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Seven new species of *Chimarra* (Trichoptera: Philopotamidae) from Malawi

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Abstract

For the first time species of caddisflies in the genus *Chimarra* Stephens 1829 are reported from Malawi. The following new species are described: *Chimarra zombaensis*, *C. flaviseta*, *C. chichewa*, *C. circumverta*, *C. mulanjae*, *C. psittacus* and *C. calidopectoris*. The descriptions add to the knowledge of Afrotropical diversity in the order Trichoptera.

Key words: taxonomy, caddisflies, Afrotropical, insect morphology, species biodiversity

Introduction

With more than 780 described species, the genus *Chimarra* Stephens 1829 is the largest genus of Trichoptera (Morse, personal communication 26 February 2014). The genus is cosmopolitan in distribution with the exception of Antarctica and the highest diversity is found in the Oriental and Neotropical regions (Morse 2013). While *Chimarra* might be the most species-rich Trichoptera genus, only 87 species have been reported from the Afrotropical region (Tobias & Tobias 2008), all in subgenus *Chimarra* (Morse 2013). This can be compared to 299 described species in the Neotropical region and 321 in the Oriental region (Morse 2013); this indicates that the species diversity of *Chimarra* in the Afrotropical region is low or it is largely unknown. This bias is made particularly clear by the fact that the Afrotropical Biogeographic Region is larger than the other two regions; indeed, the density of known species of Trichoptera generally in the Afrotropical Region is the lowest in the world (de Moor & Ivanov 2008; Morse 1997, 2011).

Material and methods

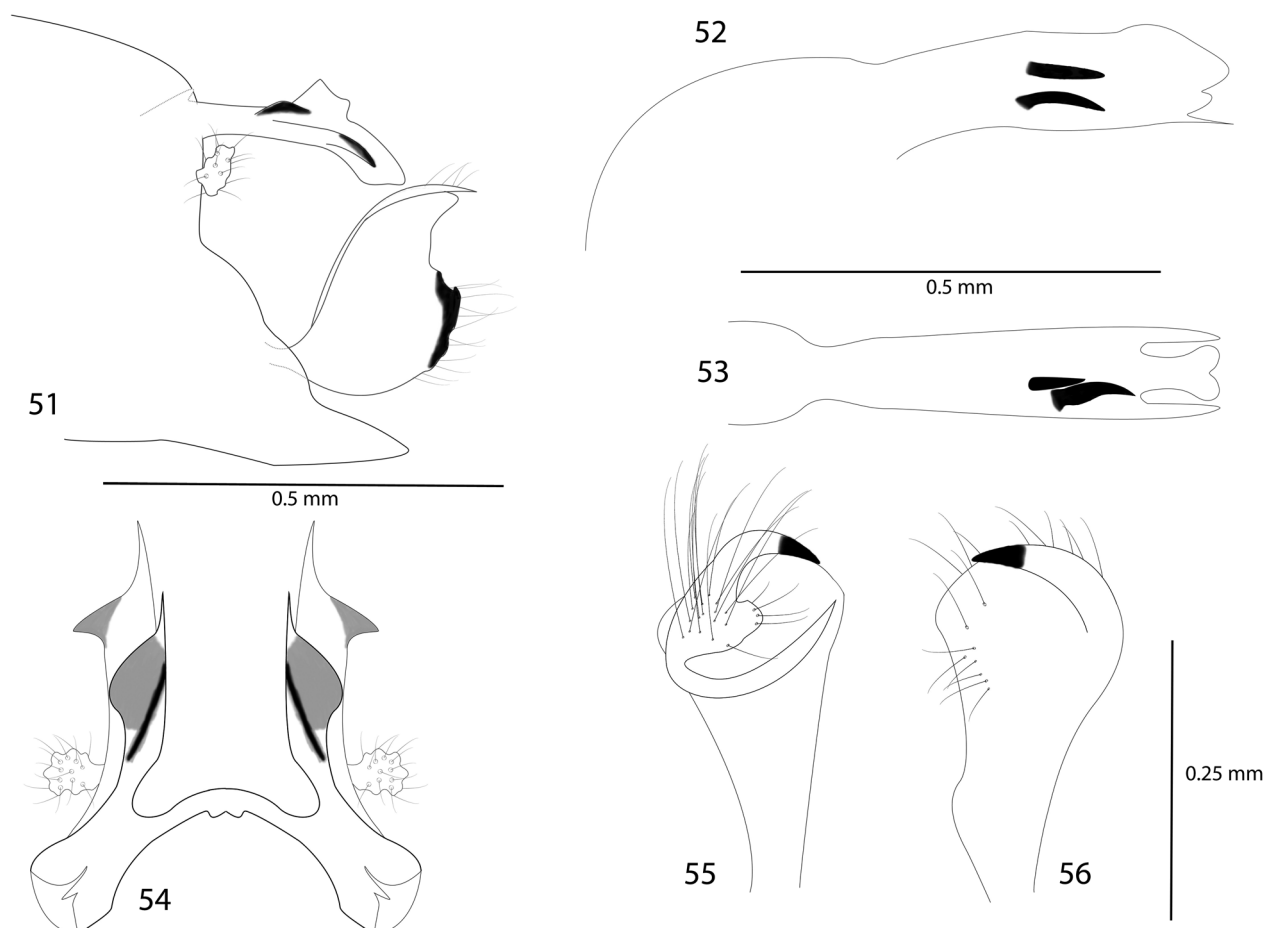
Specimens were collected using a UV or “black” light trap placed near streams at dusk for two to three hours. The locations of the collection sites are mapped in Figure 1. The material was preserved in 95% ethanol. Sorting and determination was executed at the laboratory at the Swedish Museum of Natural History. The individuals were initially grouped based on genital morphology after the abdomen was separated from the rest of the body. Extraction of DNA was carried out on the abdomen with QIAamp® DNA Micro kit (QIAGEN), which also macerated the abdomen. The abdomen was dehydrated in absolute alcohol and temporarily suspended in Euparal on a microscope slide. Illustrations of genitalia were drawn using a Nikon Eclipse 80i light microscope with a Nikon Y-IDT drawing tube. The illustrations were subsequently scanned and finalized in Adobe® Illustrator® 15.1 and Photoshop® 12.1. Wings were temporarily mounted in glycerol on a microscope slide and photographed using a Nikon D700 camera attached to a Nikon Eclipse 80i microscope. For photographing the head region, the specimen was mounted in Euparal and photos were taken with a Lumenera Infinity X camera attached to an

view; in lateral view ventral spine curved ventrad, dorsal spine straight; posterior part of phallosome divided into pair of poorly-sclerotized apicoventral spines beside and beneath membranous posterior end of endotheca.

Male holotype: Malawi: Mulanje Mountains: stream near Minunu hut, S15.92481°, E35.63856°, 2014 m, light trap, 10 November 2012, Loc# Ma41, leg. M. Espeland, S. Dupont and R. Murphy (Fig. 1, locality #7).

Paratypes: Same data as holotype: 2 males.

Etymology. *Calidopectoris*, from Latin *calida*, warm, and *pectoris*, heart, refers to the nickname of Malawi: “The Warm Heart of Africa”.



FIGURES 51–56. *Chimarra calidopectoris*, new species, holotype. 51—genitalia, left lateral; 52—phallic apparatus, left lateral; 53—phallic apparatus, dorsal; 54—genitalia, dorsal; 55—right inferior appendage, dorsal; 56—right inferior appendage, ventral.

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