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Gastrotricha from the Poznań Palm House—one new subgenus and three new species of freshwater Chaetonotida (Gastrotricha)

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Abstract

Gastrotricha is a cosmopolitan phylum of aquatic and wet terrestrial invertebrates comprising about 800 described species. Gastrotrichs have never been studied in artificial habitats such as greenhouses. In this paper we present 13 species belonging to 5 genera of the family Chaetonotidae that have been found in a water body with tropical aquatic plants. *Tristratachaetus* subgen. nov. and *Chaetonotus (Tristratachaetus* subgen. nov.*) rhombosquamtus* sp. nov., *Chaetonotus (Chaetonotus) eximius* sp. nov. and *Chaetonotus (Chaetonotus) pravus* sp. nov. are described as a new to science. Additionally, taxonomic, biogeographic and ecological remarks for all recorded species are provided.

Key words: artificial habitat, Chaetonotidae, *Chaetonotus (Tristratachaetus) rhombosquamatus*, *Chaetonotus (Chaetonotus) eximius, Chaetonotus (Chaetonotus) pravus,* greenhouse fauna, introduced animals, new species, new subgenus, taxonomy

Introduction

Gastrotricha is a taxon of monophyletic, microscopic, acoelomate metazoans ranging from 50 µm to 3500 µm (Kisielewski 1997a; Hochberg & Litvaitis 2000; Todaro *et al*. 2006b). Hitherto, *ca.* 800 nominal species of Gastrotricha divided into two orders (Chaetonotida and Macrodasyida) are described. They inhabit aquatic (marine as well as freshwater) and wet terrestrial ecosystems (peat–bogs, alder woods, riparian forest *etc.*) (Kisielewski 1997a). Gastrotrichs constitute a significant component of benthic, psammic and epiphytic ecosystems (Nesteruk 1996a; 2000; 2004; 2007a; 2008; 2010; Balsamo & Todaro 2002; Balsamo *et al.* 2008). The main factors accounting for our poor knowledge of these animals are methodological problems (*e.g.* collecting, extracting, preserving and determining) (Balsamo *et al.* 2008) and low number of taxonomic specialists of this group. Despite their abundance in various habitats, they are often omitted in faunistic studies or, very often, mentioned only as group, without identification to species level (*e.g.* Węsławski *et al*. 1997; Kotwicki *et al*. 2005a, b).

Gastrotrichs are known to inhabit various ecosystems from tropical to polar regions (*e.g.* Scourfield 1897; Hochberg 2005; Balsamo *et al.* 2008; 2010; Todaro *et al*. 2009; 2011; Kieneke 2010). One of the most interesting environments may be astatic waterbodies in Bromeliaceae Juss, where the gastrotrichs coexist with insects, crustaceans *etc.* (Kisielewski 1991), and sediments in dark sea caves (Todaro *et al.* 2006a). In artificial environments gastrotrichs have been found in the sand filters of a cold marine mesocosm where they coexist with other representatives of meiofauna (Parent *et al.* 2001). Although aquatic fauna in greenhouses have been studied by several researchers (*e.g.* Lankester 1880; Scourfield 1947; Reid 2001; Duggan & Duggan 2011), there is no information about gastrotrichs inhabiting artificial water bodies of palm houses (greenhouses that are specialised for the growing of palms and other tropical and subtropical plants).

In the context of introduced animals, greenhouses are considered as inland islands (*e.g.* Zawierucha *et al.* 2013). Tropical material has been found during the last 50 years of research in Poznań Palm House (Poland, Wielkopolska Lowland). In terrestrial habitats exotic ants (Pisarski 1957), three mite species new to science (Wiśniewski & Hirschmann 1991a, b), a Cuban endemic mite (Niedbała 2010), and tropical microschizomids (Zawierucha *et al.* 2013) were found. In aquatic habitats, in turn, Copepoda (Urbański 1950), both Turbellaria and Nemertea (including thirteen species new to Poland) (Kolasa 1973) and Oligochaeta (including three new for Poland) have been found (Moszyński 1932; Legeżyński 1974).

The purpose of this study is to increase the knowledge of Gastrotricha inhabiting such artificial habitats.

Gastrotricha taxonomy is still based mainly on the characteristics of the external appearance of these animals (Balsamo *et al.* 2009), but molecular data suggest that these may be misleading indicators of phylogenetic relationships (Paps & Riutort 2012; Kånneby *et al.* 2012; 2013). However, the accurate morphometry of the specific body characteristics (*e.g.* pharynx, furca, scales, spines, *etc.*), and the distribution of scales and spines are very important and necessary for species identification (Kisielewski 1981; 1991; Balsamo *et al.* 2009). What makes taxonomic identification extremely difficult is the fact that gastrotrich intraspecific variability and overlap of characters are virtually unknown (Balsamo *et al.* 2009; Kånneby 2011). Another methodological problem is time restriction imposed on the examination of living specimens. Gastrotricha are characterised by a short time span of preservation, during which the specimens are still useful. Studies conducted by Nesteruk (1998) have proved that freshwater gastrotrichs from bottom sediments can be studied without statistically significant changes for only five days after they have been collected.