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## CONFUSIONS IN FUNGAL SYSTEMATICS

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## ABSTRACT

The focus of this thesis has been on fungi with corticioid, polyporoid or stipitate stereoid sporocarps in the Agaricomycetes, but included are also two papers which are methodologically oriented. The family Podoscyphaceae, which is comprised of stipitate stereoid fungi, is studied with regard to representatives of five genera utilizing molecular marker LSU. Species in the family Podoscyphaceae are recovered in orders Agaricales, Hymenochaetales, Polyporales, Atheliales, and in one new order. The new order Stereopsidales, and the family Stereopsidaceae are described after molecular phylogenetic analyses of the nuclear genes *rpb2*, *tef1*, nLSU and nSSU, incorporating *Stereopsis radicans* and the new combination *Stereopsis globosum*, formerly *Clavulicium globosum*. *Clavulicium macounii*, which shares morphological traits with the Stereopsidales, is recovered as the sister lineage to the Stereopsidales or as sister to the Phallomycetidae, and is left *incertae sedis*. Polyporales is studied with genomic data and multi-locus phylogenies, but the species relationships are still difficult to resolve, especially with regard to corticioid and resupinate species. Steccherinaceae, which is comprised of resupinate polypores and resupinate hydroid species, is studied in more detail. Genera *Antrodiella*, *Steccherinum* and *Junghunia*, are highly polyphyletic, showing once more that the morphological characters used to classify fungi have been misleading. Adding unidentified sequences to phylogenetic studies on any fungal group has an effect on the phylogenetic interpretation which can not be ignored, and it is recommended that significant BLAST hits are included in the phylogeny. Single copy genes inferred from proteomes of 50 Agaricomycotina species have slightly different evolutionary histories, and many splits can not be resolved.

**Keywords:** Agaricomycetes, order nova, family nova, comb. nova, orthology, homology, paralogy, gene tree incongruence, species tree, systematics, fungi, phylogeny.

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