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Vegetation and site conditions of floating mats in Switzerland

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SUMMARY

The present study deals with a survey of vegetation and site conditions of floating mats in Switzerland. The study area is restricted to the Swiss Alps.

The sites studied are situated between 1200 m and 2400 m a. s. l., mostly (70%) between 1450 m and 2050 m a. s. l. Most of the more than 200 phytosociological relevés made show that vegetation samples in about 50 different geographical localities studied belong to the *Caricetum limosae* s.l. The front of floating mats at mesotrophic lakes may be fringed by the *Caricetum diandrae*.

Water samples were taken twice in each of the seven localities selected. About 4500 measurements of water chemistry were evaluated (pH-value, electrical conductivity, the concentrations of the cations Ca, Mg, Na, K, Fe, Mn as well as o-PO₄-P and tot-PO₄-P).

The temporal fluctuations of the measured values were analysed; a high temporal constancy was shown in particular for the pH-values, the electrical conductivity and the concentrations of Ca²⁺ and Mg²⁺.

A test of homogeneity of the total data matrix as well as their single components demonstrated that the pH-value, the electrical conductivity and the concentrations of Ca²⁺, Mg²⁺, Na⁺, K⁺ and tot-PO₄-P of the free mire water were suited to a principal component analysis, whereas the other parameters would not have a predictive influence. The primary axis associated with the pH-value, the electrical conductivity and the concentrations of Ca²⁺ and Mg²⁺ represents the alkalinity and is explaining the main part of the data structure. The second axis, intercorrelated with the first, is associated with the concentrations of K⁺ and tot-PO₄-P.

The correlations between the Ca²⁺- concentration, the pH-value, and the electrical conductivity of the free mire water were analysed; it has been shown that the electrical conductivity is a function of the Ca²⁺- concentration and the pH-value.

The correlations of the different concentrations of ions between the free mire water and the water pressed out of the floating mat are analysed. These correlations are highly significant in the case of Ca²⁺, Mg²⁺ and o-PO₄-P.

The concentrations of cations out of a peat bog floating mat were compared with those of other European peat bog waters. The differences observed can't be explained by the gradients of precipitation proposed by ALETSEE (1967).

A phytosociological classification of the *Caricetum limosae* s.l. is proposed for the Swiss Alps.

The ecologically investigated complexes of floating mats were compared, and the correlation between the vegetation and the water chemistry was discussed.

The present study shows that the *Caricetum limosae* s.l. occurs over the whole amplitude of alkalinity. A high water level during the whole year as well as immobile (ground) water are characteristic of the sites inhabited by *Carex limosa*. The *Caricetum limosae* s.l. is not restricted to poor mire water with low pH-value. The alkalinity of the mire water as well as the water balance of the site influence the type of vegetation within the *Caricetum limosae* s.l.

In conclusion, the importance of the water flow for the differentiation of the plant cover in mire ecosystems is discussed in detail.