

## Systematics and cryptic species in lichenized fungi

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In lichen systematics the naming of species results from their accurate delimitation based on morphological and, increasingly, on phylogenetic data. During the last years several studies have presented multilocus phylogenetic analyses that elucidated the identity of many sterile lichen species, or conclusively placed morphologically well known taxa to well defined phylogenetic groups. The microfilamentous lichens *Cystocoleus ebeneus* and *Racodium rupestre* were confirmed to be ascomycetes belonging to the Dothideomycetidae but not close to lichenized members within the subclass. Similarly, the genus *Normandina* turned out to be a monophyletic group within the Verrucariaceae. Morphological and phylogenetic species concepts complement each other. In-depth molecular studies focusing on critical lichen groups often reveal the presence of cryptic species forming well defined phylogenetic clades and result in the description of new taxa. However, the phylogenetic species concept should also be carefully considered when applied to cosmopolitan lichens which exhibit a high degree of morphological diversity, such as species constituting the *Tephromela atra* complex. In such cases what might appear to be clear genetic differentiation at a small scale may dissolve when the sampling is extended to wider geographic areas, owing to ongoing genetic differentiation and/or incomplete lineage sorting.

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