An annotated catalogue of the pygmy grasshoppers of the tribe Scelimenini Bolivar, 1887 (Orthoptera: Tetrigidae) with two new Scelimenena species from the Malay Peninsula and Sumatra

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Abstract

Pygmy grasshoppers (Tettigidae) are a speciose group of complicated taxonomy, with many species requiring clarification on their species boundaries, and more still awaiting discovery. Two new species of Scelímena Serville, 1838 are described: (1) from S. discalis species group S. gombakensis sp. nov. and (2) from S. hexodon species group Scelímena marti sp. nov. Catalogue of Scelímena genera (15) and species (100) is presented and taxonomy and biogeography of the tribe are discussed. New and resurrected combinations are: Falconius becvari (Buzzetti & Devriese, 2008) comb. nov. (of Gaulidiadum becvari), Gaulidiadum carli Hebard, 1930 comb. resurr. (of Bidentatettix carli), Indoscelímena india (Hancock, 1907) comb. nov. (of Scelímena india), Paragavialidium nodiferum (Walker, 1871) comb. nov. (of Platygavialidium nodiferum), Platygavialidium productum (Walker, 1871) comb. nov. (of Gaulidiadum productum), Scelímena hexodon (Haan, 1843) comb. resurr. (of Hexocera hexodon), Scelímena rosacea (Hancock, 1915) comb. resurr. (of Amphibotettix rosaceus), Tegotettix bifocrocodil (Storozenko & Dawrueng, 2015) comb. nov. (of Gaulidiadum bifocrocodil). New synonyms are: Gaulidiadum phangensum Mahmood, Idris & Salmä, 2007 syn. nov. (of Eufalconius pendleburyi), Gaulidiadum phillipinum Bolivar, 1887 syn. nov. (of Platygavialidium productum comb. nov.), Hexocera Hancock, 1915 syn. nov. (of Scelímena), Paracriotettix Liang, 2002 syn. nov. (of Scelímena), Paracriotettix zhengi Liang, 2002 syn. nov. (of Scelímena melli), Scelímena mellioides Deng, 2016 syn. nov. (of Scelímena melli), Scelímena wayishanensis Deng, 2016 syn. nov. (of Platygavialidium sinicum). The genus Scelímena is divided into six species groups. Eucrionettix nee-soon Tan & Storozenko nom. nov. is new name for homonym Eucrionettix guentheri Tan & Storozenko, 2017. Finally, a tabular key to 15 Scelímena genera, based on 16 morphological characters, is presented.

Key words: Gaulidiadum, Hexocera, Eucrionettix, synonymy, homonymy, taxonomy, Southeast Asia
Introduction

Pygmy grasshoppers (Insecta: Orthoptera: Tetrigidae) are a very diverse family with currently more than 1,900 species globally (Cigliano et al., 2018). However, the taxonomy of the group remains problematic as many species were poorly delimited and wrongly classified (see Tumbrinck, 2014).

Since the establishment of the section Scelimenae (Bolivar, 1887), the taxonomy of the group has been a puzzle where different authors with different approaches moved species between not-so-well-defined genera. In the beginning, Bolivar (1887) founded a practical system although he was also already aware that his system did not reflect real evolutionary relationships. Bolivar (1887) included all the macropterous Tetrigidae genera with filiform antennae that bear strong spine(s) on their paranota into Scelimenae. This included Scelimena Seville, 1838 (the nominotypical genus, type species: Tetrix producta Serville, 1838 from Java or Borneo) with five species [of which four valid today], Gavialidium Saussure, 1862 with nine species [eight valid today], Chthonius Bolivar, 1887 [preoccupied, new name is Tefrinda Bolivar, 1906] with a single species, and Criotettix Bolivar, 1887 with 19 species [all valid]. Later, authors described numerous genera and moved species between these genera. Interesting for us is the genus Eugavialidium Hancock, 1907 with E. dentiumeris as its type species, separated from Scelimena on the basis of a strong metalateral (ML) plate (= strong projection of humeral angle) (Hancock, 1907). Günther (1938) synonymized the genus with Scelimena and placed some of its members in Scelimena and others in Gavialidium. This synonymization and rearrangement resulted in a large distribution gap between G. crocodilium (Saussure, 1862), the type species of the genus, and the other congeners. As such, it was clear that there are likely errors.

Problematic taxa require revisions—examination, understanding variability, and clarifying species boundaries. Nonetheless, there are still many species of Tetrigidae awaiting discovery and description. In Southeast Asia, this is especially the case since we are still at the stage of discovering more new species (Tan et al., 2017).

Two new species of Scelimena were found in Southeast Asia and described below: Scelimena gombakensis sp. nov. from Ulu Gombak Forest Reserve (UGFR), Selangor, Peninsular Malaysia and Scelimena marta sp. nov. from Sumatra, Indonesia. Scelimena marta sp. nov. We also present a tabular key to the 15 Scelimenini genera.

The aims of the paper are (1) to describe two new Scelimena species from Malay Peninsula and Sumatra, and (2) to provide a discussion on Scelimenini tribe and make some rearrangements in the classification of some wrongly assigned species and genera, so researchers in the future will have a better baseline in Scelimenini research.

Material and methods

Collection by hand and sweep-netting were carried out by Amira Aqilah Muhammad in Ulu Gombak Forest Reserve (UGFR), Selangor, Malaysia in 2017. Photographic images were taken using Olympus OM-D E-M5 compact mirrorless camera with M. Zuiko 14-42 mm f3.5–5.6 lens and Canon EOS 500D digital SLR camera with a compact-macro lens EF 100mm 1:2.8 USM. The specimens were preserved by storing in ethanol and then pinned and dry-preserved.

Specimens collected by Amira Aqilah Muhammad were imaged using Dino-Lite Pro AM413ZT and measurements were made on computer software DinoCapture 2.0. Specimens examined by Josip Skejo were imaged using Leica DFC 420C digital camera attached to a M80 compound stereomicroscope. For photographs of photographers that are not among the authors of the paper, credits are written below each photograph, and for museum specimens that are not type specimens of two new species, full data are written below the photograph.

Image editing was accomplished using Adobe Photoshop CC 2014. Scales were given with the images. Morphological measurements and counts were done on specimens before they were pinned. The following measurements following terminology by Tumbrinck (2014) were made (Fig. A1):

- **PL**: pronotum length (from the anterior margin (FM included if present) to the tip);
- **PW**: pronotum width (in its widest parts);
- **PH**: pronotum height (from the lowest part of the lateral lobes to the highest part of dorsum);
- **HWL**: hindwing length (from the base to the apex);
HFL hind femur length (from the base to the tip of the knee);
HFW hind femur width (in its widest part);
TL tegmen length (visible part of the tegmina);
VW vertex width (in frontal view between the eyes, or in dorsal view between the place of the supraocular lobes);
EW eye width (in frontal or dorsal view);
SW scutellum (or frontal ridge) width (between the facial carinae);
IAH infrascapular area height (in its highest part).

The following measurements following Tan & Artchawakom (2015) were also made:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BL</td>
<td>body length (length from vertex of head to apical margin of subgenital plate);</td>
</tr>
<tr>
<td>PAW</td>
<td>prozona width at anterior margin;</td>
</tr>
<tr>
<td>PPW</td>
<td>prozona width at posterior margin;</td>
</tr>
<tr>
<td>MAL</td>
<td>middle segment of antenna length (7th or 8th segment);</td>
</tr>
<tr>
<td>MAW</td>
<td>middle segment of antenna width (7th or 8th segment);</td>
</tr>
<tr>
<td>1stAW</td>
<td>first antennal segment width (in the middle of the segment) = scapus width;</td>
</tr>
<tr>
<td>TW</td>
<td>tegmen width (in the middle, after radius vein to posterior (= ventral margin));</td>
</tr>
<tr>
<td>FFL</td>
<td>fore femur length;</td>
</tr>
<tr>
<td>FFW</td>
<td>fore femur width (in the middle);</td>
</tr>
<tr>
<td>MFL</td>
<td>mid femur length;</td>
</tr>
<tr>
<td>MFW</td>
<td>mid femur width (in the middle);</td>
</tr>
<tr>
<td>HTL</td>
<td>hind tibia length (from knee to base of apical spine);</td>
</tr>
<tr>
<td>n(HTIS)</td>
<td>number of inner spine on hind tibia;</td>
</tr>
<tr>
<td>n(HTOS)</td>
<td>number of outer spine on hind tibia;</td>
</tr>
<tr>
<td>1stTL</td>
<td>first tarsal segment (basal) length;</td>
</tr>
<tr>
<td>3rdTL</td>
<td>third tarsal segment (apical) length (without claws);</td>
</tr>
<tr>
<td>SGPL</td>
<td>subgenital plate length;</td>
</tr>
<tr>
<td>SGPW</td>
<td>subgenital plate width;</td>
</tr>
<tr>
<td>OVDL</td>
<td>ovipositor dorsal valve length;</td>
</tr>
<tr>
<td>OVDW</td>
<td>ovipositor dorsal valve width (maximum, including denticle);</td>
</tr>
<tr>
<td>OVVL</td>
<td>ovipositor ventral valve length;</td>
</tr>
<tr>
<td>OVVVW</td>
<td>ovipositor ventral valve width (maximum, including denticle).</td>
</tr>
</tbody>
</table>

Terminology of pronotal projections follows Skejo (2017):

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM</td>
<td>frontomedial (where the median carina begins in the anterior margin of the pronotum);</td>
</tr>
<tr>
<td>FL1</td>
<td>first frontolateral (anterior prolongation of prozonal carina);</td>
</tr>
<tr>
<td>FL2</td>
<td>second frontolateral;</td>
</tr>
<tr>
<td>FL3</td>
<td>third frontolateral;</td>
</tr>
<tr>
<td>PM</td>
<td>promedial (in prozona, on the median carina);</td>
</tr>
<tr>
<td>PML (PML1, PML2)</td>
<td>promediolateral (as posterior prolongation of prozonal carinae);</td>
</tr>
<tr>
<td>PL</td>
<td>prolateral;</td>
</tr>
<tr>
<td>MM1</td>
<td>first metamedial (in the start of metazona, on the median carina);</td>
</tr>
<tr>
<td>MM2</td>
<td>second metamedial (after MM1 on the median carina);</td>
</tr>
<tr>
<td>MM3</td>
<td>third metamedial (after MM2 on the median carina);</td>
</tr>
<tr>
<td>MML1</td>
<td>first metamediolateral;</td>
</tr>
<tr>
<td>MML2</td>
<td>second metamediolateral;</td>
</tr>
<tr>
<td>MML3</td>
<td>third metamediolateral;</td>
</tr>
<tr>
<td>ML</td>
<td>metalateral (projection of the humeral angle, shoulders, where humeral carina meets lateral);</td>
</tr>
<tr>
<td>VL</td>
<td>ventrolateral (the projection of the lateral lobes).</td>
</tr>
</tbody>
</table>
Depositories

Abbreviations of the museum collections used in the study:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMNH</td>
<td>Natural History Museum, London, UK;</td>
</tr>
<tr>
<td>DEI</td>
<td>Deutsches Entomologisches Institut, ZALF e.V. Müncheberg, Germany;</td>
</tr>
<tr>
<td>FRIM</td>
<td>Forest Research Institute Malaysia, Peninsular Malaysia;</td>
</tr>
<tr>
<td>ISNB</td>
<td>Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium;</td>
</tr>
<tr>
<td>MCSN</td>
<td>Museo Civico di Storia Naturale &quot;Giacomo Doria&quot;, Genoa, Italy;</td>
</tr>
<tr>
<td>MfN</td>
<td>Museum für Naturkunde, Berlin, Germany;</td>
</tr>
<tr>
<td>MHNG</td>
<td>Muséum d'histoire naturelle, Geneve, Switzerland;</td>
</tr>
<tr>
<td>MNCN</td>
<td>Museo Nacional de Ciencias Naturales, Madrid, Spain;</td>
</tr>
<tr>
<td>MTD</td>
<td>Senckenberg Natural History Collections of Dresden, Germany;</td>
</tr>
<tr>
<td>MZUM</td>
<td>Zoology Museum University of Malaya, Peninsular Malaysia;</td>
</tr>
<tr>
<td>NCB</td>
<td>Nederlands Centrum voor Biodiversiteit, Leiden, the Netherlands;</td>
</tr>
<tr>
<td>NHERS</td>
<td>Naturhistoriska riksmuseet, Stockholm, Sweden;</td>
</tr>
<tr>
<td>UMO</td>
<td>University Museum Oxford, Hope Entomological Collections, Oxford, UK;</td>
</tr>
<tr>
<td>ZIN</td>
<td>Zoological Institute of the National Academy of Sciences, St. Petersburg, Russian Federation;</td>
</tr>
<tr>
<td>ZRC</td>
<td>Zoological Reference Collection, Lee Kong Chian Natural History Museum, Singapore.</td>
</tr>
</tbody>
</table>

Description of two new species of the genus Scelimena

Family Tetrigidae Rambur, 1838

Subfamily Scelimeninae Bolivar, 1887

Tribe Scelimenini Bolivar, 1887

Genus Scelimena Serville, 1838

The genus Scelimena is one of the most diverse genera found in Southeast Asia. This genus, currently consisting of 23 species, is distributed in the Oriental region (including countries like China, India, Indonesia, Malaysia, Myanmar, the Philippines, and Vietnam) (Cigliano et al., 2018). Little is known about biology and ecology of this genus, except for its importance as an indicator of environment quality (Mahmood et al., 2007; Zha et al., 2017). Members of the genus are relatively large; they are good flyers, swimmers and divers and can survive in semi-aquatic environment. Lamellated hind tibia and the first segment of hind tarsus are modifications enabling swimming (Kirby, 1914; Mahmood et al., 2007; Zha et al., 2017).

Scelimena gombakensis Muhammad, Tan & Skejo, sp. nov.
(Figs 1, 2)

Material examined. Holotype (male): Peninsular Malaysia, Selangor, Ulu Gombak Field Studies Centre, lowland secondary rainforest, on river rocks, N3.325609, E101.753433, 257m, 24 September 2017, 10:20 a.m. MYT, coll. A.A. Muhammad, Muhammad Hafiz Mohd Amin & Afyza Maisarah Azizan, [AAM.17.79] (deposited in the ZRC).

FIGURE 1. *Scelimena gombakensis* sp. nov. habitus in lateral (A, B) and dorsal (C, D) views; male holotype (A, C), female paratype (B, D). Scale bars = 5 mm. Photographs by Ming Kai Tan.

**Diagnosis.** This new species differs from congeners by the following characters: (1) median and lateral carinae substraight and lined with yellow nodules, (2) tegminal (dorsal) sinus less tall than lower sinus, (3) posterior angles of lateral lobes in dorsal view produced into a long, acute spine that curved anteriorly, (4) color pattern.

**Comparison with congeners.** This new species closely resembles *Scelimena discalis* (Hancock, 1915) from Indochina and *Scelimena melli* Günther, 1938 from southern China (Guangdong, Guangxi, Guizhou).

New species differs from *S. discalis* by a relatively smaller size: BL (including pronotum) in males 20.1–24.6, females 23.7–28.7 (males 25, females 29.5–30.5 for *S. discalis*); PL (from collar) males 19.3–23.5, females 22.8–27.8 (males 24, females 28.5–29.5 for *S. discalis*); PW (with spines) males 5.5–6.8, females 6.1–8.0 (males 7.0–7.2, females 8.3–8.5 for *S. discalis*); HFL males 7.8–9.0, females 7.2–9.9 (males 7.0–7.5, females 9.2–9.5 for *S. discalis*); HFW: males 2.0–2.4, females 1.6–2.7 (males 1.8–1.9, females 2.4 for *S. discalis*).

New species differs from *S. melli* by its tegminal (dorsal) sinus excised more deeply (in *S. melli* shallowly excised); median and lateral carinae substraight and lined with yellow nodules (in *S. melli* almost straight and smooth, without nodules).

This new species also differs from sympatric *Scelimena razalii* Mahmood, Idris & Salmah, 2007 by size (in *S. razalii* relatively smaller), medium carina (obsolete in *S. razalii*), texture of pronotum surface (in *S. razalii* smooth...
without nodules), anterior margin of pronotum (truncated in *S. razalii*), and shape of tegmina (in *S. razalii* elongated and acuminate) (Mahmood et al., 2017).

**Description.** Male. Body large sized for Tetrigidae in general (Figs. 1A, 1C). Body dark grey with a tint of green.

**Antennae.** Antennae filiform, 13-segmented; antennal bases below the level of lower margin of eyes; 1\(^{st}\) massive scapus (scutellum width a third (1/3) width of scapus), 2\(^{nd}\) stout pedicel, 3\(^{rd}\) to 6\(^{th}\) elongated basal segments, 7–9\(^{th}\) extremely elongated mid segments (about 11.2 times as long as wide), elongated 10–11\(^{th}\) subapical segments, 12–13\(^{th}\) reduced, small apical segments. Antennal segment dark grey with yellow apex. Face yellow with dark grey patterns (Fig. 2A).

**Head.** In frontal view. Transverse and lateral carinae of the vertex slightly elevated. Frontal costa long, bifurcates below the mid of the compound eyes height, just between the paired lateral ocelli. Scutellum in its widest part as wide as an antennal groove. Scutellum forms shallow concavity, becoming wider ventrally. Upper margin of the antennal grooves visible below (about 0.1 mm) the lower margins of the compound eyes. Lateral ocelli placed near the level of lower margins of eyes (Fig. 2A). Compound eyes oblongly ovoid. Generally dark grey with some pale-yellow patterns (Fig. 2A). In dorsal view. Fastigium of vertex with deep concavities behind lateral carinae, not produced in front of the eyes, 1.3 times wider than the width of one eye (Fig. 2B). Scutellum width one third the width of the scapus. Anterior margin of fastigium truncated, median carina of fastigium strongly produced in front

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**FIGURE 2.** *Scelimena gombakensis* sp. nov. face in anterior view (A), head in dorsal view (B), head and anterior part of pronotum in lateral (C) and dorsal (D) views, abdomen in ventral view (E), male subgenital plate in ventral (F) and lateral (G) views, female subgenital plate in ventral view (H) and ovipositor in lateral view (I). Scale bars = 1 mm. Photographs by Amira Aqilah Muhammad.
of the anterior margin of fastigium (Fig. 2B); lateral carinae elevated; subocular lobes distinct. Compound eyes oval. In lateral view. Compound eyes hemispheric, exerted above vertex. Frontal ridge (or scutellum) distinctly produced to form two broadly rounded lobes; the two lobes are of about equal height (Fig. 2C).

**Pronotum.** Pronotum finely nodulose, very long (macropronotal state), well surpassing abdominal apex, hind femur, and entire hind tibiae (Figs. 1A, 1B). In frontal view. ML slightly projected outwards as bright yellowish tubercle. VL strongly projected outwards as bright spine. In dorsal view. Anterior margin slightly concave; posterior process of pronotum, with truncated apex (Fig. 2D). Dorsal plate of pronotum dark grey with tint of green. Nodules along the carinae yellow. Prozonal carinae diverge posteriorly. FM very small, almost unrecognizable, tubercle-shaped; FL1 small sized, tuberculated, yellowish; FL2 large, projected laterally, spine-like with oblique apex, yellowish; FL3 small, angular; PM medium sized tubercle; PML1 and PML2 small tubercles; PL low; MM1 large tubercle, MM2 and MM3 smaller tubercles; MML1 larger than MML2 and MML3, ML strong tubercle directed outward, yellowish, not spine-like; VL strong, produced outwards and forwards. In lateral view. Median carina of pronotum substraight (Fig. 2C). Prozonal carinae well defined and lined with yellow nodules. Hind margin of lateral lobes of pronotum bisinuate, tegminal (dorsal) sinus less deep than lower sinus; lower part of lateral lobe directed laterally; posterior angles of lateral lobes in dorsal view produced into a long, acute spine that curved anteriorly (Fig. 2C, 2D). Lateral lobes of pronotum, dark grey with posterior and ventral margin yellow (Fig. 2C). FM small, almost unrecognizable, tubercle-shaped; FL1 small sized, tuberculated, yellowish; FL2 large, projected laterad, spine-like with oblique apex, yellowish; FL3 small, angular; PM medium sized, slightly elevated above the dorsum; PML1 and PML2 small, tubercle-shaped; PL low; MM1 larger than MM2 and MM3; MML1 the highest of metamediolateral projections; MML2 and MML3 lower than MM1, ML present as strong tubercle, yellowish, not spine-like; VL strong, produced outwards and its apex forwards.

**Wings.** Tegmenula elongated, oval with apical margin subacute; 3.4 times longer than wide; visible part of tegmen 0.6 times less wide than mid femur (Fig. 2C). Hind wings long, not surpassing apex of pronotum.

**Legs.** Fore and middle legs. Fore and mid femora not compressed laterally; basal half of upper carina of the fore femur finely serrated, apical half smooth (Figs. 2C, 2D). The upper and lower carinae of middle femur slightly sinuated and finely serrated. Fore femur 6.2 times, mid femur 6.4 times as long as wide. Fore and mid legs dark grey, with parts of carinae yellow. First segment of fore and mid tarsi dark grey, third segment with dark grey base and yellow ring. Hind legs. Hind femur 3.8 times as long as wide. Upper side of hind tibia with 4 to 5 outer and 0 inner spines; spines can be indistinct with minute denticles between spines. Ventral surface of first tarsal segment with 3 pads. Length of first tarsal segment of hind legs 1.5 times the length of third segment (without claws). Hind femora greenish dark grey with some yellow patterns (Fig. 1A). Hind tibiae dark grey, with yellow patterns and nodules. First segment of hind tarsus yellow with ventral grey, second segment grey, third segment grey with yellow band in the middle.

**Abdominal apex.** Tergite greyish with yellow patterns. Basal sternite yellow, apical sternite incising subgenital plate dark grey with yellow patterns (Fig. 2E). Subgenital plate in ventral view triangular, with apex of plate slightly excised (Fig. 2F); in lateral view slender and elongated (Fig. 2G). Cerci stout basally with pointed apex (Fig. 2G).

**Female.** Similar to male, but larger. Body, head and legs generally similar colored (Figs. 1C, 1D). Mid antennal segments 14.2 times as long as wide. Fastigium of vertex 1.5 times wider than width of one eye from above. Frontal ridge between eyes (scutellum width) a third of scapus' width. Tegmen 3.2 times longer than wide. Fore femur 5.8 times, mid femur 6.6 times as long as wide. Hind femur 3.7 times as long as wide. Upper side of hind tibia with 2 to 5 outer and 2 to 3 inner spines. Length of first tarsal segment of hind legs 1.5 times as long as that of third segment (without claws).

Subgenital plate 1.1 times longer than broad; posterior margin of plate lobed (Fig. 2H). Cerci same as male. Valves of ovipositor narrow, dentate. Upper valve of ovipositor 3.4 times longer than its maximum width. Lower valve of ovipositor 3.7 times longer than its maximum width; apical tooth curved downward (Fig. 2I). Ovipositor dark grey with yellow pattern, with apices of denticles blackish (Fig. 2I).

**Measurements.** See Table 1.

**Etymology.** This species is named after the type locality Ulu Gombak, Peninsular Malaysia. The specific epithet is third declension Latin adjective (gombakensis, -e) in female grammar gender.

**Life history.** This species was found perching on river rocks in lowland secondary rainforest. Found in cool and high humidity area under canopies.
**Remarks.** Owing to its morphological similarities with *S. discalis* barring some size discontinuities, we initially hypothesized that *S. gombakensis sp. nov.* may represent one of the subspecies of the widely distributed *S. discalis* (first described from Sivasagar, Upper Assam, India and then recorded in Kanchanaburi province, Thailand).

<table>
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<tr>
<th></th>
<th>Males</th>
<th>Females</th>
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<td>23.6</td>
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<tr>
<td>(including pronotum)</td>
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</tr>
<tr>
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<td>(from collar)</td>
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<tr>
<td><strong>PW</strong></td>
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<td>(w/ spine)</td>
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<td>?</td>
</tr>
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<tr>
<td><strong>3RD TL</strong></td>
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</tr>
<tr>
<td><strong>SGPL</strong></td>
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<td>1.2</td>
</tr>
<tr>
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<td>1.1</td>
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<td>0.4</td>
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<td><strong>OVVW</strong></td>
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</table>

**TABLE 1.** Measurements (in mm) and counts of *Scelimena gombakensis* sp. nov.
Thailand [see Storozhenko & Dawwrueng, 2015]). However, without data on its population genetics, we refrain from describing this taxon as a subspecies.

Moreover, because these morphologically similar Scelimena (including *S. melli*) are semi-aquatic in behavior and rely on the river they inhabit (Zha et al., 2017), we speculate that these populations are probably restricted to the water catchments that they are found in: *S. discalis* from India restricted to the Brahmaputra catchment; *S. discalis* from Thailand restricted to the Mae Klong (= Mekong) watershed; *S. gombakensis* sp. nov. restricted to the Sungai Gombak of the Gombak Catchment in Selangor, Malaysia. This lends support that these populations are likely to be evolving independently, thus representing distinct lineages and species.

**Scelimena marta** Skejo & Tan, sp. nov. (Figs 3–5)

**Material examined.** Holotype (female, MNCN_Ent 219686, abbreviated HT, Fig. 3): Indonesia: Sumatra: mid Sumatra [locality not precise on the labels] leg. Sumatra Expedition 1877–1878, collected in VIII.1878. det. [as Hexocera marta sp. nov.] J. Skejo 12.V.2017. (MNCN). Paratypes: 2 males (MNCN_Ent 219688, abbreviated PT1—Fig. 4; and MNCN_Ent 219687, PT2—Fig. 5). Probably from the very same locality and environments as the holotype. leg. Sumatra Expedition 1877–1878, collected in VIII.1878. det. [as Hexocera marta sp. nov.] J. Skejo 12.V.2017. (MNCN)

**Diagnosis.** This new species most resembles *Scelimena hexodon* (de Haan, 1843) comb. resurr. and is assigned to the *Scelimena hexodon* species group. The species can be easily separated from Bornean *S. hexodon* by the following states of the characters: (I) second frontolateral projections (FL2) are more produced and more spiky in *S. hexodon*, (II) metalateral projection (ML) is weaker in *S. marta*, (III) first metamedial projection (MM1) is much higher in *S. hexodon* than in *S. marta*, (IV) ventrolateral spines are shorter in *S. marta*, (V) *S. hexodon* has wider shoulders than *S. marta*, and (VI) is generally larger species (body length including pronotum about 24 mm in males, while about 28 mm in females). In other characters, the two species are very close and are thus both assigned to this species group.

**Description.** Holotype female (Fig. 3).

**Antennae.** Very long and thin, 13 segmented: 1\(^{st}\) massive scapus (width of the frontal ridge between eyes about 2 times width of scapus), 2\(^{nd}\) stout pedicel, 3\(^{rd}\)–6\(^{th}\) elongated basal segments, 7–8\(^{th}\) extremely elongated mid segments (about 14 times as long as wide), elongated 9–10\(^{th}\) subapical segments, 11–13\(^{th}\) reduced, small apical segments. Coloration. Scapus and pedicel dark, flagellum yellowish green or brown.

**Head.** In frontal view. Transverse and lateral carinae of the vertex slightly elevated. Frontal costa long, bifurcates below the mid of the compound eyes height, just between the paired lateral ocelli. Scutellum in its widest part as wide as an antennal groove. Scutellum forms shallow concavity, becoming wider ventrad. Upper margin of the antennal grooves visibly below (about 0.1 mm) the lower margins of the compound eyes. Vertex width (1.02 mm) 1.6 times a compound eye width (0.63 mm). Compound eyes ovoid. Coloration. Vertex dark, frons, upper half of the facial carinae yellowish green, frons yellowish green, genae with dark stripes, labium dark with two light spots (yellowish green). In dorsal view. Frontal costa cut in the fastigium, and its anterior margin is concave. Medial carina of the vertex is short and low, present only in the upper fifth of the vertex length. Fossulae deep. Lateral and transverse carinae of the vertex forming obtuse angle. Compound eyes oval. Vertex wider than a compound eye 1.6 times. Coloration. Greenish yellow with dark patches. In lateral view. Eyes subglobular in shape, exerted above the vertex. Paired lateral ocelli large, visible just below the anterior lower margin of the compound eyes. Palpi without widened apical segments. Vertex, fastigium, and frons not visible. Coloration. Dark, after the eyes there is yellowish green stripe. Palpi yellowish green with dark patches.

**Pronotum.** Pronotum very long (macropronotal state), surpassing abdominal apex for 1.6 length of the hind femur. In frontal view. Ventrolateral projection of the lateral lobes (VL), metalateral projections of the shoulders (ML) and first metamedial projection (MM) highly raised as spines. Second frontolateral projection (FL2) and second prolateral (PL2) produced forwards as tooth. In dorsal view. Anterior margin of the pronotum truncated. FM small, FL1 unrecognizable, FL2 strong, tooth-like and projected in the front, FL3 weak, prozonal carinae straight and parallel, PM rounded (larger than FM, smaller than MM1), PL1 distinct and small, while PL2 larger
and tooth-like. PML1 and PML2 small, wart-like. Ventrolateral (VL) projection of the lateral lobes strongly projected outwards as acute spine, directed forwards. Interhumeral carinae unrecognizable (barely seen between PML2 and MML1). Angle between humeral (also known as humero-apical) and external lateral carina obtuse, shoulders bearing strong metalateral (ML) tubercles raised as spines. After ML, there are two more tubercles on the external lateral carina of the pronotum, much smaller than ML: MM1 is the largest of medial unpaired projections, while size of MM2 to MM4 decreases caudal. MML1 to MML3 small, decreasing in size towards the apex. Median carina of the pronotum continuous from the anterior margin to the tip of the pronotum, low and granulated. Internal lateral carina decurved and slightly visible only in the level between the hind knees. Pronotum slightly depressed after MM1, and after the mentioned depression flat. Pronotal apex truncated, slightly concave. Pronotal surface granulated with fine and medium sized tubercles. In lateral view. Prozona directed slightly upwards, not straight. FM small and wart like, prozonal carinae granulated with medium sized tubercles, PML1 small, PML2 larger and wart-like. FL1 unrecognizable, FL2 projected forwards as a tooth, PL1 small, PL2 larger tubercle. Ventral margin of the lateral lobes straight, not saw-like, ventrolateral spine sharp, ventral sinus (triangular) slightly deeper than tegminal (rectangular) sinus. Infrascapular area large and triangular, not as wide as tegmina. PM is the second largest projection on the dorsum, just after large rounded MM1. MM2 and MM3 low. MML1,
MML2, MML3 and MML4 low, decreasing in size caudad. Infrascapular area fused with lateral area, which runs to the apex of the pronotum. Before ML, one tubercle present in humeral carina, and after strong ML, two more tubercles present in the external lateral carina. Pronotum with depression after MM1, then flat to the apex. Coloration. Smaller projections, spines, tubercles, area around and after MM1, and pronotal dorsum after the level of the hind knees yellowish green, rest of the pronotum (including MM1) dark.

Wings. Tegmenula elongated, oval, and smooth (finely granulated), with apical margin subacute; three times longer than wide; visible part of tegmen 0.6 times width of the mid femur. Hind wings long, not surpassing apex of pronotum. Coloration. Tegmenula yellowish green, and alae dark.

Legs. Fore legs. Femur with carinated and undulated dorsal and ventral margins, dorsal more than ventral, dark with weak greenish patches. Femur about 5.3 times as long as wide. Tibia rectangular in cross-section, having fine denticles in its margins, bearing two light rings, one in proximal part and one in the middle. Proximal tarsal segment much shorter than the prolonged distal. Two thirds of the distal segment yellowish green in color, while proximal segment and the distal part of the distal segment black. Claws pale colored with dark apices. Mid legs. Femur with carinated dorsal margin. Besides the genicular tooth, three weak teeth present in the dorsal margin, while the ventral margin has a weaker undulation. Mid femur 5.6 times as long as wide. Tibia rectangular in cross-section, dark in color, and with three pale rings (in the beginning, in the middle and distally). Proximal tarsal segment much shorter than the prolonged distal. Two thirds of the distal segment yellowish green in color, while proximal segment and the distal part of the distal segment black. Hind femora with alternating yellowish green and dark parts, lappets (spines) being bright in color. Hind legs. Femur slender, 3.8 times as long as wide. Dorsal margin with three dentiform lappets before the antigenicular tooth, while ventral margin bearing four strong spines (lappets transformed into strong denticles). Four transverse ridges hardly recognizable in the external lateral area of the hind femur. Genicular and antigenicular teeth small and blunt, incision clearly visible before the knee. Tibia
widened towards the apex, in the distal part lamellate. Upper side of hind tibia a few (3–5) larger outer and (3–5) inner spines and minute denticles between those spines. Hind tibia dark, with a light band in the proximal third of its length. First tarsal segment widened (adapted for swimming), 1.4 times longer than the third. First pulvillus of the proximal segment of the hind tarsus angular (without apical tooth) with right-angled apex, second angular with obtuse angle, and the third one rounded, and blunt. First and second tarsal segments are dark in color, almost black, while the distal (third) is yellowish green. Claws pale colored with dark apices.

**TABLE 2.** Measurements (in mm) and counts of *Scelimena marta* sp. nov. (HT—holotype, PT1—male paratype n.1, PT2—male paratype n.2). All the measurements are in millimeters.

<table>
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<th>Character</th>
<th>Female HT</th>
<th>Male PT1</th>
<th>Male PT2</th>
</tr>
</thead>
<tbody>
<tr>
<td>BL (including pronotum)</td>
<td>25.8</td>
<td>21.1</td>
<td>20.8</td>
</tr>
<tr>
<td>PL (from FM to the apex)</td>
<td>24.7</td>
<td>19.9</td>
<td>19.9</td>
</tr>
<tr>
<td>PW (w/ spine)</td>
<td>6.6</td>
<td>5.2</td>
<td>5.7</td>
</tr>
<tr>
<td>PW (w/o spine)</td>
<td>5.1</td>
<td>4.3</td>
<td>4.5</td>
</tr>
<tr>
<td>PH</td>
<td>4.4</td>
<td>2.4</td>
<td>2.6</td>
</tr>
<tr>
<td>HWL</td>
<td>21.5</td>
<td>17.6</td>
<td>17.4</td>
</tr>
<tr>
<td>HFL</td>
<td>7.8</td>
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</tr>
<tr>
<td>HFW</td>
<td>2.1</td>
<td>1.7</td>
<td>1.8</td>
</tr>
<tr>
<td>TL</td>
<td>3.1</td>
<td>2.2</td>
<td>2.4</td>
</tr>
<tr>
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<td>0.9</td>
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</tr>
<tr>
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</tr>
<tr>
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<td>0.9</td>
</tr>
<tr>
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<td>4(-5)</td>
<td>3(-5)</td>
</tr>
<tr>
<td>n(HTIS) L</td>
<td>4(-5)</td>
<td>4(-5)</td>
<td>4(-5)</td>
</tr>
<tr>
<td>n(HTOS) R</td>
<td>3(-5)</td>
<td>4(-5)</td>
<td>3(-5)</td>
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<td>n(HTOS) L</td>
<td>4(-5)</td>
<td>4(-5)</td>
<td>4(-5)</td>
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<tr>
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<td>1.3</td>
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<td>0.8</td>
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FIGURE 5. *Scelimena marta* sp. nov. male paratype (PT2), male paratype (PT1), habitus in dorsal (A) and lateral view (B), and face in anterior view (C). Photographs by Josip Skejo & Dhaneesh Bhaskar.
Abdominal apex. Subgenital plate 1.13 times longer than broad; posterior margin of plate lobed. Cerci hairy and stout basally, with pointed apex. Valves of ovipositor narrow, dentate. Upper valve of ovipositor 5 times longer than its maximum width. Lower valve of ovipositor 4.5 times longer than its maximum width; apical tooth curved downwards. Ovipositor dark with yellowish patches, with apices of denticles blackish. Tergites and sternites yellowish brown with dark markings.

Male paratypes. In morphology correspond to the female description, except for smaller size (consult Table 2. and Figs. 3 and 4 for comparative measurements) and different shape of the abdominal apex, due to sexual dimorphism.

Measurements. Table 2.

Etymology. This species is named after María Marta Cigliano (currently working at the División Entomología in the Museo de La Plata, and National Scientific and Technical Research Council, Argentina). María Marta is a famous orthopterist specialized in taxonomy of Tristiridae and Acrididae: Melanoplinae, especially in America. She has described one tribe, 15 genera and 70 species. The specific epithet is noun in apposition, (Marta, ae, f.) and is made of her mid name.

Catalogue of the genera and species of the tribe Scelimenini Bolívar, 1887

The subfamily Scelimeninae currently includes about 30 genera and more than 300 species (Cigliano et al., 2018), and comprehensive revision is needed. The subfamily is divided into three tribes: Criotettigini, Scelimenini, and Thoradontini. Since we deal here with the genus Scelimena and related genera, Criotettigini and Thoradontini are not discussed in the present paper.

Currently, there are 15 genera and 100 species assigned to the tribe Scelimenini (Fig. 6): Amphibotettix (consisting of 3 species), Bidentatettix (2 species), Discotettix (6 species), Eufalconius (1 species), Euscelimena (3 species), Falconius (20 species), Gavialidium (2 species), Indoscelimena (6 species), Paragavialidium (15 species), Paramphibotettix (3 species), Platygavialidium (5 species), Scelimena (23 species), Tagaloscelimena (2 species), Tefrinda (1 species) and Tegotettix (8 species). The revision of the group is possible only when type species of each genus is examined and described. Of the listed genera, Scelimena and Falconius are widespread in the Oriental region, while others are more or less restricted to certain geographic areas (Fig. 6) (Günther 1955).

Compared to other Tettigidae, Scelimenini members can be recognized by a few characters: (I) dorsal margin of the antennal groove positioned low, from the lower third of the compound eyes height or lower than the compound eye lower margin (as opposed to high position of the antennal groove, in several other subfamilies between the eyes), (II) in frontal view long frontal costa (as opposed to short), (III) presence of pronotal projections—unpaired frontomedial and medial, and paired lateral and mediolateral (as opposed to absence of the projections), (IV) toothed femora (as opposed to smooth), and (V) pulvilli of the hind tarsi lacking apical teeth (as opposed to presence of the teeth) and different in size (decreasing in size —Amphibotettix, or being larger towards the apex—all the other genera (except Tefrinda)). Considering these characters, some of the above-mentioned genera do not belong to Scelimenini; and some of the species within the genera were assigned to those genera because of superficial resemblance to Scelimenini taxa (i.e., long pronotum, amphibious life style, and large size). Genera that do not share characters with other Scelimenini are Amphibotettix and Tefrinda, and thus should not be regarded Scelimenini, Amphibotettix could be regarded Scelimeninae member, but Tefrinda could be Criotettigini member. It has obtuse pulvilli, all same in size, U shaped carinae of the vertex, high position of the antennal grooves, and pronotum lacking projections homologous to those of Scelimenini. Those genera require further revision before taxonomic position can be determined accurately. Here we discuss genera assigned to Scelimenini and present bibliographic and biogeographic data, type material of most of the type species examined, as well as certain taxonomic acts fixing assignment of some species that were erroneously put into wrong genera. In more details we discuss Amphibotettix, Bidentatettix, Eufalconius, Euscelimena, Gavialidium, Hexocera (syn. nov. of Scelimena), Tefrinda, and certain species groups and species within Scelimena, while in less details, briefly we discuss 'more taxonomically complicated' genera—Discotettix, Falconius, Indoscelimena, Paragavialidium, Paramphibotettix, Platygavialidium, Tagaloscelimena, Tegotettix, and certain species and species groups within Scelimena. We present basis for further studies and understanding of the former, but for latter genera and their species we point the necessity of deep and detailed taxonomic and biogeographic revision, thus they are briefly discussed and their species are shortly listed in checklist with type locality data and notes.

Genus Amphibotettix Hancock, 1906


**Type species**: *Amphibotettix longipes* Hancock, 1906

**Composition and distribution.** Three species in Borneo (*A. longipes*), Peninsular Malaysia (*A. hafizhaii*), and (?) Thailand (*A. abbotti*). One species (*A. rosaceus*) transferred back to Scelimena.

**Notes.** The type species of the genus, *A. longipes* Hancock, 1906 (Fig. 7), endemic to Borneo, shares some morphological characters with Ophiotettigini genera and some with Guinean Batrachideinae (specifically *Palaioscaria*). Its affinity to those groups should be revisited in the future. Position of its antennal grooves are much higher than in other Scelimenini, its legs are longer and without teeth, and morphology of vertex is rather different from Scelimenini. *Amphibotettix abbotti* (Rehn, 1904), endemic to Thailand, was assigned to this genus by Hancock (1907), but without discussion on new combination. This species was not examined since, and its affinity to other congeners is questionable. *Amphibotettix hafizhaii* (Mahmood, Idris & Salmah, 2007), endemic to Peninsular Malaysia, was assigned to this genus by Storozhenko & Dawwrueng (2015) based on a drawing from Mahmood *et al*. (2007) depicting long frontal projection of the pronotum. Its placement remains questionable until the specimens are examined. *Amphibotettix rosaceus* Hancock, 1915 (Fig. 13) from Vietnam and Myanmar, was described as *Amphibotettix* (Hancock, 1915), then moved to *Scelimena* based on similarities with *S. producta* and *S. nitidogranulosa* (Günther, 1938), and then put back into *Amphibotettix*. The species belongs to *Scelimena* (*S.*
Amphibotettix abotti (Rehn, 1904)


Notes. Type material not examined. According to the Rehn's (1904) description of the species, it probably belongs to the genus Scelimena (body and legs are not extremely prolonged and there is no frontomedial projection on the anterior margin of the pronotum).

Amphibotettix hafizhaii (Mahmood, Idris & Salmah, 2007)

Scelimena hafizhaii: Mahmood et al. 2007.

Notes. Type material was not examined in this study. According to Mahmood et al. (2007) description and drawings, the species is indeed close in morphology to *A. longipes* and could belong to the genus *Amphibotettix*. Further study is necessary.

Type locality: Peninsular Malaysia: Negeri Sembilan (= Sembilon in Mahmood et al. [2007]).

Amphibotettix longipes Hancock, 1906


Type material examined. 1♂ PARATYPE Borneo: Sarawak: Brunei, Brit. Mus. 1923–1929 (BMNH).

Type locality: Borneo: Brunei.

Amphibotettix rosaceus Hancock, 1915

Note. Transferred back to the genus *Scelimena*. See under *Scelimena rosacea comb. resurr.*

Genus Bidentatettix Zheng, 1992


Composition and distribution. Two species, one in NW Vietnam (*B. gorochovi*) and one in S Yunnan (*B. yunnanensis*).

Notes. The genus was established for *B. yunnanensis* Zheng, 1992 from Xishuangbanna (PR China), characteristic in toothed carinae, toothed femora and high horns made of lateral and transversal carinae of the vertex. Described in the same year from Son La (Vietnam), only about 300 km east to Xishuangbanna, *B. gorochovi* (Podgornaya, 1992) was moved from the genus *Tettilobus* to *Bidentatettix* by Storozhenko & Paik (2011). The two species could be synonymous but closer examination is needed. Described from Nilgiris (India: Tamil Nadu), *Gavialidium carli* Hebard, 1930 comb. resurr. is a member of the genus *Gavialidium*, very close to the type species of the genus (*G. crocodilum*), and very likely not a member of the genus *Bidentatettix* (as according to Storozhenko & Paik 2011). This is based on *G. carli* having less dentate carinae and femora very similar to that of *G. crocodilum* (see Hebard 1930: Figs 3, 4), and on the distribution gap between *Bidentatettix* and *Gavialidium*—of about 3000 km. The genera *Bidentatettix*, *Gavialidium*, and *Tegotettix* are very similar morphologically. Despite of the previous attempts to classify the genus as Cladonotinae (e.g. Storozhenko & Paik 2011, Zha et al. 2017), it is very close to *Tegotettix* (its type species, *T. armatus*), *Paragavialidium* and *Gavialidium* and is thus a true Scelimenini member.

*Bidentatettix carli* (Hebard, 1930)

Note. Transferred back to the genus *Gavialidium*. See *Gavialidium carli comb. resurr.*
**Bidentatettix gorochovi** (Podgornaya, 1992)


**Notes.** Type material not examined, but according to type specimens' drawings in Podgornaya (1992) and Storozhenko & Paik (2011), this species is very close to *B. yunnanensis* and we conclude they belong to the same genus. Since two type localities are close, it should be examined if they belong also to the same species. Holotype male is deposited in ZIN, St. Petersburg, Russian Federation.  
**Type locality:** NW Vietnam: Son La.

**Bidentatettix yunnanensis** Zheng, 1992


**Notes.** Type material not examined, but according to type specimens' drawings in Zheng (1992) and Storozhenko & Paik (2011), this species is very close to *B. gorochovi* and we conclude they belong to the same genus. Since two type localities are close, it should be examined if they belong also to the same species. Holotype female is deposited in Institute of Zoology of the Shaanxi Normal University in PR China.  
**Type locality:** PR China: S Yunnan: Xishuangbanna

**Genus Discotettix** Costa, 1834

*Discotettix* (*Mnesarchus*): Kevan 1966.

**Type species:** *Discotettix armatus*, synonym of *D. belzebuth*

**Composition and distribution.** Six species, in Mindanao—the Philippines (*D. scabridus*), Borneo (*D. belzebuth* and *D. shelfordi*), Sumatra (*D. selysi*), Metawe (*D. doriae*) and southern Peninsular Malaysia (*D. selangori*).  
**Notes.** The genus has recently been assigned to Scelimenini (Skejo & Bertner, 2017), but the formal synonymization of Discotettiginae and Scelimeninae and revision of the genus *Discotettix* will soon be published (Skejo, Pushkar & Tumbrinck in preparation). The genus is characteristic within Scelimenini in having widened subapical antennal segments (6<sup>th</sup> to 8<sup>th</sup> or 9<sup>th</sup>) and large pronotal projections. It is closely related to *Paragavialidium* Zheng, 1994. *Discotettix belzebuth* (Serville, 1838) (Fig. 8) is the species with the highest pronotal projections.

**Discotettix belzebuth** (Serville, 1838)

*Tetrix belzebuth*: Serville 1838.

**Notes.** Type material examined, and will be discussed within *Discotettix* revision.  
**Type locality:** According to the original paper (Serville 1838) Java, but it is probably Borneo, since no records of this species originated from Java after the description.

**Discotettix doriae** Bolivar, 1898

**Notes.** Type material examined, and will be discussed within *Discotettix* revision.  
**Type locality:** Sipora, one of the Mentawai islands by Sumatra (Bolivar, 1898).
FIGURE 8. Alive *Discotettix belzebuth* (Serville, 1838) female, standing on a fallen leaf in Sarawak (Malaysia: Borneo). Photograph by Arthur Anker, reproduced with photographer's permission.

*Discotettix scabridus* (Stål, 1877)

*Mnesarchus scabridus*: Stål, 1877

**Notes.** Type material examined, and will be discussed within *Discotettix* revision.

**Type locality:** The Philippines: most probably Mindanao Isl.

*Discotettix selangori* Mahmood, Idris & Salmah, 2007

**Notes.** Type material not examined, but the species will be discussed within *Discotettix* revision.

**Type locality:** Peninsular Malaysia: Selangor.

*Discotettix selysi* Bolivar, 1887

**Notes.** Type material examined, and will be discussed within *Discotettix* revision.

**Type locality:** W Sumatra: Padang Panjang.

*Discotettix shelfordi* Hancock, 1909

**Notes.** Type material examined, and will be discussed within *Discotettix* revision.

**Type locality:** Malaysia: Borneo: Sarawak: Kuching.
Genus Eufalconius Günther, 1938


Type species: Eufalconius pendleburyi Günther, 1938

Composition and distribution. Monotypic genus, its only species (E. pendleburyi) inhabiting Peninsular Malaysia.

Notes. This monotypic genus from Malay Peninsula is characteristic among Scelimenini in having a short pronotum (brachypronotal state) that led Storozhenko & Pushkar (2017) to conclude that it belongs to Cladonotinae. However, the genus has all the Scelimenini characters, and is closely related to Paragavialidium and Platygavialidium. The genus is characteristic in (I) very wide metalateral plates, that are of the same width as ventrolateral projections of the paranota and (II) females with flattened distal segment of the hind tarsi and (III) lack of ventrolateral spine. Eufalconius pendleburyi Günther, 1938 may belong to Paragavialidium but such an act would require future examination and better understanding of Paragavialidium. Furthermore, Gavialidium phangensum Mahmood, Idris & Salmah, 2007 syn. nov. (Mahmood et al., 2007: Fig. 6), described from Kuala Lompat: Pahang (Peninsular Malaysia) is conspecific with Eufalconius pendleburyi Günther, 1938 (see Storozhenko & Pushkar, 2017 and Skejo & Bertner, 2017), and is synonymized with the latter. The two are identical in morphology (especially in characteristic wide shoulders, strong triangular ML projection), and distribution of G. phangensum syn. nov. fits into the distribution area of E. pendleburyi.

Eufalconius pendleburyi Günther, 1938

Gavialidium phangensum: Mahmood et al. 2007; syn. nov.


Type locality: Peninsular Malaysia: Selangor: Bukit Kutu.

Genus Euscelimena Günther, 1938

Abbassia: Kirby 1914, Hebard 1930.

Type species: Scelymena gavialis Saussure, 1862.

Composition and distribution. Three species in Sri Lanka (E. logani, E. gavialis) and India (E. harpago, E. gavialis).

Notes. Members of the genus inhabit India and Sri Lanka. The genus is composed of three species and is well defined. Diagnostic characters of the genus are (I) a narrow vertex (as opposed to wide in most of other Scelimenini), (II) lack of frontomedial projection, while other projections low, (III) dentate lower margin of the hind femora (as opposed to smooth), (IV) short prozona, and (V) very widened, lamellate hind tibiae and first tarsal
segments. Euscelimena harpago is widespread in India, E. gavialis restricted to southern India and Sri Lanka, while E. logani is endemic to Sri Lanka (Blackith, 1992, Skejo et al., 2018). Taxonomic placement is not clear and should be clarified in future. Taxonomy and nomenclature of the genus have been very dynamic, a lot of nymphs were described as new species in the past, and careful examination of large series is suggested for good identification to species level.

**Euscelimena gavialis** (Saussure, 1862)

Scelymena gavialis: Saussure 1862.
Scelimena harpago [partim]: Bolívar 1887.
Scelimena gavialis: Uvarov 1892.
Scelimena nodosa: Walker 1871, Kirby 1914.
Abbasia subserrata: Kirby, 1914.
Scelimena subserrata: Hebard 1930.
Euscelimena subserrata: Günther 1938a, Otte 1997.

_type material examined._ 1♀ SYNTYPE (Scelymena gavialis) [Ceylon: Peradenia] leg. M. Humboldt (MHNG).
_type locality:_ Sri Lanka: Peradenyia (in Saussure (1862) L'île de Ceylan (…) Peradenia)

**Euscelimena harpago** (Serville, 1838)

Gryllus (Locusta) femoratus [nomen oblitum]: Stoll 1813.
Tetrix harpago: Serville 1838.
Scelimena harpago: Uvarov 1927.
Scelimena contracta: Walker 1871.
Scelimena contracta: Kirby 1910.
Scelimena uncinata: Kirby 1914.
Scelimena femorata: Kirby 1910, Bolivar 1918.

Notes. Type material not examined. The type of Serville's Tetrix harpago was not found in Paris (MNHN) nor Madrid (MNCN), but one specimen collected by Henri Louis Frédéric de Saussure, probably by comparison with Serville's specimens in Paris. The specimen belongs to E. harpago. 1♂ Indes. Or. INI M'H de Sauss. (MNCN). Furthermore, specimens of S. kempi reported by Seeman et al. (2018) in fact belongs to E. harpago (JS checked the specimen in Tumbirinck's collection).
_type locality:_ India: Maharashtra: Mumbai [= Bombay in Seville (1938)].

**Euscelimena logani** (Hancock, 1904)


_type material examined._ 1♂ PARATYPE Kandy Ceylon Brit. Mus. 1923–1929. (BMNH).
_type locality:_ Sri Lanka: Kandy: by Mahaweli river.
Genus *Falconius*, Bolívar, 1898
(Fig. 9)


**Type species**: *Criotettix clavitarsis* Bolívar, 1887


**Notes.** The genus currently includes 20 species and its taxonomy is confusing. The genus was established by Bolívar (1898) for a *Criotettix* species (*F. clavitarsis* Bolívar, 1887), type locality Borneo) and two new species (*F. clavatus* Bolívar, 1898 and *F. gestroi* Bolívar, 1898) in which females have widened third (distal) segment of the hind tarsi. Since this character is present also in *Eufalconius*, we are not sure if it represents apomorphic or homoplastic character. Members of this genus are smaller than most Scelimenini, have visible interhumeral carina (evident only in *Euscelimena* and some *Tegotettix* species within Scelimenini), lack prontal projections homologous to that of Scelimenini, despite of having sometimes wrinkled pronotum with elevations, and the antennal grooves and paired lateral ocelli situated higher. Despite preliminary examination of species with photographs in Orthoptera Species File Online (Cigliano *et al*. 2018), this remains unclear. Within the genus *Falconius*, large variability in the morphology of the lateral lobes can be observed; and ventrolateral projection can be (1) sharp spine strongly directed forwards (*F. bedoti, F. clavitarsis, F. dubius, F. guanxiensis, F. hainanensis, F. longicornis, F. longidorsalis, F. tschernovi and F. undatifemura*), (2) long transverse spine gently curved forwards (*F. clavatus and F. palawanicus*), (3) short spine directed forwards (*F. pseudoclavitarsis*), short transverse spine (*F. annulicornus and F. deceptor*), (4) short tooth-like spine (*F. elephant*), or (5) truncated (*F. becvari* comb. nov., *F. gestroi, F. inaequalis, F. karnyi, F. planitarsus*) (Storozhenko 2017). *Gavialidium becvari* is transferred here, thus *Falconius becvari* (Buzzetti & Devriese, 2008) comb. nov. This genus is morphologically also similar to *Arulenus* Stål, 1877 and *Mazarredia* Bolívar, 1887. Revision of the genus was published recently (Deng *et al*. 2009), so we do not assess taxonomy of all the species, especially from Chinese, in details.

*Falconius annuliconus* Liang, 2000

**Type locality:** Guangdong, the exact locality not known since we did not examine the original description.

**Notes.** Little is known on this species. It is doubtful if this is available name since the description (which we did not examine) was published in Proceedings of the 5th National Congress of Insect Taxonomy (in PR China). Deng (2016) reported new specimens from Diaoluoshanxiang (Hainan). We did not examine material, photographs of drawings of this species and for us it remains not well known, so we cannot assess its taxonomy.

*Falconius becvari* (Buzzetti & Devriese, 2008), comb. nov.


**Type material** (deposited in Buzzetti’s collection) was not examined, but the drawings from the original paper and the description were. Also, the second author of the species (H. Devriese) was reviewer of the paper and did not disagree with the new combination. Drawings in the paper (Buzzetti & Devriese 2008) are good and presence of the head frontal view drawing is very helpful in assigning the species to the correct genus.

**Type locality:** N Sumatra; Gunung Leuser NP: Bukit Lawang
Notes. *Gavialidium becvari* Buzzetti & Devriese, 2008 has the lateral ocelli between the eyes (as opposed to on the lower margin of the compound eyes), lacks strong pronotal projections (as opposed to presence), frontal costa is short in frontal view (as opposed to long), fastigium is slightly wider than an eye, and lacks horns. All of those are characters of *Falconius* so we introduce a new combination—*Falconius becvari* (Buzzetti & Devriese, 2008) comb. nov. Since the species was described on a single male (holotype), it is not known if female specimens have swollen distal segment of the hind tarsi.

_Falconius bedoti* (Bolivar, 1909)

_Eugavialidium bedoti _: Bolivar, 1909.

**Type material** (deposited in MNGN Geneva) was not examined, but the original description (Bolivar 1909) and drawings by Günther (1938).

**Type locality**: Indonesia: W Java: Bandung Regency: Pangalengan.

**Notes.** The species was originally described on one male specimen from Java (deposited in MNGN Geneva), as assigned to the genus *Eugavialidium*, which is today synonym of *Scelimena*. Günther (1935) moved the species to the genus *Falconius* and realized (Günther 1938a) that he already reported it once, but under the name *F. clavitarsis* (Günther 1937). Günther (1938) examined 8 specimens from W Java (Jasinga, Tjisaroea, Bogor), N Sumatra (*Deli* Serdang, Sirambe) and Peninsular Malaya (Penang), and noted that specimens from Java are the largest, while those from Penang and Sirambe the smallest. From Günther’s (1938) drawings, it seems that species belongs to *Falconius*—female has swollen distal segments of the hind tarsi. However, closer examination of the head in frontal view is needed.

_Falconius clavatus* Bolivar, 1898

**Type material examined.** 1♀ HOLOTYPE Mentawei Sipora Sereinu V–VI. [18]94. Leg. Modigliani (MCSN).

**Type locality**: Mentawei Islands by Sumatra: Sipura.

**Notes.** Tumbrinck uploaded to OSF photographs of two specimens (male and a female) from East Borneo. Those specimens are similar to the type specimens and are probably conspecific. The female holotype and Bornean female specimens have swollen distal segments of the hind tarsi. All the specimens have antennal grooves and lateral ocelli positioned high, so we conclude that this species belong to the genus.

_Falconius clavitarsis* (Bolivar, 1887)

_Criotettix clavitarsis_: Bolivar, 1887.

**Type material examined.** 1♂ SYNTAXE Sumatra: Sirambe XII. [18]90.–III. [18]91. Leg. E. Modigliani (NCB).

**Type locality**: Borneo and Sumatra: Sirambe.

**Notes.** Further research should examine if two syntypes belong to the same species, and if not lectotype should be designated. Since this is the type species of the genus further taxonomic revisions of Scelimenini should focus on comparing this species and species related to it with other congeneres.

_Falconius deceptor* Günther, 1938


**Type locality**: Middle East Borneo.

**Notes.** This species is easily distinguished from its congeners by the hump on the pronotum between the
shoulder (visible in Fig. 9). Females have swollen tarsi and lateral ocelli and bifurcation are positioned high, so this species indeed belongs to the genus *Falconius*.

**FIGURE 9.** Alive *Falconius cf. deceptor* Günther, 1938 male, standing on a leaf in Danum Valley (Borneo: Malaysia: Sabah). Photograph by Paul Bertner, reproduced with photographer’s permission.

*Falconius dubius* Günther, 1938

**Type material examined:** name bearing holotype female from Leiden, and allotype male from Dresden.
Photographs of those types is available in OSF. 1♀ HOLOTYPE Midden Ost Borneo 15.VIII.1925. Leg. H. C. Siebers (MTD), 1♂ ALLOTYPES Midden Ost Borneo 15.VIII.1925. Leg. H. C. Siebers (MTD)

**Type locality:** Middle East Borneo.

**Notes.** The species is morphologically very close to *F. clavatus*. Even Günther (1938) was not sure if it was new species or just a form of *F. clavatus* when describing the species. Tumbrinck uploaded photographs of specimens of *F. clavatus* from Borneo to OSF and the specimens seem to be very similar. However, we will remain this question open for the detailed *Falconius* revision, especially in Borneo, in the future.

*Falconius elephant* Storozhenko, 2017

**Type material** not examined, but the drawings of the holotype female (deposited in ZIN) in the original paper (Storozhenko 2017) were examined.

**Type locality:** Cambodia: Dâmrei (Elephant Mountains): village Styeng-Chkhral.

**Notes.** After examination of drawings and description, we conclude that the species really belongs to the genus *Falconius* (evidenced by the high position of the bifurcation, lateral ocelli, and antennal grooves, as well as swollen distal segment of the hind femora in female holotype), and is unique among the congeners in short tooth-like ventrolateral projection.

*Falconius gestroi* Bolívar, 1898

**Type material examined.** 3♂♂ SYNTYPES Mentawei Sipora Sereinu V–VI.[18]94. Leg. Modigliani (MCSN). Photographs of the syntypes are available in OSF.

**Type locality:** Mentawai Islands by Sumatra (Sipura and Siberut).

**Notes.** This species is morphologically similar to *F. karnyi*, also inhabiting Mentawai Islands. They have wrinkled pronotum, with elevated interhumeral carinae, and they have elevations in the place of metamediolateral projections (MML2, MML3). Also in those species, the median carina is elevated between the shoulders. In all those characters, those two Mentawai species are morphologically similar to *F. inaequalis* from Myanmar.

*Falconius guangxiensis* Zheng & Jiang, 1997

**Type material** not examined. Original paper was not available so we do not present data on the type series of this species or its place of deposition.

**Type locality:** SE China, Guangxi, Guang Zhuang, Longrui.

**Notes.** The species was two times reported as new species (Zheng & Jiang 1997, Jiang & Zheng 1998). Since we did not examine drawings, photographs of specimens of this species, we cannot make any conclusions. Deng (2016) reported new localities for the species from Guangxi (Fangcheng District, Jiao'anxiang, Huanjiang, Jiuwan Mountain).

*Falconius hainanensis* Liang, 2000

**Type locality:** Hainan. The exact locality not known since we did not examine the original description.

**Notes.** Little is known on this species. It is doubtful if this is available name since the description (which we did not examine) was published in Proceedings of the 5th National Congress of Insect Taxonomy (in PR China). Deng (2016) reported new specimens from Jianfeng Mountain (Hainan). We did not examine material, photographs of drawings of this species and for us it remains not well known, so we cannot assess its taxonomy.
Falconius inaequalis (Brunner von Wattenwyl, 1893)

Mazarredia inaequalis: Brunner von Wattenwyl 1893.
Eugavialidium feae: Bolivar 1909.

Type material examined. 2♀ and 1♂ SYNTYPES Carin Cheba 900-1100 m V–XII.[18]88. Leg. L. Fea.

Type locality: Myanmar: Karen Hills (= Carin Cheba on the original labels).

Notes. Tumbrinck uploaded to OSF photo of a female specimen of this species from mountainous forest of N Thailand (Tak Mae Salid Monkating 30.VII.1992. leg. S. Ingrisch det. Skejo & Tumbrinck) belonging to this species that has hitherto been known only from Myanmar. The species belongs to the genus Falconius and is related to F. becvari comb. nov., F. bedoti, F. gestroi, F. karnyi and F. planitarsus. Revision of this subgroup within the Falconius is also needed to assess correctly intra-specific variation.

Falconius karnyi Günther, 1938

Type material examined. 1♂ and 1♀ Mentawei: Sipora 9.X.1924. Leg. H. H. Karny (MTD), 2♀ SYNTYPES Mentawei: Siberoet 25.IX.1924. Leg. H. H. Karny (NCB). Photographs of those types are available in OSF.

Type locality: Mentawai Islands: Sipora and Siberut.

Notes. The species is morphologically very similar to F. gestroi. It also shares a lot of morphological characters with F. becvari, F. inaequalis and F. planitarus. It is one of the three Falconius species known from Mentawai Islands.

Falconius longicornis Deng, Zheng & Wei, 2009

Type material not examined, just the drawing of the holotype in Deng et al. (2009). Detailed drawing of the female hind tarsus and head in frontal view made it easier to assess the species correctly.

Type locality: PR China: Guangxi: Luocheng: Qingmingshan 600 m a.s.l.

Notes. From the photographs in the original paper, it is evident that the species belongs to the genus Falconius—distal segment of the hind tarsi is swollen in female. Antennal grooves, lateral ocelli and frontal costa bifurcation are placed high. In contrast to other congeners, this species has strong and long ventrolateral directed outwards and backwards.

Falconius longidorsalis (Zheng & Yang, 2015)


Type material was not examined, nor the original paper. According to OSF, holotype is female specimen deposited in the Shaanxi Normal University collection.

Type locality: SE China: Guangdong: Fengkai.

Notes. The species was recently described, and year later assigned to the genus Falconius—distal segment of the hind tarsi is swollen in female. Antennal grooves, lateral ocelli and frontal costa bifurcation are placed high. In contrast to other congeners, this species has strong and long ventrolateral directed outwards.

Falconius palawanicus Günther, 1938

Type material: 1♂ and 1♀ SYNTYPES N. Palawan: Binaluan Nov. –Dec.1913. Leg. G. Boettcher (MTD).

Type locality: the Philippines: Palawan Islands: Binaluan.
Notes. This is the only species of the genus *Falconius* hitherto known to inhabit the Philippines. Only Palawan Islands are inhabited by *Falconius*, while from other islands no species of the genus are known. This species has very long ventrolateral spines directed forwards. It belongs to the genus based on high position of laterall ocelli and swollen distal segment of the hind femora in female. The species is by appearance similar to *Scelimena* spp. Within the genus, the most similar species to *F. palawanicus* is *F. clavatus*.

*Falconius planitarsus* (Hancock, 1907)

*Mazarredia planitarsus*: Hancock 1907

**Type material examined.** 1♂ SYNTYPE N.W. Borneo: Kuching leg. Sarawak Museum 7.VII.[18]99., 1♀ SYNTYPE N.W. Borneo Kuching 29.VI.1900. Leg. R. Shelford (UMO). Photographs of the syntypes are available online in OSF.

**Type locality:** Malaysia: Borneo: Sarawak: Kuching.

Notes. The species belongs to the genus *Falconius*—lateral ocelli are between the eyes and the distal tarsal segment is swollen in females. This is species without ventrolateral spines. Günther (1938) reported three new specimens belonging to this species (from Sarawak: Dulit Mt.) and a female specimen from Kinabalu as this species, but with a question mark. Günther (1938) compared the species with *F. pseudoclavitarsis* (but uses the wrong specific epitheton—*pseudoplanitarsis*) and *F. deceptor*.

*Falconius pseudoclavitarsis* Günther, 1938


**Type locality:** Middle East Borneo.

Notes. In some parts of the publication, Günther (1938) refers to this species as *F. pseudoplanitarsis*. However, there is no described species with such epitheton and we believe that Günther (1938) refers to *F. pseudoclavitarsis*, because in all the type labels and in the original description it is written in such way. The species is true *Falconius*, close in morphology to *F. deceptor*.

*Falconius tschernovi* Storozhenko, 2014

**Type material** not examined, but the drawings of the female holotype in Storozhenko (2014) and photographs of specimens in Storozhenko & Dawwrueng (2015). Type specimen is deposited in ZIN.

**Type locality:** Vietnam: Bac Giang Province.

Notes. The species was described on a single female holotype (Storozhenko 2014) and later male specimens were reported (Storozhenko & Dawwrueng 2015). It is morphologically similar (according to Storozhenko 2014) to *F. dubius* and *F. guangxiensis*. It belongs to the genus *Falconius*, what is visible from Storozhenko's (2014) drawings of the hind tarsi and head in frontal view.

*Falconius undatifemura* Zheng & Wang, 2006

**Type material** was not examined. According to OSF, the type series includes holotype female. Probably two female specimens reported by Deng (2016) from Jinghong represent holotype and paratype of the species.

**Type locality:** SC China: Yunnan: Jinghong.

Notes. Since we did not examine drawings, photographs of specimens of this species, we cannot make any conclusions. According to the key presented in Deng *et al.* (2009) and Deng (2016), the species is related to *F.
hainanensis. It has a lot of projections at the dorsum of pronotum, wide vertex, and antennae inserted at the level of the lower margins of the compound eyes. This description is doubtful and we are not sure if the species is rightly assigned to the genus.

**Genus Gavialidium Saussure, 1862**


**Type species**: Scelymena (Gavialidium) crocodilus Saussure, 1862

**Composition and distribution.** Two species, inhabiting Sri Lanka (*G. crocodilus*) and India (*G. carli comb. resurr.*).

**Notes.** The genus is restricted to India (Tamil Nadu) and Sri Lanka. Members of the genus are characterized by a wrinkled pronotum with evident pronotal projections (short frontomedial, somewhat larger promedial, metamedial, mediolateral, and wart-like metalateral), lateral and transversal carinae of the vertex elevated as horns, dentated pronatal carinae, and strongly toothed femora. Members of this genus have high horns of the vertex, and not lamellated hind tibiae and tarsi. A lot of the species were subsequently assigned to the genus, but the authors did not examine type specimens of *G. crocodilum* (Fig. 10). After examination of the type specimen, it is clear that only *G. carli comb. resurr.* together with the type species belong to this genus. *Gavialidium becvari* is transferred to *Falconius* (see *Falconius becvari comb. nov.*); *G. novaeguineae* and *G. eremitum* were transferred back to *Scelimena* by Tumbrinck (2018), *G. phangensum* is synonymized with *Eufalconius pendleburyi* (see *Eufalconius pendleburyi*), *G. bufocrocodil* is transferred to *Tegotettix* (see *Tegotettix bufocrocodil comb. nov.*). Two species from the Philippines were previously also assigned to the genus *Gavialidium—G. philippinum* Bolivar, 1887 and *G. productum* (Walker, 1871). These species do not belong to this genus neither and are transferred to *Platygavialidium* (see *Platygavialidium philippinum comb. nov.* and *P. productum comb. nov.*). Lastly, *G. alligator* (Serville, 1862), described on nymphs, was synonymized with *G. crocodilum* by Blackith (1992) without discussion, so future research should test if *G. alligator*, cited by Hancock (1904) to be smaller and with higher projections, is really a distinct species or not.

**FIGURE 10.** *Gavialidium crocodilum* (Saussure, 1862) male head in frontal (A) and dorsal (B) view, from Bolivar’s Tettigidae collection in MNCN. Photographs by Josip Skejo.
Gavialidium carli Hebard, 1930, comb. resurr.


Type material not examined, but the drawings of the type (Hebard 1930) and the original description were. The type series is composed of a female holotype, a male allotype, two more male paratypes, and one more female paratype. The type series is deposited in MHNG Geneva.

Type locality: India: Tamil Nadu: Nilgiris: Gudalur.

Notes. The species is very close in morphology to G. crocodilum. It differs from Sri Lankan G. crocodilum by larger size and more robust appearance, longer fastigial horns (projected beyond the eyes), stronger pronotal projections and hind femora strongly lamellate and serrate. Hebard (1930) writes that by the robust appearance, the species is close to G. aligator, which is considered later synonym of G. crocodilus. The species is much more similar to G. crocodilum than to Bidentatettix species. Species of the later genus have much stronger and toothed pronotum carinae, their vertex is wider, and they do not belong to the same biogeographic region. Thus, we move the species back to the genus Gavialidium. The original description (Hebard 1930) is well written and can serve as good basis for comparison, until the specimens are available for examination.

Gavialidium becvari Buzzetti & Devriese, 2008

Note. Transferred to the genus Falconius. See under Falconius becvari comb. nov.

Gavialidium bufocrocodil Storozhenko & Dawrueng, 2015

Note. Transferred here to the genus Tefotettix. See under Tefotettix bufocrocodil comb. nov.

Gavialidium crocodilum (Saussure, 1862)

Scelymena (Gavialidium) crocodilus: Saussure 1862.
Scelymena (Gavialidium) aligator: Saussure 1862.

Type material examined. The type series is composed of 6 male and 3 female specimens (syntypes), deposited in Geneva. Of those, one male and one female syntypes were examined. 1♀ SYNTYPE and 1♂ SYNTYPE Kaduganawa Leg. M. A. Humbert (MHGN). Photographs of the type will soon be available in OSF.

Type locality: Sri Lanka: Central Province: Kandy District: Kadugannawa.

Notes. This is the type species of the genus and it should be examined whenever authors are dealing with Gavialidium. After examination of the type species, it became obvious that most of the species do not belong to this genus. The species has high fastigial horns (lower than G. carli however), wrinkled pronum with evident projections, very low position of the lateral ocelli (in the level of the lower margin of the compound eye), scutellum as wide or slightly wider than antennal grooves. It is very close to G. carli.

Gavialidium phangensum Mahmood, Idris & Salmah, 2007

Note. Synonymized with Eufalconius pendleburyi. See under E. pendleburyi.
*Gavialidium philippinum* Bolivar, 1887 syn. nov.

**Note.** Synonymized with *Platygavialidium productum comb. nov.* See under *Platygavialidium productum comb. nov.*

*Gavialidium productum* (Walker, 1871)

**Note.** Transferred here to the genus *Platygavialidium.* See under *Platygavialidium productum comb. nov.*

**Genus Hexocera** Hancock, 1915

syn. nov. of *Scelimena*


**Type species:** *Acridium hexodon* Haan, 1843.

![FIGURE 11. Alive *Scelimena hexodon* (Haan, 1843) comb. nov. from Tawau Hills Park (Malaysia: Borneo: Sabah). Photograph by Chun Xing Wong Claveria, reproduced with photographer's permission.](image-url)
Composition and distribution. Monotypic genus with its only species (*H. hexodon*) inhabiting Borneo.

Notes. The genus is synonymous with *Scelimena*. This monotypic genus included only *H. hexodon* (de Haan, 1843), characteristic in extremely high pronotal projection, forming strong and sharp spines. The genus shares all the morphological characters with *Scelimena*. *S. hexodon comb. resurr.* (Fig. 11) is restricted to Borneo, and Blackith's (1992) record of the species for Sumatra was not confirmed. However, in Sumatra, a new species is found (*Scelimena marta* sp. nov.) closely related to *S. hexodon*. Since the presence of the large spines is the only character separating *Hexocera* from *Scelimena* (and it is not really separating character), we synonymize *Hexocera syn. nov.* with *Scelimena*. Borneo is inhabited by a few species with pronotal projection much larger than in their congers (e.g., *Discotettix belzebuth*, *Tegotettix armatus*), and so *S. hexodon* also have the largest spines within the genus.

*Hexocera hexodon* (Haan, 1843)

Note. Transferred back to the genus *Scelimena* in the present paper. See *Scelimena hexodon comb. resurr.*

Genus *Indoscelimena* Günther, 1938


Type species: *Eugavialidium flavopictum* Bolivar, 1909.

Composition and distribution. The genus is composed of 6 species distributed in India (*I. angulata*, *I. flavopicta*, *I. india* comb. nov., *I. saussurei*), Myanmar (*I. birmanica*, *I. hamata*), and (?) Thailand (*I. birmanica*).

FIGURE 12. Male of *Indoscelimena india* (Hancock, 1907) comb. nov. from northeastern India. Photograph by Hojun Song, reproduced with photographer's permission. Scale bar 1 cm.

Notes. The genus was hitherto composed of five species from India and Myanmar. Here we transfer one more species to the genus and report the genus for the first time from Thailand. Members of this genus are easily separated from other similar genera (*Euscelimena* and *Scelimena*) by the smaller and robust appearance, blunt (obtuse) pronotal projections and obtuse femoral teeth, usually bright yellow or orange (Günther 1938, Blackith 1992). Furthermore, species of this genus lack teeth on the ventral margin of the hind femora. *Indoscelimena*
Indoscelimena angulata (Hancock, 1915)

*Eugavialidium angulatum*: Hancock 1915.

*Scelimena angulata*: Steinmann 1970.


*Indoscelimena flavopicta* [partim]: Günther 1938a.

**Type material** not examined. According to Hancock (1915) the type series is composed of a single female (holotype) deposited in Philadelphia (USA).

**Type locality**: India: Kolkata (= Calcutta in Hancock [1915]).

**Notes**: From the original description, it is not possible to assess if this species belongs to *Indoscelimena*, so we follow Günther's (1938) classification. Günther (1938) placed one syntype of the type species of the genus under this species. We cannot assess if the identification was correct.

Indoscelimena birmanica (Brunner von Wattenwyl, 1893)

*Gavialidium birmanicum*: Brunner von Wattenwyl 1893.

*Eugavialidium birmani*: Hancock 1907a.

*Eugavialidium birmanicum*: Kirby 1910, Hancock 1915.

*Scelimena (?) birmanica*: Kirby 1914.


**Type material examined**: 1♀ SYNTYPE Carin Asciuii Cheba 1200–1300 m XII.[18]87. Leg. L. Fea, 1♀ SYNTYPE Carin Cheba 400–900 m XII.[18]87. Leg. L. Fea, 1♂ SYNTYPE Carin Checu 1300–1400 m II.–III.[18]88. Leg. L. Fea (MCSN). Photographs of the type specimens are available online in OSF.

**Type locality**: Myanmar: the Karen Hills (in original paper Carin Asciuii Cheba, Cain Cheba, and Carin Ghecu (Brunner von Wattenwyl 1893).

**Notes**: The species belongs to the genus *Indoscelimena*, it has weak and obtuse pronotal projections, moderately widened hind tibiae and proximal tarsal segments. The species is here reported for the first time from two localities in Thailand, deposited in Josef Tumbrinck's collection (1♀ Thailand: Tak Province: Ban Mae Salit Luang 600–800 m a.s.l. 16.V.1988. Leg. S. Ingrisch, 1♀ Thailand: Tak Province: Doi Mon Kathing 800 m a.s.l. 15.V.1988. Leg. S. Ingrisch). Photographs of those specimens are available online in OSF. The specimens were tentatively identified as *I. birmanica* because of the similarity with the examined types. However, more study is needed in future to correctly assess identity of all the specimens regarded *Indoscelimena* members.

Indoscelimena flavopicta (Bolivar, 1908)


*Indoscelimena angulata* [partim]: Günther 1938a.

**Type material** not examined, but the original description. Lectotype (designated by Günther (1938) as holotype) female, has label: Calcutta F. S. Both antennae, the right front leg, the tarsi of the left front legand both middle legs, and both hind legs are missing (Hollier 2016).
**Type locality**: India: Kolkata.

**Notes.** Almost nothing is unfortunately known on this species, which is the type species of the genus. Thus, taxonomic acts should be careful before the type specimen (lectotype) is examined and photographs of become available. Günther (1938) examined the type specimens and was one to designate this species as the type of the genus, thus we believe it is morphologically similar to *I. hamata*, *I. birmanica*, and *I. india*. The second type specimen has been placed under *I. angulata*, presumably by Günther (Hollier 2016). Hitherto, the species was known only from India (Kolkata), and here we report specimens tentatively identified as this species, for the first time from Thailand. Two specimens were found in Tumbrinck's collection (1♀ and 1♂ Thailand: Tak Province: Doi Mon Kathing, Doi Ka Thing 800–1000 m 20.V.1998. Leg. S. Ingrisch).

**Indoscelimena hamata** Günther, 1938


**Type material** not examined, but the drawings of the male holotype from Günther (1938). According to the original description, the holotype male is the only known specimen of the species. The male holotype is deposited in Kolkata, in the National Zoological Collection of the Zoological Survey of India.

**Type locality**: Myanmar: Arakan Mts. (= Arakan Yoma in Günther [1938]).

**Notes.** The species is morphologically very similar to *I. flavopicta* according to Günther (1938). The species is however known only from a male holotype and never reported again, so future studies could discover that it is conspecific with an already described congener.

**Indoscelimena india** (Hancock, 1907), **comb. nov.**


*Eugavialidium indicum*: Hancock 1915.

**Type material** not examined. Hancock (1907b) wrote about two specimens of *S. india*, but without mentioning their sex. However, according to measurements provided (length of body entire, male 19.5 mm, pronotum 18 mm, posterior femora 7 mm) it is probable that those are two male syntypes. The type (or types?) are deposited in Philadelphia and according to OSF, there is a male holotype.

**Type locality**: India: Assam: Cherrapunjee [Cherapunji in Hancock (1907b)].

**Notes.** In original description Hancock (1907b) wrote that the species is like *S. producta* [tentative comparison] but stouter, pronotal carinae have yellow markings, vertex is almost equal in width to one eye, anterior margin of the pronotum is somewhat angular, pronotum is extended beyond the knees almost to tibial apices, dorsum granulated, depressed and uneven, humeral angles unarmed (no ML), behind the shoulders bifossulate, with a pair of rounded slightly nodules, posterior process stout at the base and acuminate toward the apex, anterior margin of the pronotum little protuberant and subtuberculate (present FM), lateral lobes' anterior margin armed with small tubercles, while the posterior laminate outwards, and armed with a distinct, acute spine directed transversely but little curved forward. Hind femora without teeth. Hind tibiae and the first segment of the posterior tarsi less dilated than in *S. producta*. According to this description, it is clear that the species is closer to *Indoscelimena* species than to *Scelimena*, and is thus transferred to the genus *Indoscelimena*. We have examined a male specimen from Assam that fits Hancock's description (from Khasi Hills, examined in MNCN Madrid), and a male collected in India recently (by H. Song, Fig. 12), and assigned them to this species.

**Indoscelimena saussurei** (Hancock, 1915)

*Eugavialidium saussurei*: Hancock 1915.

Type material not examined. In the original paper, number of specimens or their sex were not precised, but measurements were only given for a male. In OSF it is written that in Philadelphia one holotype male is deposited. We do not know if type series include more specimens.

Type locality: India: Kolkata.

Notes. Description of this species (Hancock 1915) agrees more that of Indoscelimena than that of Euscelimena or Scelimena—ventral margins of the hind femora are not armed, vertex is about the same width as the compound eye, hind tibia is moderately widened, while the first tarsal segment very little or not at all. Furthermore, ventrolateral projection is not strong, but weakly produced and bearing weak spine. Because of those characters and because of biogeographic affinity, we agree that the species is member of Indoscelimena. However, examination of more specimens is needed. Hancock (1915) wrote that the species is very similar to I. angulata, but it is also to I. india.

Genus Paracriotettix Liang, 2002
syn. nov. of Scelimena


Type species: Paracriotettix zhengi Liang, 2002.

Composition and distribution. Monotypic genus with its only species (P. zhengi) inhabiting PR China: Sichuan.

Notes. The genus is synonymous with Scelimena. This monotypic genus included only P. zhengi, which is found to be conspecific with S. melli, see comments under S. melli.

Paracriotettix zhengi Liang, 2002

Note. Synonymized with Scelimena melli. See comments under S. melli.

Genus Paragavialidium Zheng, 1994


Type species: Paragavialidium curvispinum Zheng, 1994

Composition and distribution. This genus is endemic to PR China and includes 15 species distributed in Anhui (P. anhuiensis, P. curvispinum), Guangdong (P. serrifemura), Guangxi (P. longzhouensis, P. serrimarginis, P. tridentatum), Guizhou (P. prominemarginatum), Hainan (P. hainanensis), Jiangxi (P. tenuifemura), Sichuan (P. emeiensis, P. sichuanensis), Yunnan (P. platynotum), Zhejiang (P. islandium, P. orthacanum). For P. nodiferum comb nov. it is only known that it originates from N China, but the exact locality is not known.

Notes. This genus is composed of Chinese species of variable morphology. Members of the genus can have narrow or wide vertex, high or low projections, strongly toothed or weakly toothed femora (Zha et al., 2016). Some species of the genus (e.g. P. platynotum) have rather different morphology from the congeners. The genus fits typical Scelimenini characters, but since it is very heterogenous, it is in need of revision (Skejo & Bertner 2017). Some species from this genus could be transferred to Platygavialidium and vice versa. Characters generally applicable to describe the genus are (I) extremely wide metalateral plate, (II) strong frontolateral projections directed forwards, (III) strong ventrolateral projections usually directed forwards and (IV) presence of medium sized digitate frontomedial projection directed upwards (Deng et al., 2012). Platygavialidium nodiferum (Walker, 1871) agrees in morphology with species from this genus much more than with that of its own genus, so the species is here transferred to this genus (= Paragavialidium nodiferum comb. nov.). It should be checked if any of the described Chinese species represents synonym of this described species that has not been reported since the
description, and if *Paragavialidium uvarovi* (Günther, 1938) really represents synonym of this species. Because the genus has been reviewed a few times in last years (Deng *et al.* 2012, Deng 2016), we just present list of the species included in the genus with type locality according to full authority.

*Paragavialidium anhuiensis* Zha, Deng & Zheng, 2014

**Type locality:** SE China: Anhui: Jinzhai County.

*Paragavialidium curvispinum* Zheng, 1994

**Type locality:** SE China: Anhui: Guniujiang.

*Paragavialidium emeiensis* Zheng & Cao, 2011

**Type locality:** SC China: Sichuan: Emei Mt.

*Paragavialidium hainanensis* (Zheng & Liang, 1985)


**Type locality:** SE China: Guangdong: Hainan: Jianfengling.

*Paragavialidium islandium* Zha & Wen, 2016

**Type locality:** SE China: Zhejiang: Wenzhou: Nanji Island.

*Paragavialidium longzhouensis* Zheng & Jiang, 1994

**Type locality:** SE China: Guangxi: Guangxi-Zuang.

*Paragavialidium nodiferum* (Walker, 1871), comb. nov.

*Tettix nodifera:* Walker 1871, Jacobson 1905.
*Acanthalobus nodiferus:* Kirby 1910.
*Criotettix nodiferus:* Günther 1938b.
*Platygavialidium uvarovi:* Günther 1938a, 1939, Bey-Bienko & Mistshenko 1951.

**Type material examined.** 1 ♀ HOLOTYPE N China (BMNH). Photographs of the type specimen are available online in OSF.

**Type locality:** North China.

**Notes.** The species is here transferred to the genus *Paragavialidium*. Günther (1938, 1939) placed the species in *Platygavialidium*. The species is transferred to this genus based on presence of moderately high frontomedial projections, strongly armed femora, and strong pronotal projections. It also fits the distribution area of the genus *Paragavialidium* and not of *Platygavialidium*. More research is needed to assess its exact locality and to check if some of the Chinese species are synonymous with it.
**Paragavialidium orthacanum Zheng, 1994**

*Type locality*: SE China: Zhejiang: Lishui.

**Paragavialidium platynotum Zheng & Xu, 2010**

*Type locality*: SC China: Yunnan: Menlian.

**Paragavialidium prominemarginatum Zha & Ding, 2017**

*Type locality*: SC China: Guizhou: Jiangkou: Fanjingshan Mt.

**Notes.** According to the photographs of the type in the original paper (Ding et al. 2017), this is one of the *Paragavialidium* and *Scelimenini* species in general with the widest metalateral projections. Metalateral triangular plates are wider than the spines of the ventrolateral projections and in these characters, the species is very similar to *Eufalconius* and demonstrates that *Eufalconius* could be just a derived form of *Paragavialium*.

**Paragavialidium serrifemura Zheng & Cao, 2011**

*Type locality*: SE China: Guangdong: Ruyuan.

**Paragavialidium serrimarginis Deng & Zheng, 2012**


**Paragavialidium sichuanensis Zheng, Wang & Shi, 2007**

*Type locality*: SC China: Sichuan.

**Note.** Deng (2016) reported one female specimen, likely a holotype of the species. According to the data in Deng (2016) the exact type locality is PR China: Sichuan: Ya'an: Zhougong Mountain.

**Paragavialidium tenuifemura Deng, 2016**

*Type locality*: SE China: Jiangxi: Yushan Sanqingshan.

**Paragavialidium tridentatum Zheng, 1994**

*Type locality*: SE China: Guangxi: Longsheng.

**Genus Paramphibotettix Günther, 1938**


*Type species*: *Scelimena sanguinolenta* Bolívar, 1887

**Composition and distribution.** Three species distributed in Java (*P. sanguinolentus*), Sumatra (*P. lieftincki*), and Myanmar (*P. multidentatus*).
Notes. The genus cannot be easily defined at its validity is in question. The three species belonging to the genus are not very related to each other. *Paramphibotettix lieftincki* Günther, 1938 from Sumatra resembles *Scelimena* species (e.g., *Scelimena hexodon* species group) and should probably be assigned to *Scelimena*. However, a more comprehensive study is necessary to conclude on its taxonomic position. *Paramphibotettix sanguinolentus* (Bolívar, 1887) from Java resembles some *Scelimena* species, from *Scelimena nitidogranulosa*, but differs in absence of the pronotal projection, except for medium sized frontomedial. The type species of the genus does not share a lot of morphological characters with *P. multidentatus* (Hancock, 1915) from Myanmar. *P. multidentatus* looks similar to *Indoscelimena* and could belong to this genus. Diagnostic characters in the tabular key were adjusted to fulfill the morphology of the type species, while for other two species more taxonomic work is needed to enlighten their position.

*Paramphibotettix lieftincki* Günther, 1938


**Type locality:** Sumatra: Simanimbo, Lampung.

Notes. The species is characteristic in bright coloration (with greenish, orange, yellow and red tint), narrow vertex, antennal grooves' dorsal margin slightly or at the lower margin of the compound eyes (antennae not between the eyes), lateral ocelli below the mid of the compound eyes height, strong and spiky second frontolateral projections (FL2), long and spiky ventrolateral spine, pronotum with indistinct MMs weak MMLs, humeral angles oblique, not armed with ML or bearing weak metalateral tubercle, prolonged femora, ventral margin of the hind femora without lappets, weakly widened hind tibiae and not widened hind tarsi. This species is similar to *S. hexodon* and *S. marta* sp. nov. in coloration, but not so much in morphology of pronotum—it has much shorter projections than species of *Scelimena hexodon* species group have. Contrary to other *Paramphibotettix* species, it lacks strong frontomedial projection.

*Paramphibotettix multidentatus* (Hancock, 1915)


**Type material** not examined, but original description and Günther's (1938) drawings of the holotype. The type female is deposited in the National Zoological collection of the Zoological Survey of India in Kolkata.

**Type locality:** E Myanmar: Dawna range: Sukli 600–900 m a.s.l.

Notes. The species is morphologically very close to *I. birmanica* (to the type specimens and those newly reported from Thailand) and should probably belong to the genus *Indoscelimena*. However, since we just examined original description and Günther's (1938) drawings and since the genus is not well understood, we cease from any formal taxonomic actions. Morphological characters of the species (after Hancock 1915) are—body and legs with yellowish markings, obtuse yellowish tubercles covering carinae of the pronotum, vertex slightly narrower than and eye, lateral ocelli in the level of the lower margins of the compound eyes, frontomedial projection elevated tubercle, between the shoulders there are elevated projections (= MML1), MML2 and MML3 also evident and obtusely elevated, metalateral tubercle small and obtuse, towards the apex of the pronotum, tubercles of the lateral carinae becoming smaller and less distinct, ventrolateral projection strongly projected, fore and mid femora with tubercles on dorsal and ventral margins (mid has stronger tubercles), margins of the hind tibiae and the proximal segment of the hind tarsi moderately expanded.
Paramphibotettix sanguinolentus (Bolivar, 1887)

Scelimena sanguinolenta: Bolivar 1887, Hancock 1907a, 1907b, Kirby 1910, París 1994.

Type material examined. 1 ♀ SYNTYPE Java Brunner (with Bolivar's label Scelymena sanguinolenta Krauss) (MNCN), 1 ♀ SYNTYPE Java Fhs. (NHRS). The photo of the syntype is available online in OSF. Specimens from Wien were not examined.

Type locality: Java (without specified locality).

Notes. This is the type species of the genus. Diagnostic characters of the species are presented in the tabular key. The species is somewhat similar to P. lieftincki by the strong second frontolateral projection, and strong and long ventrolateral spine. It is characteristic in presence of elevated frontomedial projection, which is lacking in P. lieftincki. The species is very similar in some characters (low position of the frontal costa bifrcation, lateral ocelli, low pronotal projections on the discus) to members of the genus Scelimena and detailed revision in the future should resolve if Paramphibotettix with its type species is really a separate genus. The main difference from Scelimena species is elevated frontomedial projection.

Genus Platygavialidium Günther, 1938


Type species: Eugavialidium formosanum Tinkham, 1936

Composition and distribution. Five species distributed in the Philippines (P. dentifer, P. kraussi, P. productum comb. nov.), PR China (P. sinicum), R China [= Taiwan] (P. formosanum)

Notes. When the genus was established (Günther, 1938), it included species without complex ventrolateral projection (as opposed to saw-like ventrolateral spines in Gavialidium). However, this character alone cannot be useful. Problematic taxonomy resulted in some Platygavialidium species being assigned to Gavialidium, including Gavialidium productum (Walker, 1871) and G. philippinum (Bolivar, 1887) from the Philippines. Two mentioned species lack dentate carinae, wrinkled dorsum, and fastigial horns. Diagnostic characters of the genus Platygavialidium are wide shoulders (metalateral tubercles, not strongly triangularly projected as in Paragavialidium nor as oblique as in Gavialidium), lack of fastigial horn, wide vertex, strong ventrolateral projections, low pronotal projections (so pronotum is almost flat) and lack of large frontomedial projection. Species from the Philippines are very related and could all be synonymous. Platygavialidium formosanum (Tinkham, 1936) from Taiwan is the type species of the genus. Platygavialidium nodiferum (Walker, 1871) has much wider humeral angles projected as triangular plates and is not regarded member of this genus, but of Paragavialidium. Its morphology and distribution fit those of the Paragavialidium and thus P. nodiferum comb. nov. is proposed. The true taxonomic position of P. sinicum Günther, 1939 from Fujian, PR China remains unclear. Species other than the type species (P. formosanum) have lateral ocelli and the antennal grooves positioned lower than the type species. Four species from the Philippines that are closely related do not have exact distribution data, but we only know they inhabit the Philippines. Taiwan and Chinese species are less related to this group than the species within the group are related.

Platygavialidium dentifer (Stål, 1877)

Tettix dentifer: Stål, 1877, Casto de Elera 1895.
Gavialidium dentifer: Bolivar 1887.
Eugavialidium dentifer: Hancock 1907a, Kirby 1910, Bruner 1915.
Scelimena sentiferum [misspelling]: Otte 1997.
Platygavialidium kraussi [partim]: Günther 1938a.
Type material examined. 1 ♀ HOLOTYPE Ins. Phillipp. Leg. Semper (NHRS). The photographs of the holotype are available online in OSF.

Type locality: The Philippines (without specified locality).

Notes. Bifurcation of the frontal costa, lateral ocelli are slightly below the lower margin of the compound eyes, while antennal grooves significantly above the lower margins of the compound eyes. FL2 are produced as teeth, ML is strongly projected tooth, and behind it there is one smaller tooth. VL is strong and bilobate, anterior spine is longer and directed forwards, while the posterior lobe is rounded. Pronotal projections on the discus are recognizable. Fore, mid and hind femora are elongated and equipped with sharp teeth. A male specimen from Luzon identified by Günther (1938), of which photo is available in OSF probably does not belong to this species. It has much stronger ML plates. Further studies should determine variability within this species. P. dentifer is similar P. productum and P. kraussi. P. dentifer and P. kraussi could be synonymous with P. productum.

Platygavialidium formosanum (Tinkham, 1936)

Eugavialidium formosanum: Tinkham 1936, Tinkham 1937.
Gavialidium philippinum [partim]: Karny 1915.

Type material not examined. According to OSF, there are two paratypes (without defined sex) of the species deposited in Philadelphia. However, we have examined photographs from OSF and online media photographs of this species from Taiwan. Günther (1938) did not examine types of the species as well.

Type locality: R China: Taiwan: Taihoku Prefecture: Hokutō.

Notes. This species is morphologically most distant from other species of the genus. It is the only species of the genus inhabiting Taiwan, and is more slender than other species assigned to the genus. Vertex is relatively narrow, lateral ocelli, bifurcation and dorsal margins of the antennal grooves are positioned higher than in other species of the genus. VL projection is prolonged into sharp spine slightly directed forwards and the posterior lobe is reduced and rounded. ML is present as tubercles on the humeral angles, pronotal projections are lower than in other species. All the femora are elongated and bear small teeth.

Platygavialidium kraussi (Bolivar, 1887)

Gavialidium kraussi: Bolivar 1887.
Eugavialidium kraussi: Hancock 1907a, Kirby 1910.
Eugavialidium kraussei: Bruner 1915.

Type material not examined. Paris (1994) writes about two female syntypes (data: 2 ♀♀ SYNTYPES Philippinen. Thorey) deposited in Wiena.

Type locality: The Philippines (without specified locality).

Notes. There are two specimens—male and female—in OSF identified by Günther (1938) as this species, from the Philippines—Mindanao: Surigao, deposited in Berlin. Those specimens belong to P. dentifer. If identification based on comparison with types is correct, P. kraussi, P. dentifer and P. productum could be all synonymous and represent one species with high inter-specific variability, as is for example Scelimena noveguineae. Until the type specimens of the species are not examined, we will not synonymize them formally.

Platygavialidium nodiferum (Walker, 1871)

Note. Transferred here to the genus Paragavialidium. See under Paragavialidium nodiferum comb. nov.
Platygavialidium productum (Walker, 1871), comb. nov.

Tettix producta: Walker 1871.
Paramphibotettix sanguinolentus [partimm T. producta noted as synonym]: Blackith 1992.

Type material examined. 1♀ SYNTYPE (Tettix producta) without data (BMNH). Photographs of this syntype are available in OSF. Despite the lack of data on the specimen (except the type label), Walker (1871) writes in the original paper that the type comes from the Philippines, from Mr. Cuming's collection. 1♀ LECOTYPE (Gavialidium philippinum) Filipinas leg. Baer (MNCN). The lectotype is damaged, it lacks antennae and all the legs except the left foreleg (tarsus broken) and middle foreleg (tarsus broken as well). The photographs of the lectotype will soon be available online in OSF.

Type locality: The Philippines (without specified locality).

Notes. Lectotype of Gavialidium philippinum and Tettix producta are conspecific, the former being different only in the morphology of the posterior margin of the ventrolateral projection, what probably represents local variability, thus the former is synonymized with the later (G. philippinum syn. nov.) This species is very close in morphology to P. dentifer and P. kraussi and three species could be synonymous. The main differences this lectotype (and the series of this species from the Philippines in Bolivar's collection) are: posterior margin of the ventrolateral projection is extended and slightly bilobate at the apex, space between promedial and first metamedial projection more flat, and femora are somewhat more robust and bear stronger teeth. Interspecific variability of those species should be assessed in future. The species does not have high fastigial horns and shoulders are different in morphology. Since the species is close to P. dentifer inter-specific morphology should be examined in future between the species, as P. dentifer, P. kraussi could represent but synonyms of P. productum.

Platygavialidium sinicum Günther, 1939

Scelimena wuyishanensis: Deng, 2016; syn. nov.

Type material examined. 1♀ HOLOTYPE, 1♀ PARATYPUS, and 1♂ PARATYPE Shaowu, Fukien (500 m) Leg. J. Klapperich 29.VI.1937 (MTD). Photographs of the holotype and the paratypes are available in OSF. Photographs of Scelimena wuyishanensis were examined from Deng (2016).

Type locality: PR China: Fujian (= Fukien in Günther [1939]): Shaowu.

Notes. The species more similar to its congeners from the Philippines, than to one from Taiwan. It is however different as it has very wide vertex and more elongated hind femora. Also, morphology of the ventrolateral spines is different—the anterior spine is strong and directed forwards, while the posterior margin is slightly produced, rounded and not spiky. Pronotal projections are lower, since the pronotum is much longer than in other congeners and ML is smaller tubercle than in the congeners from the Philippines. The specimens Deng (2016) reported do not belong to Scelimena species, but are conspecific with P. sinicum. Types of two species are identical in morphology. Type locality of the female holotype specimen of S. wuyishanensis originated from Fujian: Nanping: Wuyishan (600 m a.s.l.), while that of P. sinicum from Fujian, Nanping, Shaowu, just about 60 km SW.

Genus Scelimena Serville, 1838

Tettix (Scelimena): Serville 1838.
Scelymena [misspelling]: Saussure 1862.
Sceihymena [misspelling]: Bolivar 1902.
**New Scelímena and Taxonomic Notes**  

_Hexocera:_ Hancock 1907a, Kirby 1910, Hancock 1915, Tinkham 1936, Günther 1938b.  
**Paracriotettix** _Liang 2002, Deng 2016;_ **syn. nov.**

**Type species:** _Tetrix (Scelímena) producta_ Serville, 1838 ( = _Scelímena producta producta_).

**Composition and distribution.** 23 species, divided into six species groups (_Scelímena bellula_ group, _Scelímena discalis_ group, _Scelímena hexodon_ group, _Scelímena novaeguineae_ group, _Scelímena producta_ group, and _Scelímena spiculata_ group), and five species (_S. brevispina, S. guangxiensis, S. razalii, S. spicupennis, and S. wulingshana_) not assigned to any of the species groups. The species of this genus inhabit India (_S. discalis, S. kempí_), Myanmar (_S. chinensis, S. rosacea_), Thailand (_S. bellula, S. discalis, S. songkrana_), Vietnam (_S. rosacea_), PR China (_S. brevispina, S. guangxiensis, S. spicupennis, S. wulingshana, S. melli_), Peninsular Malaysia (_S. gombakensis, S. razalii_), Sumatra (_S. marta, S. producta_), Borneo (_S. dentimeris, S. hexodon_), Palawan Isl. (_S. boettcheri_), Philippines (_S. spiculata_), Java (_S. producta producta_), East Sumba (_S. producta dammermani_), Sulawesi (_S. celebica_), Flores (_S. Floresana_) and New Guinea with adjacent small islands (_S. eremita, S. novaeguineae_).

**Notes.** Bruner (1915) presented names of four new _Scelímena_ species from the Philippines, but never formally described them, those are, thus nomina nuda: _Scelímena boettcheri_ Bruner, 1915 [near _S. boettcheri_ of Günther, 1938], _Scelímena ledyardi_ (Bruner, 1915), _Scelímena palidaventris_ Bruner, 1915. This large genus is currently composed of 25 species (including _S. hexodon comb. resurr_. _S. eremita, S. novaeguineae, S. rosacea comb. resurr._ and two new species). The type species of the genus is _S. producta_, described from Java. The type species is characterized by large body size (from the tip of the vertex to the tip of the pronotum 28.5 mm), vertex 1.53 times as wide as a compound eye, small but evident fastigial horns, long frontal costa, of which the bifurcation is in the lower third of the compound eye height, antennal grooves evidently below the lower margins of the compound eyes, long antennae, mostly low pronotal projections (unrecognizable frontomedial, low promedial, metamedial and mediolateral), strong frontolateral projections, metalateral tubercle (of variable size, can be larger or smaller), ventrolateral projection forming a spine directed forwards, large wings and alae, elongated and toothed fore and mid femora, dentate ventral margin of the hind femora, and widened distal part of the hind tibiae together with the proximal hind tarsal segment. The genus can be tentatively divided into six species groups (Fig. 15), according to their shared morphological characters. Most of the Chinese species assigned to _Scelímena_ cannot be assessed nor discussed in this study because of the lack of comparative material and voucher specimen. Digitalization of Chinese type specimens is strongly needed. One species of the genus is transferred to _Indoscelímena (I. India_), and one species (_S. wuyishanensis_) synonymized with _Platygaualidium sinicum_.

**_Scelímena bellula_ species group**


**Type species:** _Scelímena bellula_ Storothenko & Dawrueng, 2015.

**Composition and distribution.** Four species inhabiting PR China (_S. melli, S. nitidogranulosa_), Thailand (_S. bellula_), Myanmar and Vietnam (_S. rosacea_). Reports of _S. rosacea_ from India (Blackith 1992) are doubtful.

**Notes.** This is northern group within _Scelímena_, characteristic in colorful appearance (with yellow, orange and red tints) and pronotal projections are very low so the dorsum is very smooth. Metalateral tubercles are absent. Members of the group superficially resemble _Paramphibotettix_ and _Amphibotettix_ (species other than the type species). Except of _S. bellula_ and _S. melli_, morphology of the other species is not well known so basically other two species are tentatively assigned to this group and further research is needed. Since the holotype of _Paracriotettix zhengi_, the only species assigned to the genus _Paracriotettix_, was found to be conspecific with _S. melli_, the genus _Paracriotettix_ is synonymized with _Scelímena_.

_Eugavialidium:_ Hancock 1907a, Kirby 1910, Hancock 1915, Tinkham 1936, Günther 1938b.
Scelimena bellula Storozhenko & Dawwrueng, 2015


**Type material** not examined, but the photographs of the types from Storozhenko & Dawwrueng (2015) were. The type series, deposited in ZIN (St. Petersburg) is composed of a holotype female, 3 females paratypes, 3 male paratypes, and 3 nymphs paratypes (from the type locality as well).

**Type locality**: Thailand: Surat Thani Province, 40 km SW of Phanom City; environs of Khao Sok NP.

**Notes**: Storozhenko & Dawwrueng (2015) recently described this species from Thailand and presented detailed description of it. Here we assign the species to *Scelimena bellula* species group. It is related to *S. nitidogranulosa*, *S. rosacea* and some undescribed species from the region.

Scelimena melli Günther, 1938


*Scelimena mellioides*: Deng 2016; syn. nov.


**Notes**: Holotype of *Paracriotettix zhengi* is in fact badly molted *S. melli* with deformed pronotal process. Head and pronotal morphology is the same so we synonymize *P. zhengi* with *S. melli*. The species is here assigned to *Scelimena bellula* species group because of smooth pronotal surface and lack of strong pronotal projections and colorful appearance. Morphology and ecology of this species were discussed recently (Zha *et al*., 2017). Type specimen photographs of *S. mellioides* female (Deng 2016) completely fit morphology of *S. melli*. *S. melli* is widespread in China and known from Guangxi (Jinxiu, Rongshui, Longsheng, Xing'an, Guilin, Longzhou), Guizhou (Jiangkou, Chishui, Xi), Guangdong (Bolo, Qujiang, Ruyuan) and finally Sichuan, from where *S. mellioides* was described. Thus, we synonymize *S. mellioides* with *S. melli*.

Scelimena nitidogranulosa Günther, 1938


**Type material examined.** 1♀ HOLOTYPE China: Canton Leg. S. V. Mell (MfN). The photo of the holotype is available online in OSF. Ventrolateral spines of the holotype are broken.

**Type locality**: PR China: Guangdong: Guangzhou [= Canton in Günther (1938)].

**Notes**: The species is here assigned to *Scelimena bellula* species group, based on its similarity to *S. bellula* and *S. rosacea*. Deng (2016) reported specimen of this species from Guangdong (Ruyuan), Hainan (Nada, Changjiang, Chengmai, Ding'an, Qiongshan), and Fujian (Wuyishan). We are not sure if drawings from Liang & Zheng (1998) really represent this species—vertex in this specimen is much wider than in the holotype.

Scelimena rosacea (Hancock, 1915), comb. resurr.


Type material not examined, but the original description was. Male holotype is deposited in Kolkata, in the National Zoological Collection of the Zoological Survey of India.

Notes. Morphology of this species is not well known. Here, we present diagnostic parts of the original description (Hancock 1915) of the holotype. The species is larger in appearance than *Amphibotettix longipes*, ventrolateral projections less produced, body yellowish and black, pronotum with rose tints, tubercles and the spines of the lateral lobes rose. Vertex narrower than one of the eyes, narrowed forwards, antennae inserted below the eyes. Pronotum flat above, elongated, irregularly depressed before the shoulders, dorsum smooth, minutely granulate, between the shoulders somewhat elevated, behind the shoulders bearing a pair of obtuse nodes, and further backwards on the base of the hind process with another pair of very obtuse rounded nodes, humeral angles with double carinae, median carina of pronotum very low, anterior margin turned upwards, but not produced in a tubercle. Lateral carinae of the pronotum rose in color, before the shoulders on each side forward near the sulci terminating in a rose-colored spot. Sides of pronotum at the front of lateral lobes produced on each side in a tubercle (= FL2). Anterior and middle femora elongated and narrow, hind femora slender elongate, carinae of hind tibiae strongly dilated, and the first joints of the hind tarsi. the first and second pulvilli small subacute, and widely separated, dividing the article into thirds, the third pulvilli strongly obtuse and flat below (Hancock 1915). Tentatively, we identified two specimens from Vietnam as this species, but the reference point for further identification should be based on holotype examination, not on our Fig. 13. The description of the species is similar to that of *S. bellula* and *S. nitidogranulosa*, and rather different from that of *Amphibotettix* [compare Hancock's (1915) description with tabular key to *Amphibotettix*], thus we assign the species to the genus *Scelimena* and to *Scelimena bellula* species group. This group is morphologically close to *Scelimena melli*.

FIGURE 13. Two females of *Scelimena rosacea* (Hancock, 1915) comb. resurr.—red/orange and yellow color morphs from Tay Yen Tu Nature Reserve (North Vietnam) 10.VII.2013. Photograph by Jerome Constant, reproduced with photographer’s permission.
Scelimena discalis species group

Type species: Eugavialidium discaleis Hancock, 1915 (= Scelimena discalis)

Composition and distribution. Four species inhabiting India (S. discalis, S. kempi), Thailand (S. discalis, S. songkrana), and Malaysia (S. gombakensis).

Notes. Members of the group are characterized by blunt (rounded) pronotal projections, tuberculated lateral pronotal carinae, usually yellowish or orange in coloration. This group inhabits the westernmost part of the Scelimena distribution. This group is morphologically and biogeographically close to Scelimena nitidogranulosa in the North, Scelimena producta species group in the South, and Indoscelimena in the East.

Scelimena discalis (Hancock, 1915)

Eugavialidium discalis: Hancock 1915.

Type material not examined. According to the original description it is not specified how many males and females make the type series (Hancock 1915). OSF, however reports male holotype to be deposited in Philadelphia.

Type locality: India: Assam: Sivasagar [= Sibsagar in Hancock (1915)].

Notes. This is the type species of Scelimena discalis species group. It is characteristic in wide vertex, and nodulated pronotal and femoral carinae. It is morphologically similar to S. gombakensis. Differences are reported in the diagnosis of S. gombakensis. Two specimens were examined in Tumbrinck's collection (a male and a female from Thailand: Khao Yai NP X.1990. Leg. S. Ingrisch). Identification in future should be based on comparison with type specimens.

Scelimena gombakensis Muhammad, Tan & Skejo, sp. nov.

Type locality: Malaysia: Selangor: Ulu Gombak Field Studies Centre (lowland secondary rainforest).

Note. The species is described in the first part of the paper.

Scelimena kempi (Hancock, 1915)

Eugavialidium kempi: Hancock 1915.
Eugavilidium indicum [misidentification, partim]: Hancock 1913.

Type material not examined. According to Hancock (1915) the species is described from a single female (holotype). OSF reports female holotype to be deposited in Philadelphia. Shishodia (1991) reported male type, deposited in the National Zoological Collection in Kolkata (Zoological Survey of India).

Type locality: India: Assam: Rebang stream above Panji.

Notes. The species is here tentatively assigned to Scelimena discalis species group. It could also be a member of the genus Indoscelimena, according to the original description (Hancock 1915) and comparison with Indoscelimena birmanica. Examination of type specimens is needed to correctly assess its taxonomic status. Hancock (1915) writes about nodulated pronotum and legs in S. kempi, and because of that the species is here assigned to Scelimena discalis species group. Note that Scelimena discalis group is in morphology close to certain Indoscelimena species and in future further re-arrangement of the species between the genera could be performed. Shishodia (1991) presented drawings of S. kempi which are very similar to S. india, but we are not sure if the identification was correct. Furthermore, Shishodia (1991) reported one male paratype to be deposited in the
Zoological Survey of India, with the data Abor Expedition: above Panji 1216 m a.s.l., Rebang stream, under the inventory number 7565/19. Hancock (1915) however, did not report males, but since the specimen is from the type locality it could be conspecific with female holotype.

**Scelimena songkrana** Zha & Wen, 2017


**Type material** not examined, but the original description and photographs of the types in Zha et al. (2017) were. The type series is composed of holotype female, five male paratypes, and nine female paratypes with data: Nan Province, Doi Phu Kha National Park, 19°12′0.48″N, 101°4′54.85″E, 1254 m a.s.l., 13. IV. 2016, Leg. Lingsheng Zha. The type series is deposited in the Herbarium of Mae Fah Luang University, Chiang Rai, Thailand.

**Type locality**: Thailand: Nan Province: Doi Phu Kha NP.  
**Notes**: The species was described recently from Thailand. Zha et al. (2017) provided detailed morphological description and data on habitat and ecology. The species is morphologically close to *S. discalis* and *S. gombakensis*—it has tuberculated carinae and femora, and is thus here assigned to *Scelimena discalis* species group.

**Scelimena hexodon species group**

*Hexocera*: Hancock 1915, Günther 1938a, Blackith 1992, Yin et al. 1996, Otte 1997; **syn. nov.**

**Type species**: *Acridium (Tetrix) hexodon* Haan, 1843 (= *Scelimena hexodon* comb. resurr.)

**Composition and distribution**. Two species inhabiting Borneo (*S. hexodon* comb. resurr.) and Sumatra (*S. marta* sp. nov.).

**Notes**: This group is close to *Scelimena producta* species group, but its members have larger pronotal projections (strong metalateral spines or tubercles, strongly elevated first metamedial projection, and large ventrolateral spines). Size of the pronotal projection itself is not a satisfying character.

**Scelimena hexodon** (Haan, 1843), comb. resurr.

*Acridium (Tetrix) hexodon*: Haan 1843.  
*Scelimena hexodon*: Hancock 1907a, Kirby 1910.  
*Eugavialidium hexodon*: Willemsen 1928.  
*Hexocera sexspicata*: Hancock 1915.  
*Scelimena cf. dentiumeris* [misidentification]: Tan & Wahab 2018.

**Type material examined**. 1♀ HOLOTYPE Sakoembang (NCB). The photographs of the holotype are available in OSF. Type material of *Hexocera sexspicata* was not examined. According to Hancock (1915) the type series of *H. sexspicata* is composed of a single male holotype from Borneo: Sabah: Sandakan, deposited in the collections of the Zoological Survey of India in Kolkata.  
**Type locality**: Indonesia: Borneo (Kalimatan): Meratus Mt. Range: Gunung Sakoembang.  
**Notes**: Among *Scelimena* species, *S. hexodon* is the species of the highest pronotal projections—VL, ML and MM1 are strongly projected as high and sharp spines. It is the type species of the *Scelimena hexodon* species group. *S. hexodon* is related to *S. marta*. Specimen from Brunei reported by Tan et al. (2018) as *Scelimena dentiumeris* belong to this species.
Scelimena marta Skejo & Tan, sp. nov.

Type locality: Middle (inner) Sumatra.

Note. The species is described in the first part of the paper.

Scelimena novaeguineae species group

Type species: Gavialidium novaeguineae Bolivar, 1898 (= Scelimena novaeguineae)

Composition and distribution. The group includes three species, S. floresana from Flores, S. eremita from New Guinea, and S. novaeguineae, also from New Guinea.

Notes. This group inhabits the easternmost part of the Scelimena distribution and is characterized by robust appearance, strong frontolateral projections, strong metalateral projection (produced as bilobate or simple triangular plate or spine), tubercles behind the metalateral on the lateral carinae, and hind femora with minute teeth on the dorsal margin. The group is related to eastern Scelimena producta species group.

Scelimena eremita (Günther, 1938)

Eugavialidium eremitum: Günther 1938c.

Type material examined. 1♀ SYNTYPE D[eutsch]. Neu-Guinea Kai-Inland 50–70 km landeinwärts westlich von Finschhafen I,[19]09- Leg. Prof. S. Neuhaus (MfN), 1♀ SYNTYPE D[eutsch]. Neu-Guinea Kai-Inland 50–70 km landeinwärts westlich von Finschhafen I.[19]09- Leg. Prof. S. Neuhaus (MTD). Photographs of the female syntypes are available in OSF.


Notes. The species was transferred back to the genus Scelimena by Tumbrinck (2018). It does not share morphological similarities with Gavialidium species from India and Sri Lanka, but to Scelimena species from the islands of SE Asia—e.g., Scelimena producta species group. Together with S. novaeguineae, this species is related to S. floresana (Tumbrinck, 2018). Characters that imply placement within Scelimena (sensu Tumbrinck, 2018) are: vertex lacking fastigial horns (as opposed to presence in Gavialidium), pronotum without net-like elevations (as opposed to Gavialidium in which pronotal projections are wrinkled, and pronotum is rich in net like elevations), strong FL2 and ML (as oposed to weak and tuberculated), and simple VL (as opposed to bi- or trilobate), and finally dilated hind tibiae and tarsi (not widened in Gavialidium). Morphology and variability of the species are discussed in Tumbrinck (2018)—it has smaller distribution area than its congener from New Guinea. Tumbrinck (2018) discussed taxonomic placement of this species, and having our unpublished manuscript, agreed that it should be placed within Scelimena (thus in his paper Scelimena eremita was reported as new combination).

Scelimena novaeguineae (Bolivar, 1887)

Eugavialidium novaeguineae: Kirby 1910.

Type material examined. 6♂♂ and 2♀♀ SYNTYPES N. Guinea SE: Haveri VII.–XI.[18]93. Leg. Loria, 1♀ SYNTYPE N. Guinea: Ramoi II.1875. Leg. Beccari (MNCN), 3♂♂ and 3♀♀ SYNTYPES N. Guinea SE: Haveri VII.–XI.[18]93. Leg. Loria (ISNB). Paris (1994) reported 43 more syntypes to be deposited in Genoa. Those syntypes were not examined by us. Photographs of the examined syntypes are available in OSF (ICNB) or will be soon available (those from MNCN).
Type locality: New Guinea: Papua New Guinea: Central Province: Haveri (close to Port Moresby).

Notes. Morphology and variability of the species is discussed in Tumbrinck (2018). The species was transferred back to the genus Scelimena (Tumbrinck, 2018). It does not share morphological similarities with Gavialidium species from India and Sri Lanka, but to Scelimena species from the islands of SE Asia—e.g., Scelimena producta species group. Together with S. eremita, this species is related to S. floresana. Characters that imply placement within Scelimena (sensu Tumbrinck, 2018) are: vertex lacking fastigial horns (as opposed to presence in Gavialidium), pronotum without net-like elevations (as opposed to Gavialidium in which pronotal projections are wrinkled, and pronotum is rich in net like elevations), strong FL2 and ML (as opposed to weak and tuberculated), and simple VL (as opposed to bi- or trilobate), and finally dilated hind tibiae and tarsi (not widened in Gavialidium). The species is widespread in New Guinea, not localized as its congener from the island. Tumbrinck (2018) discussed taxonomic placement of this species, and having our unpublished manuscript, agreed that it should be placed within Scelimena (thus in his paper Scelimena novaeguineae was reported as new combination).

Scelimena floresana Günther, 1955


Type material examined. 1♂ HOLOTYPE Rana Mese W. Flores 1300 m 21.XI.1949. Leg. Dr Bühler & Dr. Sutter (NMB). Photographs of the holotype are available online in OSF.

Type locality: Indonesia: Lesser Sunda Islands: Flores: Rana Mese.

Notes. The species is morphologically close to S. novaeguineae and S. eremita and is thus assigned to Scelimena novaeguinea species group. Concerning distribution, this is the westernmost species of this eastern species group. This colorful species is assigned to S. novaeguinea on the basis of the following morphological traits: FL2, VL, and ML are the strongest projections, humeral angles bear one large dentiform ML, and before it there is one more pair of strong yellowish projections, fore and mid femora are elongated and hind femora have toothed dorsal margin, while ventral margin lacks lappets.

Scelimena producta species group

Eugavialidium: Hancock 1907a, Kirby 1910, Hancock 1915, Tinkham 1936, Günther 1938a.

Type species: Tetrix (Scelimena) producta Serville, 1838 (= Scelimena producta producta).

Composition and distribution. The group included four species and one subspecies, inhabiting the Philippines: Palawan (S. boettcheri), Borneo (S. dentiumeris), Sumatra (S. producta), Java (S. producta producta), East Sumba (S. producta dammermani), and Sulawesi (S. celebica).

Notes. The group is close to the NW Scelimena discalis species group, as well as to eastern Scelimena novaeguineae species group. The group is characterized by small pronotal projections, presence of small or medium sized metatarsal tubercles, large ventrolateral spine, usually directed forwards, and large body size. S. dentiumeris which is probably very close in morphology to S. producta, served as the type species of the genus Eugavialidium in the past. Taxonomy of this genus was not clear, so Günther (1938) synonymized the genus with Scelimena. We fully agree with synonymization of Eugavialidium and Scelimena.

Scelimena boettcheri Günther, 1938


Type material examined. 9♂ and 4♀ SYNTYPES N. Palawan: Binaluan Nov.–Dec. 1913 Leg. G. Boettcher (DEI), 1♂ and 2♀ SYNTYPES N. Palawan: Binaluan Nov.–Dec. 1913 Leg. G. Boettcher (MTD). Photographs of
the syntypes are available online at OSF and DORSA webpages. Günther (1938) described species on 18 syntypes, of which two were not found in DEI and MTD.

**Type locality:** the Philippines: Palawan Islands: Taytay: Binaluan.

**Notes.** The species is morphologically very close to *Sceлимena producta* and is thus here included in *Sceлимena producta* species group. The main difference is lack of teeth on the ventral margin of the hind femora. It is for now the only *Sceлимena* species reported to inhabit Palawan.

![FIGURE 14. Alive Sceлимena producta (Serville, 1838) female, standing on a stone in Gunung Leuser NP (Indonesia: Sumatra). Photograph by Arthur Anker, reproduced with photographer's permission.](image)

*Sceлимена celebica* (Bolivar, 1887)

*Gavialidium celebicum:* Bolivar 1887.

**Type material examined.** 1♀ LECTOTYPE Minahassa: Celebes Leg. Staudinger (MNCN). Photographs of the lectotype will soon be available online in OSF.

**Type locality:** Indonesia: Sulawesi: Minahassa Peninsula.

**Notes.** The species is here included in *Sceлимена producta* species group, based on similarity with the type species of the group—*Sceлимена producta*. The main differences from *S. producta* are smoother pronotum, lack of metalateral projections, lack of teeth on the ventral margins of the hind femora and slightly narrower vertex.

*Sceлимена dentiumeris* (Hancock, 1907)

*Eugavialidium dentiumeris:* Hancock 1907a, Kirby 1910, Günther 1935.
*Sceлимена cf. dentiumeris* [misidentification of *S. hexodon*]: Tan & Wahab 2018.

**Type material** not examined. According to Hancock (1907) the type series consists of two syntype females. According to OSF, holotype female is deposited in Philadelphia.

**Type locality:** According to OSF the type locality is Borneo: Brunei, but in the original description, only 'Borneo' is mentioned, without precise locality.

**Notes.** Morphology and ecology of this species are not well known. Important parts of the original Hancock's
(1907) description are presented: Body yellowish, ML projections yellow. Vertex distinctly wider than one eye. Pronotum with pale colored projections, depressed behind the shoulders, humeral angles armed with triangular tubercle (= ML) on each side, and with evidence of indistinct tubercles forwards on the carinae, VL is strong simple spine directed forwards, femora elongated, ventral margin of the hind femora minutely toothed. The species is tentatively assigned to Scelimena producta species group. Günther (1938) reported two females from Middle Borneo. Günther (1938) reported that these females have pronotum length 21.5 and 22 mm, ratio of the width of an eye compared to vertex width is 22:25. Günther (1938) noted that the specimens are quite similar in appearance to typical S. producta, but the metalateral tubercles are stronger, and ventrolateral projection is stronger. Hancock (1907) reported pronotum length 24.2–25 mm, and Günther (1938) reported a female, also collected by Siebers in 1925 in the Middle East Borneo, with a pronotum length of 27 mm, monochrome brown in color, generally resembling other specimens, but after the ML projections there are 3–4 smaller tubercles on the lateral carinae.

Scelimena producta (Serville, 1838)

**Note.** The species is divided into two subspecies, nominotypical western subspecies and eastern S. p. dammermanni. See nominotypical subspecies for more information of S. producta.

Scelimena producta dammermanni Günther, 1938

*Type material* was not examined. According to the original description (Günther, 1938a) the type series is composed of 19 specimens (syntypes): 10 males and a female with data Ost-Sumba: Mao Marroe 400 m V.1925, while five males and three females have data Ost-Sumba: Kananggar 700 m V.1925. Leg. Dammermann. According to OSF type specimens are deposited in NBC Leiden.

**Type locality:** Indonesia: Sumba: East Sumba: Kananggar and Mao Marru.

**Notes.** Since the specimens or drawings of the subspecies were not examined, no comments can be given on its taxonomy or morphology. According to Günther (1938), the main differences between this and nominative subspecies is size (S. p. dammermanni being larger), color (S. p. dammermanni being more ornamented) and lack of ML tubercles in S. p. dammermanni. According to the characters presented, S. p. dammermanni could be morphologically intermediate form between S. celebica and typical S. producta.

Scelimena producta producta (Serville, 1838)

*Tetrix (Scelimena) producta:* Serville 1838.

*Scelimena producta:* Bolívar 1887, Brunner von Wattenwyl 1893, Hancock 1907a, 1907b, Kirby 1914, Günther 1938a, Mahmood et al. 2007.

*Paramphibotettix producta:* Otte 1997 [based on misunderstanding of Blackith's (1992) synonymy].

**Type material examined.** 1♀ HOLOTYPE Java [on one label written Borneo, but this is unlikely] (MNHN). Photographs of the female holotype are available online in OSF.

**Type locality:** Indonesia: Java.

**Notes.** This is the type species of Scelimena producta species group, of the genus Scelimena, of the tribe Scelimenini and the subfamily Scelimeninae. Here, it is assigned to Scelimena producta species group and is regarded to be close relative of S. boettcheri, S. celebica and S. dentumeris. The species is characteristic in the following morphological characters: presence of the small trinacular tubercles (ML) at the humeral angles, low pronotal projections, elongated femora with undulated margins, and lappets on the ventral margin of the hind femora forming teeth. The nominative subspecies is known from Sumatra, Java and Bali, while East Sunda is inhabited by the eastern subspecies, S. p. dammermanni.
Scelimena spiculata species group

Type species: *Tettix spiculatus* Stål, 1877.

**Composition and distribution.** One species inhabiting the Philippines (Samar: Catbalogan, Surigao, Mindanao: Zamboanga) (Günther 1938a).

**Notes.** This group includes only one species, inhabiting Mindanao and adjacent islands of the Philippines. For now, it is the only *Scelimena* species known from the Philippines (excluding Palawan archipelago, which is biogeographically more similar in fauna to Borneo). In the museum collections (e.g. in MNCN) more new (undescribed) species belonging to this group were found, but larger series and more research in the Philippines are needed to clarify status of taxa that are members of the group. This group is unique within *Scelimena* from the islands of SE Asia in lacking ML projection of the humeral angles, but having distinct tubercles on the lateral carinae, distinctly after the humeral angles. *S. spiculata* has elongated and smooth fore and mid femora, with fine tubercles on their margins, and the hind legs lack teeth and lappets on the ventral margins. The group is probably related to *Scelimena producta* species group, but also *S. spiculata* superficially resemble species of the *Scelimena bellula* species group.

**Scelimena spiculata** (Stål, 1877)

*Tettix spiculatus* Stål 1877, Casto de Elera 1895.

*Gavialidium spiculatum* Bolivar 1887.
**Eugavialidium spiculatum**: Hancock 1907a, Kirby 1910, Bruner 1915.
**Scelimena spiculata**: Günther 1938a.

**Type material examined.** 1 ♀ SYNTYPE Ins. Philipp. Leg. Semper (MfN), 1 ♀ SYNTYPE [cited as HOLOTYPE in OSF] Ins. Philipp. Leg. Semper (NHRS). Photographs of the examined syntypes are available online in OSF.

**Type locality:** The Philippines (without specified locality).

**Notes.** The species is unique within *Scelimena* species in lacking ML projection, but having distinct tubercles on the lateral carinae, distinctly after the humeral angles. *S. spiculata* was in the past moved between different genera (*Gavialidium, Eugavialidium, Scelimena*), and here we agree with Günther (1938) that the species belongs to the genus *Scelimena*, and is close in morphology to members of *Scelimena producta* species group.

*Scelimena* species not considered in this study and not assigned to any species group

**Scelimena brevispina** Cao & Zheng, 2011


**Type material** not examined. According to OSF the type is female holotype, deposited in Shaanxi Normal University Orthoptera collection.

**Type locality:** According to OSF PR China: Sichuan: Mt. Emai.

**Notes.** We did not examine any drawings, photographs, or description of this species, so we cannot suggest to which species group to place the species. Deng (2016) reported two males and three females from Sichuan: Emeishan. Since in Chinese ‘shan’ means ‘Mountain’, those specimens from Emei Mt. could represent the type series of the species.

**Scelimena guangxiensis** Zheng & Jiang, 1994


**Type material** not examined. OSF does not report data on type specimens.

**Type locality:** According to OSF type locality is PR China: Guangxi.

**Notes.** According to drawing of this species in Liang & Zheng (1998), it could belong to *Scelimena bellula* species group. It does not have ML, pronotum is smooth and the strongest projections are VL and FL2. Careful examination of the type specimens is needed in future. Deng (2016) reported specimens from Shangsi Hongqi, Shangsi Fenghuang, and Huanjiangmu.

**Scelimena razalii** Mahmood, Idris & Salmah, 2007

*Scelimena razalii*: Mahmood et al. 2007.

**Type material** not examined. Mahmood et al. (2007) reported holotype female, male allotype, and female paratype, all from Malaysia: Phang: Kuala Lompat 19.VII.2003. Leg. Norliyana. Type depository is Center for Insect Systematics, School of Environmental and Natural Resource Series, Faculty of Science and Technology, University Kebangsaan Malaysia.

**Type locality:** Malaysia: Kuala Lompat: Pahang [= Phang in Mahmood et al. (2007)].

**Notes.** Mahmood et al. (2007) reported that the species is different from *S. discalis* in having no tubercles on pronotal carinae. Thus, we do not regard it relative of *S. gombakensis sp. nov.* or *Scelimena producta* species group. Drawings are not accurate enough to assess taxonomic position of this species.
Scelimena spicupennis Zheng & Ou, 2003


**Type material** not examined. OSF does not report data on type species, but reports that depository is Southwest Forestry College, Kunming, PR China.

**Type locality:** According to OSF, PR China: Yunnan.

**Notes.** Deng (2006) reported 1♀ from PR China Yunnan: Pu'er: Jingdong, collected of 29.V.2001. This female could be the holotype female.

Scelimena wulingshana Zheng in Huang, 1992


**Type material** not examined. OSF does not report data on type series.

**Type locality:** According to OSF PR China: Hubei. The type locality is, probably according to the specific epitheton, Wulingshan [= Wuling Mt.] Nature Reserve in the northwestern part of the Xinglong County, Hebei Province, 130 km from Beijing.

**Notes.** We did not examine any drawings, photographs, or description of this species, so we cannot suggest to which species group to place the species. Deng (2016) reported the species from Sichuan (Mabian), Guizhou (Chishui), Hubei (Lichuan), and Hunan (Dayong, Guzhang).

**Scelimena species transferred to other genera or synonymized with other species**

**Scelimena india** Hancock, 1907

**Note.** Transferred to the genus Indoscelimena. See under *Indoscelimena india comb. nov.*

**Scelimena mellioides** (Deng, 2016)

**Note.** Synonymized with *Scelimena melli*, see under *Scelimena melli*.

**Scelimena wuyishanensis** Deng, 2016

**Note.** Synonymized with *Platygavialidium sinicum*, see under *Platygavialidium sinicum*.

**Genus Tagaloscelimena** Günther, 1938


**Type species:** *Gavialidium aurivillii* Bolivar, 1887 (= *Tagaloscelimena aurivillii*).

**Composition and distribution.** Two species (*T. aurivillii* and *T. cebuensis*) inhabiting Philippines.

**Notes.** Species of this genus are characterized by robust appearance, narrow vertex, short prozona, median carina being the highest part of the pronotum, lack of high pronotal projections (especially strong metalateral) and slightly widened hind tibiae and tarsi. The genus superficially resembles *Tefrinda*. Contrary to *Tefrinda*, *Tagaloscelimena* species do not have foliaceous apical segment of the palpi and the hind tarsi are typical for Scelimenini. Members of this genus resemble also *Euscelimena* on the first sight.
Tagaloscelimena aurivillii (Bolivar, 1887)

鬣蜥科


*Eugavialidium aurivillii*: Hancock 1907a, Kirby 1910, Bruner 1915.

Type material examined. 1♀ SYNTYPE Ins. Philipp. Leg. Semper (NHRS). Photographs of the syntype are available online in OSF. París (1994) reported one more syntype (male) to be deposited in Vienna (with data Philipinen, Thorey), but this male was not examined in the study.

Type locality: The Philippines (without exact locality).

Notes. The species resembles *Scelimena* species, however it has weaker FL2 (present as denticles) and other pronotal projections are reduced. Prozona is wide and pronotum is robust. Hind tibiae and proximal segment of the hind tarsi are slightly widened. Günther (1938) reported numerous specimens of the species from the Philippines with exact locality data: Luzon (Limay, Isarog Mt., Pagsanjan), Masbate (Aroroy). Furthermore, Günther (1938) reported that specimens from Pagsanjan and Aroroy are much smaller in size than other specimens examined.

Tagaloscelimena cebuensis Günther, 1938

鬣蜥科

Type material examined. 1♀ HOLOTYPE and 1♂ PARATYPE Cebu (MTD). Photographs of the type specimens are available online at DORSA website (http://systax.org/de/details/tax/160401).

Type locality: The Philippines: Central Visayas: Cebu.

Notes. This species has vertex narrower than in *T. aurivillii*, it is smaller in size and has smoother pronotum, femora are more robust and have stronger tubercles, ventrolateral projections are shorter and not directed forwards, but outwards. Furthermore, this is much more colorful species than *T. aurivillii*, it has dark pronotum marked with yellow tint. On the type labels, Günther (1938) firstly wanted to describe it as a subspecies of *T. aurivillii*, but then decided to describe it as a separate valid species.

Genus Tefrinda Bolivar, 1906

鬣蜥科

*Chthonius*: Bolivar 1887, 1906, Hancock 1907a, Kirby 1910.


*Chthonotettix*: Hancock 1907a, Kirby 1910, Rehn 1939.

Type species: *Tettix palpatus* Stål, 1877 (= Tefrinda palpata).

Composition and distribution. Monotypic genus, whose only species (*T. palpata*) inhabits the Philippines (Luzon, Siargao).

Notes. The genus and its sole species are unique among Scelimenini in (I) very narrow vertex (narrower than a compound eye), (II) lack of evident pronotal projections, (III) palpi with folliaceous articles (similar to that of Ophiotettigini), (IV) lateral ocelli between the eyes, (V) conical ventrolateral projections and (VI) obtuse pulvilli of the hind tarsi. Relationship to other Scelimenini genera is not clear. Superficially, *Tefrinda* resembles *Tagaloscelimena*, but according to the mentioned morphological characters it could be member of the tribe Criotettigini.

*Tefrinda palpata* (Stål, 1877)

鬣蜥科

*Tettix palpatus*: Stål 1877, Casto de Elera 1895.

*Chthonius palpatus*: Bolivar 1887, Hancock 1907a.

*Chthonotettix palpatus*: Hancock 1907b.

Tefrinda palpatus: Bruner 1915.

**Type material examined.** 1♀ HOLOTYPE and 1♂ PARATYPE [labeled as ALLOTYPE] Ins. Phillipp. Leg. Semper (NHRS). Photographs of the type specimens are available online in OSF.

**Type locality:** The Philippines (without specified locality).

**Notes.** Morphology of the species is discussed under the genus Tefrinda and in the tabular key. Günther (1938) reported specimens from the Philippines with exact locality data—Luzon (Limay, Los Baños, Pagsanjan), Siargao.

Genus Tegotettix Hancock, 1913


**Type species:** Tegotettix armatus Hancock, 1913.


**Notes.** The genus is composed of at least a few species groups that are different in morphology and can be easily distinguished (Günther, 1955). The first group, resembling *Gavialidium*, is composed of species with strong pronotal projections (*T. armatus, T. bufocrocodil, T. celebensis, T. siebersi* and *T. tuberculatus*), the other groups is composed of the species from the Philippines without pronotal projections (*T. corniculatus* and *T. sagittarius*), the third group of one Bornean species (*T. cristiferus*), and one of a single New Guinean species (*T. novaeguineae*). Type species of the genus is Bornean *Tegotettix armatus* Hancock, 1913, the species having the highest projections of all the congeners. Species that are morphologically similar to the type species are *T. celebensis* Günther, 1937 from Sulawesi, and *T. bufocrocodil* (Storozhenko & Dawwrueng, 2015) *comb. nov.* (new combination of *Gavialidium bufocrocodil*, see Figure 22–25 in Storozhenko & Dawwrueng, 2015), having high fastigial horns, wide shoulders with tuberculated metateral plate, ventrolateral projection without an apical spine, visible frontomedial projection (small), larger promedial, large metamedial and mediolateral projections, triangular infrascapular area, not widened hind tibiae, and strongly dentate fore and mid femora and fore and mid tibiae. Members of this genus do not have ventrolateral projection produced in spine, but with truncated margin. The genus is in need of revision.

*Tegotettix armatus* Hancock, 1913


**Type material** not examined, but the original description and Günther's (1937) drawings were. According to OSF, holotype male is deposited in Philadelphia.

**Type locality:** Malaysia: Borneo: Sarawak: Kuching.

**Notes.** This is the type species of the genus. Hitherto, Günther's (1937) drawing was the only reference point for identification of the species. Recently, a female specimen was discovered in Tumbrinck's collection (with data Borneo: Sabah: Poring 18.III.1996. Leg. (by fogging) A. Floren). Photographs of the specimen are uploaded to OSF and are now publicly available. The species has high fastigial horns, toothed margin of the vertex, low position of lateral ocelli, bifurcation and antennal grooves, long antennae, elevated FM+PM (fused projection), massive MM1, MM2, MM3, MM4, MM5 and MM6 (decreasing in size towards the apex), ML projection is present as strong triangular tubercle, MMLs are lower than MMs, widened and undulated fore and mid tibiae, armed with tubercles, fore and mid femora with strong and sharp teeth on both dorsal and ventral margins, hind femora reduced in size (probably the species is not good jumper) and armed with strong lappets on dorsal and ventral margin. Hind tibiae and tarsi are not lamellate. The species is related to *T. bufocrocodil* from Thailand.
**Tegotettix bufocrocodil** (Storozhenko & Dawwrueng, 2015), comb. nov.


**Type material** not examined, but the original description and figures of type specimens in Storozhenko & Dawwrueng (2015) were. The type series (deposited in ZIN) is composed of holotype female (with data Thailand: Nakhon Ratchasima Province, environs of Khao Yao National Park, 500–1000 m, 26.X.–4.XI.2000. Leg. A. Gorochov and L. Anisyutkin), two female paratypes with the same data as holotype, one female paratype (with data Thailand: Trat Province, environs of Bo Rai District, 100–200 m 20.XII.2014. Leg. P. Pawangkhanant), and one male paratype from Cambodia (with data vicinity of Sen Monorom village, 12.II.2002. Leg. M. Berezin).

**Type locality:** Thailand: Nakhon Ratchasima Province, environs of Khao Yao National Park, 500–1000 m.

**Notes.** The species is here transferred to the genus _Tegotettix_ based on its similarity with the type species of the genus. The species is very close in morphology to _T. armatus_, the main difference being much lower metamedial projections of the pronotum.

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**Tegotettix celebensis** Günther, 1937

_Tegotettix corniculatus celebensis:_ Günther 1937.

**Type material examined.** 1♀ SYNTYPE Celebes: Latimodjong-Geb. Oeroe 800 m VIII.1930. Leg. Heinrich (MN). Photographs of the female syntype are available online in OSF. Günther (1937) reported one more syntype specimen from Südcelebes: Samanga (XI.1895. Leg. Fruhstorfer) deposited in MTD. OSF lists three syntypes, which is incorrect—the specimen in OSF listed to be deposited in National Museum Szczecin is probably the same specimen as the one reported to be in MTD.

**Type locality:** Indonesia: Sulawesi: South Sulawesi Province: Latimojong Mt.: Oeroe.

**Notes.** The species is morphologically similar to _T. siebersi_ from Borneo. It was originally described as a subspecies of _T. corniculatus_, but probably Günther (1937) was not familiar with morphology of _T. corniculatus_ type specimens. This species is more related to _T. armatus_, _T. bufocrocodil_ and _T. tuberculatus_ than to _T. corniculatus_, which is probably not member of this genus. It has much lower pronotal projections than _T. armatus_ and _T. bufocrocodil_.

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**Tegotettix corniculatus** (Stål, 1877)

_Tettix corniculatus:_ Stål 1877, Casto de Elera 1895.
_Xistra corniculata:_ Bolívar 1887, Kirby 1910, Bruner 1915.

**Type material examined.** 1♂ HOLOTYPE Ins. Phillipp. Leg. Semper (NHRS). Photographs of the holotype are available online in OSF.

**Type locality:** The Philippines (without precise locality).

**Notes.** This species probably does not belong to the genus _Tegotettix_. It is morphologically very different from other species of the genus. It remains a question if it belongs to Scelimenini. Further studies should assess its taxonomic position and whether it is more similar to _Xistra_ or to Scelimenini genera, including _Tegotettix_. Günther (1938) also reported that _T. corniculatus_ and _T. sagittarius_ are much more similar to _Xistra_ species. We leave the species in _Tegotettix_ for now, until the revision of this genus and _Xistra_ are published.

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**Tegotettix cristiferus** (Günther, 1935)

_Xistra cristifera:_ Günther 1935.
Type material examined. 1♀ SYNTYPE Midden O-Borneo 18.XI.1925. Leg. H. C. Siebers (MTD). Photographs of the female syntype are available online in OSF. According to Günther (1935) one more syntype (from Java) is deposited in National Museum Szczecin, and was not examined in this study.

Type locality: Middle East Borneo.

Notes. The species resembles Xistra species more than Tegotettix members. Of Tegotettix members, it is somewhat close to Bornean T. siebersi. It could be in future moved back to the genus Xistra. It is also similar in morphology to T. sagittarius and T. corniculatus, differing from them in higher fastigial horns, and compresso-elevated median carina (as discus) between the shoulders. The species has very depressed vertex, it lacks pronotal projections homologous to those in Tegotettix species (more specifically to T. armatus, T. bufocrocodil and T. celebensis). Detailed revision of more specimens is needed to assess true taxonomic position of this species.

Tegotettix novaeguineae Günther, 1938


Notes. The species is closer to T. armatus, T. bufocrocodil, T. celebensis, and T. tuberculatus in morphology than to T. corniculatus and T. sagittarius. It also shares morphological features with Bornean T. cristiferus and T. siebersi. However, pronotal projections and leg morphology are rather different and currently we cannot assess true taxonomic position of this species. Fastigial horns in this species are much lower than in any other species of the genus, elevated FM+PM are absent, and humeral angles are much weaker than in other species of the genus. Günther (1938) compared the species to T. sagittarius and T. corniculatus.

Tegotettix sagittarius (Bolivar, 1887)

Xistra sagittaria: Bolivar 1887, Bruner 1915.

Type material examined. 1♂ HOLOTYPE Ins. Phillipp. Leg. Semper (NHRS). Photographs of the holotype are available online in OSF. Paris (1994) reported there are six specimens in the type series in NHRS. A female specimen of probably Paratettix sagittatus is uploaded under T. sagittarius in OSF (with allotype label). This allotype specimen is not conspecific with the holotype male.

Type locality: The Philippines (without precise locality).

Notes. T. sagittarius is very similar to T. corniculatus, the main difference being lower pronotum and lower fastigial horns in the former. This species probably does not belong to the genus Tegotettix. It is morphologically very different from other species of the genus. It remains a question if it belongs to Scelimenini. Further studies should assess its taxonomic position and whether it is more similar to Xistra or to Scelimenini genera, including Tegotettix. Günther (1938) also reported that T. corniculatus and T. sagittarius are much more similar to Xistra species. We leave the species in Tegotettix for now, until the revision of this genus and Xistra are published.

Tegotettix siebersi Günther, 1938

Type material examined. 1♀ SYNTYPE Midden O-Borneo 15.IX.1925. Leg. H. C. Siebers, 1♂ SYNTYPE Midden O-Borneo 7.VIII.1925. Leg. H. C. Siebers (MTD). Photos of the syntypes are available in OSF.
**Type locality:** Middle East Borneo.

**Notes.** The species is morphologically similar to *T. celebensis*, but also somewhat to *T. cristiferus*. Fastigial horns are high, elevated FM+PM are absent (by this character it can be easily distinguished from *T. armatus*), there are not elevated MMs (MM2 to MM6) on the median carina, and humeral angles are much weaker than in *T. armatus*. Günther (1938) compared the species to *T. sagittarius* and *T. corniculatus*, which are very different morphologically and resemble *Xistra* species (and are probably members of that genus). In dorsal view, species is similar to *T. celebensis*. Since taxonomy of the genus is still complicated, not a lot can be said on the position of this and related species.

*Tegotettix tuberculatus* (Bolivar, 1887)

*Eugavialidium tuberculatum*: Hancock 1907a, Kirby 1910.

**Type material examined.** 1♀ LECTOTYPE Minahassa Leg. Stauding (MNCN). Photos of the lectotype female will be soon available online in OSF.

**Type locality:** Indonesia: Sulawesi: Minahassa Peninsula.

**Notes.** The species is similar to *T. celebensis*, but the pronotum is more smooth (less granulated and warty), vertex is slightly narrower, and MM1 is lower. Other morphological characters are very similar and future studies should determine if those species are synonymous.

Identification key to the 15 Scelimenini genera

Owing to the complexity of the taxonomy of Scelimenini, we provide a provisional tabular key to assist with identification (Table 3). More materials need to be examined, and a more in-depth analysis of the morphology is needed before we can present a useful and accurate dichotomous key.

*Eucriotettix neesoon* Tan & Storozhenko, nom. nov.


**Notes.** Although this species does not belong to Scelimenini, we use this opportunity to correct the primary homonymy of *Eucriotettix oculatus guentheri* Ichikawa 1994. A new name was introduced for former species.

**Etymology.** This species is named after its type locality (Nee Soon swamp forest, Singapore); the specific epithet is noun in apposition.
TABLE 3. Tabular key to 15 Scelimenini genera (numbered 1 to 15, sorted alphabetically by row) and 16 morphological characters used in taxonomy of this group (sorted morphologically – first head, then pronotum characters, and then leg characters). The key is suitable for future cladistic analysis and is more accurate than any provisional identification key that could be provided.

<table>
<thead>
<tr>
<th></th>
<th>1 Antennal grooves</th>
<th>2 Antennae</th>
<th>3 Lateral ocelli</th>
<th>4 Frontal costa bifurcation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Amphibotettix</td>
<td>In the lower third of the compound eyes height</td>
<td>Filiform</td>
<td>Between the compound eyes</td>
</tr>
<tr>
<td>2</td>
<td>Bidentatettix</td>
<td>Below the lower margins of the compound eyes</td>
<td>Filiform</td>
<td>Slightly below the level with the lower margins of the compound eyes</td>
</tr>
<tr>
<td>3</td>
<td>Discotettix</td>
<td>Below the lower margins of the compound eyes</td>
<td>With widened segments</td>
<td>In the level with the lower margins of the compound eyes</td>
</tr>
<tr>
<td>4</td>
<td>Eufaliconius</td>
<td>Below the lower margins of the compound eyes</td>
<td>Filiform</td>
<td>In the level with the lower margins of the compound eyes</td>
</tr>
<tr>
<td>5</td>
<td>Euscelimena</td>
<td>Below the lower margins of the compound eyes</td>
<td>Filiform</td>
<td>In the lower third of the compound eyes height</td>
</tr>
<tr>
<td>6</td>
<td>Falconius</td>
<td>In the lower third of the compound eyes height</td>
<td>Filiform</td>
<td>Between the compound eyes</td>
</tr>
<tr>
<td>7</td>
<td>Gavialidium</td>
<td>Below the lower margins of the compound eyes</td>
<td>Filiform</td>
<td>In the level with the lower margins of the compound eyes</td>
</tr>
<tr>
<td>8</td>
<td>Indoscelimena</td>
<td>In the level with the lower margins of the compound eyes</td>
<td>Filiform</td>
<td>Between the compound eyes</td>
</tr>
<tr>
<td>9</td>
<td>Paragavialidium</td>
<td>Below the lower margins of the compound eyes</td>
<td>Filiform</td>
<td>In the level or slightly below the level of the compound eyes' height</td>
</tr>
<tr>
<td>10</td>
<td>Paramphibotettix</td>
<td>Below the lower margins of the compound eyes</td>
<td>Filiform</td>
<td>In the lower third of the compound eyes height</td>
</tr>
<tr>
<td>11</td>
<td>Platgyavialidium</td>
<td>Below the lower margins of the compound eyes</td>
<td>Filiform</td>
<td>In the level or slightly below the level of the lower margin of the compound eyes' height</td>
</tr>
<tr>
<td>12</td>
<td>Scelimena</td>
<td>Below the lower margins of the compound eyes</td>
<td>Filiform</td>
<td>In the level with the lower margins of the compound eyes</td>
</tr>
<tr>
<td>13</td>
<td>Tagaloscelimena</td>
<td>In the level with the lower margins of the compound eyes</td>
<td>Filiform</td>
<td>In the lower third of the compound eyes height</td>
</tr>
<tr>
<td>14</td>
<td>Tefrinda</td>
<td>In the lower third of the compound eyes height</td>
<td>Filiform</td>
<td>Between the compound eyes</td>
</tr>
<tr>
<td>15</td>
<td>Tegotettix</td>
<td>Below the lower margins of the compound eyes</td>
<td>Filiform</td>
<td>In the level or slightly below the level of the lower margin of the compound eyes' height</td>
</tr>
</tbody>
</table>
TABLE 3 (continued). Tabular key to 15 Scelimenini genera.

<table>
<thead>
<tr>
<th></th>
<th>5 Vertex width</th>
<th>6 Trasverse and lateral carinae of the vertex in frontal and dorsal view</th>
<th>7 Maxilar palpi</th>
<th>8 Dorsum of pronotum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Amphibotettix</td>
<td>Narrow, in frontal view much lower than eyes.</td>
<td>Not widened towards the apex, pale colored</td>
<td>Smooth, without visible projections.</td>
</tr>
<tr>
<td>2</td>
<td>Bidentatettix</td>
<td>Very wide, few times wider than a compound eye.</td>
<td>Not widened towards the apex, dark</td>
<td>Warty, with numerous tubercles and strong projections.</td>
</tr>
<tr>
<td>3</td>
<td>Discotettix</td>
<td>Wider than a compound eye, in a level with the dorsal margin of a compound eye.</td>
<td>Not widened towards the apex, dark</td>
<td>With net like elevations, almost flat, and with strong and visible projections, in some species produced as spines.</td>
</tr>
<tr>
<td>4</td>
<td>Eufalconius</td>
<td>Very wide, in the level with the dorsal margin of the compound eyes.</td>
<td>Not widened towards the apex, dark</td>
<td>With net like elevations, wrinkle, with strong and visible projections.</td>
</tr>
<tr>
<td>5</td>
<td>Euscelimena</td>
<td>Narrow, in frontal view much lower than eyes.</td>
<td>Slightly widened towards the apex, yellow</td>
<td>Finely granulated, flat, with weak projections (visible under stereomicroscope).</td>
</tr>
<tr>
<td>6</td>
<td>Falconius</td>
<td>Wider than a compound eye, in a level with the dorsal margin of a compound eye.</td>
<td>Not widened towards the apex, brown or pale colored</td>
<td>Finely granulated (in some species somewhat tuberculated), with elevated parts or flat, or wrinkled, projections not homologous to those in other genera with projections.</td>
</tr>
<tr>
<td>7</td>
<td>Gavialidium</td>
<td>Wider than a compound eye, in a level with the dorsal margin of a compound eye.</td>
<td>Not widened towards the apex, dark</td>
<td>Warty, and with net-like elevations, with numerous tubercles and strong projections.</td>
</tr>
<tr>
<td>8</td>
<td>Indoscelimena</td>
<td>Wider than a compound eye, in a level with the dorsal margin of a compound eye.</td>
<td>Not widened towards the apex, dark</td>
<td>Flat, projections smooth and visible as small elevations (under stereomicroscope).</td>
</tr>
<tr>
<td>9</td>
<td>Paragavialidium</td>
<td>Wider than a compound eye, in a level with the dorsal margin of a compound eye.</td>
<td>Not widened towards the apex, dark</td>
<td>With net like elevations, almost flat, and with strong and visible projections, in some species produced as spines.</td>
</tr>
</tbody>
</table>

... continued on the next page
TABLE 3. (Continued)

<table>
<thead>
<tr>
<th></th>
<th>Vertex width</th>
<th>Trasverse and lateral carinae of the vertex in frontal and dorsal view</th>
<th>Maxilar palpi</th>
<th>Dorsum of pronotum</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>About s wide as a compound eye, in the level with the upper marginings of the compound eyes.</td>
<td>Weakly elevated in frontal view, in dorsal view acutely angled.</td>
<td>Not widened towards the apex, yellow</td>
<td>Finely granulated, almost flat, projections recognizable (under stereomicroscope).</td>
</tr>
<tr>
<td>10</td>
<td>Paramphibotettix</td>
<td>Wider than a compound eye, in a level with the dorsal margin of a compound eyes.</td>
<td>In frontal view weakly (but visibly) elevated, in dorsal view acutely angled.</td>
<td>Not widened towards the apex, dark</td>
</tr>
<tr>
<td>11</td>
<td>Platygavialidium</td>
<td>Wider than a compound eye, in a level with the dorsal margin of a compound eyes.</td>
<td>Not widened towards the apex, dark</td>
<td>Finely granulated, usually flat (in some species border between prozona and metazona elevated), without projections, or with visible projections, or with very strong projections.</td>
</tr>
<tr>
<td>12</td>
<td>Scelimena</td>
<td>About s wide as a compound eye, below the level with the upper marginings of the compound eyes.</td>
<td>Not widened towards the apex, pale colored</td>
<td>Finely granulated, slightly undulated or flat. Projections recognizable under stereomicroscope.</td>
</tr>
<tr>
<td>13</td>
<td>Tagaloscelimena</td>
<td>Wider than a compound eye, in a level with the dorsal margin of a compound eyes.</td>
<td>Elevated as high horns in frontal view, acutely angled in dorsal view.</td>
<td>Not widened towards the apex, dark</td>
</tr>
<tr>
<td>14</td>
<td>Tefrinda</td>
<td>Narrow, slightly below the level of the compound eyes.</td>
<td>Widened, yellow and folliaceous towards the apex</td>
<td>Finely granulated, flat, without recognizable projections.</td>
</tr>
<tr>
<td>15</td>
<td>Tegotettix</td>
<td>Wider than a compound eye, in a level with the dorsal margin of a compound eyes.</td>
<td>Not widened towards the apex, dark</td>
<td>Finely granulated, almost flat, projections recognizable (under stereomicroscope).</td>
</tr>
</tbody>
</table>
### TABLE 3 (continued). Tabular key to 15 Scelimenini genera.

<table>
<thead>
<tr>
<th></th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Metalateral projection</td>
<td>Frontomedial projection</td>
<td>Ventrolateral projection</td>
<td>Distal segment of the hind tarsi</td>
</tr>
<tr>
<td>1</td>
<td><em>Amphibotettix</em></td>
<td>Absent</td>
<td>Long and digitate, produced upwards and slightly forwards above the head</td>
<td>Projected as simple long spine</td>
</tr>
<tr>
<td>2</td>
<td><em>Bidentatettix</em></td>
<td>Triangular plate with warts and teeth at the tip</td>
<td>Absent</td>
<td>Projected outwards, saw-like</td>
</tr>
<tr>
<td>3</td>
<td><em>Discotettix</em></td>
<td>With tubercles or spines</td>
<td>In most of the species long and digitate, in some smaller</td>
<td>Projected outwards, saw-like</td>
</tr>
<tr>
<td>4</td>
<td><em>Eufalconius</em></td>
<td>Strong triangular plate wider than VL</td>
<td>Small</td>
<td>Without spines, truncated</td>
</tr>
<tr>
<td>5</td>
<td><em>Euscelimena</em></td>
<td>Absent (or present as small tubercle)</td>
<td>Absent</td>
<td>Projected as simple long spine</td>
</tr>
<tr>
<td>6</td>
<td><em>Falconius</em></td>
<td>Absent</td>
<td>Absent</td>
<td>In some species not projected, in others projected as simple long spine</td>
</tr>
<tr>
<td>7</td>
<td><em>Gavialidium</em></td>
<td>Triangular plate with wart at the tip</td>
<td>Absent</td>
<td>Projected outwards, saw-like</td>
</tr>
<tr>
<td>8</td>
<td><em>Indoscelimena</em></td>
<td>Absent or present as small and oblique wart</td>
<td>Absent or present as minute wart</td>
<td>Projected as simple long spine</td>
</tr>
<tr>
<td>9</td>
<td><em>Paragavialidium</em></td>
<td>Strong triangular plate</td>
<td>Present as high projection directed upwards, not covering head</td>
<td>Projected as spine with a few lobes</td>
</tr>
<tr>
<td>10</td>
<td><em>Paramphibotettix</em></td>
<td>Absent (or present as small tubercle)</td>
<td>Present as short projection directed upwards</td>
<td>Projected as simple long spine</td>
</tr>
<tr>
<td>11</td>
<td><em>Platygavialidium</em></td>
<td>Strong triangular plate</td>
<td>Absent</td>
<td>Projected as spine with one large and one weak lobe</td>
</tr>
<tr>
<td>12</td>
<td><em>Scelimena</em></td>
<td>Absent or present as simple tooth, wart, or long spine</td>
<td>Absent</td>
<td>Projected as simple long spine</td>
</tr>
<tr>
<td>13</td>
<td><em>Tagaloscelimena</em></td>
<td>Absent</td>
<td>Absent</td>
<td>Projected as simple long spine</td>
</tr>
<tr>
<td>14</td>
<td><em>Tefrinda</em></td>
<td>Absent</td>
<td>Absent</td>
<td>Projected as simple long spine</td>
</tr>
<tr>
<td>15</td>
<td><em>Tegotettix</em></td>
<td>Triangular plate with wart at the tip</td>
<td>Small, fused with PM into larger elevated projection, not projected above the head</td>
<td>Without spines, truncated</td>
</tr>
<tr>
<td>14</td>
<td>Fore and mid femora</td>
<td>Ventral margin of the hind femur</td>
<td>Hind tibia and the first tarsal segment</td>
<td>Pulvilli of the hind tarsi</td>
</tr>
<tr>
<td>-----</td>
<td>---------------------</td>
<td>----------------------------------</td>
<td>----------------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Amphibotettix</td>
<td>Very elongated, smooth and without teeth.</td>
<td>Robust, equipped with strong teeth.</td>
<td>Robust, equipped with strong teeth.</td>
</tr>
<tr>
<td>2</td>
<td>Bidentatettix</td>
<td>Smooth</td>
<td>Strongly widened, lamellate</td>
<td>With small toothed lappets</td>
</tr>
<tr>
<td>3</td>
<td>Discotettix</td>
<td>Robust or elongated, bearing smaller (if long) or stronger teeth</td>
<td>Robust, equipped with strong teeth</td>
<td>With small toothed lappets</td>
</tr>
<tr>
<td>4</td>
<td>Eufalconius</td>
<td>Robust, equipped with strong teeth</td>
<td>Ubiquitous, not bearing teeth.</td>
<td>With strong and sharp lappets</td>
</tr>
<tr>
<td>5</td>
<td>Euscelimena</td>
<td>Robust, equipped with strong teeth</td>
<td>Smooth</td>
<td>Smooth</td>
</tr>
<tr>
<td>6</td>
<td>Falconius</td>
<td>Elongated, finely granulated, without teeth</td>
<td>Smooth</td>
<td>Smooth</td>
</tr>
<tr>
<td>7</td>
<td>Gavialidium</td>
<td>Robust, equipped with strong teeth</td>
<td>With strong and sharp lappets</td>
<td>With small lappets</td>
</tr>
<tr>
<td>8</td>
<td>Indoscelimena</td>
<td>Robust, equipped with strong teeth</td>
<td>Bearing strong teeth</td>
<td>Bearing strong teeth</td>
</tr>
<tr>
<td>9</td>
<td>Paragavialidium</td>
<td>Robust, equipped with strong teeth</td>
<td>With small lappets</td>
<td>With small lappets</td>
</tr>
<tr>
<td>10</td>
<td>Paramphibotettix</td>
<td>Robust, equipped with strong teeth</td>
<td>With small lappets</td>
<td>With small lappets</td>
</tr>
<tr>
<td>11</td>
<td>Platygavialidium</td>
<td>Robust or elongated, bearing smaller (if long) or stronger teeth</td>
<td>Robust, equipped with strong teeth</td>
<td>With small lappets</td>
</tr>
<tr>
<td>12</td>
<td>Scelimena</td>
<td>Elongated, with unilamellate, one angular, without apical tooth</td>
<td>Elongated, with unilamellate, one angular, without apical tooth</td>
<td>Elongated, with unilamellate, one angular, without apical tooth</td>
</tr>
<tr>
<td>13</td>
<td>Tagaloscelimena</td>
<td>Robust, equipped with strong teeth</td>
<td>With small lappets</td>
<td>With strong and sharp lappets</td>
</tr>
<tr>
<td>14</td>
<td>Tegritettix</td>
<td>Robust, equipped with strong teeth</td>
<td>Smooth</td>
<td>Smooth</td>
</tr>
<tr>
<td>15</td>
<td>Tagotettix</td>
<td>Robust, equipped with strong teeth</td>
<td>Smooth</td>
<td>Smooth</td>
</tr>
</tbody>
</table>

**TABLE 3 (continued)** Tabular key to 15 Scelimenini genera.

- **Amphibotettix**: Very elongated, smooth and without teeth. Hind tibia and the first tarsal segment are robust, equipped with strong teeth. Pulvilli of the hind tarsi are robust, equipped with strong teeth.
- **Bidentatettix**: Smooth. Hind tibia and the first tarsal segment are strongly widened, lamellate. Pulvilli of the hind tarsi are not widened.
- **Discotettix**: Robust or elongated, bearing smaller (if long) or stronger teeth. Hind tibia and the first tarsal segment are robust, equipped with strong teeth. Pulvilli of the hind tarsi are not widened.
- **Eufalconius**: Robust, equipped with strong teeth. Hind tibia and the first tarsal segment are not widened. Pulvilli of the hind tarsi are not widened.
- **Euscelimena**: Robust, equipped with strong teeth. Hind tibia and the first tarsal segment are smooth. Pulvilli of the hind tarsi are not widened.
- **Falconius**: Elongated, finely granulated, without teeth. Hind tibia and the first tarsal segment are smooth. Pulvilli of the hind tarsi are not widened.
- **Gavialidium**: Robust, equipped with strong teeth. Hind tibia and the first tarsal segment are smooth. Pulvilli of the hind tarsi are not widened.
- **Indoscelimena**: Elongated, with unilamellate, one angular, without apical tooth. Hind tibia and the first tarsal segment are smooth. Pulvilli of the hind tarsi are not widened.
- **Paragavialidium**: Robust, equipped with strong teeth. Hind tibia and the first tarsal segment are smooth. Pulvilli of the hind tarsi are not widened.
- **Paramphibotettix**: Robust, equipped with strong teeth. Hind tibia and the first tarsal segment are smooth. Pulvilli of the hind tarsi are not widened.
- **Platygavialidium**: Robust or elongated, bearing smaller (if long) or stronger teeth. Hind tibia and the first tarsal segment are smooth. Pulvilli of the hind tarsi are not widened.
- **Scelimena**: Elongated, with unilamellate, one angular, without apical tooth. Hind tibia and the first tarsal segment are smooth. Pulvilli of the hind tarsi are not widened.
- **Tagaloscelimena**: Robust, equipped with strong teeth. Hind tibia and the first tarsal segment are smooth. Pulvilli of the hind tarsi are not widened.
- **Tegritettix**: Robust, equipped with strong teeth. Hind tibia and the first tarsal segment are smooth. Pulvilli of the hind tarsi are not widened.
- **Tagotettix**: Robust, equipped with strong teeth. Hind tibia and the first tarsal segment are smooth. Pulvilli of the hind tarsi are not widened.
Acknowledgements and authors' contributions

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AAM (under the supervision of NAA and MSA) found the new species S. gombakensis, JS found the new species S. marta. AAM, JS, and MKT contributed to the species descriptions. JS and DB contributed to the discussion on the overview of Scelimenini. AAM, MKT, and JS are authors of equal contribution to the study.

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