

THE BACTERIAL MICROBIOME OF *Lobaria pulmonaria* L. HOFFM.: COMPOSITION, ACQUISITION AND VARIABILITY

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In comparison to other lichens, *Lobaria pulmonaria* L. Hoffm. is less stress-resistant. It only tolerates a quite narrow range of variation in ecological conditions. *L. pulmonaria* prefers undisturbed and relatively cool and humid habitats with minimal air pollution. Our ongoing project aims on deciphering phenotypic traits enabling this model lichen to adapt to changing environmental conditions. The lichen microbiome is suggested to consist of a rather constant core microbiome complemented by a variable microbiome. Based on former studies, we hypothesize that the variable part of the microbiome is responsible to meet habitat-dependent challenges and may be acquired from the local surrounding environment. To address this hypothesis, we performed state-of-the-art metaproteome analyses of samples, which have been collected at 14 different European sites. Comparisons of the microbiomes of all sampling sites confirmed that the microbiome of *L. pulmonaria* consists of a core and a variable part. Additionally, we analysed habitat specific conditions affecting the taxonomical and functional composition of the bacterial microbiome such as tree species or altitude. Especially the climate variables seem to have the highest impact. *L. pulmonaria* mostly establishes on tree trunks side-by-side with different moss species. By comparing the composition of the lichen-associated with the moss-associated bacterial microbiome, we can support our hypothesis that mosses can act as a bacterial and especially a cyanobacterial reservoir supporting the lichen during establishment. Our results show that the direct environment and the climate shapes the variable part of the microbiome of *L. pulmonaria* and therefore it may enable the holobiont to cope with environmental changes and, thus, can be considered as an important ecological trait mediating lichen stress tolerance.