DNA barcoding identifies an introduced hover fly species (Diptera: Syrphidae: Syrphinae) in the Afrotropics

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Introduction

Recently (2013-2014), several adult hover fly specimens (Fig. 1) from 11 localities in Benin, Nigeria, and Cameroon (West and Central Africa) were caught of a species that we could not identify using existing identification keys for Afrotropical Syrphidae.

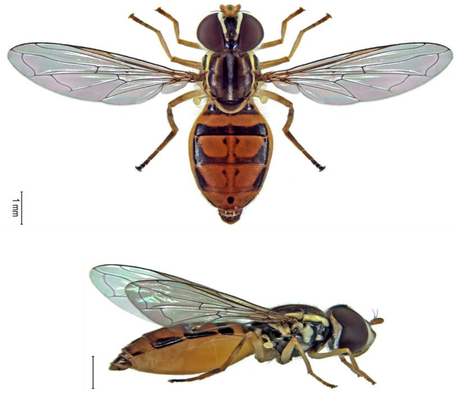

Fig. 1. Dorsal (top) and lateral (bottom) view of an adult female *Toxomerus floralis*.

Material and Methods

Non-Afrotropical identification keys were used to identify the specimens by their external morphology. The standard mitochondrial COI barcode region of 9 specimens collected in 2014 from Benin and Cameroon was sequenced and subjected to BLAST-IDS in BOLD. Fragments of the nuclear 18S and 28S rDNA were sequenced and subjected to phylogenetic analysis (outgroup: *Ocyptamus dimidiatus*). A preliminary study on the oviposition behaviour and larval morphology was performed. Larvae species identification was performed by rearing them up to adult stage and comparing the adults to barcoded specimens.

Results

Study of the external morphology showed strong similarity with *Toxomerus floralis* from the New World (Fig. 1). BLAST-IDS in BOLD revealed a 100 % sequence similarity with *T. floralis* from Suriname (South America) (accession EU409157 in Fig. 2). 28S rDNA confirmed that the specimens belonged to *T. floralis* (100 % similarity) - (18S rDNA did not show phylogenetic resolution at the species level). The species is widely spread in Benin, Nigeria, and Cameroon (Fig. 3), and at several localities abundancies of both adults and larvae (Fig. 4) are high. The larvae were found to feed on pollen from two plant species from different families (Cyperaceae and Orobranchaceae) (Fig. 4).

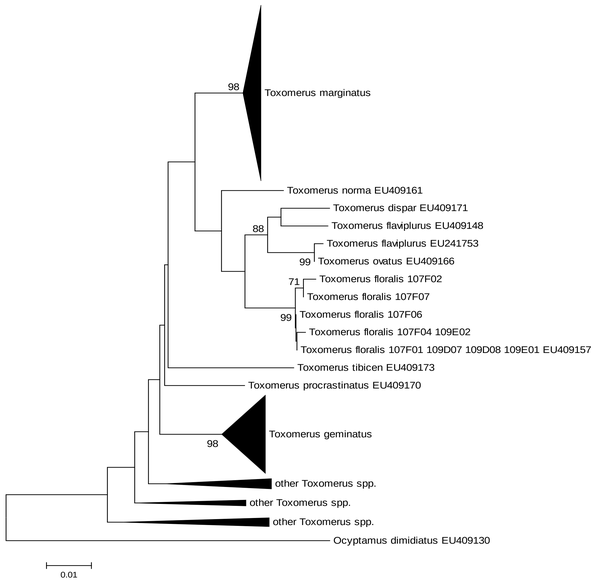

Fig. 2. NJ tree of the genus Toxomerus (537 bp COI alignment). Bootstrap values ≥ 70% are shown.

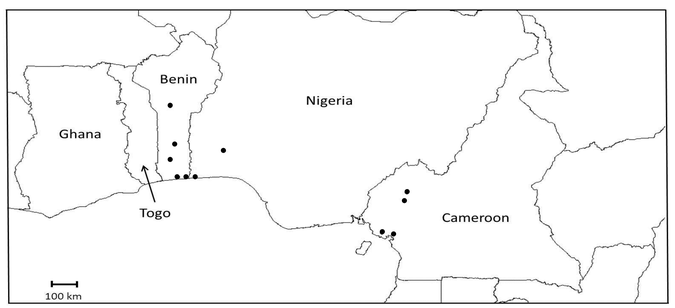

Fig. 3. Localities were *Toxomerus floralis* was found in W and C Africa.

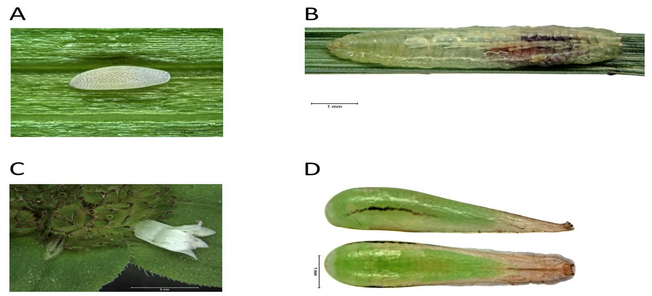

Fig. 4. Different life stages of *T. floralis*. A: egg, B: larvae, C: larvae on *Mitrocarpus hirtus*, D: lateral (top) and dorsal (bottom) view of the pupa. Scale bar = 0.5 mm for A; 1 mm for B and D, and 5 mm for C.

Conclusion

This is only the second known established introduction of a New-World species of hover fly in the Afrotropics, the first one being the saprophagous species *Ornidia obesa*. The species seems well-spread in a large area of Western Africa. The larvae of the species are pollinivorous, which is a rare feeding mode within the subfamily Syrphinae. Moreover, it is the only Syrphinae species of which the larvae feed on pollen from two plant species from different families (Cyperaceae and Orobranchaceae).