**IS TEMPERATURE A KEY FACTOR IN SYMBIOTIC MICROALGAE DISTRIBUTION?**

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High flexibility in photobiont choice is considered to be a strategy to survive under variable selective pressures, widening the ecological niche and therefore enabling the occurrence of lichens even in nutrient-poor and climatically-harsh environments. *Buellia zoharyi* Galun is a circum-Mediterranean/Macaronesian lichen which usually occurs in biocrusts in semi-arid areas*.* Recent literature detected different *Trebouxia* spp. as primary phycobionts in this lichen spp. (*Trebouxia asymmetrica*, *Trebouxia cretacea*, *Trebouxia* sp. *arnoldoi* and *Trebouxia* sp. OTUA25), which evidenced that *B. zoharyi* is flexible regarding phycobiont choice, and this is, in turn, related to geographic location.

In this study, the primary phycobiont of 200 thalli of *B. zoharyi* collected from 27 distant populations were identified by Sanger sequencing. To summarize the climate in each location, we used altitude and 19 bioclimatic variables from the WorldClim database. The relative effects of climate on the species distribution modelingwere analysed by Multinomial regression analysis and Principal components analysis. The dataset was made up of the *Trebouxia*-composition detected by Sanger sequencing on these 27 records. Statistical analyses highlighted variables related to low temperatures and seasonality as the main factors influencing microalgae distribution in the lichen thalli.

Unialgal cultures of these four *Trebouxia* were subjected to different temperatures (7ºC, 15ºC, 22ºC, 29ºC and 36ºC). The responses of these strains were characterized using chlorophyll fluorescence measurements. None of the microalgae survive at 36ºC after 21 days, and *T. cretacea* died at 29ºC. *Trebouxia* sp. OTUA25 showed the highest, similar Fv/Fm values at each temperature. Analogous behavior was observed in *T. asymmetrica,* except that its Fv/Fm values decrease at 8ºC. The lowest Fv/Fm measurements were recorded for *Trebouxia* sp. *arnoldoi*. *T. cretacea* exhibited its optimum within a range of 15ºC-22ºC.

Our results indicate temperature as the key bioclimatic factor that influences phycobiont distribution patterns. Funding: PROMETEO/2017/039(GVA).