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**Englische Zusammenfassungen
der im Berichtsjahr 1979 abgeschlossenen Diplomarbeiten**

Summaries of Diploma Thesis

AESCHIMANN David. Etude morphologique et phytogéographique du *Silene vulgaris* (Moench) Garcke s.l. (*Caryophyllaceae*) dans le domaine alpin occidental et les territoires avoisinants. 151 S. (Manuskript)

Morphological and phytogeographical study in *Silene vulgaris* (Moench) Garcke s.l. (*Caryophyllaceae*) in West Alps and adjacent neighbouring regions.

Silene vulgaris s.l. being very polymorphous, it offers a taxonomical problem that cannot be resolved but with the help of a study on variation. The paper deals with morphology of life-forms occurring within the group as well as some taxonomic and chorologic aspects.

The studies on stem and root morphology revealed that a revision of the terminology was useful; new terms were accordingly suggested. Fifteen life-forms of *Silene vulgaris* s.l. were described and a new subdivision of cryptophytes within the RAUNKIAER-ELLENBERG key to life-forms was presented. The origin and importance of the lignified forms were discussed.

Five subspecies of *Silene vulgaris* were distinguished within the Alpine region; for three of them, a detailed distribution map was given. A new variety viz. *Silene vulgaris* (Moench) Garcke ssp. *vulgaris* var. *neoalpina* Aeschimann et Bocquet was described; a new subspecific combination viz. *Silene vulgaris* (Moench) Garcke ssp. *montana* (Vest) Aeschimann et Bocquet was proposed as well.

In conclusion, the taxonomic value of the described life-forms as well as the geographical distribution of the subspecies related to geology and glaciations were discussed.

EGLOFF Thomas. Pflegemassnahmen und Sukzessionen in Schutzgebieten feuchter Standorte am Beispiel Reusstal. 192 S. (Manuskript)

Management procedure and successions in protected wetlands in the Reuss plaine.

Many older publications show that best management for straw-meadows, allowing the growth of highly valued litter, was already known in the last decades of the last century. For the actual conservation purpose also the economic question has to be considered, how many times a meadow must be cut, in order not to change straw-meadow vegetation essentially.

Beside bush encroachment (due to not-cutting) there is also a great danger coming from the influx of nutrients from the surrounding intensively fertilised meadows and fields ("indirect fertilisation"). Therefore, a method must be developed to control such protected areas by e.g. detecting the growing width of a marginal disturbed zone early enough. For this purpose, direct fertilisation on chosen plots in a larger straw-meadow area was induced to simulate the marginal conditions, analysing floristic changes. Sponsored by fertilisation with N, P, K were mostly *Agrostis gigantea*, *Mentha aquatica*, *Angelica silvestris* and the agriophyte *Solidago serotina* (on one plot each), all species which had been rare on moderately moist straw-meadows. This fertilisation raised production of these meadows up to 72 %. Fertilisation with only P and K, to the contrary, just sponsored some Leguminosae on certain plots and didn't raise production. "Warning species" were extracted by tabular comparison of relevés on the same plots in the former unfertilised and in the actual fertilised state. This fertilisation experiment was controlled with chemical soil analysis, which, for methodical reasons, gave satisfactory results only for K. Also standardised photographic documents, regularly taken, showed the development of these plots. These fertilised plots also served as test quadrats for the evaluation of serial photos (only marginally treated in this paper). On oblique aerial photos, in normal colour, NPK-plots are clearly visible, also stripes on the edge of straw-meadows, showing damages by trampling and by vehicles (tractors). Methodically not satisfying was the stochastic stratified distribution of these test quadrats on the basis of a vegetation map, and also the dominance-abundance-scale of Braun-Blanquet, because of the low differentiation for the lower values (1 and 2).

The optical effect of a straw-meadow can be only documented in a very limited way by the synthetic diagram of flower colours (synth. phenological spectra). The dominating colours of these meadows being confined to the vegetative shoots of these plants. However, this procedure allows a quantitative assessment of the different phenological aspects.

KURMANN Marie Helena. Oekologische Untersuchungen von Trespen-Halbtrockenrasen in der Nordschweiz, mit besonderer Berücksichtigung des Wurzelwerkes. 44 S. (Manuskript)

Ecological investigations in dry *Bromus erectus*-grasslands in northern Switzerland with special regard to the root system.

The object of this thesis was to determine if the diversity of root system makes possible the coexistence of different plant species, and if there are relationships between root morphology and the aboveground activity of the plant. Several abiotic parameters were also investigated.

The soil of the investigated plots was a very stony rendzina. Available soil phosphate was very limited, whereas the organic nitrogen content was relatively high, probably due to periodical desiccation of the upper soil layers preventing a good microbial activity.

Classified by their root growth characteristics the investigated species can be divided into shallow rooted plants (*Hippocrepis comosa*, *Viola hirta*, *Thymus pulegioides*), medium deep rooted plants (*Anthericum ramosum*, *Scabiosa columbaria*). These different groups of species are differentially influenced by nutrient and water availability. Only *Bromus* has an intensive rooting system in the upper horizons (where the nutrients are), but also some roots in the deeper horizons (where water is available); this can help to understand the dominant role of this species in these grasslands.

The coexistence of the species in dry *Bromus erecta*-grasslands is based among other factors on an interplay between the different root types and periodical changes in water availability within the different soil horizons.

LEUCHTMANN Adrian. Physiologische Differenzierungen in der Familie der Lemnaceen. 86 S. (Manuskript)

Physiological differentiation within the family of the *Lemnaceae*.

The paper deals with physiological responses of several duckweed species to various organic substances.

A. The content of organic substances in waters of northern Switzerland and northeastern France (Alsace). Ten strains representing *Spirodela polyrrhiza*, *Lemna minor*, *L. gibba*, *L. aequinoctialis* and *L. minuscula* were cultivated in darkness under sterile conditions, casamino acids, yeast extract and vitamin B₁ being added separately or in combinations to the Hutner's medium containing 1 % sucrose. Growth rate, size of fronds, root length as well as some qualitative features were scored.

The results can be summed up in the following way:

1. *Lemna gibba* (strain 6861 and 8428) proved to be different towards all the used substances;
2. *Lemna minuscula* (strain 6597) was inhibited by all the used substances;
3. *Spirodela polyrrhiza* (strain 7344) and *Lemna minuscula* (strain 6600) were inhibited by casamino acids, whereas other used substances

- apparently had no influence upon the performance of these strains;
4. *Lemna minor* (strain 6578 and 6591) was able to grow only if the yeast extract or vitamin B₁ were added to the medium;
 5. *Lemna aequinoctialis* (strain 7001 and 7806) was able to grow only if the yeast extract was added, but the vitamin B₁ caused no response.
 6. The ratio: length/width of fronds was not influenced by any of the studied substances.
 7. Out of the five investigated species, *L. gibba* and *L. minor* did not form roots in darkness; whereas *S. polyrrhiza*, *L. aequinoctialis* and *L. minuscula* (only in solutions without yeast or vitamin B₁) showed a nearly normal growth of roots.
- B. The water content of soluble organic nitrogen as well as that of soluble organic carbon were measured monthly from May to August 1979 in water samples taken from 44 stations in northern Switzerland and northeastern France (Alsace). No relation was observed between the concentration of these organic compounds and the occurrence of various *Lemnaceae* species. The studied water samples contained 0.02-1.64 mg/l of soluble organic nitrogen and 1.0-21.0 mg/l of soluble organic carbon; no difference occurred in this respect between stations inhabited by the duckweeds and those where no *Lemnaceae* occurred.

WEGELIN Thomas. Sukzession auf offenen Böden im Schaffhauser Jura.

113 S. (Manuskript)

Succession on open soils in the Jura Mountains.

In the commune of Merishausen (Jura Mountains, Ct. Schaffhausen) the vegetation of ten roadside slopes was investigated. They differed in age (3-, 6-,/40 years old), and in aspect, in position (above/below road), in parent rock (different limestone strata, marne, partly mixed), and in neighbouring vegetation (different partly abandoned meadows, distance of forest edge), and the inclination of the plots was between 30 and 44°. Two of these slopes had been treated with the usual lawn-seed mixtures.

Soon it became clear that - especially the younger sites - were composed of a multitude of micro-sites; therefore, no homogeneous vegetation was present. Independent of age, these slopes were very rich in species (45-82 spp.). And regardless of their position to the road, cover values amounted to over 80 % for 40-year-old slopes, for younger slopes above the road around 20 %, below the road to 91 %. Cover values for the moss layer were always very low, except for a 40-year-old slope above the road (62 %).

On these slopes plants of different plant-sociological formations were found in similar distribution, except for a young slope below the road where species of weed- and ruderal communities were prevailing. Normally, species of *Festuca-Brometea* and *Molinio-Arrhenatheretea* were dominating.

Evaluation according to life-form spectra gave a dominance of hemicryptophytes (68-84 %). The distribution of different life-forms was similar on all slopes and can be connected with the *Mesobrometa* of the region.

Comparing slope vegetation with the one of the neighbouring meadows clearly

showed that the prevailing amount of plant species had migrated from there. More moisture-demanding species of lawn-seed mixtures had practically disappeared in four years.

Soil formation seems to be very slow as is shown by the above humus values on 40-year-old slopes, which may be due to the high carbonate content of the parent-rock, blocking the break-down of humus. Soil-physical investigations gave a mosaic of irregularly changing values of apparent and real density, accounting for different slopes as well as for parts of the same slope. Texture analysis of fine earth gave different water regime and, consequently, different cover values for the herb layer which are mostly higher on the lower slope parts. Soil development progresses towards a rendzina.

Judging these results it seems to be clear that conservation of species-rich unfertilised meadows on such slopes should be possible. To accelerate reconstitution seed can be mixed with site-adapted species, i.e. with such species most frequent in the vegetation relevés of such slopes.

Management procedures to conserve such meadows must be investigated for each case, especially to prevent bush encroachment.

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