

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

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

**Band:** 81 (1983)

  

**Artikel:** Pflanzensoziologisch-ökologische Untersuchungen von gemähten Magerrasen bei Davos

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**Kapitel:** Summary

**DOI:** <https://doi.org/10.5169/seals-308715>

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## Summary

The present study deals with the *vegetation of regularly mowed grassland of localities poor in nutrients* (Parsenmähder) in a subalpine zone near Davos (Grisons, Switzerland). Phytosociological and ecological aspects were studied and the significance of the vegetation for farming and nature conservation was also discussed. Altogether, 226 relevés (166 mowed and generally unfertilized meadows [Mähder] located on morains consisting of mixtures of various rocks; 28 mowed, fertilized grasslands; and 32 pastures poor in nutrients) were mathematically processed; subsequently data were arranged manually in a vegetation table and classified. In addition to traditionally recorded habitat data, the pH value of the topsoil was measured in all stands where relevés were taken; samples of the topsoil of 59 of them, covering the entire range of grassland types studied, were subjected to a complete chemical analysis. The management of each area was determined from 1968 onwards.

Based upon classification of relevés, the following vegetation units were distinguished:

- Group I : Meadows in locations naturally rich in nutrients (*Ligusticum mutellina-Festuca violacea* type), units 1,2,3,4
- Group II : Meadows on acidic soils, poor in nutrients (*Hypochoeris uniflora-Nardus stricta* type), units 5,6,7
- Group III: Meadows in locations of moderate conditions (*Pulsatilla sulphurea-Helianthemum grandiflorum* type), units 8,9,10,11
- Group IV : Meadows on alkaline soils, poor in nutrients (*Laserpitium latifolium-Globularia nudicaulis* type), units 12,13,14
- Group V : Fertilized grassland (*Polygono-Trisetion*), units 15,16,17
- Group VI : Pastures poor in nutrients (*Nardion, Seslerietalia*), units 18, 19,20,21

Ordination of the relevés using principal component analysis clearly shows the continuous character of the vegetation studied. An exception is the fertilized grassland, which turned out to be a group by itself. Two main floristic gradients characterize the unfertilized meadows (Mähder). They can be explained ecologically as follows: *Gradient A*, encompassing units 5,6,7,8,9,10,12,13,14, is distinctly correlated to the *content of bases* and soil acidity. The gradient is quite steep and of great significance for distinguishing different vegetation types within an oligotrophic range. *Gradient B*, encompassing units 1,2,3,4,8,9, can be explained by a combination of factors such as relief, supply of water, bases and nutrients, soil depth and duration of snow cover. This combination of factors is best described by the term "*sink*". In addition to the gradients mentioned above, units 6,7 and 14 are characterized by *favourable temperature conditions*.

It proved to be difficult to assign most of the units described to existing phytosociological units. This is due to the fact that the vegetation units distinguished in the present paper are not "typical" communities identified by character species. The meadows in locations naturally rich in nutrients (units 1-4) are close to the *Caricion ferrugineae* Br.-Bl. 1931 and the *Polygono-Trisetion* Br.-Bl. 1947. The meadows in acidic locations, poor in nutrients (units 5-7), as well as the acidophilous pas-

tures (units 18,19,20), could best be assigned to the *Nardo-Trifolion alpini* Preisg. 1949 and to the *Eu-Nardion* Br.-Bl. 1926, respectively. The meadows in locations of moderate conditions (units 8-11) fall between the *Eu-Nardion* Br.-Bl. 1926, the *Seslerion coerulea* Br.-Bl. 1926 and the *Caricion ferrugineae* Br.-Bl. 1931. Finally, the meadows and pastures on alkaline soils, poor in nutrients (units 12-14, 21), are considered to be closest to the *Seslerion coerulea* Br.-Bl. 1926 and the *Caricion ferrugineae* Br.-Bl. 1931.

Regarding the effect of different management treatments on mowed and generally unfertilized meadows (Mähder), application of fertilizers and grazing by sheep, in particular, resulted in marked changes in vegetation. As for *fertilizer applications*, only meadows in locations with moderate conditions proved to be responsive to them, but not those in locations with extreme conditions (groups II and IV) where no significant improvement was found. The effects of *grazing by sheep* must be considered as unfavourable on steep slopes as it leads to increased erosion, decreased fodder quality and a monotonous appearance of the stand. During the first 10 to 20 years following cessation of management, only changes in relative abundance of the species and in physiognomy of the stand occur whereas the floristic composition itself remains basically unchanged.

The meadows (Mähder) studied are an intriguing, aesthetically appealing element of the landscape and a habitat harbouring many rare and endangered species; it is definitely worthwhile to preserve them. Recommendations are given that would ensure adequate management of these meadows (including moderate application of fertilizers and grazing by sheep). It goes without saying, however, that the traditional utilization (i.e. mowing every second year without applying fertilizers) remains the optimal management to preserve these meadows for the future.

## Résumé

*La végétation des prairies maigres fauchées du Gotschnagrat (Parsennmähder) près de Davos, d'une surface continue d'environ 1.5 km<sup>2</sup>, a été étudiée phytosociologiquement, écologiquement et dans l'optique de sa signification tant agricole que pour la protection de la nature. 166 relevés de végétation de prairies de fauche (avant tout sur moraine mélangée), 28 relevés de prairies grasses et 32 de pâturages maigres ont été analysés mathématiquement, interprétés à la main sous forme de tableaux, puis classifiés. En plus des données de station habituelles, l'acidité de l'horizon supérieur a été déterminée. En outre pour 59 des placettes réparties sur tout le spectre de la végétation étudiée, les caractéristiques chimiques de l'horizon supérieur du sol ont été analysées en laboratoire. L'exploitation de chaque surface de relevé a été reconstituée jusqu'à 1968, sur la base d'une enquête.*

La classification a livré les groupements d'unités suivantes:

Groupement I : prairies de fauche de stations naturellement eutrophes  
(association *Ligusticum mutellina-Festuca violacea*),  
unités 1, 2, 3, 4