

Review of
The study of photobionts in the lichenized genus *Lepraria*
by
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Algae in lichen associations were a long time neglected by lichenologists. Reasons were intelligible – fungal partner is a dominant component of lichen thallus and, moreover, lichens were taxonomically accepted as lichenized fungi. Nevertheless, deeper understanding of biological and ecological aspects of lichen associations as well as origin and principles of lichenization were impossible without further study of photobionts. Until recently, the genus *Trebouxia* s.l., the most common photobiont, was taxonomically insufficiently known for several problems. Modern techniques advance our knowledge of photobionts eminently.

It is my great pleasure that Ondřej Peksa focused his interest on these methods and a new working group together with Pavel Škaloud was established at the Faculty of Science, Charles University. His thesis contains studies of several aspects of photobiont biology:

1. Investigation of algae morphology and taxonomy using modern techniques – confocal microscopy and molecular methods.
2. Identity of photobionts of selected lichen taxa eventually in lichen communities.
3. Role of photobionts in lichen ecology.

An introduction of the thesis is framed by a concise history of present knowledge on identity of photobionts, their diversity, biogeography and ecology. Some postulations in the introductory review should be specified:

p. 21: Nyati (2007) ...different *Trebouxia* species in saxicolous and corticolous *Xathoria* specimens – **or species?**

p. 22: ... specificity means the number of partners... – **The specificity is inversely proportional with number of partners!**

p. 23: ...another widespread lichens have been found to associate with more than one photobiont lineage... What lichen species?

Use of the term selectivity is inconsistently defined in comparison with the term specificity in literature so far and seems to be redundant in a strict sense of the word. It could be conceptualized as specificity within a local range. Another view could be the specificity as a theoretical value (all potential partners) and the selectivity as manifested association(s). However, basic problem is that selectivity value is still very depending on our present knowledge. Another problem is that potential compatible partners in any habitat are not evaluated. Further aspect is an uneven role of different photobionts in ontogeny of a lichen association – eg. theft or loan of alga between *Xanthoria parietina* and *Physcia* spp. (Ott 1987).

p. 25: ...low selectivity of mycobiont represents advantage in extreme habitats... **Is any hypothesis on role of high selectivity? Could it represent any advantage for a lichen in special cases?**

Results of several studies involved in the thesis are important and some new findings challenge further questions and discussion:

– Results show markable changes in chloroplast shape during liberation of photobiont cells from the lichen thallus. **Have you any hypothesis for these changes, their reason or role?**

- Leprose thallus with a large surface of soredia is a textbook example of adaptation to humid air conditions in ombrophobous habitats. **However, some *Lepraria* spp. prefer a different habitat – sunny and dry. Have you any comment ?**
- The character of contact between hyphae of lichenized fungus and algae cells enables to evaluate the phylogeny of the association. **Have you found any difference between different ecological groups of *Lepraria* spp. in this respect?**

Analysis of algal partners of *Lepraria* spp. in different ecological habitats and namely atypical or transitional niches show that lichenized fungus has rather low specificity/selectivity in respect of ecological amplitude as well as towards species of photobiont. However, responsibility for a particular niche realization seems to have the taxon of alga, its surviving and ecological profit, and probably its light sensitivity, or in other words, ability of mycobiont to supply a shelter (which is perhaps rather weak in soredia in comparison with heteromeric thallus). **Is possible to speculate upon ancestry of studied lichens associations or photobionts on basis of these data?**

The extent of the data and overall quality of the thesis. are sufficient to fulfil demands for a Ph.D. thesis. The applicant demonstrated ability to work independently, set objectives, analyze data and discuss them in more or less broader context. Therefore I recommend this thesis to be accepted for the award of PhD.

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