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

Herausgeber: Geobotanisches Institut, Stiftung Rübel (Zürich)

Band: 82 (1984)

Artikel: Schaffung artenreicher Magerwiesen auf Strassenböschungen : Eignung von verschiedenem Saatgut für die Neuschaffung "Mesobrometum"-artiger Bestände : eine Untersuchung in der Nordschweiz = Creation of "Mesobrometum"-type grassland : evaluation of different seed mixtures (to induce the formation) : a study in northern Switzerland

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Kapitel: Summary

DOI: https://doi.org/10.5169/seals-308722

Viele der in den Rasenmischungen enthaltenen Arten waren sehr wahrscheinlich standortfremd und ausländisch, z.T. waren auch andere Arten als angegeben dabei. Der Einfluss von solchem Saatgut auf die Entwicklung von Magerbiotopen sowie die Gefahr einer Florenverfälschung werden diskutiert. Es wird vorgeschlagen, anstelle solcher standortfremder Arten das Schnittgut einheimischer Magerwiesen in Rasenmischungen mitzuverwenden.

Die Erkenntnisse, welche sich aus dieser Arbeit für die Praxis ergeben, sind in den Schlussfolgerungen zusammengefasst.

Summary

This study, carried out from 1980 until 1982, deals with the possibility of inducing the formation of *Mesobrometum*-like grassland (i.e. semidry, unfertilized meadows) on road embankments. Four seed mixes composed of two basically different mixes were utilized, both with and without *Lolium perenne*, a species known to cover open soil very quickly. All four mixes, however, had seeds of 12 rarer species characteristic of *Mesobrometum*-type grasslands in common. Three study areas in northern Switzerland were chosen: the first one on the slope of an embankment, the second one where the road cut through a limestone ridge, and the third one on a slope where a layer of topsoil rich in organic matter had been added. All three study areas had a slope of 60% and an aspect between SSE and WSW. Each study area was subdivided into random blocks on which the different seed mixes were sown.

The soil of the one study area where topsoil rich in organic material had been added was distinctly different from that of the other two areas. Here we found a markedly higher content of organic matter, nitrogen and exchangeable calcium; the carbonate content, on the other hand, was considerably lower. The soils found at the limestone ridge showed great variability; some contained stones and rocks in percentages up to 45%. The average distribution in particle size in all three study areas, however, was very close to that observed in typical clay soils. It seemed that the water and nutrient supply tended to be limiting in some areas. On the embankment, the soil in places was compacted to such an extent that it became difficult for the roots to penetrate, which, in turn, limited the water supply intake for the plants.

The development of vegetation was surprisingly uniform with all the different treatments and in all three areas studied. During the third year of the experiment, the vegetation cover reached 65% and 85% on plots where seed was sown; on the other hand, the cover values recorded in control plots where no seed was sown were usually below 50% and particularly low within the range of the limestone ridge. The moss cover never exceeded 10%. Regarding species diversity, the number of species per 1 m^2 found during the third vegetation period was on the average over 15; within the three study areas the species number per 1 m^2 observed was lowest on the limestone slope and highest on the slope with added humus. In the case of

the soil with added humus-rich topsoil, however, the significance of the seed pool should not be underestimated. An analysis of the species found according to their life forms showed that hemicryptophytes were prevalent from the very beginning. Summer therophytes, on the other hand, were found to some extent only during the first vegetation period on areas without added humus and had disappeared almost completely on plots with added humus by the end of the third vegetation period. In the third year of the experiment, the number of winter therophytes was considerably reduced as well.

Grasses covered between 30% and 40% of the study areas by the end of the third year of the experiment, while forbs covered between 15% and 28%, except in the control plots on the limestone slope and the one with the additional humus layer, where the recorded cover values for forbs were 6% and 2%, respectively. It was in the legumes cover that we recorded the most significant differences between the three study areas; on the average, legumes covered between 10% and 40% but were markedly less abundant in the study area with added topsoil than in the two other areas. In some areas, extremely large covers of legumes were observed, particularly towards the end of the vegetation period, which possibly resulted in the suppression of other species. The cover percentage of *Lolium perenne*, which was added to the mixture in order to obtain a satisfactory cover quickly during the first vegetation period, diminished rapidly in the course of the second and third years. Apparently *Lolium perenne* had no adverse effect on the development of other species.

Among the species whose seeds were present in the mixes sown, *Plantago lanceolata, Sanguisorba minor, Lotus corniculatus, Festuca duriuscula, Dactylis glomerata* and *Achillea millefolium* thrived on all the plots. *Festuca ovina, Bromus erectus* (containing a considerable percentage of *Bromus cf. stenophyllus* Link.) and *Poa pratensis* grew well only on plots rich in humus, whereas *Poa compressa* occured mainly in the two study areas poor in humus. *Trisetum flavescens, Coronilla varia, Holcus lanatus* and *Chrysanthemum leucanthemum* showed no clear patterns. Only two of the rarer species that the seed mixtures contained were able to become established to any extent: *Dianthus carthusianorum* was found within all three study areas, whereas *Thymus pulegioides* ocurred only on areas poor in humus.

Immigration into the areas studied from the surroundings was found to be very limited; the few outside species that did germinate originated mainly from fertilized grasslands or are known to be ubiquitous. An analysis of the species found in the study areas according to their sociological affinity to *Mesobrometum* and *Arrhenatheretum* type grasslands, respectively, showed higher percentages for ubiquitous species and for species characteristic to *Arrhenatheretum* type grassland than for those linked closely to *Mesobrometum* type grassland. Based on these observations, we can therefore conclude that the seeds of all of the desirable species must be contained within the seed mixes utilized; the only exception to the use of these mixes would be in situations where the desirable species grow in the immediate surroundings of the area to be sown.

It was found that commercially available seed mixtures very often contain seeds of stands with conditions quite different from the ones in the area where they will be sown (different ecotypes) and sometimes these mixes

contain seeds of completely foreign species. The inherent danger in the use of such mixes containing seeds of unadaptable ecotypes and of possibly foreign species is discussed. It is suggested that hay made regionally on existing *Mesobrometum* type grassland and an appropriate mixture of locally grown seed be used to induce the formation of this vegetation type on road embankments more successfully.

Conclusions drawn for practical applications are summed up under "Schlussfolgerungen".

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