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- Die Samendichte der ersten 10 cm war sowohl innerhalb der Untersuchungsobjekte wie auch zwischen den verschiedenen Beständen qualitativ und quantitativ recht unterschiedlich (s. S. 80ff. u. S. 108ff.). Die durchschnittliche Samendichte von zwei Waldböden lag zwischen ca. 3'630 Samen pro m² (Fichtenforst) und 4'250 Samen pro m² (Laubmischwald, Hochwald). Diejenige der Bodenproben von vier gleichbehandelten Schlagflächen erreichte Werte zwischen 6390 Samen pro m² und rund 10'000 Samen pro m².
Der grösste Teil der Arten in den Samenbanken der Schlagflächen konnte auch in der aktuellen Vegetation des entsprechenden Bestandes ausgemacht werden. Der Samenvorrat der Schlagflächen wies gegenüber der aktuellen Vegetation also nur einige zusätzliche Pflanzenarten auf. Demgegenüber fehlten in der aktuellen Vegetation der Waldbestände mindestens die Hälfte der Samenbankarten der entsprechenden Flächen.
Diese Resultate lassen die Wichtigkeit des Samenvorrates für die Erstbesiedlung des durch das Schlagereignis neugeschaffenen Standortes erahnen.
- Vor allem im dunklen Altersklassenwald haben Schlagflächen für den Naturschutz durchwegs ihre Bedeutung (s. S. 114ff.). Sie ermöglichen vielen lichtbedürftigen Pflanzen ein Aufkommen und Überleben. Wegen den oft beschränkten Ausbreitungsmöglichkeiten sollten aber vermehrt wieder lichte, aufgelockerte und stufige Waldbestände mit natürlicher Bestockung geschaffen werden.

SUMMARY

The present study deals with ecological and plantsociological aspects of quite recent woodland clearings. For this purpose, 113 clearings, mostly located on moraines of the last glacial period in the northeastern and eastern part of the Swiss Midlands, were investigated from 1989 till 1992. The syndynamical and syntaxonomical changes of clearing communities were observed. Another main point of interest was the effect of clear cutting on the microclimate and soil characteristics. Furthermore, germinating experiments with soil samples from forests and woodland clearings were performed, in order to examine the seed banks of these stands and to establish their significance for the colonization of new clearings.

Following are the most important results:

- The impact of the clear cut on the microclimate and the characteristics of the soil generally corresponded with the results of earlier investigations (see p. 64ff. and 95ff.). The improved soil conditions (mostly phosphorus and potassium) caused by the release of nutrients on the examined areas seem to last longer than the supposed two or three years. The released nutrients are taken up by well developed clearing vegetation. Parts of the nutrients returned back relatively fast by decomposition of the herbs in spring.
- Phytosociological classification: A separation of the *Epilobion* from the *Atropion* was possible with groups of typical acid soil indicators (see p. 52ff. and 112ff.). The two variants of *Rubus*-communities were apposed to the *Sambuco-Salicion*. The clearing communities on eight sites were unique, characterized by special conditions.
The relevés of the *Epilobion* belong to a *Carex pilulifera*-clearing community (*Sencioni silvatici-Epilobietum angustifolii* Tx. 50), which occurred in three different variants.
Because of mostly optimal site conditions with little competition during colonization, the plant communities of the *Atropion* were usually very rich in species and strongly influenced by random colonization, as well as by the history of the stands. Therefore, on

average sites a plantsociological distinction of the *Carex silvatica*-clearing community was difficult. Nevertheless several formations were described.

One of the *Rubus*-communities of the *Sambuco-Salicion* was close to the *Epilobion*, the other to the *Atropion*.

- Syndynamical evaluations were carried out for nine ecological groups and the number of species (see p. 44ff. and 104ff.). They demonstrated the greatest species diversity already in the first or second year of succession.

Maintenance, such as cutting of shrubs and mowing, lead to a further increase in the number of plant species. The distribution pattern of the nine ecological groups was also altered. For the syndynamical interpretations, better results were obtained by the cover of the shrub layer, than by the actual age of the woodland clearings.

- Clearing communities are mostly very rich in species (see p. 31ff.). On the 113 plots studied, 492 plant species were found. The average for the relevés of 50 m² was about 50 species. The whole clearing, with an average area of 2280 m², contained a mean of 81 species.

The significance of the species pool in the surrounding areas for the species variety was established: Three times as many species from gardens came up in clearings near towns (Zürich, Bülach).

- The seed bank of the first 10 cm was distinctly different in quality and quantity, both within the plots and between different stands (see p. 80ff. and 108ff.). The average seed pool of two forest soils contained 3'630 seeds per m² in a spruce forest, respectively 4250 seeds per m² in deciduous seedling forests. Four soil samples of woodland clearings, investigated by the same method, reached values between 6390 seeds per m² and about 10'000 seeds per m².

In the clearings, most of the species in the seed bank were also been found in the present vegetation. The seed pool of the clearing contained only a few additional plant species. On the other hand, at least half of the species in the seed bank did not occur in the actual vegetation of the mature forest.

These results indicate the importance of seed banks for the colonization of new stands.

- Woodland clearings are important for nature conservancy, especially in dark age-class forest (see p. 114ff.). Many species with a great necessity for light have the possibility to come up and survive. But in order to improve their dispersal, forest stands with natural stocking should increase.