SYSTEMATICS AND PHYLOGENY

On some interesting African katydids (Orthoptera Tettigoniidae)

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Abstract

Results of the study of specimens collected in Africa and preserved in different European collections and museums are reported and extensively illustrated. The tribe Preussiini Karsch, 1890 is resurrected for the genera *Preussia* Karsch, 1890, *Enochletica* Karsch, 1896 and *Weissenbornia* Karsch, 1888. The following three new species are described: *Eurycorypha ndokiensis* n. sp., *Eurycorypha feai* n. sp. and *Eurycorypha kenyensis* n. sp. *Rhacocleis dernensis* Salfi, 1926 is confirmed in its original genus, *Conocephalus algerinorum* Massa, 1999 is moved into the subgenus *Anisoptera*. In addition, new diagnostic characters or distributional data for *Horatosphaga crosskeyi* Ragge, 1960, *Horatosphaga somali* (Schulthess-Schindler, 1898), *Ducetia crosskeyi* Ragge, 1961, *Ducetia fuscopunctata* Chopard, 1954, *Tropidonotacris amabilis* Ragge, 1957, *Tropidonotacris carinata* Chopard, 1954, *Pardalota asymmetrica* Karsch, 1896, *Eurycorypha stylata* Stål, 1873, *Eurycorypha velicauda* Karsch, 1893, *Eurycorypha kevani* Chopard, 1954 and *Oxygonatium huxleyi* Ragge, 1980 are reported.

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Introduction

The results of studies carried out on specimens of Tettigoniinae, Concephalinae and Phaneropterinae collected in Africa and preserved in various museums and collections are presented. This is the fifth contribution on the same subject (Massa, 2013, 2014, 2015a, 2015b).

Materials and Methods

Some African specimens were kindly obtained from Philippe Moretto; further specimens were examined in the museums cited below or loaned from them.

Abbreviations used in this paper:
BMCP: Bruno Massa Collection, University of Palermo;
MfN: Museum für Naturkunde, Berlin;
MNCN: Museo Nacional de Ciencias Naturales, Madrid;
MSNG: Museo Civico di Storia Naturale 'G. Doria', Genoa;
MSNP: Museo Storia Naturale, University of Pavia;
MZUF: Museo Zoologico La Specola, Florence;
NHM: Natural History Museum, London.

Some specimens were photographed with a Nikon Coolpix 4500 digital camera, mounted on a Wild M5 Stereomicroscope or Leica MZ75, and photos were integrated using the freeware CombineZP (Hadley, 2008). Mounted specimens were measured with a digital calliper (precision 0.01 mm); the following measures were taken (all measurements in mm): body length: dorsal length from the head to the apex of the abdomen, ovipositor excluded in females; pronotum length: length of the pronotum

along dorsal median line; pronotum height: maximum height of the pronotum; hind femur: length of hind femur; tegmina: length of tegmina; ovipositor: maximum length from the base of sub-genital plate.

Results

Fam. Tettigoniidae Krauss, 1902

Subfam. Tettigoniinae Krauss, 1902

Rhacocleis dernensis Salfi, 1926 (Figure 1A,B)

Material examined. Libya, Cirene (1♀) (MSNG).

Remarks. According to Willemse & Willemse (2005), *Pterolepis* presents only one spine on the outer upper side of fore tibiae, while *Rhacocleis* bears three spines. They supposed that *R. dernensis* (not examined by them) could belong to the genus *Pterolepis* Rambur, 1838. The specimen examined here presents three spines (Figure 1B), like the holotype ♂ (NHM) (see photo in OSF); thus the species remains in the genus *Rhacocleis* Fieber, 1853. Salfi (1929) described the habitus of the female, whose sub-genital plate is short and with a raised central carina (Figure 1A).

Subfam. Conocephalinae Burmeister, 1838

Tribe Conocephalini Burmeister, 1838

Conocephalus (*Anisoptera*) *algerinorum* Massa, 1999 (Figure 1C,D)

Material examined. Algeria, surroundings of Algeri 26.VII.1976, B. Massa (♂ holotype) (BMCP).

Remarks. When Massa (1999) described this species, he did not assign it to a subgenus and not notice the presence of sternal spines. A further study of the holotype allowed to establish that it has indeed the sternal spines and therefore belongs to the subgenus *Anisoptera* Latreille, 1829. Characters of this brachypterous species (shape of 10th tergite, cerci) (Figure 1C-E) are very unique and African species related to it are currently unknown.

Subfam. Phaneropterinae Burmeister, 1838

Tribe Preussiini Karsch, 1890 n. tribe

Weissenbornia praestantissima Karsch, 1888 (Figures 2A-I, 3A-F and 4A-C).

Material examined. Cameroon, Lowry-Kribi-Mündung (♂ holotype); Cameroon, Mundame (1♀) (MfN); Cameroon (2♂) (MCNM); Cameroon, Folepi V.2015, P. Moretto (1♂) (BMCP). *Preussia lobatipes* Karsch, 1890. Cameroon, Barombi Station (♀ holotype) (MfN); Gold Coast (1♂) (MCNM); Ivory Coast, Man, Mt. Tonkoui (1200 m) 28.VI-1.VII.2014 (UV trap), P. Moretto (♂); same data 24-27.XI.2014, 18-20.VI.2015, 24-28.VI.205 (UV trap), P. Moretto (4♂) (BMCP). *Enochletica ostentatrix* Karsch, 1896. Cameroon, Lolodorf, L. Conradt (syntypes of *E. ostentatrix*) (MfN); Central African Republic, La Maboké, M'Baiki X.1965, M. Pavan (3♂) (MSNP); Cameroon, L. Conradt 1898-1899 (holotype of *E. affinis*) (MNCN); Central African Republic, Dzanga-Ndoki National Park, Ndoki, border of Lake 1, UV trap 13-14.II.2012 (10♂); Ndoki, Lake 1, UV trap 1, 20-23.II.2012 (11♂); 24-25.II.2012 (6♂); 28-29.II.2012 (1♂); 29.II-1.III.2012 (1♂); 1-2.III.2012 (2♂); Ndoki, Lake 1, camp 1, 15-16.II.2012 (3♂); Ndoki, Lake 1, UV trap 2, 10-12.II.2012 (2♂), P. Moretto; Central African Republic, 10 km E of Bambio (490 m) 10.XII.2008, J. Halada (1♂) (BMCP).

Diagnosis. Large size (body length: 22.0-26.0 mm), fastigium of vertex narrow, pointed and furrowed, as large as first antennal segment, face large and short, fastigium of frons with a small furrowed horn. Eyes oval, moderately prominent, scapus placed within an area with raised margins. Pronotum flat and smooth, nearly as long as high, with evident lateral margins and well-developed humeral excision, lateral lobes rounded on hind and lower margins. Legs short and stout; fore coxae armed, fore femora short and laterally flattened, fore femora inferiorly sulcate. Tympana conchate. Tegmina well developed, slightly shorter than hind wings. Medial field with crossed veinlets, 2 apically divided branches radiate from radial vein. 10th tergite unmodified, sub-genital plate concave, long and narrow, provided with styli. Cerci stout and in-curved. Females with ovipositor rapidly tapering and sharply bent upwards near base, valves slightly crenulated.

Type genus. *Preussia* Karsch, 1890

Remarks. According to Karsch (1888) the genus *Weissenbornia* is related to the East-Asian group Psyrae Brunner von Wattenwyl, 1878, and differs from East-Asian Holochlorae Brunner von Wattenwyl, 1878 by the long styli at the male sub-genital plate. Jacobson & Bianchi (1905) formally recognized Holochlorae as tribe Holochlorini. Bei-Bienko (1954) followed these authors, included also Psyrae in that tribe and highlighted that Holochlorae and Psyrae include a number of closely related genera, artificially divided by Brunner von Wattenwyl (1878) on the basis of the structure of the ovipositor. According to Bei-Bienko (1954) all genera of the tribe Holochlorini are characterized by conspicuous deep humeral notch on lateral lobes of pronotum, tegmina fully developed, fore coxae with long spine, fore and mid tibiae with longitudinal groove on upper side, fore tibiae markedly widened basally, inner tympanum concealed by swelling; other characters are variable.

It seems evident that characters of *Weissenbornia* do not lie within Holochlorini. The genus *Weissenbornia* indeed is characterized as follows: fastigium of vertex narrow, pointed and furrowed, as large as first antennal segment, face rough, large and short, fastigium of frons with a small furrowed horn. Eyes oval, moderately prominent, scapus placed within an area with raised margins. Labial palps with stout segments, the last flattened, spoon-like and unusually large (Figure 3A). Pronotum flat and smooth, nearly as long as high, with evident lateral margins and well-developed humeral excision, lateral lobes rounded on hind and lower margins. Legs short and stout; fore coxae armed, fore and mid tibiae and femora short and laterally flattened, fore femora inferiorly sulcate. Tympana conchate. Tegmina well developed, slightly shorter than hind wings. Stridulatory area short (Figure 4A). Medial field with only crossed veinlets, 2 apically divided branches radiate from radial vein. Tenth tergite unmodified, sub-genital plate concave, long and narrow, with 2 long styli. Cerci stout, in-curved and pointed (Figures 2A-C, 3A,B and 4A).

Karsch (1890) also described the genus *Preussia*, very similar to *Weissenbornia*, characterized by wider tegmina and hind femora with a wide bulge; fore femora are also compressed and inferiorly sulcate, with inner margin provided with spines, like *Weissenbornia* (Figures 2D-F, 3C-E and 4B). Further, Karsch (1896) describing the genus *Enochletica* (Figures 2F-I, 3E,F and 4C), wrote that it is much related to the genus *Weissenbornia* and differs from it by simpler palps and not foliaceous-inflated legs, basal lobe of pronotum much more protruding, fore and hind margins of tegmina nearly parallel, and hind wings blackish. Actually, these three genera (*Weissenbornia*, *Preussia* and *Enochletica*) have peculiar fore and mid femora: they have an inner ventral flattened margin, provided with big spines, underneath resting tibiae remain partially hidden (Figures 3A-F). This character is much evident in *Weissenbornia* (Figure 3B), less and less in *Preussia* (Figure 3D) and *Enochletica* (Figure 3F). *Weissenbornia* and *Enochletica* have also long styli (Figure 2C,I), *Preussia* styli of normal size (Figure 2F); the three genera have similar pronotum shape (both in dorsal and lateral view: Figures 2A,B,D,E,G,H). However, the genus *Enochletica* was never included in any tribe of Phaneropterinae, and *Preussia* was the sole representative of the group Preussiae Karsch, 1890. Only Griffini (1906) used the name Preussiae as subfamily.

For the above listed reasons it is here proposed to re-establish the tribe Preussiini Karsch, 1890, that includes the genera *Weissenbornia*, *Preussia* and *Enochletica*, each represented till now by one species: *Weissenbornia praestantissima* Karsch, 1888, *Preussia lobatipes* Karsch, 1890, *Enochletica ostentatrix* Karsch, 1896.

Tribe Acrometopini Brunner von Wattenwyl, 1878

Horatosphaga crosskeyi Ragge, 1960 (Figure 5A-D)

Material examined. Ivory Coast, Comoe, Kolomabira (228 m) 8.VI.2015, 12.VII.2015 (UV), P. Moretto (2♂, 1♀); Comoe, Zamou (245 m) 5-6.VI.2015 (UV), P. Moretto (2♂) (BMCP).

Remarks. *H. crosskeyi* has the 10th male abdominal tergite stout and very variable, the sub-genital plate very characteristic (Figure 5A-C), and the female lacks hind wings, as in many species of the genus (Ragge, 1960). The stridulatory file, previously undescribed, is curved, 1.4 mm long, and consists of ca. 100 teeth, of which the central ones are higher than the others (Figure 5D).

Distribution. This species was described from Nigeria (Ragge, 1960) and later recorded from Senegal (Ragge & Roy, 1961); its presence in the Ivory Coast was expected.

Horatosphaga somali (Schulthess-Schindler, 1898) (Figure 5E,G)

Material examined. Somalia, Afgoi III-IV.1978, A. Simonetta (2♂); Scebeli river, between Afgoi and Kurtumware IV-V.1977, A. Simonetta (1♂) (MZUF); Afgoi 9.I.1985, B. Baccetti (1♂); Balad 23.VI.1984 (1♀) (MSNG).

Remarks. The male of *H. somali* is easily identifiable by its flat sub-genital plate and flat and in-curved cerci (Figure 5G). The stridulatory file, previously undescribed, is curved, ca. 1.5 mm long, and consists of 50 teeth, of which the proximal part contains 35 small teeth increasing in size, and the distal part ca. 15 large and widely spaced teeth [Figure 5E,F to compare it with *H. leggei* (Kirby, 1909) from Democratic Republic of Congo, see Massa, 2015b].

Distribution. It is known from acacia semi-desert areas of Somalia and East Ethiopia (Ragge, 1960).

Tribe Ducetiini Brunner von Wattenwyl, 1878

The tribe Ducetiini is characterized as follows: pronotum with moderately deep or shallow humeral notches, fore coxae without spine, rarely with small spine, femora often spinose on lower side, fore tibiae gradually narrowed from the tympana, with dorsal spines, fore and mid tibiae with longitudinal upper groove and marginal spinules, both tympana oval, covered by membrane, male sub-genital plate deeply bifurcate into two long lobes or tubular, without apical styli (Liu & Kang, 2007). The type-genus is *Ducetia* Stål, 1874, the only genus of the tribe also covering tropical Africa, the others are Asiatic.

Ducetia crosskeyi Ragge, 1961 (Figure 6A-E)

Material examined. Ivory Coast, Comoe, Kolomabira (228 m) 11.XI.2014 (UV), P. Moretto (1♂); Comoe, Zamou (280 m) 10.XI.2015 (UV), P. Moretto (1♂) (BMCP).

Remarks. Sexual characters of *D. crosskeyi* allow to identify it easily (Figure 6A-D). Its stridulatory file, previously undescribed (Ragge, 1961, 1980), is straight, 1.7 mm long, and consists of ca. 100 very dense and evenly spaced teeth (Figure 6E).

Ducetia fuscopunctata Chopard, 1954 (Figure 6F)

Material examined. Ivory Coast, Man, Mt. Tonkoui (1200 m) 28.VI-1.VII.2014, 1-4.VII.2014, 13-15.VII.2014, 18-20.VI.2015 (UV trap), P. Moretto (7♂, 2♀) (BMCP).

Remarks. *D. fuscopunctata* was described from Guinea (Chopard, 1954) and later recorded also from Sierra Leone, Ghana and Togo (Ragge, 1961). Thus, its presence in Ivory Coast was expected. The stridulatory file, previously undescribed (Chopard, 1954; Ragge, 1961), is curved, 2.7 mm long, and consists of more than 100 very dense and evenly spaced teeth (Figure 6F).

Tribe uncertain

Chopard (in Chopard & Mc Kevan, 1954) tentatively placed the genus *Tropidonotacris* within Ducetiae (currently tribe Ducetiini), but its characters do not fit with those of Ducetiini (anterior tibiae abruptly narrowed from tympana, without dorsal spines, see Liu & Kang, 2007). Thus, this genus is not here reported within Ducetiini; however, the dorsal carina from head to abdomen, unique in this genus within African Phaneropterinae, should be interpreted as apomorphic.

Tropidonotacris amabilis Ragge, 1957 (Figure 7E)

Material examined. Somalia, Migiurtina, Bur Tinle (Haud) 5-8.VI.1953, G. Scortecci (5♂); Somalia, Gardo 10-12.VI.1953, G. Scortecci (4♂); Somalia, Mogocori 10.XII.1982, S.B.S. (Spedizione Biologica in Somalia) (1♂); Somalia, Mahas 8.XII.1982, S.B.S. (1♂) (MSNG).

Remarks. Described from South Ethiopia and North Kenya (Ragge, 1957), previously unrecorded from Somalia.

Tropidonotacris carinata Chopard, 1954 (Figure 7A-D)

Material examined. Somalia, El Ellan 24.XI-4.XII.1985, S.B.S. (2♂) (MZUF); Somalia, Misciani 26.XII.1984 (light), B. Baccetti (1♂); Ethiopia, Banno 10.VI.1939, Miss.[ione] E. Zavattari Sagan-Omo (1♂) (MSNG).

Remarks. Sexual characters of the male are: sub-genital plate large with sinuate margins, narrowing at apex, deeply divided, with lobes contiguous to apex, styli absent, cerci stout, shorter than sub-genital plate, feebly curved, a little flattened towards apex, which ends in a sharp point (Figure 7A-C; for comparison with *T. amabilis* and *T. grandis* see Figure 7E,F). The stridulatory file is dark, curved, 1.6 mm long, and carries 30-32 teeth (Figure 7D); it is similar to that described by Hemp *et al.* (2014) for *T. grandis* Ragge, 1957.

Distribution. According to Chopard & Mc Kevan (1954) and Ragge (1957) *T. carinata* covers Kenya and Somalia. Thus, two species of the genus *Tropidonotacris* live in Somalia, while the third species, *Tropidonotacris grandis* Ragge, 1957 is present only in Tanzania, where Hemp *et al.* (2014) highlighted its rarity.

Tribe Pardalotini Brunner von Wattenwyl, 1878

Pardalota asymmetrica Karsch, 1896

Material examined. Zambia, Kapabi, Kasanka Nat. Park 4.V.2014, F. Willems (1♀) (BMCP).

Distribution. *P. asymmetrica* was hitherto known from Uganda, Tanzania, Democratic Republic of Congo (Karsch, 1896; Heller *et al*., 2014; Massa, 2015a). The new record extends the known distribution of this species southwards.

Tribe Amblycoryphini Brunner von Wattenwyl, 1878

Genus *Eurycorypha* Stål, 1873

The genus currently contains 37 species, of which 16 have the 10th male tergite modified, 11 have it normal, while in 1 species (*E. brunneri* Brancsik, 1893 from Madagascar) it is unknown; in addition, in other 8 species only the female is known, and one species [*E. fallax* (Brunner von Wattenwyl, 1884) from Sudan] is only known from a nymph. In accordance with Hemp *et al*. (2013) the genus is in need of taxonomic revision, probably some taxa are synonyms, but there are many other species to be described, whose specimens are preserved in European museums. Three new species are described below, and some interesting new records are reported for another three species.

Eurycorypha stylata Stål, 1873

Material examined. Eritrea, Dorfu (1♂, 1♀) (MSNP).

Distribution. Described on a male from Sierra Leone, it is characterized by a long raised sulcate (above and below) processus of the 10th abdominal tergite, forked apically, and by stout, in-curved and pointed cerci. The female sub-genital plate is fairly triangular and medially sulcate. It is widespread in tropical Africa, and has been recorded from Gabon, Cameroon, Somalia, Guinea, Uganda, Ivory Coast and Burkina

Faso (Brunner von Wattenwyl, 1878; Karsch, 1889, 1892; Schulthess-Schindler, 1898; Griffini, 1906; Sjöstedt, 1933; Ragge, 1968; Massa, 2013). Previously it was unknown from Eritrea.

Eurycorypha ndokiensis new species (Figure 8A,C)

Material examined. Central African Republic, Dzanga-Ndoki National Park, Ndoki, Lac 1, 02°28'40.5N 016°13'02.6E, 8-10.II.2012 (UV trap), P. Moretto (♂ holotype); Central African Republic, Dzanga-Ndoki National Park, Ndoki, camp 1, 02°28'51.0N 016°13'04.5E, 14-15.II.2012 (UV trap), P. Moretto (♂ paratype) (BMCP).

Measurements. Body length: 15.7-17.1; length of pronotum: 3.7; height of pronotum: 3.5; length of hind femurs: 12.2-12.3; length of tegmina: 22.6-22.7.

Male description. Color. Green or yellow-green, legs yellowish.

Small species. Head typical of the genus, eyes oval, fastigium of vertex wide, ca. three times as wide as scapus. Fronto-genal carinae well-developed. Antennae long, scapus green, remaining part yellow. Pronotum flat, with just concave fore margin and rounded hind margin. Lateral carinae distinct, humeral excision well-developed, tegument smooth. Both pairs of wings well-developed. Tegmina about 3.3-3.5 times longer than broad, rounded at tips. Veins and veinlets not much contrasting to remaining parts of tegmina. Hind wings with brown archedictyon, longer than tegmina.

Fore coxae armed, fore tibiae with open tympana and 4 spines on inner ventral margin; fore and mid femurs without dorsal spines. Fore femurs with 3 spines on inner ventral margin. Hind tibiae with 3 apical spurs on each side, hind femurs with 8-10 spines on outer ventral margin.

Last abdominal tergite modified, with enlarged apex, ending into two well-developed down-curved processes. A triangular pointed process branches off at their base running towards base of cerci. Cerci long, up-curved and with fine pointed apex; in mid-length a long up-curved spine detaches, perpendicularly to cerci and laterally compressed (Figure 8A). Sub-genital plate just concave, tricarinate, long, without styli (Figure 8C).

Female. Unknown.

Etymology. *Eurycorypha ndokiensis* is named after the locality where it was collected, Dzanga-Ndoki National Park in the Central African Republic.

Diagnosis. It is a small species, the male is characterized by the largely modified 10th abdominal tergite.

Discussion. All species of the genus *Eurycorypha* Stål, 1873 with modified 10th tergite have different characters from *E. ndokiensis*. Concerning the species of *Eurycorypha* (9) described only on the female sex, they may be excluded for the following reasons. *E. adicra* Karsch, 1892 from Cameroon has 5 radial veins, long lateral lobes of pronotum, much longer than high, with lower border just sinuous above fore coxae, *E. brevicollis* Stål, 1876 from Namibia is of larger size, its pronotum is short, with fore margin clearly curved, *E. brevipennis* Karsch, 1889 from Madagascar has the pronotum wrinkled, wings rather short and clearly oval, *E. fallax* (Brunner von Wattenwyl, 1884) from Sudan was described only on a larva (similar to an ant), *E. flavescens* (Walker, 1869) has clearly oval tegmina, *E. montana* Sjöstedt, 1902 from Cameroon differs by pattern of tegmina veinlets, *E. mutica* Karsch, 1891 from Cameroon is of larger size (♀ 22 mm) and has a different pattern of tegmina veinlets, and *E. zebrata* Bruner, 1920 from Cameroon has rather oval tegmina with very characteristic vertical sinuous lines, and larger size (♀ 30 mm). We have few information on *E. klaptoczi* Karny, 1917 from Guinea, that according to Karny (1917) is related to *E. securifera* and *E. aequatorialis*.

Eurycorypha feai new species (Figure 8B,D)

Material examined. Democratic Republic of Congo, Njolé XI-XII.1902, L. Fea (♂ holotype) (MSNG); West Africa (♂ paratype) (MfN).

Measurements. Body length: 14.9-15.0; pronotum length: 3.6-3.7; pronotum height: 3.4-3.5; length of hind femora: 10.8-11.1; length of tegmina: 22.0-22.2.

Male description. Color. Yellowish.

Small species. Head typical of the genus, eyes oval, fastigium of vertex wide, ca. three times as wide as scapus. Fronto-genal carinae well-developed. Antennae long, yellow. Pronotum flat, just concave at fore margin and rounded at hind margin. Lateral carinae distinct, humeral excision well-developed, teguments smooth. Both pairs of wings well-developed. Tegmina about 3.3-3.5 times longer than broad, rounded at tips. Veins and veinlets not much contrasting with remaining parts of tegmina. Hind wings longer than tegmina.

Fore coxae armed, fore tibiae with open tympana and 5 spines on inner and outer ventral margins; mid tibiae with 8 inner and outer ventral spines; fore femora with 4 inner ventral spines, mid femora with 4 outer ventral spines, hind femora with 8 outer and 2 inner ventral spines.

Last abdominal tergite modified, with an enlarged apex, ending into two well-developed up- and down-curved processes. Cerci stout, long, up-curved and with pointed apex; before apex a long rounded spine detaches, perpendicular to cerci (Figure 8B). Sub-genital plate short, concave, laterally rounded, without styli, provided with a central raised keel (Figure 8D).

Female. Unknown.

Etymology. *Eurycorypha feai* is named after Leonardo Fea (1852-1903), Italian painter, zoologist and explorer, who worked at the Museo Civico di Storia Naturale of Genoa and collected in Africa and Asia thousands and thousands of interesting specimens, included the holotype of this species.

Diagnosis. It is a small species, the male is characterized by the specifically modified 10th abdominal tergite, with an enlarged apex, ending with two well-developed up- and down-curved processes; sub-genital plate is short, concave, laterally rounded, without styli.

Discussion. See *E. ndokiensis*. In addition, *E. feai* differs from *E. ndokiensis* by the lateral profile of 10th tergite, cerci more stout, their lateral spine differently placed and sub-genital plate shorter and rounded.

Eurycorypha velicauda Karsch, 1893

Material examined. Ivory Coast, Man, Mt. Tonkoui (1200 m) 24-28.VII.2015 (UV trap) (1♂), P. Moretto (BMCP).

Distribution. Karsch (1893) described the species from Togo; the present record from Ivory Coast extends the known distribution westwards.

Eurycorypha kevani Chopard, 1954 (Figure 8E,F)

Material examined. Somalia, El Uebhao 8.XII.1982, S.B.S. (1♂); El Da 6-7.XII.1982, S.B.S. (1♂); Misciani 26.XII.1984, B. Baccetti (at light) (10♂) (MSNG); Somalia, El Ellan 24.XI-4.XII.1985, S.B.S. (2♂) (MZUF).

Remarks. The male sub-genital plate of *E. kevani* has very long and stout processes, similar to styli (Figure 8E), the 10th tergite is regular, the cerci are in-curved, long and apically pointed, the ovipositor is stout, well curved (more than in *meruensis* and *varia*), tegmina oval, at apex widely rounded (Chopard, 1954). Stridulatory file ca. 1.5 mm long, curved and consisting of ca. 100 very dense and evenly spaced teeth (Figure 8F).

Distribution. Described from different localities of Kenya, where it was considered very common on *Acacia* trees and bushes (Chopard & Mc Kevan, 1954), it was not previously cited from Somalia.

Eurycorypha kenyensis new species (Figures 8G-I and 9A-C)

Material examined. Kenya, Tharaka Matiri 14.IV.1979, A. Baglione (1♂ holotype, 1♀ allotype) (MSNG).

Measurements. Male. Body length: 14.9; pronotum length: 3.6; pronotum height: 3.8; length of hind femora: 10.0; length of tegmina: 22.0. Female. Body length: 17.5; pronotum length: 4.4; pronotum height: 4.6; hind femora lacking; length of tegmina: 28.5; length ovipositor: 6.0.

Male description. Color. Green, legs yellowish.

Small species. Head typical of the genus, eyes oval, fastigium of vertex wide, ca. three times as wide as scapus. Fronto-genal carinae not much developed. Antennae long, scapus green, remaining part yellow. Pronotum flat, just concave on the fore border and rounded on the hind border. Lateral carinae distinct, humeral excision well-developed, teguments rough (Figure 8G,H). Both pairs of wings well-developed. Tegmina not much oval, rounded at tips, about 3.6 times longer than broad. Hind wings longer than tegmina.

Fore coxae armed, fore tibiae with open tympana and 5 spines on inner and outer ventral margins; mid tibiae with 9 inner and outer ventral spines; fore femora with 3 inner ventral spines, mid femora with 4 outer ventral spines, hind femora with 3 inner ventral spines. Upper margins of femora covered by scattered yellow hairs.

Last abdominal tergite unmodified, ending with a small depression, nearly straight, cerci thin and sinuous, apically pointed and blackish. Styli absent, but sub-genital plate ending with two rather long processes (less than in *E. kevani*), similar to stout styli (Figure 9A).

Female description. Same characters as male, with the following differences.

Mid femora have only 2 spines, pronotum is smooth (Figure 8I), ovipositor is longer than pronotum, up-curved and provided with small denticles on upper and lower margins (Figure 9C), sub-genital plate narrow, rectangular with straight apex; on its sides there are two lateral up-curved bulges (Figure 9B).

Etymology. Named after the country (Kenya) where the specimens were collected.

Diagnosis. It is a small species, the male sub-genital plate is characterized by two rather long apical processes, similar to styli (1/3 shorter than in *E. kevani*). The female is characterized by two lateral bulges on the ovipositor.

Discussion. The number of species in the genus *Eurycorypha* with unmodified 10th male tergite is 11. Only *E. kevani* has long and stout processes, similar to styli, but these are 1/3 longer than in *E. kenyensis* n. sp. Among the species of which only the female has been described, none has bulges on the lateral margins of the ovipositor.

Oxygonatium huxleyi Ragge, 1980 (Figure 9D-G)

Material examined. Ivory Coast, Man, Mt. Tonkoui (1200 m) 18-20.VI.2015 (UV trap) (1♂), P. Moretto.

Remarks. Cadena-Castañeda (2014) has proposed to consider the genus *Oxygonatium* Ragge, 1980 as belonging to the tribe Amblycoryphini. According to Ragge (1980) it is indeed closely related to *Eurycorypha*, but lacks frontogenal carinae, has the pronotum without lateral carinae (Figure 9D,E), swollen bases of the mid and hind tibiae and a conspicuously extended point at the tip of the hind femora (Figure 9F). In addition, the eyes of *O. huxleyi* (Figure 9D) are more rounded and less elongate than in the species of the genus *Eurycorypha*. The stridulatory file is curved, 2.4 mm long, and consists of ca. 100 teeth, of which the central are higher than the external ones (Figure 9G).

Distribution. The only species of the genus known till now covers Ghana and Ivory Coast (Ragge, 1980).

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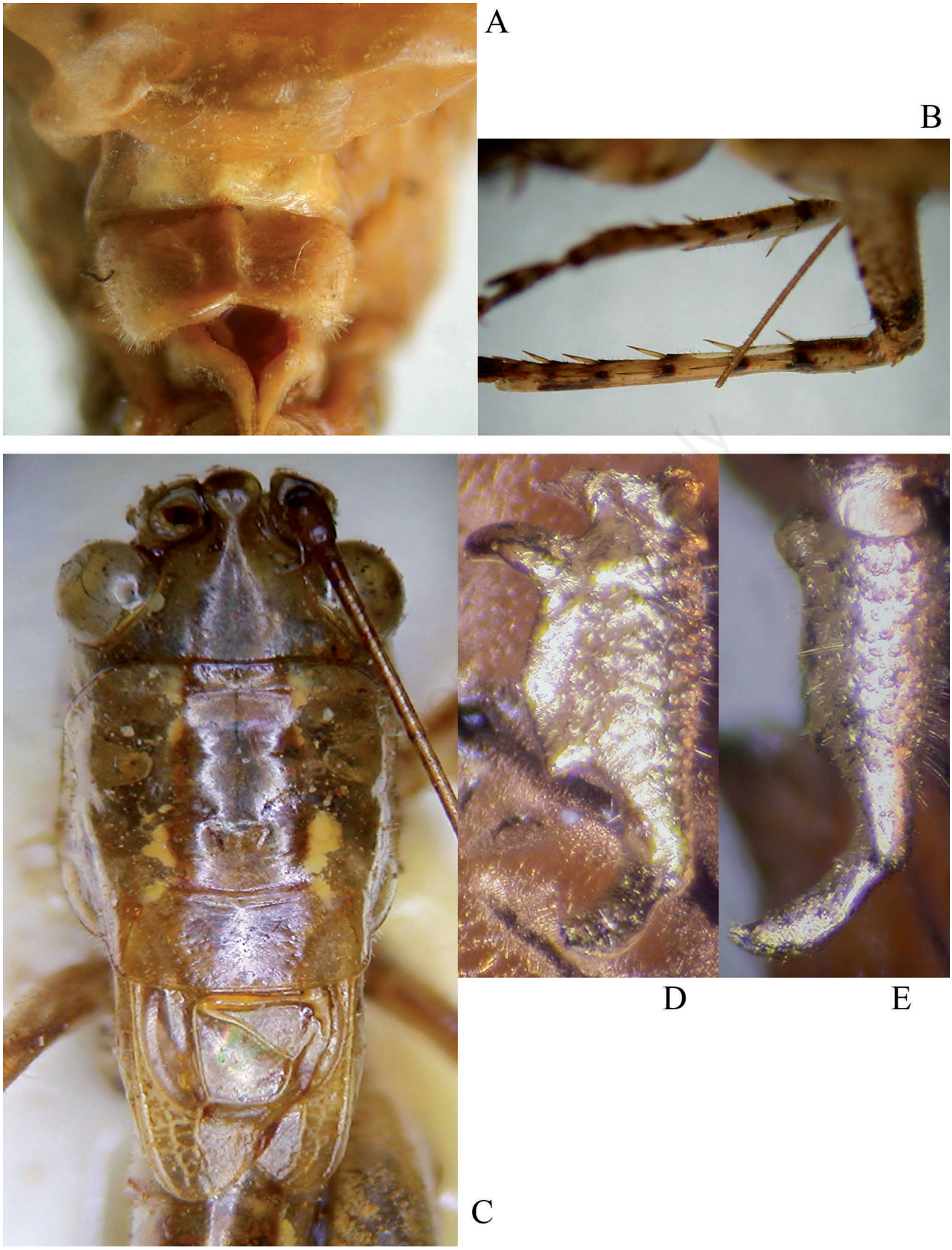


Figure 1. A,B): *Rhacocleis dernensis*. Female sub-genital plate (A) and anterior tibiae (note the presence of five spines on lower margin) (B). C-E): *Conocephalus* (*Anisoptera*) *algerinorum*. Head, pronotum and tegmina (C), dorsal view of right cercus (D), and lateral view of the same (E).

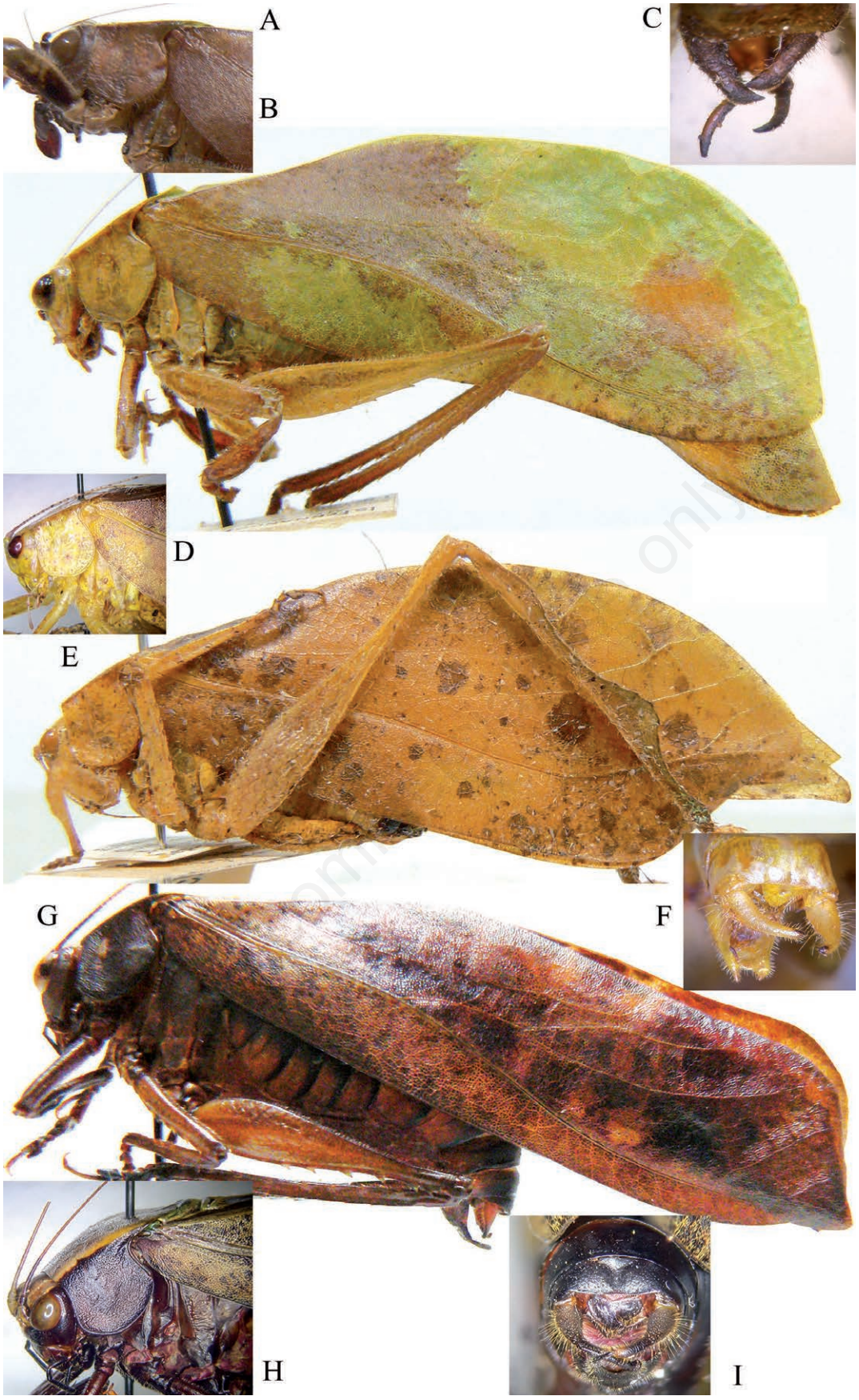


Figure 2. A-C): Head and pronotum (A), left side, whole insect (B), last abdominal segments (C) of *Weissenbornia praestantissima*. D-F): Head and pronotum (D), left side, whole insect (E), last abdominal segments (F) of *Preussia lobatipes*. G-I): Head and pronotum (G), left side, whole insect (H), last abdominal segments (I) of *Enochletica ostentatrix*.

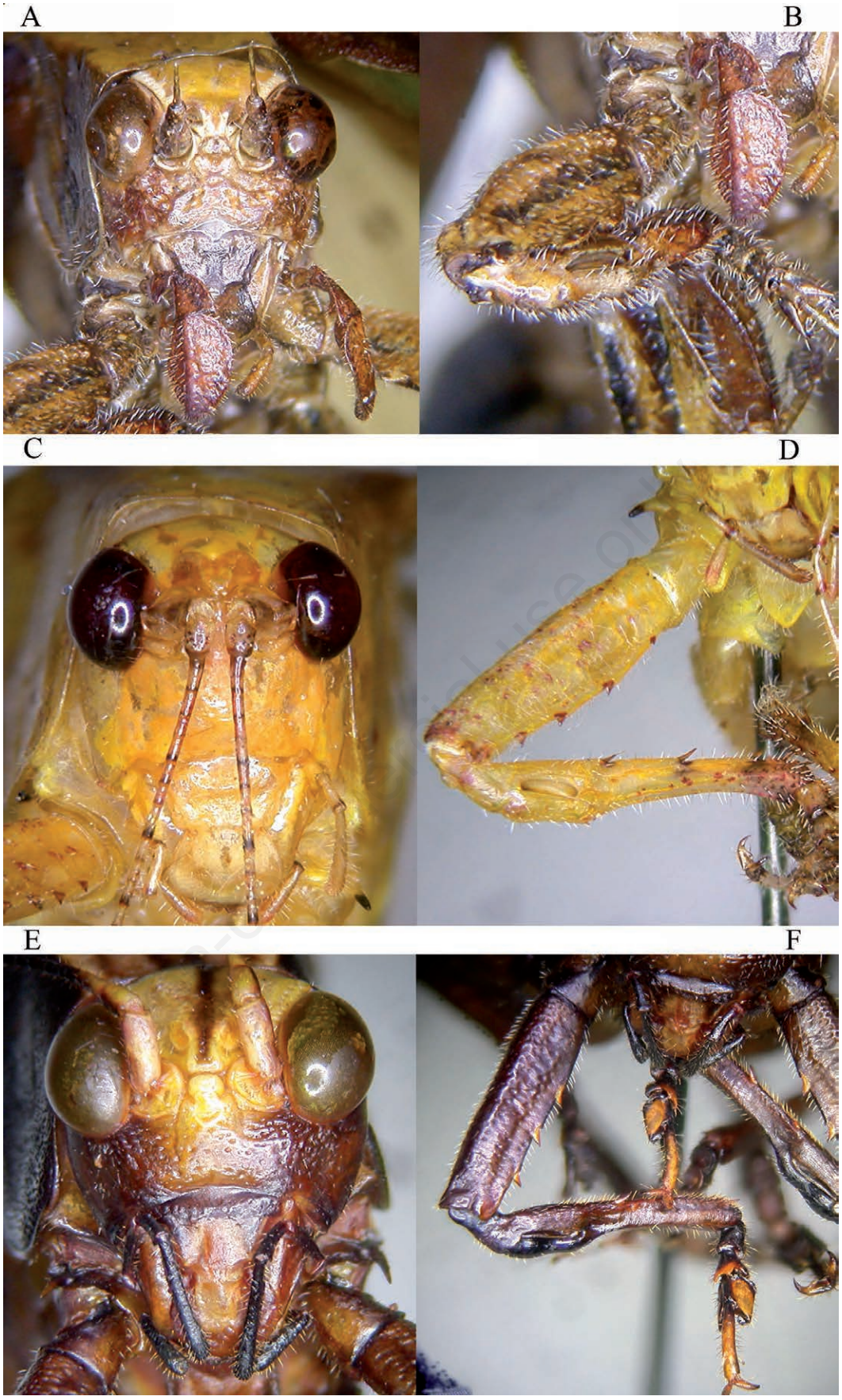
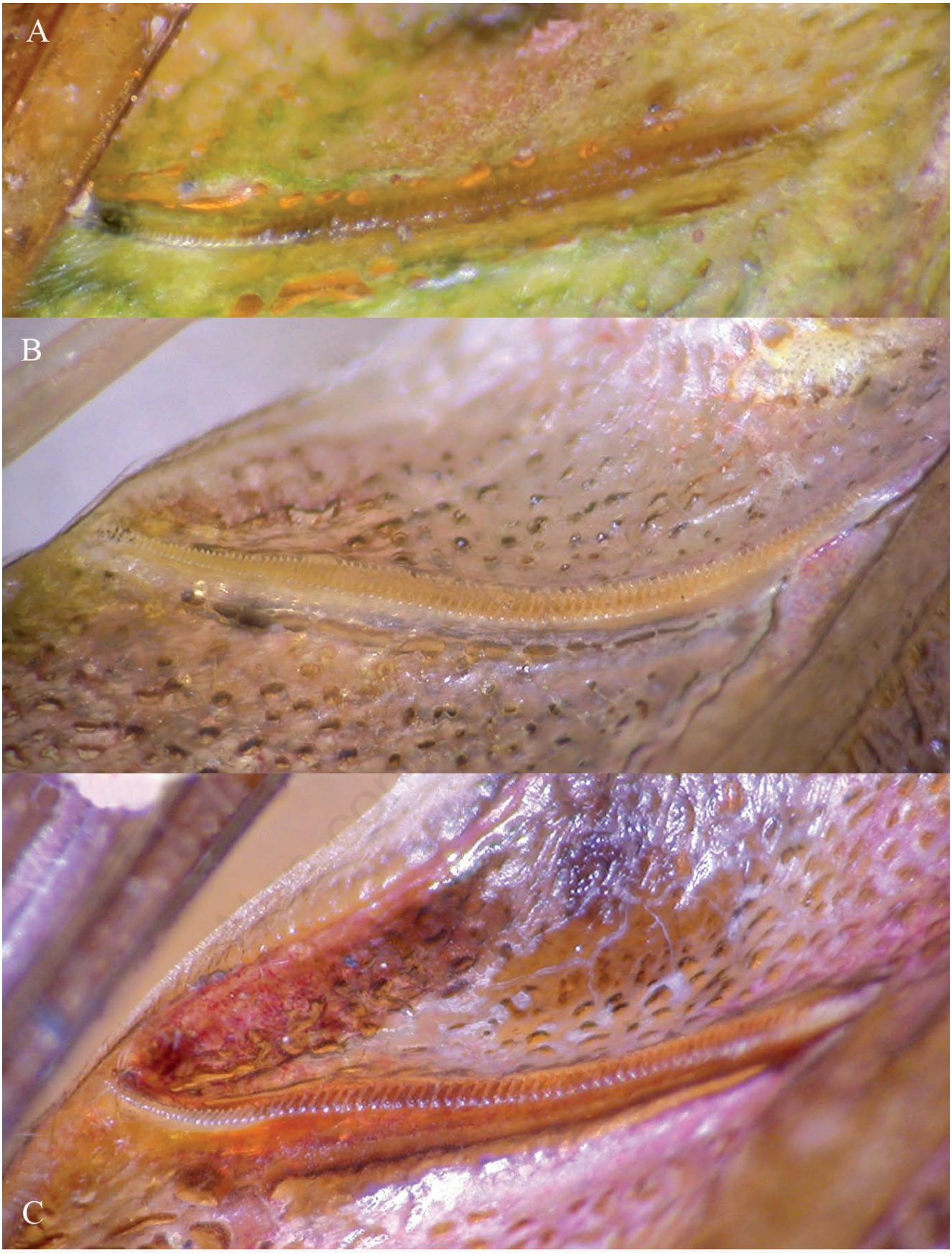


Figure 3. A,B) Face (A) and fore legs (B) of *Weissenbornia praestantissima*. C,D) Face (C) and fore legs (D) of *Preussia lobatipes*. E,F) Face (E) and fore legs (F) of *Enochletica ostentatrix*.



Fgure 4. A-C) Stridulatory file on the underside of the left tegmen of *Weissenbornia praestantissima* (A), *Preussia lobatipes* (B) and *Enochletica ostentatrix* (C).

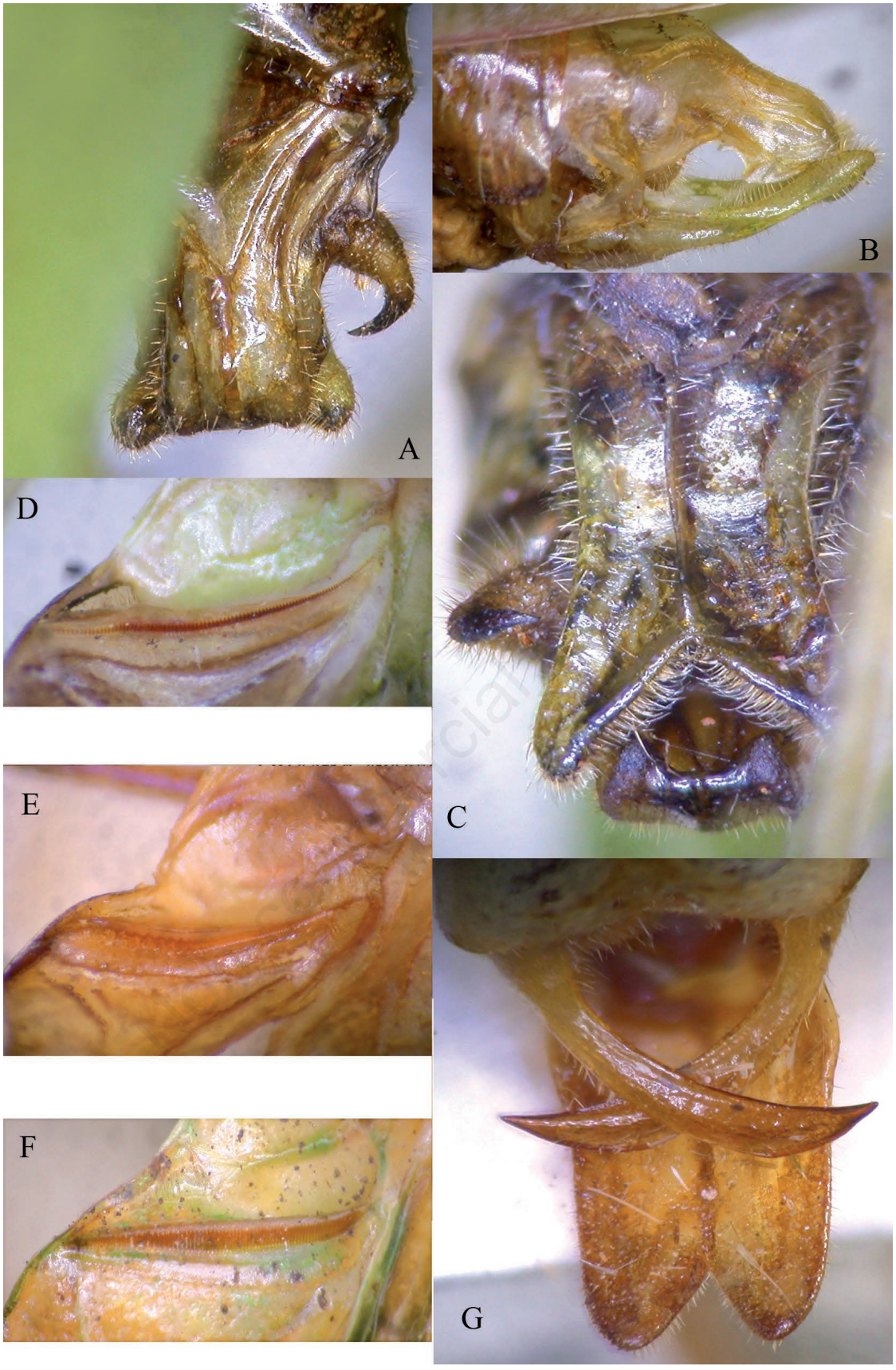


Figure 5. *Horatosphaga crosskeyi*: dorsal view of male supra-genital plate (A), lateral view of last abdominal segments of male (B), ventral view of male sub-genital plate (C) and stridulatory file on the underside of the left tegmen (D). *Horatosphaga somali*: stridulatory file on the underside of the left tegmen (E) and dorsal view of male cerci and sub-genital plate (G). *Horatosphaga leggei*: stridulatory file on the underside of the left tegmen (F).

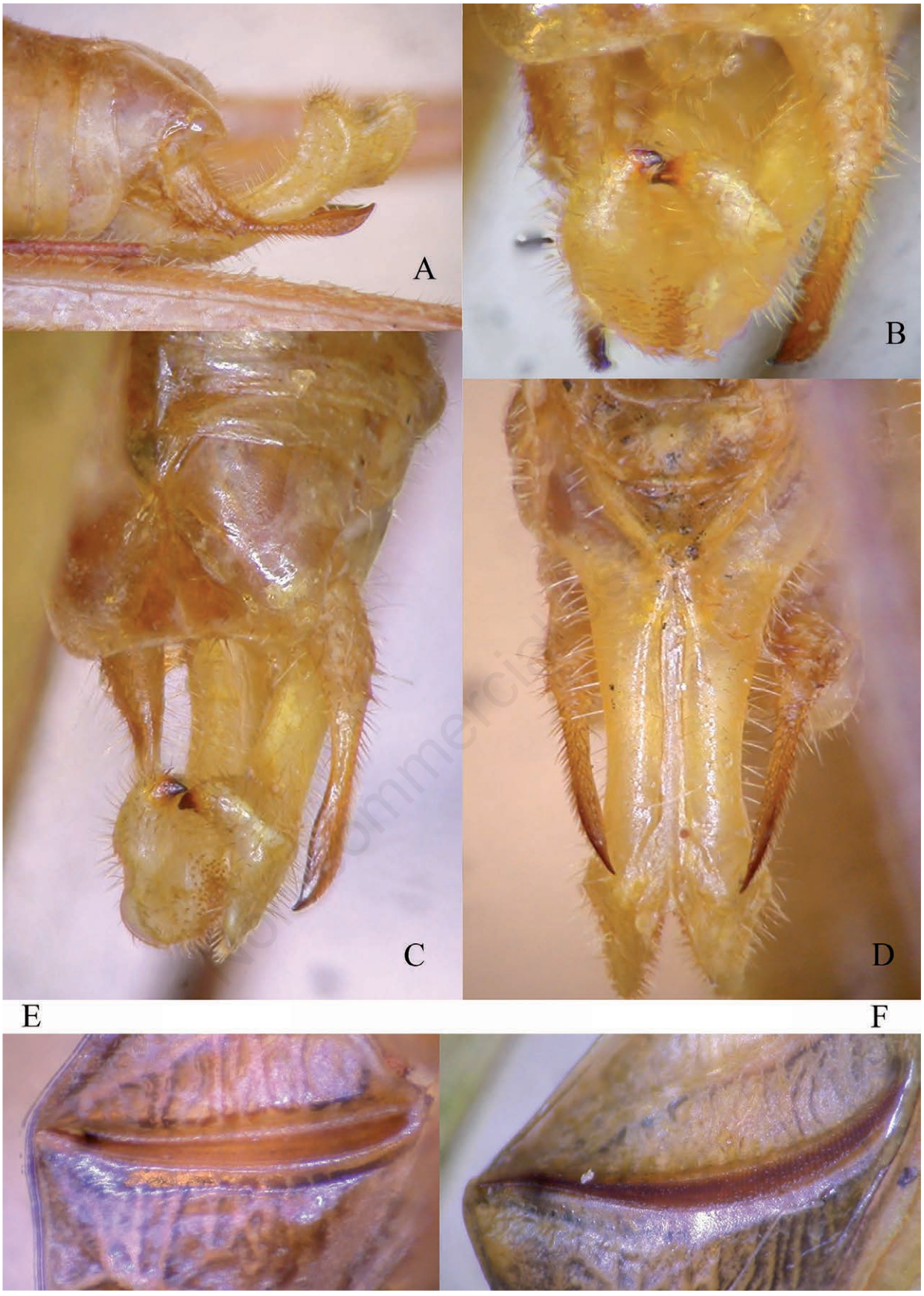


Figure 6. ***Ducetia crosskeyi*****: lateral view of last abdominal segments of male (A), dorso-frontal view of male cerci and sub-genital plate (B), dorsal view of male cerci and sub-genital plate (C), ventral view of male sub-genital plate (D) and stridulatory file on the underside of the left tegmen (E).** ***Ducetia fuscopunctata*****: stridulatory file on the underside of the left tegmen (F).**

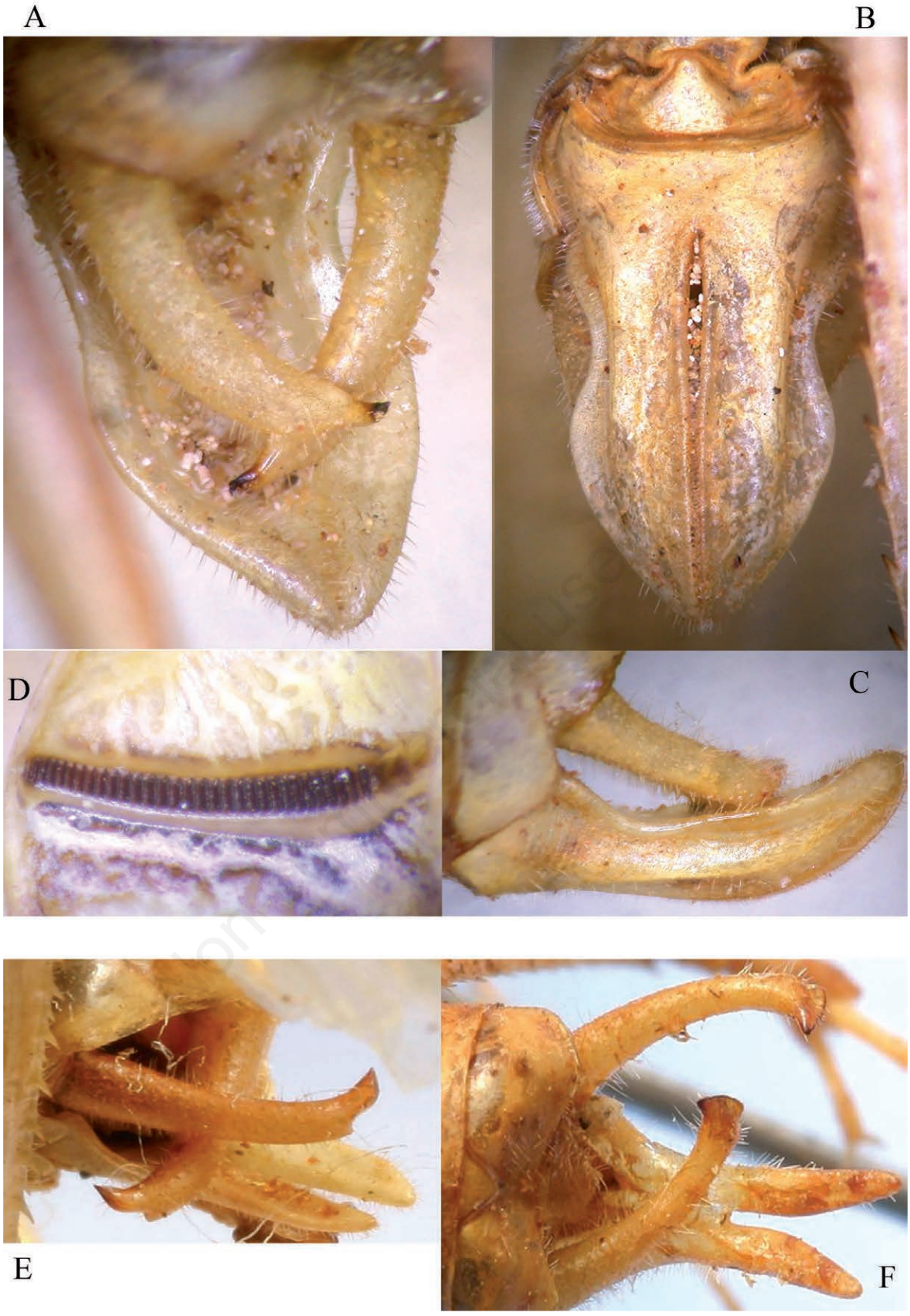


Figure 7. ***Tropidonotacris carinata*****: dorsal view of male cerci and sub-genital plate (A), ventral view of male sub-genital plate (B), lateral view of male cerci and sub-genital plate (C) and stridulatory file of the left tegmen (D).** ***Tropidonotacris amabilis*****: latero-dorsal view of male cerci and sub-genital plate (E).** ***Tropidonotacris grandis*****: latero-dorsal view of male cerci and sub-genital plate (F). E and F: courtesy of Orthoptera Species File.**

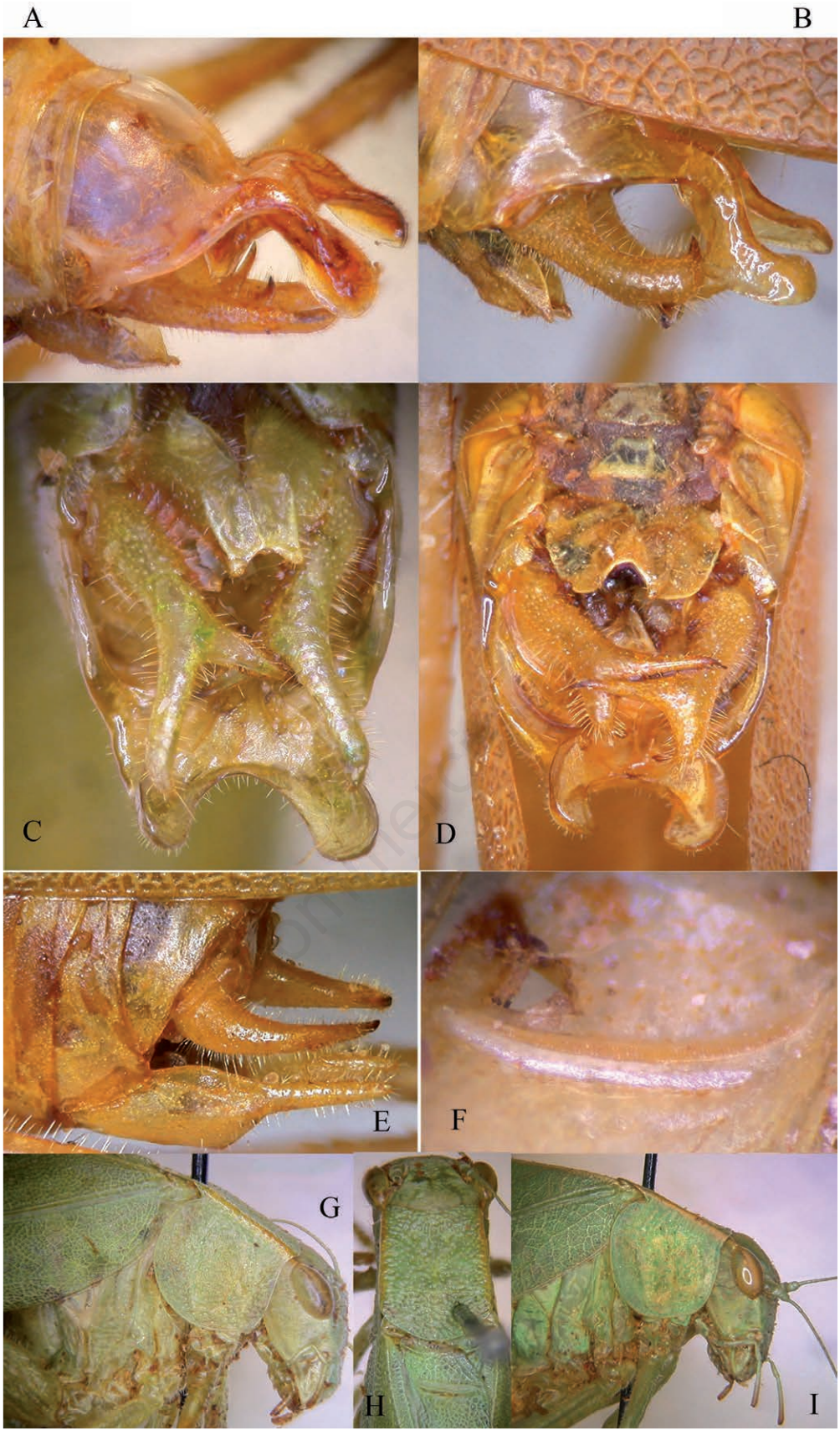


Figure 8. Lateral view of last abdominal segments of male *Eurycorypha ndokiensis* n. sp. (A) and *Eurycorypha feai* n. sp. (B), ventral view of male sub-genital plate of *Eurycorypha ndokiensis* n. sp. (C) and *Eurycorypha feai* n. sp. (D). Lateral view of last abdominal segments of male *Eurycorypha kevani* (E) and stridulatory file of the left tegmen of the same (F). Lateral (G) and dorsal (H) view of head, pronotum and tegmina of male *Eurycorypha kenyensis* n. sp., lateral view (I) of head, pronotum and tegmina of female *E. kenyensis* n. sp.

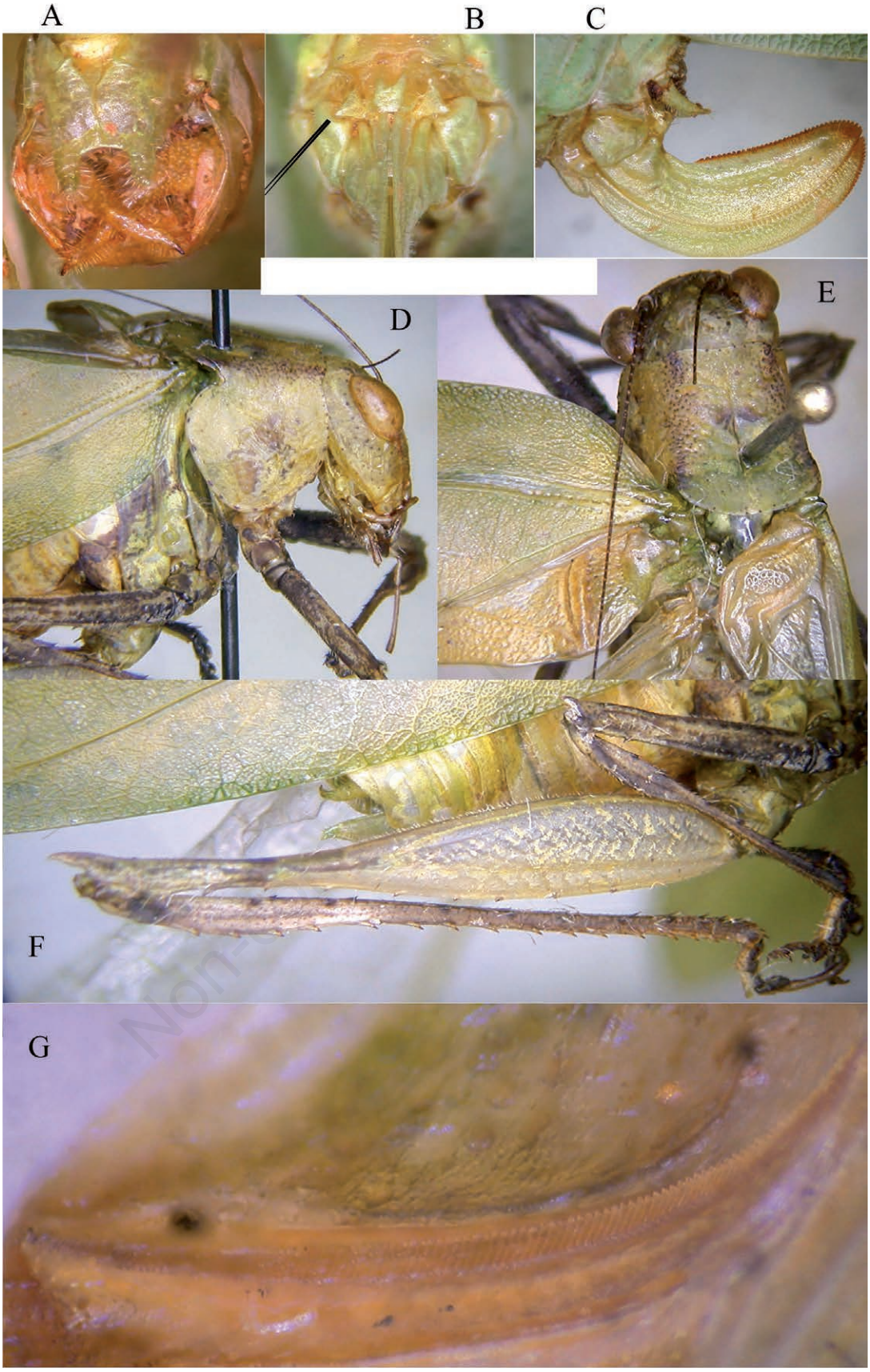


Figure 9. A-C). Ventral view of male sub-genital plate of *Eurycorypha kenyensis* n. sp. (A), ventral view of female sub-genital plate (B: note lateral bulges) and lateral view of the ovipositor of the same (C). D-G. Right lateral view of head and pronotum of *Oxygonatium huxleyi*, male (D), dorsal view of head, pronotum and stridulatory area (E), lateral view of mid and hind legs (F) and stridulatory file of the left tegmen (G).