

## Scientific note

## A new locality and new colour variant of the giant stick insect *Achrioptera manga* from the northern tip of Madagascar

(Insecta, Phasmatodea)

Raphali R. Andriantsimanarilafy, Alain J. V. Rakotondrina &amp; Frank Glaw

The charismatic giant stick insects of the genus *Achrioptera* are endemic to Madagascar and the Comoro archipelago (Hennemann & Conle 2004). With a female total

length (head plus body length) of up to 26 cm *Achrioptera* species are the largest insects of Madagascar and their splendid males are among the most colourful stick



Fig. 1. Male *Achrioptera manga* from Ampombofofo, close to the northern tip of Madagascar, with red colour on the limbs (photos by Raphali R. Andriantsimanarilafy).



Fig. 2. Male *Achrioptera manga* from Forêt d'Orangea, south of the Antsiranana bay, with orange colour on the limbs (photo Frank Glaw).

Raphali R. Andriantsimanarilafy & Alain J. V. Rakotondrina, Species & Conservation Program, Madagasikara Voakajy, Antananarivo, Madagascar; e-mail: arraphali@voakajy.mg; alainrakoto@mvoakajy.mg  
Frank Glaw (corresponding author), SNSB – Zoologische Staatssammlung München, Münchhausenstr. 21, 81247 München, Germany; e-mail: glaw@snsb.de

insects in the world (Glaw et al. 2019). The recently described *Achrioptera manga* is considered a microendemic species with an assumed distribution range of ca. 65 km<sup>2</sup> only. It is currently known from just two dry forest localities (Montagne des Français and Forêt d'Orangea) south of the Antsiranana bay in northern Madagascar and its distribution to the south might be limited by the range of its presumably allopatric sister species *A. fallax* (Glaw et al. 2019). Living males of *A. manga* have a metallic blue or turquoise body coloration with yellow or orange colour on the ventral surfaces of the femora of all limbs (Fig. 2).

During herpetological surveys in the Ampombofofo region, a still unprotected area of deciduous dry forest on limestone underground in the far north of Madagascar, the first author observed and photographed an adult male of a blue stick insect with red colour on the ventral femora (GPS coordinates 12.094629°S, 49.336458°E, 26 m above sea level; Fig. 1) on 22<sup>nd</sup> of March 2018 at night (19h30). The insect was sitting ca. 100 cm above the ground. The new locality is situated ca. 20 km north of the known localities (Forêt d'Orangea) of *A. manga*, demonstrating that its distribution range extends significantly further north than hitherto known and includes the dry forests north of the Antsiranana bay. Furthermore, the coloration of this northernmost *A. manga* differs from individuals of Montagne des Français and Forêt d'Orangea by the red (versus yellow or orange) colour on the ventral femora. This shows that the aposematic colouration of this species can vary among different localities, as it is known from aposematically and predominantly blue-coloured frogs of the genus *Dendrobates*, e.g. in the *D. tinctorius* complex (Wollenberg et al. 2006).

Most insect groups in the region are too poorly studied to be compared, but the species composition of the herpetofauna of Ampombofofo is rather similar to that of Montagne des Français and Orangea (Megson et al. 2009). However, at least in one snake species (*Heteroliodon folhy*) distinct intraspecific genetic differences were found between the populations north and south of the Antsiranana bay (Nagy et al. 2012, suppl. fig. S2), suggesting substantial isolation of these populations by the marine barrier. Future studies should therefore investigate if the red-limbed Ampombofofo population of

*A. manga* is also genetically different from the southern populations. The new record of the charismatic *A. manga* might also be used as an additional argument to include the Ampombofofo forest in the network of protected areas in north Madagascar. This area harbours numerous rare and threatened reptiles and amphibians (Megson et al. 2009), including a still unidentified and potentially new dwarf chameleon probably related to *Brookesia micra* (Glaw et al. 2012) and is clearly worth to be protected.

**Acknowledgements.** We are grateful to the Rainforest Trust for funding this project, the Malagasy authorities for issuing research permits, and to Oskar Conle for reviewing the manuscript.

## References

- Glaw, F., Hawlitschek, O., Dunz, A., Goldberg, J. & Bradler, S. 2019. When giant stick insects play with colors: Molecular phylogeny of the Achriopterini and description of two new splendid species (Phasmatodea: *Achrioptera*) from Madagascar. *Frontiers in Ecology and Evolution* 7: Article 105.
- , Köhler, J., Townsend, T. M. & Vences, M. 2012. Rivaling the world's smallest reptiles: discovery of miniaturized and microendemic new species of leaf chameleons (*Brookesia*) from northern Madagascar. *PLoS ONE* 7: e31314.
- Hennemann, F. H. & Conle, O. V. 2004. Revision of the tribe Achriopterini Bradley & Galil, 1977, with the description of a new genus, three new species and a new subspecies from Madagascar (Phasmatodea: Phasmatidae: Phasmatinae). *Mitteilungen der Münchner Entomologischen Gesellschaft* 94: 5–54.
- Megson, S., Mitchell, P., Köhler, J., Marsh, C., Franzen, M., Glaw, F. & D'Cruze, N. 2009. A comprehensive survey of amphibians and reptiles in the extreme north of Madagascar. *Herpetology Notes* 2: 31–44.
- Nagy, Z. T., Sonet, G., Glaw, F. & Vences, M. 2012. First large-scale DNA barcoding assessment of reptiles in the biodiversity hotspot of Madagascar, based on newly designed COI primers. *PLoS ONE* 7: e34506.
- Wollenberg, K. C., Veith, M., Noonan, B. P. & Lötters, S. 2006. Polymorphism versus species richness – systematics of large *Dendrobates* from the Eastern Guiana Shield (Amphibia: Dendrobatidae). *Copeia* 2006: 623–629.