BioOne COMPLETE

Phlugidia usambarica (Orthoptera: Tettigoniidae: Meconematinae, Phlugidini), a new species from the East Usambara Mts, Tanzania

Author: Hemp, Claudia

Source: Journal of Orthoptera Research, 11(1) : 63-66

Published By: Orthopterists' Society

URL: https://doi.org/10.1665/1082-6467(2002)011[0063:PUOTMP]2.0.CO;2

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Downloaded From: https://bioone.org/journals/Journal-of-Orthoptera-Research on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

Phlugidia usambarica (Orthoptera: Tettigoniidae: Meconematinae, Phlugidini), a new species from the East Usambara Mts, Tanzania

Claudia Hemp

Department of Animal Ecology II NWI, Bayreuth University, 95440 Bayreuth. E-mail: andreas.hemp@uni-bayreuth.de

Abstract

A new species of *Phlugidia* (Orthoptera: Tettigoniidae: Meconematinae) is described from the East Usambara Mts, Tanzania; a list is given of Saltatoria species occurring in the same habitat.

Key words

Species, description, Phlugidini, Africa

Introduction

The East Usambara Mts are known for their high species diversity and degree of endemism. This high proportion of endemic species may be a result of the old age of the mountains, the long interval of separation from Central African forests and the stability of a continuous forest cover (Rodgers & Homewood 1982). Lowland forests, grading into submontane forest communities, offered sufficient habitats for speciation. Nowadays few areas of indigenous forest remain in the East Usambara, due to human use, especially clearing for tea plantations.

Over 20 Acridoidea and about 20 Ensifera species were originally described from the East and West Usambara Mts, many of them endemic, especially among the Ensifera (Bolívar I. 1906; Bolívar C. 1914; Descamps 1964, 1967; Griffini 1909; Hochkirch 1996; Jago 1982, 1983; Jin & Kevan 1991; Karny 1909; Karsch 1888, 1889, 1896; Ragge 1980; Ramme 1929; Sjöstedt 1909, 1913, 1929, 1931; Uvarov 1941, 1953).

Methods

Measurements of dimension in mm. Those of body length include male genitalia and the ovipositor of the female; the length of the ovipositor was measured from its base at the subgenital plate to its tip.

Depositories.—NHML: Natural History Museum London, UK. EDNMK: Entomological Department National Museums of Kenya, Nairobi. MNB: Museum Für Naturkunde, Zentralinstitut der Humbolt-Universität zu Berlin.

Results

Phlugidia usambarica n. sp.

Holotype.— ♂: Tanzania, East Usambara Mts, Sigi Trail, 450 m, Mar 1999 (C. Hemp coll.), depository NHML.

Paratypes.— Tanzania, East Usambara Mts, 1 ♀, Sigi Trail, 450 m, Aug 2001 (C. Hemp coll.), depository NHML ; 1 ♂, Sigi Trail, 450 m, Mar 1999 (C. Hemp coll.), depository EDNMK; 1 ♀, Sigi Trail 450 m, Aug 2001 (C. Hemp coll.), depository EDNMK.

Additional material examined.— Tanzania, East Usambara Mts, 3 ♂♂, 3 ♀♀, 2 nymphs, Sigi Trail, 450 m, Mar 1999, Aug 2001 (C. Hemp coll.).

Description.— **Male.**
Head: fastigium of vertex short; first antennal segments nearly touching medially. Eyes prominent and globular. Antennae more or less 4 times as long as body (Fig. 1).
Thorax: pronotum elongate, convex, about two times as long as wide seen from above; without carinae or median furrow; surface smooth and shiny. Pronotum inflated above elytra. Lateral lobes of pronotum shallow with small margin.
Wings: wings absent, tegmina partly covered by pronotum when folded together, posterior margin almost straight, visible from above.
Legs: front coxa bearing spine-like curved process pointing forward. Front femur with 3 spines, fore tibia with three inner and three outer spines, inner spines longer. First of these spines arising just below tympanal organ. Tympanal organs flat, open and non-conchate on both sides of the front tibiae. Midfemur unarmed, midtibia in its middle with single small ventral spur. Hind femur unarmed, hind tibia dorsally with a row of many small spines, hairy.
Abdomen: ninth abdominal segment with posterior margin triangular, spine-like apex slightly curved upwards (Figs 2, 3). Tenth abdominal tergite posterior margin has v-shaped notch (Fig. 3), lateral margins raised on each side, forming blunt processes at posterior margin (Figs 2, 3). Cerci slender, ending in an inner rounded lobe and a short outer one (Fig. 3). Subgenital plate almost square, styli tapering and curved downward (Fig. 5).

Downloaded From: https://bioone.org/journals/Journal-of-Orthoptera-Research on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use



Fig. 1. *P. usambarica* male nymph about 1.5 m above the ground atop a broad leaf along the Sigi Trail in the East Usambaras Mts (Mar 99).

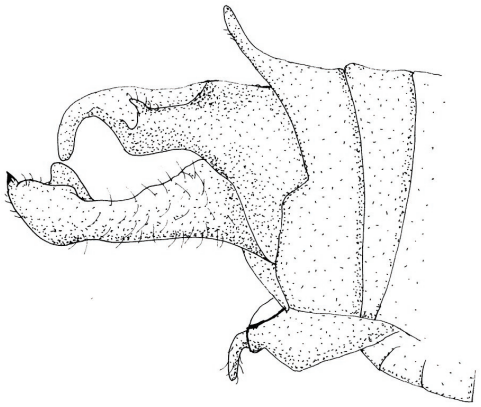


Fig. 2. Lateral view of male genitalia of *P. usambarica.*

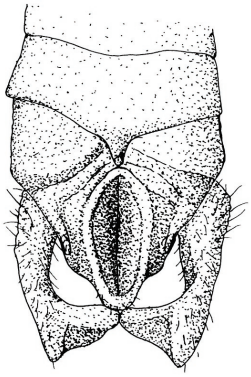


Fig. 3. Dorsal view of male genitalia of *P. usambarica*.

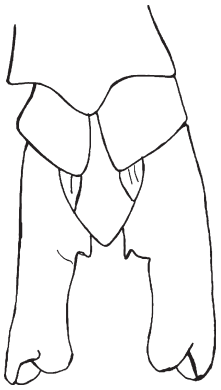


Fig. 4. Dorsal view of male genitalia of *Phlugidia africana* Kevan 1993 (from Kevan & Jin 1993).

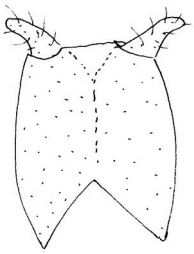


Fig. 5. Ventral view of male subgenital plate of *P. usambarica*.

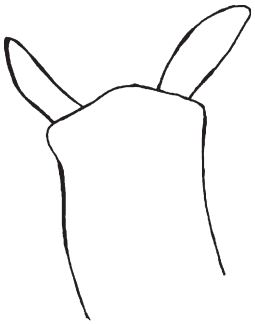


Fig. 6. Ventral view of male subgenital plate of *P. africana* (from Kevan & Jin 1993).

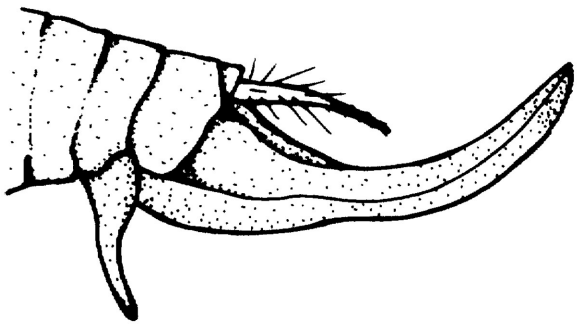


Fig. 7. Lateral view of ovipositor, *P. usambarica.*

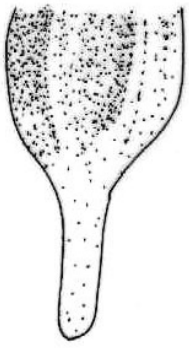


Fig. 8. Ventral view of female subgenital plate, *P. usambarica.*

Downloaded From: https://bioone.org/journals/Journal-of-Orthoptera-Research on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

Measurements.— **Males** (n = 5). Measures in mm. Length of body: 9.8 to 11.0 (mean 10.3); median length of pronotum: 3.8 to 4.1 (mean 4.0); length of hind femur: 11.0 to 11.5 (mean 11.2); visible median length of elytra: 0.1 to 0.4 (mean 0.26).

Coloration.— Legs and part of abdomen greenish; eyes, base of hind femur, and a broad median line running on the pronotum to the abdomen's end, vivid iridescent turquoise blue. Head and lines beside blue median line, brown-reddish. Preserved insect greenish to tawny, reddish lines on pronotum, abdomen and head persistent.

Female: as male with following differences: pronotum shorter, flat, not raised in tegminal area as in male, tegmina not visible, even at sides of posterior margin of pronotum. Cerci very long and slender (1.4 mm), hairy (Fig. 7). Ovipositor inflated over basal half, up-curved, tips of valves dark pigmented (Fig. 7). Subgenital plate undivided, ending in finger-like projection (Figs 7, 8).

Measurements.— **Females** (n = 5). Measures in mm. Total length (with ovipositor): 11.0 to 14.8 (mean 12.7); median length of pronotum: 3.0 to 3.3 (mean 3.2); length of hind femur: 9.5 to 11.0 (mean 10.0); length of ovipositor: 5.0 to 5.3 (mean 5.1).

Habitat of P. usambarica and co-occurring Saltatoria species.— P. usambarica was collected in lush vegetation on large leaves of the submontane forests, about 1 to 2 m above the ground (Fig. 1). It was found along the Sigi Trail from altitudes of 450 to 900 m and on the Kwamkoro Nature Trail above Amani (900 m).

Saltatoria species living syntopically with *P. usambarica* in the vegetation (1 to 2 m) along the Sigi Trail include: *Stenoschmidtia elegans* (Decamps) (Eumastacidae), *Rhainopomma usambarica* (Ramme) (Lentulidae), *Parepistaurus amanicus* Uvarov (Acrididae, Coptacridinae), *Dioncomena ornata* Brunner v. Wattenwyl (Tettigoniidae, Phaneropterinae), *Anthracites usambaricus* Sjöstedt (Tettigoniidae, Conocephalinae, Agraeciini), *Agraecia* sp. (Tettigoniidae, Conocephalinae, Agraeciini), and *Acauloplax exigua* Karsch (Tettigoniidae, Pseudophyllinae). On the forest floor *Ixalidium haematoscelis* Gerstäcker (Acrididae, Catantopinae), *Aresceutica subnuda* Karsch (Acrididae, Catantopinae), *Gymnoscirtus unguiculatus* (Karsch) (Tettigoniidae, Mecopodinae) and *Loveridgacris impotens* (Karsch) (Pyrgomorphidae) were noted.

Along the Kwamkoro Nature trail (900 m) above Amani, *Mastarammea karaseki* (Ramme), *R. usambarica*, *Parepistaurus amanicus* occurred syntopically with *P. usambarica;* while on the forest floor *Physocrobylus tessa* Hochkirch, *A. subnuda*, and *Ixalidium transiens* Ramme were found.

Diagnosis and discussion

The genus *Phlugidia* was erected for the species *Phlugidia africana* Kevan, occurring on the Kenyan coast (Kevan & Jin 1993). This new genus was erected solely for geographical reasons, as it was the first species of Phlugidini found on the African continent.

The tribe Phlugidini was newly defined by Kevan & Jin (1993) containing, beside *Phlugidia* Kevan, the genera *Phlugis* Stål, *Phlugiola* Karny, and *Tenuiphlugis* Kevan. Gorochov (1998) added *Asiophlugis*. The key characters of the Phlugidini are a short vertex, which is declivent and not pointed, the eyes are prominently globosely protruding, the lateral lobes of the pronotum are shallow with no visible humeral sinus and the auditory foramen is small. The ovipositor is swollen in the basal part and the distal parts are strongly curved upwards.

The genus *Phlugidia* is characterized by minute thoracic spiracles and a thoracic auditory foramen which is virtually nonexistent. All sterna are unarmed. The tegmina are greatly reduced, to rounded lobes, and hind wings are absent. The front leg coxae bear a long spine-like process. Femora and tibiae have short spurs. The tympana are open, oval and flat. On the last abdominal segment posterior margins are notched with obliquely raised sides. The cerci are stout and straight.

The genus *Phlugidia* agrees closely with *Phlugiola* in general characters but differs in a more shallow lateral lobe of the pronotum, with the lower margin less convex, an obsolete thoracic foramen, a comparatively long anterior coxal process, greatly reduced tegmina that are covered by the pronotum, and femora tapering gradually from their widest points to their distal ends (Kevan & Jin 1993).

Kevan & Jin (1993) remark that *Phlugiola dahlemica* Eichler, known only from female greenhouse populations (Berlin, Germany, lost during the second world war) might well originate from Africa and not, as suggested previously, from South America, and thus might belong to the genus *Phlugidia*. Arguments given for this are a comparatively long coxal process of this species and hind femora that gradually narrow distally. These are characters of the genus *Phlugidia*. In *Phlugiola* the front coxal process is shorter or lacking and the hind femora are abruptly narrowed distally. A deeply bilobed female subgenital plate was listed by Karny (1907) as a generic feature for *Phlugiola* which was erected on the species *Phlugiola redtenbacheri* Karny. Females of *P. dahlemica* however have an entire subgenital plate with the posterior margin nearly straight. As Kevan & Jin (1993) had no females of *P. africana* they could not clarify the value of an entire or bilobed female subgenital plate serving as a generic character separating *Phlugidia* and *Phlugiola*.

P. usambarica as well has an entire subgenital plate but of a different shape with a smoothly rounded posterior margin (Fig. 7, 8) and this might now lead to the suspicion that another generic character separating *Phlugiola* and *Phlugidia* had been found, so justifying a shift of *P. dahlemica* to *Phlugiola*. However, in the meantime another *Phlugiola* species has been found in South America in which females have an entire subgenital plate (Nickle, in process). Thus the shape of the female subgenital plate cannot serve as a generic feature separating these two genera and the origin of *Phlugiola dahlemica* remains uncertain.

The differences between *P. usambarica* and *P. africana* lie in the shape of the male genitalia; the female of *P. africana* is hitherto unknown. The male cerci of *P. usambarica* lack the inner basal teeth present in *P. africana* and the cercal apices are more inflated and more strongly differentiated into two lobes (Fig. 4). The 10th abdominal segment is triangular with a v-shaped notch as in *P. africana*, but there are no lateral processes in *P. africana*. The posterior margin of the 9th abdominal tergum projects as a median spine-like process in *P. usambarica*, while it is triangular and without a process in *P. africana* (Figs 3, 4). The male subgenital plate is of square shape in *P. usambarica* (Fig. 5) and rectangular in *P. africana* (Fig. 6). The

Downloaded From: https://bioone.org/journals/Journal-of-Orthoptera-Research on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

coloration of the living animal is a vivid iridescent blue, mixed with reddish and green, while *P. africana* shows a pattern of green and brownish (Kevan & Jin 1993).

Acknowledgments

I would like to thank the two reviewers for valuable advice on the manuscript.

References

Bolívar C. 1914. Eumastacinos nuevos ó poco conocidos (Orthoptera, Locustidae). Trabajos del Museo Nacional de Ciencias Naturales 16: 1-47.

Bolívar I. 1906. Fasgonurídeos de la Guinea Española. Memorias de la Sociedad española de Historia natural 1: 327-377.

Descamps M. 1964. Revision préliminaire des Euschmidtiinae (Orthoptera - Eumastacidae). Mémoires du Museum National D'Histoire Naturelle N.S. A, Zoologie 30 (A): 1-318.

Descamps M. 1967. Un nouveau *Stenomastax* de Tanzanie (Orth. Eumastacidae). Bulletin de la Société entomologique de France 72: 167-172.

Gorochov A. V. 1998. New and little known Meconematinae of the tribes Meconematini and Phlugidini (Orthoptera: Tettigoniidae) Zoosystematica Rossica 7: 101-131.

Griffini A. 1909. Note sopra algune Phasogonouridae del Congo. Annales de la Société entomologique de Belgique 53: 21.

Hochkirch A. 1996. *Physocrobylus tessa*, a new grasshopper species from the East Usambara Mountains, NE Tanzania and its systematic position (Acridoidea, Acrididae, Coptacridinae). Journal of Orthoptera Research 5: 53-55.

Jago N. D. 1982. The African Genus *Phaeocatantops* Dirsh, and its allies in the world tropical genus *Xenocatantops* Dirsh, with description of new species (Orthoptera Acridoidea, Acrididae, Catantopinae). Transactions of the American Entomological Society Philadelphia 108: 429-451.

Jago N. D. 1983. Flightless members of the *Phlaeoba* Genus group in eastern and north-eastern Africa and their evolutionary convergence with the genus *Odontomelus* and its allies (Orthoptera Acridoidea, Acrididae, Acridinae). Transactions of the American Entomological Society Philadelphia 109: 77-126.

Jin X.-B., Kevan D. K. McE. 1991. *Afrophisis*, a new genus and two new species of small orthopteroids from Africa (Grylloptera Tettigonioidea Meconematinae). Tropical Zoology 4: 317-328.

Karny H. H. 1909. Ostafrikanische Orthopteren. Sammelausbeute von A. Borgert, 1904-1905. Zoologische Jahrbücher (Systematik) 27: 477-80.

Karny H. 1907. Revisio Conocephalidarum. Abhandlungen der K.K. Zoologischen-Botanischen Gesellschaft in Wien 4(3): 1-114.

Karsch F. 1888. Die Meconemiden. Ein orthopterologischer Beitrag. Wiener Entomologische Zeitung 7: 159-162.

Karsch F. 1889. Orthopterologische Beiträge. III. Berliner entomologische Zeitung: 415-464.

Karsch F. 1896. Neue Orthopteren aus dem tropischen Afrika. Stettiner Entomologische Zeitung 57: 242-359.

Kevan D. K. McE., Jin X.-B. 1993. Remarks on the tribe Phlugidini Eichler and recognition of new taxa from the Indo-Malayan region and East Africa (Grylloptera: Tettigonioidea: Meconematidae). Invertebrate Taxonomy 7: 1589-610.

Nickle D. A. In Process. New species of tettigoniids (Orthoptera: Tettigoniidae) of the neotropical genera *Arachnoscelis* (Litroscelidinae) and *Phlugiola* (Meconematinae). Journal of Orthoptera Research.

Ragge D. R. 1980. A review of the African Phaneropterinae with open tympana (Orthoptera: Tettigoniidae). Bulletin of the British Museum (Natural History) 40: 1-192.

Ramme W. 1929. Afrikanische Acrididae. Revisionen und Beschreibungen wenig bekannter und neuer Gattungen und Arten. Mitteilungen des Zoologischen Museums Berlin 15: 247-492.

Rodgers W. A., Homewood K. M. 1982. Species richness and endemism in the Usambara mountain forests, Tanzania. Biological Journal of the Linnean Society 18: 197-242.

Sjöstedt Y. 1909. In: Sjöstedt, Y (Hrsg.): Wissenschaftliche Ergebnisse der Schwedischen Zoologischen Expedition nach dem Kilimanjaro, dem Meru und den umgebenden Massaisteppen Deutsch-Ostafrikas 1905-1906. 17. Orthoptera. Locustodea: 125-148, Acridoidae: 149-200.

Sjöstedt Y. 1913. Neue Orthopteren aus Ost- und Westafrika nebst einigen anderen zugehörigen Formen. Arkiv för Zoologi 8: 1-26.

Sjöstedt Y. 1929. Acridoidea aus Zentralafrika gesammelt von R. Grauer während seiner Expedition 1909-1911. Arkiv för Zoologi 20A: 1-41.

Sjöstedt Y. 1931. Acridoidea aus Kongo und anderen Teilen von Afrika. Arkiv för Zoologi 22A: 1-64.

Uvarov B. P. 1941. New African Acrididae (Orthoptera). Journal of the Entomological Society of South Africa 4: 47-71.

Uvarov B. P. 1953. Grasshoppers (Orthoptera, Acrididae) of Angola and Northern Rhodesia, collected by Dr. Malcolm Burr in 1927-1928. Publicacoes Culturais da Companhia de Diamantes de Angola 21: 9-217.

Downloaded From: https://bioone.org/journals/Journal-of-Orthoptera-Research on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use