

A revision and a molecular phylogeny of the austral and partly bipolar lichen genus *Psoroma*

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Psoroma is a heterogeneous genus in the lichen family Pannariaceae. Within its family, it is characterized by having green algae as a primary photobiont and cyanobacteria as secondary photobionts localized to particular structures known as cephalodia. A lichen with two symbiotic partners, in addition to its major mycobiont, is referred to as tripartite.

Psoroma in a wide sense has an almost global distribution. It is found in polar areas (6 species are at present recognized from Antarctica), alpine areas, Palearctic, montane forests (from Madagascar to Japan/Tahiti/N. Australia), and has a concentration of species in former southern Gondwanaland territories, southern South America and New Zealand/southern Australia. Thus, it is unique in having species concentrations in such different areas of the world, and most certainly an old evolutionary history related to major events in the earth's history, maybe at least during the last 100 mill. years.

Psoroma in a strict sense should be restricted to 15-20 mostly brownish species, concentrated to soil and to arctic-alpine or steppe areas. Such biomes are not the oldest ones, and *Psoroma* s. str. may not be the most ancient part of the complex. To define different parts of this heterogeneous group and their evolutionary relationships, molecular-based studies are needed. We have now initiated a cooperation and have a plan of addressing various subgroups of the complex, some related to the neighbouring genus *Pannaria*. Most of these groups potentially represent new and yet undescribed genera.

The topic of the first manuscript are species forming yellowish-green patches of squamules resting on a thin, black mat of fungal hyphae ('prothallus') on cortex in austral areas. Our ITS and LSU-based analysis produced a phylogenetic tree which shows, when constructed on a sufficient number of sequences, two distinct groups, in addition to the reference groups *Psoroma* s. str. and *Pannaria*. One is yellow due to usnic acid, a unique character within the family, and contains two widespread species, one of them with an erroneously adapted name. This group will be described as a new genus, and may contain two species in addition, which will be studied separately. The other group is strongly yellow-green when wet, but weakly green when dry. However, this is not due to any secondary compound, but to lack of the mostly brownish melanins present in most species of *Pannaria* s.str. Thus, this is the colour of the