Species evolution in lichen symbiosis: *Tephromela atra* species-complex as a model study

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Lichens constitute one of the most wide-spread fungal symbioses. However, the contribution of symbiotic relationships to species diversification is still under-investigated among this group of fungi. Lichenized fungi (mycobionts) depend on their association with an algal partner to form the symbiotic structure. These fungi are found only in the lichenized stage, and therefore represent interesting models to address questions of evolution under symbiotic conditions. The classification of lichens relies largely on morphology, but many species are heterogeneous and represent unresolved species complexes. In these cases the morphological classification fails to resolve species complexes and identify uniform species. Furthermore, species complexes prevent the understanding to what extent mycobiont genotypes correlate with photobiont selectivity. We investigate the genetic aspects of the symbiotic speciation of lichens using taxa belonging to the cosmopolitan *Tephromela atra* species complex as models. *Tephromela atra* has been considered as a phenotypically and ecologically plastic, cosmopolitan species occurring on diverse substrata. It is an example *par excellence* for a lichen species complex in Europe with taxa that were controversially considered as varieties or species. Further, the association of *Tephromela atra* with different photobiont species could indicate a certain degree of selectivity or specificity for the algal partners in diverse habitats, and can play a determinant role in speciation processes.

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