

Phalangopsidae crickets from Espiritu Santo Island, Vanuatu (Insecta, Orthoptera, Grylloidea)

Laure DESUTTER-GRANDCOLAS

Muséum national d'Histoire naturelle,
Département Systématique et Évolution, UMR 7205 CNRS,
case postale 50 (entomologie), 57 rue Cuvier, F-75231 Paris cedex 05 (France)
desutter@mnhn.fr

Desutter-Grandcolas L. 2012. — Phalangopsidae crickets from Espiritu Santo Island, Vanuatu (Insecta, Orthoptera, Grylloidea). *Zoosystema* 34 (2): 287-304. <http://dx.doi.org/10.5252/z2012n2a7>

ABSTRACT

The long-legged crickets (Grylloidea, Phalangopsidae Blanchard, 1845) collected during the SANTO 2006 Global Biodiversity Survey are studied. Three genera (four species) are represented in the material at hand: three troglobitic species (*Megacris lipsae* n. gen., n. sp., *Parendacustes* sp. 1, *Parendacustes* sp. 2) and one epigeal species (*Brevizacla molisae* n. sp.) widespread in Santo rainforests. The species are defined by their morphology and male and female genitalia, and their habitats documented. These taxa are briefly compared to New Caledonian Phalangopsidae.

KEY WORDS

Grylloidea,
Phalangopsidae,
Micronesia,
Pacific,
New Caledonia,
new genus,
new species.

RÉSUMÉ

Les grillons Phalangopsidae de l'île d'Espiritu Santo, Vanuatu (Insecta, Orthoptera, Grylloidea).

Les grillons Phalangopsidae Blanchard, 1845 (Grylloidea) collectés lors de l'expédition SANTO 2006 sont étudiés. Trois genres (quatre espèces) sont représentés dans le matériel disponible: trois espèces troglobies (*Megacris lipsae* n. gen., n. sp., *Parendacustes* sp. 1, *Parendacustes* sp. 2) et une espèce épigée (*Brevizacla molisae* n. sp.), largement répandue dans les forêts tropicales de l'île de Santo. Les espèces sont définies sur la base de leur morphologie et de leurs genitalia mâles et femelles, et leur habitat documenté. Ces taxons sont brièvement comparés aux Phalangopsidae de Nouvelle-Calédonie.

MOTS CLÉS

Grylloidea,
Phalangopsidae,
Micronésie,
Pacifique,
Nouvelle-Calédonie,
genre nouveau,
espèces nouvelles.

INTRODUCTION

In the course of SANTO 2006 Global Biodiversity Survey (Bouchet *et al.* 2011a, b), orthopteran insects have been specifically sampled and observed, in order to document their taxonomic and biological diversity. New taxa were found in katydids (Tettigoniidae Krauss, 1902) and raspy crickets (Gryllacrididae Blanchard, 1845) (Hugel 2009), and grasshoppers proved very little present (Hugel 2012). As in many island systems, the most diverse of all Orthoptera collected are crickets, with more than 30 putative species (Desutter-Grandcolas *et al.* 2011). The systematic study of Santo crickets has been partly done (Desutter-Grandcolas 2009; Robillard 2009): 16 species, 13 of which new to science, were then described/redescribed, and their habitats and acoustic communication signals documented.

The present paper resumes the SANTO 2006 material studies, dealing with the long-legged crickets (Grylloidea, Phalangopsidae Blanchard, 1845). No phalangopsid species had been previously reported from the Vanuatu (Willemse 1925; Eades *et al.* 2011), and all the taxa presented here are new for the Vanuatu territory. They include both troglobitic taxa found in the karstic systems (Deharveng 2011), and epigeal taxa, collected by sight in rainforests in various localities. In total, four species are documented: two new species, the troglobitic *Megacris lipsae* n. gen., n. sp. and the epigeal *Brevizacla molisae* n. sp.; and two additional, probably new, troglobitic species known by juveniles only (*Parendacustes* sp. 1 and sp. 2).

MATERIAL AND METHODS

MATERIAL

Troglobitic species were collected in the “Karst section” of SANTO 2006 by Josiane Lips during preliminary surveys in 2005 (Deharveng 2011). Fieldwork in Vanuatu was otherwise performed in the section “Forêts, Montagnes, Rivières” of SANTO 2006 with Sylvain Hugel and Tony Robillard. Specimens were then collected and observed by sight, during the day and at night, and their habitats individually checked. All the specimens are deposited in the collections of the Muséum national d’Histoire naturelle, Paris.

DESCRIPTIONS

Forewing venation is named after Desutter-Grandcolas (2003). Male and female genitalia have been dissected on water relaxed specimens and cleaned in cold KOH, and drawn using a stereomicroscope Leica MZx12 with a camera lucida. They are preserved in glycerin in a small vial pinned with each examined specimen. Male genitalia are named after Desutter (1987), modified in Desutter-Grandcolas (2003).

ABBREVIATIONS AND SYMBOLS

Dotted areas in the figures represent dark parts of head, pronotum, wings, legs and tergites, and membranous parts in male and female genitalia.

Specimen origin

fn field number.

General morphology

ad, am, av dorsal, median and ventral TIII apical spurs;
F femur;
FW forewing;
HW hindwing;
I, II, III fore, median, hind (leg, femur, tibia, tarsus, basitarsus);
T tibia;
s1-s4 TIII subapical spurs numbered from apex upward.

Forewing venation

1-nA anal veins 1 to n;
CuA, CuP anterior, posterior cubital veins;
MA, MP anterior, posterior media veins;
R radial vein.

Male genitalia

d v dorsal valves;
ec a ectophallic apodeme;
ec f ectophallic fold;
ej d ejaculatory duct;
en s endophallic sclerite;
ps s pseudepiphallallic sclerite;
ps p pseudepiphallallic paramere;
r rami;
v v ventral valves.

Measurements (in mm, mean into parentheses)

Lad length of dorso apical spur of hind tibia;
LFIII length of hind femur;
LFW maximal length of forewings;
Lovip length of ovipositor;
Lpron median length of pronotum dorsal disc;
LTIII length of hind tibia;

Ltar length of hind basitarsi;
wFW width of forewings at mirror anterior angle;
wpron posterior width (unless noticed) of pronotum.

Institution

MNHN Muséum national d'Histoire naturelle, Paris.

LIST OF SPECIES INCLUDED

Brevizacla molisae n. sp.

Megacris lipsae n. gen., n. sp.

Parendacustes sp. 1

Parendacustes sp. 2

SYSTEMATICS

Superfamily GRYLLOIDEA Laicharding, 1781

Family PHALANGOPSIDAE Blanchard, 1845

Genus *Brevizacla* Gorochov, 2003

Mikuchomaklaia (*Brevizacla*) Gorochov, 2003: 722.

Brevizacla – Gorochov 2006: 444.

TYPE SPECIES. — *Mikluhomaklaia* (*Brevizacla*) *curta* Gorochov, 2003.

DISTRIBUTION. — Known from Papua New Guinea and the Solomon Islands. The species described here represents the easternmost location attested for the genus.

Brevizacla molisae n. sp.

(Figs 1-4; Table 1)

TYPE MATERIAL. — Holotype: Vanuatu, Espiritu Santo, Luganville, site du CTRAV, 15°27'00"S, 167°12'26"E, forêt côtière sur sable, 1 ♂, 30.X.2006, fn 11, sur tronc au sol près terriers, L. Desutter-Grandcolas (MNHN-ENSIF2828).

Allotype: Same locality, date and collector as the holotype, 1 ♀, fn 17, sur tronc 20 cm de diamètre, à 25-30 cm H, cavités à la base (MNHN-ENSIF2829).

Paratypes (12 ♂♂, 5 ♀♀): Same locality, date and collector as the holotype: 1 ♂, fn 23, sur contrefort; 1 ♂, fn 15, sur tronc 30 cm de diamètre, à 25-30 cm H, cavités à la base; 1 ♂, fn 28, sur souche 10 cm de diamètre, à 25 cm H, cavités à la base; 1 ♂, fn 9, sur racine émergente avec cavité à la limite du sol; 1 ♂, fn 26, sur branche morte au sol en partie cassée et enterrée; 1 ♂, fn 14, sur

tronc contourné à contrefort, à 20 cm H; 1 ♂, fn 24, sur contrefort; 1 ♂, fn 22, sur morceau de bois mort au sol; 1 ♂, fn 19, sur arbre mort couché, non au sol; 1 ♀, fn 12, sur tronc au sol, près terriers; 1 ♀, fn 13, à la base d'un tronc 25 cm de diamètre proche bois mort (MNHN-ENSIF2830-2834, ENSIF2836-2841); 1 ♂, fn 8, sur tronc 10 cm de diamètre, à 30 cm H; 1 ♀, fn 7, sur tronc 15 cm de diamètre, à 30 cm H, petites cavités à la base (MNHN-ENSIF2902-2903, in alcohol collection, vials 556, 557). Same locality and collector as the holotype: 28.X.2006, 1 ♂, fn 3, sur tronc d'arbre coupé, à 10 cm H; 2 ♀♀, fn 4, 5, sur tronc penché parallèle au sol (MNHN-ENSIF2842-2844); 31.X.2006, 1 ♂, fn 1, sur tronc couché près du sol, avec cavités (MNHN-ENSIF2845).

OTHER MATERIAL EXAMINED. — 18 ♂♂, 7 ♀♀, 23 juveniles. Same locality, date and collector as the holotype: 1 juvenile ♀, fn 10, sur racine émergente avec cavités à la base à la limite du sol; 1 juvenile ♀, fn 18, sur tronc 20 cm de diamètre, à 25-30 cm H, cavités à la base; 1 juvenile ♀, fn 21, sur racine contrefort, à 15 cm H; 1 juvenile ♀, fn 27, sur branche morte au sol en partie cassée et enterrée; 1 juvenile ♀, fn 20, sur tronc mort au sol; 1 juvenile ♂, fn 16, sur tronc 20 cm de diamètre, à 25-30 cm H, cavités à la base; 1 juvenile ♂, fn 25, sur petit tronc, à 15 cm H (MNHN-2661-2667). Same locality and collector as the holotype: 28.X.2006, 1 juvenile ♀, fn 2, à la base d'un tronc 15 cm de diamètre, racines formant contrefort bas, espaces entre sol et racine; 1 juvenile ♂, fn 6, sur tronc penché parallèle au sol (MNHN-ENSIF2868-2869). Same locality and collector, 29.X.2006, 1 juvenile ♀, fn 52, sur tronc à contrefort 30 cm de diamètre, à 10 cm H (MNHN-ENSIF2870); 31.X.2006, 1 juvenile ♂, fn 2, sur tronc 10 cm de diamètre, à 80 cm H (MNHN-ENSIF2871). — Vanuatu, Espiritu Santo, Big Bay, Matantas, Vathé Conservation area, 15°20'S, 166°95'E, 26.X.2006, nuit, 1 ♂, fn 64, sur contrefort d'un arbre, près cavité, 25 cm H; 1 ♂, fn 65, sur contrefort d'un arbre, près cavité, 50 cm H; 1 ♂, fn 66, sur contrefort d'un arbre avec cavité à sa base; 1 ♂, without precision; 1 ♂, fn 62, sur contrefort d'un arbre 20 cm de diamètre, cavité à la base; 1 ♂, fn 61, sur contrefort d'un arbre 60 cm de diamètre, 80 cm H; 1 ♂, fn 67, sur contrefort d'un arbre avec cavité à sa base; 1 ♂, fn 58, sur tronc; 1 ♀, fn 63, sur tronc; 1 ♀, fn 59, sur tronc à contrefort, 40 cm H; 1 ♀, fn 60, sur tronc mort au sol 30 cm de diamètre, 25 cm H; 1 juvenile, fn 68, sur tronc 80 cm de diamètre, 45 cm H, L. Desutter-Grandcolas (MNHN-ENSIF2848-2857, 2878-2880); 25.X.2006, nuit, 1 ♂, fn 31, 1 juvenile, fn 36, without precision (bad condition); 1 ♂, fn 28, sur tronc 70 cm de diamètre à contrefort, 30 cm H; 1 ♂, fn 27, sur tronc 70 cm de diamètre à contrefort, 40-50 cm H; 1 ♂, fn 37, tronc à contrefort, creux à la base, 90 cm H sur contrefort; 1 ♂, fn 25, sur tronc 80 cm

de diamètre avec cavités à la base, 25 cm H; 1 ♀, fn 34, 1 juvénile, fn 36, sur tronc contourné avec bois mort à la base, 1 m H; 1 ♀, fn 26, sur tronc 70 cm de diamètre avec contrefort, 40-50 cm H (MNHN-ENSIF2858-2860, 2872-2877); 21.X.2006, 2 juvéniles, fn 32, 33, without precision (MNHN-ENSIF2824-2825). — Vanuatu, Espiritu Santo, Nattawa, forêt paturée, 15°19'29"S, 167°12'09"E, 29.X.2006, jour, 1 juvénile, fn 50, litière, L. Desutter-Grandcolas (MNHN-ENSIF2881). — Vanuatu, Espiritu Santo, Peavot, Mt. Nouresororo, 636 m alt., 14°59'26"S, 166°45'14"E, forêt de brume, 22.X.2006, nuit, 1 ♀, fn 16, à la base du contrefort d'un très gros tronc, S. Hugel (MNHN-ENSIF2882). — Vanuatu, Espiritu Santo, Butmas, 600 m alt., forêt du plateau de Tankara, 15°21'56"S, 166°59'E, 13.X.2006, nuit, 1 ♂, fn 25, 40 cm H sur tronc à échasse; 1 ♂, fn 30, 2 m H sur petit bambou 2 cm de diamètre; 1 ♂, fn 29, 1.70 m H, tronc 70 cm de diamètre, bois mort et cavités à la base; 1 ♂, fn 27, 1.50 m H, sur tronc à contrefort 60 cm de diamètre; 1 ♂, fn 32, 1 ♀, fn 33, 1 juvénile, fn 34, 2 m H, sur tronc à contrefort; 1 juvénile, fn 26, 2.50 m H sur tronc à contrefort; 1 juvénile, fn 28, 1.50 m H, tronc à contrefort 50 cm de diamètre; 1 juvénile, fn 31, 40 cm H sur tronc à contrefort (MNHN-ENSIF2883-2892); 16.X.2006, nuit, 2 juvéniles, fn 11, 3, falaise calcaire alvéolée (MNHN-ENSIF2893-2894).

ETYMOLOGY. — Species named after Grace Mera Molisa, politician and poet, who campaigned in favour of Vanuatu independence and Melanesian culture.

DIAGNOSIS. — Small species spotted with yellow, brown and black (Fig. 1). Face with three wide longitudinal brown lines, separated with light yellow (Fig. 2A). Tibiae I without tympanum. Male with short, glandular forewings more or less hidden under the pronotum (Fig. 3); head dorsum and tergites not glandular. Male genitalia: pseudepiphallus transverse, with a longitudinal crest raised distally as a thin horn; pseudepiphallic parameres plate like, slightly concave, with thin spine-like outer distal and inner proximal angles (Fig. 4). Female apterous; ovipositor small, shorter than FIII; valve apex smooth. Copulatory papilla short, flat and slightly asymmetrical, distal margin bisinuate (Fig. 2).

DESCRIPTION

Small species flecked with black, brown and yellow (Figs 1; 3).

Head

Eyes protruding (Fig. 2B). Fastigium longer than wide, lateral margins rounded. Ocelli (Fig. 2B) all small and subequal in size, slightly protruding; distance between lateral ocelli smaller than the

distance between median ocellus and one lateral ocellus; median ocellus subapical. Scapes longer than wide, inner upper half with strong, short setae. Palpi long and thin; fifth joint slightly widened only close toward apex, and truncated near apex (Fig. 2C).

Pronotum

Squared, with rounded lateral margins. Dorsal disc: anterior margin only slightly sinuate; distal margin strongly sinuate; a deep longitudinal furrow on anterior $\frac{3}{5}$. Lateral lobes distinctly truncated distally; anterior lobes greatly raised (Fig. 1).

Legs

Long and thin. TI without tympanum; two apical spurs, the inner the longest. TII with two apical ventral spurs, dorsal spurs lacking on both sides. TIII compressed laterally, distinctly higher than wide; three outer apical spurs, the median the longest; two inner apical spurs, the ventral missing, the median and dorsal subequal and less than 1.5 times the median outer spur; three inner and four outer subapical spurs, the outer longer and curved. TIII serrulated on both inner and outer margins, except between apical and subapical spurs; spines small and most often bent over the tibia; inner serrulation: no spine between spurs 1 and 2, 1-2 spines between spurs 2 and 3; 17-20 above spurs, smaller toward tibia basis; outer serrulation: 0-2 spines between spurs 1 and 2, 2-4 spines between spurs 2 and 3, 2-4 spines between spurs 3 and 4, 13-18 spines above spurs. Basitarsomeres III very long, about 3 times as long as tarsomeres III-3; two rows of small spines dorsally, mostly distally set: 1-4 inner spines, and 4-6 outer spines, in addition to distal spines.

Terminalia

Cerci very long, longer than the body (Fig. 1).

Colouration

Pilosity short, brown and golden. Head dorsum light brown, with four brown lines on vertex, more or less joining anteriorly and laterally. Ocelli white; lateral ocelli in a transverse black

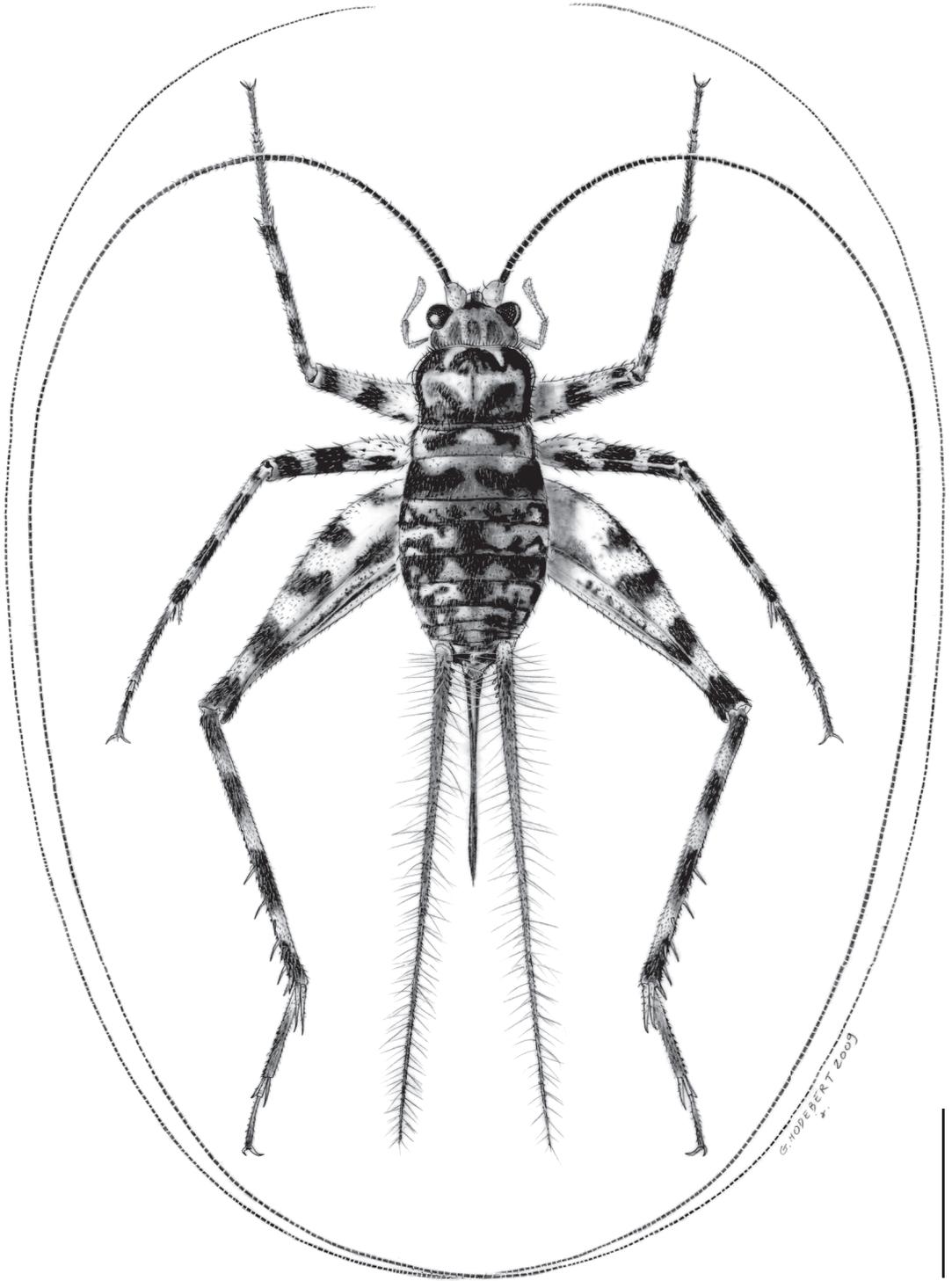


FIG. 1. — *Brevizacla molisae* n. sp., habitus, female allotype. Scale bar: 5 mm.

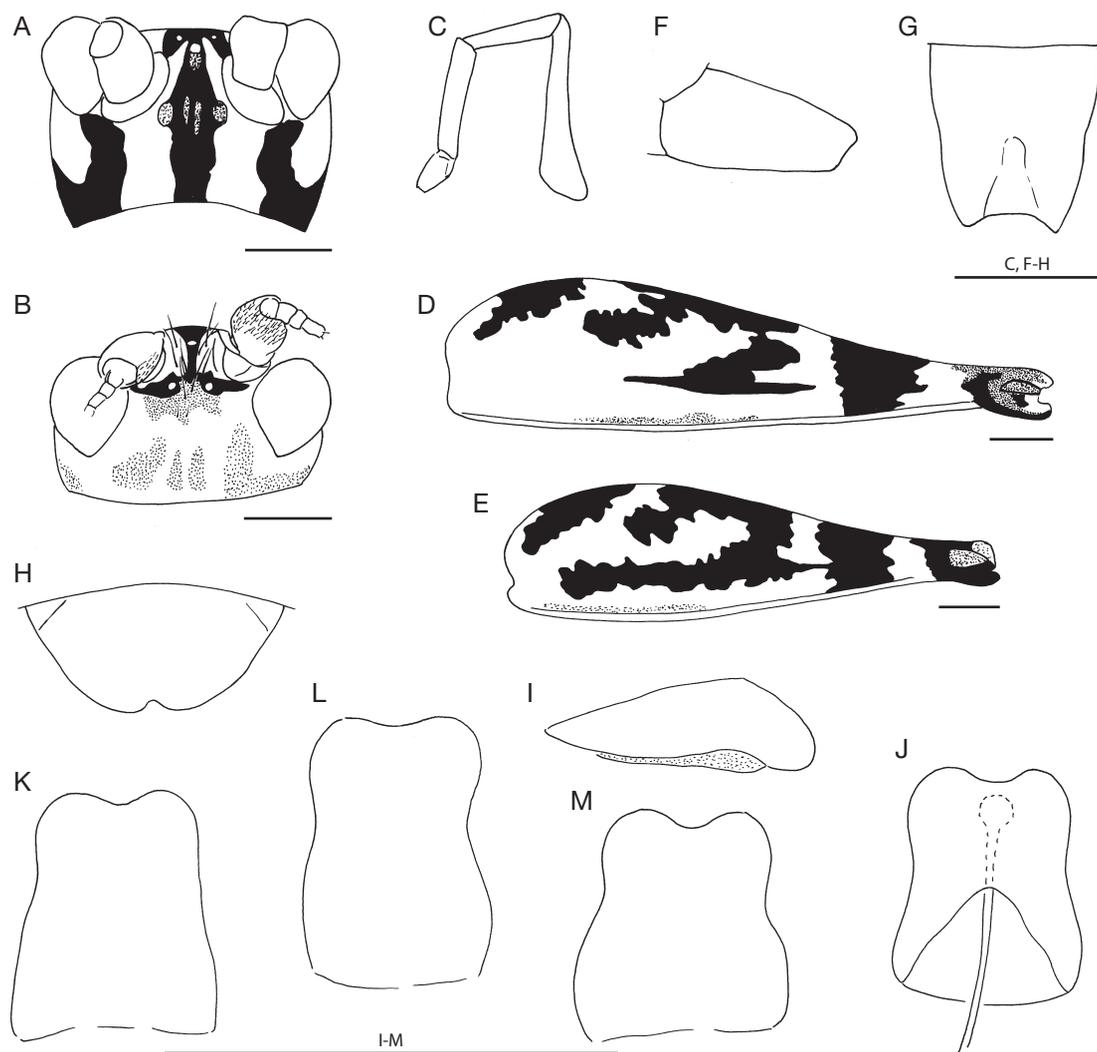


FIG. 2. — *Brevizacla molisae* n. sp.: **A**, face colouration; **B**, head dorsum; **C**, maxillary palpus; **D**, **E**, colouration pattern of hind femur in the specimens originating from Luganville (**D**) and Butmas (**E**); **F**, **G**, male subgenital plate in ventral (**F**) and lateral (**G**) views; **H**, female subgenital plate in ventral view; **I**–**M**, copulatory papillae in lateral (**J**) and ventral views (**J**–**M**) of females from Luganville (**I**, **J**), Peavot (**K**), Matantas (**L**) and Butmas (**M**). Scale bars: 1 mm.

brown line prolonged anteriorly toward median ocellus; median ocellus circled with black. Eyes brown, circled with light yellow. Fastigium with a median longitudinal dark line, bordered with yellow. Cheeks widely light yellow behind the eyes; posterior and ventral margins bordered with black brown. Face (Fig. 2A) with three wide brown lines separated by light yellow; lateral lines below the

eyes widened laterally toward the cheeks; median line going from median ocellus to episternal suture, prolonged on clypeus, and including indistinct lighter flecks, one under median ocellus and a pair of elongated ones between antennal pits. Scapes light brown, somewhat darker on inner margins. Antennae brown. Palpi light brown. Pronotum: Dorsal disc mottled yellow and brown; pyriform

inscriptions yellow (Fig. 3); lateral lobes brown, anterior angle more or less yellow. Legs light yellow with brown rings and flecks; tibiae with four rings; FI with two rings (apical and subapical) and a basal fleck on dorsal side; FII with three rings, basal one incomplete; FIII with two distal rings (apical, subapical) and three more or less ring-shaped flecks toward coxae, outer side light yellow basally with an additional longitudinal brown line (Fig. 2D).

Terminalia

Cerci brown, with a wide yellow basal ring. Supranal plate yellow basally, brown more distally.

Tergites

Mottled with yellow and brown, tergites I and IV clearly darker.

Male

FW present but greatly reduced, not reaching the distal margin of metanotum and often hidden under the pronotum; distal margins thick and rounded, glandular. Tergites without glandular pits. Subgenital plate low and squared (Fig. 2F), distal margin truncated and sinuate (Fig. 2G).

Male genitalia

Pseudepiphallic sclerite transverse with a medio-longitudinal crest raised distally as a high horn, as in other species of the genus (Fig. 4A-C); anterior margin deeply indented. Rami not clearly separated from pseudepiphallic sclerite, straight. Pseudepiphallic parameres located beyond pseudepiphallic sclerite (Fig. 4C), having the shape of a quadrate horizontal plate most often slightly concave; outer, distal angle of parameres hook-like (Fig. 4A-C); inner, proximal angle elongate and raised (Fig. 4A, C). Ectophallic arc membranous between apodemes; ectophallic apodemes wide and straight, more sclerotised along outer margins (Fig. 4A). Ectophallic fold membranous, wide, going beyond the proximal limit of parameres, distal margin deeply indented (Fig. 4B). Ectophallic valves flat, nearly as long as ectophallic fold, slightly sclerotised from endophallic sclerite (Fig. 4B, C). Endophallic



FIG. 3. — *Brevizacla molisae* n. sp., specimen from Big Bay, Matantas (ENSIF2873): **A**, **B**, male forewings at low (**A**) and high (**B**) magnification. Scale bars: 1 mm.

sclerite with a wide basis, more sclerotised distally, and a thin, long distal sclerite (Fig. 4B). Dorsal cavity lacking.

Female

Apterous. Subgenital plate distal margin indented (Fig. 2H). Ovipositor small, well shorter than FIII, straight; apex hardly wider than the main part of the valves, smooth.

TABLE 1. — Measurements of *Brevizacla molisae* n. sp. Abbreviation: **wpron**, maximal width of pronotum, including anterior angles of lateral lobes.

| Locality | | Lpron | wpron | LFIII | LTIII | Lovip |
|-------------------|-------------------|---------|----------|---------|---------|-------|
| Luganville | Males | | | | | |
| | holotype | 2.5 | 3.3 | 9.5 | 8.3 | – |
| | paratypes (n = 5) | 2.4-2.5 | 3.1-3.3 | 9.0-9.5 | 7.8-8.3 | – |
| | mean value | 2.4 | 3.2 | 9.3 | 8.1 | – |
| | Females | | | | | |
| allotype | 2.3 | 3.7 | 10.2 | 8.7 | 7.0 | |
| paratypes (n = 4) | 2.3-2.5 | 3.6-3.8 | 9.3-10.3 | 8.2-8.7 | 6.9-7.3 | |
| mean values | 2.4 | 3.7 | 9.9 | 8.5 | 7.1 | |
| Matantas | Males | | | | | |
| | n = 4 | 2.2-2.3 | 2.9-3.0 | 8.2-8.8 | 6.9-7.5 | – |
| | mean value | 2.3 | 3.0 | 8.5 | 7.2 | – |
| | Females | | | | | |
| n = 4 | 2.2-2.4 | 3.3-3.5 | 8.2-9.3 | 7.4-7.8 | 6.3-6.9 | |
| mean value | 2.3 | 3.4 | 8.8 | 7.7 | 6.7 | |
| Peavot | Female | | | | | |
| n = 1 | 2.4 | 3.5 | 9.7 | 8.2 | 7.0 | |
| Butmas | Males | | | | | |
| | n = 4 | 2.1-2.2 | 2.8-3.0 | 7.7-8.5 | 6.6-7.2 | – |
| | mean value | 2.1 | 2.9 | 8.1 | 6.9 | – |
| | Female | | | | | |
| n = 1 | 2.3 | 3.3 | 9.4 | 8.1 | 7.4 | |

Female genitalia

Copulatory papilla (Fig. 2I, J) short and very flat; distal margin strongly sinuate; lateral margin curvatures asymmetrical.

Juveniles

Very lightly coloured: head dorsum yellow parts connected behind the transverse black band at the level of lateral ocelli, resulting in a very contrasted pattern.

Measurements

See Table 1.

Variation

In the males originating from Luganville, the paramere plate is sometimes more concave, slightly “rolled” upon itself (Fig. 4G), and there is globally a certain amount of variation in the paramere shape (Fig. 4F-I). Specimens originating from Matantas and Butmas are globally smaller than the specimens from Luganville (Table 1), and somewhat darker (compare for example FIII colouration; Fig. 2D, E). In the males, the pseudepiphallallic horn is thinner and the pseudepiphallallic sclerite more concave, with a wider distal outer

angle (Fig. 4D, E); in some specimens, the horn is elongated apically over about $\frac{1}{4}$ of its total length. There is a certain amount of variation in female copulatory papilla also (Fig. 2I-M): The Butmas female has a copulatory papilla shorter and slightly wider than Luganville specimens (Fig. 2K), that of Matantas is longer with a distal margin less sinuated (Fig. 2L), that of Butmas is wider and rounder (Fig. 2M).

HABITAT. — According to the specimens collected, *Brevizacla molisae* n. sp. is a nocturnal species, which forages on tree trunks or diverse tree structures (roots, buttresses). Only one specimen has been collected during the day, in the leaf litter (one juvenile from Nattawa, a pastured forest), and none has been found under barks: *B. molisae* n. sp. may hide during the day in the cavities that occur at the base of tree trunks.

Genus *Megacris* n. gen.

TYPE SPECIES. — *Megacris lipsae* n. sp.

ETYMOLOGY. — Taxon named after its very large size (greek adjective $\mu\epsilon\gamma\alpha\varsigma$, $\mu\epsilon\gamma\alpha\lambda\eta$) and the suffix “-acris”, common in Orthoptera.

DIAGNOSIS. — Very large species. Fastigium wide, bearing three small ocelli arranged as an equilateral triangle.

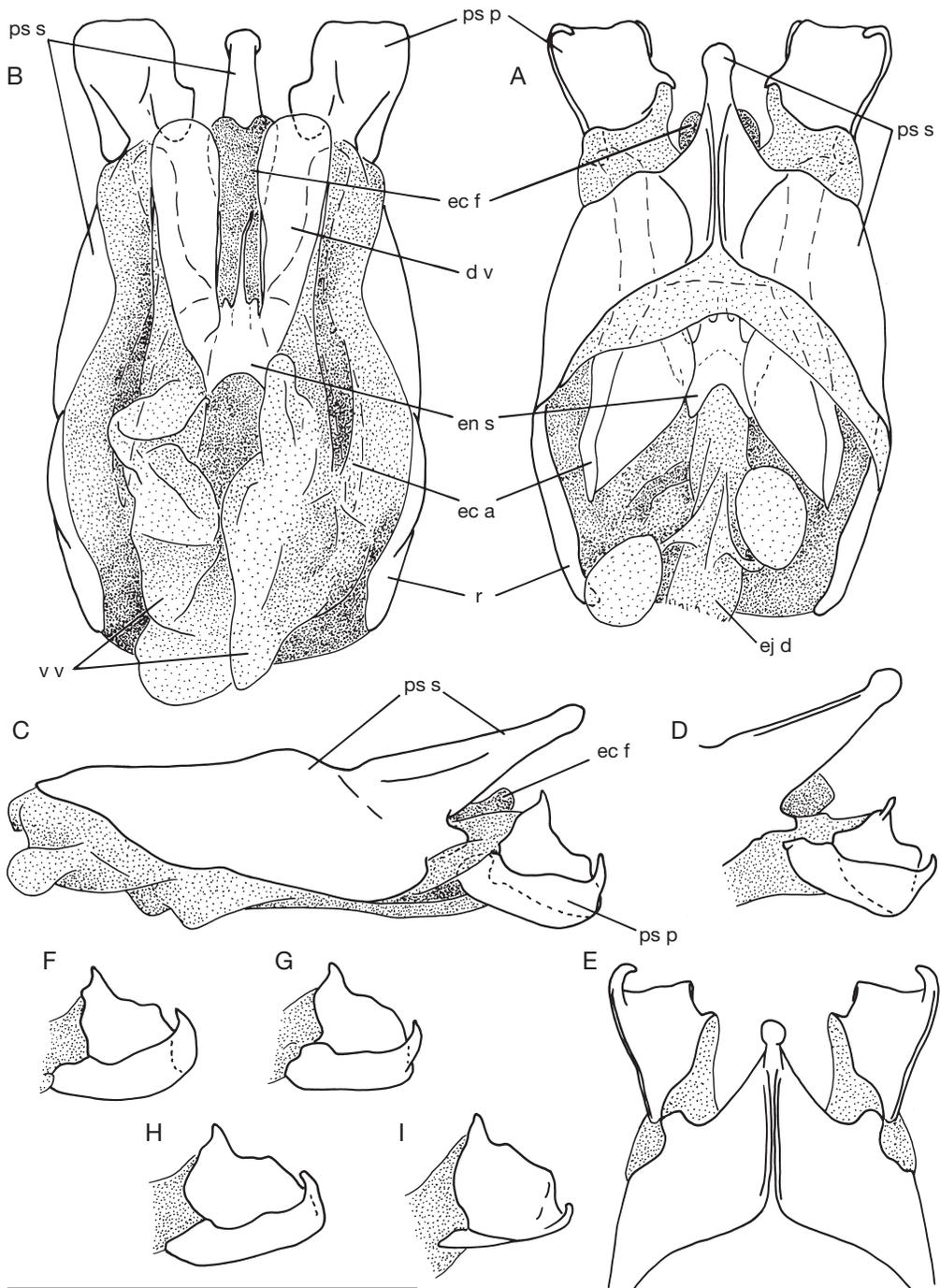


FIG. 4. — *Brevizacla molisae* n. sp.: A-E, male genitalia in dorsal (A, E), ventral (B) and lateral (C, D) views in specimens from Luganville (A-C) and Butmas (D, E); F-I, variation in paramere shape in specimens from Luganville (F-H) and Matantas (I). Abbreviations: see Material and methods. Scale bar: 1 mm.

Inner and outer tympana both oval and very small. Inner subapical spurs of TIII increasing in length through tibia length, the longest almost as long as basitarsus III. FWs present in females (and so certainly in males), but short. Female ovipositor with dorsal valves apex ornamented with transverse crests, ventral valves with ventral teeth. Female genitalia hardly sclerotised, having the shape of a finger; aperture of spermathecal duct trench-like, located apically and ventrally on the papilla. Spermathecal duct short.

REMARK

We describe here a new species and a new genus, although it is known by females and juveniles only. Cricket taxonomy being mostly based on male genitalia, it is difficult to compare this species with known taxa. However, it presents a combination of morphological characters not yet encountered in long-legged crickets, which justifies the definition of a new genus: if the spurs, serrulation and dorsal crest of TIII are similar to those of *Trellius* Gorochov, 1990 and other Phaloriinae Gorochov, 1985, wing condition and size are radically different. Also, to my knowledge no Phaloriinae has yet been reported from caves.

Megacris lipsae n. sp. (Figs 5, 6; Table 2)

TYPE MATERIAL. — Holotype: Vanuatu, Butmas, Puits sans Nom, 15°23.583'S, 166°57.247'E, 370 m alt., 1 ♀ (Karst sample SK05-Lips47/2016), 25-VIII-2005, J. Lips (MNHN-ENSIF2898, alcohol collection vial 552). Paratypes (2 ♀♀): Vanuatu, Nambel, Millenium, 15°26.31'S, 167°03.40'E, 200 m alt., 1 ♀ (without hindlegs), 1 ♀ (Karst sample SK05-Lips19/1747-1759), J. Lips, 8.VIII.2005 (MNHN-ENSIF2899, 2900, alcohol collection vials 553, 554).

OTHER MATERIAL EXAMINED. — 1 ♀, 2 juveniles. Vanuatu, Nambel, Millenium, 15°26.31'S, 167°03.40'E, 200 m alt., 2 juveniles (Karst sample SK05-Lips19/1747), 8.VIII.2005, J. Lips (MNHN-ENSIF2900, alcohol collection vial 554). — Same locality, date and collector as the holotype, 1 ♀ (ovipositor broken) (MNHN-ENSIF2901, alcohol collection vial 555).

ETYMOLOGY. — Species named after the speleologist Josiane Lips, who collected the specimens in Santo caves.

DIAGNOSIS. — In addition to the characters of the genus, species characterised by its size, pattern of colouration

(head, pronotum, tergites, legs), very short ovipositor and detailed shape of female genitalia.

DESCRIPTION

Species large and robust. Global colouration yellowish, with brown spots and marks.

Head

Vertex and fastigium not separated by a steep slope (Fig. 5A). Fastigium as wide as the scapes (Fig. 5B); median ocellus subapical in position, but located in a shallow depression, not in a deep furrow (Fig. 5B, C). Eyes slightly protruding, relatively small (only slightly longer than the scapes). Maxillary palpi long; joint 5 longer than joint 4, itself longer than joint 3; joint 5 slightly widened apically, truncated obliquely (Fig. 5D).

Pronotum

Slightly transverse; dorsal disc distinctly longer than the lateral lobes (Fig. 5E); anterior angles of lateral lobes raised dorsally (Fig. 5F).

Legs

TI with two ventral apical spurs; inner spur the longest. TII with three apical spurs (no outer dorsal spur); inner ventral spur the longest. TIII with four pairs of subapical spurs (Fig. 5G), the inner of each pair slightly lower on tibia than the outer; subapical spurs otherwise arranged symmetrically along a median, serrulated keel; outer subapical spurs all of equal size; inner subapical spurs increasing in length toward tibia apex; distance between subapical spurs 1 and 2 equal to the distance between subapical spur 1 and tibia apex (Fig. 5G); three pairs of apical spurs: outer apical spurs small, the median the longest; inner apical spurs very long, the median longer than half basitarsus III, the dorsal (the longest) at least $\frac{3}{4}$ as long as basitarsus III (Fig. 5G). TIII serrulation made of extremely small spines: median keel without spine between apex and spurs 1, 3-5 between spurs 1 and 2; 3-5 between spurs 2 and 3; four between spurs 3 and 4; lateral serrulation above subapical spurs: 9-10 inner and 7-10 outer teeth. Basitarsi III flattened dorsally, with 0-1 spine dorsal on inner margin, five on outer margin, in addition to a small apical outer spine. Tarsal claws long and acute.

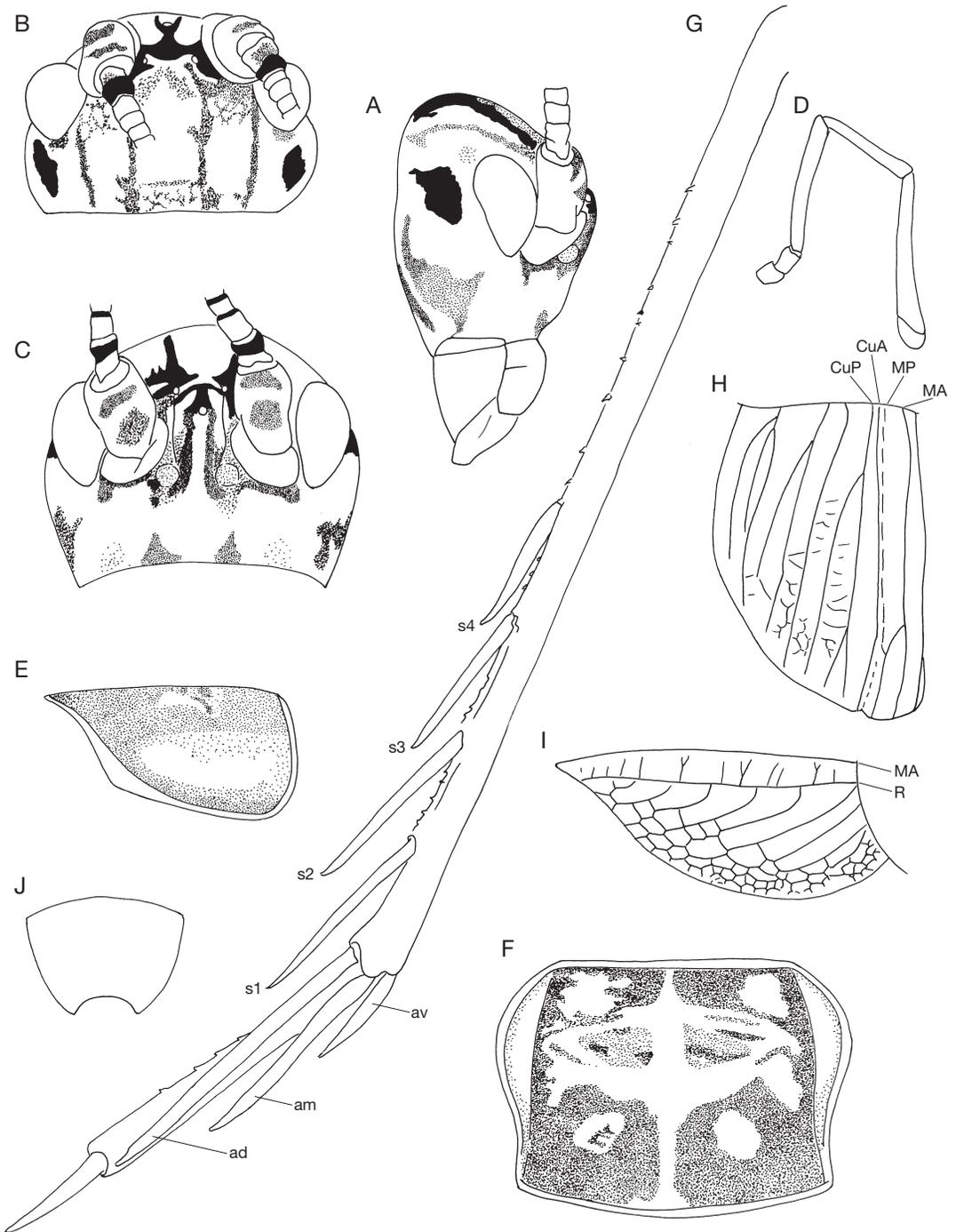


FIG. 5. — *Megacris lipsae* n. gen., n. sp.: **A**, head, lateral; **B**, head dorsum; **C**, face; **D**, maxillary palpus; **E**, **F**, pronotum, lateral lobe (**E**) and dorsal disc (**F**); **G**, hind tibia inner side; **H**, **I**, forewing venation, on dorsal (**H**) and lateral (**I**) fields; **J**, subgenital plate. Abbreviations: see Material and methods. Scale bar: 1 mm.

Terminalia

Cerci very long.

Colouration

Very light colouration, perhaps due to preservation in alcohol. Head dorsum light yellow (Fig. 5B); four longitudinal brown lines, joining anteriorly along posterior margins of antennal pits, lateral lines bordering the inner margins of the eyes. Eyes black, lower margin lighter. Ocelli whitish; median ocelli connected by a transverse whitish line on the face. Fastigium yellow laterally; behind median ocellus, a median longitudinal brown line, subdivided into two transverse lines separate from lateral ocelli by a white transverse line. Face yellowish (Fig. 5C); two longitudinal dark brown lines on each side of median ocellus, along antennal pits; antennal pit lower margins marked with brown. Cheeks light yellow, except for lower third and posterior margin, lightly mottled with brown; a wide brown spot behind each eye (Fig. 5A). Mouthparts yellow; clypeus whitish. Palpi white, last three joints densely covered by strong black setae, except in basal fourth. Scapes light yellow; a median whitish spot, a lower light ochre spot and an upper brown line on ventral side (Fig. 5C). Antennae light yellowish brown. Pronotum brown with yellow pattern (Fig. 5E, F); anterior and posterior margins yellowish, with numerous strong black setae (except on lower margins of lateral lobes); dorsal disc otherwise with a thin, longitudinal, light yellow line, a pair of yellow rounded spots more or less distinct just behind anterior margin, another pair in posterior third, and a very large yellowish fleck in anterior half, including brownish muscular inscriptions and a pair of small brownish lines; lateral lobes with a wide transverse yellow band. Legs light yellow with brown marks, densely covered with short black setae. TI, TII with a brown fleck near the knee and three brown rings, one subapical surrounding tympana, one at about mid length and one apical. TIII with a distal and an apical brown rings, and brown flecks around each pair of subapical spurs. FI, FII with four brown marks on each side, the most apical on the knee and prolonged along femur ventral margin, the subapical at about $\frac{1}{4}$ of femur length, extended dorsally as an almost complete ring and often connected to apical fleck. FIII with

brownish knees; two subapical brown rings; basal half with brown stripes on dorsal side, light yellow on lower part. Apical spurs light yellow, apex brown. Basitarsi light yellow, apex brown. Tarsomeres 2 brown. Tarsomeres 3 light yellow, marked with brown basally. Tarsal claws light yellow, brown apically. Tergites yellow dorsally, with a light-brown median dotted band; anterior and posterior margins bordered with light brown, this colouration getting darker toward abdomen tip; tergites brown laterally, with a pair of whitish dots on each side, more or less conspicuous along abdomen. Supra-anal plate brown. Cerci brown on basal half, somewhat lighter basally; yellowish on distal half.

Male

Unknown. Most probably winged.

Female

HWs vestigial. FWs not reaching posterior margin of tergite III. Dorsal field venation (Fig. 5H) comprising eight regularly spaced, faint, longitudinal veins, with many, very faint, transverse veins in distal half: 3 anal veins (2A and 3A bifurcated 2-3 times each, 1A straight), CuP bifurcated twice, CuA straight, MP clearly visible only after its connection to MA on FW apical fourth and delimiting a small vanal fan; area between CuA/MP and MA thus wide and regular, without transverse veins. Lateral field (Fig. 5I) delimited by MA; MA and R much stronger than other veins; area between MA and R wide, crossed by numerous transverse veins; R bifurcated 8 times; many transverse veins in lower half of R bifurcations. FWs brown, perhaps yellowish on dorsal basal third, area between CuA and MA lighter (whitish?); densely covered by short, golden setae. Sternites light yellow; posterior margin of sternite 8 light brown. Subgenital plate as on Figure 5J; posterior margin concave; yellowish brown. Ovipositor very short, only $\frac{1}{3}$ as long as FIII; apex small and acute; dorsal valves with transverse crests, ventral valves with three main teeth, in addition to smaller ones (Fig. 6A-C).

Female genitalia

Copulatory papilla only slightly sclerotised, very long and thin, somewhat plicated (Fig. 6D, E);

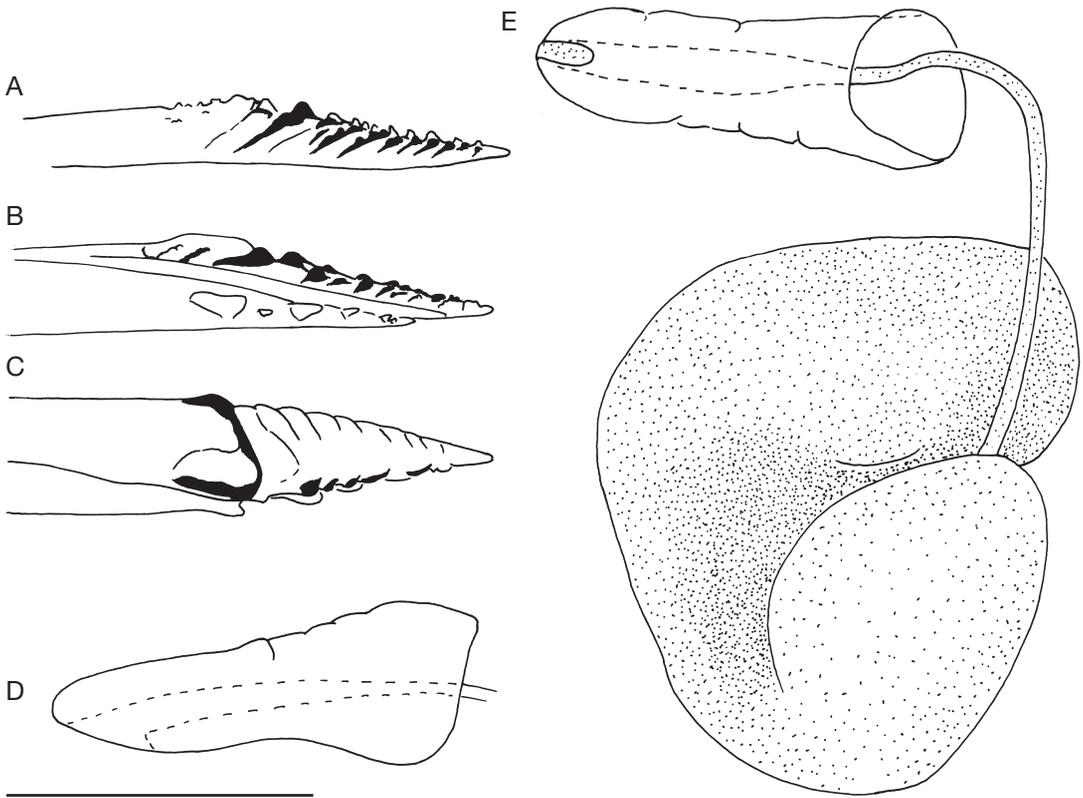


FIG. 6. — *Megacris lipsae* n. gen., n. sp.: **A-C**, ovipositor apex in dorsal (**A**), ventral (**B**) and lateral (**C**) views; **D, E**, copulatory papilla in lateral (**D**) and ventral (**E**) views. Scale bar: 1 mm.

lateral margins subparallel, apex rounded. Spermathecal duct very short, thin between papilla and spermatheca, but wider within papilla, and with a large, trench-like aperture; gonopore located at spermatheca mid length, not apical. Spermatheca large, bean-shaped (Fig. 6E).

Juvenile

Colouration similar to that of females.

Measurements

See Table 2.

Variation

Head dorsum: longitudinal brown lines very thin; on the face, brownish area under the eyes and antennal pits, perhaps (partially?) prolonged down to episternal

suture. Pronotum: yellowish spots near dorsal disc anterior third more or less conspicuous, sometimes absent; posterior margin bordered with yellowish brown. Joint 3 of maxillary palpi brown basally.

Genus *Parendacustes* Chopard, 1924

Parendacustes Chopard, 1924: 190.

TYPE SPECIES. — *Parendacustes cavicola* Chopard, 1924.

DISTRIBUTION. — Genus mostly diversified in Papua New Guinea and Malaysia, and known from the Nicobar Islands in the West to New Caledonia in the East. It is reported here from the Vanuatu for the first time.

Two species are present in our samples by juveniles only. They are tentatively placed in the genus *Parendacustes*, to which they are broadly similar (size, number of tibial spurs

TABLE 2. — Measurements of *Megacris lipsae* n. gen., n. sp.

| Females | Lpron | Lpron | LFW | wFW | LFIII | LTIII | Ltars | Lad | Lovip |
|-------------------|---------|---------|---------|---------|--------------|--------------|-------------|-------------|---------|
| Holotype | 4.3 | 5.1 | 5.4 | 3 | 17.8 | 17.1 | 5.3 | 5.3 | 10.2 |
| Paratypes (n = 2) | 3.6-3.7 | 4.2-4.6 | 4.5-4.8 | 2.6-2.7 | 15.3 (n = 1) | 15.1 (n = 1) | 4.9 (n = 1) | 3.8 (n = 1) | 8.1-8.5 |
| Female (n = 1) | 4 | 4.8 | 5.2 | 2.9 | 18.1 | 16.9 | 5.2 | — | — |
| Mean values | 3.9 | 4.7 | 5 | 2.8 | 17.1 | 16.4 | 5.1 | 4.6 | 8.9 |

and shape of male pseudepiphallid sclerite in sp. 1). As *Parendacustes lifouensis* Desutter-Grandcolas, 2002, their number of TIII subapical spurs is reduced compared to other species of the genus, with 3-4 outer and 1-2 inner spurs (three outer and two inner subapical spurs in *P. lifouensis*).

Parendacustes sp. 1
(Fig. 7A-D; Table 3)

MATERIAL EXAMINED. — Vanuatu, Espiritu Santo, ile de Malo, grotte Lao, 15°40.399'S, 167°05.181'E, 2 m alt., 5 juveniles (fn 1889), 20.VIII.2005 (J. Lips) (MNHN-ENSIF2896, alcohol collection vial 550).

HABITAT. — The cave where *Parendacustes* sp. 1 has been found is a crack 15 m long in the coral shelf, on the shore line.

DESCRIPTION

Specimens characterised by the following characters: size small, even in older individuals. No wing pads in older juveniles.

Head

Fastigium narrower than the scapes. Ocelli all very small; median ocellus small, vertical, subapical in position and located in a shallow depression. Eyes protruding, relatively small (only slightly longer than the scapes). Maxillary palpi not very long; joint 4 longer than joint 3 and shorter than joint 5; joint 5 slightly, but regularly widened toward apex, truncated straight (?) apically.

Pronotum

Transverse; anterior margin concave; posterior margin convex; posterior angle of lateral lobe raised dorsally (included in the measure of pronotum posterior width, see Table 2).

Legs

TI, TII with two ventral apical spurs; no trace of tympana on TI in older juveniles. FIII apical third very thin (Fig. 7A). TIII (Fig. 7A) well shorter than

FIII (see measurements); three inner and three outer apical spurs; outer spurs short, the median the longest, twice as long as dorsal spur; inner spurs much longer, the dorsal the longest, shorter than half basitarsus III; 3-4 outer subapical spurs, of equal size, located in TIII basal half, the first two closer to each other than to the third, the first (most apical) closer to TIII apex than to second spur; only one inner subapical spur, short, slightly lower on TIII than the outer subapical spur 2; a large spine or an additional inner subapical spur sometimes present near TIII apex (Fig. 7B). TIII without dorsal serrulation. Basitarsi III very long (see measurements), without dorsal serrulation (Fig. 7A).

Colouration (specimens in alcohol)

Head dorsum light yellow; four longitudinal brown lines, two median, joining behind lateral ocelli into a short transverse brown line, and two lateral, very short. Face (Fig. 7C) light yellow; two longitudinal black lines on each side of median ocellus, down to lower margin of antennal pit; in lighter specimens, each of these lines widened as a triangular black spot at inner angle of antennal pit, prolonged by a thin black line along antennal pit and by a small triangular spot between the outer angle of antennal pit and the eye; in darker specimens dark spots and line under antennal pit and eye enlarged and prolonged down to episternal suture as a wide dark triangle more or less mottled with yellow; in all specimens, these dark spots and lines delimiting a light yellow, median, bottle-like area, extended or not down to episternal suture. Cheeks light yellow; posterior margins more or less marked with dark brown. Mouthparts light yellow; two dark spots along upper margin of clypeus. Pronotum brown with light yellow pattern; margin light yellow, darker on lateral lobe posterior fourth. Dorsal disc posterior margin widely bordered with yellow, with a row of brown dots; a median longitudinal yellow line; muscular inscriptions yellow, widely

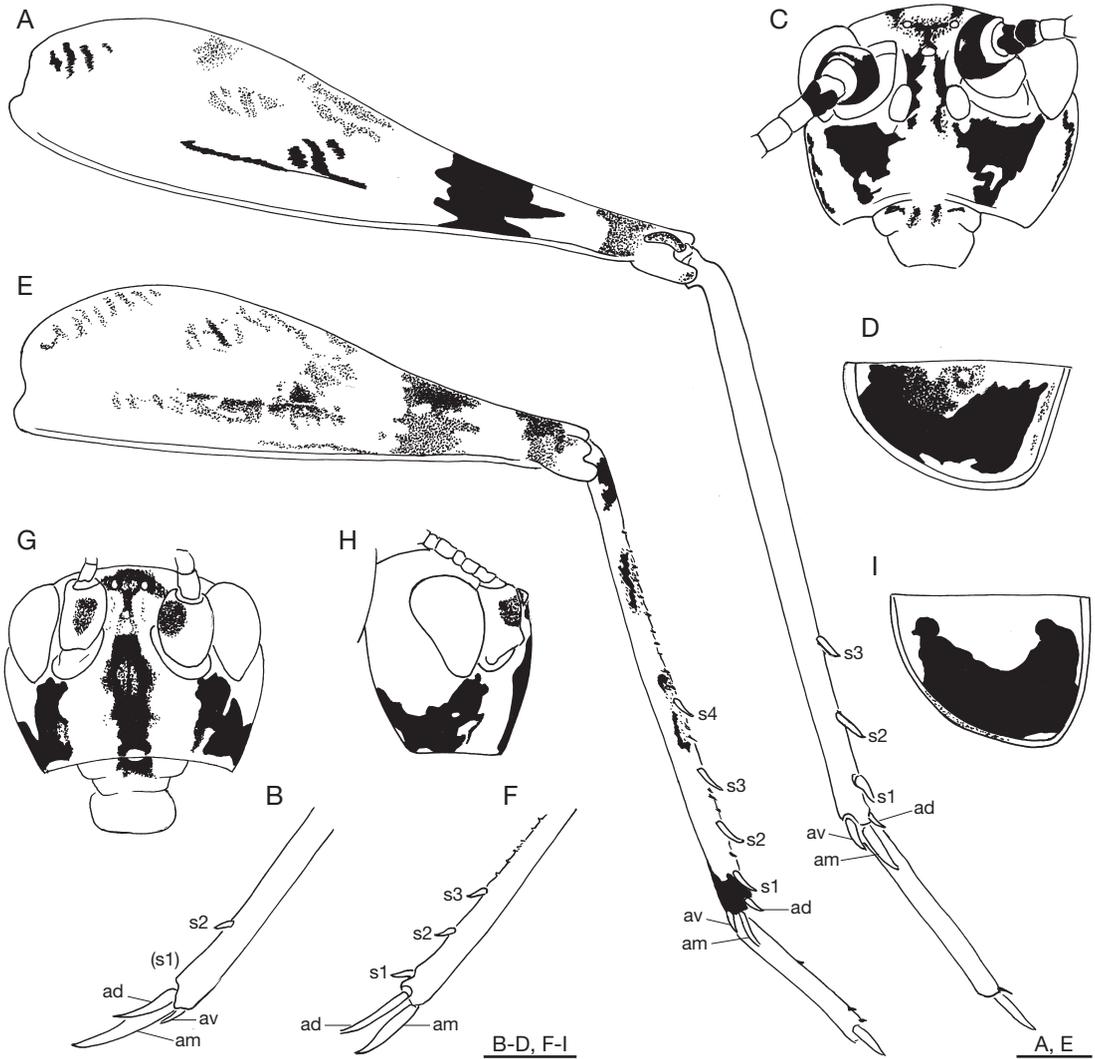


FIG. 7. — *Parendacustes* spp.: **A-D**, *Parendacustes* sp. 1, Tibia outer (**A**) and inner (**B**) sides, face (**C**) and pronotum lateral lobe (**D**); **E-I**, *Parendacustes* sp. 2, Tibia outer (**E**) and inner (**F**) sides, face (**G**), cheeks (**H**) and pronotum lateral lobe (**I**). Abbreviation: (**s1**) facultative inner subapical spur; other abbreviations, see Material and methods. Scale bars: 1 mm.

bordered with yellow (anteriorly) and yellowish brown (posteriorly). Lateral lobes brown; lower margins yellow (Fig. 7D). Legs annulated light yellow and brown, densely covered with short, black setae; tarsi light yellow. Tergites mottled light yellow and brown; posterior margins yellow, bordered with brown dots, possibly fused together, especially on distal tergites. Sternites light yellow. Outer tooth of coxae I and distal half of coxa outer

margins brown; a small dark spot near coxa I inner tooth. Cerci yellowish, darker basally.

Male genitalia (juvenile state)

Pseudepiphallus prolonged by two long, lateral processes; posterior margin unpaired.

Measurements

See Table 3.

Parendacustes sp. 2
(Fig. 7E-I, Table 3)

MATERIAL EXAMINED. — Vanuatu, Espiritu Santo, Loran, gouffre Lavav, 15°05.895S, 166°59.755E, 220 m alt., 1 ♀ juvenile (Karst sample SK05-Lips10/1683), 4.VIII.2005 (J. Lips) (MNHN-ENSIF2897, alcohol collection vial 551).

HABITAT. — *Parendacustes* sp. 2 has been found in the Lavav sinkhole, a 20 m deep and 15 m in diameter guano cave with day light. The cricket has been found by day. Many bats were present on the walls.

DESCRIPTION

Specimen (young female juvenile) very close to *Parendacustes* sp. 1, but characterised by the following characters:

Head

Eyes and ocelli somewhat bigger.

Pronotum

Posterior angles of lateral lobes not as raised dorsally.

Legs

FIII apical third not as thin (Fig. 7E). TIII (Fig. 7E) with four outer subapical spurs; three inner subapical spurs, short, slightly lower on TIII than outer subapical spurs (Fig. 7F); three outer and only two inner apical spurs (no ventral inner spur), median and dorsal inner apical spurs subequal in length, the median slightly longer; TIII serrulated with very small spines, located on both inner and outer margins; inner spines number: none between apex and spur 1, and between spurs 1 and 2, one between spurs 2 and 3, 10-11 above subapical spur 3; outer spines: none between apex and spur 1, one between spurs 1 and 2, 2-3 between spurs 2 and 3, 2-3 between spurs 3 and 4, 11-14 above subapical spur 4. Basitarsi III not flattened dorsally, with two spines on inner margin and 4-6 spines on outer margin, in addition to apical ones (Fig. 7E).

Colouration (specimen preserved in alcohol)

Head dorsum light yellow, with a dark brown area between the eyes, but not reaching them, enclosing the whitish lateral ocelli and two additional yellow spots; a dark brown line running along

fastigium from median ocellus; fastigium otherwise light yellow (Fig. 7G). Cheeks light yellow, lower third and posterior margin entirely dark brown (Fig. 7H). Face (Fig. 7G) light yellow with a wide median, longitudinal, dark brown line between median ocellus and episternal suture, somewhat prolonged on clypeus; dark line enclosing a pair of thin yellowish lines between antennal pits, and a small rounded spot along episternal suture; a wide brown line under each eye, connected to dark pattern of cheek. Mouthparts light yellow mottled with brown. Maxillary palpi light yellow; last three joints with dark lines on their sides. Scapes light yellow; a dark rounded spot on ventral side. Antennae light brown. Pronotum dorsal disc almost entirely yellowish, posterior fourth darker and with dark spots; lateral lobes dark brown, except for yellow anterior margin and lower anterior angle (Fig. 7I). Leg pattern of colouration very similar to that of *Parendacustes* sp. 1, but more contrasted; tibiae and tarsi darker (yellowish) than femora (light yellow).

Female (juvenile)

Ovipositor without conspicuous ornamentation.

Measurements

See Table 3.

DISCUSSION

All the phalangopsid species described here from Espiritu Santo Island and found during SANTO 2006 proved to be new to science. As no phalangopsid crickets were known from the island before (Willemse 1925, 1951), this greatly increases the estimated richness of this territory. The phylogenetic diversity of Santo is also surprisingly high, as the three genera belong to different putative clades: *Brevizacla* clearly belongs to the *Caltathra* Gorochoy, 1986 group of genera (Desutter-Grandcolas 2002) characterised by the presence of ectophallic dorsal valves and their associated endophallic sclerites and apodemes; *Parendacustes* belongs to the Cachoplistinae Saussure, 1877 (senior synonym of Homoeogryllinae Desutter, 1987), and *Megacris* n. gen. is close to

TABLE 3. — Measurements of *Parendacustes* sp. 1 (last instar male juveniles, n = 2) and *Parendacustes* sp. 2 (young female juvenile, n = 1). Abbreviations: see Material and methods.

| | Lpron | wpron | LFIII | LTIII | Ltars | Lad |
|----------------------------|---------|---------|----------|-------|---------|---------|
| <i>Parendacustes</i> sp. 1 | 2.4-2.5 | 3.6-3.8 | 9.7-10.3 | 8-8.3 | 3.4-3.5 | 1.7-1.8 |
| <i>Parendacustes</i> sp. 2 | 1.9 | 2.5 | 7.8 | 6.6 | 2.4 | 0.9 |

Trellius Gorochov, 1988, presently in the Phaloriinae Gorochov, 1985 subfamily (Eades *et al.* 2011).

Another trait of the diversity of Phalangopsidae crickets in Santo is its similarity with that observed in New Caledonia. Members of the *Caltathra* group and of the Cachoplantinae are present in both territories: *Caltathra* and *Protathra* Desutter-Grandcolas, 1997 in New Caledonia versus *Brevizacla* in Santo for the first clade, *Parendacustes* (different species) in the second. *Protathra* has been described by the female sex only, but the observation of additional male specimens confirmed both the relationship and distinctiveness of *Protathra* and *Caltathra* (pers. obs., Desutter-Grandcolas *et al.* in prep.). Finally, provided Phaloriinae is a monophyletic group, they are represented in Santo by *Megacris lipsae* n. gen., n. sp., by several species of the epigean genus *Phaloria* Gorochov, 1985, and possibly by the epigean genus *Pseudotriginidium* Chopard, 1915 *incertae sedis* (Desutter-Grandcolas 2009), which is present in both territories (Desutter-Grandcolas 1997, 2009).

In the same way, the habitat of phalangopsid taxa is similar in New Caledonia and in Santo. In both places, *Parendacustes* species are found in caves, and two have been found only in cracks along the shoreline (*Parendacustes* sp. 1 in Santo, *P. lifouensis* Desutter-Grandcolas, 2002 from Lifou Island in New Caledonia). On the other hand, *Brevizacla*, *Caltathra* and *Protathra* all live in rainforests, where they forage on tree trunks at night (Desutter-Grandcolas 1997). Only *Megacris lipsae* n. gen., n. sp. differs greatly from its putative relatives: it would actually be the first troglolithic species acknowledged in Phaloriinae.

These similarities between cricket communities from New Caledonia and Vanuatu could apply to all islands located in the southwest Pacific Ocean. The species described here extend anyway farther East the known distribution of all these genera.

Acknowledgements

Fieldwork was performed during the SANTO 2006 Global Biodiversity Survey organised by the MNHN, the Institut pour la Recherche et le Développement and Pro-Natura International, in agreement with the government of the Vanuatu, and was funded by the MNHN. I thank L. Deharveng and J. Lips for specimens collected in caves in the “Karst section” of SANTO 2006, G. Hodebert (MNHN) for specimen drawing, G. Lecorvec (MNHN) for the pictures of *Brevizacla molisae* n. sp., and S. Poulain (CNRS/MNHN) for specimen preparation. I am grateful to S. Ingrisch (Museum Alexander Koenig, Bonn), A. Ohler (MNHN) and an anonymous referee for their thorough review of this manuscript. Finally I am indebted to the inhabitants of Espiritu Santo Island, who kindly welcomed and helped us during our stay.

REFERENCES

- BOUCHET P., LE GUYADER H. & PASCAL O. 2011a. — The “Making of” Santo 2006, in BOUCHET P., LE GUYADER H. & PASCAL O. (eds), *The Natural History of Santo*. Patrimoines Naturels 70. Muséum national d’Histoire naturelle, Paris; IRD, Marseille; Pro-Natura International, Paris: 529-548.
- BOUCHET P., LE GUYADER H. & PASCAL O. (eds) 2011b. — *The Natural History of Santo*. Patrimoines Naturels 70. Muséum national d’Histoire naturelle, Paris; IRD, Marseille; Pro-Natura International, Paris, 572 p.
- CHOPARD L. 1924. — Note sur quelques orthoptères cavernicoles de Sumatra et de Java. *Annales de la Société entomologique de France* 93: 189-192.
- DEHARVENG L. 2011. — Caves and soils, in BOUCHET P., LE GUYADER H. & PASCAL O. (eds), *The Natural History of Santo*. Patrimoines Naturels 70. Muséum national d’Histoire naturelle, Paris; IRD, Marseille; Pro-Natura International, Paris: 265-333.
- DESUTTER L. 1987. — Structure et évolution du complexe phallique des Grylloidea (Orthoptera) et classification des genres néotropicaux de Grylloidea. 1re partie. *Annales de la Société entomologique de France* (n.s.) 23: 213-239.

- DESUTTER-GRANDCOLAS L. 1997. — Le peuplement de grillons (orthoptères, Grylloidea) des sous-bois forestiers du Col d'Amieu (Nouvelle-Calédonie). 1ère partie. Étude du peuplement. Analyse systématique, in NAJT J. & MATILE L. (eds), *Zoologia Neocaledonia*, 4. *Mémoires du Muséum national d'Histoire naturelle*, Paris 171: 125-135.
- DESUTTER-GRANDCOLAS L. 2002. — The Phalangopsidae (Orthoptera, Grylloidea) of New Caledonia, with descriptions of four new species, in NAJT J. & GRANDCOLAS P. (eds), *Systématique et endémisme en Nouvelle-Calédonie. Mémoires du Muséum National d'Histoire naturelle*, Paris 187: 103-115.
- DESUTTER-GRANDCOLAS L. 2003. — Phylogeny and the evolution of acoustic communication in extant Ensifera (Insecta, Orthoptera). *Zoologica Scripta* 32: 525-561.
- DESUTTER-GRANDCOLAS L. 2009. — New and little known crickets from Espiritu Santo Island, Vanuatu (Insecta, Orthoptera, Grylloidea, *Pseudotrigonidium* Chopard, 1915, Phaloriinae and Nemobiinae p.p.). *Zoosystema* 31 (3): 619-659. <http://dx.doi.org/10.5252/z2009n3a12>
- DESUTTER-GRANDCOLAS L., HUGEL S. & ROBILLARD T. 2011. — Focus on Orthoptera, in BOUCHET P., LE GUYADER H. & PASCAL O. (eds), *The Natural History of Santo*. Patrimoines Naturels 70. Muséum national d'Histoire naturelle, Paris; IRD, Marseille; Pro-Natura International, Paris: 123-127.
- EADES D. C., OTTE D., CIGLIANO M. M. & BRAUN H. 2011. — Orthoptera Species File Online. Version 2.0/4.0 (27/09/2011). <http://orthoptera.speciesfile.org>
- GOROCHOV A. V. 2003. — New and little known crickets of the subfamily Phalangopsinae (Orthoptera, Gryllidae): 2. Oceania, Sri Lanka, and Australia. *Entomological Review* 82: 719-729.
- GOROCHOV A. V. 2006. — New and little known crickets of the subfamily Phalangopsinae (Orthoptera, Gryllidae): 3. Indonesia, the Philippines, and Seychelles. *Entomological Review* 86: 438-448.
- HUGEL S. 2009. — Gryllacrididae and Tettigoniidae (Insecta, Orthoptera, Ensifera) from Espiritu Santo, Vanuatu. *Zoosystema* 31 (3): 525-576. <http://dx.doi.org/10.5252/z2009n3a10>
- HUGEL S. 2012. — *Hebridea* Willemse, 1925, an endemic genus of grasshoppers from Vanuatu (Orthoptera, Caelifera). *Zoosystema* 34 (2): 267-277. <http://dx.doi.org/10.5252/z2012n2a5>
- ROBILLARD T. 2009. — Eneopterinae crickets (Insecta, Orthoptera, Grylloidea) from Vanuatu. *Zoosystema* 31 (3): 577-618. <http://dx.doi.org/10.5252/z2009n3a11>
- WILLEMSE C. 1925. — Contribution à la faune des Orthoptères des Nouvelles Hébrides. *Transactions of the entomological Society of London* 3-4: 513-529.
- WILLEMSE C. 1951 [1950]. — On a collection of Orthoptera from the Caroline Islands from the Bernice P. Bishop Museum of Honolulu. *EOS* tomo extraordinario: 352-362, pls 9-11.

*Submitted on 6 October 2011;
accepted on 23 November 2011.*