

A new species of *Neoleva* (Caelifera, Acridoidea, Acrididae, Gomphocerinae) from Central Tanzania

CLAUDIA HEMP^{1,2}

¹ University of Bayreuth, Dept. Plant Systematics, Bayreuth, Germany.

² Senckenberg Biodiversity and Climate Research Centre, Frankfurt, Germany.

Corresponding author: Claudia Hemp (claudia.hemp@uni-bayreuth.de)

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Abstract

A new species of *Neoleva* Jago, *N. magna* sp. nov. is described from Central Tanzania. A key to all species of *Neoleva* is presented.

Keywords

East Africa, grasshopper, taxonomy

Introduction

Neoleva Jago, 1996 was erected by Jago (1996) with *N. mega* Jago, 1996 from Ethiopia as the type species, and another three species from Kenya were included. *Neoleva* are stocky brachypterous Gomphocerinae. The antennae are longer than the head and the pronotum together. Males have a rounded subgenital plate and simple cerci. There is a marked sexual dimorphism, the females being considerably larger than the males (Fig. 1). Males show a contrasting color pattern with an orange dorsal abdomen and orange parts on the hind femora, while females are duller in color. In males a pair of white spots at the anterior margin of the pronotum is present and a pair of angulate cream to white bands on the meso- and metanotum. The epiphallus has a strong bridge and a narrow interspace (Jago 1996). *Neoleva* are a geophilous species found in habitats ranging from semi-desert to savanna woodlands.

In this paper, a new species, *N. magna*, is described from the Mwapwa District in Central Tanzania.

Material and methods

Material studied.—All available specimens of the four species of *Neoleva*, including the type specimens present in the Natural History Museum London, UK, were studied and compared to specimens of the new species, *Neoleva magna* sp. nov. from Tanzania.

Genital preparations.—For genital preparations, specimens were relaxed in water, the phallus extracted manually, macerated in 5% KOH, then neutralized in 5% acetic acid.

Photographic procedure.—The macerated epiphallus was photographed with an Olympus Tough TG 6 Camera, and the images were processed using the stacking program supplied with that camera.

Measurements.—The body length refers to the body length of the insect from head to the tip of the abdomen. Additionally, the total length according to Jago (1996), taken from the frons to the tips of the folded posterior femora, is given.

Depositories.—BMNH: Natural History Museum London, UK. CCH: Collection of Claudia Hemp.

Results

Neoleva magna sp. nov.

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Material examined.—**Holotype:** TANZANIA • ♂; Mwapwa District, Chagalawe Hill; 6°53'47"S, 36°02'46"E; miombo woodlands, ca 750 m; March 2015, C. Hemp leg.; BMNH. **Paratypes:** TANZANIA • 1♀; same data as holotype; BMNH • 2♂, 2♀, same data as holotype; CCH • 3♂, 1♀; Msaze village near Gulwe; 6°31'23"S, 36°22'12"E; 1000 m a.s.l.; March 2017 and March 2020; C. Hemp leg.; CCH.

Description.—**Male.** General coloration: A speckled pattern of gray, dark, and white patches with abdomen, inner sides of the hind femora, and apical parts of the tibiae orange. Tegmina light brown in costal area, darker brown above with some dark spots around the media area (Fig. 2). Pronotum with well-developed

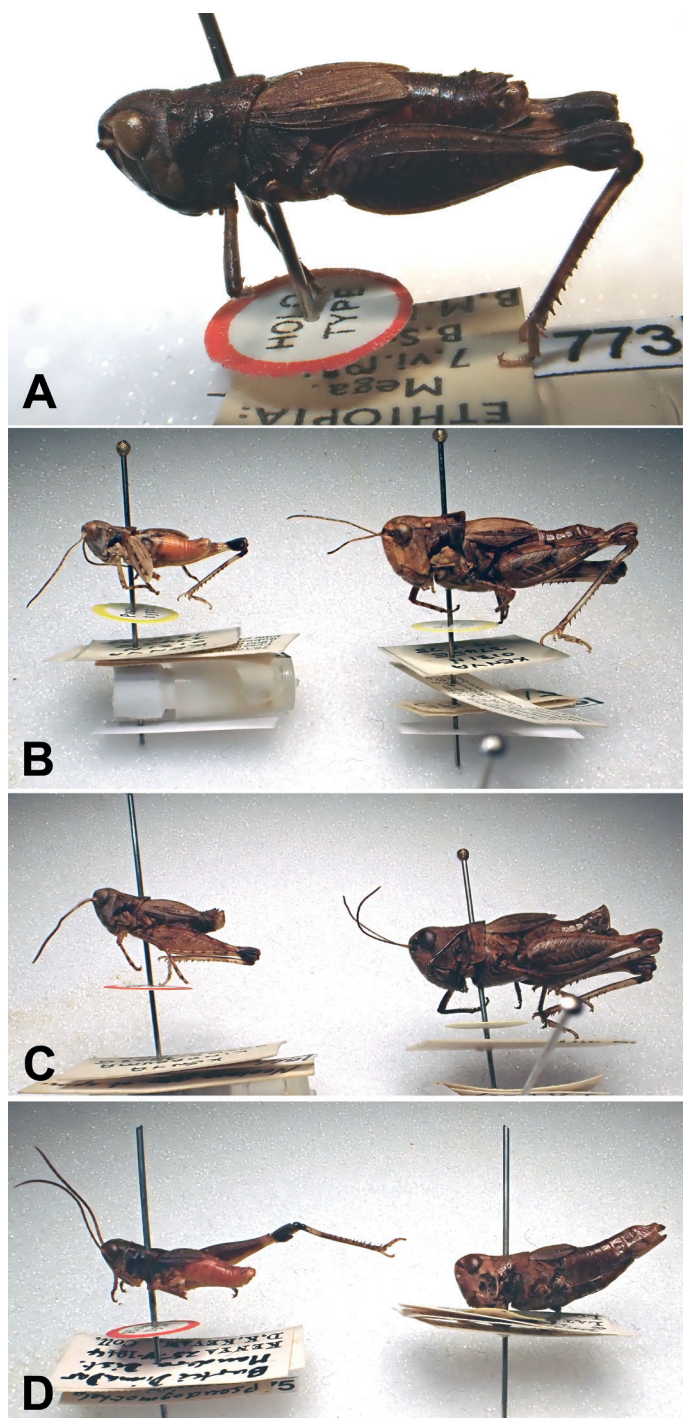


Fig. 1. Types of *Neoleva* species. A. Male holotype of *N. mega*; B. Types of *N. bufooides*, left male, right female; C. Types of *N. robertsoni*, left male, right female; D. Types of *N. kevani*, left male, right female.

pair of white spots at anterior margin and angulate white lines on meso- and metazona (Fig. 3D). Ventral parts of lateral pronotal lobes white or creamy (Fig. 3A). Lunules of hind femora dark with a postgenicular white band both on femur and tibia (Fig. 2A). Remaining part of outer side of hind femora greyish or creamy with three dark fasciae on dorsal ridge. These fasciae extend into inner parts of the hind femora. Fore and mid legs speckled white or greyish and black.

Head and antennae. Antenna about 1.5 times longer than head and pronotum, about 13 mm. Frontal ridge flat coarsely punctate on upper part and with a medial ocellus at about the middle of the ridge (Fig. 3C).

Pronotum and legs. Pronotum crossed by three deep sulci, the posterior one separating the mesozona from the metazona continuing deep into the lateral pronotal lobes with an abrupt angle about in the middle of the pronotal lobes and then running anteriorly almost to the anterior margin (Fig. 3A). A medial carina is faint on pro- and mesozona but well-developed on the metazona. The tegmina reach to about the middle of the abdomen and are tectate with elevated veins along the whole length.

Abdomen. Supra-anal plate triangular, at tip appendiculate (Jago 1996; compare his figs 109–112, p. 80 and Fig. 3 B). Cerci are short and slightly laterally compressed (Fig. 3 B).

Internal genitalic morphology. Ancorae of epiphallus very weakly sclerotized and comparatively small. Bridge narrow. Inner and outer lophi typical for *Neoleva* (Fig. 4).

Female. Larger and stouter than the male (Fig. 2B), color pattern duller but generally similar to male having a pair of white dots at the anterior pronotal margin and angular white lines at the posterior part of the pronotum (Fig. 5A). Some females are uniformly brown while others also have orange hind femora. Ovipositor valves short; dorsal surfaces of upper valves concave, forming an almost cup-like structure with dark sclerotized margins. Ventral valves with slightly undulating margin, this margin also dark sclerotized with more acute tips (Fig. 5B).

Measurements. (mm)

	Males (N=4)	females (N=6)
Head width	4.2–4.4	5.7–6.1
Interocular Distance	1.0–1.1	1.1–1.2
Posterior femur length	13.0–12.8	17.5–18.8
Posterior femur width	3.7–3.8	4.7–5.2
Tegminal length	7.1–7.6	10.1–10.9
Pronotum length	3.3–3.5	4.8–5.2
Pronotum width	4.7–4.9	6.7–7.8
Body length	17.7–18.5	26.2–26.5
Total length*	18.5–22.0	24.5–29.5

*Frons to tips of folded posterior femora.

Differential diagnosis.—*Neoleva magna* sp. nov. is the largest known species in the genus, males having a total length of about 18.5 to 22 mm, following Jago (1996) who measured the total length (frons to tips of folded posterior femora). All other known species of *Neoleva* are smaller. The females are also larger than those of the known other species, although means overlap (see Table 1). Male *N. magna* sp. nov. resemble *N. bufooides* Jago, 1996 and *N. robertsoni* Jago, 1996 in having a white or creamy ventral margin of the pronotal lobes. In those species, however, the outer sides of the hind femora are more or less uniformly orange to red but are light grey or whitish in *N. magna* sp. nov. in which only the ventral and inner sides of the hind femora are vivid orange. *N. mega* Jago, 1996 and *N. kevani* Jago, 1996 appear to have much duller coloration. However, living specimens of these taxa have not been seen, and for *N. mega*, only the male holotype is known. *N. magna* sp. nov. also has an appendiculate supra-anal plate as described by Jago (1996) for *N. kevani* and *N. mega*. In contrast to the other known species of *Neoleva*, *N. magna* sp. nov. has tectate folded tegmina, while in the other species, the wings are more evenly shaped and more closely appressed to the abdomen. Internally, the male

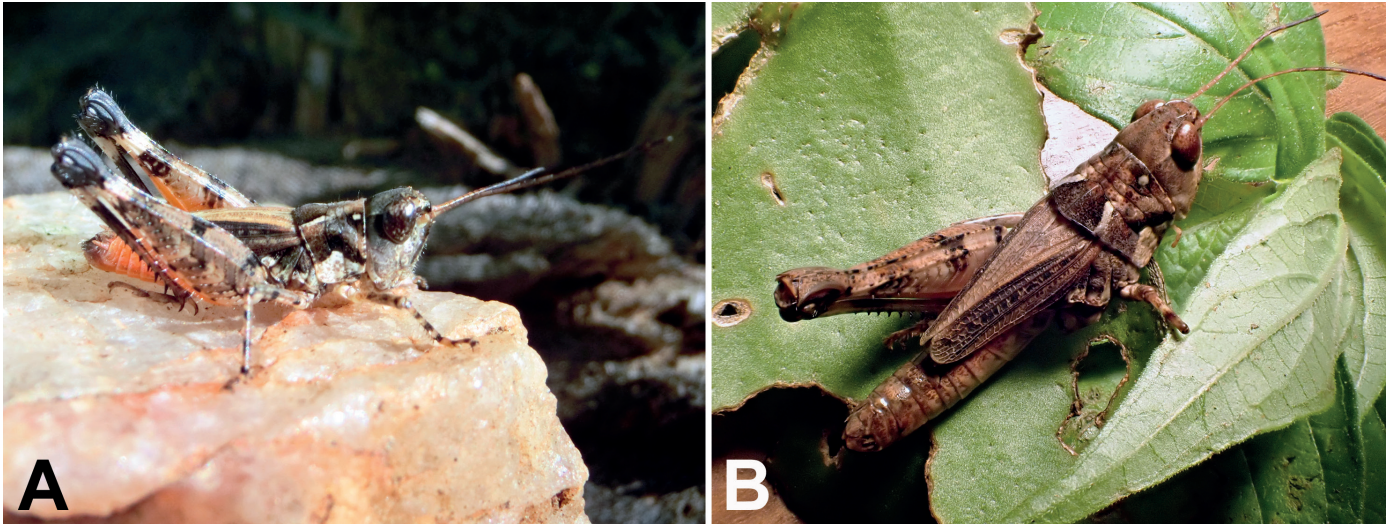


Fig. 2. *Neoleva magna* sp. nov. A. Male; B. Female.

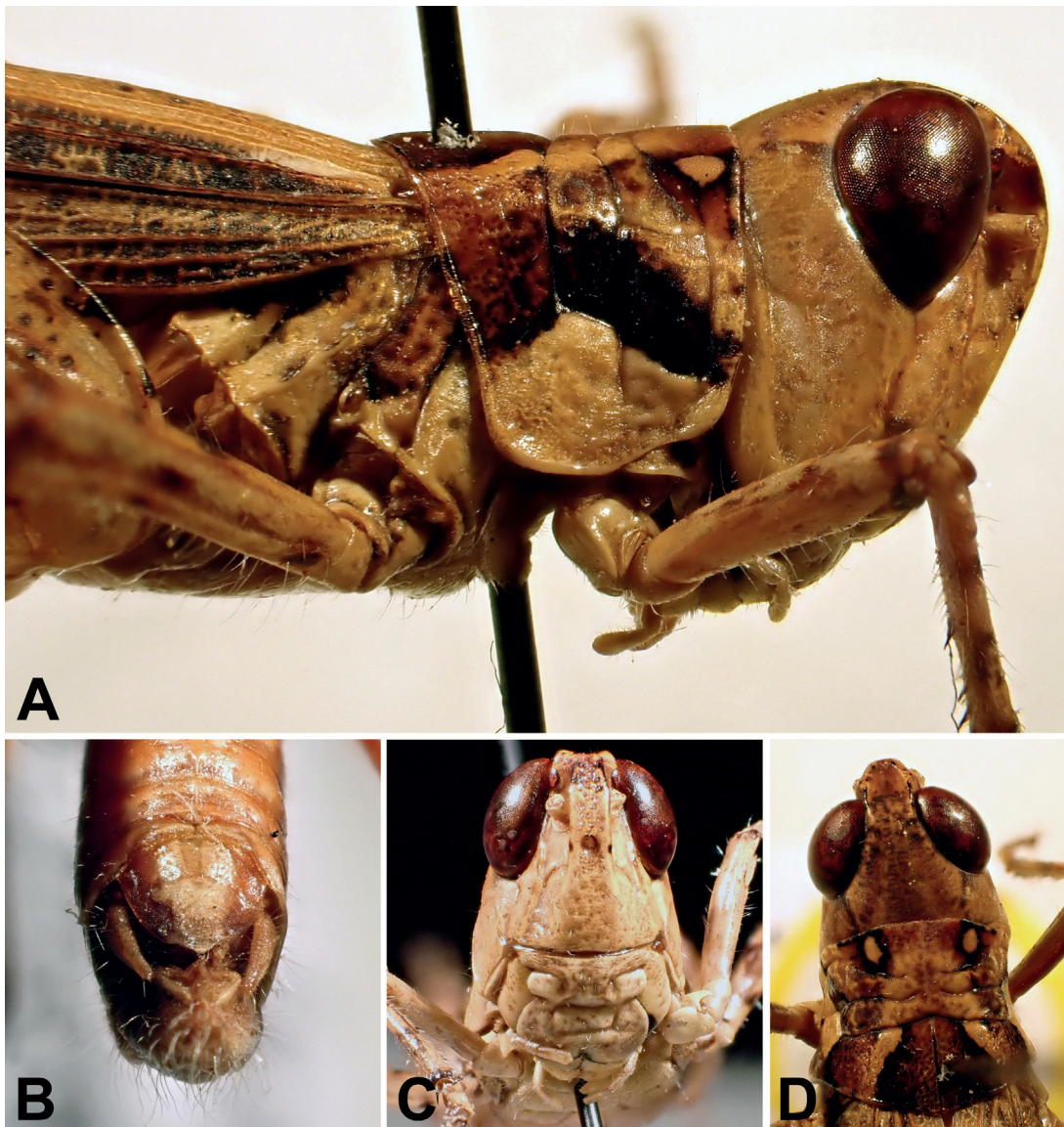


Fig. 3. *Neoleva magna* sp. nov., morphological details of male. A. Lateral view on head and pronotum; B. Dorsal view on abdominal apex with supra-anal plate; C. Face; D. Head and pronotum, dorsal view.

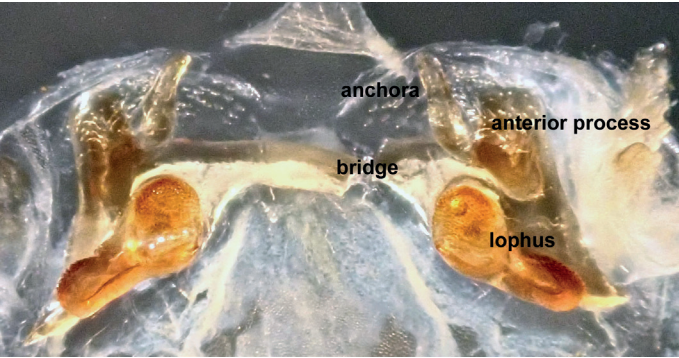


Fig. 4. Epiphallus of *Neoleva magna* sp. nov.

epiphallus of *N. magna* differs from the other three species in its relative size, the distance of the ancorae to each other and the orientation and size of the lophi.

Song.—Unknown.

Etymology.—From latin: *-magnus* = big, because it is the largest species of the genus so far.

Habitat.—Ground dweller on open patches within miombo woodlands and along forest margins with sparse vegetation.

Distribution.—Tanzania, Mpwapwa District.

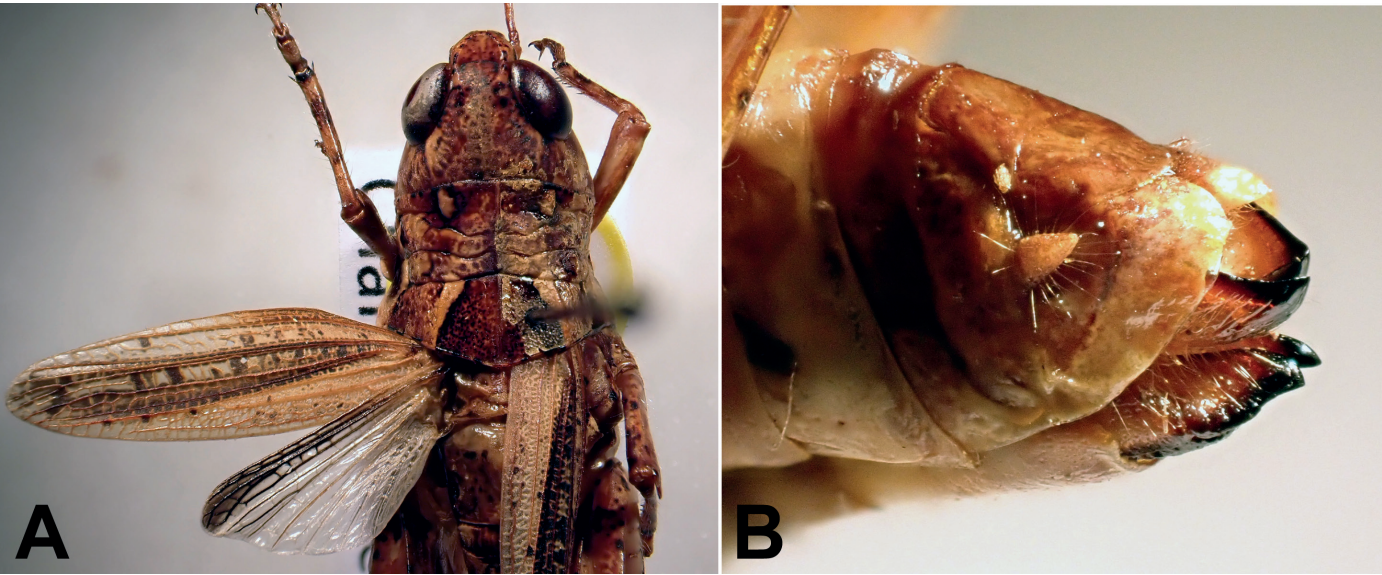


Fig. 5. Female *Neoleva magna* sp. nov. A. Dorsal view of head, pronotum, and spread wings B. Lateral view on abdominal apex.

Table 1. Morphological characters distinguishing *Neoleva* species.

Species /characters	Tegmina	Total length male	Total length females	Color ventral lateral pronotal lobes	Supra-anal plate
<i>N. magna</i> sp. nov.	tectate	>18.5 mm	24.5–29.5 mm	white/creamy	apical appendix
<i>N. robertsoni</i>	lobes	<18.5 mm	22.6–25.7 mm	white/creamy	tapered
<i>N. bufoides</i>	lobes	<18.5 mm	22.2–24 mm	white/creamy	strongly tapered
<i>N. kevani</i>	lobes	<18.5 mm	Not known	brown/black	apical appendix
<i>N. mega</i>	lobes	<18.5 mm	Not known	brown/black	apical appendix

Key to *Neoleva* males (adapted from Jago 1996)

- 1 Tegmina tectiform; male body length (head to tips of folded hind femora) >18.5 mm; Central Tanzania, Mpwapwa District*N. magna* sp. nov.
- 1' Tegmina lobe-like; male body length smaller than 18.5 mm..... 2
- 2 Lateral pronotal lobes with creamy marginal area ventrad..... 3
- 2' Lateral pronotal lobes light brown or black ventrad..... 4
- 3 Inner lophi widely spaced. Supra-anal plate weakly tapered, lacking a transverse sulculus, with extensive melanitic area and pair of darker melanitic spots in basal two-fifth. (Kenya, Meru Region).....*N. robertsoni* Jago, 1996
- 3' Inner lophi comparatively closely spaced. Supra-anal plate strongly tapered, with a clear transverse sulculus and with two weak darkly pigmented areas distal to sulculus (Kenya, Lysamais area)..... *N. bufoides* Jago, 1996

- 4 Inner pair of lophi comparatively small, dorso-lateral angles of lophi produced and lateral margins constricted to form a waist. Abdomen vivid orange red at maturity. Supra-anal plate with strong marginal darker pigmentation and broad apical appendix. (S. Kenya).....*N. kevani* Jago, 1996
- 4' Inner pair of lophi comparatively large, dorso-lateral angles not greatly produced and central section of lateral margins not constricted. Abdomen dark brown to red and black. Supra-anal plate with small apical appendix and rather uniform darker brown pigmentation throughout lightening at margin (Ethiopia).....*N. mega* Jago, 1996

Discussion

Neoleva species are geophilous according to habitat information provided in Jago (1996) and on the labels. No information is available for the holotype Ethiopian male of *N. mega*. *N. bufoides* (*Acacia*

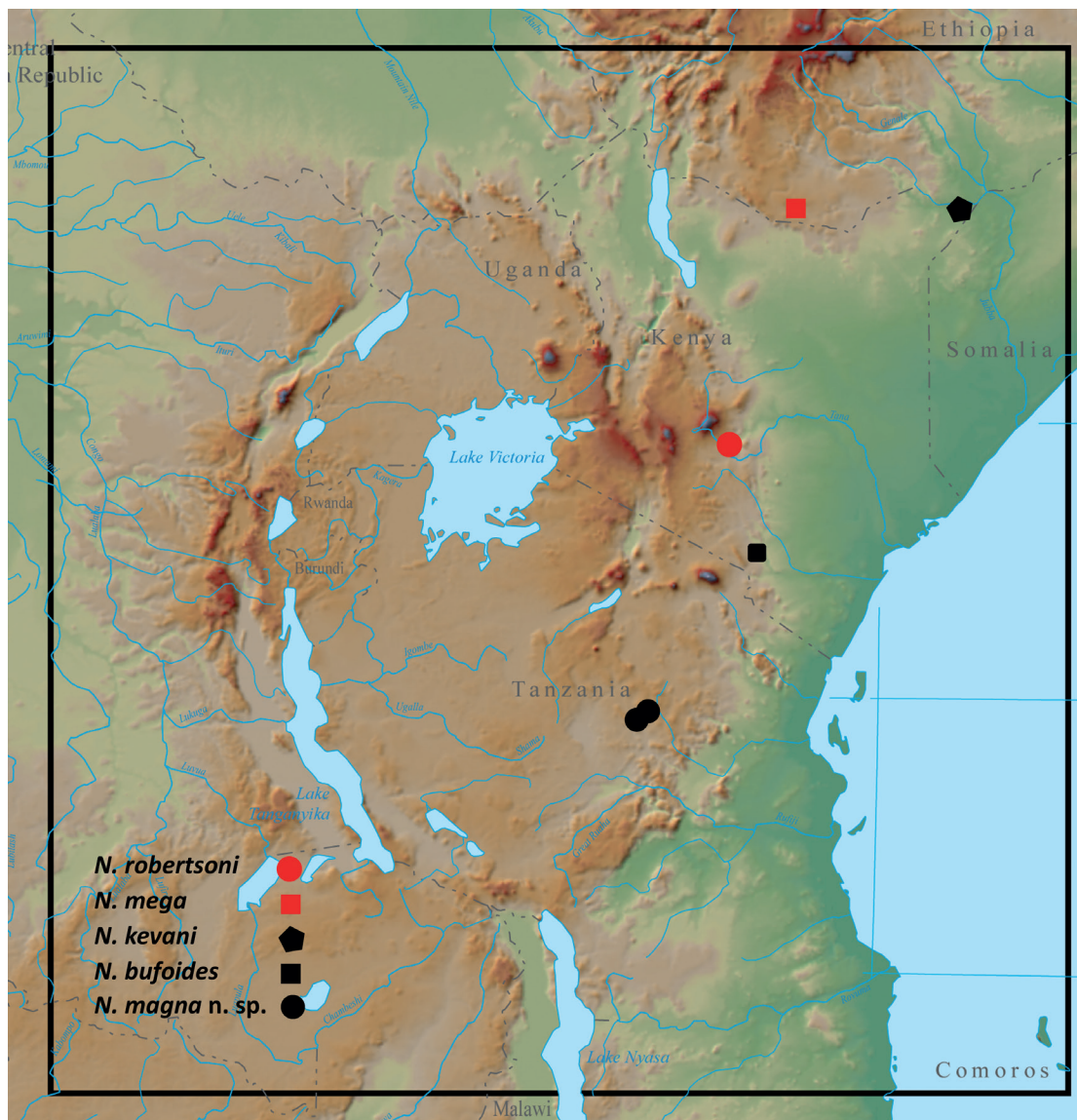


Fig. 6. Distribution of *Neoleva* species. Source of map: Google maps.

shrub; sparse vegetation, *Acacia* thicket, banks of dry riverbed, see Jago 1996), *N. robertsoni* (thicket and herbs), and *N. kevani* (desert grass and thorn bush) are all species that were caught in savanna woodlands on patches with sparse vegetation or in semi-desert areas. *N. magna* sp. nov. occupies a similar habitat in miombo woodlands where it was found at two localities: South of Dodoma at the edge of Changalawe hill covered with sparse miombo forest and at a similar hill near Gulwe not far from the district city Mpwapwa. Hemp and Heller (2019) gave more information on the localities near Gulwe and Changalawe Hill, also listing syntopic Orthoptera for these areas. As already pointed out in Hemp and Heller (2019) Miombo woodlands are vanishing rapidly, mostly due to recurrent burning and transformation into agricultural fields. *N. magna* sp. nov. is probably also under pressure since it seems to be bound to thickets and forest edges of miombo woodlands.

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