Englische Zusammenfassungen der im Berichtsjahr 1994 abgeschlossenen Diplomarbeiten (Summaries of Diploma Theses)

- Podiumsdiskussion der Referenten zu ausgewählten Themen
  (Leitung dipl. Forsting. M. BICHSEL, Geobotanisches Institut ETHZ)

c) weitere Vorträge

STÖCKER G., Institut für Ökosystemforschung, Halle/Saale, Deutschland: Quantitative Erfassung der Veränderungen von Wald-Ökosystemen durch Immissionen. 8.2.1991.
CRAWFORD D.J., Ohio State Univ., Columbus, Ohio, U.S.A.: Evolution and genetic variation in plants on oceanic islands. Insights from allozymes and DNA. 24.5.1991.

7. ENGLISCHE ZUSAMMENFASSUNGEN DER IM BERICHTSJAHR 1989 ABGESCHLOSSENEN DIPLOMARBEITEN
(Summaries of Diploma Theses)

ESER Michael. Wirtsrassen bei endophytischen Pilzen von Gräsern. 58 S. (Polykopie)

Host races in fungal endophytes of grasses.

Various grasses are hosts of systemic endophytes in the family *Clavicipitaceae* (Ascomycetes). Following a method of LATCH and CHRISTENSEN (1985) artificial infection of aseptic seedlings (*Festuca arundinacea* Schreb., 'Barcel', 'FA 223' und 'Stella'; *F. pratensis* Huds., 'Prédix', Klon 217; *F. rubra* L., 'Echo'; *Lolium perenne* L., 'Bastion' und *Poa pratensis* L., 'Monopoly') with seven isolated strains of *Acremonium* fungi (*Acremonium lolii* [*L. perenne*], *A. typhinum* [*F. rubra*], *A. coenophialum* [*F. arundinacea*], *A. uncinatum* [*F. pratensis*] and a strain of *Acremonium* of *F. pulchella* Schrader) was attempted. Only seven of the 724 inoculated seedlings were successfully infected. Because of the low rates of infection it was not possible to demonstrate any host specificity of the host races. The failure of the infection cannot be interpreted as actual incompatibility with the examined combinations. The difficulties in artificial infection of grasses with endophytes were discussed.
The isolates of the fungi used were characterized by morphological features and electrophoretic enzyme variation. The detected enzyme patterns and the morphological similarity of the fungal strains did not correlate. The enzyme variation does not seem to be a useful criteria for the taxonomy of the *Acremonium* fungi. A possible correlation of the taxonomical similarity of the fungal strains and their host specificity could not be examined.

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FISCHER Lorenz Andreas. Pflanzensoziologische und ökologische Untersuchungen auf einem sekundären Auenstandort in Brugg (Kanton Aargau). 34 S. (Polykopie).

Phytosociological and ecological studies on a secondary riverine biotope in Brugg (Canton of Aargau). (See contribution in this volume).

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GUGGENHEIM Esther. Mauervegetation in der Stadt Zürich. 53 S. + Anhang. (Polykopie)
Wall vegetation in the city of Zurich. (See contribution in this volume).

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JÄGGLI Barbara. Samenproduktion sechs ausgewählter Unkrautarten auf verschiedenen Ackerstandorten. 43 S. + Anhang (Polykopie)
Seed production of six ruderal weeds on different sites (see contribution in this volume).

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LANGENAUER Regula. Morphologische und ökologische Ursachen der Zu- und Abnahme charakteristischer Pflanzenarten in einem verschieden bewirtschafteten Trespen-Halbtrockenrasen bei Merishausen (SH). 83 S. (Polykopie).
Morphological and ecological causes for the increase or decrease of characteristic plant species in limestone grassland with different treatments in Northern Switzerland.

The paper deals with the effect of different treatments (cutting every year, every second and every fifth year in July, yearly cutting in October, controlled burning in early spring and no management) on the vegetation and particular species after 13 years of study.

1. Dry weight of the living phytomass was highest in plots of controlled burning with 290 g/m^2 and lowest in yearly cut plots with 190 g/m^2. Litter decays slowly in the study area: At the beginning of July the amount was still 60% of the living phytomass.
2. Controlled burning, cutting every fifth year and no management had a favourable effect on tall species with rhizome and/or underground runners (e.g. *Salvia pratensis, Brachypodium pinnatum)*, but inhibited small species, which regenerate mainly by seeds (e.g. *Anthyllis vulgaris, Medicago lupulina*) .
3. Cutting in July or October every year and cutting in July every second year had a favourable effect on small species, which regenerate vegetatively as well as by seeds (e.g. *Leontodon hispidus).*
4. About 60 plant-species per 50 m^2 were found in plots cut every year in July or October or cut every second year; only about 50 were found in plots of controlled burning and in those cut every fifth year or without management. A thick layer of litter, dry soil after burning or a high cover of *Brachypodium pinnatum* caused a reduction in the number of species.
5. The cover of *Brachypodium pinnatum* stayed low in regularly cut plots and increased more quickly with controlled burning than with cutting every fifth year or without management.
6. Plots cut every fifth year and those without management were very similar. Only few and small trees could be found in both treatments.
7. Predictions made by KRÜSI (1981) and statements made by MERZ (1986) on the vegetational changes were confirmed in most cases.
8. In order to preserve species-rich limestone grasslands a combined treatment is recommended, where cutting in summer should be effected around mid-July to allow cha-

racteristic plant species to regenerate by seeds. Near the edge of the forest and near bushes certain areas should be cut only every second or third year, in order to favour late-flowering species. Controlled burning is not recommended as treatment for limestone grassland.

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OTTO Michael. Feuchtgebiete und waldfreie Trockenstandorte im oberen Bergsturzgebiet von Goldau. 91 S. (Polykopie)

Wetlands and open dry grasslands in the upper region of the landslide of Goldau/SZ, Switzerland.

Area

The village of Goldau is situated at the northern border of the Alps, between the Lakes of Zoug and Lowerz (Central Switzerland). To the north, Goldau is bordered by the hill called Rossberg (1580 m a.s.l.). At its northern flank the stone and mud avalanche went down in 1806, burying parts of the village. The mountain has a dangerous stratification composed of benches of conglomerates and marly strata. Soils are normally shallow and weakly developed lithosols or regosols rich in rock debris. The climate is mild and moderately humid.

The special investigation area at the upper end of the landslide between 800 and 1500 m a.s.l. is characterized by its changing humidity conditions. Different units of grassy pine woods colonize most of the surface alternating with treeless wetlands and open dry sites. High water levels provoke here the death of all tree species giving way to flat-rooting individuals which at their turn are then menaced by drought periods.

Wetlands

The evaluation of 45 relevés (sensu Braun-Blanquet) gave seven vegetation units (No. 1-7) and ten indicator plant groups which were compared with similar data from literature.

Unit 1 resembles moist *Molinia* meadows (cf. REHDER 1962, Girstel) and is normally found in wet gaps of the woodlands.

Units 2 and 6 are related to wet *Bryum*-rich small sedge spring swamps (with *Carex davalliana,* cf. KLÖTZLI 1969, northern Midlands).

Unit 3 is equivalent to the *Carex flacca-Molinia litoralis* stage, *Pinguicula alpina*-variant of wet unconsolidated marly slopes (FABIJANOWSKI 1950, Fallätsche).

Unit 4 and to some extent unit 5 are comparable to reed rich small sedge swamps (cf. GIUGNI 1989, western Alps).

Unit 7, so far, has no equivalent in literature. Apparently, it is a pioneer stage of spring swamp on underdeveloped wet soils.

Most wetlands belong to the *Carex davalliana* flushed swamps and are only occurring in small patches of mostly below 20 m^2 in pine woodland.

Open dry sites

Only four representative places were found suitable for small relevés. All belong to developing stages of blue grass - tussock sedge (*Sesleria coerulea, Carex sempervirens*) - dry meadows. Towards open pine woodlands (*Cirsio tuberosi-Pinetum silvestris* sensu ELLENBERG and KLÖTZLI 1972). Still many spring swamp plants occur, this time together with typical dry site plants. The cause is probably lying in wet early year periods and rapid paludification in rainy summer periods, enabling the existence of swamp plants. On the other hand, desiccation may take place in short periods of summer drought because water-holding-legacity of the soil is very low, explaining the presence of dryness indicators.

Succession trends

Possible general succession trends in wetlands are driving from intermittently wet and

poor to (intermittently) dry and richer sites. However, most units are quite stable or constant in species composition for the next decennia, this succession is slow. Development of units 1, 2, 4 and 6 is probably leading to *Molinia* meadows (*Gentiano-Molinietum*) and consequently to bush encroachment and natural afforestation, because most *Molinia* meadows are only existent when mown. Unit 3 could develop to a *Molinia* pine woodland (*Molinio-Pinetum*), and unit 5 is resembling a wet open patch in woodland and most likely not changing much in the near future. Unit 7 is probably developing to dry gaps or to a type of *Molinia* meadow.
Succession on dry sites is adjusting to the adjacent pine woodlands (*Cirsio tuberosi-Pinetum montanae*).

Conservation

The landslide area is of high natural value and worth protecting. Its present status as a "plant protection area" guarantees the necessary conservation measures.

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SCHMIDT Gerhard. Sukzessionsvorgänge in den Waldgesellschaften im Goldauer Bergsturz. 61 S. (Polykopie)

Primary succession in pioneering forest communities in the landslide of Goldau/SZ, Switzerland.

In 1806 the village of Goldau was destroyed by a landslide which covered an area of 8 km length and 2 km width. About 300 people lost their lives. This "fresh" soil was colonized by new plant communities.
The present paper deals with phytosociological and pedological investigations in forests on the landslide.

1. The following forest communities occur in the landslide region:
- *Polygalo (chamaebuxi)-Piceetum* (No. 53 by ELLENBERG and KLÖTZLI 1972) with three variants: with *Juniperus communis* in the tree-layer, with *Cypripedium calceolus* and as type.
- *Molinio-Pinetum silvestris* (No. 61)
- *Cirsio tuberosi - Pinetum montanum* (No. 63)
- Transitional areas between 53/61 and 61/63

2. The *Polygalo(chamaebuxi)-Piceetum* is closed and 14-20 m high (poor herb-layer).
   The *Molinio-Pinetum silvestris* is not completely closed and up to 10 m high, and occurs on unstable slopes.
   The *Cirsio tuberosi-Pinetum montanae* is low, totally open, and occurs on the least developed soils.
3. *Fagus silvatica* is absent in all these communities because it cannot colonize these regions for ecological reasons, the soil being too shallow and often intermittently wet. The pedological investigations showed a calcaric regosol in the lower and a lithosol in the upper region, both are little developed soils on limestone and marnes. The regosol is slightly more developed than the lithosol. Above 950 m a.s.l. soil develops very slowly. The uppermost layer is removed periodically by landslides, erosion and small avalanches resulting in a recurrent succession. In these raw soils, the roots of the *Molinio-Pinetum* and the *Cirsio-Pinetum* are fixed well. These forest communities will still be present in the region for a long time, but in a variable size and extension. The *Polygalo(chamaebuxi)-Piceetum* and the mixed deciduous forest cannot settle above 950 m a.s.l. or then in small patches only.
4. Woodless areas are found in two site types:
- On slopes above 1100 m a.s.l.: soils remaining quite wet for some time, but rapidly

manifesting strong water deficiency in dry periods.
- In depressions: soils remaining wet under the influence of spring-water and often in shadowy positions.

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SEEHOLZER Christian. Biosystematische Untersuchungen an schweizerischen *Drosera*-Arten. 72 S. (Polykopie)

Biosystematic investigations on Swiss Drosera species.

The local Swiss taxa of the genus *Drosera* L. (*D. rotundifolia* L. 2n=20, *D. x obovata* Mert. et Koch 2n=30, *D. anglica* Huds. 2n=40, *D. intermedia* Hayne 2n=20) belong to the section *Rossolis* Planch. They were examined by means of cytology and isoenzyme analysis. The investigation of 204 individuals from twelve sites resulted in genetic identities I=1.00 between populations within the taxa and average heterozygosities H_m of 18.8-37.5%. This was explained by self-pollination, vegetative reproduction, colonization of low competition ecological niches, and high plasticity of the phenotypes of all taxa. The speciation of *D. anglica* originates in a hybrid with *D. rotundifolia* as one parent. *D. x obovata*, the hybrid *D. anglica* x *D. rotundifolia*, stands isoenzymatically between both parents. *D. intermedia* is clearly separated from the other three taxa. Single loci of *D. intermedia* and *D. rotundifolia* show possibly fixed heterozygosity and indicate a chromosome number of x=5 for the genus *Drosera*. A comparison of the four taxa with two individuals of *D. adelae* (section *Arachnopus* Planch.) showed that both sections are probably well differentiated from each other. Subalpine dwarfed forms of *D. anglica* and *D. rotundifolia* are genetically indistinguishable from normal forms. The Swiss *Drosera* taxa depend on the unchanging conservation of peatland biotopes because of their lacking potential of genetic adaption.

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