## ABSTRACT OF RECENT PhD DISSERTATIONS

# THE GENERA *CHIONOLOMA*, *OXYSTEGUS*, *PACHYNEUROPSIS* AND *PSEUDOSYMBLEPHARIS* (POTTIACEAE, BRYOPHYTA): TAXONOMY AND PHYLOGENETIC RELATIONSHIPS

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Pottiaceae is the largest known moss family, with one of the most complex taxonomies among the bryophytes. The circumscription of genera within the Pottiaceae is challenging and it has been a matter of dispute ever since the establishment of the family. In this thesis, four related genera belonging to the Pottiaceae subfamily Trichostomoideae were studied: *Chionoloma* Dixon, *Oxystegus* (Limpr.) Hilp., *Pachyneuropsis* H.A. Mill. and *Pseudosymblepharis* Broth. The main goals of this work were (i) to resolve phylogenetic relationships among these four related traditional genera of the Pottiaceae inferring a phylogeny derived from nuclear and the plastid markers; (ii) to provide a comprehensive taxonomic synthesis of the species placed within *Chionoloma*, *Oxystegus*, *Pachyneuropsis* and *Pseudosymblepharis* worldwide and (iii) to search for new molecular markers of potential phylogenetic utility by assembling the chloroplast and mitochondrial genome of two species of these genera, *Oxystegus tenuirostris* var. *tenuirostris* (Hook. & Taylor) A.J.E. Sm. y *Pseudosymblepharis schlimii* M. Alonso, M.J. Cano & J.A. Jiménez.

In order to achieve the first goal, a phylogeny derived from nuclear ITS and the plastid markers *atp*B-*rbc*L, *trn*G and *trn*L-F was inferred. Putative monophyly of these four genera was investigated using maximum likelihood and Bayesian inference analyses. Ancestral state reconstruction showed high levels of homoplasy in the characters historically used for the generic division of *Chionoloma* s.l. Based on the results, it was suggested that *Chionoloma*, *Oxystegus* and *Pseudosymblepharis* should be merged into a single genus, for which the oldest name *Chionoloma* has priority. Additional analyses are needed to clarify the taxonomic status of *Pachyneuropsis*.

The taxonomic revision was based on more than 2,600 specimens deposited in different herbaria or collected during filed trips. A total of 131 names were found and their nomenclatural types were examined, carrying out the lectotypification of 69 names. As a result of this revision, keys, descriptions, illustrations, photographs and

distribution data of each species were provided. After the taxonomic study, it was concluded that *Chionoloma* is composed of 22 species and one variety, 18 of them were newly combined and a new species was described and illustrated. Moreover, 56 names were newly synonymized and a total of 87 new records for various countries were reported. Results related with *Pachyneuropsis* showed that this genus included two species, being one of them a new combination. Besides, two names were considered as new synonyms.

The search for new molecular markers was based on genomic studies focus on complete the organellar genome of two species of this group. Just the mitochondrial genome of the species *Chionoloma tenuirostre* var. *tenuirostre* was assembled and annotated. The genome was 105,001 bp long, with a GC content of 39.2%, comprising 40 protein coding, 24 tRNA, and 3 rRNA genes. All introns reported from the mitochondrial genome of all but one peristomate moss were present, whereas no 50 bp region was repeated within the genome. The genic content and order was identical to that of most mosses, highlighting that the mitochondrial genome is static not only across the phylogenetic depth but also breadth of the moss tree of life. A phylogenetic tree was inferred from the whole genome of 16 species of mosses to validate the sequence of *C. tenuirostre* var. *tenuirostre* by confirming its shared ancestry with *Syntrichia* Brid.

Broadly, this thesis constituted not only the first phylogenetic study of the genera *Chionoloma*, *Oxystegus*, *Pachyneuropsis* and *Pseudosymblepharis* but also the first taxonomic revision of this group and one of the few genomic studies with bryophytes performed so far.