

**Zeitschrift:** Veröffentlichungen des Geobotanischen Institutes der Eidg. Tech. Hochschule, Stiftung Rübel, in Zürich

**Herausgeber:** Geobotanisches Institut, Stiftung Rübel (Zürich)

**Band:** 92 (1987)

**Artikel:** Pilzökologische Untersuchungen in Wiesen und Brachland in der Nordschweiz (Schaffhauser Jura) = Myco-ecological investigations in meadows and fallow land in Northern Switzerland (Jurassic mountains near Schaffhausen)

**Autor:** Brunner, Ivano

**Kapitel:** Summary

**DOI:** <https://doi.org/10.5169/seals-308857>

### **Nutzungsbedingungen**

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. [Siehe Rechtliche Hinweise.](#)

### **Conditions d'utilisation**

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. [Voir Informations légales.](#)

### **Terms of use**

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. [See Legal notice.](#)

**Download PDF:** 26.11.2024

**ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>**

- Die bodenphysikalischen und -chemischen Werte eignen sich zur Ergänzung bereits vorhandener autökologischer Daten bestimmter Makromyceten.
- 6. 1983 war die Pilzsaison mittel, 1984 gut und 1985 schlecht. Anhand detaillierter Mikroklimadaten wird der Einfluss von Niederschlägen, Trockenperioden und Temperaturen auf die Pilzaspekte besprochen (Kap. 4.5.10).
- 7. Meteorologische Faktoren spielen eine wichtige Rolle für das Fruchtkörperwachstum:
  - Niederschlagsmenge: Vor den ersten Fruchtkörperfunden der häufigsten Makromyceten fallen in der Regel über 10 mm Niederschlag pro Woche.
  - Frost: Trotz Frösten im Frühling und Herbst fruktifizieren eine Reihe saprober Pilze. Eine durch Frost mögliche Fruchtkörper-Induktion wird diskutiert (Kap. 4.5.11).
- 8. Natürlich verjüngte einjährige Föhrenkeimlinge sind in Parzellen mit Schnitt jedes Jahr mit einer Häufigkeit von 5-10 pro m<sup>2</sup>, mit Schnitt jedes zweite Jahr und mit jährlichem Brand mit einer Häufigkeit von 2-4 pro m<sup>2</sup> zu finden. In Parzellen mit Schnitt jedes 5. Jahr und ohne Bewirtschaftung sind sie mit 0-1 pro m<sup>2</sup> relativ gering vertreten.
- 9. In 8-jährigem Brachland konnten vor allem 4-7-jährige Jungföhren gefunden werden; 1-3-jährige sind selten. Möglicherweise ist dafür die Deckungszunahme von Brachypodium pinnatum verantwortlich: 1. weil sich schwer abbaubare Streue akkumuliert und 2. weil die Zahl der für die Samenkeimung günstigen Mikrostandorte, sog. "regeneration niches", reduziert wird.
- 10. 29% der einjährigen Föhrenkeimlinge aus einem Wiesenstandort "uf der Gräte" waren ektomykorrhiziert. Von allen untersuchten Kurzwurzeln wiesen nur gerade 4% eine Ektomykorrhiza vom Typ Ba auf. Aus einem Waldrandstandort im "Grätental" waren alle einjährigen Sämlinge ektomykorrhiziert. 69% ihrer Kurzwurzeln waren ektotroph. Neben drei Ektomykorrhizotypen (Ga, Ic, Hb) wurde noch eine "Pseudomykorrhiza" festgestellt. Nur der Typ Ga kann als Cenococcum graniforme identifiziert werden.
- 11. Vier Ektomykorrhizapilze (Suillus collinitus, Hebeloma cf. circinans, Tricholoma terreum, Rhizopogon luteolus) der Waldföhre, aus lokalen Wiesen- und Föhrenforststandorten gesammelt, wurden isoliert und in vitro mit steril aufgezogenen Föhrenkeimlingen konfrontiert. Alle Pilzarten (mit Ausnahme von R. luteolus; keine Infektion) bildeten Ektomykorrhizen des Typs Aa.
- 12. Morphologisch-anatomische Vergleiche der Ektomykorrhizen von natürlich verjüngten einjährigen Föhren ergaben in keinem Fall eine Übereinstimmung mit in vitro-synthetisierten Ektomykorrhizen.

#### SUMMARY

Myco-ecological investigations in meadows and fallowland in Northern Switzerland.

In Merishausen ("Schaffhauser Randen") differently managed semi-dry meadows (Mesobrometum; 3700 m<sup>2</sup>), a fertilized mown meadow (200 m<sup>2</sup>), pine fo-

rests<sub>2</sub> (Brachypodio - Pinetum; 400 m<sup>2</sup>) and beech woods (Carici - Fagetum; 400 m<sup>2</sup>), each divided into 50 m<sup>2</sup> plots, were investigated in terms of fungus- and plant-sociology, fungus- and plant-phenology, pedology and microclimate. All stands were visited regularly at one or two week intervals on more than 100 excursions during the vegetation periods in 1983-1985.

In addition, the natural regeneration of pine (Pinus silvestris) was recorded and ectomycorrhizae of one-year-old pine seedlings were investigated and classified. Simultaneously, ectomycorrhizal fungi were cultivated in pure culture from fruitbodies and used to inoculate seedlings grown under sterile conditions. The ectomycorrhizae which resulted in vitro were examined and classified, and their morphology and anatomy compared with naturally occurring ectomycorrhizae.

1. Altogether, 195 species of fungi were recorded in 15 research areas (4700 m<sup>2</sup>). The majority of these taxa are macromycetes of the classes Basidiomycetes (83%) and Ascomycetes (13%). The species Clavaria incarnata, Entoloma costatum, Psathyrella phaseolispora and Agrocybe gibberosa were very rare findings.
2. The fungus communities of meadows, pine forests, and beech woods differ distinctly from each other.
3. The fungus communities of pine forest and beech woods are astonishing in their large number of characteristic saprobic fungi, as well as in their relative poverty of species of ectomycorrhizal fungi. Possible causes for this are discussed (Chapt. 5.3).
4. Many fungal taxa found in the Mesobrometum were established by other authors in dry meadows of Switzerland and Germany as well as in meadows on inland dunes in Germany; a few species also have an arctic-subantarctic-alpine distribution.
5. Investigations of the fungus community of the Mesobrometum (3700 m<sup>2</sup>) showed:
  - Following the results of three years of investigations under the most favourable conditions the "minimum area" of the taxa found is 1750 m<sup>2</sup>.
  - The number of species-area curve<sub>2</sub> increases continuously and still has a rise of over 50% at 3700 m<sup>2</sup> (investigated research area).
  - After at least 8 years fallow the number and density of the species of fungi increases.
  - Contrary to managed unfertilized mown meadows the C/N-ratio increases in fallows from 10.5-12.9 to 11.7-13.4 by about 1.0; a negative influence on soil-inhabiting saprobic fungal flora cannot be observed.
  - Yearly burning of the vegetation in spring results in an increase of certain nitrophilic macromycetes.
  - Intensive management and fertilization suppresses (?) nearly all the fungal flora in a habitat (only a few fructifications could be observed).
  - Physical and chemical data of soils can complete autecological data of certain macromycetes already available.
6. The fungus season in 1983 was middling, in 1984 good, and in 1985 bad. With detailed microclimatic data, the influence of precipitations, dry periods, and temperatures on the fungus aspects are discussed (Chapt. 4.5.10).
7. Meteorological factors play an important role in growth of fruitbodies:
  - Amount of precipitation: As a rule, one week before first finds of

most of the macromycetes, precipitation is over 10 mm per week.

- Frost: In spite of frosts in spring and autumn a large number of saprobic fungi fructify. A possible induction of fruitbodies by frost is considered (Chapt. 4.5.11).
8. Naturally regenerating one-year-old pine seedlings are to be found with a frequency of 5-10 per  $m^2$  in plots which are cut every year, with a frequency of 2-4 per  $m^2$  in plots which are cut every second year and in plots which are burnt yearly. Seedlings are relatively rare with a frequency of 0-1 per  $m^2$  in plots which are cut every fifth year and in those that are not managed.
  9. In 8-year-old fallows 4-7-year-old pine could be found frequently, 1-3-year-old pine were rare. Possibly, increase of cover by Bra-chypodium pinnatum is responsible for: 1) accumulation of poorly decomposing litter and 2) reducing of favourable microstands for seed-germination, so-called "regeneration niches".
  10. Twenty-nine percent of one-year-old pine seedlings from a meadow stand "uf der Gräte" were ectomycorrhizal, of all investigated short roots only 4% had ectomycorrhizae of type Ba. From the border of a wood in the "Grätental", all one-year-old pine seedlings were ectomycorrhizal and in 69% the short roots were ectotrophic. In addition to the three types of ectomycorrhiza (Ga, Ic, Hb), one "Pseudomycorrhiza" was as- certained. Only the type Ga could be identified as Cenococcum graniforme.
  11. Four ectomycorrhizal fungi (Suillus collinitus, Hebeloma cf. circinans, Tricholoma terreum, Rhizopogon luteolus) of pine, collected from local meadow and pine forest stands, were isolated and used to inoculate pine seedlings grown under sterile conditions. All species of fungi (with exception of R. luteolus; no infection) formed ectomycorrhizae of type Aa.
  12. Comparisions of morphology and anatomy of ectomycorrhizae of naturally regenerated one-year-old pine seedlings did not result, in any case, in agreement with ectomycorrhizae synthesized in vitro.