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Authors: Bland, R. G., and Desutter-Grandcolas, L.

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An annotated list of Orthoptera from St Eustatius and Saba, Dutch West Indies, with descriptions of two new cricket species (Trigonidiidae, Mogoplistidae)

R. G. Bland and L. Desutter-Grandcolas

(RGB) Biology Department, Central Michigan University, Mt. Pleasant, MI 48859 USA. Email: bland1rg@cmich.edu
(LD-G) ESA8043 CNRS, Département Systématique et Evolution, Muséum National d'Histoire naturelle 45 rue Buffon, F-75005, Paris, France

Abstract

Orthopteran species on the Lesser Antilles islands of St Eustatius and Saba are poorly known. Recent field surveys and examinations of museum collections revealed 24 species separated into the following families: Acrididae, 6; Tettigoniidae, 6; Gryllidae, 2; Mogoplistidae, 1; Oecanthidae, 1; Phalangopsidae, 2; Podoscirtidae, 5; Trigonidiidae, 1. Seven species are new, 2 of which are described herein (Mogoplistidae*: Cycloptilum eustatiensis*; Trigonidiidae: *Cyrtoxipha orientalis*). Crickets alone are represented by 12 species. Among all species, 1 is cosmopolitan, 2 are neotropical, 4 are distributed in most of the Caribbean region, 5 occur in one or several provinces located in the Greater Antilles, and 12 are distributed in the Lesser Antilles province only. Among these last species, 8 could be endemic to St Eustatius and/or Saba. Species diversity and distribution patterns are discussed in relation to island habitats and groupings.

Key words

Orthoptera, grasshoppers, katydids, crickets, West Indies, St Eustatius, Saba

Introduction

The Orthoptera on islands of the West Indies have been described in literature beginning in the late 1800s. Many of these descriptions occur within comprehensive studies centered primarily on orthopterans of Central and South America and others are in smaller taxonomic studies or short reports of these insects on specific islands. Recent work on Orthoptera in the Greater Antilles suggests a strong diversity for Hispaniola (Perez-Gelabert 2001), whereas literature of the Lesser Antilles indicates that the suborder Caelifera is poorly represented, although there may be moderate species diversity in the suborder Ensifera (Walker & Greenfield 1983, Desutter-Grandcolas & Otte 1997, Desutter-Grandcolas & Bland 2003). The Dutch West Indies islands of St Eustatius and Saba, located in the northern third of the Lesser Antilles (Fig. 1), were unrepresented in orthopteran literature until the recent description of a new species of phalangopsid cricket on Saba (Desutter-Grandcolas & Otte 1997), and five podoscirtid cricket species on St Eustatius and Saba, 4 of which are new (Desutter-Grandcolas & Bland 2003). The purpose of this study is to provide an annotated list of these and other orthopterans present on the islands and to describe 2 new cricket species.

St Eustatius, Saba, and St Martin comprise the northern part of the Netherlands Antilles. St Eustatius, 243 km southeast of Puerto Rico, is 30 km^2 (*ca* 8 km long and 3.7 km wide) in size. The trade winds are predominantly easterly and monthly mean temperatures range from 24 to 27°C in the central region. Precipitation is very erratic but means range from 37 mm (March) to 165 mm (September) on the central plain. Annual precipitation reaches 1500 to 2000 mm on the high slopes of the Quill, a volcanic crater (Stoffers 1956). A short beach is on the west side of the island and hills occupy the northern third of the island. An elevated plain forms the island's central region. Vegetation on the plain, coastal area, and northern hills is a subtropical dry-forest scrub consisting of sparse to dense grass, a variety of shrubs such as *Croton*, and scattered small trees including *Acacia*. Uncontrolled grazing by goats has resulted in severe damage to shrubs on the plain. At the southeast end of the island the Quill ascends to 604 m and the vegetation changes to a subtropical moist forest on the upper slopes of the crater. The floor of the crater is at an elevation of 273 m and contains a subtropical wet forest consisting of several tree stories, shrubs, lianas, and ferns. Stoffers (1956) outlines further information on plant communities of St Eustatius and Saba.

Saba, 27 km northeast of St Eustatius, is a nearly circular volcanic island of 13 km^2. Mean temperatures in the 2 relatively flat areas where the main towns occur are slightly cooler than those for the central region of St Eustatius, due to the higher elevations on Saba. Precipitation ranges from 48 mm (March) to 172 mm (September) in the flat areas and is over 2000 mm at the top of Mt Scenery (Stoffers 1956). Mt Scenery is 870 m high and forms the central half of the island. The island's perimeter consists of steep bluffs and narrow valleys (guts) that run down from Mt. Scenery. Coastal bluffs and the few associated flats contain a subtropical dry-forest scrub. The island's terrain is steep and a dense subtropical moist forest, which occurs above about 100 m, changes to a subtropical wet forest on the upper slopes of Mt Scenery, where ferns, tree ferns, *Anthurium*, and *Philodendron* are common, and palm breaks occur. The peak of Mt Scenery is a cloud forest (remnant elfin woodland).

Methods and Materials

Specimens were collected by R. Bland & D. Valek Mar 7 to13, 1998, and Aug 16 to 20, 1999, on St Eustatius. Saba was sampled August 10 to 15, 1999. Nets, baited pitfall traps, oatmeal trails, and an aerosol pyrethroid insecticide were employed. The latter was used to stun crickets on shrubs or crickets as high as 4 m on small trees. A white cloth was positioned beneath the vegetation to catch the falling specimens. An ultrasonic bat detector was used at night to help locate katydids and crickets. Katydid and cricket stridulation occurred at night unless otherwise noted. Male genitalia are named according to Desutter-Grandcolas (2003). Plants were identified using Stoffers (1956) and Howard (1988, 1989).

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Table 1. Orthoptera species collected on St Eustatius and Saba. Species distribution patterns are based on biogeographical areas proposed by Morrone (2001). Provinces of the Caribbean Region: C, Cuba; H, Hispaniola; J, Jamaica; LA, Lesser Antilles; PR, Puerto Rico.

Taxa	St Eustatius	Saba	Distribution Pattern
ACRIDOIDEA, Acrididae			
Cyrtacanthacridinae			
Schistocerca nitens caribbeana Dirsh	X	X	Caribbean: LA
Schistocerca pallens (Thunberg)	X	X	Neotropical
Gomphocerinae			
Orphulella punctata (DeGeer)	X		Neotropical
Rhammatocerus cyanipes (Fabricius)	X		Caribbean: whole region
Oedipodinae			
Lactista eustatia Bland	X		Caribbean: northern LA, endemic(?)
Sphingonotus haitensis haitensis (Saussure)	X	X	Caribbean: J,H, PR, northern LA
TETTIGONIOIDEA, Tettigoniidae			
Conocephalinae			
Conocephalus cinereus Thunberg	X	X	Caribbean: whole region
Neoconocephalus maxillosus (Fabricius)	X		Caribbean: whole region
Neoconocephalus triops (Linnaeus)	X	X	Caribbean: whole region; Nearctic
Phaneropterinae			
Microcentrum triangulatum Brunner von Wattenwyl	X		Caribbean: PR, LA
Orophus decoratus (Walker)		X	Caribbean: H, northern LA
Pseudophylinae			
Nesonotus tricornis (Thunberg)		X	Caribbean: northern LA
GRYLLOIDEA			
Gryllidae, Gryllinae			
Gryllodes sigillatus (Walker)	X	X	Cosmopolitan
Gryllis assimilis assimilis (Fabricius)	X	X	Caribbean: J, LA; Neotropical?
Oecanthidae, Oecanthinae			
Oecanthus allardi Walker & Gurney	X		Caribbean: C,J, H, PR, northern LA
Phalangopsidae, Phalangopsinae			
Amphiacusta saba Desutter-Grandcolas	X	X	Caribbean: northern LA
Amphiacusta sanctaecrucis Desutter-Grandcolas	X		Caribbean: northern LA, southern LA(?)
Podoscirtidae, Hapithinae			
Orocharis angustus Desutter-Grandcolas	X		Caribbean: northern LA
O. fulvescens Saussure	X	X	Caribbean: northern LA
O. minutus Desutter-Grandcolas	X		Caribbean: northern LA
O. proalbifrons Desutter-Grandcolas	X		Caribbean: northern LA
Orochirus maculatus Desutter-Grandcolas & Bland	X		Caribbean: northern LA
Mogoplistidae, Mogoplistinae			
Cycloptilum eustatiensis Desutter-Grandcolas n.sp.	X	X?	Caribbean: northern LA
Trigonidiidae, Trigonidiinae			
Cyrtoxipha orientalis Desutter-Grandcolas n.sp.	X		Caribbean: northern LA

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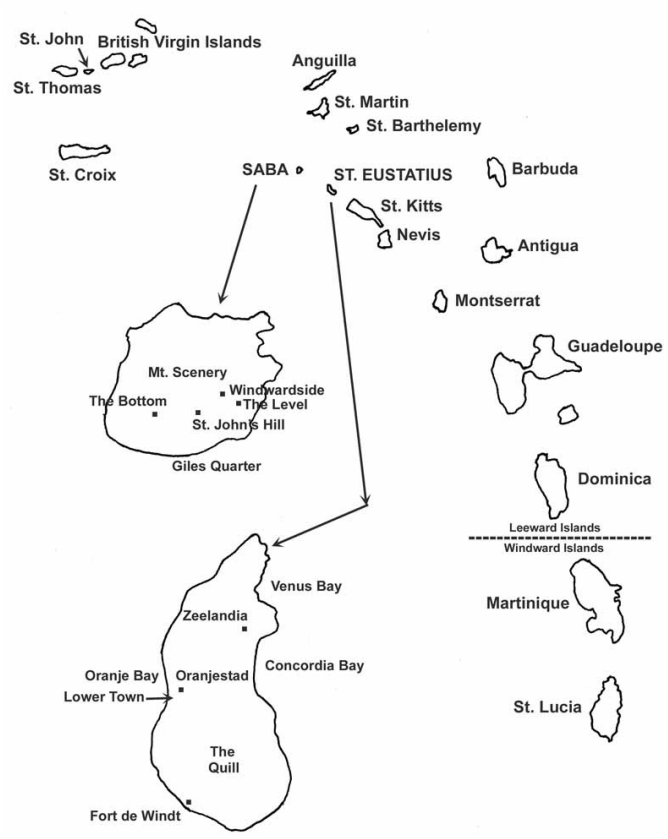


Fig. 1. Northern Lesser Antilles showing the location of St Eustatius and Saba. Insets of the islands illustrate the general collecting areas.

Additional orthopteran specimens, collected primarily in 1949 by Burgers and Hummelinck, were loaned from the Zoölogisch Museum Amsterdam (ZMA). Other specimens were obtained from the Academy of Natural Sciences of Philadelphia (ANSP) and the Zoologisk Museum, Copenhagen (ZMC). Specimens studied are deposited in ANSP, MNHN (Muséum National d'Histoire naturelle, Paris), UMMZ (University of Michigan Museum of Zoology, Ann Arbor), ZMA, and ZMC.

Distributional areas were classified according to Morrone (2001). The Caribbean Region thus covers southern North America, Central America, northern South America, and the West Indies. The region is subdivided into many provinces and those which include the West Indies are of particular importance, *i.e.*, the provinces Lesser Antilles, Puerto Rico, Hispaniola, Cuba, and Jamaica. We have not separated the Central American provinces.

Results

Table 1 is a summary of the 24 species of Orthoptera on St Eustatius and Saba. Eight may be endemic to St Eustatius and/or Saba, 4 have a broad Caribbean distribution, 2 are neotropical, and 1 is cosmopolitan. Twenty-two species were recorded from St Eustatius and 11 to 12 species from Saba. St Eustatius has 6 acridid species and Saba 3. Each island has 4 tettigoniid species, 2 of which are exclusive to each island. Twelve grylloid species were collected from St Eustatius but only 4 to 5 from Saba. Seven were exclusive to St Eustatius but none to Saba.

Table 2 shows the distribution of species among major vegetation zones. Eleven species occur in the mixed grass/shrub habitat of the subtropical dry forest scrub and 5 of these overlap secondarily into a transition zone between the scrub and the subtropical moist forest. Four additional species are found primarily in the transition zone, two of which overlap into the subtropical moist forest and a third into the mixed grass-shrub habitat of the scrub. Each species is discussed below.

Table 2. Distribution of species among habitats and vegetation zones on St Eustatius and Saba. The transition zone is the interface between the dry-forest scrub and moist forest. Matching superscripts indicate a species overlap into a secondary habitat.

Vegetation type	
Subtropical dry-forest scrub	
Sand, low ground cover	*Orphulella punctata*
Gravel, sparse grass[a]	*Lactista eustatia, Sphingonotus h. haitensis*
Mixed grass, shrubs[b]	*Rhammatocerus cyanipes, Schistocerca nitens caribbeana*[a,c], *S. pallens*[c], *Conocephalus cinereus, Neoconocephalus maxillosus, N. triops, Cycloptilum eustatiensis*[c], *Oecanthus allardi, Orocharis fulvescens*[c], *O. minutus, O. proalbifrons*[c]
Transition zone	
Sparse grass, shrubs, small trees[c]	*Nesonotus tricornis*[d], *Orophus decoratus*[d], *Orocharis angustus, Cyrtoxipha orientalis*[b]
Subtropical moist forest	
Shrubs, mixed trees[d]	*Orochirus maculatus*[c]
Subtropical wet forest	*Amphiacusta saba*[e]
Lush vegetation around buildings[e]	*Amphiacusta sanctaecrucis, Gryllodes sigillatus, Gryllus a. assimilis*

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SUPERFAMILY ACRIDOIDEA
Family Acrididae
Subfamily Cyrtacanthacridinae

Schistocerca nitens caribbeana Dirsh, 1974
Dirsh. 1974. Series Entomologica 10: 104.

Type locality.— Grenada.

Distribution.— Caribbean Region, Lesser Antilles Province: most of Lesser Antilles (Dirsh 1974). New locations: St Eustatius, Saba.

This is the most common *Schistocerca* species, adults occurring throughout the year in disturbed areas, grass, herb, and vine/shrub mixtures of the central plain and coastline of St Eustatius, and in small weedy fields and scrub-covered, gravel bluffs of Saba.

Specimens examined.— 15 ♂♂, 10 ♀♀. St Eustatius, near Concordia, 21-II-1949, A. C. J. Burgers, 4 ♂♂; Quill, site 431, 12-VII-1949, P. Wagenaar Hummelinck, 1 ♂; Oranjestad, 13-VII-1949, P. Wagenaar Hummelinck, 1 ♂; near Concordia, 11-II-1949, A. C. J. Burgers, 1 ♀; near Oranjestad, 24-II-1949, A. C. J. Burgers, 1 ♀; Bovenwindse Eilanden, 11-III-1949, (no collector), 1 ♀; Oranjestad, 9-VII-1949, P. Wagenaar Hummelinck, 1 ♀ (ZMA); 1 km W. Fort de Windt, 8-III-1998, R. Bland, 2 ♂♂; 1.5 km W. Fort de Windt, 8-III-1998, R. Bland, 1 ♀; Lower Town, Oranje Bay, 7-III-1998, R. Bland, 1 ♂, 1 ♀; Lower Town, Oranje Bay, 8-III-1998, R. Bland, 1 ♂, 1 ♀; Fort de Windt, 16-VIII-1999, R. Bland & D. Valek, 1 ♂; N. side Oranjestad, 18-VIII-1999, R. Bland & D. Valek, 1 ♂ (UMMZ). Saba, 1948-1949, P. Wagenaar Hummelinck, 1 ♀; Bottom, 20-VII-1949, P. Wagenaar Hummelinck, 1 ♂, ♀ (ZMA); St John's, 400m, 21-XI-1987, 1 ♀; Giles Quarter bluff, 13-VIII-1999, R. Bland & D. Valek, 1 ♂; The Level, Windwardside, 11-VIII-1999, R. Bland & D. Valek, 1 ♂ (UMMZ).

Schistocerca pallens (Thunberg, 1815)
Thunberg. 1815. Mem. Acad. Imp. Sci. St Petersburg 5: 237.

Type locality.— South America.

Distribution.—Neotropical Region: West Indies, Mexico, Central America, tropical South America (Dirsh 1974, Harvey 1981, Perez-Gelabert 2001). New locations: St Eustatius and Saba.

This species was collected at intermediate elevations in weedy fields near Windwardside, Saba. Specimens were also collected near Oranjestad and the Quill on St Eustatius in 1949. Adults probably occur throughout the year.

Specimens examined. — 4 ♂♂. St Eustatius, in the Quill, site 427, 12-VII-1949, P. Wagenaar Hummelinck, 1 ♂; near Oranjestad, 24-II-1949, A. C. J. Burgers, 1 ♂ (ZMA). Saba, Windwardside, 11-VIII-1999, R. Bland & D. Valek, 2 ♂♂ (UMMZ).

Subfamily Gomphocerinae

Orphulella punctata (DeGeer, 1773)
DeGeer. 1773. Mémoires pour server à l'histoire des insectes 3: 503.

Type locality.— South America: Surinam?

Distribution.— Neotropical Region: much of West Indies and Mexico south through Central America to Argentina (Rehn 1905, Otte 1981, Perez-Gelabert 2001). New location: St Eustatius.

Adults and nymphs were collected in August on St Eustatius at the upper edge of the beach below Oranjestad on a small patch of sand and gravel covered with the ground vine *Ipomoea pes-caprae* (L.) R. Br. ssp. *brasiliensis* (L.) Ooststr. (seaside morning glory, seaside yam) and sparse dry grass. Specimens in the Zoölogisch Museum collection were captured in February 1949 from Concordia Bay.

Specimens examined.— 1 ♂, 10 ♀♀. St Eustatius, near Concordia, 21-II-1949, A. C. J. Burgers, 4 ♀♀; Manahega Well, downtown, 7-VIII-1949, P. Wagenaar Hummerlink, 1 ♀ (ZMA); beach below Oranjestad, 20-VIII-1999, R. Bland & D. Valek, 1 ♂, 5 ♀♀ (UMMZ).

Rhammatocerus cyanipes (Fabricius, 1775)
Fabricius. 1775. Systema Entomologiae: 292.

Type locality.— Panama, La Chorrera.

Distribution.— Caribbean Region: Cuba, Jamaica, Haiti, Dominican Republic, Puerto Rico, Lesser Antilles, Mexico, Panama, and northern South America (Otte 1981, Assis-Pujol 1999, Perez-Gelabert 2001). New location: St Eustatius, St Croix, St John.

Specimens examined.— 2 ♀♀. St Eustatius, near Concordia, 24-11-1949, A. C. J. Burgers. 4 ♂♂, 4 ♀♀. St John, Reef trail at Europa trail junction, 1-II-1990, R. Bland, 3 ♂♂, 3 ♀♀. St Croix, S.E. St Croix at Grape Tree Bay, 27-X-1984, 1 ♂ (UMMZ).

Subfamily Oedipodinae

Lactista eustatia Bland, 2002
Bland. 2002. Journal of Orthoptera Research 11: 25.

Type locality.— St Eustatius, near Oranjestad.

Distribution.—Caribbean Region, Lesser Antilles Province: St Eustatius (Bland 2002).

This small oedipodine of dry scrub was collected near Oranjestad and Concordia in February 1949 and was described for the first time by Bland (2002). It is the first *Lactista* reported in the West Indies. The genus includes 8 other species in southwestern US through lowland Mexico and Central American to Venezuela (Hebard 1932, Otte 1984).

Specimens examined.—2 ♂, 6 ♀♀. St Eustatius, near Oranjestad, 21-II-1949, A.C.J. Burgers, 1 ♂, 2 ♀♀ (ZMA), 1 ♀ (ANSP); St Eustatius, near Concordia, 21-II-1949, A.C.J. Burgers, 2 ♀ (ZMA), 1 ♂, 1 ♀(ANSP).

Sphingonotus haitensis haitensis (Saussure, 1861)
Saussure. 1861. Revue et Magazin de Zoologie (2) 13: 323.

Type locality.—Haiti.

Distribution.— Caribbean Region: Jamaica, Hispaniola, Puerto Rico, and Lesser Antilles Provinces (Nevis) (Otte 1984, Perez-Gelabert 2001). New locations: St Eustatius and Saba.

Specimens were found in August on open scrub habitat on trails consisting of pebbles and 2 to 8-cm rocks mixed with gravel

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and sand, very sparse, low grasses, and a few herbs. Juveniles were common in sandy patches. On St Eustatius, specimens were collected in hills between Zeelandia and Venus Bay and, on Saba, on coastal bluffs near Giles Quarter. This subspecies is discussed by Otte (1984) who records it from Jamaica, Hispaniola, Puerto Rico and Nevis, and by Perez-Gelabert (2001).

Specimens examined.— 7 ♂♂, 4 ♀♀. St Eustatius, trail 100-500 m S. Venus Bay, 18-VIII-1999, R. Bland & D. Valek, 3 ♂♂, 3 ♀♀. Saba, Giles Quarter bluff, 13-VIII-1999, R. Bland & D. Valek, 4 ♂♂, 1 ♀ (UMMZ).

SUPERFAMILY TETTIGONIOIDEA
Family Tettigoniidae
Subfamily Conocephalinae

Conocephalus cinereus Thunberg, 1815
Thunberg. 1815. Mem. Acad. Imp. Sci. St Petersburg 5: 27.

Type locality.—Jamaica.

Distribution.— Caribbean Region, Jamaica, Cuba, Hispaniola, Puerto Rico and Lesser Antilles Provinces: Northern Lesser Antilles, Jamaica, Cuba, Hispaniola, Mona Island, Puerto Rico, Bahamas, Florida, and Mexico south to northern South America (Gurney 1959, Naskrecki 2000, Perez-Gelabert 2001). New locations: St Eustatius, Saba, St Kitts.

These katydids, common in March on St Eustatius, occurred in patches of dry grass mixed with small amounts of green grass and herbs. Succulent low herbs growing in hillside catch-basins below Oranjested had adults and juveniles. At night stridulating males produced a very soft whirring sound lasting 3 to 4 s, followed by 8 to 12 rapid clicks. About 25% of the specimens were macropterous and the remainder had tegmina of intermediate lengths. Specimens were recorded from Saba in February 1982; we found individuals to be uncommon in August on St Eustatius and absent on Saba.

Specimens examined.— 8 ♂♂, 14 ♀♀. St Eustatius, Oranje Bay, Lower Town, 7-III-1998, R. Bland, 2 ♂♂, 3 ♀♀; 8-III-1998, R. Bland, 1 ♂; 10-III-1998, R. Bland, 2 ♂♂, 5 ♀♀ (UMMZ). Saba, 10-II-1982, Ellis/Simonthomas, 1 ♂, 4 ♀♀ (ZMA). St Kitts, Frigate Bay, 4-IV-1994, R. Bland, 2 ♂♂, 2 ♀♀ (UMMZ).

Neoconocephalus maxillosus (Fabricius, 1775)
Fabricius. 1775. Supplementum Entomologiae Systematicae 2: 84.

Type locality.— America.

Distribution.—Caribbean Region: widely distributed throughout much of the Caribbean, Bermuda, Florida, Panama, and south to Brazil (Walker & Greenfield 1983). New location: St Eustatius.

Specimens on St Eustatius were collected in August from dry grassy fields and in November from succulent grass. Only late-instar nymphs were found in March and no specimens were recorded in August on Saba. Stridulation began at early dusk.

Specimens examined.— 3 ♂♂, 4 ♀♀. St Eustatius, XI-1998, L. Bauer, 1 ♀; 1 km W. Fort de Windt, 16-VIII-1999, R. Bland & D. Valek, 1 ♂, 1 ♀; NE side Oranjestad, 19-VIII-1999, R. Bland & D. Valek, 1 ♀ (UMMZ).

Neoconocephalus triops (Linnaeus, 1758)
Linnaeus. 1758. Systema Naturae per Regna tria naturae (10th ed.) 1: 430.

Type locality.— Indiis (probably West Indies) (Otte 1997, Otte *et al*. 2002).

Distribution.— Nearctic and Caribbean Regions. This species has the broadest range of any *Neoconocephalus,* extending from central and western US to much of the Caribbean, Bermuda, Mexico, Central America, Peru and Guyana (Walker & Greenfield 1983, Perez-Gelabert 2001). New locations: St Eustatius and Saba.

Specimens were collected in February (1949) and November (1998) from succulent grass on St Eustatius and in August from mixed dry and green grass and herb patches on Saba. Males stridulated intermittently in the late afternoon and irregularly during the night.

Specimens examined.— 3 ♂♂, 4 ♀♀. St Eustatius, Schildpaddenbaai (Turtle Bay), 21-II-1949, A. C. J. Burgers (ZMA); St Eustatius, XI-1998, L. Bauer, 1 ♂, 2 ♀♀. Saba, Windwardside, 27-VII-1949, P. Wagenaar Hummelinck, 1 ♂ (ZMA); Windwardside, Cottage Club, 11-VIII-1999, R. Bland & D. Valek, 1 ♂, 1 ♀ (UMMZ).

Subfamily Phaneropterinae

Microcentrum triangulatum Brunner von Wattenwyl, 1878
Brunner von Wattenwyl. 1878. Verh. der Zoologisch-botanischen Gesellsch Wien. 28: 338.

Type locality.— Guadeloupe or St Thomas.

Distribution.— Caribbean Region, Puerto Rico and Lesser Antilles Provinces: Puerto Rico, St Thomas, St Croix (University of Michigan collection), and Guadeloupe (Otte 1997, Otte *et al*. 2002). New location: St Eustatius (presumably; the label is generalized).

Specimens examined.— 1 ♂. Nederlandse Bovenwindse Eilanden, 20 to 30-III-1949 (ZMA).

Orophus decoratus (F. Walker, 1869)
Walker, F. 1869. Catalogue of the Specimens of Dermaptera Saltatoria in the Collection of the British Museum 2: 373.

Type Locality.— Hispaniola: Santo Domingo.

Distribution.— Caribbean Region, Hispaniola and Lesser Antilles Provinces: Hispaniola. New Location: Saba.

Specimens were collected at Windwardside on Saba in August at lights and on a building during the day, and at 400 m on St John's Hill in November. The species was originally described from Hispaniola as *Microcentrum decoratum* F. Walker but is currently considered as one of 23 species in the genus *Orophus* (P. Naskrecki pers. com., Otte *et al*. 2002).

Specimens examined.—3 ♂♂, 1 ♀. Saba, St John's, 400 m, 21-XI-1987, J. Stock, 1 ♂ (ZMA); Windwardside, 13-VIII-1999, R. Bland & D. Valek, 2 ♂♂; Windwardside, Cottage Club, 14-VIII-1999, R. Bland & D. Valek, 1 ♀ (UMMZ).

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Subfamily Pseudophyllinae

Nesonotus tricornis (Thunberg, 1815)
Thunberg. 1815. Mem. Acad. Imp. Sci. St Petersburg 5: 278

Type locality.—Lesser Antilles.

Distribution.— Caribbean Region, Lesser Antilles Province: St Martin and St Barthelemy (Beier 1960). New Location: Saba.

A male of this robust blackish brown species was captured in August at Windwardside, Saba, at a light inside a home. The genus consists of 6 species (Otte 1997, Otte *et al.* 2002) that occur on about 5 islands in the Lesser Antilles and in South America.

Specimen examined.— 1 ♂. Saba, Windwardside, 13-VIII-1999, R. Bland & D. Valek (UMMZ).

SUPERFAMILY GRYLLOIDEA
Family Gryllidae
Subfamily Gryllinae

Gryllodes sigillatus (Walker, 1869)
F. Walker. 1869. Catalogue of the Specimens of Dermaptera Saltatoria in the Collection of the British Museum 1: 108.
Type locality.— Australia.

Known distribution.— Cosmopolitan in tropical regions. Recorded from most of the West Indies (Bruner 1916). New locations: St Eustatius and Saba.

Specimens were collected along edges of flower beds, on lawns, and in open buildings on both islands in March and August. Singing occurred intermittently during the day.

Specimens examined.— 1 ♂. St Eustatius, Oranje Bay, Kings Well Hotel, 7-III-1998, R. Bland (MNHN).

Gryllus assimilis assimilis (Fabricius, 1775)
Fabricius. 1775. Systema Entomologiae: 280.

Type locality.— Jamaica.

Distribution.— The identity of this species has been largely debated and is still uncertain. Consequently, it has been reported from the whole neotropical region (Rehn & Hebard 1915, Alexander & Walker 1962, Chopard 1967, Perez-Gelabert 2001), north to southernmost California, Texas, and Florida (Weissman *et al*. 1980). Its actual distribution may be restricted to the Caribbean Region (Desutter 1990). Our identifications were based on morphological characteristics listed by Alexander and Walker (1962), Nickle and Walker (1974), and Weissman *et al*. (1980). New locations: St Eustatius and Saba.

Individuals (primarily females) were readily collected in August on Saba at oatmeal trails placed near succulent vegetation and on lawns next to buildings. Singing occurred intermittently during the day. Individuals were less common on St Eustatius, slightly smaller, and lighter brown in color. The mean body length of females on St Eustatius, excluding ovipositor, was 19.1 (n=3,r= 18.0 to 21.3); on Saba, female mean body length was 21.2 (n=4, r=19.1 to 22.1). Male specimens from both islands were too few in number for comparison.

Specimens examined.— 3 ♂♂, 7 ♀♀. St Eustatius, Schildpaddenbaai (Turtle Bay), 21-II-1949, A. C. J. Burgers, 2 ♂♂, 2 ♀♀; II-III-1949, 1 ♂, 1 ♀ (ZMA); NE side Oranjestad, 19-VIII-1999, R. Bland & D. Valek, 1 ♀. Saba, Windwardside, Cottage Club, 12-VIII-1999, R. Bland & D. Valek, 1 ♀; 13-VIII-1999, R. Bland & D.Valek, 1 ♀; 14-VIII-1999, R. Bland & D. Valek, 1 ♀ (UMMZ).

Family Mogoplistidae
Subfamily Mogoplistinae

Cycloptilum eustatiensis Desutter-Grandcolas, n. sp.

Type locality.— St Eustatius, 200 m above trailhead to Quill.

Known distribution.— Caribbean Region, Lesser Antilles Province: St Eustatius, Saba (?).

Specimens were collected from shrubs 1 to 2 m in height in the dry forest scrub and lower moist forest of St Eustatius in August by using insecticidal aerosol. Two additional specimens originating from Saba (see below) were also examined. They could be *C. eustatiensis*, even if they present a slightly longer ovipositor. Observation of males and comparison of the calling songs of Saba and St Eustatius specimens will be necessary to confirm this identification.

Specimens examined.—See below for the full description of the species.

Family Oecanthidae
Subfamily Oecanthinae

Oecanthus allardi T. Walker & Gurney, 1960
Walker, T. & Gurney. 1960. The Florida Entomologist 43: 9.

Type locality.— Virgin Islands: St Croix.

Distribution.— Caribbean Region, Cuba, Hispaniola, Jamaica, Puerto Rico and Lesser Antilles Provinces: the Greater Antilles (Cuba, Hispaniola, Jamaica, Mona, Puerto Rico) and the northern Lesser Antilles (St Thomas, St Kitts, St Croix) (Walker 1967). New location: St Eustatius.

This West Indian species was heard commonly at night in March and August on St Eustatius on shrubs along roadsides where grass-shrub edges occurred. Chirps were produced at about 20/s at 23°C and the local population collectively created a distinctive pulsating sound. Individuals were especially common on 1.5 to 2.5 m-tall *Jatropha gossypiifolia* L., a common herbaceous plant of disturbed areas. Immatures and adults were present on leaves in March, often 2 or more individuals within a 0.5 m-length of stem.

Specimens examined.— 3 ♂♂, 1 ♀. West Indies, St Eustatius, 1.5 km W. Fort de Windt, 8-III-1998, R. Bland (UMMZ).

Family Phalangopsidae

Specimens examined were in the Amphiacustae group of Phalangopsidae and include 9 genera distributed in Central America and the West Indies (Desutter-Grandcolas 1993). Only 1 genus is known in the West Indies, *Amphiacusta* Saussure, 1874, for which 24 species, separated into 7 species groups, have been described (Desutter-Grandcolas & Otte 1997). In the material studied for the present paper, 2 species groups are documented, the *caraibea* group and the *pronauta* group:

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1. The *caraibea* group consists of 2 species, *A. caraibea* (Saussure, 1897) and *A. saba* Desutter-Grandcolas, 1997, and is known only from the Lesser Antilles.
2. The *pronauta* group of species comprises *A. pronauta* Desutter-Grandcolas, 1997, *A. sanctaecrucis* Desutter-Grandcolas, 1997, *A. minor* Desutter-Grandcolas, 1997 and *A. nauta* Desutter-Grandcolas, 1997. The group formerly was known from the islands of Puerto Rico and St Croix, and with uncertainty from other Lesser Antilles islands. The material at hand extends its distribution to more southerly islands in the Leeward (upper) Lesser Antilles.

Subfamily Phalangopsinae

Amphiacusta saba Desutter-Grandcolas, 1997
Desutter-Grandcolas & Otte. 1997. Annales de la Société entomologique de France (N.S.) 33: 127.

Type locality.— Saba.

Known distribution.— Caribbean Region, Lesser Antilles Province: Saba. New location: St Eustatius.

On St Eustatius in March, oatmeal trails on the floor of the Quill crater attracted an abundance of individuals, with as many as 5 crickets feeding at a single small pile of bait.

On Saba, specimens were easily collected in August from oatmeal trails placed in lush vegetation next to buildings and along a concrete path ascending Mt Scenery. Many individuals were observed eating the crushed red fruit of the Surinam cherry, *Eugenia uniflora* L., and abundant, 6 mm-diameter white, tubular flowers falling from the tree canopy on Mt Scenery. A few individuals were feeding on dry plant debris.

Specimens examined.—10 ♂♂, 11 ♀♀. St Eustatius, Quill crater floor, 11-III-1998, R. Bland, 1 ♂ (MNHN), 3 ♂♂, 5 ♀♀ (UMMZ). Saba, Windwardside, lower Mt. Scenery trail, 10-VIII-1999, R. Bland & D. Valek, 3 ♂♂, 3 ♀♀; 13-VIII-1999, R. Bland & D. Valek, 2 ♂♂; Cottage Club, 12-VIII-1999, R. Bland & D. Valek, 1 ♂, 1 ♀; 13-VIII-1999, R. Bland & D.Valek, 2 ♀♀ (UMMZ).

Amphiacusta sanctaecrucis Desutter-Grandcolas, 1997
Desutter-Grandcolas & Otte. 1997. Annales de la Société entomologique de France (N.S.) 33: 118.

Type locality.—St Croix: Christiansted.

Known distribution.— Caribbean Region, Lesser Antilles Province: St Croix, St John, Martinique(?), St Lucia(?). New locations: St Eustatius, Barbados, Antigua, St Thomas.

This species was previously known from St Croix and St John and with uncertainty from Martinique and St Lucia. The material at hand confirms that it is largely present in the Virgin Islands and in the northern (Leeward) Lesser Antilles. More material, however, is still necessary to acknowledge the presence of *A. sanctaecrucis* in the southern (Windward) Lesser Antilles (Fig. 1).

These relatively small *Amphiacusta* were found on St Eustatius in February (1949), March, and August along the edges of lawns and in landscaping where moisture was available.

Specimens examined.— 9 ♂♂, 6 ♀♀. St Eustatius, Oranjestad, 21-II-1949, A.C.J. Burgers, 1 ♂, (ZMA); Kings Well Hotel, Oranje Bay, 8-III-1998, R. Bland, 2 ♀♀ (UMMZ, MNHN); 200 m above trail head to Quill, 20-VIII-1999, R. Bland & D. Valek, 1 ♀ (MNHN). Barbados, 2 ♂♂ (ANSP); Cottage, 03-XII-1931, 1 ♂ (R. Brown) (MNHN). Antigua, St Johns, C.A. Barber, 1 ♂(ANSP). St Jan (= St John) (Deutsche Vestind.), 1906, Raunhicer, 1♂ (ZMC). St Thomas, Krebs, 1 ♀ (MNHN), 2 ♀♀ (ZMC); Arsted, 1 ♂ (MNHN), 2 ♂♂ (ZMC).

Family Podoscirtidae

Orocharis and *Orochirus* species listed below are described in Desutter-Grandcolas & Bland (2003). In the West Indies, *Orocharis* species are distributed into at least 4 species groups, separated by their body shape, coloration patterns, male genitalia and stridulum. Only the *angustus*, *fuscifrons* and *fulvescens* species groups occur on St Eustatius and Saba, represented by *O. angustus* and *O. minutus* [*angustus*], *O. proalbifrons* [*fuscifrons*], and *O. fulvescens* [*fulvescens*].

Subfamily Hapithinae

Orocharis angustus Desutter-Grandcolas, 2003
Desutter-Grandcolas & Bland. 2003. Transactions of the American Entomological Society 129: 65.

Type locality.— St Eustatius, new trail to Quill crater.

Known distribution.— Caribbean Region, Lesser Antilles Province: St Eustatius.

This species, smaller and more slender than *O. fulvescens*, was collected on St Eustatius in March and August at a height of 2 to 3 m on tall shrubs in the transition zone between the dry scrub and moist forest zones.

Specimens examined.—1 ♂, 2 ♀♀. St Eustatius, new trail to Quill crater, 13-III-1998, R. Bland, 1♂; 11-III-1998, R. Bland, 1 ♀; 200 m above trail head to Quill, 20-VIII-1999, R. Bland & D. Valek, 1 ♀ (MNHN).

Orocharis fulvescens Saussure, 1878
Saussure. 1878. Mémoires de la Societé de Physique et d'Histoire naturelle de Genève 25: 612. Desutter-Grandcolas & Bland. 2003. Transactions of the American Entomological Society 129: 61.

Type locality.—St Martin.

Known distribution.— Caribbean Region, Lesser Antilles Province: St Martin. New locations: St Eustatius and Saba.

This brown species was the most commonly heard of the tree crickets on both islands, producing a loud buzz every 3-4 reminiscent of an electric buzzer (Desutter-Grandcolas & Bland 2003, see their Figs 62, 65, Table 3). Males and females typically were collected at 2.5 to 3.0-m heights on shrubs in the subtropical dry forest, and small trees at lower elevations of the moist forest. Individuals rested longitudinally in the midrib crease of a leaf, often with their antennae extended beyond the leaf apex. On Saba, specimens were common on citrus trees and evergreen shrubs at the Level above Windwardside. A captive specimen fed avidly on petals of Mexican sunflower, *Tithonia diversifolia* (Hemsl.) A. Gray. Adults were present in March and August.

Specimens examined.—12 ♂♂, 1 ♀. St Eustatius, new trail to Quill crater, 12-III-1998, R. Bland, 2 ♂♂ (UMMZ); 13-III-1998, R. Bland,

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1 ♂ (MNHN). 200 m above trail head to Quill, 18-VIII-1999, R. Bland & D. Valek, 1 ♂ (UMMZ). Saba, Windwardside, The Level, 11-VIII-1999, R. Bland & D. Valek, 4 ♂♂ (UMMZ), 2 ♂♂, 1 ♀(MNHN); Cottage Club, 13-VIII-1999, R. Bland & D. Valek, 2 ♂♂ (UMMZ).

Orocharis minutus Desutter-Grandcolas, 2003
Desutter-Grandcolas & Bland. 2003. Transactions of the American Entomological Society 129: 66.

Type locality.— St Eustatius, 1 km W. Fort de Windt.

Known distribution.— Caribbean Region, Lesser Antilles Province: St Eustatius.

A female was collected on St Eustatius in March on Barbados cherry, *Malpighia emarginata* Sessé & Moç. *ex* DC, at a height of 3 m. These tall shrubs are in the dry scrub zone.

Specimens examined.— 1 ♀. St Eustatius, 1 km W. Fort de Windt, 9-III-1998, R. Bland, 1 ♀(MNHN).

Orocharis proalbifrons Desutter-Grandcolas, 2003
Desutter-Grandcolas & Bland. 2003. Transactions of the American Entomological Society 129: 60.

Type locality.— St Eustatius, 1 km W. Fort de Windt.

Known distribution.— Caribbean Region, Lesser Antilles Province: St Eustatius.

This greenish species was collected on low forbs in dry grassy fields, on *Croton astroites* Dryander at a height of 2 m, and 2 to 3 m high on other shrubs on St Eustatius in March and August. The loud chirping and trilling (Desutter-Grandcolas & Bland, 2003, Figs 61, 64 and Table 1) also were heard commonly from individuals 4 to 5 m high in trees of dry-forest scrub.

Specimens examined.— 5 ♂♂. St Eustatius, 1.5 km W. Fort de Windt, 10-III-1998, R. Bland, 2 ♂♂ (UMMZ, MNHN); 1 km W. Fort de Windt, 16-VIII-1999, R. Bland & D. Valek, 1 ♂ (MNHN); 1.5 km W. Fort de Windt, 17-VIII-1999, R. Bland & D. Valek, 2 ♂♂ (UMMZ, MNHN).

Orochirus maculatus Desutter-Grandcolas and Bland, 2003
Desutter-Grandcolas & Bland. 2003. Transactions of the American Entomological Society 129: 68.

Type locality.— St Eustatius, 200 m above trail head to Quill.

Known distribution.— Caribbean Region, Lesser Antilles Province: St Eustatius.

Individuals were heard in March and August stridulating from high perches in trees in the lower elevations of the moist forest of St Eustatius. Two were captured on leaves at relatively low heights of about 3.8 m, one individual resting on *Pisonia fragrans* Dum.-Cours. The loud, highly irregular, sharp buzzing sounds (Desutter-Grandcolas & Bland, 2003, Fig. 63 and Table 4) are distinctive and unique, being reminiscent of the continuous transmission of Morse code.

Specimens examined.— 2 ♂♂. St Eustatius, 200 m above trail head to Quill, 18-VIII-1999, R. Bland & D. Valek, 1 ♂ (UMMZ); 20-VIII-1999, R. Bland & D. Valek, 1 ♂ (MNHN).

Family Trigonidiidae
Subfamily Trigonidiinae

Cyrtoxipha orientalis Desutter-Grandcolas, n. sp.

Type locality.— St Eustatius, 200 m above trailhead to Quill.

Known distribution.— Caribbean Region, Lesser Antilles Province: St Eustatius.

Specimens were captured from shrubs 1 to 2 m high in the lower moist forest and dry scrub of St Eustatius in August by using insecticidal aerosol.

Specimens examined.— See below for the full description of the species.

DESCRIPTIONS OF NEW SPECIES

Family Mogoplistidae, subfamily Mogoplistinae

According to Chopard's (1956) key, the mogoplistid crickets collected on St Eustatius belong to the genus *Cycloptilum* Scudder, 1868. This genus is known only from North America, except for one species described from Japan (Otte 1994), and has not been mentioned yet from the West Indies. Following Love & Walker (1979), the St Eustatius specimens could belong to the *trigonipalpum* group of species and be close to *C. trigonipalpum* (Rehn & Hebard, 1912), *C. spectabile* Strohecker (1939) and *C. albocircum* (Love & Walker 1979). Our specimens differ, however, from these species by their stridulatory file, coloration pattern, and size; their calling song is unknown.

Five other mogoplistid species are acknowledged today from the West Indies (Otte 1994): *Cycloptiloides americanus* (Saussure 1874) described from Cuba, *Ectatoderus antillarum* Redtenbacher 1892 described from Saint Vincent, *E. contectus* (Rehn & Hebard 1912) described from Haiti, *E. insularis* Bruner, 1906 described from Trinidad and *Ornebius minimus* (Caudell 1922) described from Antigua. These species fit presently accepted definitions of mogoplistid genera and are clearly different from the species described here. For the 2 species described from localities close to St Eustatius and Saba, a major difference is their distinctive sizes, large (*E. antillarum*) or minute (*O. minimus*), according to original descriptions.

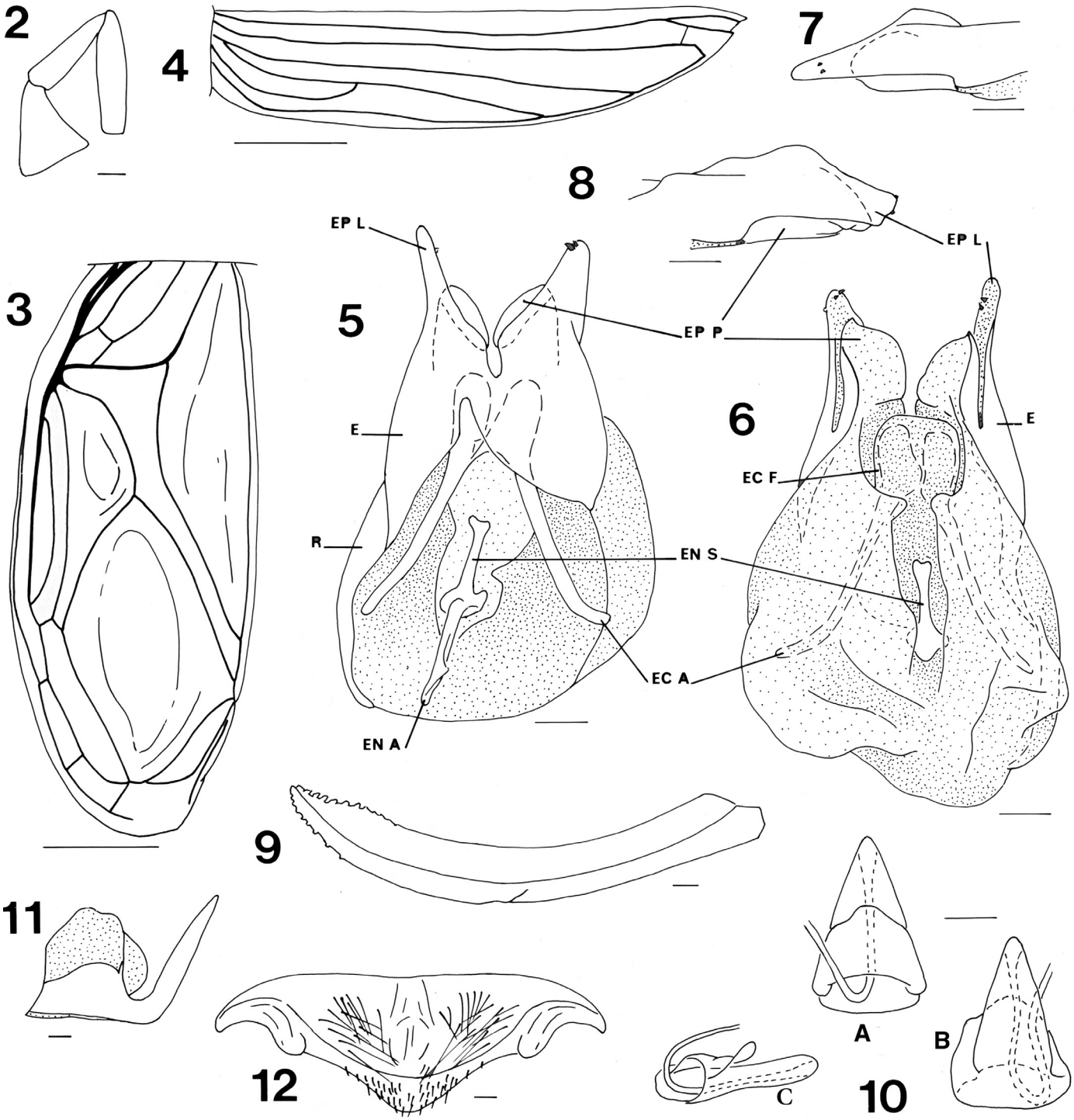
Cycloptilum eustatiensis sp. n.
(Figs 11-12)

Material examined.— Dutch West Indies, St Eustatius, 1 km W. Fort de Windt, 17-VIII- 1999, 1 ♂ holotype, 1 ♂paratype, 5 juveniles; NE side Oranjestad, 19-VIII-1999, 1 ♀; 200 m above trail head to Quill, 18-VIII-1999, 1 juvenile. Dutch West Indies, Saba, Windwardside, Cottage Club, 11-VIII-1999, 1 ♀; Windwardside, The Level, 11-VIII-1999, 1 ♀ (R. Bland & D. Valek).

Depository.— Male holotype, male paratype, females and juveniles (Muséum National d'Histoire Naturelle, Paris).

Diagnosis.— Among *Cycloptilum* species, *C. eustatiensis* is characterized by its size, color pattern, and file teeth number.

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Figs 2-10. *Cyrtoxipha orientalis,* n. sp. 2, lateral view of left maxillary palpi; 3, 4, dorsal and lateral fields of male forewing; 5, 6, dorsal and ventral views of male genitalia; 7, 8, lateral view of left and right apical lobes of pseudepiphallus; 9, female ovipositor; 10, female copulatory papilla in dorsal (A), ventral (B) and lateral (C) views. Scales: 1 mm in Figs 3, 4; 0.1 mm in all other figures. Abbreviations: E, pseudepiphallus; EC F, ectophallic fold; EN S, endophallic sclerite; EP L, pseudepiphallic lobe; EP P, pseudepiphallic paramere; R, rami. Membranous parts figured with dots.

Figs 11,12. *Cycloptilum eustatientis*, n. sp. 11, right male paraproct; 12, male suranal plate. Scales: 0.1 mm. Membranous parts figured with dots.

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Description.— Main morphological features similar to that of the other species of the genus (Love & Walker 1979). Species similar to *C. trigonipalpum* for file teeth number (<100), but with a distinct coloration and pronotum length (>4 mm). Scale coloration whitish grey. Abdomen blackish, with distinctly white distal margins.

Male: Stridulatory file about 1 mm long and with 78 teeth (n=1). Paraprocts symmetrical, with a long dorsal hook (Fig. 11). Suranal plate much wider than long, its distal margin with numerous wide and short setae (Fig. 12). Male genitalia: epi-ectophallic invagination long and thin. Pseudepiphallic sclerite narrow with a median longitudinal crest. Ectophallic dorsal valves close to the pseudepiphallic sclerite, long and tubular. Ectophallic invagination well-developed, rolled in a spiral.

Measurements.— (in mm, n = 2) Median length of pronotum: 4 to 4.5; anterior width of pronotum: 1.6 to 1.7; posterior width of pronotum: 2.6 to 2.9; length of hindfemora: 5.1 mm; length of hindtibiae: 3.4 to 3.6 ($\bar{x}$=3.5) mm.

Female: Similar to other species of the genus. In the only female from St Eustatius, ovipositor shorter than hindfemora. Genitalia without a distinct copulatory papilla, the spermathecal duct opening into a flat and large, partly sclerotized pouch.

Measurements.—(in mm, n = 1) Median length of pronotum: 2.2; anterior width of pronotum: 1.7; posterior width of pronotum: 2.2; length of hindfemora: 5.7; length of hindtibiae: 4.3; length of ovipositor: 5.

Two other females originating from Saba are present in the material under study. They differ from the St Eustatius female by their slightly longer ovipositor. Their identification should be confirmed by the observation of males from the same locality. Their measurements are as follows: median length of pronotum: 2 to 2.2; anterior width of pronotum: 1.6 to 1.8; posterior width of pronotum: 2.2 to 2.3; length of hindfemora: 5.2 to 5.7; length of hindtibiae: 3.6 to 3.8; length of ovipositor: 5.2.

Family Trigonidiidae, subfamily Trigonidiinae

Only one trigonidiine species has been collected in St Eustatius. It belongs to the genus *Cyrtoxipha*, presently known by 4 species originating from Cuba and the southern United States (Walker 1969). Its occurrence in the Lesser Antilles is attested here for the first time.

Among trigonidiines, *Cyrtoxipha* is characterized by its flattened head, relative length of the last 3 joints of the maxillary palpi, and horizontally lengthened eyes (Chopard 1956: 259). Males have a complete stridulum. Both sexes present a yellowish, uniform coloration (at least in dried specimens) and are long-winged. Tibiae I have one inner and one outer tympanum, both large and oval.

The most characteristic features of *Cyrtoxipha* relate to male genitalia: these are asymmetrical, as already noted by Walker (1969), the anterior margin of the pseudepiphallic sclerite being asymmetrically indented and the left and right pseudepiphallic apical lobes being of different shapes.

Cyrtoxipha orientalis sp. n.
(Figs 2-10)

Material examined.— Dutch West Indies, St Eustatius, 200 m above trail head to Quill, 18-VIII-1999, ♂ holotype, ♀ allotype, 1 ♂ paratype, 1 ♀ paratype. Dutch West Indies, St Eustatius, 1 km W. Fort de Windt, 17-VIII-1999, 1 ♂ paratype (R. Bland & D. Valek).

Depositories.— ♂ holotype, ♀ allotype, 1 ♂ paratype (Muséum National d'Histoire naturelle, Paris); 1 ♂ and 1 ♀ paratype (University of Michigan Museum of Zoology, Ann Arbor).

Diagnosis.— Among *Cyrtoxipha* species, *C. orientalis* is characterized by its male genitalia, especially the shape of the apical lobes of the pseudepiphallus, and male stridulatory file teeth number (see Walker 1969). The only species close to *C. orientalis* for these features is *C. confusa*, but the detailed shape of the pseudepiphallic lobes provides a distinction between the species. The male genitalia of *C. gundlachi* Saussure, 1874, a species otherwise similar in external morphology, are clearly different from those of *C. orientalis*.

Description.— Specimens of light yellowish, uniform coloration, at least in dried specimens, except for the brown eyes largely bordered with yellow, and the black tips of subapical and apical spurs of hindtibiae, apical spurs and spines of first hindtarsomeres, and tarsal claws. Head, pronotum and legs densely covered with long, light yellow or yellowish brown setae. Head as in the other species of the genus; in particular, maxillary palpi with the last joint only slightly enlarged, the 4th joint being almost as long as the 3rd (Fig. 2). Pronotum only slightly narrowed anterad; dorsal disc without black dots on its distal margin. Hindtibiae with 3 pairs of subapical spurs, the inner ones the longest; as in other trigonidiines (Desutter 1990), only 2 long apical spurs on the inner side (the first one lacking), and 3 small ones on the outer side. First hindtarsomeres without dorsal spines, except apical ones, but with strong and long setae on their outer margin. Claws not serrated, but with a large tooth on their concave side. Wings longer than tegmina, the cerci as long as the wings.

Male: Stridulatory apparatus complete, with a large mirror and a small apical field (Fig. 3). File approximately 1 mm long, with about 90 teeth (n=1). Lateral field as in Fig. 4. Male genitalia similar to that of the other species of the genus (Figs 5,6), but the apical lobes of specific shapes (Figs 7,8).

Measurements.— (in mm, mean value in parentheses, n = 3) Median length of pronotum: 1.0; posterior width of pronotum: 1.7 to 1.8 (1.7); length of hindfemora: 4.2 (n=2); length of hindtibiae: 4.0 to 4.2 (n=2); median length of tegmina: 4.8 to 5.2 (5).

Female: Tegminal venation: dorsal field with 5 longitudinal, parallel and strong veins, separated by weak transverse veins; lateral field venation as in male. Ovipositor as in Fig. 9.

Copulatory papilla triangular, thick and partly covered dorsally by a hardened membrane; aperture of spermathecal duct located at the tip of the papilla (Fig. 10).

Measurements.— (in mm, n = 2). Median length of pronotum: 1.1; posterior width of pronotum: 1.5 to 1.6; length of hindfemora: 4.4 (n=1); length of hindtibiae: 4.2 (n=1); length of ovipositor: 2.3; median length of tegmina: 4.9 to 5.0.

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Discussion

Differences in the size of vegetation zones and accessibility to collecting sites partly explain our records of species distribution in habitats and why more orthopterans were found on St Eustatius than on Saba. St Eustatius is over twice the size of Saba. The predominant vegetation on St Eustatius is subtropical dry-forest scrub, which includes a diversity of grasses, forbs, shrubs, and small trees that are available as food sources and, in the case of male crickets and some male katydids, perching sites for stridulation. Habitats within the flat or rolling terrain of the scrub are generally accessible for sampling. Due to these scrub characteristics, more orthopterans were recorded from this forest type than from any other on St Eustatius. The second largest number of species was collected from the transition zone between the scrub and subtropical moist forest. This zone is moderately sloped making it relatively large in area and accessible for collecting.

In contrast to St Eustatius, the scrub forest of Saba is smaller and both it and the moist forest are much less accessible, due to the deep valleys and steep ridges that form much of the island. The steep terrain results in a narrow transition zone, which also is relatively inaccessible. The smaller size of Saba, the dense moist forest and small transition zone, and the difficulty in reaching diverse collecting sites, contributed to the lower number of orthopteran species collected on this island and the apparent lack of endemics. Additional species likely are present in the dense forest of Saba.

A similar sampling effort for all orthopteran groups shows clear differences in species number between these groups, *i.e.*, as many cricket species (12) were collected as acridid (6) and tettigoniid (6) species together. This greater diversification of crickets, which also present a more restricted distribution (see below and Table 1), could indicate more limited dispersal abilities and more possibilities for significant biogeographical data.

A comparison of cricket distribution patterns reveals 3 distinct species groups: 1, cosmopolitan species (1 species: *Gryllodes sigillatus*); 2, species distributed mainly in the Greater Antilles (2 species: *Gryllus assimilis, Oecanthus allardi*); 3, species distributed in the Lesser Antilles only, being present either in a restricted number of nearby islands (*Amphiacusta saba, A. sanctaecrucis, Orocharis fulvescens, Cycloptilum eustatiensis*), or being potentially endemic to St Eustatius according to available data (*Orocharis angustus, O. minutus, O. proalbifrons, Orochirus maculatus, Cyrtoxipha orientalis*). The distribution of *Amphiacusta* species groups in the whole West Indian region supports patterns 2 and 3 above, with species groups present in the Greater Antilles only (*annulipes, bahamasensis, variegata, and mona* groups), one group present in the more easterly Greater Antilles and the more northern Lesser Antilles (*pronauta* group) and one group present only in the Lesser Antilles (*caraibea* group) (Desutter-Grandcolas & Otte 1997). Available data for podoscirtine Hapithini also support pattern 3, several species groups being known from the Lesser Antilles only (Desutter-Grandcolas & Bland 2003); this clade may also support pattern 2, although our knowledge of the Greater Antilles hapithine species is still insufficient.

The combined presence in St Eustatius, and to a lesser extent Saba, of taxa distributed in the Lesser Antilles only and of taxa distributed in both the Lesser and Greater Antilles, illustrates the separation of the 2 Antilles regions from a biogeographical point of view, with a transition zone located in the northern Lesser Antilles. Such a pattern has been demonstrated for other biotas (Eickwort 1988, Liebherr 1988, among others) and corresponds to a general feature of West Indian biogeography.

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