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New Acrometopae from East Africa (Tettigoniidae: Phaneropterinae)

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Abstract

Two new species of Acrometopae and the female of *Lamecosoma inermis* Ragge are described from Tanzania, East Africa. *Horatosphaga parensis* n. sp. occurs in montane forest clearings of the South and North Pare Mountains. *Peronura uguenoensis* n. sp. inhabits herbaceous vegetation in the North Pare Mts. Notes on altitudinal distribution and habitat requirements are given for both species. *L. inermis* is an inhabitant of the savannah grasslands in the colline and submontane zone of southeast and eastern Kilimanjaro.

Key words

Katydid, song, *Horatosphaga*, *Peronura*, Tanzania, new species

Introduction

A profound revision of the Acrometopae was made by Ragge (1960). Members of this group are characterized by the lack of a fore coxal spine, biconchate fore tibiae, sloping fastigium verticis and stridulatory modification of the male forewings beyond the stridulatory organ itself (Ragge 1960). The most obvious feature of the group is the high degree of sexual dimorphism. Genera belonging to the Acrometopae are *Peronura* Karsh, *Lamecosoma* Ragge, *Conchotopoda* Karsch, *Horatosphaga* Schaum and *Prosphaga* Ragge.

The genus *Horatosphaga* shows the highest diversity with 24 species. The genera *Peronura, Prosphaga,* and *Lamecosoma* each contain two species, and the genus *Conchopoda,* restricted to south Africa, has five species. The main distribution of the Acrometopae [the most species (24)], lies in eastern Africa.

Material and Methods

Identification.—Acridoidea spp. were identifed to genus level mainly with keys of Dirsch (1965), and to species level with keys of, *e.g.*, Hollis (1970), Jago (1971, 1984, 1989, 1994) and Kevan (1954). For Tettigonioidea spp. keys, *e.g.*, by Ragge (1964, 1980), were used. An overview of Saltatoria species occurring around Kilimanjaro, also providing keys, is given by Sjöstedt (1909). The material was checked again in the entomological collection of the National Museums of Kenya, Nairobi, and at the Natural History Museum, London.

Collection plots.— Around Kilmanjaro, the North and South Pare Mts, permanent plots have been laid from 1996 onwards , in which the vegetation has been studied using the method of Braun-Blanquet (1964). Within these vegetation units the Saltatoria communities were recorded (by netting, by song recording or visual detection). Each plot was checked at least three times over different years and at various times of the year; sometimes as many as 15 visits were made to obtain the full species census. Further publications on the ecology of East African Saltatoria are in preparation.

Measurements.— Total body length refers to the body length of the insect, disregarding tegmina. In females the ovipositor is included in body length. Tegminal length is determined as viewed from above; they are not incorporated in body length. The terminology of the veins and areas in the male forewing follows Ragge (1960).

Song.— A field recording of the song of *Horatosphaga parensis* was made with a Canon Video Camera X1, and is limited to the audio frequency range. Song duration was measured from the beginning of the first clearly visible syllable to the end of the last. The terminology applied to oscillograms is that of Ragge & Reynolds (1984).

Depositories.—NHML: Natural History Museum London, UK. EDNMK: Entomological Department National Museums of Kenya, Nairobi. MNB: Museum für Naturkunde, Zentralinstitut der Humboldt-Universität zu Berlin. All other material remains in the collection of the author.

Results and Discussion

***Horatosphaga parensis* sp. n.**
Figs 1-8.

Holotype.— ♂. Tanzania, North Pare Mts, Kindoroko Forest Reserve, herbaceous vegetation at lower border of montane forest, 1750 m, Apr 2001, C. Hemp coll.; depository, NHML.

Paratypes.— All Tanzania. 1 ♀; same collection data as holotype, except Feb 2001; depository, NHML. 1 ♂; same data as holotype; depository, MNB. 1♀; same data as holotype; depository, MNB. 1 ♂; same data as holotype, but Feb 2001; depository, EDNMK. 1 ♀; same data as holotype; depository, EDNMK.
Additional material examined, all Tanzania, all C. Hemp coll. 6 ♂♂, 5 ♀♀; same data as holotype, but Feb 2001, Mar 2001, Apr

Fig. 1. Oscillogram of the calling song of *H. parensis;* 27 syllables appear.

2001. 4 ♂♂, 3 ♀♀; North Pare Mts, Kindoroko Forest Reserve, forest clearing in herbaceous vegetation, 1800 m, Feb 2001. 2 ♂♂, 2 ♀♀, 1 nymph; South Pare Mts, Mt. Shengena, forest clearing in herbaceous vegetation, 1900 m, Dec 2000, Mar 2001. 1 ♂; South Pare Mts, Mt. Shengena, swamp, 1950 m, Mar 2001.

Description.— **Male**: habitus color dark green, stridulatory area of right tegmen with yellowish-brown markings; pronotum green or with yellow or brown dorsal stripe. Lateral yellow lines behind eyes.
Head: antennae yellow, more than twice as long as length of insect. Cuticle of head smooth, fastigium of vertex sulcate. Eyes small, circular.
Thorax: pronotum without lateral carinae.
Tegmina and wings: tegmina surpassing body by about a third; about three times longer than broad. Venation of right forewings as in Fig. 2. Rs branching from radius at about half length of tegmen, Rs bifurcate in tegmen posterior third. Area Cu1a oval, emarginate, cubitus vein 1a elevated to a ridge. Costal area with veins parallel, mostly bifurcate. Alae reduced, hidden under tegmina, about 4.5 mm long.
Legs: tympanic auricles of foretibiae slightly inflated. Fore and mid femora unarmed, hind femora with 6 to 8 minute spinules in two rows ventrally; fore and mid tibiae with 10 to 12 minute spinules in two rows ventrally, hind tibiae with numerous small spinules in four rows.
Genitalia: subgenital plate large, robust, strongly up-curved, deeply incised at posterior end into two lobes (Fig. 3). Tenth abdominal tergite greatly enlarged (Fig. 4). Cerci slender, with hooked tips, positioned at a 90° angle upwards, immediately beneath the hood of the tenth abdominal tergite.

Measurements.— **Male** (n = 12)
Total length of body: 15 to 19 mm ($\bar{x}$: 16.4); median length of pronotum: 4.1 to 4.8 mm ($\bar{x}$: 4.5); length of hind femur: 21 to 24 mm ($\bar{x}$: 22); length of tegmina: 14 to 17.2 mm ($\bar{x}$: 15.5).

Female: habitus color dark green, without yellow or brown marks.
Thorax: pronotum dorsally broader than in male, lateral lobes more shallow at posterior end.
Tegmina: tegmina broader along whole length as compared to male, and rounded at apex, venation faint.
Legs: as in male.
Genitalia: subgenital plate with broad base, incised apex (Fig. 5). Ovipositor short, stout, up-curved, serrated. Cerci straight with broad base (Fig. 6).

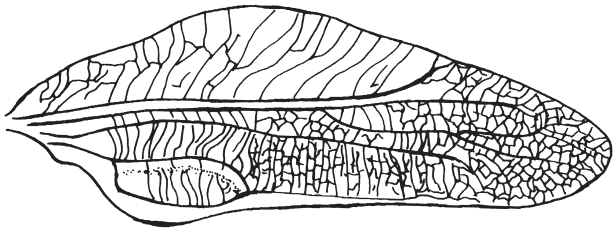

Fig. 2. Right tegmen of male *H. parensis*.

Fig. 3. Male subgenital plate of *H. parensis* in posterior view.

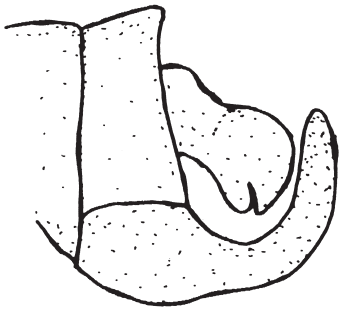

Fig. 4. Lateral view of abdominal apex of male *H. parensis.*

Measurements.— (n= 10)
Total length of body: 21.0 to 25.5 mm ($\bar{x}$: 23.2); median length of pronotum: 4.5 to 5.1 mm ($\bar{x}$: 4.9); length of hind femur: 20.0 to 22.6 mm ($\bar{x}$: 21.3); length of tegmina: 20.0 to 22.2 mm ($\bar{x}$: 21.3); length of ovipositor: 6.5 to 7.1 mm ($\bar{x}$: 6.9).

Diagnosis.— *H. parensis* belongs to a group of species with an enlarged tenth abdominal tergite. Other species of this group are *Horatosphaga elgonis* (Chopard), *H. ruspolii* (Schulthess), *H. diminuta* (Chopard) and *H. vicina* (Chopard), all known from Kenyan localities. *H. elgonis* has a shorter pronotum (3.9 to 4.1 mm), and shorter hind femora (17.4 to 20.2 mm) than *H. parensis* and a uniquely hood-shaped tenth abdominal tergite. It is a mountain species restricted to the montane zones of the Aberdare Range and Mt. Elgon (heath zone at 3500 m) (Ragge 1960).

H. ruspolii has fully developed hind wings, and its pronotum (4.7 to 5.7 mm) and hind femora (24.7 to 28.4 mm) are longer than in *H. parensis*. The known range of this species is confined to an area of steppe and semidesert associated with the northern border of Kenya. *H. diminuta* and *H. vicina* both have reduced tegmina and rudimentary hind wings, as has *H. parensis*. Ragge (1960) stated

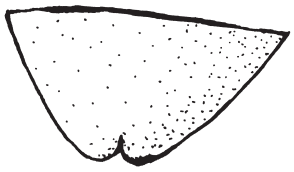

Fig. 5. Female subgenital plate of *H. parensis.*

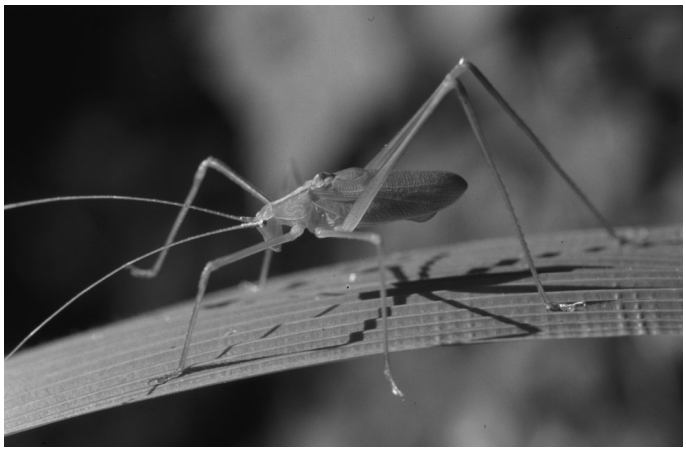

Fig. 7. ♂ *H. parensis*.

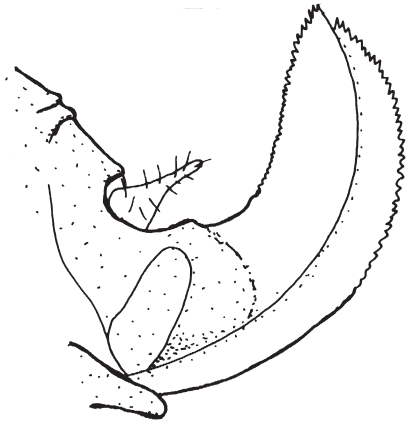

Fig. 6. Lateral view of abdominal apex of female *H. parensis.*

Fig. 8. Clearing in the Kindoroko Forest Reserve at 1800 m. Habitat of *H. parensis*.

that these two species might be two forms of the same species (differing only in tegmina length) which further material, unavailable for Ragge´s study, would confirm. *H. diminuta* has a longer pronotum (4.7 to 6.1mm), hind femora and tegmina (18.9 to 25.7 mm), than *H. parensis*. It is known only from a very small area of Kenya on or near the northern border. *H. vicina* has tegmina usually longer than 25 mm (*H. parensis* 14 to 17.2 mm) and is only known from its type locality near Marsabit, Kenya. The females of *H. vicina* have shorter tegmina (14.8 to 17.0 mm) that are shorter than the abdomen; in *H. parensis* the tegmina (20.0 to 22.2 mm) surpass the body, concealing the ovipositor completely. An almost vertically up-turned ovipositor, as found in *H. parensis,* is not known for any other species of *Horatosphaga*, except *H. elgonis,* which also possesses a stout and short ovipositor. The ovipositors of all other *Horatosphaga* species are longer and less stout.

The male subgenital plate is deeply incised apically, forming two lobes (Fig. 3). A similar, but less deeply incised, subgenital plate is found only in *H. vicina* and *H. diminuta*.

Two closely related species with an enlarged tenth abominal tergite occur in West Africa. These are *H. inclusa* (Karsch 1893), in Ghana, and *H. crosskeyi* Ragge 1960 from Nigeria. The cerci of these species are swollen, strongly in *H. inclusa* and moderately in *H. crosskeyi*. In *H. parensis* the cerci are turned vertically upward with bent sclerotized dark brown tips positioned directly under the enlargement of the tenth abdominal tergite. As Ragge (1960) did not make any statement about the cerci of the East African species with an enlarged tenth abdominal tergite, no further comparisons can be made.

Habitat.— *H. parensis* inhabits the montane zone of the North and South Pare Mts. It was found at altitudes of 1750 m to 2200 m in the North Pare Mts. (Fig. 8). These elevations coincide with the present occurrence of forest: this species inhabits herbaceous vegetation from the lower forest border and forest clearings to the top of Mt. Kindoroko. It was also found in shady banana-coffee plantations of the North Pare from 1600 to 1750 m, which provide similar habitat as forest clearings. In the South Pare Mts *H. parensis* was collected in corresponding habitat. The lower forest border of Mt. Shengena is situated at about 1950 m. This border is a result of frequent fires started by the local human population. Where indigenous montane *Ocotea* forest is left, *H. parensis* can be found along forest edges and clearings to altitudes of about 2300 m. Above this, altitude clearings are scarce and *Ocotea* forest changes to *Erica* forest. Mt. Shengena reaches an altitude of about 2400 m.

At the lower forest border of the Kindoroko Forest Reserve, *H. parensis* lives syntopic with two *Phlesirtes* species, *Parepistaurus* sp., two *Amytta* species, *Rhainopomma montana* (Kevan), *Acanthacris ruficornis* (Fabricius), *Heteracris trimaculata* Grunshaw and *Chromothericles* sp. In clearings in the montane forest, *Amytta* sp., *Chromothericles* sp., *Phlesirtes* sp. and *Rhainopomma montana* were noted together with *H. parensis*. On clearings of the montane forests of Mt. Shengena in the South Pare Mts, *H. parensis* occurred together with *Phlesirtes* sp., *Phyteumas purpurascens* (Karsch), *Amytta* sp. and *Rhainopomma montana*.

Song.— Males of *H. parensis* perform their calling songs after sunset. The song lasts about 7 to 10 s; 4 to 5 syllables are performed

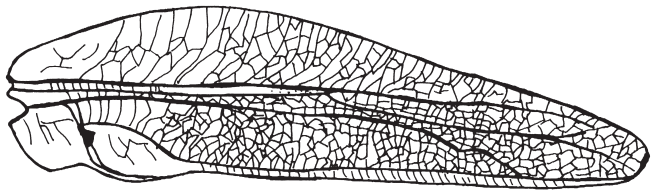

Fig. 9: Right tegmen of male *P. uguenoensis*.

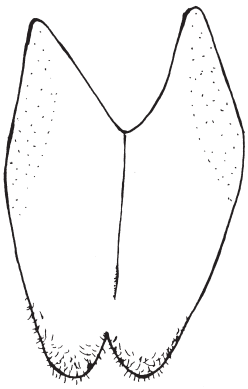

Fig. 10. Ventral view of subgenital plate of male *P. uguenoensis*; anterior margin at top.

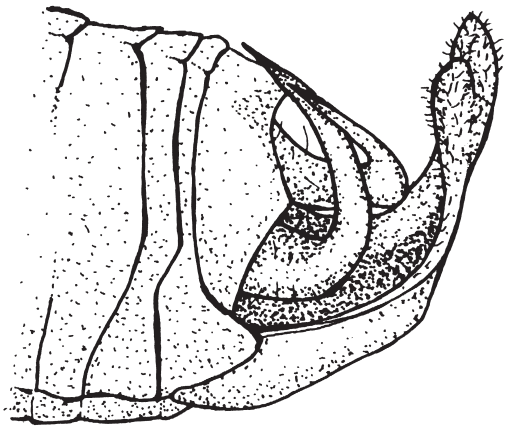

Fig. 11. Side view of abdominal apex of male *P. uguenoensis*.

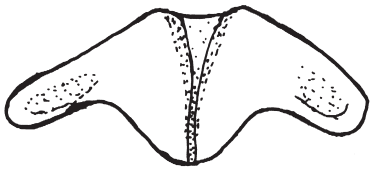

Fig. 12. Ventral view of subgenital plate of female *P. uguenoensis*; anterior margin at top.

per second (night recordings at about 18 °C). The call begins very faintly, rising in loudness toward the end of the song (Fig. 1). The insects sang irregularly and had silent gaps of variable length between single songs. During the gaps these insects usually moved in the vegetation.

***Peronura uguenoensis* n. sp.**
Figs 9-14

Holotype. —♂: Tanzania, North Pare Mts, grazed meadow, 1300 m, Feb 2001 C. Hemp coll., depository, NMHL.

Paratypes.— All Tanzania, all North Pare Mts. 1 ♀; same data as holotype; depository, NHML. 1 ♂; same data as holotype; depository, MNB. 1 ♀; lower border of Kindoroko Forest Reserve, 1750 m, Mar 2001, C. Hemp coll.; depository, MNB. 1 ♂; same data as holotype; depository, EDNMK. 1 ♀; lower border of Kindoroko Forest Reserve, 1750 m, Mar 2001. C. Hemp coll.; depository, EDNMK.
Further material examined, all Tanzania, all C. Hemp coll. All North Pare Mts. 1 ♂, 1 ♀; same data as holotype. 1 ♂, ♀; lower border of Kindoroko Forest Reserve, 1750 m, Feb 2001.

Description.— **Male:** color dark green, pronotal disc with brown fascia. Yellow lines behind eyes.
Head: antennae tawny to brown, more than twice body length. Cuticle of head smooth, fastigium of vertex pointed, sulcate, about one half length of scapus. Eyes small, circular.
Thorax: pronotum without lateral carinae.
Tegmina and wings: tegmina surpassing body, about 4 times longer than broad. Venation of right forewing as in Fig. 9. Rs branching off from radius at about half length of tegmen, becoming faint in apical area of tegmen; medius curves to cubitus at about two thirds of tegmen length (Fig. 9). Cubital area unmodified, smooth. Alae reduced, hidden under tegmina, about 2 mm long.
Legs: tympanic auricles of fore tibiae not inflated. All femora with stout, shining black spines with broad base; fore femora with 5 to 9 outer and 4 to 8 inner spines; mid femora with 6 to 9 outer and 4 to 7 inner spines; hind femora with 6 to 10 outer and 4 to 8 inner spines. Tibiae with spines of normal slender shape, marked black; fore and mid tibia ventrally with two rows of numerous spines, becoming more dense distally; apically one pair of spurs dorsally and ventrally. Hind tibiae with 4 rows of numerous black spines, somewhat more dense on the ventral side distally; 2 spurs ventrally, 1 pair of spurs dorsally.
Genitalia: subgenital plate large and up-curved, incised at posterior end into two lobes; with dense short hairs on lobes (Fig. 10, 11). Cerci long, acuminate, with dark pointed apex (Fig. 11).

Measurements.— **Male** (n = 5)
Total length of body: 19.0 to 22.5 mm ($\bar{x}$: 21.2); median length of pronotum: 5.6 to 6.1 mm ($\bar{x}$: 5.9); length of hind femur: 21.8 to 26.5 mm ($\bar{x}$: 24.5); length of tegmina: 18.5 to 21.3 mm ($\bar{x}$: 20.4)
Female: habitus color dark green.
Thorax: pronotum dorsally broader than in male.
Tegmina: not surpassing body, broader along whole length compared to male, rounded at apex, venation faint.
Legs: similar to male. Femora with stout black spines; fore femora with 7 to 9 outer and 4 to 7 inner spines; mid femora with 7 to 8 outer and 6 to 8 inner spines; hind femora with 5 to 10 outer and 6 to 8 outer spines. Tibiae as in male.
Genitalia: subgenital plate broad with two lateral expansions and a median ridge (Fig. 12). Ovipositor moderately up-curved, serrated in posterior area. Cerci straight (Fig. 13).

Measurements.— **Female** (n = 5)

Table 1. Saltatoria species on a grazed meadow in the North Pare Mts at 1300 m co-occurring with *P. uguenoensis.*

Acrida bicolor (Thunberg)
Acrida sulphuripennis (Gerstäcker)
Aulacobothrus dorsatus (I. Bolivar)
Cataloipus pulcher Sjöstedt
Catantops momboensis (Sjöstedt)
Coenona brevipedalis Karsch
Conocephalus (Conocephalus) conocephalus (Linné)
Conocephalus (Anisoptera) maculatus (Le Guillou)
Cyrtacanthacris tatarica (Linné)
Dictyophorus (Tapesiella) griseus (Reiche & Fairemaire)
Duronia chloronota (Stål)
Epacrocatantops curvicercus (Miller)
Gastrimargus africanus (Saussure)
Gymnobothrus lineaalba I. Bolivar
Gymnobothrus temporalis (Stål)
Heteropternis thoracica (Walker)
Horatosphaga heteromorpha (Karsch)
Humbe tenuicornis Schaum
Leptacris monteiroi (I. Bolivar)
Lophothericles sp.
Metaxymecus gracilipes (Brancsik)
Morphacris fasciata (Thunberg)
Odontomelus cf. *brachypterus* (Gerstäcker)
Ornithacris cyanea (Stoll)
Orthochtha dasycnemis (Gerstäcker)
Peronura clavigera (Karsch)
Phaeocatantops decoratus (Gerstäcker)
Phaneroptera sparsa (Stål)
Phlesirtes sp. 1
Plagiotriptus hippiscus (Gerstäcker)
Pnorisa squalus (Stål)

Total length of body: 31.0 to 33.5 mm ($\bar{x}$: 32.1); median length of pronotum: 6.4 to 6.6 mm ($\bar{x}$: 6.5); length of hind femur: 23.0 to 24.0 mm ($\bar{x}$: 23.4); length of tegmina: 16.0 to 19.0 mm ($\bar{x}$: 17.7); length of ovipositor: 13.5 to 13.6 mm ($\bar{x}$: 13.5)

Etymology.— Another name applied to the North Pare mountains is Ugueno Mts.

Diagnosis.— The genus *Peronura* Karsch was erected on *P. clavigera*. The generic characters given are: forewings reduced to small lobes less than twice the length of the pronotum, with the MA area concave basally and the frontal fastigium almost as long as the antennal scrobes. For the female no diagnostic characters were given (Ragge 1960).

Ragge (1960) states that the reduced wings of this monotypic genus are the only nonsexual character distinguishing *Peronura* from *Horatosphaga*. However, the male cerci, with their long acuminate

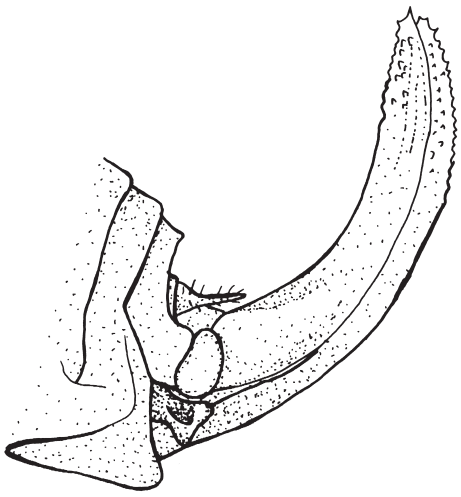

Fig. 13. Lateral view of abdominal apex of female *P. uguenoensis*

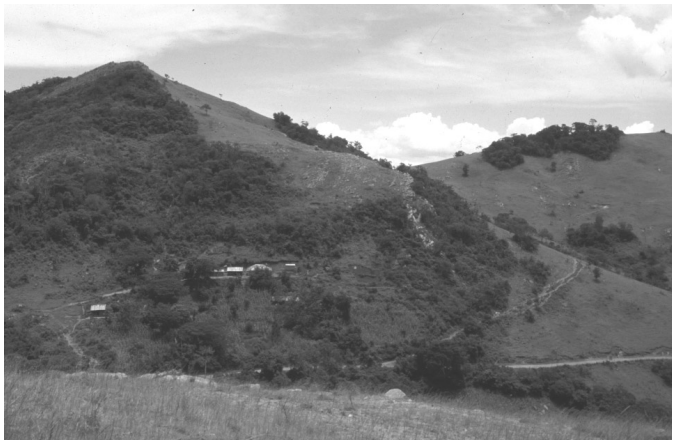

Fig. 14. Grazed meadows in the North Pare Mts. at 1300 m, habitat of *P. uguenoensis.*

form, are very different. The tubercles at the base of the ovipositor in females, protruding from an enlarged eighth abdominal tergite, are also conspicuous. Although the genitalic characters in both sexes are striking, Ragge (1960) remarked that they may only be of importance on the specific level.

P. uguenoensis and *P. clavigera* males share long acuminate cerci that cross each other, and females of both species have a pair of tubercles at the base of the ovipositor. Both these characters are unknown from any species of *Horatosphaga*, making them diagnostic (on the genus level) for *Peronura*. Another common character is the dark black stout spines occurring ventrally on the femora and present in both species.

The tegmina of *P. uguenoensis* are not reduced to small lobes less than twice the length of pronotum as in *P. clavigera*, a generic character of *Peronura*. Brachyptery also occurs in some species of *Horatosphaga*, so reduced tegmina cannot be taken as a diagnostic character on the genus level.

A second species, *P. hildebrandtiana* Karsch, is included in the genus *Peronura*. The description is based on a single female holotype. As there are no data available for the male, the status of this species must remain in doubt. Ragge (1960) notes that the female lacks the tubercles at the base of the ovipositor and he suggests that this specimen probably belongs to *Horatosphaga*.

With the species *P. uguenoensis,* the generic status of *Peronura* is confirmed, since the most important genitalic characters are shared by both species and separate them from the genus *Horatosphaga*.

P. uguenoensis differs from *P. clavigera* in the length and shape of the tegmina. The male subgenital plate of *P. clavigera* is broadly incised, forming an "u" between the resulting blunt outer edges, which are directed and slightly curved inward. However, the subgenital plate of *P. clavigera* undergoes considerable variation even within one population: the incision may be wider or narrower. In *P. uguenoensis* no variation in the expression of the posterior lobes was noted. Furthermore the lobes are more hairy than in *P. clavigera*. The fastigium verticis is pointed, about one half the length of the scapus and is narrowly sulcate in *P. uguenoensis*; it is shorter, about one third of the length of scapus, and broadly sulcate in *P. clavigera*. The females of both species are very similar. They may be distinguished by their different tegmina length and the size and degree of hairiness of the tubercles of the 8th tergite. In *P. clavigera*, the genitalic tubercles are huge and densely haired, while in *P. uguenoenis* they are smaller and without hairs.

Habitat.— The habitat of *P. uguenoenis* is similar to that of *P. clavigera*, a widespread species in grassland habitats of East Africa. *P. uguenoensis* prefers grasslands intermingled with herbs and seems to be restricted to higher altitudes in the North Pare Mts (Fig. 14). It was noted from 1300 m to the lower border of the forest at 1750 m in a transect laid from Lembeni (foot of North Pare Mts at the tarred road Moshi-Tanga, 900 m) to the top of Mt. Kindoroko (2200 m).

A plot at 1300 m, a grazed meadow on an incline of about 30° (Fig. 14), was visited three times in 2001 (January, February and March) and once in 2002 (September), to study the saltatorian community. Syntopic with *P. uguenoensis* were 33 Saltatoria species (Table 1). *P. clavigera* co-occurred with *P. uguenoensis* on this meadow; sometimes individuals of both species were found on one shrub. However, *P. uguenoensis* also occurred at much higher altitudes, whereas *P. clavigera* was not collected higher than 1300 m in the North Pare Mts.

At the lower forest border of Kindoroko Forest Reserve, at an altitude of 1750 m, *P. uguenoensis* inhabited fallow arable land with herbaceous vegetation. Here Saltatoria species from lower altitudes, like *P. uguenoensis* itself and others, such as *Phlesirtes* sp. 1, *Aulacobothrus dorsatus*, *Acrida sulphuripennis*, *Humbe tenuicornis, Odontomelus* cf. *brachypterus, Ixalidium bicoloripes* Uvarov, and *Morphacris fasciata*, found their upper limit. Montane species, probably dependent on a higher air humidity, had their first occurrence on this fallow land as well. These were *H. parensis* (see above), *H. trimaculatus, Phlesirtes* sp. 2, *Amytta* sp. 1 and 2, *Chromothericles* sp., and *Parepistaurus* sp. *Rhainopomma montana* was found in humid places along riversides, from about 1500 to the fallow land at 1750 m, occurring there syntopic with *Peronura parensis. P. parensis* was not seen in the adjacent forest clearings.

Lamecosoma inermis Ragge, 1961

Figs 15-19

Ragge (1961) described the male of *L. inermis* from the Karura forest, Nairobi Kenya. He states that there are female specimens from the Chyulu Hills of Kenya in the collection of the British Museum that resemble the holotype of this species. However, since these females are from a different locality, Ragge hesitated to identify them with males of *L. inermis*.

Males and females of *L. inermis* were collected around East Kilimanjaro, Tanzania, making it possible to describe the female of *L. inermis* with certainty.

Material studied. — All Tanzania, all Mt. Kilimanjaro, all C. Hemp coll. 1 ♀; Tanzania, Mt. Kilimanjaro, eastern slopes, savannah grassland,

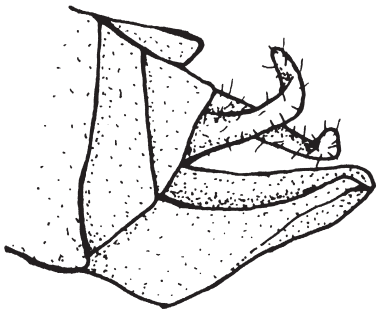

Fig. 15. Abdominal apex of *L. inermis* male.

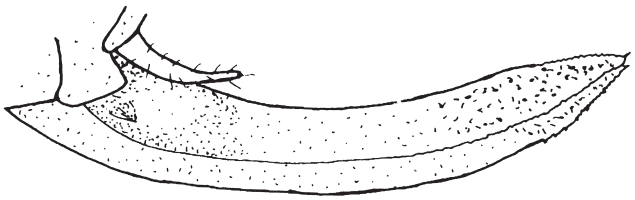

Fig. 17. Lateral view of ovipositor of *L. inermis.*

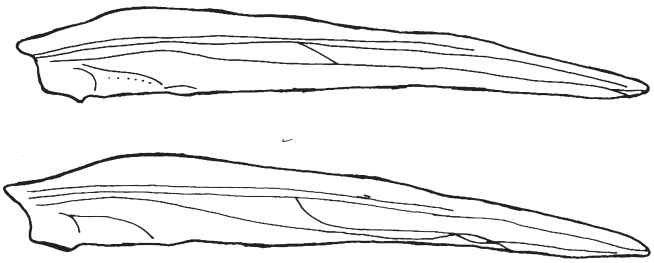

Fig. 16. Right forewings of two male *L. inermis* showing variation.

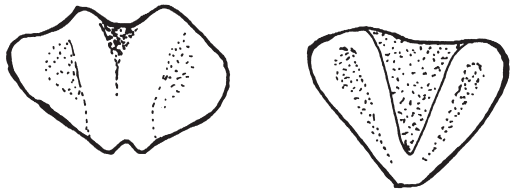

Fig. 18. Female subgenital plates. Left, *L. inermis*, Right, *H. heteromorpha.* Anterior margin at top.

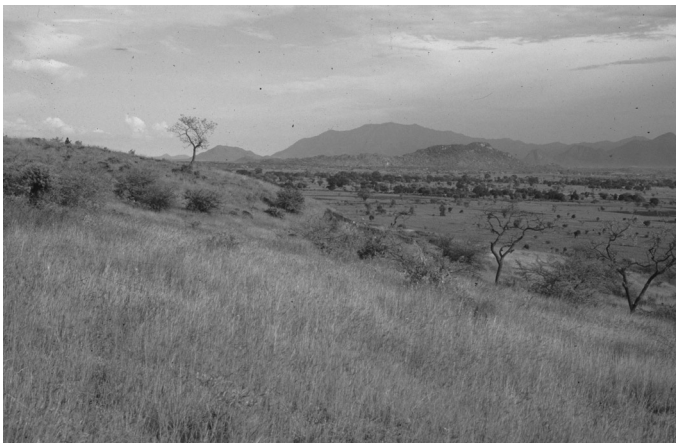

Fig. 19. Especially in January, individuals of *L. inermis* are found in savannah grasslands in southeast and east Kilimanjaro.

1170 m, Jan 2001, C. Hemp coll.; depository, NHML. 1 ♀; eastern slopes, savannah grassland, 1170 m, Jan 2001, depository, MNB. 1 ♂; southeastern slopes, *Hyparrhenia* grassland, 1270 m, Feb 2001. 1 ♀; southeastern slopes, Lake Chala area, savannah grassland, 1000 m, Dec 1997. 1 ♀; southeastern slopes, Lake Chala area, savannah grassland, 1025 m, Dec 1997. 1 ♂; southeastern slopes, *Hyparrhenia* grassland, 1270 m, Feb 2001. 1 ♂; southeastern slopes, savannah grassland on parasitic volcanic vent, 1200 m, Jan 2001.

Description.— **Female**: color uniformly green with legs tawny-greenish-yellow, dorsal part of pronotum brown or green.
Head: antennae tawny to brown, about 1.5 times longer than length of insect. Cuticle of head smooth, fastigium of vertex blunt, sulcate; fastigium of frons extending upwards beyond fastigium verticis. Eyes small, circular.
Thorax: pronotum without lateral carinae.
Tegmina and wings: tegmina very narrow, surpassing body, longer than flexed hind knees, about 7 to 10 times longer than broad. Alae completely reduced.
Legs: tympanic auricles of fore tibiae not inflated. All femora armed with only a few spines; fore femora with 5 to 9 outer and 5 to 9 inner spines; midfemora with 4 to 6 outer and 4 to 6 inner spines; hind femora with 3 to 6 outer and 2 to 3 inner spines. Tibiae with spines of normal slender shape; fore and mid tibia ventrally with two rows of numerous spines, becoming denser distally, with both a dorsal and ventral pair of spurs. Hind tibiae with 4 rows of numerous spines, becoming somewhat denser on the ventral side distally; two spurs ventrally, one pair of spurs dorsally.
Genitalia: subgenital plate as in Fig. 18. Cerci narrow and acuminate, ovipositor slightly up-curved (Fig. 17).

Measurements.— **Female**

	Ragge (1961) n = 2	(n = 4)
Length of body	37.2 to 38.2 mm ($\bar{x}$: 37.7)	27 to 34 mm ($\bar{x}$: 31 mm)
Length of body and tegmina	—	40 to 43 mm ($\bar{x}$: 41.6)
Median length of pronotum	4.6 to 4.8 ($\bar{x}$: 4.7)	4.8 to 5.0 mm ($\bar{x}$: 4.9)
Length of hind femur	22.6	20 to 25 mm ($\bar{x}$: 23.3)
Length of tegmina	30.6 to 32.4 ($\bar{x}$: 31.5)	31 to 33 mm ($\bar{x}$: 32 mm)
Length of ovipositor	11.8 to 11.9 ($\bar{x}$: 11.85)	10.2 to 10.5 mm ($\bar{x}$: 10.4)

Diagnosis.— The spination of the legs of females of *L. inermis* differs slightly from the spination of the males. On males the spines are stouter, more numerous and mostly marked black at their tips. Compared to the data given by Ragge (1961), the Kilimanjaro specimens have lesser body and ovipositor lengths. Measurements for the length of the pronotum, hind femur and tegmina coincide well.

Comparing the measurements of the males, the specimens of Ragge are smaller in body size. The data for length of pronotum and hind femur fit well. The length given for the tegmina is slightly shorter than that found in the Kilimanjaro specimens. All in all, the measurements of Kenya and Kilimanjaro individuals agree well. Since Ragge (1961) did not show tegminal venation and the lateral view of the genitalia of male *L. inermis,* figures 15 and 16 are included in this paper for illustration.

H. heteromorpha also occurs in the Kilimanjaro habitats of *L. inermis*. The females of both species are similiar, while males can be easily separated. *L. inermis* males lack the alae which are fully developed in *H. heteromorpha*. Females can be distinguished by comparing the subgenital plates (Fig. 18): the subgenital plate of *H. heteromorpha* females has a deep v-shaped central depression (Fig. 18, right), while in *L. inermis* only a shallow depression is present anteriorly (Fig. 18, left). Posteriorly, a shallow emargination occurs in *L. inermis*, while the subgenital plate of *H. heteromorpha* ends bluntly.

Measurements.— **Male**

	Ragge (1961) (n = 1)	n = 3
Length of body	—	20.0 to 23.0 mm
Length of body and tegmina	31.2 mm	35 to 36 mm
Median length of pronotum	4.8 mm	4.5 to 5.0 mm
Length of hind femur	25.8 mm	24.5 to 25.2 mm
Length of tegmina	26.8 mm	27.0 to 28.0 mm

Habitat.— Specimens of *L. inermis* were collected only in colline and submontane savannah grasslands on the southeastern and eastern slopes of Mt. Kilimanjaro (Fig. 19) at altitudes of 1000 to nearly 1300 m. Table 2 lists the 61 co-occurring Saltatoria species from 10 plots where *L. inermis* was present.

Acknowledgements

For the evaluation of the sound data of *H. parensis,* my gratitude to Prof. O. von Helversen (Erlangen) and his staff. Many thanks also for the valuable advice of the two reviewers, Prof. S. Ingrisch and Dr. A. V. Gorochov. I would also like to thank Dr. Koen Maes and Dr. Michael Mungai for their support in working in the entomological collection of the National Museums of Kenya, Nairobi as well as Judith Marshall, Natural History Museum , London.

Table 2. Saltatoria species co-occurring in *L. inermis* habitat. Tettigonoidea marked by *; all other species are Acridoidea.

Plot number	85	105	258	259	260	261	237	238	227	228
Altitude (m)	1020	1000	1170	1170	1170	1170	1200	1200	1270	1270
Acorypha glaucopsis (Walker)	x									
Acorypha laticosta (Karsch)										x
Acrida bicolor (Thunberg)									x	
Acrotylus blondeli Saussure	x									
Acrotylus longipes rosea Bolivar	x									
Acrotylus patruelis (Herrich-Schaeffer)	x	x								
Afroxyrrhepes acuticercus Dirsh	x									
Aulacobothrus dorsatus (I. Bolivar)							x	x		
Brachycatantops emalicus (Kevan)	x								x	
Brachycrotaphus sjöstedti Uvarov	x						x	x	x	x
Brachycrotaphus tryxalicercus (Fischer)	x		x	x	x	x				
Cannula gracilis (Burmeister)									x	x
Cataloipus oberthuri (I. Bolivar)	x								x	x
Catantops momboensis Sjöstedt	x									
Chrotogonus hemipterus Schaum	x									
Clonia jagoi Kaltenbach*	x		x	x	x	x				
Conocephalus (X.) meruense (Sjöstedt)*	x		x	x	x	x				x
Conocephalus (C.) conocephalus (Linné)*	x	x								
Conocephalus (A.) maculatus (Le Guillou)*	x									x
Cyrtacanthacris tatarica (Linné)	x	x								
Diabolocatantops axillaris (Burmeister)	x									
Epacrocatantops curvicercus (Miller)	x		x	x	x	x			x	x
Eucoptacra brevidens Uvarov										x
Gastrimargus africanus africanus (Saussure)	x									
Gastrimargus determ. vitripennis (Saussure)	x		x	x	x	x	x	x		
Gastrimargus verticalis verticalis (Saussure)							x	x		
Gymnobothrus sp. 1	x									
Gymnobothrus cruciatus I. Bolivar	x									
Gymnobothrus lineaalba I. Bolivar	x								x	x
Gymnobothrus sp. 2							x	x		
Heteracris coerulescens (Stål)									x	x
Heteropternis pudica (Serville)	x									
Heteropternis thoracica (Walker)	x		x	x					x	
Horatosphaga heteromorpha (Karsch)*	x								x	x
Humbe tenuicornis (Schaum)	x		x	x						

Table 2. continued

Lamecosoma inermis Ragge*	x	x	x	x	x	x	x	x	x	x
Megalotheca longiceps (Peringuey)*	x						x	x	x	x
Meruana usambarica Karsch			x	x	x	x				
Mesopsis laticornis (Krauss)	x									
Metaxymecus gracilipes (Brancsik)	x									
Morphacris fasciata (Thunberg)	x									
Odontomelus brachypterus (Gerstäcker)							x	x	x	x
Oedaleus flavus somaliensis Sjöstedt	x	x	x	x						
Oedaleus nigeriensis Uvarov			x	x						
Oedaleus senegalensis (Krauss)	x	x								
Orthochtha dasycnemis dasycnemis (Gerst.)	x		x	x	x	x	x	x	x	x
Peronura clavigera Karsch*			x	x	x	x				
Phymateus viridipes Stål									x	
Plagiotriptus hippiscus Gerstäcker			x	x						
Pnorisa squalus (Stål)	x		x	x		x	x	x		x
Pseudarcyptera cephalica (I. Bolivar)	x									
Pycnodictya galinieri (Reiche & Fairm.)	x									
Rhaphotittha levis (Karsch)	x	x								
Rhaphotittha subtilis Karsch	x		x	x						
Ruspolia differens (Serville)*	x									
Ruspolia sp.*							x	x		
Sphodromerus reductus Kevan		x								
Stenohippus maculifemur Jago	x	x								
Taramassus cunctator (Karsch)	x						x	x		
Tristia pallida Karny			x	x		x	x	x	x	
Truxalis burtti Dirsh	x	x								

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