

**A new katydid of the genus *Phoebolampta* from St Maarten
(Orthoptera: Tettigoniidae: Phaneropterinae)**

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ABSTRACT. A new species of katydid is described from the Lesser Antillean island of St Maarten, Dutch West Indies. *Phoebolampta caeruleotergum* sp. n. (Tettigoniidae: Phaneropterinae) differs from congeners in having a deeply incised humeral sinus, ventral valvulae of the ovipositor broad, at least half the width of the gonoplac, and male cerci shorter than the subgenital plate, with gently hooked apical lobes of near equal size.

KEY WORDS: Orthoptera, Phaneropterinae, *Phoebolampta*, Lesser Antilles, West Indies.

INTRODUCTION

Phaneropterinae is the largest subfamily of the Tettigoniidae, comprising over 2000 species distributed worldwide (GWYNNE, 2001), and is thought to be sister group to a clade comprising Pseudophyllinae, Phyllophorinae, Acridoxeninae, Mecopodinae and Lipotactinae (GOROCHOV 1988, INGRISCH 1995, OTTE 1997, summarised in GWYNNE 2001). Phaneropterinae are mostly cryptic leaf-mimics, remaining motionless on their host plants during the day and feeding largely at night. However, some members of the tribe Barbitistini have abandoned leaf mimicry, having shortened wings and being active during the day (KEVAN 1982). The Phaneropterinae as currently defined comprises some 14 tribes, but there are still over 100 genera of uncertain tribal position. The last major treatment of the subfamily was undertaken by BRUNNER VON WATTENWYL (1878), but his monograph is largely outdated and a comprehensive revision of this important group is sorely needed.

The genus *Phoebolampta* was described by BRUNNER VON WATTENWYL (1878) to accommodate his new species *P. magnifica* from St Domingue (now the Republic of Haïti) which was later synonymised with *Microcentrum excellens* WALKER, 1869 by KIRBY (1906) who also placed *M. subaequale* WALKER, 1869 in the genus. REHN (1907) later added a third species, *Phoebolampta cubensis* from Cuba. Here we describe a fourth species, *Phoebolampta caeruleotergum* HEADS, sp. n. from the Lesser Antillean island of St Maarten.

MATERIAL AND METHODS

The new species was discovered by Ian and Mark BUSHELL in April 2006 near a small saline lagoon on the southern coast of St Maarten. The specimens studied herein are descended from individuals collected by Ian and Mark BUSHELL and were reared by one of us (C. LAKIN) on a mixed diet of *Arbutus unedo* (Ericaceae), various *Rubus* and *Rosa* spp. (Rosaceae: Rosoideae), *Acacia* sp. (Leguminosae: Mimosoideae) and *Fuschia* sp. (Onagraceae) at an ambient temperature of 22-28 °C during the day and 15-18 °C at night, with a 12:12 h photoperiod. Specimens were studied by S.W. HEADS who is responsible for the systematic description. Pinned specimens were examined using Olympus and Zeiss stereomicroscopes and photographs were taken using an Olympus DSLR E-500 digital camera with a Zuiko Digital 50 mm 1:2 macro lens. Measurements were made using a Sealey digital Vernier caliper (model no. AK962EV) and are given in millimetres unless otherwise stated. Specimens intended for study using scanning electron microscopy were mounted on aluminium stubs before being coated with gold-palladium and examined using a JEOL JSM-6100 SEM. All specimens are deposited in the Zoological Museum of Amsterdam, The Netherlands (ZMAN).

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SYSTEMATICS

Family Tettigoniidae STOLL

Subfamily Phaneropterinae BURMEISTER

Genus *Phoebolampta* BRUNNER VON WATTENWYL

Phoebolampta BRUNNER VON WATTENWYL, 1878: 31, 352. Type species: *Microcentrum excellens* WALKER, 1869 (= *Phoebolampta magnifica* BRUNNER VON WATTENWYL, 1878; synonymised by KIRBY, 1906).

Phoebolampta caeruleotergum HEADS sp. n.

(Figs 1-4, Table 1)

Diagnosis

Phoebolampta caeruleotergum conforms in size and general habitus with other species of the genus but can be distinguished from congeners by the following characters: humeral sinus prominent, deeply incised ($\text{\textcircled{♂/♀}}$); ventral valvulae of ovipositor broad, at least half the width of the gonoplac ($\text{\textcircled{♀}}$); male cerci shorter than subgenital plate, with gently hooked apical lobes of near equal size ($\text{\textcircled{♂}}$).

Description

$\text{\textcircled{♂/♀}}$: Size and general habitus typical of the genus; body form elongate, both sexes fully winged (Figs 1-3; for anatomical measurements see Table 1). Head with fastigium of vertex small, directed anteriorly but not especially produced, with prominent dorsal and anterior sulci; frons almost flat in profile. Eye round, situated high on the head, with slight anterior bulge. Antennae inserted between eyes, with robust scape around 1.5 times as long as pedicel; flagellar articles elongate, very slender. Pronotum elongate; anterior margin only slightly concave; posterior margin uniformly obtuse, with very small median indentation; surface of pronotal disc smooth, with uniform ornament of shallow depressions, interrupted by a weak, v-shaped transverse sulcus; lateral lobes deep, anterior margin almost straight, pleural and posterior margins obtuse, bordered by a row of small setae; humeral sinus strongly incised. Prosternum simple, unarmed; mesosternum with broad lobes, strongly angular on posterior margin; metasternum with large, strongly angular lobes. Auditory spiracle moderate in size, directed laterally, not covered by pronotal lobe.

Legs slender and elongate, generally smooth, not notably setaceous. Both tibial auditory tympana exposed. Profemur subcylindrical, widening apically; dorsal surface smooth, ventral surface strongly grooved, bordered by two rows of fine setae. Protibia prominently

expanded and laterally compressed in tympanal region (more so in males than in females); narrow medially and inflating towards apex with 6-8 subapical spines; apex armed on ventral surface with 2 apical spines. Mesofemur subcylindrical, not tapering; dorsal surface smooth, ventral surface flattened with small, irregularly spaced marginal spines. Mesotibia laterally compressed, evenly tapering distally; armed ventrally with between 8 and 10 subapical spines arranged in pairs and two stronger apical spines. Metafemur laterally compressed, basal half expanded; external surface glossy, ornamented with irregular small pits; ventral surface grooved, with prominent external ridge armed with evenly spaced spines; internal surface with similar spines on apical third. Metatibia quadrate in cross section, dorsal surface armed with numerous spines arranged in two rows along the entire length; spines becoming slightly longer and more densely spaced apically; ventral surface with fewer, smaller spines on the internal and external margins; apex with 3 interior and 3 exterior apical spurs.

Tegmina surpassing abdominal apex, in outline relatively narrow, typical of the genus in shape, apex blunt, not angular; C short, strongly curved towards costal margin basally; SC long, slightly sinuous, reaching margin in the distalmost third of tegmen; R running close to and parallel with SC, branching at midwing; R₁ directed apically, converging on SC but never fusing with it, with two, short apical branches; RS bifurcate, anterior branch sinuous, posterior branch only slightly so; MA simple and almost straight for most of its length, bifurcating distally before reaching the posterior margin; MP and cubito-anal system typical of the genus.

♂: Abdomen with tenth tergite slightly flared dorso-laterally; apex truncate, extending over broadly triangular supra-anal plate; surface of supra-anal plate without tubercles. Subgenital plate with broad, triangular base, tapering towards apex, with prominent median carina; styles simple. Cercus slender and gently incurved (Fig. 4 b-c), densely setaceous with bilobed apex; lobes of near equal size, gently hooked inwards. Internal genitalia simple, without sclerotized parts. Stridulatory file with 91 teeth and formed of an unbroken, arching series (Fig. 4 e-h) with the distalmost half on raised ridge; proximal teeth small, strongly serrated; medial teeth broad, not flanged or serrated; distal teeth broader than proximal teeth but not as broad as medial teeth, not flanged but may be minutely serrated.

♀: Supra-anal plate triangular, with small median carina. Subgenital plate with broad, triangular incision basally, tapering strongly distally, apex blunt. Cercus short, strongly incurved, very broad basally, tapering to a point apically, with covering of long setae. Ovipositor with prominent lobate structure basally, strongly serrated apically; ventral valvulae broad, at least half the width of the gonoplac (Fig. 4 a).

Colouration (♂/♀): Overall colour "normal" green, typical of Phaneropterinae (see Fig. 1). Antennae pale pink. Eye yellow-green ventrally, grading into pink-red dorsally; pseudopupil black or dark brown. Humeral angle of pronotum with prominent creamy-white line dorsally, sometimes grading into pink-red ventro-laterally; pink-red colouration of humeral angles occasionally extending onto the medio-cubital angle of the tegmen. Protrochanter, profemur and proximal half of protibia, brown (especially around protibial auditory

tympana, often darker in males); distal half of protibia green. Apex of mesofemur occasionally light brown. Metafemur often with pale creamy-white longitudinal line dorso-laterally. Males sometimes have pale brown bands on the metatibia; these are generally absent in females. Tegmen generally of uniform green but in some individuals, may have dark brown patches along distal margins. Hindwing hyaline with main veins bright green; membrane colourless. Dorsal surface of abdomen a uniform pale blue; abdominal spiracles surrounded by darker blue rings. Ventral surface of abdomen green; sternites often a paler green than the rest of the body. In females, the ovipositor is green with reddish-brown apical serrations.

Table 1. Anatomical measurements of *Phoebolampta caeruleotergum* sp. n. Abbreviations as follows: P, length of pronotum at midline; IOS, interocular space; L, length of body (from tip of vertex to apex of abdomen); F, length of metafemur; OV, length of ovipositor; SGP, length of subgenital plate (all measurements are given in millimetres).

Females (n = 3)							
Specimen	P	IOS	L	F	OV	SGP	Tegmen
Holotype	6.37	2.15	25.37	20.83	4.39	2.79	34.22
Paratype 1	7.18	2.33	25.78	22.86	4.84	2.96	38.69
Paratype 2	6.71	2.50	25.62	21.50	4.46	2.61	34.47
Mean	6.75	2.33	25.59	21.73	4.56	2.79	35.79
Max	7.18	2.50	25.78	22.86	4.84	2.96	38.69
Min	6.37	2.15	25.37	20.83	4.39	2.61	34.22
Max/Min	1.13	1.16	1.02	1.10	1.10	1.13	1.13
Males (n = 3)							
Specimen	P	IOS	L	F	Cerci	SGP	Tegmen
Allotype	7.80	2.56	27.89	22.12	3.41	5.67	36.18
Paratype 3	6.67	2.39	24.19	21.46	3.74	5.49	33.64
Paratype 4	6.43	2.38	21.62	20.83	3.86	5.14	33.04
Mean	6.97	2.44	24.57	21.47	3.67	5.43	34.29
Max	7.80	2.56	27.89	22.12	3.86	5.67	36.18
Min	6.43	2.38	21.62	20.83	3.41	5.14	33.04
Max/Min	1.21	1.08	1.29	1.06	1.13	1.10	1.10



Fig. 1. *Phoebolampta caeruleotergum* sp. n. Photograph of adult ♂ on *Rubus fruticosus* (Rosaceae) in the laboratory.

Type material

Holotype: ♀, laboratory reared, original provenance: St. Maarten, Neth. Antil., culture: C. Lakin (UK), 06.xii.2007, S. W. HEADS. Allotype: ♂, same data as holotype. Paratypes: two ♀♀ and two ♂♂, same data as holotype. All specimens with type and determination labels and deposited in ZMAN.

Type locality

St Maarten, Netherlands Antilles: 18°1'12.62"N, 63°3'50.32"W, elevation 0.61 m; scrubland immediately adjacent to saline lagoon 100–150 m from shoreline at Little Bay, 2 km south-west of Philipsburg. The habitat at this locality consists of sandy soils with sparse, scrubby vegetation dominated by *Acacia* sp. (upwards of 20 m high). Specimens were originally discovered feeding on *Acacia* leaves very local to the shoreline (Ian BUSHHELL, personal communication 2007).



Fig. 2. *Phoebolampta caeruleotergum* sp. n.: A – lateral aspect of holotype ♀; B – lateral aspect of allotype ♂ (scale bars: 10 mm).

Etymology

The specific epithet is a combination of the Latin words *caeruleus*, meaning ‘sky blue’, and *tergum*, meaning ‘back’ and is a reference to the blue colouration of the abdominal terga.

Remarks

Phoebolampta caeruleotergum is most similar to *P. subaequale* and *P. cubensis*, the females of these species all having rows of apical serrations on the ovipositor. Females of *Phoebolampta excellens* differ most notably from those of the other species in having a shorter, less strongly curved ovipositor with no apical serrations. Nevertheless, *P. caeruleotergum* females can easily be distinguished from *P. subaequale* and *P. cubensis* in having much broader ventral valvulae (at least half the width of the gonoplac) and a deeply incised



Fig. 3. *Phoebolampta caeruleotergum* sp. n. A – dorsal aspect of holotype ♀; B – dorsal aspect of allotype ♂ (scale bar: 10 mm).

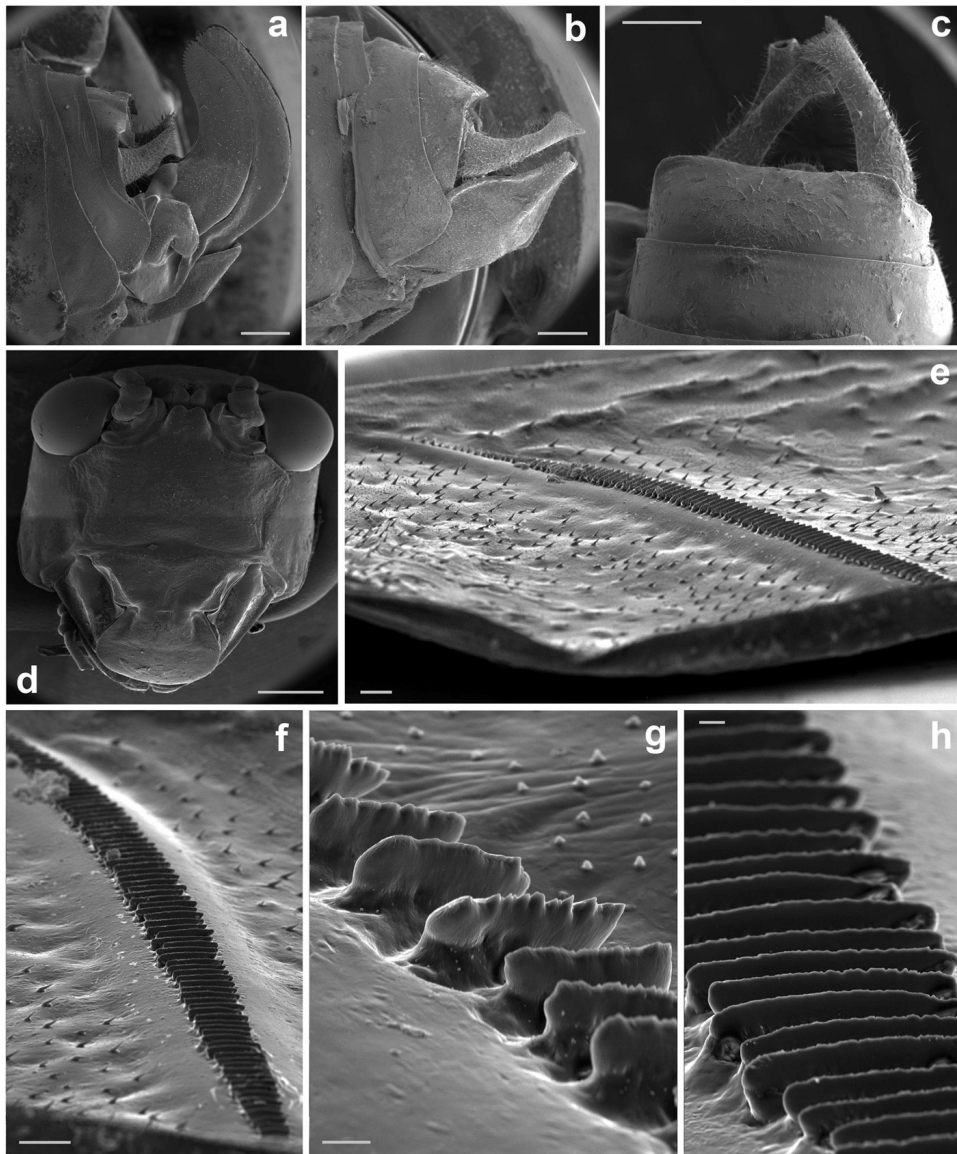


Fig. 4. Scanning electron micrographs of *Phoebolampta caeruleotergum* sp. n.: a – lateral view of ♀ terminalia; b – lateral view of ♂ terminalia; c – dorsal view of ♂ terminalia; d – anterior view of ♂ head capsule (composite of two separate micrographs); e – stridulatory file on underside of left ♂ tegmen; f – distal half of stridulatory file showing raised stridulatory ridge; g – proximal serrated file teeth; h – distal file teeth (scale bars: A, B, C and D = 1000 µm; E and F = 100 µm; G and H = 10 µm).

humeral sinus. Males of *P. caeruleotergum* are also readily distinguished from those of the other species by the deeply incised humeral sinus. The song of *P. caeruleotergum* is currently being studied by Dr Berthold HEDWIG (University of Cambridge) and will be described elsewhere.

Phoebolampta is one of the many phaneropterines that remain unassigned to tribes and the affinities of the genus are uncertain. Morphologically, *Phoebolampta* appears closest to *Microcentrum* and *Turpilia*, both of which are present in the West Indies and across Central and North America. However, a more thorough revision of these genera is required in order to confirm their relationships. *Phoebolampta* appears to be restricted to the West Indies; *P. excellens* and *P. subaequale* are both known only from Hispaniola (PEREZ-GELABERT 2001) and *P. cubensis* is at present recorded only from Cuba (REHN 1907). *Phoebolampta caeruleotergum* constitutes the first record of the genus from the Lesser Antilles and it is very likely that the genus is present on other islands in the West Indies.

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