

A LICHEN SPECIES-COMPLEX AS A MODEL TO STUDY EVOLUTION OF ORGANISMS IN SYMBIOSIS

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We compiled a worldwide study on *Tephromela atra*, a widespread, crust-forming lichen species complex, which exhibits a high degree of morphological heterogeneity. The long-lasting debate about the recognition of *taxa* within the complex never considered the question whether the adaptation to habitats (spanning from the Mediterranean to the arctic and alpine regions) or substrates (calcareous and siliceous rocks, bark) correlates with the preference to certain algal partners. The multilocus phylogenetic hypothesis reconstructed for the mycobionts using ITS and the two protein coding genes b-tubulin and mcm7, recovered not less than 13 monophyletic clades, the majority of them well supported by morphological, chemical or ecological traits. We found that lichen mycobionts can associate with photobionts belonging to nine strains/species of *Trebouxia*. In the Alps and cold habitats of the South Hemisphere *Trebouxia simplex* and three new photobiont strains were recovered, whereas lichen thalli from the Mediterranean and temperate region consort with different *Trebouxia* species and host in the thalli multiple *Trebouxia* strains. *Tephromela atra* represents an interesting model to study adaptation and evolution of organisms in symbiosis.