Zootaxa 3881 (3): 258–266
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3881.3.4
http://zoobank.org/urn:lsid:zoobank.org:pub:AEC661C7-07A7-40DF-ACD3-C25504571BBB

Four new species of *Cichlidogyrus* (Monogenea, Ancyrocephalidae) from *Sarotherodon mvogoi* and *Tylochromis sudanensis* (Teleostei, Cichlidae) in Cameroon

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Abstract

The four *Cichlidogyrus* species (Monogenea, Ancyrocephalidae) found on the gills of *Sarotherodon mvogoi* and *Tylochromis sudanensis* (Teleostei, Cichlidae) in Cameroon are considered new and are described herein. *Cichlidogyrus mvogoi* **n. sp.** from *Sarotherodon mvogoi*, characterised by a long (> 100 µm), thin and spirally coiled penis and a short marginal hook pair I. *Cichlidogyrus sigmocirrus* **n. sp.** from *Tylochromis sudanensis*, characterised by a short marginal hook pair I, a slightly spirally coiled penis with reduced heel, an accessory piece being a spirally coiled band wrapped round the penis and attached to the penis basal bulb by a very thin filament. *Cichlidogyrus chrysopiformis* **n. sp.** from *Tylochromis sudanensis*, characterised by an marginal hook pair I of medium size, a thin spirally coiled penis (1.5 turn) with a developed flared heel, an accessory piece being a large gutter shaped band, ending in a narrow complex extremity, and linked to the basal bulb of the penis by a very thin filament, a short, straight and slightly ringed vagina. *Cichlidogyrus djietoi* **n. sp.** from *Tylochromis sudanensis*, characterised by a slightly spirally coiled penis (2 turns) with developed heel, an accessory piece being a large gutter shaped band, ending in a narrow folded back extremity, a short funnel shaped vagina. The three latter species are also remarkable by the morphology of their auricles implanted on the anterior side of the dorsal transverse bar which make them (together with the other species described from *Tylochromis* hosts) a homogeneous and original group within *Cichlidogyrus*, this distinctive feature seems to be ancestral compared to other *Cichlidogyrus* species.

Key words: Platyhelminth, Parasite, *Cichlidogyrus mvogoi* **n. sp.**, *Cichlidogyrus sigmocirrus* **n. sp.**, *Cichlidogyrus chrysopiformis* **n. sp.**, *Cichlidogyrus djietoi* **n. sp.**, freshwater fish, Africa

Introduction

Within the framework of a larger general study (2007–2010) of the biodiversity along and on either side of the Cameroon Volcanic Line (CVL) and funded by the French National Research Agency (ANR), we checked the cichlid fishes and their associated ancyrocephalid parasites (Monogenea). This study presents the results obtained on new monogenean species parasitizing *Sarotherodon mvogoi* (Thys van den Audenaerde) and *Tylochromis sudanensis* Daget.

Material and methods

Fish were caught either by gill net, cast net, or by hook and identified by comparison of their morphometric, meristic or chromatic characters following Bitja Nyom (2012). Five specimens of *Sarotherodon mvogoi* from two localities and 14 specimens of *Tylochromis sudanensis* from two other localities were sampled (see new species

 Accepted by N. Dronen: 4 Oct. 2014; published: 5 Nov. 2014

Muterezi Bukinga *et al*. (2012) stated that the accessory pieces associated with the penis of the parasite species described from *Tylochromis jentinki* and *T. polylepis* are not connected to the base of the penis, and that this phenomenon is unique within *Cichlidogyrus* spp. Conversely, in this work, a small filament has been observed which links the AP to the basal bulb of the penis at least in two of the three newly described monogeneans infecting a species of *Tylochromis*. Nevertheless, those *Cichlidogyrus* spp. are different by the morphological features of their sclerotized haptoral pieces and reproductive organ structures, which make them a homogeneous and original group within this genus [i.e. the implantation of auricles on the anterior side of the dorsal transverse bar, the dissymmetry between ventral and dorsal anchors, the ribbon shape and spirally coiled aspect of the accessory piece associated with the penis].

As morphological and genetic data seem to be congruent in *Cichlidogyrus* species (Pouyaud *et al*. 2006), and as molecular data place *C. pouyaudi* from *T. jentinki* as the sister species of all the *Cichlidogyrus* spp. studied by Mendlova *et al*. (2012), we suppose that this group of *Cichlidogyrus* spp. parasitizing *Tylochromis* spp. is ancestral compared to the other congeneric species. As *Tylochromis* species are also ancestral compared to other cichlids (Azuma *et al*. 2008; Dunz & Schliewen 2013; Farias *et al*. 2001; Klett & Meyer 2002; Streelman *et al*. 1998), we hypothesize that this model could be a good illustration of host/parasite coevolution process,

Acknowledgments

The authors wish to thank the French National Research Agency (ANR) program (IFORA) for providing financial support during the sampling missions (2007–2010) and the IRD Representative in Cameroon for technical support during field studies. They are also grateful to M.P.M. Vanhove for valuable comments on the draft of this manuscript and the two referees for valuable comments. A. Bitja Nyom was funded by the International Foundation for Science (FIS) in 2009 and by the French Research Institute for Development (IRD) (BEST grant) in 2010. This is publication ISE–M 2014–166–SUD.

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