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Einzigartig entwickelte sich *Pulsatilla sulphurea*, deren Blätter nicht wie üblich aus der Plumula zwischen den Kotyledonen, sondern aus einem Knoten am unteren Hypokotylteil herauswachsen.

Sterblichkeit. - Die Sterblichkeit war im Felde viel höher als im Labor. Die Silikatarten wiesen eine höhere Sterblichkeit auf Karbonat- als auf Silikatboden sowie auf nackter als auf vegetationsbedeckter Bodenoberfläche auf. Die Karbonatarten dagegen erlitten bedeutend höhere Verluste auf Silikat- als auf Karbonatboden; ihre Sterblichkeit war allerdings ähnlich auf nackter wie auf vegetationsbedeckter Bodenoberfläche.

Im allgemeinen waren die Verluste auf den nackten Versuchsflächen im Sommer höher als im Winter. Auf den vegetationsbedeckten Flächen war die Sterblichkeit dagegen unterschiedlich je nach Substrat: in der eher offenen Karbonatvegetation waren die Verluste im Sommer am grössten, in der eher geschlossenen Silikatvegetation dagegen im Winter.

Summary

Germinating behaviour and early developmental phases of some Alpine species were studied under natural as well as controlled conditions. In laboratory, germination tests with pre-treated or not pre-treated seeds sown onto blotting paper, sterile garden soil as well as silicate and carbonate Alpine soils, were carried out in various series. In the wild, control plots established above timberline comprised silicate and carbonate soils, surfaces with various reliefs being chosen; sowings within these plots were made upon naked as well as vegetation-covered soil. Germination and the development of seedlings and young plants were examined in regular intervals.

The following taxa were studied: a) from silicate: *Sesleria disticha*, *Hieracium alpinum*, *Senecio carniolicus*, *Cardamine alpina*, *Salix herbacea*, *Gnaphalium supinum*, *Soldanella pusilla*, *Geum montanum*, *Ranunculus Grenierianus*, *Nardus stricta*, *Carex sempervirens*, *Gentiana Kochiana*, *Helictotrichon versicolor*, *Luzula multiflora*, *Antennaria dioeca*, *Pulsatilla sulphurea*. b) from carbonate: *Sagina Linnaei*, *Veronica alpina*, *Arabis coerulea*, *Ranunculus alpestris*, *Salix retusa*, *Hutchinsia alpina*, *Saxifraga caesia*, *Dryas octopetala*, *Carex firma*, *Gentiana Clusii*, *Helianthemum alpestre*, *Anthyllis alpestris*, *Sesleria coerulea*, *Leontopodium alpinum*, *Carex sempervirens*, *Scabiosa lucida*.

Germinating behaviour. - Germination rates in seeds from niches with a short vegetation period were frequently rather high. Taxa depending upon a long vegetation period were greatly variable in this respect, their germinating behaviour being influenced by seed-dormancy. The most successful methods for breaking the dormancy proved to be mechanical scarification with a razor-blade as well as treatment with the gibberellic acid; stratification trials were less effective. Some dormancy mechanisms apparently were very complex.

Seeds of most studied species remained partly viable for several years, but the germinating behaviour varied from one taxon to another with the increasing seed age.

Influence of the substratum upon the germination was mostly not demonstrable in laboratory conditions. In the field, taxa from carbonate germinated rather poorly in siliceous soil, whereas taxa from silicate behaved comparably both in silicate as well as carbonate plots. Germination rates were generally much higher in naked soils than in vegetation-covered surfaces.

Development of young plants. - Most of the taxa originating from niches with a short vegetation period developed rapidly in controlled conditions, whereas the development of taxa depending upon a longer vegetation period was rather variable.

Influence of the substratum upon the development of young plants was obvious in most taxa studied in laboratory conditions, plants from silicate and those from carbonate growing best in their respective soils. In the field, however, the plants at the end of the observation period were too small for getting any conclusive information.

The development of young plants in *Pulsatilla sulphurea* was particularly interesting, leaves not growing from the plumula between the cotyledons, but from a knob situated at the base of the hypocotyl.

Mortality. - Mortality was much more pronounced in the field than in laboratory conditions. Taxa from silicate survived much better in silicate than in carbonate, mortality rates being higher in naked surfaces than in vegetation-covered ones. Taxa from carbonate suffered more losses in silicate than in carbonate, no particular differences being observed between naked and vegetation-covered surfaces.

Mortality in naked soil was generally higher in summer than in winter. In vegetation-covered surfaces mortality varied in function of the substratum: maximal summer losses were observed in the rather sparse vegetation upon carbonate, whereas in winter the rather closed vegetation upon silicate proved to be more affected.

Résumé

La germination et les premières phases de développement de quelques espèces alpines ont été étudiées sous conditions contrôlées ainsi que dans le milieu naturel de ces plantes. Au laboratoire, les semis ont été effectués avec ou sans prétraitement des graines sur le buvard d'une part et sur le sol du jardin stérile ainsi que sur les sols alpins silicate et carbonate d'autre part. Sur le terrain, des parcelles à reliefs divers sur silicate et carbonate ont été choisies, les semis ayant été faits parallèlement sur les surfaces nues et celles recouvertes par la végétation. Le comportement germinatif et le développement des jeunes plantes ont été contrôlés à intervalles réguliers.

Les espèces suivantes ont été étudiées: a) de silicate: *Sesleria disticha*, *Hieracium alpinum*, *Senecio carniolicus*, *Cardamine alpina*, *Salix herbacea*, *Gnaphalium supinum*, *Soldanella pusilla*, *Geum montanum*, *Ranunculus Grenierianus*, *Nardus stricta*, *Carex sempervirens*, *Gentiana Kochiana*, *Helictotrichon versicolor*, *Luzula multiflora*, *Antennaria dioeca*, *Pulsatilla sulphurea*.