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Honouring Nobel Peace Prize winner Wangari Maathai: *Notogomphus maathaia*e sp. nov., a threatened dragonfly of Kenya's forest streams (Odonata: Gomphidae)

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Abstract

Notogomphus maathaiae sp. nov. (holotype ♂: Kenya, Western Province, Mt Elgon District, Mt Elgon, Rongai River, 2,361 m a.s.l., 1°02'19.4"N, 34°45'20.5"E, 06 vi 2000) is described from a series of 8 males and 3 females collected at montane forest streams in Kenya. The status and biogeography of this and other montane species are discussed.

Introduction

Wangari Maathai, the Nobel Peace laureate for 2004 and the first African woman to be honoured with this prize, was rewarded for her tireless effort to protect Africa's natural environment through sustainable solutions for human development. She has focused on the protection of Africa's last remaining and fast shrinking forests, which led to the foundation of the Green Belt Movement. The Nobel Committee's choice for 2004 emphasizes the importance of the protection of the world's natural resources in the fight against poverty. Safeguarding forests and watersheds will not only benefit the livelihood of individual human beings, but also secure a peaceful future for mankind. We wish to acknowledge Wangari Maathai and her achievements by naming a forest dwelling odonate from Kenya in her honour: Maathai's Longleg (*Notogomphus maathaiae* sp. nov.).

The imagines of the genus *Notogomphus* are easily recognised in Africa by their possession of very long and spiny hind femora and rather short male cerci with a large ventro-basal tooth. The species are associated with highlands; most lowland records are in hills or the piedmont, while other species are truly montane, known only from 2,200-2,600 m a.s.l. The species breed in streams which are usually forested, but running waters of major lowland forest areas (e.g. Lower Guinea, Congo Basin) appear to lack *Notogomphus* species. Of about 20 recognised species, only four occur west of the Congo Basin. The remaining species inhabit the great highlands of eastern Africa, particularly their northern end (Ethiopia,

Kenya, Tanzania and Uganda), and most have relatively small ranges. A secondary hot-spot lies in Cameroon, where three endemic species occur (Vick 2003). More species may await discovery, especially in highland regions in Upper Guinea (e.g. Cameroon, Gabon), the Albertine Rift (especially east DRC) and Angola.

Nomenclature used for the colour pattern of synthorax follows Cammaerts (2004: 97). The following acronyms for collections are used:

NMK – National Museums of Kenya, Nairobi, Kenya
RMNH – Nationaal Natuurhistorisch Museum Naturalis, formerly Rijksmuseum van Natuurlijke Historie, Leiden, The Netherlands
BMNH – Natural History Museum, formerly British Museum (Natural History), London, UK

Notogomphus maathaiae sp. nov.

(Figs 1a-e, Plate I)

Specimens studied

Holotype ♂: Kenya, Western Province, Mt Elgon District, Mt Elgon, Rongai River, 2,361 m, 1°02'19.4"N, 34°45'20.5"E, 06 vi 2000, leg. VC, NMK.
Allotype ♀: 08 i 2001, leg. VC at type locality, NMK.
Paratypes: 1 ♂ 06 vi 2000, leg. VC at type locality; 2 ♂ idem, 08 i 2001; 1 ♂ idem, 2,223 m, 1°02'04.8"N, 34°46'46.5"E, 15 xi 2001; all RMNH.
Other specimens: 1 ♂, 1 ♀ Marioshoni Forest, April 1970, leg. B. Watulege, NMK. 1 ♀ Kampala (but see p. 181), Uganda, ix 1951, leg. D.G. Sevastopulo, NMK. 2 ♂ Katamayu, iii 1942, leg. V.G.L. van Someren, BMNH.

Male holotype

A medium-sized and rather dark *Notogomphus* species with conspicuously contrasting grass green frons, postdorsal stripes and thoracic sides.
Head: Labium pale brown. Labrum uniformly dark brown and clypeus blackish brown, contrasting with green mandibles, genae and antefrons. Frons green except for broadly black base. Vertex and antennae black. Front of occiput green, contrasting with vertex, with fairly broad black border. Postgenae blackish brown with two small green spots. Eyes in life dark green.
Thorax: Prothorax blackish brown with two large medio-dorsal green spots, one on forelobe and the other on hindlobe and adjacent part of middle lobe. Synthorax dorsally brownish black to dorsal half of mesokatepisternum and somewhat below the humeral suture, with two green postdorsal stripes well separated from green collar and black middorsal carina. Antehumeral stripes absent. Sides, coxae and underside green with only dark traces on the interpleural and metapleural sutures. Legs dark rufous, paler rufous on hind legs; apices of femora and entire tibiae and tarsi black.
Wings: Hyaline, venation including entire costa black. Pterostigma pale brown between black veins; above 3-4 cells. 14 Ax in Fw and 8-9 in Hw; 11-12 Px in Fw and 10 in Hw; anal triangle 3-celled.

Abdomen: Terminally barely expanded, almost parallel-sided. S1-2 green, dorsally black with broad green medio-dorsal lines. S3 black with small baso-lateral green triangles and a very thin green medio-dorsal line. S4-6 black, S7-10 dark rufous and blacker dorsally, S4-7 with small green baso-lateral spots and extremely thin medio-dorsal lines. Auricles green with narrow black border. Appendages dark brown, slightly shorter than S10; cerci marginally longer than epiproct. Cerci straight, ending in a blunt point, with a down- and slightly in-curved acute ventral tooth at midlength that is just visible internally in dorsal view. The cerci may have long spine-like tips in teneral males, which may apparently break off as in the holotype. Branches of epiproct broad, apices truncated, up-curved and ending in a small hook. The branches are rather weakly divergent, rather straight, more or less parallel to cerci. Anterior hamules blackish, slender and ending in a back-curved point. Posterior hamules broad, more than twice as large as anterior hamules, tapering to forward directed sharp point. Head of penis very slender ventrally with a lip-like expansion at the tip.
Measurements [mm]: Body length 47; abdomen length (excl. appendages) 35.1; Hw length 29.5 (range 29.0-30.0); pterostigma length in Fw 2.8 (range 2.7-2.9), in Hw 3.0 (range 3.0-3.0).

Female allotype

Similar in coloration to male, but green areas slightly more extensive, e.g. sides of abdominal S3 with green smear.
Head: Vertex rather flat, without horn- or pit-like structures. Occiput reduced to a black concave semicircular ridge. This ridge slightly thicker laterally and with a

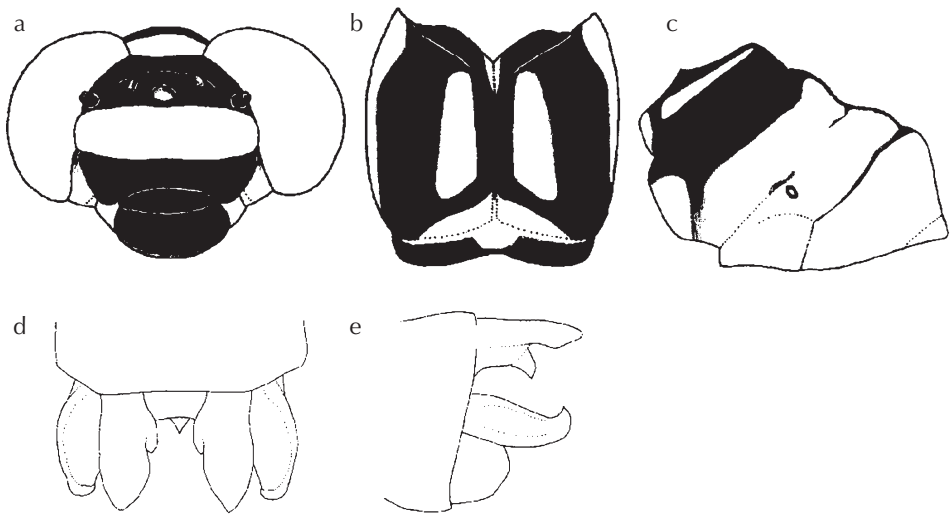

Figure 1: Features of *Notogomphus maathaiae* sp. nov. — (a) head in frontal view; (b) synthorax in dorsal view; (c) synthorax in lateral view; (d) male appendages in dorsal view; (e) male appendages in lateral view.

dense fringe of long black hairs. Postero-ventrally of this, where the occiput borders the postgenae, a few similar hairs.
Wings: 13-14 Ax in Fw and 9-10 in Hw; 11-13 Px in Fw and 10-12 in Hw.
Abdomen: Vulvar scale typical of genus, roughly triangular, slightly less than half as long as sternite of S9. Scale's apex with a triangular incision that is just under a third as deep as scale, resulting in two sharp apical points. Sternite with transverse crescent-shaped ridges lying externally at level of each point of scale.
Measurements [mm]: Abdomen length 35.7; Hw length 32.4 (range 31.8-33.0); pterostigma length in Fw 2.9 (range 2.8-3.0), in Hw 3.0.

Variation in males

Paratypes are similar to holotype. Teneral specimens may have long spine-like tips to cerci, which may apparently break off (as in holotype). 13-15 Ax in Fw and 9-10 in Hw; 10-12 Px in Fw and 10-11 in Hw. Abdomen length 33.8-37.4; Hw length 28.5-31.0, pterostigma (Fw) 2.8-3.1.

Biological notes

Mature adults were recorded in January, April, June, September and November and emerging individuals were seen in March and November, indicating that the species is not seasonal. Males were found at the Rongai River during sunny periods, flying off into the tree canopy as soon as the sky became overcast. They were observed flying close to the water surface and between large boulders near a waterfall, obviously searching for females. Occasionally a male perched close to the waterfall on vegetation, but without showing territorial behaviour. Mating was not observed. Two females were seen ovipositing into shallow water under overhanging rocks close to the waterfall. The females also flew to and fro close to the water surface, releasing eggs while briefly touching the water with the tip of the abdomen. Neither of the two females was guarded by males and they flew into the canopy after about five minutes of oviposition.

Discussion

Identification

Notogomphus maathaiae sp. nov. differs from congeneric species by the male appendages and the following combination of markings: face extensively dark including entire labrum but antefrons wholly pale, green postdorsal stripes well separated from pale collar and black middorsal carina, antehumeral stripes absent, side of synthorax uniformly green almost without black lines. *N. maathaiae* is closest to *N. flavifrons* Fraser, 1952, which is known only from SW Uganda and which differs by the postdorsal stripes being close to the middorsal carina and narrowly confluent with it and the collar, the presence of (vague or broken) antehumeral stripes and pale corners to the labrum, as well as by the shape of the cerci (see Fraser 1952). The penes of both species are similar in their general shape.

Distribution, conservation and biogeography

N. maathaiae sp. nov. was first discovered on the Kenyan side of Mt Elgon by VC on 8 June 2000. While revising the collections of the NMK, KDBD found a pair that had been collected in Marioshoni Forest by B. Watulege in April 1970. This forest lies on the East Mau Escarpment midway between Nakuru and Kericho (2,600 m). This collection also contains a female said to be from Kampala in Uganda, but this locality is peculiar and may result from inaccurate labelling. The BMNH in London has two teneral males collected in the Katamayu Forest on the Kikuyu Escarpment (2,200 m). The specimens in London had been identified as a "Kenya race" of *N. flavifrons* by Pinhey (1961: 75). The species appears to be restricted to forest streams between 2,200 and 2,600 m and has only been found at three sites in western Kenya, apart from the dubious Kampala record. It should be searched for on the forested slopes of the Aberdares and Mt Kenya. Even if this species proves to be more common in montane forests, it can be regarded as threatened. A drastic decline of this species can be expected following the severe loss of montane forests in Kenya during the last few decades. *N. maathaiae* sp. nov. seems to depend on pristine streams for its survival; because of the imperilment of its habitat it has been submitted as "endangered" on the global Red List by the World Conservation Union (IUCN).

Most of eastern Africa consists of highlands over 1,000 m, formed by tectonic orogenesis from the early Tertiary onwards (Griffiths 1993). Several isolated mountains tower above these highlands, some reaching well over 4,000 m. The majority of these is volcanic and only emerged in the last five million years, although Mt Elgon is fifteen million years older. The upper montane forests on the isolated mountains and the regions above the timberline were not in contact in the late Quaternary (Hedberg 1986), so that endemic species developed locally. Nonetheless the East African dragonflies are neither known for having a rich montane fauna nor for the presence of many montane endemics (Clausnitzer 2002). The discovery of the apparently truly montane *N. maathaiae* sp. nov. is therefore surprising. Other notable montane dragonflies in Kenya are *Platycypha amboniensis* (Martin, 1915), *Pseudagrion bicoerulans* Martin, 1907 and *Atoconeura kenya* Longfield, 1953. All three are largely confined to highland forest streams in Kenya and north Tanzania between 1,500 and 3,000 m. *P. amboniensis* occurs below 2,000 m and is endemic to the western slopes of Mt Kenya and the eastern slopes of the Aberdares, making it particularly vulnerable to expanding agriculture and deforestation on the mountain slopes. *P. bicoerulans* on the other hand is characteristic of altitudes above 2,500 m and is not found below 2,000 m. This species has geographically well separated populations, which differ in details of coloration (V. Clausnitzer unpubl.).

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