

Preface

The present book is part four of the Monograph of the Hypotricha, a series which reviews in great detail this highly interesting group of spirotrichous ciliates. The monograph is the most extensive revision since Kahl (1932), which is still an important treatise. The series will comprise six volumes.

The first volume is about the oxytrichids, a group which was considered for a long time as monophyletic because of the rather stable pattern of 18 frontal-ventral-transverse cirri (Berger & Foissner 1997, Berger 1999). However, the many molecular analyses published in the last decade combined with the sifting of the morphological and ontogenetic data indicate that this conspicuous pattern very likely already evolved in the last common ancestor of the Hypotricha so that it cannot be used as apomorphy of a subgroup of the hypotrichs (Berger 2006a, 2008). Now, I consider the fragmentation of dorsal kinety 3 as main morphological apomorphy of the oxytrichids (Berger 2006, p. 33; 2008, p. 46). Consequently, “18-cirri hypotrichs” which lack this fragmentation are very likely misplaced in the oxytrichids, for example, *Gonostomum*, *Urosoma*, *Urosomoida*, or some *Oxytricha* species (e.g., *O. lanceolata*). The misplacement of *Gonostomum* in the oxytrichids is also shown by molecular data, indicating that the dorsal infraciliature is as important as the ventral cirral pattern for the estimation of the major phylogenetic relationships within the hypotrichs.

The second volume of the series is mainly about the Urostyloidea (Berger 2006a), a rather large group whose members have the urostyloid midventral complex (zigzagging frontoventral cirri originating from more than six anlagen) in combination with the simple, plesiomorphic dorsal kinety pattern composed primarily of three bipolar bristle rows. Thus, species which also have a zigzagging cirral pattern, but a more complex dorsal infraciliature (e.g., dorsal kinety 3 fragmentation and/or dorso-marginal kineties) have been removed from the urostyloids, for example, *Neokeronopsis* and *Uroleptus*. The latter genus is now assigned to the so-called Dorsomarginalia (Berger 2006a), where it branches off rather basally. By contrast, *Neokeronopsis* belongs to the oxytrichids – a large subgroup of the Dorsomarginalia – because it has the same type of dorsal kinety fragmentation (Berger 2006a, p. 1190). This hypothesis was later corroborated by molecular data (Foissner & Stoeck 2008).

The Amphisiellidae and Trachelostylidae are the major taxa treated in the third volume (Berger 2008). The amphisiellids (e.g., *Amphisiella*, *Lamlostyla*, *Hemisin-cirra*) are non-dorsomarginalian hypotrichs with a more or less prominent fronto-ventral row formed from two or three anlagen, while the trachelostylids are a small group of marine 18-cirri hypotrichs with a curious dorsal kinety pattern, at least in the type species of the whole group. In addition, several genera of uncertain or unknown position within the hypotrichs have been included, for example, *Apourosomoida*, *Erimophrya*, or *Hemiurosoma*. Two species previously classified in *Hemisin-*

cirra have been transferred to the urostyloid genus *Anteholosticha* for which a new key was added.

The present volume is about the Gonostomatidae and the Kahliellidae. *Gonostomum*, the name-bearing type genus of the Gonostomatidae, was previously assigned to the oxytrichids because the type species *G. affine* is basically an 18-cirri hypotrich (Berger & Foissner 1997, Berger 1999, see also second paragraph of present preface). We hypothesised that the simple dorsal kinety pattern – three bipolar kineties with caudal cirri – has evolved from the complex oxytrichid pattern by a loss of both dorsal kinety fragmentation and dorsomarginal kineties. Molecular analyses however indicated that *Gonostomum* branches off rather early in the Hypotricha tree. This supports the hypothesis that *Gonostomum* has taken over the simple dorsal kinety pattern from the last common ancestor of the hypotrichs (Berger 2008, p. 23). An important morphological apomorphy of the gonostomatids is the conspicuous oral apparatus: the major portion of the adoral zone extends mainly along the left body margin while the proximal portion curves knee-shaped towards cell midline. In addition, the paroral is composed of few to very few, rather widely spaced cilia. This pattern also occurs in some other genera, for example, *Paragonostomum*, *Wallackia*, and *Cladotricha* so that the reactivation of the Gonostomatidae Small & Lynn, 1985 seems useful. Further studies will show whether or not this was an equitable decision.

The kahliellids are a difficult, uncertain group because a strong apomorphy is lacking. Currently, the preservation of parental structures (e.g., marginal rows, dorsal kineties) in the next generations is used as unifying feature. In addition, the type species of the whole group is relatively little known so that the present review is certainly only an interim solution. Molecular data about “kahliellid” species are rare and do not support, as in many other cases, the morphological classification.

Most taxa reviewed in the present book are terrestrial and/or limnetic, that is, very few (e.g., *Pseudokahliella marina*) are marine. Only few species, for example the very common and widely distributed *Gonostomum affine*, are known for a long time (Stein 1859). Most have been discovered in the 1900s by Kahl, Horváth, Ruinen, Foissner, and Eigner. Thirty-three gonostomatids, 15 kahliellids, and 24 “other” species are reviewed as valid in the present volume. Details about synonymy rates will be provided in the last volume of the monographic series.

As in the previous volumes, almost all available data on morphology, ontogenesis, molecular biology, ecology, and faunistics have been included. For each species, a detailed list of synonyms is provided, followed by a nomenclature section. In the remarks, all important data concerning systematics, synonymy, phylogeny, and similar taxa are discussed. The morphology section contains a thorough description, following the same sequence in every species. If the data on various populations or synonyms do not agree very well, then they are kept separate so that even workers who do not agree with the synonymy proposed can use the revision. For several species, cell division data are available. They are also included because the ontogenesis is often very important to understand the interphasic cirral pattern correctly. The oc-

currence and ecology section contains a description of the type locality and all other localities where a species was recorded. In addition, almost all illustrations published so far have been included. Thus, with the present book the general microscopist need not refer back to the widely scattered original literature. Specialists, however, should always check both the present treatise *and* the original description or authoritative redescription when redescrining a known species.

The next major group which will be treated is the renowned, but difficult genus *Uroleptus*. As already mentioned above, *Uroleptus* has been assigned to the urostyloids previously because both have zigzagging ventral cirri. However, they differ distinctly in the dorsal kiny pattern (dorsomarginal row present vs. absent) and the gene sequences, indicating a convergent evolution of the so-called midventral pattern. Only recently, Foissner & Stoeck (2008) established the Uroleptidae, which comprise mainly limnetic and terrestrial species. Probably, volume 5 will also contain the Keronopsidae, a relatively small group characterised, inter alia, by a dividing cyst.

As already discussed in the preface to the amphisiellids and trachelostylids, I will certainly find already known species which should have been reviewed in a previous volume. Such taxa will be treated in supplements at the end of each book, as already done in Berger (2006a, 2008) and the present revision (*Apourosomoida*). The last volume of the monographic series will contain a key and a systematic index to all species so that the user can find all hypotrichs very easily within the various volumes.

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Helmut Berger

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