssus Stål

Liorhyssus hyalinus (Fabricius, 1794: 168) [Plate IV, Fig. 19]
Lygaeus hyalinus Fabricius
Corizus hyalinus Uhler (see Barber 1923; 1939).
Liorhyssus hyalinus Stål

Type Locality. "America Insulis".

Antillean and Caribbean Distribution. Antigua, Bermuda, Cuba, Caja de Muertos Island, Grenada, Hispaniola, Jamaica, Mona Island, Vieques, Puerto Rico; also, Argentina, Bolivia, Brazil, Chile Colombia, Galápagos Islands, Guatemala, Nicaragua, Paraguay, Venezuela. This is a cosmopolitan species, probably native to Asia.

Host Plant Record. Barber (1939) and later Wolcott (1948), wrote about the ubiquitous presence of this insect in association with Solanaceous plants, such as *Solanum lycopersicum* L. [tomato, tomate], and *Solanum melongena* L. [eggplant, berenjena] in Puerto Rico. Also, Grillo (2012) reports this species on *Solanum ptychantum* Dunal (Solanaceae) [West Indian nightshade, yerba mora] and on *Euphorbia hyssopifolia* L. (Euphorbiaceae) [spurge, lechera]. Schaefer and Chopra (1982) list records of this species feeding on: *Abutilon* (Malvaceae); *Lactuca*, *Sonchus* (Asteraceae); and *Euphorbia* (Euphorbiaceae).

Remarks. The “hyaline grass bug” was first reported in Puerto Rico by Barber (1923). Barber (1939) reports it on Mona Island from specimens collected in 1914 by Lutz; and from Vieques in a collection by Busck in 1899. This is a common species which can be told from other members of Rhopalinae occurring in Puerto Rico by the absence of ventral spines in the metafemur, and for having a sharp transverse suture defining the anterior collar in the pronotum. Schaefer and Kotulski (2000) report this species as a pest of sorghum and pistachio in the USA, and as commonly found on cotton in Egypt, and on tobacco in Afghanistan.

Material Examined. **CAJA DE MUERTOS ISLAND.** Acc. No. 126-47. Dec. 11, 1947. (2♀); **MONA ISLAND.** Aug. 11-31, 1944. H. A. Beatty (2♀, 1♂); **PUERTO RICO.** *Cabo Rojo*: Combate. Oct. 24, 1987. R. Inglés. (♀); *Carolina*: Sept. 30, 1988. A. Rivera. (♂); *Coamo*: Baños. 18°20.3N 66°22.5W. Oct. 7, 2014. A. Segarra-Carmona. *Ex. Sweeping*. (3♀, 3♂); *Ciales*: 18°10.N 66°32. W. June 16, 1965. (♀); *Juana Díaz*: Acc. No. 63-74. May 24, 1974. R. Pérez. *Ex.* Lettuce inflorescence. (♀); *Lajas*: Aug. 1991. G. Mejía. (2♀); 18°01.49N 67°04.28W. May 30, 2006. A. Segarra-Carmona. *Ex. Sweeping*. (♀, ♂); 18°01.49N 67°04.28W. May 31, 2006. A. Segarra-Carmona. *Ex. Sweeping*. (5♀, 4♂); *Mayagüez*: Nov. 12, 1987. R. Inglés. (♂); Nov. 2, 2010. E. Vélez. (♂); Nov. 3, 2010. E. Vélez. (♀); *Río Piedras*: 18°20N 66°3W. Jan. 20, 1965. S. Medina-Gaud. (♀); *San Germán*: Nov. 18, 1999. R. Tamayo. (♂); *Santa Isabel*: Nov. 16, 1997. E. Correa. (4♀).

Niesthrea Spinola

Niesthrea sidae (Fabricius, 1794: 169) [Plate IV, Fig. 20]

Cimex sidae Fabricius
Coreus sidae Fabricius
Niesthrea sidae Spinola (1837: 245)
Corizus sidae Signoret (also see Gundlach, 1893; Barber, 1923; Wolcott, 1936)
Corizus (*Niesthrea*) *sidae* Stål
Niestrea vincentii (Westwood) (Wolcott, 1948, see Remarks).

Type Locality. “Americae Meridionalis”.

Antillean and Caribbean Distribution. Bahamas, Cuba, Culebra, Desecheo, Dominica, Hispaniola, Grenada, Jamaica, Mona Island, Caja de Muertos Island, St. Croix, St. John, St. Thomas, St. Vincent, Vieques, Florida (USA); Mexico, Venezuela, Colombia.

Host Plant Record. This species appears to be common in malvaceus host plants. Martorell (1976) lists *Amaranthus* sp. (Amaranthaceae) [pigweed, bledo]; *Ipomoea* spp. (Convolvulaceae) [morning glory, gloria de la mañana]; *Gossypium barbadense* L., *Malachra alceifolia* Jacq. [bastard okra, malva de caballo], and *Waltheria indica* L. (Malvaceae) [leahter coat, basora prieta]. Schaefer and Chopra (1982) list *Sida* spp., *Abutilon* spp. (Malvaceae).

Remarks. This species was first reported in Puerto Rico by Gundlach (1893) using its synonym *Corizus sidae* (F.). It is a common species, recorded from almost every large island under Puerto Rican jurisdiction (i.e., Caja de Muertos, Culebra, Desecheo, Mona Island, and Vieques). According to Chopra (1973), the genus *Niesthrea* can be easily distinguished from the related genera *Arhyssus* and *Liorhyssus* occurring in the Nearctic and Neotropical regions by its large, broad and distally projecting median lobe of the male pygophore. *Niesthrea* is also distinguished from *Liorhyssus* by the absence of an anterior pronotal collar, and by having a distinctly punctate surface between the collar and the callus.

Also, every author listing this species from Puerto Rico does so as *N. sidae*, or one of its synonyms, except for Wolcott (1948) who refers only to *N. vincentii* (Westwood). It is unclear why Wolcott did so. According to Chopra (1973), *N. vincentii* and *N. sidae* are sympatric in the West Indies and can be told apart by examining the male genital capsule. According to these authors, the capsule's medioventral lobe in *N. sidae* is laterally rounded, almost as broad as it is long, and has a very strong basal constriction, while in *N. vincentii* the lobe is noticeably broader than long, and only slightly constricted at the base. In addition, claspers in *N. sidae* are slender with a subapical projection that is broad, and somewhat flattened distally, while in *N. vincentii* claspers are broader with no apical projection, and with a concave tip. Upon examination, all male specimens (n = 24) in MEBT appear to be *N. sidae,* showing a strongly constricted medioventral lobe, and most clearly show a strongly sclerotized subapical projection in their claspers. This examination included specimens cited by Wolcott (1936) (e.g., Acc. No. 672-17 collected by R.T. Cotton in 1917 from Humacao). Thus, Wolcott's record of *N. vincentii* as present in Puerto Rico is at this stage uncertain.

Material Examined. **CAJA DE MUERTOS ISLAND.** Mar. 22, 1935. R. Bonilla (1♀ 1♂); Jan. 8-9, 1969. H.S. Telford. (4♀ ♂); **MONA IS-**

LAND. AMC Expedition. Apr. 1935 (2♀); Aug. 11- 31, 1944. H.A. Beatty (♂); **PUERTO RICO.** *Añasco*: Oct. 5, 1991. V. González. (♀); *Aibonit*o: Oct. 24, 1988. F. Rivera. (♂); *Cabo Rojo*: Combate. Oct. 24, 1987. R. Inglés. (3♀ 3♂); 17°58.3N 67°12.7W. Oct. 24, 2014. A. Segarra-Carmona and H. Pérez. *Ex. Sweeping*. (2♀); US FWS. Jan. 29, 2010. A. Segarra-Carmona. *Ex. Sweeping*. (♀); 17°57.95N 67°10.74W. Dec. 24, 2014. A. Segarra-Carmona. Ex. *Sweeping*. (3♀ 2♂); *Coamo*; Acc. No. 105-83. Oct. 1983. F. Gallardo-Covas. (♀); Baños. 18°02.3N 66°22.5W. Oct. 7, 2014. A. Segarra-Carmona. *Ex. Sweeping*. (♂); *Guayanilla*: Sept. 25, 1987. R. Inglés. (2♀); Humacao: Acc. No. 672-17. June 9, 1917. R.T. Cotton. (4♀); *Isabela*: Acc. No. 85-85. July 29, 1985. N. Virkki. *Ex.* vegetation sand dunes. (2♀); *Juana Díaz*: Aug. 27, 1968. S. Medina-Gaud. *Ex*. on grass. (♀); *Lajas*: Acc. No. 7-59. Jan. 28, 1959. L.F. Martorell. *Ex. Sesbania serica.* (♀); 18°01.49N 67°04.29W. May 31, 2006. A. Segarra-Carmona. *Ex. Sweeping*. (♀); 18°00.81N 67°05.33W. Nov. 7, 2006. A. Segarra-Carmona. *Ex. Sweeping*. (♀); *Mayagüez*. Aug. 5, 2014. E. Pérez. (2♀); Sept. 9, 2014. G. Santaliz. (♀); *Río Grande*: El Yunque. Dec. 5, 1968. *Ex.* malaise trap. (♀); *Río Piedras*: Acc. No. 410-17. May 11, 1917. R.T. Cotton. (♀); 18°20N 66°31W. Urb. San Gerardo. Jan. 20, 1965. S. Medina-Gaud. (♀); *San Germán*: Acc. No. 17-1923. Jan. 9, 1923. F. Seín. (♂); *San Sebastián*: Mar. 23, 2013. M. Serrano. (♀); *Utuado*: Bo. Caguana. Nov. 1964. S. Medina Gaud. (♀ ♂); *Vega Baja*: Apr. 23, 1988. J. Quiñones. (♀); *Yauco*: Feb. 23, 2013. Y. Torres. (♀); **VIEQUES ISLAND.** Dec. 24-31, 1935. S.T. Danforth (1♀ 1♂).

Subfamily Serinethinae Stål

Jadera Stål

Jadera sanguinolenta (Fabricius, 1775: 721) [Plate IV, Fig. 22; Plate V, Fig. 25]

Cimex sanguinolentus Fabricius
Cimex cruentus Fabricius
Jadera sanguinolenta Stål
Jadera rubrofusca Barber (1923); junior syn. Göllner-Scheiding (1978)

Type Locality. "America."

Antillean and Caribbean Distribution. Cuba, Culebra, Jamaica, Puerto Rico, St. Croix, St. John, St. Thomas, Florida (USA); also, Colombia, Brazil, Paraguay, Uruguay, and Argentina.

Host Plant Record. Martorell (1976) lists: *Terminalia buceras* (L.) C. Wright (Combretaceae) [Black Olive, Ucar]; *Schoenoplectus tabernaemontani* (C.C. Gmel.) Palla (= *Scirpus lacustris* L. spp. *validus* (Vahl) T. Koyama) (Cyperaceae) [softstem bulrush, junco]; *Paullinia pinnata* L. (Sapindaceae) [bread and cheese, bejuco de paloma] fruit (Segarra-Carmona. 2012. Pers. observation); Other records: cotton, rice, and coffee are found in Schaefer and Kotulski (2000).

Remarks. The first record of this common species in Puerto Rico is from Gundlach (1893). Barber (1923: 2) thought it to be a new and different species, and described it as *Jadera rubrofusca*, now a junior synonym of *J. sanguinolenta* (Göllner-Scheiding, 1979), from a male specimen collected from Aibonito in June 1915. Barber also designated 22 paratypes from Cayey, Adjuntas, Aibonito, Guánica (Ensenada), and Manatí. Maldonado-Capriles and Navarro (1967), unaware of the synonymy, reported this species as a new record for Puerto Rico.

Wolcott (1948) suggested that this species resembles cotton stainers (Pyrrhocoridae), but for the presence of large and prominent ocelli in the former. It is common for these insects to form aggregations. Adults are regularly attracted to light as many collection records show. Most early host plant records from Puerto Rico are possibly in error, given the well documented coevolution between *Jadera* species and Sapindaceae (Carroll and Loye, 1987).

Material Examined **PUERTO RICO**. *Adjuntas*: 18°10.22N 66°47.72W. May 18, 2012. A. Segarra-Carmona and H. Pérez. *Ex.* MgVap lamps. (♀); *Aguada*: Nov. 8, 1987. R. Inglés. (♀); 18°20.96N 67°13.09W. Nov. 4-6, 2011. N. Valentín. *Ex.* UV light. (2♀ ♂); *Aguadilla*: Sept. 25, 1987. R. Inglés. (♀); Aug. 18, 2013. C. Santiago. (♂); *Bayamón*: Acc. No. 68-76. Aug. 16, 1976. J. Ortíz. (♀); *Barranquitas*: Feb. 6, 1987. F. Colón. (♀); *Cabo Rojo*: Boquerón. 18°00.16N 67°10.96W. Nov. 4, 2011. A. Segarra-Carmona. *Ex.* Blacklight. (2♀); Nov. 6, 2011. A. Segarra-Carmona. *Ex.* Blacklight. (♀ ♂); Apr. 28, 2012. A. Segarra-Carmona. *Ex.* Uv light. (2♀ ♂); *Carolina*: Apr. 29, 1986. R. González. (♀); *Cayey*: Acc. No. 139-89. Nov. 22, 1989. A. Ortega. (10♀ 6♂); *Coamo*: Acc. No. 23-91. Sept. 6, 1991. L.F. Martorell. *Ex.* ornamentals and citrus. (2♀ 2♂); *Corozal*: AES. Aug. 13, 1976. *Ex.* Blacklight. (♂); Aug. 21, 1976. *Ex.* Blacklight. (♀); Aug. 28, 1976. *Ex.* Light trap. (♂); Aug. 29,

1976. *Ex*. Blacklight. (♂); Aug. 30, 1976. *Ex*. Light trap. (♀); Aug. 31, 1976. *Ex*. Light trap. (♀); Sept. 1, 1976. *Ex*. Light trap. (♀); Sept. 21, 1976. *Ex*. Light trap. (♀ ♂); Sept. 25, 1976. Ex. Light trap. (♂); Sept. 27-30, 1976. *Ex*. Light trap. (♀); Sept. 29, 1976. *Ex*. Light trap. (♂); Oct. 2, 1976. *Ex*. Light trap. (♂); Oct. 6, 1976. *Ex*. Light trap. (♂); Oct. 20, 1976. Ex. Light trap. (♀); G*uánica*: May 30, 1913. E.G. Smyth. (♂); Acc. No 120-41. Sept. 17, 1941. N. Lugo. (8♀14 ♂); Acc. No. 122-41. Sept. 21, 1941. N. Lugo. (9♀ 12♂); Acc. No. 190-41. Sept. 21, 1941. N. Lugo. (3♀ 6♂); Acc. No. 122-41. Sept. 22, 1941. N. Lugo. (♀ 4♂); Acc. No. 46-64. Sept. 7, 1964. (♀); Sept. 1991. G. Mejía. (2♀); Sept. 14, 1991. V. González. (3♀); 17°57.39N 66°52.49W. Sept. 2, 2014. A. Segarra-Carmona. Ex. *Sweeping*. (♂); 17°57.34N 66°51.71W. Sept. 15, 2014. A. Segarra-Carmona. Ex. Uv and Mg Vap. (♀ ♂); *Guaynabo*: Acc. No. 22-61. July 4, 1961. Mrs. Morgan. *Ex*. trunk of mango and mahogany. (6♀ 2♂); *Humacao*: Acc. No. 54-1913. Jan. 28, 1913. D.I. Van Dine. (♀); *Isabela*: Acc. No. 81-48. (♀); *Loíza*: Punta Cangrejos. May 12, 1920. G.N. Wolcott. (♀); *Maricao*: Oct. 10, 1999. R. Tamayo. (♀); *Mayagüez*: May 7, 1979. A. Armstrong. *Ex*. pumpkin. (♀); May 8, 1979. G. Rodríguez. (♀); May 19, 1979. F. Gallardo-Covas. (2♀); Jan. 27, 1987. K. Christian. *Ex*. corn. (♂); Mar. 15, 1987. R. Dones. (♂); El Rosario. Dec. 11, 1991. V. González. (♂); Sept. 5, 1999. R. Tamayo. (♂); *Peñuelas*: Tallaboa. Acc. No. 207-47. Dec. 1947. (♀ 5♂); *Río Piedras*: Acc. No. 405-1912. May 11, 1912. T.H. Jones. (♂); *Sabana Grande*: Nov. 14, 1979. F. Gallardo-Covas. (3♂); *Vega Baja*: Mar. 27, 1988. A.F. (2♀); Apr. 23, 1988. C. Félix. (♀); Apr. 23, 1988. J. Quiñones. (♀); *Yabucoa*: Sept. 1, 1997. C. Sustache. (♀); *Yauco*: Sept. 19, 1997. E. Correa. (♀ ♂).

Jadera haematoloma (Herrich-Schaeffer, 1847: 103) [Plate IV, Fig. 21]
Leptocoris haematoloma Herrich-Schaeffer
Jadera haematoloma Stål
Jadera marginalis Walker

Type Locality. Mexico.

Antillean and Caribbean Distribution. Antigua, Cuba, Mona Island, Florida (USA); Mexico, Central America, Colombia and Venezuela.

Host Plant Record. No local records are available. Similar to other members of the Serinethinae, *J. haematoloma* is an oligophagous seed-predator on plants of the soapberry family (Sapindaceae), hence its common name "soap-berry bug" (Tsai et al., 2013). This species was first reported by Ramos (1946), who found numerous nymphs and adults under dead leaves and culms of *Panicum maximum* Jacq. (Poaceae) on Mona Island.

Remarks. This is probably the best-known species of *Jadera*. It is widely distributed in tropical and subtropical regions of North, Central and South America (Göllner-Scheiding, 1979), and it is also found in temperate parts of the USA. According to Tsai et al. (2013), this species forms large aggregations on various native and cultivated soapberries (Sapindaceae). This species has only been reported from Mona Island, and was first reported by Ramos (1946) at Uvero Beach on April 5, 1944. It is easily distinguished from its congener *J. sanguinolenta* by its deep dark eyes, body, scutellum and membrane, and the bright red lateral portion of pronotum, connexiva, and eyes. Ramos (1946) found numerous nymphs and adults under dead leaves and culms of *Panicum maximum* Jacq. (Poaceae) [guinea grass, yerba guinea] on Mona Island. As with *J. sanguinolenta*, early host plant records are likely in error.

Material Examined **MONA ISLAND.** Apr. 5, 1944. J.A. Ramos. (5♀ 3♂ JAR); Mar. 1, 1944. V. Biaggi. (♂ JAR); Acc. No. 66-84. Mar. 8, 1984. N. Virkki. (♂ JAR); L.F. Martorell. Date unknown. (♂).

Family COREIDAE Leach

Leaf-footed bugs

Leaf-footed bugs and other related coreids are generally heavy-bodied insects, with elongate or elliptical shapes. Some species are among the largest living Heteroptera. For instance, *Thasus* are bulky insects reaching 30 to 40 mm, and some species of *Vilga* are stunning and delicate bugs (Schuh and Slater, 1995). Many have the hind femora enlarged, with spines and tubercles; hind tibiae curved, with spines or leaf-like expansions (hence their common name); and still others have their third and fourth antennal segments dilated or tumid. Most of the species, however, have dull colors like brown, gray, and yellow, but some have bright colors like red, green, orange, or sometimes even metallic shadings. General characteristics are: heads generally smaller than pronotum; antennae with four segments and inserted above a line drawn through the eyes; membrane of forewing with several veins; femora of hind legs frequently incrassate; hind tibiae terete (i.e., cylindrical, could be slightly tapering, and without significant furrows or ridges), or slightly to strongly dilated; abdominal spiracles ventral; three trichobothria on abdominal segments III to VI, two on segment VII.

Key to the Subfamilies, Tribes, and Species of Coreidae in Puerto Rico (Adapted from Barber, 1939; Packauskas, 1994; Brailovsky, 2014; Marin-Fernandes et al., 2015).

1. Metafemur strongly clavate and curved; metatibia much shorter than metafemur, with a distinctive spine near the inner apex, usually larger than any metafemural spine; metathoracic scent gland orifices deep within the coxae; head and rostrum short (Meropachyinae: Merocorini . . . . *Merocoris typhaeus.*

— Metafemur rarely clavate and curved; metatibia variable in height, and generally lacking inner apical spine; metathoracic scent gland orifices lateral to coxae (Coreinae) . . . . 2.

2 (1). Head with jugum and tylus extended beyond antennal tubercles, prorrect; bucculae short, not reaching mid-length of head; Rostrum extending reaching or extending into abdomen (Anisoscelini). . . 3.

— Not having this combination of characters . . . . 9.

3 (2). Metatibia greatly expanded and leaf-like; head shorter than pronotum. (*Leptoglossus* spp.) . . . . 4.

— Metatibia not expanded; head as long or nearly as long as pronotum. . . . . 8.

4 (3) Thoracic pleura with several large contrasting yellow maculae; pronotal disc with narrow, arcuate, pale yellow transverse fascia; metatibia with outer dilation extending 85-90% length of tibia . . . . *L. gonagra.*

— Thoracic pleura without yellow contrasting maculae, but mostly orange or pale yellow with small black spots . . . . 5.

5(4) Corial transverse fascia yellowish, rectangular, with anterior and posterior margins straight and parallel . . . . 6.

— Corial transverse fascia yellowish and irregular (zig-zag) . . . . 7.

6 (5) Posterior marginal area of pronotum yellow; anterior half of pronotal disc with contrasting pale yellow areas . . . . . *L. balteatus.*

— Pronotum concolorous brown, including posterior marginal area and disc . . . . *L. phyllopus.*

7 (5). Posterior half of pronotal disc with contrasting central yellow area . . . . *L. confussus*.

— Pronotal disc completely dark brown. . . . . *L. concolor*.

8 (3). Corial transverse fascia bright reddish orange; anterolateral angles of pronotum spiny . . . . *Phthia lunata*.

— Corial transverse fascia absent; anterolateral angles of pronotum smooth . . . . *Phthiacnemia picta*.

9 (2). Distance between hind coxae equal to distance between hind coxae and lateral margin (Spartocerini) . . . . 10.

— Distance between hind coxae much narrower than distance between hind coxae and lateral margin. 13.

10 (9). Veins of membrane numerous, not distinctly anastomosing; large red and black species . . . . *Sephina erythromelas*.

— Veins in membrane distinctly anastomosing, and enclosing many irregular cellules . . . . 11.

11(10). Pro- and mesopleura with two medial contrasting black areas each; interior margin of corium with pale border; scutellum black, with pale white border and medial pale longitudinal line . . . . *Eubule scutellata*.

— Pleura, scutellum and corium, mostly concolorous . . . . 12.

12(11). Lateral margin of pronotum distinctly expanded with humeral angle distinctly elevated; connexival margin with alternating dark and testaceous bands . . . . *Spartocera fusca*.

— Lateral margin of pronotum not expanded; humeral angle not elevated; connexival margin dark brown. . . *Spartocera batatas*.

13(9). Third antennal segment expanded distally; tylus and juga deflexed not filing gap between antennal tubercles (Chariestrini) . . . . *Chariesterus gracilicornis*.

— Third antennal segment not expanded, usually shorter or subequal than second (Hypselonotini, in part) . . . . 14.

14(13). Head with juga and tylus prorrect, strongly projected anteriorly before the base of antennae . . . . 15.

— Head with tylus and juga usually only slightly, or not at all, projected before base of antennae; forewing membrane with numerous veins with weak anastomosing, at most (Hypselonotini, in part) . . . . 16.

15(14). Metafemur swollen with double row of stout spines ventrally; wing membrane with few anastomosing veins; pronotum strongly declivous with posterior angle; humeri terminating in small tooth . . . . *Mamurius cubanus.*

— Metafemur neither swollen nor armed with spines; wing membrane with many anastomosing veins (Hypselonotini). . . . . *Althos oscurator.*

16(14). Metafemur enlarged, and armed, especially distally with several spines of varying sizes; pronotum strongly declivous with posterior angle strongly spined . . . . *Zicca taeniola.*

— Metafemur slender and commonly unarmed or not strongly armed; pronotum with posterior angle not spined . . . . 16.

17(16). Head behind eyes barely callused. Posterior angle of metapleuron acute. Pronotal disc with calloused ridge anteriorly that does not reach lateral margin on each side; colors metallic, bright . . . . *Sphictyrtus whitei.*

— Head behind eyes distinctly callused. Posterior angle of metapleuron at right angle or obtuse; pronotal disc commonly devoid of calloused ridge anteriorly; colors not metallic. . . . . 17.

18(17). Head broad, posteriorly more than half as wide across eyes as pronotum; basal segment of antenna shorter than head; body oblong, parallel-sided . . . . 18.

— Head posteriorly less than half as wide across eyes as pronotum; basal segment of antenna distinctly longer than head; body broad, ovate . . . . *Anasa scorbutica.*

19(18). Femurs and tibiae with black spots; corium with two paler callused areas; head, pronotal disc, and scutellum without running longitudinal yellow stripe . . . . *Catorhintha guttula.*

— Femurs and tibiae with small reddish spots; corium without pale callused areas; head, pronotal disc, and scutellum with irregular middle longitudinal yellow stripe. . . *Catorhintha borinquensis.*

Subfamily Coreinae Leach, 1815

According to Fernandes et al. (2015), most of the Coreids belong to this subfamily. Members are mostly tropical and are exceptionally diverse in color, size and shape. Several characters serve to distinguish them, such as having a larger distance between ocellus than between ocelli and their eyes. Other distinguishing characteristics are: (1) well developed anterolateral opening of the metathoracic scent gland, with projections in the peritreme, and a large auricle that usually occupies half of the evaporatorium; (2) hemelytral membrane with veins arising from a single transverse vein, very close to the corial margin; and (3) abdominal tergites I-II and also III-VII fused (Marin-Fernandes et al., 2015).

More than 30 tribes are recognized worldwide, with most occurring solely either in the Western Hemisphere (11) or in the Eastern Hemisphere (19), and only two (i.e., Coreini and Hydarini) occurring in both hemispheres (Packauskas, 1994; Schuh and Slater, 1995; Marin-Fernandes et al., 2015). Members of four tribes occur in Puerto Rico: Anisoscelini (7 spp.), Chariesterini (1 sp.), Coreini (= Hypselonotini) (6 spp.), and Spartocerini (4 spp.). A few species are considered pests of minor potential, or of actual economic importance, particularly among those associated with legumes, cucurbits, solanaceous, and tropical fruit crops (Levin-Mitchell, 2000).

Tribe Anisoscelini **Laporte**

According to Packauskas (1994) the Anisoscelini Laporte is a large and diverse New World tribe, characterized by: the head prorrect with jugum and tylus extended beyond antennal tubercles; bucculae short not reaching mid-length of head; rostrum extended, reaching or extending into abdomen. Many species are referred to as "leaf-footed bugs" for having the hind tibiae greatly expanded on both sides, forming a leaf-like structure (e.g., *Leptoglossus* spp.). In Anisocelines the tylus does not (or only vaguely) projects beyond the jugum, and the head has a well-developed neck (Brailovsky, 2017). Seven species in three genera are reported here.

Leptoglossus Guérin-Méneville

Leptoglossus balteatus (Linneaus, 1771: 534) [Plate VI, Fig. 27; VII, C; X. 43-44]

Cimex balteatus Linnaeus
Lygaeus balteatus Fabricius
Anisoscelis fasciatus Herrich-Schäffer
Anisoscelis thoracicus Guérin-Méneville

Leptoglossus balteatus Stål (in Gundlach, 1893; Barber, 1923, 1939; Wolcott, 1936, 1948).

Type Locality. Jamaica.

Antillean and Caribbean Distribution. Bahamas, Cuba, Grenada, Hispaniola, Jamaica, Mona Island, Puerto Rico, St. Martin, St. Thomas, St. Vincent.

Host Plant Record. Reported on *Psidium guajava* L. (Myrtaceae) [guava, guayaba] by Wolcott (1936) in Ponce. Also reported feeding on tomatoes, oranges, cowpeas, guava and *Luffa* sp. (Cucurbitaceae) in Cuba, with the latter two plants recorded as breeding hosts (Levin-Mitchell, 2000).

Remarks. First reported by Gundlach (1893), this species appears to have a mostly West Indian distribution. This species is readily told from congeners in Puerto Rico by its contrasting pale-yellow areas in the anterior half of the pronotal disc, and for having a thin pale-yellow border in the posterior margin of pronotum. Wolcott (1948) associated this species with "*…more xerophytic regions*" of Puerto Rico, but the distribution of examined MEBT specimens does not bear out that conclusion, pointing to a more coastal to mid-elevation location habitat.

Material Examined. **MONA ISLAND**. 18°05.24N 67°50.66W. Sept. 7, 2013. *Ex. Sweeping* vegetation. A. Segarra-Carmona and L. Collazo. (♀) (New Record). **PUERTO RICO**. *Aguada*: Apr. 19, 2014. *Ex. Sweeping*. T. Aponte. (♂); *Aguadilla*: Aug. 10, 2013. C. Santiago. (♂); *Cabo Rojo*: Dec. 1950. Padilla. (♂ JAR); *Manatí*: Oct. 29, 1974. G. Rivera. *Ex.* Passion fruit (♂); *Maunabo*: Feb. 1, 1987. R. Dones. *Ex. Citrus* sp. (♂); *Mayagüez*: July 23, 1932. V. B. Díaz. (♀ JAR); July 9-16, 1955. *Ex.* At Light. J. A. Ramos. (♂ JAR); Apr. 5, 2013. L. García. (♂); *Quebradillas*: Sept. 21, 2014. S. Malavé. (♂); *San Sebastián*: Mar. 20, 1941. J.B. Acosta. (♂ JAR); *Vega Baja*: Apr. 9, 1988. R.L. Santos. (♀); Apr. 1981. F. Pérez. (♀).

Leptoglossus concolor (Walker, 1871: 128) [Plate VI, Fig. 28; Plate VII, B].

Anisoscelis concolor Walker
Leptoglossus concolor Distant
Leptoglossus stigma (Herbst) (sensu Stål, 1870: 163; misidentification: Gundlach 1893; Barber, 1923 and 1939; Wolcott 1936 and 1948).

Leptoglossus zonatus (Dallas) (likely misidentification. Wolcott, 1936); Martorell, 1976.)

Type Locality. Oaxaca, Mexico

Antillean and Caribbean Distribution. Cuba, Guadeloupe, Hispaniola, Puerto Rico, St. Croix.

Host Plant Record. Psidium guajava L. (Myrtaceae) [guava, guayaba]; *Bixa orellana* L. (Bixaceae) [annato, achiote].

Remarks. The taxonomic history of this species in Puerto Rico is somewhat chaotic. This species was first reported by Gundlach (1893) as *L. stigma* (Herbst), an incorrect identification that continued to be used by early 20th century workers with great consistency, until Martorell (1976) corrected its taxonomic status. Wolcott (1936: 170) also reported it as *L. zonatus* (Dallas) from specimens collected from guava and annato, and Martorell (1976) also lists it as collected from achiote. Together with *L. concolor*, both *L. stigma* and *L. zonatus* belong to the '*Stigma* species Group', which is an assemblage of about 20 medium-sized species with dorsally pronged genital capsules, well developed claspers, with both the inner basal lobe and the median lobe on the shank well developed, and a transverse wing fascia, which when present, is irregular (Allen, 1969; Brailovsky, 2014). Two species of this group, *concolor* and *confusus* occur in Puerto Rico (Packauskas, 2010).

Leptoglossus concolor can be readily distinguished from *stigma* by the rough surface texture of the pronotal calli, and for the abundant dark and pale pilosity in the anterior part of the pronotal disc. Also, both of these species are distinguished from the much larger *zonatus* by an absence of contrasting yellowish and dark areas in the pronotum (Allen, 1969; Brailovsky, 2014). Confirming Martorell's (1976) finding, all MEBT specimens examined are *L. concolor*. While these species occur sympatrically in many regions, *stigma* and *zonatus* have a greater South American distribution (Allen, 1969). Finally, while *stigma* and *zonatus* are considered important agricultural pests in South America (Levin-Mitchell, 2000), *L. concolor* has been reported only as an irregular minor pest associated with oranges in Florida, and with guava and achiote in Puerto Rico (Martorell, 1976; Levin-Mitchell, 2000).

Material Examined. **PUERTO RICO**. *Guayanilla*: Bo. Indios. June 5, 2013. G. Matos. (♀); *Isabela*: Aug. 30, 1991. AES V. González. (♂); *Lajas*: Valle de Lajas. May 14, 1979. Roble. (♂); *Mayagüez*:

Mar. 5, 1939. R. Otero. (♀ JAR); Dec. 15, 2011. L. Bonilla. (♀); *Naranjito*: Bo. Lomas. Sept. 25, 2013. R. Rivera. (♀); *Sabana Grande*: Nov. 19, 2013. A. Torres. (♀ ♂); *San Germán*: Acc. No. 88-1937. Dec. 30, 1937. G.N. Wolcott. (♀); Bo. Duey Bajo. Mar. 2014. V. Pérez. (♂).

Leptoglossus confusus Alayo and Grillo (1977: 97) [Plate VI, Fig. 29; Plate VII, D]

New Record

Leptoglossus confusus Alayo and Grillo

Type Locality. Cuba.

Antillean and Caribbean Distribution. Cuba, Puerto Rico.

Host Plant Record. On *Psidium guajava,* and frequently associated with *L. concolor* and *L. balteatus* (Grillo, 2012).

Remarks. *Leptoglossus confusus* is reported from Puerto Rico for the first time. Also, this is the first record of the species outside Cuba. As the specific name implies, this *Leptoglossus* was often confused in older literature with congeners such as *concolor,* and with *stigma* (Alayo and Grillo, 1977). This species is distinguished from *concolor* by being slightly larger and for having a much less pilose pronotum. Also, unlike *concolor* whose pronotal disc is almost uniformly dark brown, *confusus* has a readily noticeable lighter colored rectangular area on the disc that never reaches the humeral angles. No host plant records exist for Puerto Rico, but it is likely that, as in the case of other *Leptoglossus* species, guava may also be a host plant.

Material Examined. **PUERTO RICO**. *Aguadilla*: Oct. 1, 2013. C. Santiago. (♀); *Añasco*: Consumo. Sept. 12, 1937. R. Bras (♀) (JAR); *Barranquitas*: Feb. 25, 1937. E. Colón-Colón. “Det by H.G. Barber as *L. stigma”*. (♂) (JAR); *Cabo Rojo*: Feb. 21, 1999. E. Martínez. (♀); *Hormigueros*: Road 344 Km 33. Mar. 22, 1998. N. Ramos. (♀); *Maricao:* Indiera Alta. May 5, 1944. J.A. Ramos (♂) (JAR); *Mayagüez*: June 2, 1931. E. Vázquez (JAR); Oct. 22, 1935. S.M. Huddars. “Det by H.G. Barber as *L. stigma”*. (♂) (JAR); Oct. 1937. R. Bras. (♀) (JAR); Mar. 5, 1939. R. Otero. (♀) (JAR); Sept.-Oct., 1956. N. Marín (♂) (JAR); Finca Alzamora, RUM. Nov. 11, 2014. M.E. Planell. (♂); *Orocovis*: Feb. 2, 2013. R. Mercado. (♂); *Sabana Grande*: Oct. 30, 1982. M. Figueroa. (♂); Oct. 26, 2013. A. Torres. (♂); *San Germán*: Jan. 4, 1941. F. Pietri. (♂) (JAR).

Leptoglossus gonagra (Fabricius 1775: 708) [Plate VI, Fig. 30; Plate VII, A]

Cimex gonagra Fabricius
Lygaeus gonagra Fabricius
Anisoscelis gonagra Burmeister
Leptoglossus gonagra Stål (Gundlach, 1893; Barber, 1923, 1939; Wolcott, 1936; 1948)

Type locality. St. Thomas (U.S. Virgin Islands).

Antillean and Caribbean Distribution. Widely distributed in West Indies: Cuba, Jamaica, Puerto Rico, St. Croix, St. Thomas, Trinidad, Florida (USA); Mexico, Central America, South America.

Host plants. Martorell (1976) lists the following: *Cucurbita moschata* (Duch.) Duchesne and Poir. (Cucurbitaceae) [pumpkin, calabaza]; *Psidium guajava* L. (Myrtaceae); *Zea mays* L. (Poaceae) [corn, maíz]; *Spemacoce verticillata* (L.) (Rubiaceae) [shrubby false buttonweed, botón blanco]; *Citrus aurantium* L. [grapefruit, toronja], *Citrus reticulata* Blanco [tangerine, mandarina], *Citrus sinensis*·(L.) Osbeck (Rutaceae) [sweet orange, China]; *Tarenaya spinosa* (Jacq.) Raf. (Cleomaceae) [spider flower, jazmín apestoso]. Other collection or observation records include: *Punica granatum* L. (Lythraceae) [pomegranate, granada], and *Momordica charantia* L. (Cucurbitaceae) [balsamspear, cundeamor].

Remarks. This cosmopolitan species was first reported in Puerto Rico by Gundlach (1893). It is the largest member of the genus occurring in Puerto Rico. Further, of all the *Leptoglossus* spp. occurring in Puerto Rico, this is perhaps the most common and economically important. Early entomologists recognized the economic impact of this species in Puerto Rico, especially as a pest of squash (e.g., Cotton, 1918), and of citrus (Leonard, 1931). Levin-Mitchell (2000) labels it as a major pest of several crops in South America. In Brazil, this insect is considered a serious pest on guava, oranges, passion fruit, pomegranate, and pumpkin. According to Levin-Mitchell nymphs are found mainly on *Mormodica charantia* L. and *Solanum americanum* Miller, both very common herbaceous plants in Puerto Rico. In Cuba, Grillo (2012) establishes the insect as the most common and damaging of their *Leptoglossus* spp., and that it is commonly collected from a host plant that regularly supports large breeding populations. Other hosts reported include tobacco and mango (Levin-Mitchell, 2000). Several studies from Cuba and Brazil have shown *L. gonagra* as a vector of plant pathogens, such as the trypanosomatid *Phytomonas* spp. (Euglenozoa: Kinetoplatea: Trypanosomatidae) (Sbravate et al., 1989), and the pathogenic fungi *Eremothecium coryli* (Peglion) (Fungi: Sacharomycetes: Eremotheciaceae) (Grillo, 2012).

This species is easily told from other *Leptoglossus* spp. occurring in Puerto Rico. Specimens are largely dark brown with a narrow, arcuate and pale yellow to orange transverse fascia on the anterior portion of the pronotal disc. Specimens lack a transverse corial fascia and have a small cream-colored dot close to the membrane. The species also has several large and easily observed contrasting yellow maculae on the thoracic pleura, and the outer dilation of the metatibia extends almost through its entirety.

Although a common species, *L. gonagra* occasionally undergoes large population explosions. One such flare-up occurred in Puerto Rico during the latter months of 2018 with multiple reports of extensive damage in citrus groves in mountain regions. In addition, the species, which is regularly attracted to light, invaded homes and businesses in unusually large numbers in western towns. Thus, a short-lived health scare ensued when specimens were mistakenly identified by local township experts as a kissing bug (*Triatoma* spp.), and the local press immediately raised the possibility of a Chagas disease epidemic on the island. All ended well when specimens were correctly identified by entomologists, after the public had received a primer on the deadly Chagas disease from the press.

Material Examined. **PUERTO RICO**. *Aguadilla*: Acc. No. 283-39. Oct. 2, 1939. L. F. Martorell. (♀); *Cabo Rojo*: Boquerón. 18°00.66N 67°10.96W. Oct. 7, 2011. A. Segarra-Carmona. *Ex.* Blacklight. (♂); Boquerón. 18°.2.64N 67°.10.96W. Dec. 6, 2011. A. Segarra-Carmona. *Ex.* UV Light. (♂); *Cayey*: Acc. No. 111-16. May, 1916. R.T. Cotton. (♀); *Ciales*: Arenero Rd 145. Nov. 13, 1987. R. Inglés. (2♀); *Dorado*: Acc. No. 54-54. Sept. 16, 1954. (♀); *Dorado*: Nov. 2, 2014. R. Dávila. (♂); *Gurabo*: Acc. No. 37-64. Nov. 30, 1964. (♀); *Isabela*: 18°30.755N 67°05.841W. Oct. 10, 2014. *Ex. Sweeping* grasses. González and Pérez. (♀); *Juana Díaz*: Acc. No. 325-86. Fortuna AES. July 3, 1986. S. Medina-Gaud and A. Segarra-Carmona. (♀); Acc. No. 60-87. Fortuna AES. June 25, 1987. J. Pagán. (♂); Acc. No. 130-90. Fortuna AES. July 5, 1990. A. Nieves. (♀); *Lajas*: Acc. No. 101-110. Nov. 1992. D.

Lugo. (♀ ♂); *Manatí*: Acc. No. 109-87. Playa La Esperanza. Oct. 10, 1987. N. Virkki. (♂); *Maunabo*: Feb. 11, 1987. R. Dones. (♂); *Mayagüez*: RUM. Aug. 1991. G. Mejía. (2♀ ♂); Urb. Belmonte. Sept. 6, 1991. V. González. (♀); Sept. 2, 2003. A. Delgado. (♂); 18°13.03N 67°8.84W. Dec. 15, 2011. N. Valentín. *Ex. Sweeping*. (♀); Aug. 7, 2012. A. Jusino. (♀); Nov. 10, 2014. Y. García. (2♂); Nov. 10, 2014. L. Vélez. (2♀ ♂); Finca Alzamora RUM. Nov. 11, 2014. M.E. Planell. (♀); *Moca*: Sept. 1975. J. Pérez. (♀); *Río Piedras*: Acc. No. 646-1912. Sept. 17, 1912. T.H. Jones. (♂); Acc. No. 748-1912. Oct. 30, 1912. A.V. Navarrete. (♀ ♂); Acc. No. 20-16. Jan. 31, 1916. G.N. Wolcott. (♂); *Sabana Grande*: Jan. 26, 2014. Ex. *Punica granatum*. C. Negrón (♀); *Vega Baja*: Acc. No. 90-84. Finca Monterrey. Apr. 4, 1984. S. Medina-Gaud. *Ex.* Citrus leaves. (♀); Apr. 9, 1988. J. Quiñones. (♂).

Leptoglossus phyllopus (Linnaeus, 1767: 731) [Plate VI, Fig. 31; Plate VII, E].

Cimex phyllopus L.
Anisoscelis phyllopus Burmeister
Leptoglossus phyllopus Stål

Type locality. “Carolina”; St. Thomas

Antillean and Caribbean Distribution. Puerto Rico, St. Thomas; North America, Central America.

Host plants: None reported from Puerto Rico. Levin-Mitchell (2000) considers this species to be polyphagous with pest records on tomato, peaches, corn, pomegranate, guava, soybean, cowpeas, citrus, linseed, turnips and sorghum.

Remarks. Wolcott (1936) lists this mainly as a North American species in Puerto Rico, from several specimens housed at the old University of Puerto Rico’s Arts and Mechanics College (AMC) collection (now INV-COL). After an exhaustive search, these specimens could not be found. Shortly after, neither Barber (1939) nor Wolcott (1948) mention this species again, and presumably it was ignored after being considered a misidentification by early authors. During the preparation of this conspectus, we found a single individual mixup among *L. balteatus* specimens. This species can be readily differentiated from *L. balteatus* because it lacks the usual yellow marginal area in the posterior of pronotum and the contrasting pale yellow areas on anterior half of pronotal disc. The paucity of specimens in the MEBT collection likely indicates that this is an uncommon species in Puerto Rico.

Material Examined. **PUERTO RICO**. *Yauco*. Nov. 19, 1997. E. Correa (♀) MEBT: 013312.

Phthiacnemia Brailovsky

Phthiacnemia picta (Drury, 1770: 107- description) [Plate VIII, Fig. 32]
Cimex pictus Drury
Phthia picta Stål (Gundlach, 1893; Jones, 1915; Barber 1923, 1939; Ramos, 1946; Wolcott, 1936; 1948).
Phthiacnemia picta Brailovsky (2009)

Type Locality. Antigua.

Antillean and Caribbean Distribution. Antigua, Cuba, Culebra, Hispaniola, Mona Island, Puerto Rico, St. Croix, St. Martin, Vieques; Florida (USA); Mexico, Central America, North America, Colombia, Venezuela to Argentina.

Host Plant Record. From Martorell (1976): *Citrullus lanatus* (Thunb.) Matsum and Nakai [watermelon, sandía], *Cucumis melo* L. [cantaloupe, melón], *C. sativus* L. [garden cucumber, pepinillo], *Cucurbita moschata* (Duch.) Duchesne and Poir. [pumpkin, calabaza] (Cucurbitaceae); *Solanum lycopersicum* L. [tomato, tomate], *Physalis* spp. [ground cherry, sacabuche], *Solanum melongena* L. [eggplant, berenjena], *Solanum* (= nodiflorum) *americanum* Mill. [common purple nightshade, yerba mora] (Solanaceae).

Remarks. After first being listed by Gundlach (1893), its importance as a pest of tomato in Puerto Rico was recognized by early 20th century entomologists Jones (1915) and Cotton (1918). Both tomato and common purple nightshade were recognized by these early entomologists as breeding host plants, as adults and nymphs were regularly and concurrently observed sucking the fruit of both hosts. According to Levin-Mitchel (2000) this is a highly polyphagous bug. In addition to recurrent records as an important pest of tomato, this species has been recorded on eggplant, cucurbits, rice, peas, pomegranate, passion fruit and sunflower, among others. As in *L. gonagra*, this species is also associated with the transmission of protozoan pathogens, in this case, *Phytomonas serpens* (Euglenozoa: Kinetoplasea: Trypanosommatidae), an important tomato fruit parasite in Brazil (Jaskowska et al., 2015).

Together with *Phthia lunata* (F.), this anisosceline lacks the leaf-like metatibial expansion characteristic in *Leptoglossus* spp. but can be told from the former species by the absence of transverse corial fascia and the absence of spiny anterolateral angles on the pronotum. This is a highly variable species with many color forms, especially as it refers to the pronotum (McAtee, 1919). The MEBT specimens run the gamut from individuals with an almost completely dark pronotal disc (except for a small reddish area of humeral angles) to those exhibiting a wide orange/red band running between humeri. According to Brailovsky (2009), the monospecific genus *Phthiacnemia* can be distinguished from other members of the *Phthia* generic complex by an absence of metallic iridescence on its body surface, antennal segment I thickening gradually from base to apex, anterior lobe of pronotal disc without a narrow, arcuate, yellow transverse fascia, and for having humeral angles that are obtuse, truncate or gently subacute. Other distinguishing characteristics include anterolateral borders of pronotum dentate, posterolateral borders smooth, corium behind claval commissure without yellow transverse fascia, and hind tibiae in male being robust and armed.

Material Examined. **PUERTO RICO**. *Aibonito*: Nov. 21, 1988. F. Rivera. (♀); *Añasco*: Acc. No. 1032-13. Sept. 23, 1913. E.G. Smyth. (♀ ♂); Acc. No. 1032-13. Sept. 3, 1913. E.G. Smith (2♂); *Cabo Rojo*: Road 311 Km 1.8. July 23, 1983. N. Virkki. *Ex.* Tomato. (♀); Nov. 24, 1999. O. Ramos. (♀); *Guánica*: Bosque Seco. Nov. 21, 1979. F. Gallardo-Covas. (♀ ♂); *Guayanilla*: Sept. 27, 1981. K. Inglés and R. Inglés. (♂); Bo. Jaguapastos. Nov. 16, 2013. J. Campos. (♀); *Isabela*: Acc. No. 126-85. Playa Jobos. Aug. 26, 1985. N. Virkki. *Ex.* Vegetation at Seashore. (♀); *Juana Díaz*: Acc. No. 145-89. Fortuna AES Dec. 7, 1989. S. Medina-Gaud. *Ex.* Eggplant fruit and leaves. (♀ 5♂); *Lajas*: Sept. 4, 1948. Doitteau. (♂ JAR); *Lares*: Apr. 2, 1927. I.J. Román. *Ex. Coffea arabica* L. (Rubiaceae). (♀); *Mayagüez*: RUM. Nov. 7, 1987. R. Inglés. (♀); *Ponce*: Mar. 27, 1987. Enrique. (♀); *Río Piedras*: Urb. San Gerardo. Jan. 24, 1965. E. Medina and P. Medina. (♀); Acc. No. 239-1912. Mar. 24, 1912. D.L. Van Dine. (♀); Acc. No. 386-1912. May 2, 1912. T.H. Jones. (♀); Acc. No. 185-16. May 31, 1916. R.J.C. (4♀ 5♂); Acc. No. 489-1912. June 1, 1912. D.L. Van Dine. (♀); Acc. No. 521-16. June 5, 1916. E.G. Smyth. (2♂); Acc. No. 716-1914. July 7, 1914. (2♀); Acc. No. 748-1914. July 16, 1914. T.H. Jones. (♀ ♂); *Río Grande*: El Verde. Acc. No. 49-42. June 12, 1942. G.N. Wolcott. (♀).

Phthia Stål

Phthia lunata (Fabricius, 1787: 289) [Plate VIII, Fig. 33]
Cimex lunaus Fabricius

Leptoscelis rubropicta Westwood
Phthia lunata Stål (Gundlach, 1893; Barber, 1923; Wolcott, 1936)
Phthia rubropicta (Westwood), Synonymized by Stål 1870 to *P. lunata*. (Barber 1939; Wolcott 1948)

Type Locality. 'Cajennae' = French Guyana Region, including Surinam.

Antillean and Caribbean Distribution. Cuba, Guadeloupe, Martinique, Puerto Rico, St. Vincent.

Host Plant Record. None recorded from Puerto Rico. Linares and Orozco (2017) list the following host plants from Honduras: *Capsicum annuum* L. (Cayene pepper); *Citrullus lanatus* (Thunb.) Matsum. and Nakai (Watermelon). Maes and Goellner-Scheiding (1993) and Grillo (2012) report this species on *Cucurbita* sp. from Nicaragua and Cuba, respectively.

Remarks. First reported in Puerto Rico by Gundlach (1893), this species appears to be less common than *P. picta.* Brailovsky (2009) distinguishes this monospecific genus from other Anisoscelini for having its hind tibiae simple; antennal segment I longer than head; anterior lobe of pronotal disc with a narrow, arcuate, yellowish to orange-red, transverse fascia; corium behind the claval commissure with yellowish to orange-red transverse fascia; and thoracic pleura with at least three to four strongly contrasting yellowish to orange-red maculae. The species is highly variable, undergoing at least 15 different synonymies since its original 1787 description (Brailovsky, 2009; Packauskas, 2010).

As in their studies of other members of this tribe, Godoi et al. (2002) detected tripamosomatic protozoa of the genus *Phytomonas* in *P. lunata* during their survey of Amazonian phytophagous hemipterans. No surveys of this kind have been conducted in the Caribbean.

Material Examined. **PUERTO RICO**. *Coamo*: Jan. 1947. V. Sáez. (♀ JAR); *Cabo Rojo*: Joyuda. Apr. 1967. R. González. *Ex. Carica papaya*. (♂); Feb. 21, 1999. E. Martínez. (♀); *Jayuya*: Sept. 29, 1930. G. Salazar. (♀ JAR); *Lares*: Apr. 2, 1987. I.J. Román *Ex. Coffea arabica* L. (Rubiaceae). (♀ ♂); *Maricao*: July 2, 1944. J.A. Ramos. (♀ JAR).

***Tribe Chariesterini* Stål**

According to Fernandes et al. (2015) this is a small tribe formed by four genera and 24 species, most from Central America and northern South America. These authors provide a formal description of the group, characterized by: small-sized, narrow body, with lateral margins almost parallel; third antennal segment expanded, with other segments terete; head with tylus and juga deflexed, and not filling space between their antenniferous tubercles; all femora armed distally; distance between hind coxae much narrower than distance from coxa to lateral margin; and hind tibiae is never expanded.

Chariesterus Laporte

Chariesterus gracilicornis (Stål, 1870: 178) [Plate VIII, Fig. 34]

Chariesterus gracilicornis Stål

Chariesterus moestus Burmeister. Wolcott (1924, 1936). Misidentification.

Chariesterus gracilicornis Barber (1923, 1939); Wolcott (1936, 1948)

Type Locality. St. Eustatius, West Indies.

Antillean and Caribbean Distribution. Cuba, Hispaniola, Jamaica, Puerto Rico, St. Croix, St. Eustatius, St. Lucia, and Vieques.

Host Plant Record. Martorell (1976) lists the following associated plants: *Amaranthus* spp. (Amaranthaceae); *Citrus paradisi* Macfayden (Rutaceae); *Crotalaria* spp. (Fabaceae); *Cucurbita moschata* (Duch.) Duchesne and Poir. (Cucurbitaceae); *Dioscorea* spp. (Dioscoreaceae); *Gossypium barbadense* L. (Malvaceae). New plant records from MEBT specimens include: *Euphorbia hypericifolia* L. (Euphorbiaceae) [graceful sandmat, yerba niña]; *Phaseolus vulgaris* L. (Fabaceae) [kidney bean, habichuela]; *Oryza sativa* L. (Poaceae) [rice, arroz]; *Lantana camara* L. (Verbenaceae) [pink sage, cariaquillo]; and *Solanum melongena* L. (Solanaceae). Other authors have reported species feeding on amaranths and cucurbits, in addition to euphorbs (Schaefer and Mitchell, 1983).

Remarks. This very common mid-sized species (8 to 11 mm) was first reported by Gundlach (1893). Later, Wolcott (1924, 1936) reported this species as *C. moestus* Burmeister, likely based on a misidentification of specimens collected by Van Zwaluwenburg. The two species can be told apart, as *C. moestus,* which probably does not occur in Puerto Rico, has a large bi-lobed metathoracic gland auricle and sub-circular black spots in the abdominal sterna, both of which *C. gracilicornis* lacks (Ruckes, 1955). Members of this genus are slender, somewhat elongate species with prominent, acute, convergent, and sometimes spinose antenniferous tubercles with the third segment variously foliate or dilated. A key to the known species is found in Ruckes (1955). The species is not recognized as having economic importance, and its distribution appears limited to the Greater and Lesser Antilles.

Material Examined. **PUERTO RICO**. *Aibonito*: La Plata. Apr. 3, 1982. W. Fuentes. (♀); *Aguadilla*: Base Ramey. Oct. 5, 1991. V. González. (♂); Oct. 1991. G. Mejía. (♂); Aug. 26, 2003. A. Garnos. (4♂); *Arecibo*: Acc. No. 39-83. Sept. 30, 1983. S. Medina-Gaud. *Ex*. Rice field. (♂); *Arroyo*: Finca Vicente. July 20, 1978. E. Abreu. *Ex*. *Chamaesyce hypericifolia*. (7♀ 3♂); *Añasco*: Finca Arers. Oct. 31, 1981. N. Semidey. (♂); *Bayamón*: Urb. Sierra Bayamón. 18°24N 66°10W. June 27, 1965. E. Medina. *Ex*. Mixed vegetation by sidewalk. (♀ ♂); *Cabo Rojo*: Nov. 15, 2014. L. Vélez. (♀); *Caguas-Cayey*: Mar. 13, 1988. Highway. N. Galarza. (♀); *Carolina*: Feb. 18, 1988. Aida. (♀); Nov. 13, 1988. J. Jiménez. (♀); Dec. 11, 1988. M. Henriquez. (♀); *Coamo*: 18°02.3N 66°22.5W. Oct. 7, 2014. *Ex*. Sweeping grasses. A. Segarra-Carmona. (♀); *Dorado*: Urb. Costa de Oro. Dorado Beach Resort Area. Nov. 22, 1969. S. Medina-Gaud. (♂); Acc. No. 52-54. Sept. 16, 1984. (♂); *Guánica*: Apr. 23, 1987. K. Christian. *Ex*. Sorghum. (♀); Dec. 10, 1988. A. Rivera. (♀); Mar. 1991. G. Mejía. (♂); *Guayanilla*: Mogote Road 2. Sept. 25, 1987. R. Inglés. (2♂); *Guaynabo*: Oct. 9, 1988. W. Vargas. (♀); Dec. 11, 1988. (♀); *Humacao*: Acc. No. 670-17. June 9, 1917. R.T. Cotton. (♂); *Isabela*: Acc. No. 78-85. Playa Jobos. July 29, 1985. N. Virkki. *Ex*. Vegetation on Sand Dunes. (♂); Acc. 127-85. Aug. 26, 1985. N. Virkki. *Ex*. Vegetation at Seashore. (♀ ♂); Acc. No. 162-86. Agric. Expt. Subst. Apr. 29, 1986. A. Pantoja and A. Segarra-Carmona. *Ex*. *Amaranthus* sp. (♂); Feb. 26, 1987. K. Christian. *Ex*. *Phaleolus vulgaris*. (♀); Río Guajataca. Nov. 8, 1987. R. Inglés and Méndez, (2♀ ♂); AES. Aug. 30,1991. V. González. (2♀ ♂) AES Nov. 14, 1997. E. Correa. (2♀); 18°30.755N 67°05.841W. Oct. 10, 2014. *Ex*. *Sweeping* grasses. González and Pérez. (4♀ 4♂); *Lajas*: Bo. Palmarejo. Sept. 14, 1991. V. González. (♂); 18°01’49N 67°04’28W. AES. May 30, 2006. *Ex*. *Sweeping*. A. Segarra-Carmona. (2♀ 10♂); 18°0’39.70”N 67°6’12.20”W. Mar. 22, 2012. *Ex*. *Lantana camara*. Matos Otero and Jusino. (♂); *Manatí*: Acc. No. 38-83. Sept. 30, 1983. S. Medina-Gaud. *Ex*. *Oryza sativa*. (2♀ 3♂); *Mayagüez*: Jan. 4, 1979. (♂); Mar. 12, 1979. D.V. Ronda. *Ex*. *Amaranthus* sp. (♀); Finca Alzamora RUM. May 10, 1979. *Ex*. *Solanum melongena*. A.M. Armstrong. (♀); Bo. Maní-Playa. Sept. 23, 1987. R.

Inglés. (♂); Finca Alzamora RUM. Nov. 22, 1991. V. González. (2♀); RUM. Aug. 1991. G. Mejía. (♀ ♂); RUM. Oct. 1991. G. Mejía. (5♂); Sept. 5, 1999. R. Tamayo. (♂); Feb. 11, 2010. E. Vélez. (♂); Feb. 6, 2014. A. Segarra-Carmona. (♂); Mar. 7, 2014. G. Pérez. (♂); Finca Alzamora RUM. 18°13.1N 67°08.9W. Oct. 1, 2014. *Ex. Sweeping* weeds. A. Segarra-Carmona. (2♂); *Sabana Grande*: Sept. 18, 1988. A. Rivera. (♀); *San Juan*: Expreso Las Américas. Feb. 12, 1988. F. Medina. (♀); *Utuado*: Mar. 3, 1987. V. Vázquez. (♀); Bo. Viví Arriba. Apr. 25, 2014. F. Barreto. (♀); *Vega Alta*: July 25, 2003. A. Delgado. (2♂); *Vega Baja*: Acc. No. 202-84. Mar. 30, 1984. S. Medina-Gaud. *Ex. Oryza sativa*. (♀); Mar. 22, 1988. R.L. Santos. (♀); Apr. 9, 1988. C. Félix. (♀); Apr. 9, 1988. J. Quiñones. (♂); Apr. 9, 1988. R.L. Santos. (♂); *Yauco*: Acc. No. 385-1921. Oct. 25, 1921. (♀); Sept. 6, 1997. E. Correa. (♂); Oct. 4, 1997. E. Correa. (2♀). **ST. CROIX**: Sept. 3, 1988. M.V. Gómez. (♂); **VIEQUES ISLAND**: Acc. No. 16-83. July 14, 1983. N. Virkkii and J. Escudero. *Ex. Sweeping*. (2♂).

Tribe Hypselonotini **Bergroth**

Species belonging to this tribe are distributed across the Americas, with 34 genera and 352 species. According to Fernandes et al. (2015), the tribe lacks a formal description or diagnosis, thus hindering an adequate understanding of the relationships among these genera. This is especially important, these authors remark, for launching a taxonomical study on the separation between Hypselonotini and the closely related Coreini. In fact, several authors consider the species discussed below as members of Coreini (Fernandes et al., 2015).

Althos Kirkaldy

Althos obscurator (Fabricius, 1803: 200) [Plate IX, Fig. 42]
Coreus obscurator Fabricius
Margus obscurator Stål (Barber, 1923); (Wolcott, 1936)
Althos obscurator Van Duzee

Type Locality. "America meridionali".

Antillean and Caribbean Distribution. Cuba, Dominica, Grenada, Guadeloupe, Puerto Rico, Trinidad, Florida (USA); Central and South America.

Host Plant Record. No host records exist for Puerto Rico. Blatchley (1902) reported specimens from flowers of unidentified thistles and from *Senecio* sp. (Asteraceae) [rawort]. Grillo (2012) also reports a collection on dried seed-heads of *Erechtites hieraciifolius*

(L.) Raf. ex DC. (Asteraceae) [American burnweed, Achicoria de cabra] from Cuba, perhaps suggesting an association between *A. obscurator* and this plant family.

Remarks. Barber (1923) first listed this species from Puerto Rico, under its synonym *Margus obscurator* (F.), from a specimen collected in Aibonito June 2, 1915 by Lutz and Mutchler. *Althos obscurator* is a mid-sized (8 to 10 mm), light to dark brown species. Its head has a prorrect juga and tylus, strongly projected anteriorly, with a clearly club-like fourth antennal segment. Abdominal pleura, with two to six small dark spots, is present midway between spiracles and sterna, and wing membrane has many anastomosing veins; metafemur neither swollen nor armed. This appears to be a rare species in Puerto Rico, with only one recent collection (i.e., 2018) since 1956. All MEBT specimens appear to have been collected at higher altitudes, including one collected from the island's highest mountain, "Cerro Punta" in Jayuya. Grillo (2012) makes a similar observation about specimens of this rare species collected in Cuba.

Material Examined. **PUERTO RICO**. *Adjuntas*: Bo. Limaní, AES 18°10.5N 66°47.31 W. Dec. 13, 2018. Malaise trap. H. Pérez and A. Segarra-Carmona; *Cayey*: Acc. No. 24-54. Sept. 28, 1954. (♂); Acc. No. 74-54. Sept. 28, 1954. (♂) *Jayuya*: Acc. No. 73-56. Sept. 29, 1956. "Top of Cerro Punta." (♂); *Lares*: Apr. 7, 1942. A. Sifontes. (♀ ♂ JAR); *Maricao*: Apr. 15, 1944. M. Pérez. (2♂ JAR); Insular Forest. Nov. 9, 1945. (♂ JAR); **GUADELOUPE.** June 29, 1937. Mt. Soufrieve. (♀ 2♂ JAR); June 1937. Dole (2♂ JAR).

Anasa Amyot and Serville

Anasa scorbutica (Fabricius, 1775: 706) [Plate IX, Fig. 37]
Cimex scorbuticus Fabricius
Anasa scorbutica Stål (Barber, 1923 and 1939; Wolcott, 1948)

Type Locality. "America Insularis".

Antillean and Caribbean Distribution. Antigua, Bahamas, Cuba, Granada, Hispaniola, Jamaica, Puerto Rico, St. Croix, St. Vincent, Trinidad, Florida (USA), Venezuela; Central and South America.

Host Plant Record. Cucumis sativus (L.), *Cucurbita moschata* (Duch.) Duchesne and Poir. (Cucurbitaceae) (Wolcott, 1936; Martorell, 1976). Brailovsky (1985) mentions other host plants, such as tomato and cotton, but apparently, its preference is for cucurbits, like *Luffa aegyptiaca* Mill [spongue gourd, esponja] and *Lagenaria siceraria* (Molina) Standl [bottle gourd, calabazo].

Remarks. This species was first reported in Puerto Rico by Barber (1923) from specimens collected from Aibonito in 1915. The genus *Anasa* Amyot and Serville is mostly of Neotropical distribution, with only a few species occurring in the Nearctic. Over 60 species have been described, but only a handful occur in the Caribbean (Brailovsky, 1985). Brailovsky suggests that this widely distributed species was introduced into the Caribbean from Mexico and Central America through human activity (i.e., movement of cucurbit host plants through the archipelago). Although regularly found associated with cucurbit crops, there are no records of injurious economic impacts to these plants (Levin-Mitchell, 2000). The genus *Anasa* Amyot and Serville can be told from the closely related hypselonotine genus *Catorhintha* Stål by the absence of a ventral lobe-like plate below the antenna, its larger size (10 to 13 mm), its more rounded and less elongated body shape, smoothly convex head, and much shorter bucculae. *Anasa scorbutica* can be distinguished from its closely related congeners by its armed antennal tubercle, its armed metafemur and the triangular processes in the posterior margin of the pronotum (Brailovsky, 1985).

Material Examined. **PUERTO RICO**. *Aguas Buenas*: Casa Cursillos, Alt. 111.48 m. Oct. 13, 1964. S. Medina-Gaud. *Ex*. On glass door. (♂); *Adjuntas*: Acc. No. 18-85. Monte Guilarte. Apr. 19, 1985. N. Virkki. *Ex*. Mixed Vegetation. (2♀); *Cabo Rojo*: Sept. 28, 2013. G. Rodríguez. (♂); Nov. 15, 2014. L. Vélez. (♂); *Cayey*: Road 1 from Salinas to Cayey. Aug. 26, 1968. S. Medina-Gaud. *Ex*. Mixed Vegetation by Roadside. (♀); Road 1 Km 80 from Cayey to Salinas. Nov. 22-25, 1968. *Ex*. Malaise trap. (♀); *Fajardo*: Acc. No. 500-39. Oct. 31, 1939. L.F. Martorell. (♀); *Guayama*: Guamaní. Feb. 13, 1982. A. Poventud. (♀); *Juana Díaz*: Acc. No. 301-86. Fortuna AES. June 16, 1986. S. Medina-Gaud, and A. Segarra-Carmona. *Ex*. Pumpkin leaf. (♂); *Mayagüez*: Sept. 2, 2003. A. Delgado. (2♀); *Sabana Grande*: Susúa. Oct. 28, 2013. C.A. Negrón. (♂); *Yauco*: Bo. Carrizales. July 25, 1975. R. Inglés, Ex. *Solanum caribaeum*. (♀).

Catorhintha Stål

Catorhintha borinquensis Barber (1923: 1) [Plate IX, Fig. 38]
Catorhintha borinquensis Barber

Type Locality. Baños de Coamo, Puerto Rico

Antillean and Caribbean Distribution. Puerto Rico.

Host Plant Record. Not known.

Remarks. This rare endemic species was described by Barber (1923) from a male, along with 11 paratypes, from Coamo Springs, all collected by Lutz and Mutchler in May 1915. This species can be differentiated from *C. guttula* by the following combination of features: antennae, femora and tibiae have small reddish spots, not dark brown; spine in antenniferous tubercle is longer (i.e., > 1/3 length of first antennomere) and more acute; corium does not have pale callused areas; head, pronotal disc, and scutellum with irregular middle longitudinal yellow stripe; and strongly bicolored connexiva.

Early on, this species' distribution and identity has been disputed. Shortly after Barber's (1923) description, Blatchley (1926) described *C. borinquesis viridipes* from Florida designating it as subspecies because "*…spines on head behind the bases of antennae are almost as prominent as those of Anasa armigera (Say)*", meaning they were very long. Later, Torre-Bueno (1941) elevated *viridipes* to the rank of species based purportedly on their longer antenniferous tubercles as compared with *borinquensis.* In 1939, Barber (1939: 316) mentions the existence of a *borinquensis* specimen collected from Soledad, Cuba. Finally, Brailovsky and Garcia (1987) suggest that the species described by Barber (1923) may really correspond to *viridipennis,* and that the latter coexists sympatrically with *borinquensis* in Puerto Rico, and that *borinquensis* from Cuba is really *viridipennis*. This controversy remains today, and its resolution appears hampered by the apparent extreme rarity of specimens in Puerto Rico and illustrated by the fact that the only specimens recorded since 1915 correspond to those collected over 100 years later by an entomology student in 2016 (See Discussion).

Material Examined. **PUERTO RICO.** *Cabo Rojo*: Buyé. Apr. 2, 2016. Coll. I. Cuba (♀ 2♂).

Catorhintha guttula (Fabricius, 1794: 162) [Plate IX, Fig. 39]
Lygaeus guttula Fabricius
Gonocerus dorsigera Westwood
Catorhintha guttula Stål

Type Locality. "Americae Insulis".

Antillean and Caribbean Distribution. Bimini, Caja de Muertos Island, Cuba, Culebra, Grenada, Hispaniola, Jamaica, Mona Island, Puerto Rico, St. Croix, St. John, St. Kitts, St. Lucia, St. Thomas, Trinidad, Vieques; United States, Central and South America.

Host Plant Record. Martorell (1976) lists the following plant records in Puerto Rico: *Terminalia buceras* (L) C. Wright. (Combretaceae) [black olive, úcar]; *Gossypium barbadense* L. (Malvaceae) [cotton, algodón]; *Boerhavia* (=*Commicarpus*) *scandens* (L.) (Nyctaginaceae) [climbing wartclub, pegapollo]; *Zea mays* L. (Poaceae) [corn, maíz]. Schaefer and Mitchell (1983) report *Boerhavia* sp. and *Crotalaria* sp. (Fabaceae) [rattlebox, crotalaria] as host plants. Other host plant associations in the United States listed by Baranowski and Slater (1986) are: *Heterotheca* sp. [false goldenaster], *Cirsium* sp. [thistle] (Asteraceae); *Lyonia ferruginea* (Walt.) Nutt. (Ericaceae) [rusty staggerbush]; and *Ludwigia* sp. (Onagraceae) [primrose willow].

Remarks. *Catorhintha guttula* was first reported in Puerto Rico by Barber (1923). This common species is small to mid-size (7 to 9 mm), densely punctured, greyish brown, with distal ends of antennal segments III and IV yellowish brown, and two large yellowish spots on the tergum. Most MEBT specimens have unicolored pale yellow connexival, but forms with bicolored connexival are known from elsewhere. Characteristics separating *Catorhintha* from the closely related *Anasa* have been noted earlier. The genus is of Neotropical origin with 26 species described. Two species occur in Puerto Rico: *C. guttula* and *C. borinquensis* Barber (Barber, 1939; Brailovsky and Garcia, 1987; Wolcott 1936, 1948). According to Brailovsky and Garcia (1987) only two species (*C. guttula* and *C. mendica* Stål) display sexual dimorphism in femoral vestiture patterns, with males having a “dense brush” of long hairs ventrally in the front femora, which is absent in females.

Material Examined. **CAJA DE MUERTOS**. Acc. 273-47 Nov. 1947. L.F. Martorell. (♀); *Coamo*: Baños de Coamo. 18°02.3N 66°22.5W. Oct. 7, 2014. *Ex. Sweeping* grasses. A. Segarra-Carmona. (5♀9♂); **CULEBRA**: Nov. 31, 1986. E. Colón. (♀); **MONA ISLAND**. Acc. No. 100-39. Aug. 1939. L.F. Martorell. (♀ 6♂); **VIEQUES**: Acc. No. 252-47. Oct. 1947. L.F. Martorell. (♀); *Yauco*: Acc. No. 239-1921. Aug. 16, 1921. G.N. Wolcott. (2♂); **PUERTO RICO**. *Añasco*: Dec. 11, 1919. *Ex. Saccharum officinarum*. (♂); *Arroyo*: Finca Vicente. July 20, 1978. E. Abreu, *Ex. Chamaesyce hypericifolia*. (6♂); *Bayamón*: Sept. 4, 1983. J.A. Santiago

Blay. (♂); Nov. 11, 1988. M. Henriquez. (♂); *Cabo Rojo*: Joyuda. Apr. 1987. R. González. *Ex. Carica papaya*. (♂); Sept. 24, 2014. R. Muñiz. (♀); Combate. 17°58.3N 67°12.7W. Oct. 24, 2014. *Ex. Sweeping* grasses. A. Segarra-Carmona and Pérez. (♂); *Guánica*: Sept. 30, 1929. F. Gallardo-Covas. (♂). *Isabela*: Acc. No. 78-85. Playa Jobos. July 29, 1985. N. Virkki. *Ex*. Vegetation on Sand Dunes. (3♀ 6♂); *Lajas*: Sept. – Nov. 1960. R. Cotte. (♂); *Mayagüez*: Bo. Maní-Playa. Sept. 23, 1987. R. Inglés. (6♀ 6♂); Finca Alzamora, RUM. Mar. 7, 1982. W. Fuentes. (♂); *Ponce*: Fortuna. Feb. 1965. S. Medina-Gaud. *Ex*. *Panicum barbinode*. (5♀ 9♂); Acc. No. 136-57. July 8-9, 1957. S. Medina-Gaud . (♂); *Río Grande*: El Yunque. Road 191 Km 15, Jan. 15, 1965. S. Medina-Gaud. (♀ 4♂); *Salinas*: Acc. No. 70-16. Aguirre. Hacienda Teresa. Feb. 16, 1916. G.N. Wolcott. (5♀ 4♂).

Sphictyrtus Stål

Sphictyrtus whitei (Guérin-Méneville, 1857: 385) [Plate IX, Fig. 40; Plate X, Fig. 45].

Coreus (Paryphes) whitei Guérin-Méneville
Sphictyrtus whitei Stål
Paryphes whitei Walker

Type Locality. Cuba.

Antillean and Caribbean Distribution. Bahamas (i.e., Eleuthera, Mayaguana, San Salvador), Cuba, Mona Island, Turks and Caicos.

Host Plant Record. Wolcott (1941) writes about adults possibly feeding on *Coccoloba diversifolia* Jacq. (Polygonaceae) [pigeon plum, palo bobo]. Wolcott (1936) comments that Puerto Rican entomologist Francisco Seín collected these insects on corn in 1926, but Seín found no evidence of breeding or immatures. Ramos (1946) records adults feeding on *Colubrina arborescens* (Mill.) Sarg [coffee colubrina, abejuelo]; *Coccoloba diversifolia* Jacq. (Polygonaceae).

Remarks. This insect has been found only on Mona Island. First listed by Barber (1923), probably from specimens collected Dec. 20, 1913 by Van Zwaluwenburg, and by Lutz Feb. 21-26, 1914 (Barber, 1939). Ramos (1946: 29), remarks that this beautiful coreid is "*. . . known locally as "avispilla" because of the wasp-like flight and buzzing sound produced when disturbed*". Wolcott (1941) writes that this species is common on Mona Island, with large adult swarms "*. . . clinging to lower branches of trees in shade* *of a cliff, no apparent preference as to kind of tree, and not feeding. At top of cliff, adults on tender leaves of Coccolobis laurifolia, possibly feeding."* Ramos (1946) observed that this species is sometimes found in great numbers, especially near Sardinera Beach, but he found their swarms varied, as on some trips, they seemed to be entirely absent. As far as we know, there are no collection records of immatures, and its breeding host plants on Mona Island are yet to be discovered.

This is undoubtedly the most brilliantly colored and stunning coreid in our fauna. Adults are large (12 to 16 mm) with pale orange and black heads, bright orange scutellum and pronotum and the latter having bright metallic green or blue borders on its disc. Wing coria is metallic blue-green, with a broad, arched bright orange band on its disc. Ventral body is bright saffron or orange-yellow, with dark brown unarmed legs.

Material Examined. **MONA ISLAND**. Acc. No. 1306-13. Dec. 20-22, 1913. E.G. Smyth. (♂); Acc. No. 18-26. Aug. 18, 1926. F. Seín. (♀ ♂); Feb. 22, 1968. L.F. Martorell and I. García Tudurí. (25♀ 6♂); Acc. 97-39. Aug. 1939. L.F. Martorell. (♀ 6♂); Acc. No. 30-40. Dec. 1939. G.N. Wolcott. (♀); Acc. No. 63-84. Mar. 8, 1984. N. Virkki. (♂); Acc. No. 37-87. June 2, 1987. N. Virkki. *Ex. Vegetation*. (♂); Sardinera Beach. Dec. 18, 1988. A. Segarra-Carmona and A. Pantoja. (2♀); Uvero Beach. Dec. 20, 1988. A. Segarra-Carmona and A. Pantoja. (4♀ 5♂); Sardinera Beach. June 17, 2002. V.M. González. (♂); 18°05.25N 67°56.40W. Sept. 6, 2013. *Ex. UV Light*. A. Segarra-Carmona and L. Collazo. (2♀ 4♂).

Zicca Amyot and Serville

Zicca taeniola (Dallas, 1852: 514) [Plate IX, Fig. 41]
Clavigrallia taeniola Dallas
Zicca taeniola Stål

Type Locality. Venezuela.

Antillean and Caribbean Distribution. Cuba, Grenada, Hispaniola, Jamaica, Puerto Rico, St. Vincent, Trinidad; Florida, USA, Mexico; Central and South America.

Host Plant Record. Its principal host plant appears to be *Amaranthus* spp. [pig weed, bledo] seed heads and foliage (Baranowski and Slater, 1986; Grillo, 2012; Schaefer and Mitchell, 1983; Wolcott, 1936 and 1948), and it was also reported on *Celosia argentea* L. var. *cristata* (L.) Kuntze (Amaranthaceae) [cockscomb, cresta de gallo]. Martorell (1976) also reports *Z. taeniola* from *Cucurbita moschata* (Duch.) Duchesne and Poir. (Cucurbitaceae).

Remarks. This species was first reported from Puerto Rico by Gundlach (1893). This is a smaller species (7 to 8 mm), brown or yellowish brown, with slightly darker wing membrane. Meso- and especially meta-femora are armed with strong pre-apical spines. Other characteristics include the presence of sharp long humeral angles, large yellowish teeth in anterolateral margins of pronotum, and two small white dots in the center of the corium. This genus can be differentiated from *Althos* because its tylus and juga are not projected before base of antennae, and its forewing membranes have numerous veins with weak anastomosing. It can also be distinguished from other Hypselonotini because of its metafemur that is distinctly enlarged and armed distally with several spines, and its pronotum is strongly declivous with the posterior angle strongly spined.

Most specimens in the MEBT collection have been collected from disturbed habitats in coastal to mid-elevations (> 600m), which correspond to *Amaranthus* spp. abundance in Puerto Rico (See Liogier, 1985). Little is known about its biology. Baranowski and Slater (1986) write that females deposit eggs on *Amaranthus* seed heads, and early instars remain there, but that later instars and adults are also found on foliage.

Material Examined. **PUERTO RICO**. *Cabo Rojo*: Sept. 8, 2013. G. Rodríguez. (♀); *Isabela*: Acc. No. 161-86. AES Apr. 24, 1986. A. Pantoja and A. Segarra-Carmona. (3♀); *Mayagüez*: Finca Alzamora, RUM. Nov. 9, 1987. R. Inglés. (♀); RUM Aug. 1991. G. Mejía. (♀); Mar. 11, 2010. E. Vélez. (♀); Nov. 23, 2013. J. Nuñez. (♀); Finca Alzamora RUM. 18°13.1N 67°08.9W. Oct. 1, 2014. *Ex. Sweeping* weeds. A. Segarra-Carmona. (2♀ ♂); *Ponce*: Oct. 24, 2014. I. Rodríguez. (♀); *Quebradillas*: July 12, 1987. R. Cortés. (♀); *Río Piedras*: Acc. No. 417-17. Nov. 5, 1917. R.T. Cotton. (♀); *Yauco*: Nov. 12, 1997. E. Correa. (♀).

***Tribe Spartocerini* Amyot and Serville**

***Eubule* Stål**

Eubule scutellata (Westwood, 1842: 7) [Plate XI, Fig. 48] **New Record**

Spartocerus scutellatus Westwood
Spartocera scutellata Dallas
Crinocerus subtomentosus Stål

Eubule scutellata Stål

Type Locality. St. Vincent, West Indies.

Antillean and Caribbean Distribution. Antigua, Mona Island, Puerto Rico, St. Vincent, Venezuela; Brazil.

Host Plant Record. Not known.

Remarks. This species is a new record for both Puerto Rico and Mona Island. The species was identified by Dr. Harry Brailovsky (Pers. comm. 2013, Univ. Nacional de Mexico), and confirmed from illustrations found in Brailovsky (1992). This is a large, dark brown, wooly species (15 to 17 mm) with conspicuous, contrasting, and thin white or cream-colored inner border in hemelytra; black scutellum with a thin whitish median line and outer border; two conspicuous adjoining black spots on pro- and mesopleura, and a single larger spot on the metapleuron.

Little is known about the biology of members of this Neotropical genus. Host plant associations are known for only two species: *E. sculpta* (Perty) found on *Morrenia* sp. (Asclepiadoideae) and on *Cayaponia* (*=Trianosperma*) (Cucurbitaceae) (Schaefer and Mitchell, 1983); and for *E. ampliata,* found on *Jacquemontia curtissii* Peter ex Hall. f. (Convolvulaceae) (Baranowski and Glenn, 1996). All MEBT specimens have been collected from highly xeric, rocky limestone coastal habitats.

Material Examined. **MONA ISLAND**. Pájaros Beach. Dec. 20, 1988. A. Segarra-Carmona and A. Pantoja. (♀); **PUERTO RICO**. *Cabo Rojo*: Nov. 21, 1999. R. Tamayo. (♀); Playa Sucia. Feb. 4, 2012. E. Padilla. (♂).

Sephina Amyot and Serville

Sephina indierae Wolcott, 1924: 251 [Plate XI, Fig. 49]
Sephina erythromelas Walker (in Barber 1939; Wolcott, 1948)
Sephina indierae Wolcott

Type Locality. Mountains of Maricao/Yauco, Puerto Rico.

Antillean and Caribbean Distribution. Puerto Rico.

Host Plant Record. Metastelma sp. R. Britton (Apocynaceae: Asclepiadoideae), probably *M. ephedroides* (Griseb.). Some authors offer *Cynanchum* L. as a generic synonym for this plant.

Remarks. This beautiful crimson and black coreid is likely an endemic species, first described by Wolcott (1924) from specimens collected by F. Seín and G. Wolcott on its host plant *Metastelma* sp. and found in an abandoned *Coffea arabica* L. (Rubiaceae) grove in “la Indiera”, deep in the mountains north of Yauco. The type specimen is a male, currently housed at the British Museum of Natural History [BMNH(E) no. 651600]. While Wolcott did not designate any paratype, a female bearing the same collection information is held at MEBT (MEBT 0013351), and it is currently labeled as a syntype.

This is a large (18 to 24 mm), aposematically-colored velvety crimson and black, a rare species, known only from a few specimens collected at high elevations in western Puerto Rico. Members of this genus are characterized by their wing membrane veins that are not distinctly anastomosing. Their coloration is remarkably reminiscent of the aposematic coloration found in other common milkweed-feeding Pentatomomorpha (i.e., Asclepiadoideae) [i.e., *Oncopeltus* and *Spilosthetus* (Lygaeidae), and *Dysdercus* (Pyrrhocoridae)] and perhaps represents a good example of Müllerian mimicry. Finally, *Metastelma* sp., a Neotropical plant genus occurring in Puerto Rico, has also been reported as a host plant to other species in this genus, such as *S. gundlachi*, and *S. grayi* Van Duzee (Schaefer and Mitchell, 1983).

This species’ validity has been in question. Barber (1939) and Wolcott (1948) both agreed that *S. indierae* was in fact a junior synonym of *S. erythomelaena* (White, 1842: 92), a Brazilian species. We have decided it proper to keep Wolcott’s original 1924 *S. indierae* species designation using two main criteria: (1) its current status as valid species in Packauskas (2010), and on the website *Coreoidea Species File Online*. Version 5.0/5.0. [28 January 2019]. http://Coreoidea.SpeciesFile.org; and (2) because the resulting and otherwise odd distribution of *S. erythomelaena* (i.e., only Brazil and Puerto Rico) is hard to explain. Again, as we have pointed out earlier, this genus, as in many other in Coreoidea, is due for a full revision.

Material Examined. **PUERTO RICO**. *Maricao*: St. Forest. Oct. 26, 1975. L.C. Bonilla. (♀ ♂ JAR); May 13, 1978. J. Figueroa. (♀ JAR); *Utuado*: Bo. Mameyes. Sept. 17, 1983. J.A. Torres. (♂ JAR); *Yauco*: Acc. No. 147-1921. June 16, 1921. G.W. Wolcott. (♀ JAR); Acc. No. 32-87. Road 374. May 21, 1987. N. Virkki. (2♀ ♂).

Spartocera Laporte

Spartocera batatas (Fabricius, 1798: 540) [Plate XI, Fig. 46]
Lygaeus batatas Fabricius
Coreus batatas Fabricius
Corecoris batatas Barber
Spartocera batatas Amyot and Serville

Type Locality. Surinam and Guyana ('Cayenne').

Antillean and Caribbean Distribution. Cuba, Dominica, Grenada, Hispaniola, Jamaica, Martinique, Puerto Rico, Saba, Vieques; Colombia, Brazil.

Host Plant Record. Martorell (1976) considers *S. batatas* an important pest of sweet potato, *Ipomoea batatas* (L.) Lam. (Convolvulaceae) in Puerto Rico. Other plant records from Martorell include: *Solanum lycopersicum* Mill., *Solanum tuberosum* L. (Solanaceae), and *Citrus paradisi* MacFayden (Rutaceae), but there is no indication that the species is of economic importance to these crops.

Remarks. According to Wolcott (1948: 148), this species was first recorded from Puerto Rico in a 1914 typewritten report by USDA entomologist R.H. Van Zwaluwenburg as a pest of sweet potato. Jones (1915) recorded *S. batatas* adults and nymphs as occurring "*. . . in great abundance on sweet potato*, *their beaks embedded in the stalks and leaf petioles of the plants*". According to Barber (1939), the earliest known specimens of this species in Puerto Rico were collected by Busck from Aguadilla, Arroyo, Bayamón, Fajardo, Mayagüez, Utuado and Vieques in 1899. Dozier (1926) provides records of parasitism by *Trichopoda pennipes* F., a cosmopolitan tachinid fly (Diptera: Tachinidae: Phasiinae), and also recorded from the pentatomids *Nezara viridula* and *Thyanta perditor.* Dozier also recorded the presence of *Beauveria bassiana* (Bals.-Criv.) Vuill. (Fungi: Ascomycota), causing the white muscardine disease, as a natural control agent of this bug.

This species is a member of Spartocerini tribe, whose members are characterized by nearly equal distances between their hind coxae, as between the hind coxae and the lateral margins of their thorax. Adult *S. batatas* are relatively large dark brown bugs (15 to 19 mm), which can easily be distinguished from its congener, *S. fusca,* by having mostly dark brown connexival margins and rounded, not elevated humeral margins of the pronotum. Newborn nymphs are bright red, becoming dark brown as they develop towards their last instar. This species can be found at all elevations in Puerto Rico, and apparently, some specimens are attracted to light.

Material Examined. **PUERTO RICO**. *Adjuntas*: Feb. 18, 2011. D. Torres. (♀); *Aibonito*: Sector Sierra. Oct. 11, 1991. V. González, (♂); *Aguada*: Cerro Gordo. Sept. 30, 1987. F. Inglés. (♀); Nov. 1, 1987. F. Inglés. (♂); Oct. 20, 1991. F. Inglés. (♀); *Barranquitas*: Nov. 21, 1999. R. Tamayo. (♀); *Cabo Rojo*: Finca SANA. P.A. Burgos. (♀ ♂); *Camuy*: May 2, 1987. I. Román. (♂); *Carolina*: Feb. 15, 1987. M. Ríos. (♀); Mar. 10, 1987. V. Vázquez. (♂); *Corozal*: Oct. 18, 1976. *Ex. Blacklight*. (♀); *Gurabo*: Apr. 18, 1987. (♀); *Isabela*: Feb. 20, 1988. F. Medina. (♂); *Mayagüez*: Mar. 3, 1979. P.V. Ronda. *Ex*. sweet potato. (♀); *Naguabo*: Acc. No. 47-1914. Mar. 7, 1914. T.H. Jones. (♀); *Ponce*: 18°5'0.40"N, 66°39'14.65"W. Mar. 8, 2014. C. Negrón, *Ex*. unk. *Dioscoreaceae* foliage. (♀); *San Juan*: Acc. No. 145-20. Río Piedras. Oct. 27, 1920. F.S. Earle. (♀); Río Piedras. Feb. 10, 1969. J. García Tudurí. (♀); Acc. No. 118-83. Sabana Llana. Nov. 23, 1983. L. Lugo. *Ex*. sweet potato foliage. (♂); Apr. 11, 1986. W. Figueroa. (♀); Apr. 1987. F. Ruiz. (♀); *Toa Alta*: Sept. 15, 1988. E. Santiago. (♀); *Utuado*: Mar. 18, 2011. N. Valentín. (♂); Bo. Viví Arriba. Feb. 27, 2014. F. Barreto. (♂); *Vega Baja*: Apr. 9, 1988. C. Felix. (♂); *Yauco*: Feb. 16, 2013. L. Torres. (♀).

Spartocera fusca (Thunberg, 1783: 44) [Plate XI, Fig. 47]
Cimex fuscus Thunberg
Reduvius moestus Fabricius
Coreus moestus Fabricius
Spartocera geniculata Amyot and Serville
Spartocera moesta Dallas
Coreus (Spartocera) geniculatus Guérin-Méneville
Spartocera fusca Stål
Corecoris fusca Barber
Spartocera fusca Barber and Bruner

Type Locality. Not mentioned by Thunberg. Fabricius (1794: 198) as *R. moestus* from Guadeloupe.

Antillean and Caribbean Distribution: Antigua, Cuba, Hispaniola, French Guyana, Grenada, Guadeloupe, Jamaica, St. Bartholomew, St. Vincent; North, Central and South America.

Host Plant Record. Martorell (1976) lists the following host plant records in Puerto Rico: *Momordica charantia* L. (Cucurbitaceae); *Capsicum frutescens* L., *Solanum lycopersicum* Mill., *Solanum americanum* Mill., and *S. melongena* L. (Solanaceae).

Remarks. This species was first recorded from Puerto Rico by Gundlach (1893), and it is widely distributed in the Americas between the United States and Argentina (Fernandes et al., 2015). Although frequently associated with solanaceous plants, this species is not considered a pest of economic importance (Levin-Mitchell, 2000). According to this author, this species is found in weeds, gardens, and at field edges, and in addition to solanaceous host plants, it has also been recorded on cotton, sweet potatoes, and beans. Members of this genus are primarily Neotropical and easily recognized by the lack of expanded metatibia, a widely expanded and rounded abdomen, and by having much narrower hemelytra (Levin-Mitchell, 2000). *Spartocera fusca* can be readily recognized from its congener *S. batatas* by its slightly larger (17 to 21 mm) size, a bicolored (black and orange) connexival, and slightly expanded (alate) humeral angles.

Material Examined. **PUERTO RICO**. *Adjuntas*: Acc. No. 17-85. Apr. 19, 1985. N. Virkki. *Ex*. mixed Vegetation. (♀); *Cayey*: Acc. No. 127-55. Aug. 1955. (♀); Sept. 1988. M.V. Gómez. (♀ ♂); Oct. 19, 1988. J. Rosain. (♀); Nov. 9, 1988. E. Santiago. (♀); Nov. 15, 1988. C. Lara. (♂); *Guayama*: Acc. No. 71-21. Jan. 5, 1921. J.O. More. (♀); *Fajardo*: Acc. No. 464-1912. May 29, 1912. T.H. Jones. (♀); *Guayama*: Acc. No. 71-21. Jan. 5, 1921. J.O. Moore. (♀) *Lajas*: Apr. 25, 1987. V. González. (♂); *Río Piedras*: Acc. No. 508-16. June 1, 1916. E.G. Smyth. (♀); *San Sebastián*: May 1987. R. González. *Ex*. "Níspero" *Malnikara zapota* (L.) P. de Royen (Sapotaceae). (♂); *Trujillo Alto*: Acc. No. 129-83. Dec. 4, 1983. *Ex*. Eggplant fruit and leaves. N. Navarro. (39♀ 30♂); *Utuado*: Bo. Viví Arriba. Feb. 27, 2014. F. Barreto. (♀); *Yauco*: Road 128 Km 2.0. July 25, 1975. R. Inglés. *Ex*. *Solanum americanum*. (♀); Jan. 29, 1987. K. Christian. (♂).

Incertae Sedis (Coreinae)

Mamurius Stål

Mamurius prob. ***cubanus*** Barber and Bruner (1947: 79) [Plate VIII, Fig. 35] **New Record**

Mamurius cubanus Barber and Bruner

Type Locality. Holguín, Cuba.

Antillean and Caribbean Distribution. Cuba, Puerto Rico.

Host Plant Record. No host records are known.

Remarks. This is a new record for Puerto Rico. This appears to be a rare species of medium size (8 to 9 mm), dark brown, oblong-oval, stout-bodied. Grillo (2012) remarks about its rarity in Cuba. Only two recent, student-collected specimens are known from Puerto Rico. It is not known if these represent a recent introduction, or a rare local resident species that so far had never been collected. Initially, specimens were identified as members of genus *Zicca* by the senior author. However, the kind examination of a photo by H. Brailovsky (Pers. Comm. 2019. Inst. Biol. Univ. Auton. Mexico), and closer inspection of MEBT specimens, revealed clear differences with *Zicca* in the size and shape of the head (i.e., having a small buccula, larger tylus/juga), humeral spine as a small tooth, and the size and distribution of metafemoral spines. The genus *Mamurius* is not currently placed into any of the known Coreinae tribes, and its phylogenetic position within the subfamily is unclear (i.e., "*Incertae Sedis*"). Thus, species identification will remain tentative for now, until the genus is better understood.

Material Examined. **PUERTO RICO.** *Ponce:* Oct. 24, 2014. L. Rodriguez (♂); *Utuado*: Nov. 13, 2018. J.C. Marrero (♂).

Subfamily Meropachyinae Lethierry and Severin

Merocoris Perty

Merocoris typhaeus (Fabricius, 1798: 537) [Plate VIII, Fig. 36] **New Record**

Lygaeus typhaeus Fabricius
Merocoris rugosus Amyot and Serville
Merocoris typhaeus Dallas
Corynocoris typhaeus Stål

Type Locality. Carolinas, USA

Antillean and Caribbean Distribution. Cuba, Puerto Rico; Southeastern United States.

Host Plant Record. Blatchley (1926) records specimens swept from *Persea americana* Mill. (Lauraceae) [avocado, aguacate], and also from the *Polygala lutea* L. (Polygalaceae) [orange milkwort] in Florida.

Remarks. This is a new record for Puerto Rico. Only one specimen is known from Puerto Rico, and it was collected in Mayagüez in 1946 and obtained from the José A. Ramos collection. No other collections are known from Puerto Rico. This rare species is small (7 mm), dark brown, oblong-oval, clothed with a thick matted yellowish pubescence. Pronotum has three or four short blunt tubercles along each side margin and numerous ones scattered on a glabrous posterior disc. Metafemur strongly armed with three stout spines. Grillo (2012) also remarks about its rarity in Cuba.

Material Examined. **PUERTO RICO**. *Mayagüez*: Nov. 1946. C. Freyre. (♀) (JAR).

DISCUSSION

In a posthumously published paper, foremost Puerto Rican entomologist Maldonado-Capriles (1996) wrote about the scarcity of comprehensive monographs about the taxonomy of the insect orders in Puerto Rico. He discussed the urgent need for such works, as without them, he argued, more comprehensive studies of our insect fauna (e.g., biology ecology, systematics and pest management) are not possible. Maldonado-Capriles advocated that such future works be "*. . . modern and clear enough, with keys and illustrations to attract newcomers*". The first step, he understood, had to be the elaboration of keys to the families and genera, and then for their corresponding species. He concluded that a complete faunal study of the insects of Puerto Rico should be "*. . . the goal of our entomologists*". He recognized that the first steps had already been taken (by him and a few others), but prudently cautioned that time was of the essence, as human-caused changes (deforestation, large scale agriculture and pollution) were increasingly causing irreparable losses to our biodiversity.

Thus, our work began 10 years ago. We set our goal of preparing an updated monograph of Pentatomomorpha of Puerto Rico that built on the pioneering works of Barber (1939) and Wolcott (1948), and that followed examples from past works on Puerto Rican insect fauna by Maldonado-Capriles (e.g., Miridae, Reduviidae), Hymenoptera: Vespidae (Carpenter and Genaro, 2011), Hexapoda: Collembola (Mari Mutt, 1976), and by Medina-Gaud (Thysanoptera, Aphididae, Muscidae). Thus, we sought to update biological, taxonomic and biogeographical information on members of this important group in Puerto Rico.

Two key objectives guided our work: First, to produce a faunal reference that contained new or updated taxonomical keys to local species that also provided adequate pictorial identifications for use by students and by identification professionals alike; secondly, to prepare a necessarily modest appraisal of the geographic origins of local Pentatomomorpha fauna by displaying its richness and endemicity, and by documenting any faunal additions accrued since Barber (1939) and Maldonado-Capriles and Navarro (1967) arising from recent invasions or from previously unrecorded species. A welcome consequence was the enhancement and curation of an important portion of our insect collection at MEBT.

The MEBT's insect collection is the most important repository of Hexapoda in Puerto Rico, containing specimens from every island in the "Puerto Rican Bank", a geographical area that encompasses a rich diversity of taxa and ecosystems, and which spans the Central Caribbean. This area is approximately 10,000 km^2 and comprises close to 15% of the Caribbean island mass. The Bank is a distinct evolutionarily zoogeographical hotspot composed of hundreds of islands, including Puerto Rico, Vieques, Culebra, Mona Island, Caja de Muertos, Desecheo, St. John, St. Thomas (U.S. Virgin Islands), Tortola, Jost Van Dike, Virgin Gorda and Anegada in the British Virgin Islands (Morrone, 2001; Anadón-Irizarry et al., 2012). Recent research indicates that biodiversity in this unique region needs to be better understood (Clubbe et al., 2004), and that its biodiversity is increasingly threatened by the impact of human population, alien invasive species and climate change (Rojas-Sandoval and Acevedo-Rodriguez, 2015; Lister and Garcia, 2018).

As we began this work two major difficulties had to be overcome. Foremost was the unfortunate physical state of the MEBT insect collection, which after decades of disrepair had withered down to a few dozen drawers of un-curated specimens, many if not most, were unidentified and/or in bad physical condition. The second difficulty was the almost complete loss of reference collection specimens, caused by several decades of curation and renewal relegated to rather sporadic events. Thus, as a matter of cause and effect, insect taxonomy and 'in-house' insect identification activities became essentially non-existent, and institutional memory of the insects of Puerto Rico, all but lost. Between 1970 and 2000, local insect diagnosis and identification activities for all but a few insect groups (e.g., Muscidae, Thysanoptera, Aphididae) were entirely dependent on the good graces of USDA personnel at the far away Systematic Insect Laboratory in Beltsville, Maryland.

Undoubtedly, this sad state of affairs, although not unique to Puerto Rico, predictably led to an almost complete lack of taxonomical expertise of our insect fauna. Unhappily, this vacuum was perversely timed to coincide with the advent of serious global threats to biodiversity, like climate change and by wonton assault by invasive species. Both of these threats continue to irreparably alter our fragile island fauna forever. Thus, our goal has been to initiate at least a modest retort to that unfortunate state of affairs.

On Commonness and Rarity, and the Plight of Insect Biodiversity

A recent publication by Lister and Garcia (2018) revealed deep, systematic, and sustained declines in total dry weight of arthropod biomass in Puerto Rican forest samples between 1976 and 2012. During that period, these authors document large biomass declines of between four and eight times the number of insects captured by sweep samples, and as much as 30 to 60 times in captures by sticky traps. Both these declines are strongly correlated to an increase in mean maximum temperature. Given very similar trends in other tropical environments, these authors proposed that climate warming is a major driver of reductions in arthropod abundance, indirectly precipitating a bottom-up trophic cascade, and the consequent collapse of the forest food web. Climate change is clearly having a profound impact on insect species biodiversity worldwide, as illustrated by temperate region examples of bumblebees, butterflies, carabid beetles (Kerr et al., 2015; Thomas et al., 2004; Kotze and O'Hara, 2003). Evidently, effects of climate change on tropical faunas are less understood but are likely of similar or greater magnitude (Deutsch et al., 2008).

According to Meineke et al. (2018), inferring changes in spatial or temporal species distributions from collection specimens in museums may provide insights into those effects attributable to climate change. Given that the MEBT collection dates back more than a century we decided to ascertain if its data could help identify changes in species rarity or aid in documenting declines in Pentatomomorpha species in Puerto Rico. We begin by recognizing potential shortcomings. In the case of MEBT (and, we suspect, with most other insect collections), several factors make valid and strong inferences difficult. First, as discussed in Part II (Segarra-Carmona et al., 2020), our collection holdings are possibly geographically biased, as most specimens have been collected from the western side of the island, while other large areas east and south are under-represented. Second, given the beginnings of MEBT as a collection by Agricultural Experiment Station entomologists, a bias is evident in the over-representation of certain specimens, primarily from economically important species. Third, historically MEBT has relied considerably on student-collected insects as a source of new specimens. Based on our experience, students and other cursory collectors tend to collect larger and more common species, as opposed to smaller more cryptic ones. For example, rarely are soil or nocturnal insects collected, and collecting methods usually consist exclusively of using a sweep net.

With these key caveats in mind, we believe that we can still extract a number of adequate conclusions on biodiversity patterns, rarity of species and changes in distribution. Figure 1 helps us to explore the usefulness of MEBT collection records in establishing species rarity. We begin by calling attention to the fact that almost a fifth of Pentatomomorpha species reported from Puerto Rico are not represented in the MEBT collection (n = 34 species or 18%). This is especially true for species in infraorders Aradoidea and Lygaeoidea. We suspect that this may be an artifact of their cryptic behavior and/or small size, both of which contribute to their absence from cursory field collecting. Still the data shows that many species have not been collected in over 30 to 50 years. For example, among the Pentatomoidea, 13 species (18%) appear to have not been collected during this period, and there are no

TABLE 1.—*List of potentially rare Pentatomomorpha species from Puerto Rico (i.e., known only from type specimens, or historically collected only once with no record of recent collection). († = local or Antillean endemic).*

Family	Species
Pentatomidae	*Brepholoxa rotundifrons* Barber † *Caribo fasciatus* Rolston † *Caribo maculatus* Rider † *Chlorocoris tau* Spinola *Euschistus acuminatus* Walker *Grazia tincta* (Distant) *Mormidea ypsilon* L. *Podisus borinquensis* Barber † *Runibia caribeana* Zwersch and Serville †
Scutelleridae	*Sphyrocoris obliquus* (Germar)
Megaridae	*Megara puertoricensis* Barber †
Lygaeidae	*Naecoryphus albonotatus* (Barber) † *Ochrimnus laevus* Brailovsky † *Oncopeltus semilimbatus* Stå
Geocoridae	*Pamphantus pellucidus* Slater
Rhyparochromidae	*Antillocoris pallidus* (Uhler) † *Bathydema cubana* Slater and Baranowski † *Froeschneria piligera* (Stål) *Ligyrocoris litigiosus* (Stål) Several Ozophorini
Aradidae	*Acaricoris clausus* Drake and Kormilev † *Aglaocoris natalii* Drake and Maldonado-Capriles † *Aneurus pisoniae* Kormilev † *Eretmocoris prominens* Usinger and Matsuda † *Eretmocoris tatei* Harris and Drake † *Mezira abdominalis* (Stål) *Mezira placida* Kormilev †
Alydidae	*Lyrnessus geniculatus* (Guérin-Méneville)
Rhopalidae	*Xenogenus picturatum* Berg
Coreidae	*Catorhintha borinquensis* Barber † *Merocoris typhaeus* (Fabricius)

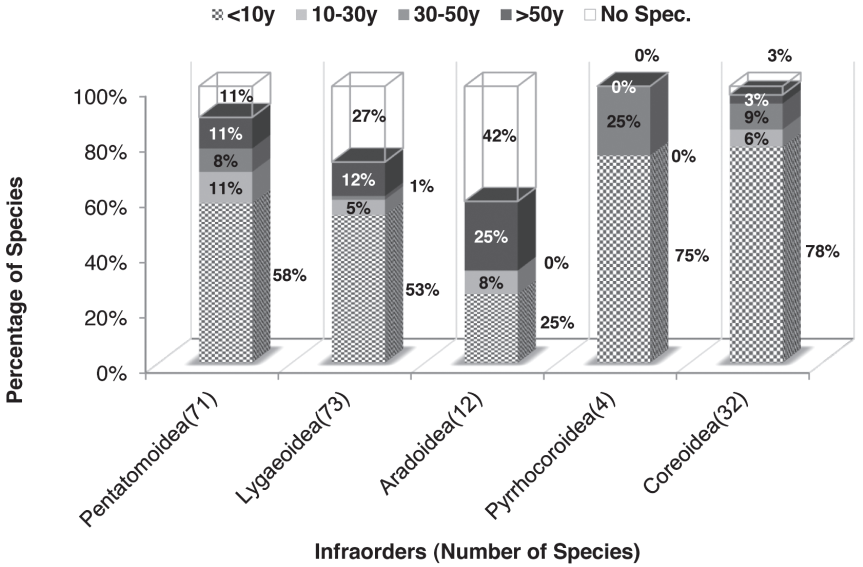

FIGURE 1. Percentage of species belonging to the five Pentatomomorpha Infraorders housed at MEBT, and their latest collection over four time-intervals of the last 50 years. (Numbers inside bars represent percentage of species last collected during that time interval; Empty boxes = % spp. never collected. Numbers in parenthesis are number of reported species in infraorder for Puerto Rico).

collection records for eight species over the past 50 years. Similarly, ten species of Lygaeoidea, and four species of Coreoidea have not been recorded as collected in over 30 to 50 years.

In trying to eliminate biases due to cryptic behavior or to size in some infraorders, we chose Pentatomomorphan families composed mainly of the larger and more conspicuous species (> 8 mm), as they are generally more likely to be collected by the average student/amateur collector. We discarded from examination those groups with a preponderance of small-sized species (i.e., Rhyparochromidae and most Lygaeoidea) and groups not regularly collected by the casual collector, such as Cydnidae or the Aradoidea, both of which may require special traps or the use of special gear, such as light traps or Berlese funnels. Four families seemed to us to be generally well represented in common collections: Pentatomidae, Scutelleridae, Lygaeidae (*'sensu strictu'*), and Coreidae. We are thus assuming roughly an equal chance of representation among MEBT specimens for these groups.

Using these larger and more conspicuous taxa, we first sought to quantify the number of specimens per species in each of these families in the MEBT collection, as a measure of uncommonness. Figure 2

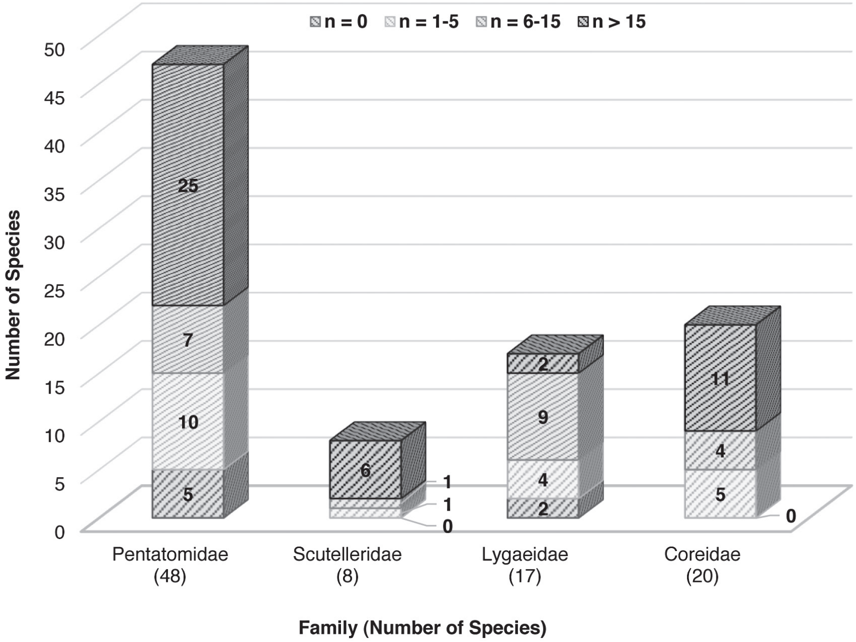

FIGURE 2. Number of species belonging to the four commonly collected Pentatomomorpha families housed at MEBT. (Number inside area represents no. of species in category); Numbers in parenthesis are number of species reported in Puerto Rico).

shows that generally the Lygaeidae tended to be less common in the collection, with the majority of species (11/17 or 65%) represented by five specimens or less. Conversely, the majority of pentatomids, coreids and scutellerids appear to be better represented, with more than 15 specimens in MEBT's collection (52%, 55%, and 75%, respectively).

We also wanted to use collection records to estimate how rare in time intervals the species of those same families were. Figure 3 shows that nearly 65% of all pentatomid, lygaeid, and scutellerid species have been collected and incorporated into MEBT during last 15 years. Coreids are more regularly collected and incorporated into MEBT than other groups, with 80% of species collected during the same period. Conversely, 10.4% of pentatomids and 11.8% of lygaeid species have not been collected in over 50 years, while all coreids and scutellerids have been collected at least once during the same period.

Expanding the analysis to encompass "time since last collection" data to superfamilies illustrates that groups we considered 'a priori' are less likely to be "casually" collected, such as Aradoidea and smaller Lygaeoidea (i.e., Rhyparochromidae), in which between 25 to 40% of their species are not represented in MEBT (Figure 3).

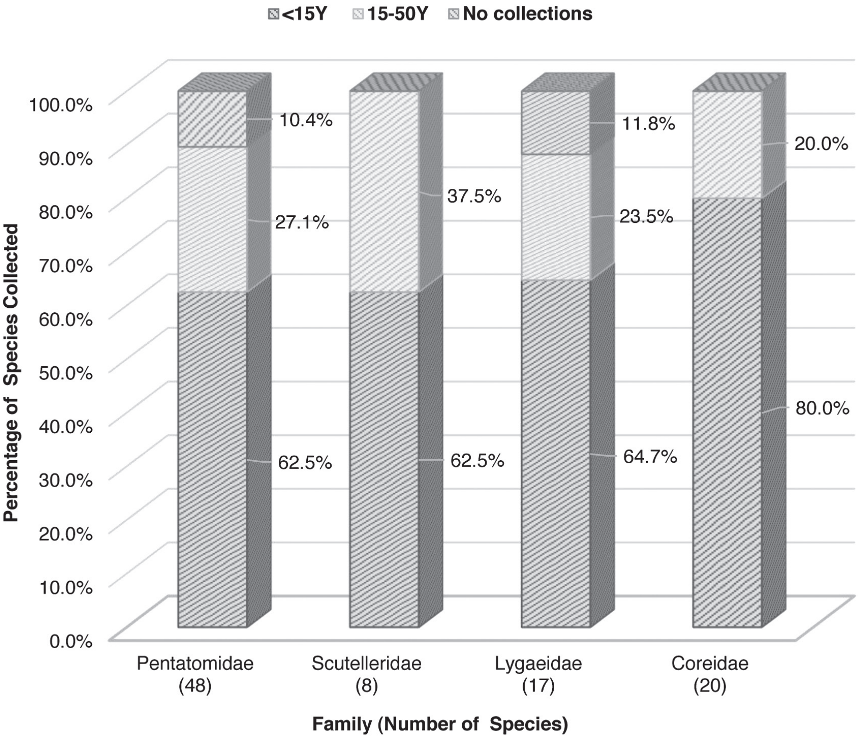

FIGURE 3. Percentage of species collected during time intervals of 0-15 and 15-50 years belonging to the four commonly collected Pentatomomorpha families. (Number inside area represents percentage of species in category). Numbers in parenthesis are number of species reported in Puerto Rico).

Again, the collections of Coreoidea species appear to be well represented in time, with over 76% of species collected at least once during the last 10 years.

Some Pentatomomorpha species appear to be very rare indeed. Table 1 is an attempt to construct a list of Puerto Rican Pentatomomorpha species known only from type specimens or those recorded to have been collected only once before 1950. First, it should be noted that about half of these taxa are local or Antillean endemics (†). On well over 60 collection trips, organized by the authors during the past 10 years, we have attempted to collect several of these species by visiting the type localities where they were first recorded. Unfortunately, none of these species were ever collected during those outings, which further suggests their extreme rarity, even hinting at their possible extinction.

However, as tempting as it may be to conclude that a species might be extinct, the case of *Catorhintha borinquensis* Barber presents an example of the perils involved. Last collection records for this species in Puerto Rico date back to 1915 (see previous discussion). Between 2011 and 2016 we organized 10 collection trips to the type locality at 'Baños de Coamo', all unsuccessful. Then, in April 2016, an alert entomology student collected three specimens of this rare species almost 90 km west of the original type location (about 1 km from the senior author's home).

We conclude that studying MEBT records may allow researchers to offer a hint of a taxon's rarity by virtue of knowing how commonly it appears within MEBT's collection as compared to other species in the collection, and by how recently these representative specimens have been collected. We also conclude that using collection records may not be entirely reliable in determining species losses or definite extinctions, especially given the lack of uniformity in collection scope and effort through extended periods of historical time.

Endemism, the Caribbean Plate, and Possible Origins of the Puerto Rican Pentatomomorpha Fauna

Work by Huang et al. (2008) demonstrates that in order to recognize essential components of historical biogeography in species conservation, we must first understand subtle patterns of geographical distribution in species diversity. In particular, the identification of areas of endemism has always been an important component in the design of species biodiversity conservation efforts, as well as to the understanding of species biogeographical invasion/extinction histories. Thus, data gathered in our Conspectus of Pentatomomorpha may be useful in exploring important questions about endemism and the origin of faunal movements of Pentatomomorpha into Puerto Rico.

We begin by examining the current distribution of species occurring in Puerto Rico. In doing so we established six general categories for geographical origin, each encompassing a larger geographical area: (1) Puerto Rican Bank endemics, i.e., known to occur only there; (2) West Indian only, species known to occur only within the West Indies (i.e., Greater, Lesser Antilles and/or the Bahamas); (3) North/Central American, species known to occur in the West Indies, Central and/or North America; (4) South American, species known only from South America and the West Indies; (5) Neotropical, widely distributed species occurring in the West Indies as well as in North, Central and South America; and (6) Cosmopolitan, representing species occurring in other world regions such as Europe, Asia, Africa and/or Australia.

Figure 4 shows that, of the 192 Pentatomomorpha species occurring in Puerto Rico, 29 species (~15%) are probably Puerto Rican bank

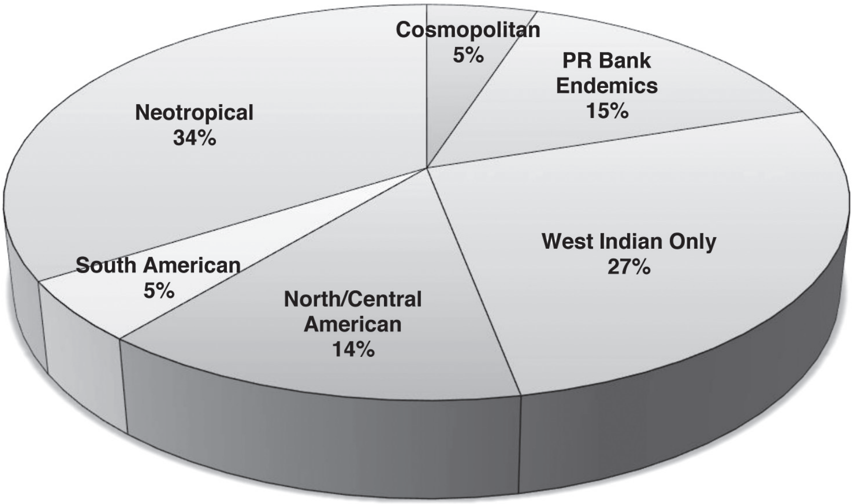

FIGURE 4. Likely origin of Pentatomomorpha species recorded from Puerto Rico.

endemics. If these are added to West Indian species, then 42% (81 spp.) of this fauna occurring in Puerto Rico are likely to be West Indian endemics. However, the next largest group of species found in Puerto Rico (34%) are species also widely distributed throughout the Neotropical region. Next, species shared only with North/Central America represent the next largest category (14%). Finally, Cosmopolitan and South American species represent the smallest share of species with 5% each.

Examination of geographical origin of species by superfamily (Table 2) shows similar origin sources to those at the infraorder level, with the exception of the Aradoidea with its seemingly large proportion of island endemics. Also, there is still a larger proportion of species shared only with North/Central America than the number shared with

TABLE 2.—*Percentage of Pentatomomorpha species by superfamily recorded from Puerto Rico by likely geographical origin.*

Superfamily	PR Bank Endemics	West Indian Only	North/ Central America	South America	Neotropical	Cosmopolitan
Pentatomoidea	12.7%	23.9%	19.7%	4.2%	35.2%	4.2%
Lygaeoidea	10.8%	31.1%	9.5%	5.4%	36.5%	6.8%
Aradoidea	66.7%	16.7%	8.3%	0.0%	0.0%	8.3%
Pyrrhocoroidea	25.0%	25.0%	50.0%	0.0%	0.0%	0.0%
Coreoidea	9.4%	28.1%	9.4%	9.4%	43.8%	0.0%

South America, and this is especially true in the Pentatomoidea. Still the largest share of fauna rests with the widespread Neotropical species, especially in the Coreoidea, Lygaeoidea and Pentatomoidea, possibly indicating their great plasticity for colonization of new habitats.

Perhaps in considering a large group such as Infraorder Pentatomomorpha, interpreting geographical distribution data may require still a finer brush. This finer approach can undoubtedly go deep into the group's taxonomical hierarchy, but in essence, important limitations arise as we progress down to smaller groups, such as tribes or genera. Principal among these limitations is the largely incomplete and relatively meager knowledge about the insect faunas in many West Indian islands.

Baranowski and Slater (2005), in their discussion of endemicity of West Indian Lygaeoidea, conclude that most of the present-day faunal distribution is the result of overwater dispersal. These authors also contrast endemism between Lesser and Greater Antilles, with the latter showing much higher degrees of endemism. Our analysis and conclusions probably differ only in the semantics of scope and accept these authors' conclusion about the high likelihood of *in situ* speciation in the West Indies due to geographical isolation and vicariance. In reality, while Baranowski and Slater were considering the question of species endemicity only in individual islands, we also considered regional endemicity. In other words, we asked the question of how many species found in Puerto Rico also occur in the West Indies and nowhere else. Therefore, if we narrowly consider just island endemics, our Puerto Rican Bank data agrees with their conclusions, showing that for the larger and more speciose superfamilies (i.e., Pentatomoidea, Lygaeoidea, and Coreoidea) local endemism appears indeed low (≈ 10-15%).

However, by using the alternative and more historical concept of endemism (i.e., species shared only with other West Indian islands), then regional endemism is indeed a much higher proportion of the fauna (≈ 35 to 45%) and likely to constitute a more relevant way to explain the present fauna. This alternative perspective on endemism makes sense in view of the region's geological history and encourages a dynamic assessment of species movements that views the West Indies essentially as a single geologic entity in recent geological times.

We know that late Jurassic to early Cretaceous (≈130 to 200 million years ago) was an important period of pentatomomorphan evolution, as representatives of all these infraorders first emerged worldwide (Yao et al., 2012). During this period the Caribbean Plate, which contains the West Indies, was somewhere within the fracturing Pangea. While there appears to be controversy as to the origin of the Caribbean Plate, the history of geological formation is fairly well established (James, 2005). Thus, during its development from Early to Middle Cretaceous

(≈90 to 130 mya), the Proto Caribbean Sea opened between the divergent plates of North and South America (Bachmann, 2001), and by late Cretaceous and early Cenozoic (≈55 to 70 mya), a single land arc ("the great Caribbean Arch") extended east from Yucatan to Puerto Rico and the Virgin Islands, north to the Bahamas and Florida, and south to northern South America through the Aves Ridge. This Caribbean Arch probably allowed unfettered overland movement of insects between North, Central and South America, as well as virtual sympatry.

According to Iturralde-Vinent (2006), it was not until after the Middle Eocene (33 to 35 mya) that large permanent islands were present within the Caribbean, and which would have provided substrates for the formation and development of the present terrestrial biota. According to Fleming et al. (2010), western and northern Hispaniola plus 'proto–Puerto Rico' separated from Cuba between early to mid-Miocene (25 to 20 mya), while southern Hispaniola joined northern Hispaniola in about mid-Miocene (circa 15 mega-annum). Puerto Rico likely separated from northern Hispaniola roughly at the same time in the Oligocene/early Miocene (25 to 23 mya). During the Miocene and Pliocene (14 to 16 mya), the Caribbean plate continued its eastward displacement, and the Greater Antilles were transported and deformed, creating deep sea straits that completed the isolation of the major islands as independent geographic entities (Iturralde-Vinent, 2006), eliminating uninterrupted overland access, and effectively ensuring allopatric and island-specific populations, and the eventual evolution of endemic species.

Understanding the significance of Caribbean plate geological events occurring between mid-Eocene and mid-Miocene (i.e., 33 to 20 mya), on current West Indian pentatomomorphan biodiversity is still a matter of conjecture. One key difficulty stems from the poor fossil record existing on the relevant terrestrial fauna. In fact, the available fossil record for West Indian insects comes almost exclusively from Hispaniolan amber deposits dating from the mid-Miocene (15 to 20 mya). For instance, from more than 200 insect species recorded from these amber deposits only three are pentatomomorphans, and all are aradids: (*Calliopsis brodzinskyorum* Froeschner, *Eretmocoris* sp., and *Mezira scheveni* Heiss (Pérez-Gelabert, 2008; Heiss, 2008).

Nevertheless, Hispaniolan amber fossils belonging to other organisms can offer valuable insights that may help our understanding of likely biogeographic events happening in Puerto Rico during that time. For example, there are Hispaniolan amber fossil records available from Anole lizards (Sherratt et al., 2015), from riodinid butterflies (Hall et al., 2004), from *Floricomus* sp. and *Misionella*. sp. spiders (Penney, 2005 a and b), and from Scarabaeine dung beetles (Tarasov et al., 2016). These records indicate that only extant fauna, at the generic level, is present, and suggest that present-day lineages had already been established by mid-Miocene.

We could then postulate that these observations agree with the statement by Baranowski and Slater (2005) about the paucity of generic endemicity in West Indies' Lygaeiod genera, in light of the relatively short evolutionary time since all these land masses were geologically unified. This may also be true for Puerto Rico, where there are no endemic pentatomomorphan genera, and a high proportion of extant genera are shared with Cuba and Hispaniola (Figure 5). In general, there appear to be more congruencies (i.e., shared genera) between Puerto Rico and Hispaniola than with Cuba, perhaps owing to the more recent geological connection with the former.

A noteworthy situation is illustrated by the Aradoidea, where Cuba appears to have an extraordinarily more diverse fauna (i.e., 22 genera) than Hispaniola or Puerto Rico, with eight and seven genera, respectively. Unfortunately, systematic collections of Carventines are rare,

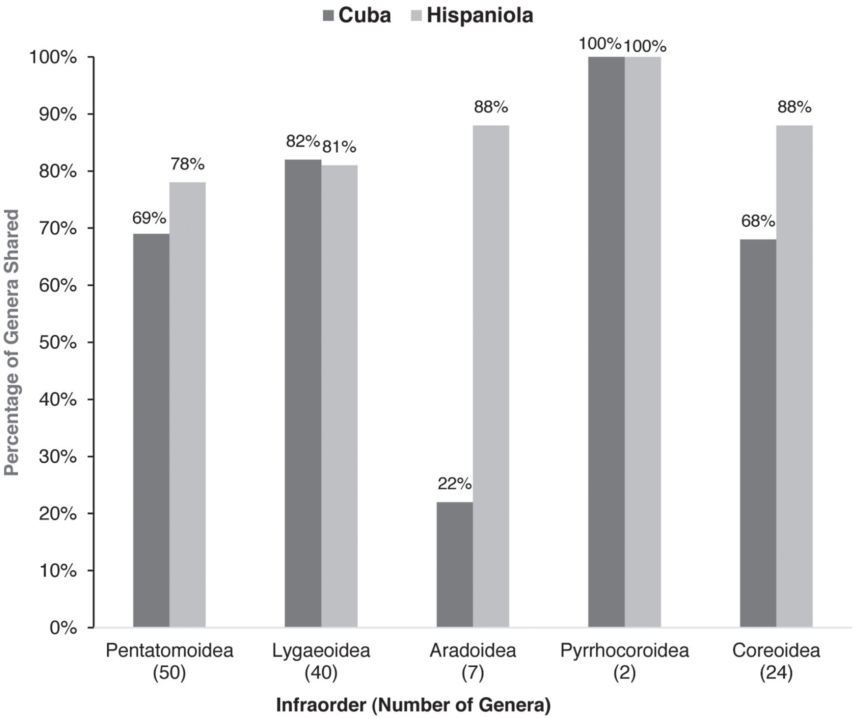

FIGURE 5. Percentage of Puerto Rican Pentatomomorpha genera shared with the islands of Cuba and Hispaniola (Number in parenthesis represents number of genera).

especially from Hispaniola. West Indian Carventines may prove to be an excellent group for studying biogeographical isolation because of their winglessness, and for their preference for secluded moist/rain forest habitats, especially at higher elevations (i.e., >500 m).

Lastly, we compare the Pentatomomorphan faunas of Puerto Rico with those in Cuba and Hispaniola (Table 3). In general, Cuban records show the highest number of genera of most superfamilies. Hispaniola tends to have larger numbers of species than Cuba in several important families, such as Pentatomidae, Lygaeidae and Rhyparochromidae. Puerto Rico has both fewer genera and species than either Cuba or Hispaniola.

As predicted by the Theory of Island Biogeography (MacArthur and Wilson, 1967), islands like Cuba, closer to large sources of new taxa

TABLE 3.—*Number of recorded Pentatomomorpha genera and species from Greater Antillean Islands [Data from Cuba by Grillo (2012); and Hispaniola by Pérez Gelabert (2008)].*

	Puerto Rico		Cuba		Hispaniola	
	Genera	Spp.	Genera	Spp.	Genera	Spp.
Pentatomoidea	**50**	**71**	**54**	**102**	**51**	**105**
Pentatomidae	34	48	34	74	35	76
Tessaratomidae	1	1	1	1	1	1
Scutelleridae	6	8	9	12	7	9
Megarididae	1	1	1	1	1	2
Cydnidae	6	11	6	10	5	14
Corymelaenidae	2	2	3	4	2	3
Lygaeoidea	**40**	**73**	**49**	**111**	**47**	**121**
Berytidae	3	4	2	3	3	3
Lygaeidae	10	17	10	25	11	31
Cymidae	1	1	2	2	2	2
Ninidae	1	1	1	1	1	1
Blissidae	2	3	4	8	3	4
Geocoridae	3	7	5	13	4	12
Oxycarenidae	1	1	1	1	1	1
Pachygronthidae	2	2	3	7	3	3
Rhyparochromidae	17	37	21	51	19	64
Aradoidea	**7**	**12**	**22**	**33**	**8**	**14**
Aradidae	7	12	22	33	8	14
Pyrrhocoroidea	**2**	**4**	**2**	**6**	**2**	**5**
Largidae	1	1	1	1	1	1
Pyrrhocoridae	1	3	1	5	1	4
Coreoidea	**24**	**32**	**30**	**58**	**16**	**26**
Alydidae	5	5	6	7	4	4
Rhopalidae	5	7	5	14	4	5
Coreidae	14	20	19	37	8	17
Total	**123**	**192**	**157**	**310**	**124**	**271**

(i.e., continents) will have increased likelihood of species invasions, and thus more biodiverse floras and faunas than islands further away from these sources. Similarly, large islands, which by virtue of their larger size offer a bigger target area for new invasions, are richer than smaller islands where extinctions are probably more common. Also, according to this theory, local species extinction is expected to be greater on smaller islands leading to lower equilibrium levels. All these corollaries could explain why Puerto Rico has fewer Pentatomomorpha genera and species, yet apparently do not explain why certain groups, like Pentatomoidea and Lygaeoidea have slightly higher species counts in Hispaniola than in Cuba (Figure 6).

It appears that important limitations may preclude us from reaching more robust hypotheses to explain pentatomomorphan biodiversity in the Greater Antilles and Puerto Rico. One limitation quickly arises from the uneven level of existing taxonomical knowledge among the islands, a situation that is especially true of Hispaniolan species. A greater understanding of Hispaniolan insect fauna will undoubtedly lead to more accurate biodiversity interpretations in the Greater Antilles. In the case of Puerto Rico, extant faunas may tell us little about the dynamics between recent immigrations and extinctions. Essentially, these lists may be only static depictions that tell us little about changes of the past. Important questions arise such as: Have Pentatomomorpha taxa colonized or gone

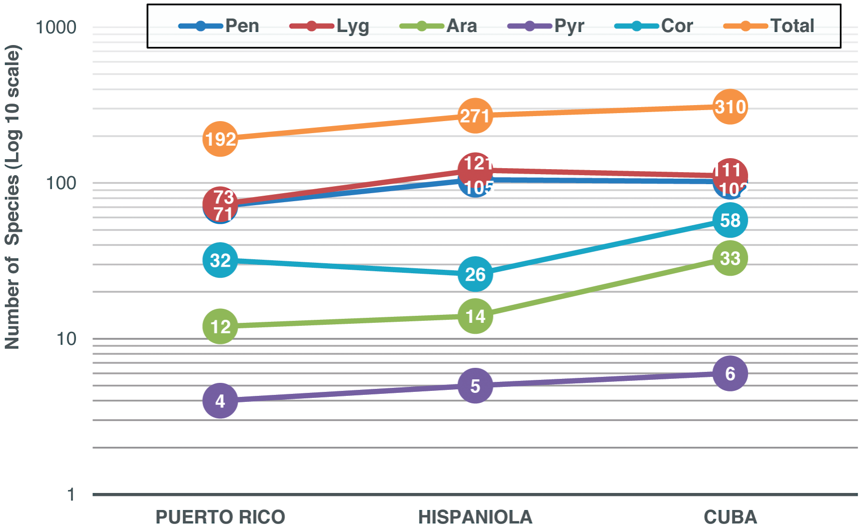

Figure 6. Number of species reported present in Puerto Rico (area =13,800 km²), Hispaniola (76,192 km²), and Cuba (109,884 km²) by Superfamily. (**Pen** = Pentatomoidea; **Lyg** = Lygaeoidea; **Ara** = Aradoidea; **Pyr** = Pyrrhocoroidea; **Cor** = Coreoidea).

extinct in Puerto Rico only once, or have they done so multiple times? How important are geographic remnants in explaining endemicity? Similarly, could the fauna have been more or less diverse in the recent past (i.e., before the Anthropocene)? Did most genera arrive overland from Central, North or South America? Or did they arrive by overwater dispersal from the Neotropical mainlands during periods of low sea level? Did island specific geographical features, such as high mountain ridges, provide added levels of population-isolation opportunities during past warming periods? It is clear that more analyses are needed to answer some of these questions about insect endemism in the West Indies.

CONCLUDING REMARKS

Maldonado-Capriles (1996) predicted that the activities fostered in preparing this kind of taxonomical work (i.e., curation, expert identification, and georeferencing of MEBT specimens) would allow an increased understanding of important patterns in insect biodiversity of the Puerto Rican Bank. Key parameters such as changing biodiversity, intraisland species distributions, the identification of species hotspots, and better historical records for invasive species introduction will bring about improved protection of our endemic species (Shaffer and Davidson, 1998; Solis and Pogue, 1999). Further, the same activities will most likely result in the description of new species to science and contribute to enhancing systematics capability within the Caribbean region.

In general, we conclude that insect biodiversity of the Puerto Rican Bank is still poorly known. We believe that climate change, as a major force for profound biogeographical change, is also poorly understood in our region. We hope that one impact of this work will lead to better use of organized biodiversity data by ecologists and students interested in the impact of climate change on species distribution and biodiversity. Abundant empirical evidence and theoretical discussions indicate that a likely outcome of climate change would be the expansion of tropical species into temperate areas, and the likely extinction of rare temperate region remnants still living in the highlands of the tropics (See Dale et al., 2001; Ward and Masters, 2007; Malcolm et al., 2006). Thus, a better understanding of West Indian insect fauna may contribute to testing these predictions of future faunal movements, extinctions and invasions caused by climate change.

We close by commenting on the role of natural history museums and collections in the knowledge of our biodiversity. Above all is their unassailable and important mission of "*… understanding the life of the planet for the benefit of the earth and its inhabitants*" (Krishtalka and

Humphrey, 2000). Historically, natural history collections have played a crucial role in disciplines at the forefront of the biological sciences, including the study of biodiversity and its losses, biological invasions, and global climate change (Suarez and Tsutsui, 2004). In fact, natural history collections serve as data archives of the natural world, and in many ways reflect past and present relationships within their represented environments (ICOM, 2013). In many cases, natural history collections may document worlds that no longer exist. For example, our century old collections at MEBT clearly document great diversity and abundance of sugarcane insect herbivores early in the 20th century, many of which are rarely observed or collected today now that the crop has nearly disappeared from this island.

At the end of the 20th century, the curator of Zimbabwe's Museum of Natural History compared the widespread neglect of natural science collections to the destruction of the ancient Libraries of Alexandria in 638 A.D. (Cotterill, 1995). This "second Alexandrian tragedy", as Dr. Cotterill describes the ongoing loss of millions of preserved specimens worldwide, paradoxically occurs in the midst of the information age, and at the dawn of a biodiversity crisis. A source of this neglect, according to Alberch (1993) is perhaps the generalized perception of natural science collections as being *"…interesting, but comparatively worthless products of a quaint pastime, as 'cabinets of curiosities' in musty museums."* It is not surprising that support for taxonomic and systematic research has steadily declined over the last 50 years, and that this is reflected in important declines in the number of taxonomists and systematists (Pyke and Ehrlich, 2010). Our past experience at MEBT undeniably bears witness to such events. We sincerely hope that this work will contribute to change the current state of affairs and stimulate analogous work here and elsewhere in the West Indies.

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Checklist of ARADOIDEA species in Puerto Rico

Family ARADIDAE (12)

Subfamily **Aneurinae Douglass and Scott**

1. *Aneurus aibonitensis* Kormilev
2. *Aneurus patriciae* Picchi
3. *Aneurus pisoniae* Kormilev

Subfamily **Carventinae Usinger**

4. *Acaricoris clausus* Drake and Kormilev
5. *Aglaocoris natalii* Drake and Maldonado-Capriles
6. *Eretmocoris gigas* Usinger and Matsuda
7. *Eretmocoris prominens* Usinger and Matsuda
8. *Eretmocoris tatei* Harris and Drake
9. *Rhysocoris disparis* (Drake and Maldonado-Capriles)

Subfamily **Mezirinae Oshanin**

10. *Brachyrhynchus membranaceus* (Fabricius) **New Record**
11. *Mezira abdominalis* (Stål)
12. *Mezira placida* Kormilev

Checklist of PYRRHOCOROIDEA species in Puerto Rico

Family LARGIDAE (1)

Subfamily **Larginae Amyot and Serville**

1. *Largus obovatus* (Barber)

Family PYRRHOCORIDAE (3)

1. *Dysdercus andreae* (Linnaeus)
2. *Dysdercus neglectus* Van Doesburg
3. *Dysdercus suturellus* (Herrich-Schaeffer)

Checklist of COREOIDEA species in Puerto Rico

Family ALYDIDAE (5)

Subfamily **Alydinae Amyot and Serville**

1. *Burtinus luteomarginatus* Maldonado-Capriles
2. *Hyalymenus longispinus* Stål
3. *Neomegalotomus rufipes* (Westwood)

Subfamily **Micrelytrinae Stål**

4. *Lyrnessus geniculatus* (Guérin-Méneville)
5. *Stenocoris filiformis* (Fabricius)

Family RHOPALIDAE (7)

Subfamily **Rhopalinae Amyot and Serville**

TRIBE CHOROSOMATINI FIEBER
- 1. *Xenogenus picturatum* Berg

TRIBE HARMOSTINI STÅL
- 2. *Harmostes dorsalis* Burmeister
- 3. *Harmostes serratus* (Fabricius)

TRIBE RHOPALINI AMYOT AND SERVILLE
- 4. *Liorhyssus hyalinus* (Fabricius)
- 5. *Niesthrea sidae* (Fabricius)

Subfamily **Serinethinae Stål**
- 6. *Jadera sanguinolenta* (Fabricius)
- 7. *Jadera haematoloma* (Herrich-Shaeffer)

Family COREIDAE (20)

Subfamily **Coreinae Leach, 1815**

TRIBE ANISOSCELINI LAPORTE
- 1. *Leptoglossus balteatus* (Linnaeus)
- 2. *Leptoglossus concolor* (Walker)
- 3. *Leptoglossus confusus* Alayo and Grillo. **New Record**
- 4. *Leptoglossus gonagra* (Fabricius)
- 5. *Leptoglossus phyllopus* (Linnaeus)
- 6. *Phthiacnemia picta* (Drury)
- 7. *Phthia lunata* (Fabricius)

TRIBE CHARIESTERINI STÅL
- 8. *Chariesterus gracilicornis* Stål

TRIBE HYPSELONOTINI BERGROTH (*COREINI* LEACH [SOME AUTHORS]).
- 9. *Althos obscurator* (Fabricius)
- 10. *Anasa scorbutica* (Fabricius)
- 11. *Catorhintha borinquensis* Barber
- 12. *Catorhintha guttula* (Fabricius)
- 13. *Sphictyrtus whitei* (Guérin-Méneville)
- 14. *Zicca taeniola* (Dallas)

TRIBE SPARTOCERINI AMYOT AND SERVILLE
- 15. *Eubule scutellata* (Westwood) **New Record**
- 16. *Sephina indierae* Wolcott
- 17. *Spartocera batatas* (Fabricius)
- 18. *Spartocera fusca* (Thunberg)

Incertae Sedis
- 19. *Mamurius* prob. *cubanus* Barber and Bruner **New Record**

Subfamily **Meropachyinae Lethierry and Severin**
- 20. *Merocoris typhaeus* (Fabricius) **New Record**

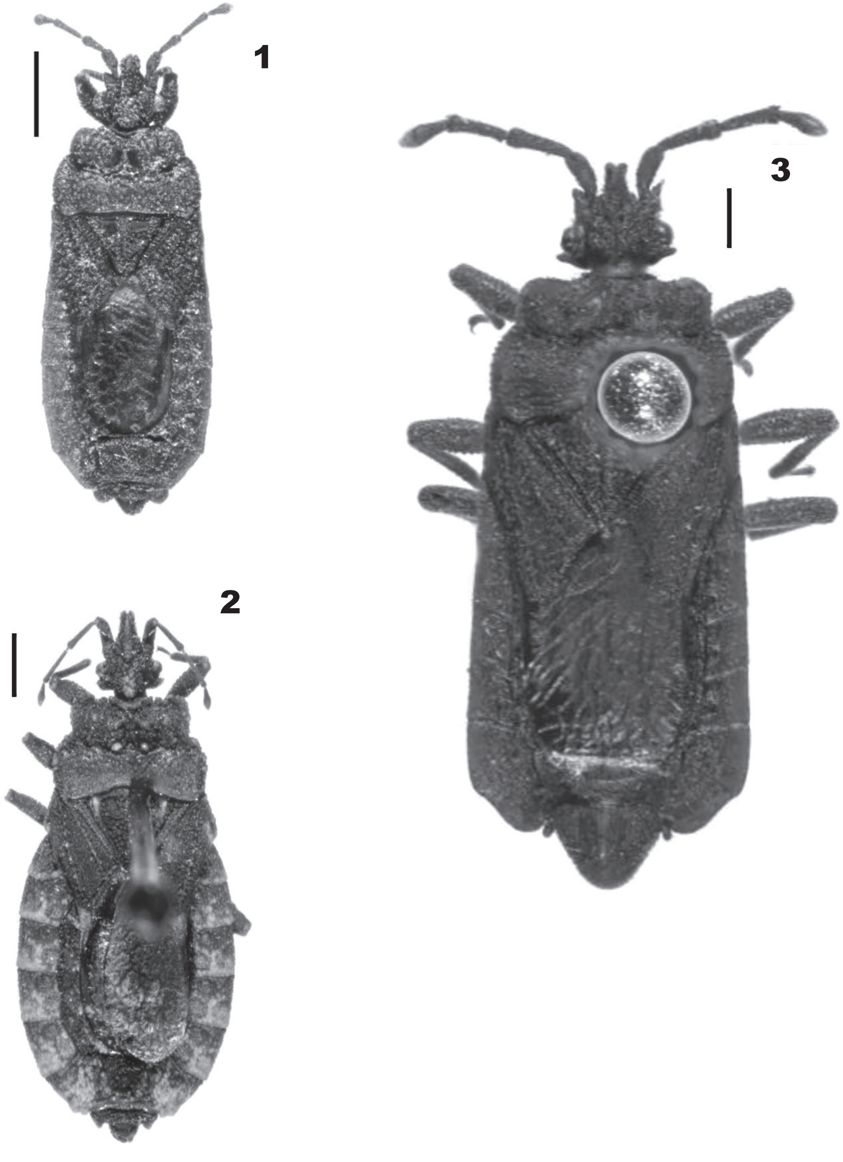

PLATE. I: ARADIDAE. 1. *Mezira placida Kormilev*; 2. *Mezira abdominalis* (Stål); 3. *Brachyrhynchus membranaceus* (F.). [Bar = 1mm]. [Photos by H. Pérez]

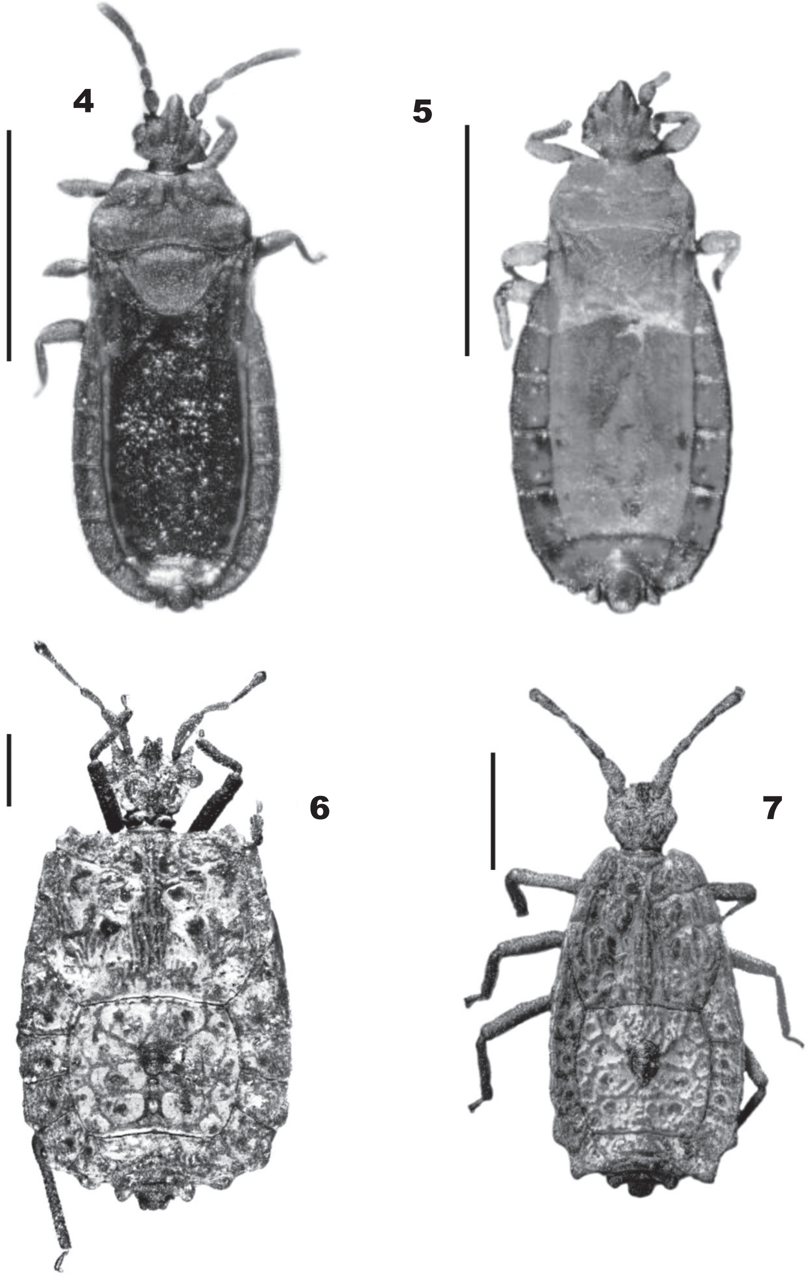

PLATE. II: ARADIDAE. 4. *Aneurus aibonitensis* Kormilev; 5. *Aneurus patriciae* Picchi; 6. *Eretmocoris gigas* Usinger & Matsuda; 7. *Rhysocoris disparis* Drake & Maldonado. [Bar = 1mm]. [Photos by H. Pérez].

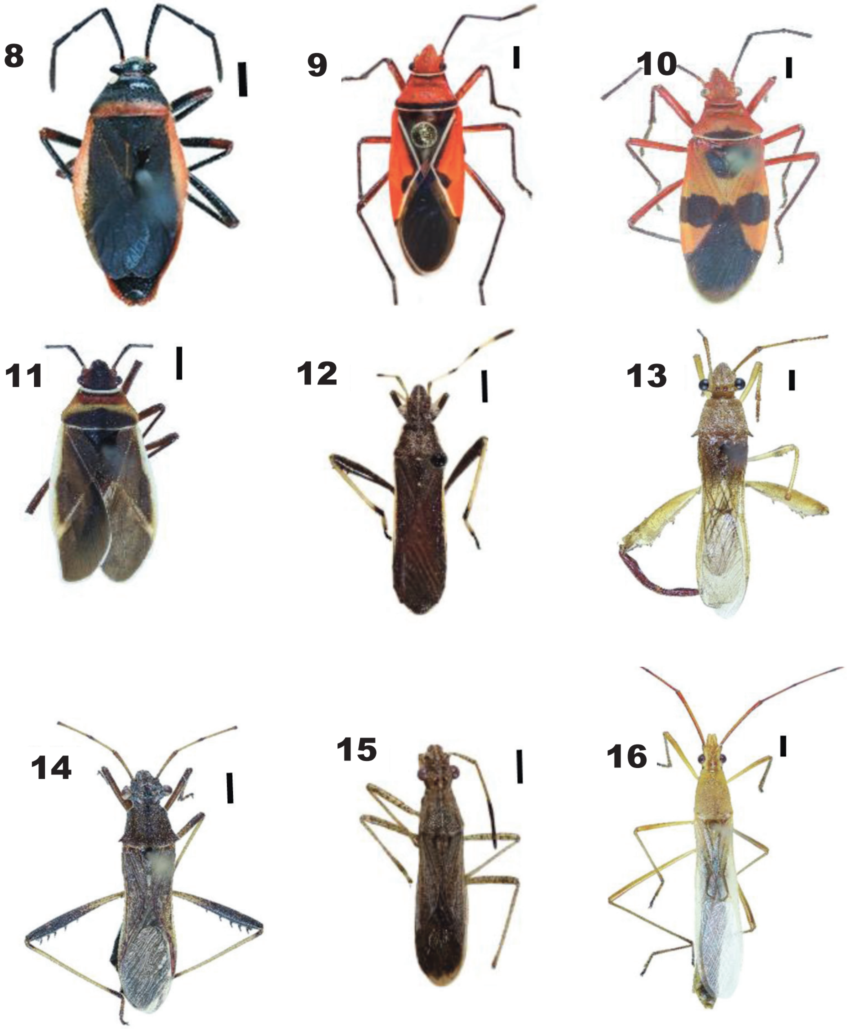

Plate. III: Largidae, Pyrrhocoridae & Alydidae. 8. *Largus ovobatus* (Barber); 9. *Dysdercus andreae* (L.). 10. *D. neglectus* Van Doesburg; 11. *D. suturellus* (Herrich-Schaeffer); 12. *Burtinus luteomarginatus* Maldonado-Capriles; 13. *Hyalymenus longispinus* Stålt; 14. *Neomegalotomus rufipes* (Westwood); 15. *Lyrnessus geniculatus* (Guérin-Méneville) 16. *Stenocoris filiformis* (F.) [Bar = 1mm. [Photos by H. Pérez].

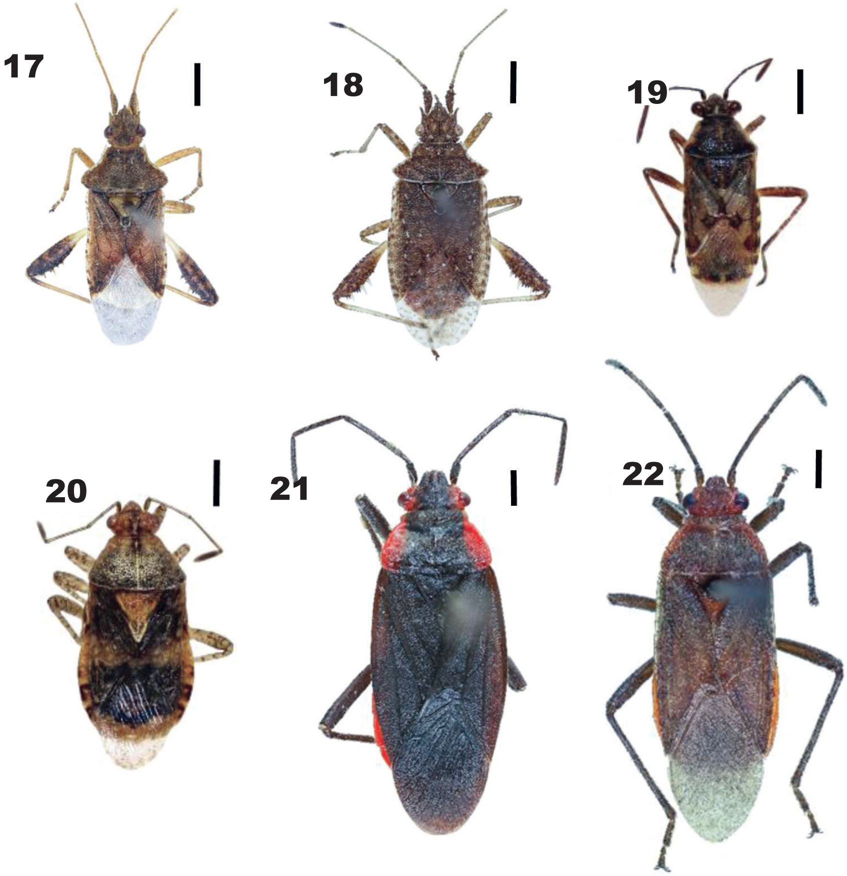

Plate IV: Rhopalidae. 17. *Harmostes dorsalis* Burmeister; 18. *H. serratus* (F.); 19. *Lyorhyssus hyalinus* (F.); 20. *Niesthrea sidae* (F.); 21. *Jadera haematoloma* (Herrich-Schaeffer); 22. *J. sanguinolenta* (F.). [Bar = 1mm]. [Photos by H. Pérez].

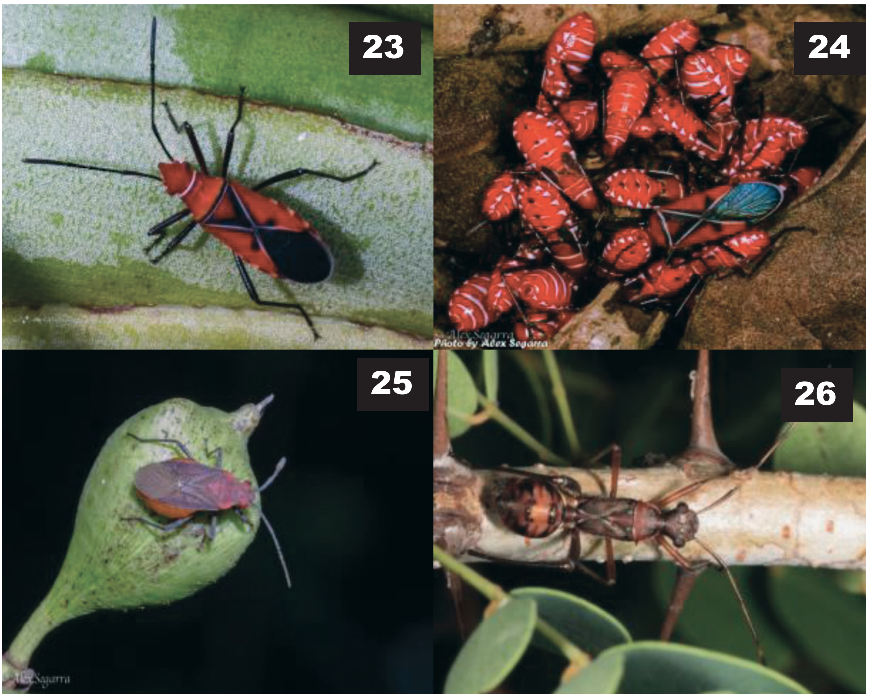

PLATE V. 23. *Dysdercus andreae* adult. 24. *D. andreae* feeding cluster with immatures; 25. *Jadera sanguinolenta* (F.); 26. *Neomegalotomus rufipes* (Westwood) nymph. [Photos by A. Segarra]

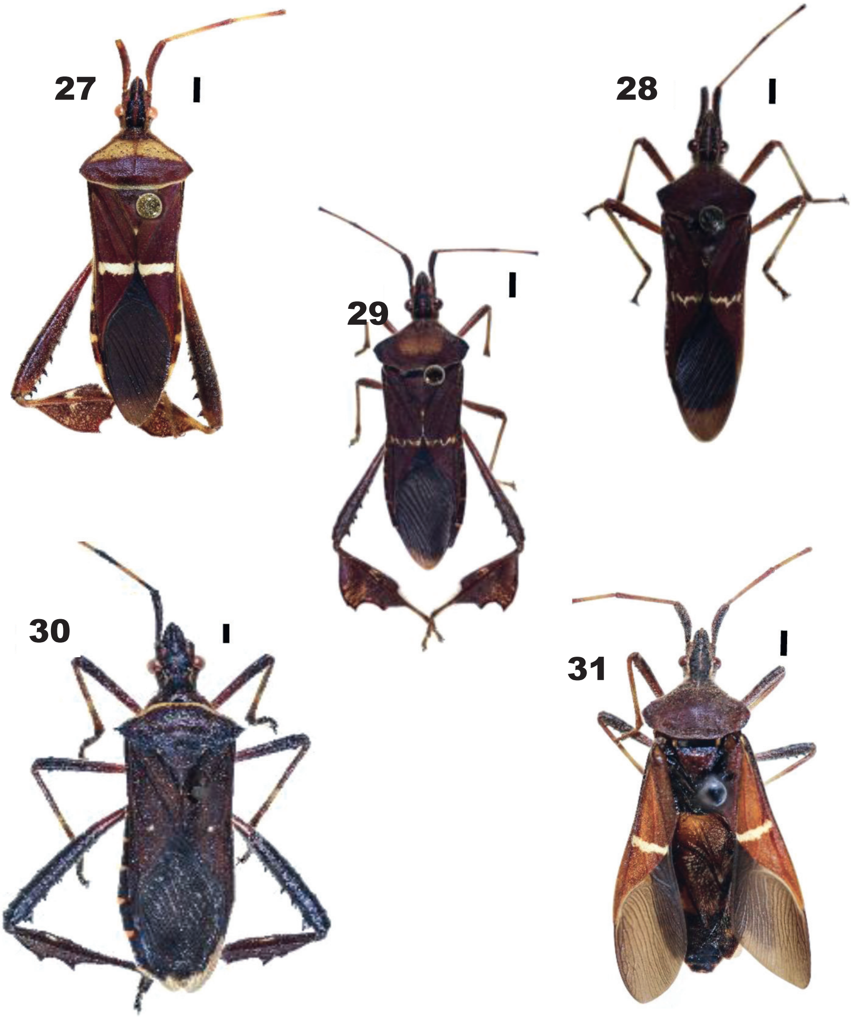

PLATE VI: COREIDAE: ANISOSCELINI. 27. *Leptoglossus balteatus* (L.); 28. *L. concolor* (Walker); 29. *L. confusus* Alayo & Grillo; 30. *L. gonagra* (F.); 31. *L. phyllopus* (L.). [Bar=1mm]. [Photos by H. Pérez].

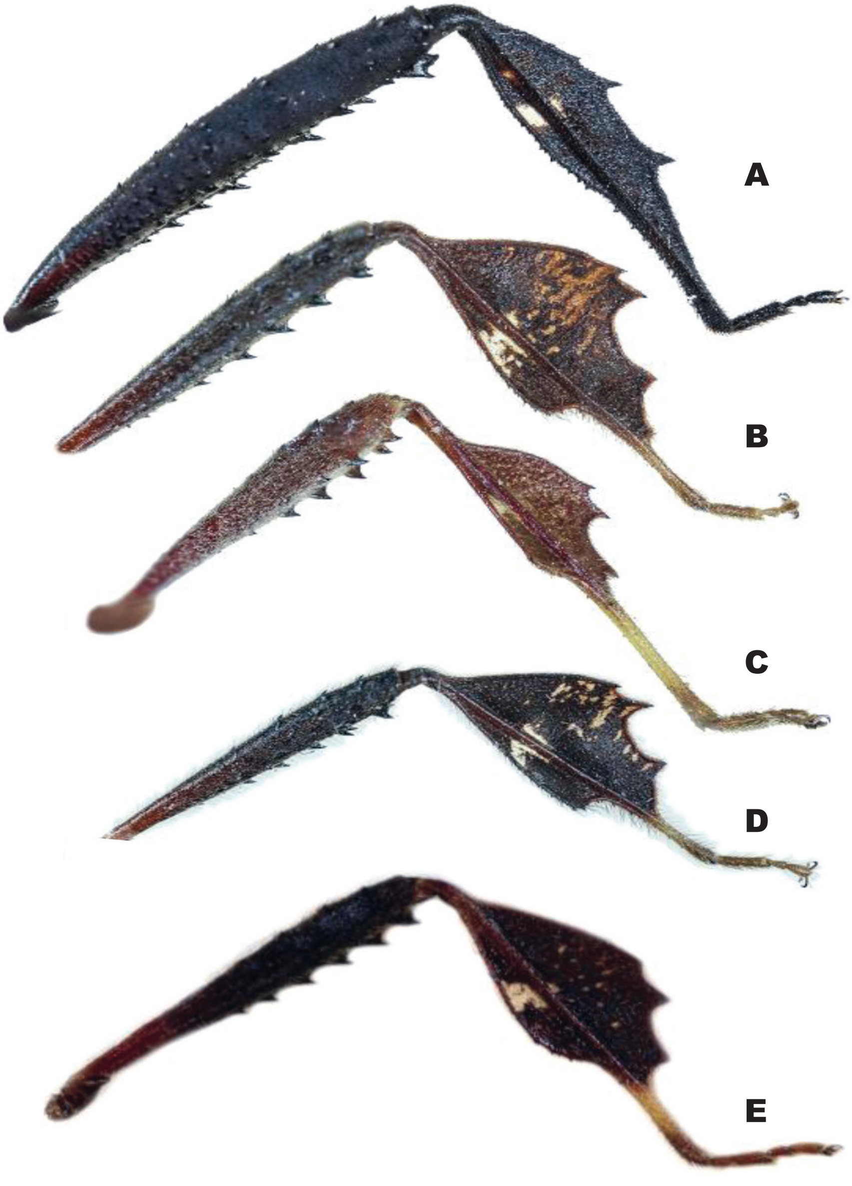

PLATE VII. *LEPTOGLOSSUS* spp. hind legs. A. *Leptoglossus gonagra* (F.); B. *L. concolor* (Walker); C. *L. balteatus* (L.); D. *L. confusus* Alayo & Grillo; E. *L. phyllopus* (Linnaeus). [Photos by H. Pérez].

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PLATE VIII: COREIDAE: COREINAE, MEROPACHYINAE. 32 *Phthiacnemia picta* (Drury); 33. *Phthia lunata* (F.); 34. *Chariesterus gracilicornis* Stål; 35. *Mamurius cubanus* Barber & Bruner; 36. *Merocoris typhaeus* (F.) [Bar=1mm]. [Photos by H. Pérez].

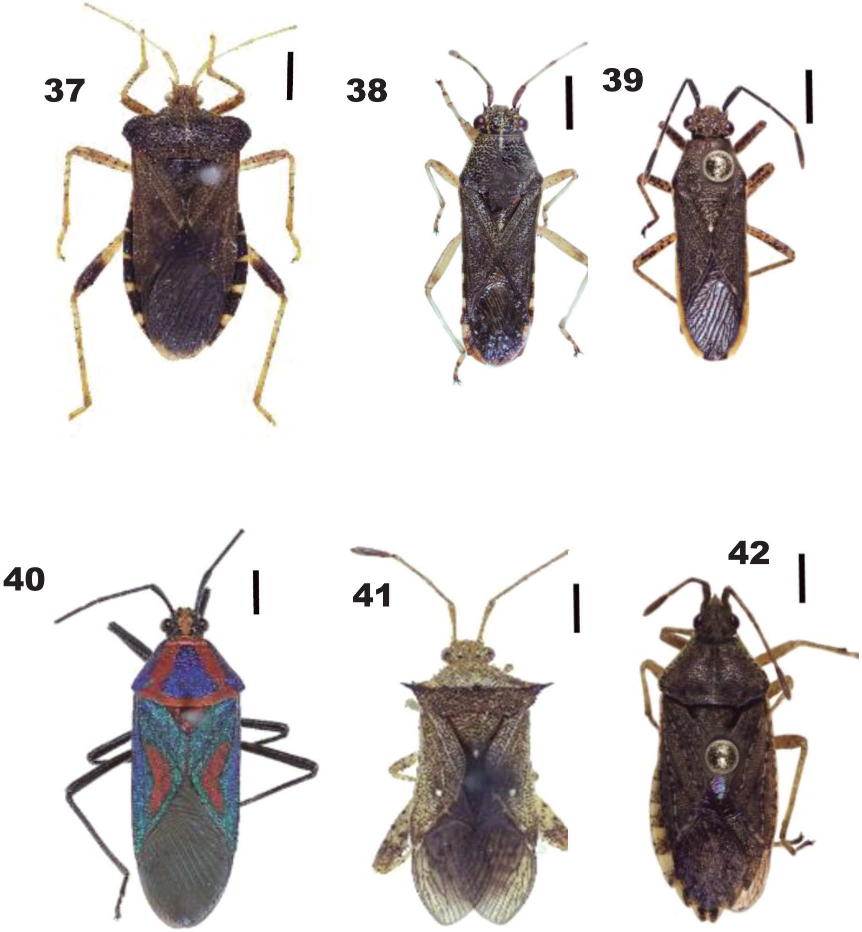

PLATE IX: COREIDAE: HYPSELONOTINI. 37. *Anasa scorbutica* (F.); 38. *Catorhintha borinquensis* (Barber); 39. *Catorhintha guttula* (F); 40. *Sphictyrtus whitei* (Guérin-Méneville); 41. *Zicca taeniola* (Dallas); 42. *Althos obscurator* (F.) [Bar=1mm]. [Photos by H. Pérez].


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Plate. X: 43. *Leptoglossus balteatus* (L.) nymph on *Momordica* sp. fruit; 44. *L. balteatus* adult on *Momordica* sp.; 45. *Sphictyrtus whitei* (Guérin-Méneville). [Photos by A. Segarra].

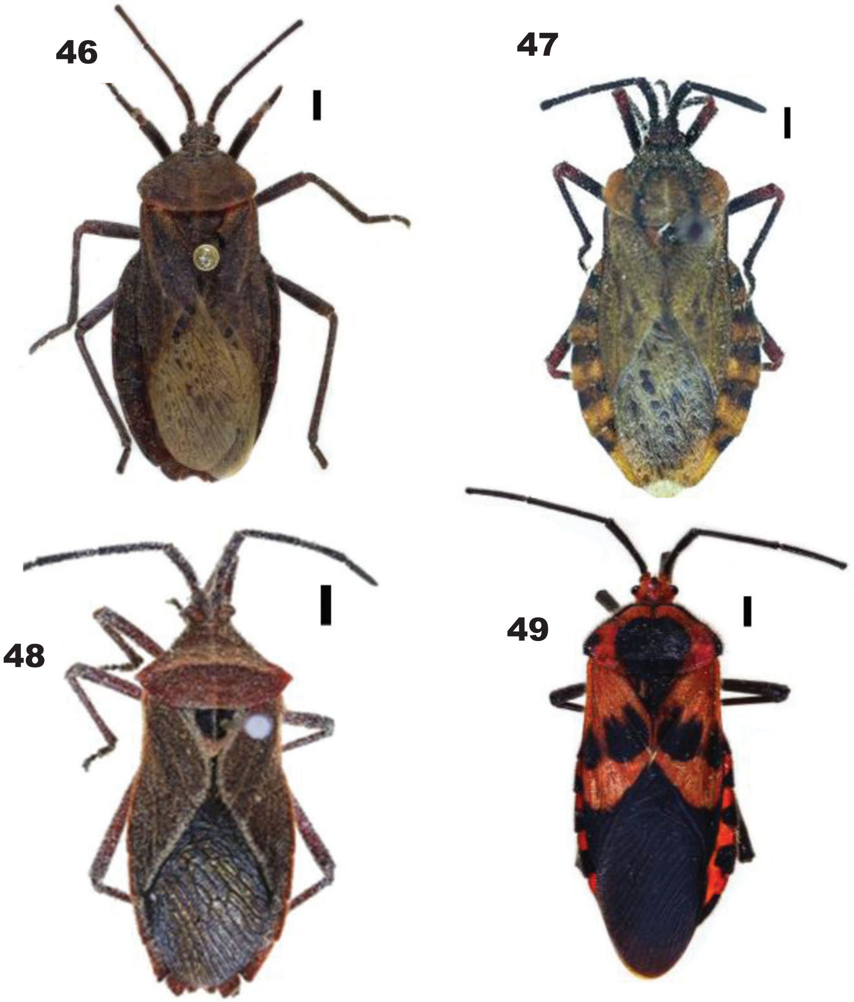

Plate XI: Coreidae: Spartocerini. 46. *Spartocera batatas* (F.); 47. *S. fusca* (Thunberg); 48. *Eubule scutellata* (Westwood); 49. *Sephina indierae* Wolcott [bar=1mm]. [Photos by H. Pérez]