

International Conference on

Mycology & Mushrooms

September 12-14, 2016 San Antonio, USA

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Diversity, ecology and specificity in Antarctic lichens

The extreme climate conditions of the Antarctic continent provide an environment where only the most tolerant organisms can survive. The terrestrial vegetation communities of the ice-free areas of this continent (ca. 2%) are mainly comprised of mosses, fungi and lichens. Especially, crustose lichens are dominant in the cold deserts where they evolved special surviving strategies and growth forms to be successful in these most extreme areas of the world. They occur in sheltered microhabitats, which provide at least some humidity and protection against sun and wind. Additionally, these slow growing and very often inconspicuous organisms are able to be active at temperatures lower than zero degrees C, under snow cover and in the driest areas with a precipitation of less than 10 mm/year. We investigated the role of climatic factors driving lichen diversity, distribution and species specificity regarding associations between mycobiont and photobiont in Antarctica using saxicolous lecideoid lichens as a model system. The mycobiontic partner of the lichenous mutualism depends on the availability of an appropriate photobiont, providing necessary carbohydrates. The various mycobiont species show variable degrees of specialization on photobiont associations. The distribution, genetic diversity and phylogenetic relationships were investigated and revealed different specificity levels of the mycobionts/photobiont interactions. Our work shows that a strong degree of specialization often is associated with a restricted geographic distribution, whereas more generalized mycobionts and photobionts are more widespread. Thus, physiological adaptation to the climate as well as the generalized association between the mutualistic partners in lichens facilitates the successful colonization of lichens in Antarctica.

Biography

Ulrike Ruprecht has completed her PhD in 2010 at the University of Salzburg and continued her Postdoctoral studies at the same university. Currently she is funded by the Austrian Science Fund (FWF) and she is a Leader of a project on lichen diversity in Antarctica and South-America.

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