

Summary

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SUMMARY

Mycosociology of riverine *Alnus incana* and *Hippophaë* stands in the Upper Rhine Valley (Domleschg, Grisons, Switzerland).

During 1986-1988, macromycetes were investigated on three plots of alder forest (*Alnetum incanae*: sites A-C, total area 2000 m²) and for comparison on one plot with sallow thorn and willow (*Hippophaë-Berberidetum*: site D, 1000 m², without alder). All four plots were situated in 600 m a.s.l. (submontane zone) on the eastern bank of the Rhine river near Rhäzüns (Domleschg, Grisons, Switzerland). The evaluation of the field data, recorded in weekly or fortnightly intervals, focuses on the following mycosociological and mycoecological aspects:

- comprehensive survey of the macromycetes associated with *Alnus incana* (enumeration of species, productivity, dynamics, fluctuation, phenology and spatial constancy of fruitbodies).
- graphic illustration of the spatial fruitbody distribution of several selected macromycetes based on fruitbody mapping at regular intervals in undisturbed permanent plots (sanctuaries).
- analysis of the influence of climatic (precipitation, air and soil temperatures) and edaphic parameters (chemical and physical properties of the soil, soil profiles) on fungal fructification.

Eighty-four collecting trips to the sites A-D yielded 3800 samples (with 1600 fully analysed collections) representing 303 fungal taxa (88% Basidiomycetes, 12% Ascomycetes; see Tab. 14). In the three alder habitats, 267 species were found (5% ectomycorrhizal fungi, 51% lignicolous fungi, 44% terricolous saprobic fungi). Comparing observations made by several authors in other Central and East European alluvial forests dominated by *Alnus incana*, the following typical mycoecological characteristics stand out:

- significant fungus aspect in spring represented by a set of typical vernal macromycetes.
- in general low density of fruitbodies with only occasional mass-occurrence of relatively few fungal species.
- dominance of lignicolous fungi (mostly belonging to *Coprinus*, *Crepidotus*, *Mycena*, *Psathyrella* and *Trametes*) due to the ample supply of standing and fallen wood.
- occurrence of many terricolous fungi, often representing nitro- and basiphilous saprobes (belonging e.g. to *Clitocybe*, *Conocybe*, *Cystolepiota*, *Marasmius* and *Pholiotina*) forming fragile and ephemeral fruitbodies.
- comparatively poor representation of ectomycorrhizal fungi, probably caused by the nutrient-rich fertile soils (resulting from periodical flooding and fixation of atmospheric nitrogen by the symbiotic *Frankia* in root nodules of alder). In general, *Paxillus filamentosus*, *Naucoria* spp. and *Inocybe* spp. occur regularly in alder and alluvial forests, whereas other ectomycorrhizal genera (especially *Amanita*, *Cortinarius*, *Hygrophorus*, *Lactarius*, *Russula* and *Tricholoma*) are only sporadically observed or seem to be absent all together.

The evaluation of pertinent literature concerning the mycoflora in Central European riverine *Alnetum incanae* demonstrated that this association is characterized by 137 frequently and 379 more or less casually alder-associated macromycetes. However, only 33 species

are exclusively restricted to *Alnus incana* habitats. In spite of the rather long and continuous monitoring period, some of the elsewhere common, highly host-specific ectomycorrhizal symbionts of *Alnus* were not recorded at the research sites A-C, viz. *Cortinarius alnetorum*, *C. bibulus*, *Gyrodon lividus*, *Lactarius lilacinus* or *L. obscuratus*.

In the sallow thorn dominated habitat, 82 fungal taxa were encountered (23% ectomycorrhizal fungi, 26% lignicolous fungi, 51% terricolous saprobic fungi). In the examined research area, the *Hippophao-Berberidetum* is restricted to dry and wind-exposed gravel banks along the Rhine river. This association extends beyond the flood level and demonstrates mycofloristic peculiarities in sharp contrast to the situation found in the neighboring *Alnetum incanae*, viz.:

- absence of an early fungus aspect due to the relatively harsh local continental microclimate.
- moderate fruitbody production on account of the poor water content and retention capacity of the soil, which is predominantly composed of coarse gravel.
- comparatively low number of lignicolous fungi which taxonomically mostly belong to the Aphyllophorales (e.g. *Daedaleopsis*, *Phellinus* and *Polyporus*).
- dominance of the terricolous saprobic macromycetes *Clitocybe*, *Collybia*, *Hemimycena*, *Mycena* and *Panaeolus* which in small localized clearings are replaced by thermophilic species of *Bovista*, *Conocybe* and *Lycoperdon*.
- increase of ectomycorrhizal fungi (representatives of *Chroogomphus*, *Cortinarius*, *Hebeloma*, *Inocybe*, *Lactarius*, *Suillus* and *Tricholoma* mostly associated with *Salix* and *Pinus*) caused by suboptimal environmental site conditions (relatively low nutrient content of soil, periodical drought, comparatively high and low temperatures due to exposure).

The macromycete flora of the *Hippophao-Berberidetum* is characterized by thermophilic taxa usually found both in xerophytic meadows and pine forests. It is remarkable, however, that species of *Entoloma* and *Omphalina*, which are typical components of the *Xerobromion*, are absent or very rare at site D. From the mycosociological point of view, the mycoflora of the *Hippophao-Berberidetum* is poorly studied yet. Based on the little available data, the substrate-specialized *Phellinus hippophaëicola* must be considered as the most characteristic species of this association.

In general, natural riverine forests represent unique plant communities whose fungus flora is especially rich in rarely observed and even unknown fungal taxa. In the investigated plots, this fact is highlighted by the occurrence of many fungi registered in the Central European Red Data Books (e.g. *Inocybe ochracea*, *Leucopaxillus mirabilis* and *Psathyrella narcotica*, to name a few very rare species). In addition, two new macromycetes (*Psathyrella immaculata* and *Rhodocybe ardosiacae*) were discovered in the *Alnetum incanae* on the research sites.