



<http://dx.doi.org/10.11646/zootaxa.3760.4.1>

<http://zoobank.org/urn:lsid:zoobank.org:pub:A2E3A664-E992-40AB-8327-59998302652D>

An annotated and revised checklist of pleurostome ciliates (Protista: Ciliophora: Litostomatea) from Slovakia, Central Europe

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Abstract

Pleurostomatids are predatory ciliates, living especially in the periphyton and benthos of various freshwater and marine habitats. In the present work, we provide an annotated and revised checklist of this ciliate group from the territory of Slovakia. Altogether 29 pleurostome species belonging to five genera have been reported there: *Acineria incurvata*, *Ac. punctata*, *Ac. uncinata*, *Amphileptus claparedii*, *Am. falcatus*, *Am. fusiformis*, *Am. parafusidens*, *Am. pleurosigma*, *Am. procerus*, *Am. punctatus*, *A. rotundus*, *Litonotus alpestris*, *Li. anguilla*, *Li. carinatus*, *Li. crystallinus*, *Li. cygnus*, *Li. fasciola*, *Li. fusidens*, *Li. hirundo*, *Li. lamella*, *Li. minisculus*, *Li. muscorum*, *Li. obtusus*, *Li. triqueter*, *Li. varsaviensis*, *Loxophyllum helus*, *Lo. meleagris*, *Lo. rostratum*, and *Siroloxophyllum utriculariae*. We have catalogued these records providing the following data for each species: (1) author(s) and date of publication; (2) name(s) of the species as appeared in the publication(s) followed by chronologically listed references including relevant page(s) in literature; (3) nomenclatural and taxonomic notes if needed; (4) main morphological characters; (5) morphological data on Slovak populations if available; and (6) all faunistic records.

Key words: *Amphileptus*, *Litonotus*, *Loxophyllum*, freshwater and soil ciliates, species diversity

Introduction

Systematics Agenda 2000 emphasized the inventory and description of biodiversity as focal activities in the 21st century. In spite of the key role of protists in nearly all ecosystems, they have been largely ignored in inventory and conservation issues due to a widespread belief that protists are ubiquitous and cosmopolitanly distributed (for review, see Cotterill *et al.* 2008, Cotterill & Foissner 2009). However, recent research shows that many protists have restricted distributions ranging from Gondwanan-Laurasian palaeoendemism to highly local endemism (Foissner 2006, 2008; Edgcomb *et al.* 2011). Our poor knowledge on distribution patterns together with the lack of local and global literature on protistan diversity are the reasons why protists have been only scarcely considered in traditional perspectives and strategies in environmental management and biodiversity conservation (Cotterill *et al.* 2008). These authors also argued that conservation of protists should be integral to any strategy that traditionally targets animals and vascular plants.

Pleurostomatids represent a very distinct ciliate group that is defined by a combination of the following features: (1) leaf-like flattened body with right–left differentiation of the ciliature, (2) slit-like oral apparatus extending along the ventral cell margin, and (3) monotelokinetal stomatogenesis (Lin *et al.* 2009, Vďačný *et al.* 2011). They are predators living in a variety of freshwater and marine habitats all around the world, including also the Antarctic and Arctic sea ice (Foissner *et al.* 1995, Petz *et al.* 1995). However, our knowledge on distribution of particular species is very insufficient, and their identification is difficult because there are more than 100 nominal species many of which were described superficially. No comprehensive revision of pleurostomatids is available, but a detailed description of the morphology and ecology of saprobiologically important taxa was provided by Foissner *et al.* (1995); taxonomy and morphology of all pleurostome ciliates reported from the Yellow and Bohai Seas were treated in the compendium of Lin *et al.* (2009); and a brief review of brackish and marine *Loxophyllum* species was supplied by Pan *et al.* (2013).

from them by the morphology of the left body side according to Kahl (1931). Specifically, the left side of *L. obtusus* is roof-like, while it bears a distinct rib-like structure in *L. carinatus* and *L. lamella*. However, this feature depends on nutrition according to Song & Wilbert (1989), who consequently suggested synonymization of *L. carinatus* with *L. obtusus*. Nevertheless, in absence of detail morphological data from *L. carinatus*-like populations we cannot exclude that *L. carinatus* is, indeed, a distinct species. Therefore, we keep here both species separated. All Slovak populations identified as *L. obtusus* displayed a roof-like left side without distinct rib-like structure (Tirjaková, personal comm.).

5. Records from Matis *et al.* (1996) not substantiated by references. Altogether there are four species whose occurrence in the territory of Slovakia is mentioned by Matis *et al.* (1996) but we were not able to substantiate their records by any published sources: *Litonotus mononucleatus*, *Li. uninucleatus*, *Li. vesiculosus*, and *Loxophyllum semilunare*. The two latter species are recognized as valid, while the two former ones are considered to be subjective synonyms of *Li. alpestris* (for review, see Foissner *et al.* 1995). Although *Li. alpestris* was reliably recorded in Slovakia, we could not include these two possible synonyms into the present checklist due to the lack of references (see above).

Acknowledgements

We are grateful to Assoc. Prof. Dr. Eva Tirjaková for her help with obtaining the literature and constructive discussions. We also thank Dr. André-Denis G. Wright and three anonymous reviewers for valuable comments that helped improve the quality of the manuscript. Technical assistance of Dr. Marek Vďačný is greatly appreciated. Financial support was provided by the Slovak Scientific Grant Agency (VEGA project 1/0600/11 and 1/0248/13).

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