Managing populations of rare wild plant species in Switzerland

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Abstract

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A survey is given of the current situation regarding the preservation and management of populations of rare and endangered plant species in Switzerland. Nature conservation falls principally within the responsibility of the cantons. The legal measures of biodiversity preservation in Switzerland are good. However, the execution is often unsatisfactory. Offices for Nature Conservancy at federal, cantonal and communal levels try to perform and supervise the legal requirements, but are often overloaded both in terms of personnel and finance. Private institutions that own many conservation areas play an important part in the management of endangered species' populations. The creation of 'ecological compensation areas' is financially promoted by the Confederation. These agricultural areas are managed without pesticides and fertilizers in order to obtain vegetation with higher diversity. The Swiss Committee for the Preservation of Wild Plants is a private institution supported by the Confederation to initiate, coordinate and survey all actions in Switzerland dealing with the preservation of rare and endangered plants. It publishes guidelines and information about the optimal management of the various species' populations. Extensive inventories of the most endangered plant species are performed and the results, together with instructions for successful management of the populations, are forwarded to the Conservancy's institutions.

Wild relatives of European crops in Switzerland

Wild relatives of the selected priority groups of European cultivated plants are scarce or not well documented in Switzerland. The genera under consideration such as wheat, pea, artichoke and cabbage have no wild relatives in our country.

Poplars probably do not exist anymore in proper populations except for the very widespread *Populus tremula*. The original habitats of *P. nigra* and *P. alba*, periodically-flooded river plains, are reduced to a few fragments, and the cultivation of poplar trees of foreign origin is common. All the remnants of seasonally flooded areas are now catalogued on a national basis, and most of them are protected, but the problem of retaining genetically pure poplar populations remains unsolved. The creation of gene reserves for

native populations of poplars (and other forest trees) has recently been started (Bonfils 1994). In these reserves and their surroundings, no foreign provenances of trees are allowed.

Dactylis is an old and very frequent meadow plant represented by many cultivars. The indigenous forest race of this complex, *D. aschersoniana* Graebner (*D. polygama* Horvat.) grows only in the warmest places of northernmost and southernmost Switzerland. It seems vulnerable since the light oak woods, in which it prefers to grow, are becoming replaced by darker beech woods due to forest managment and nutrient input from the air. The situation should be watched carefully and some of the best stands of *D. aschersoniana* have to be included in nature reserves which are managed in such a way that enough light penetrates to the ground.

Crocus is represented only by one native species of the Alps (*C. albiflorus*) that is not endangered. As far as the genus *Narcissus* is concerned, *N. pseudonarcissus* is relatively wide-spread in the mountains and mostly not endangered. However, the group of *N. poeticus* is divided into many isolated populations, and some are vulnerable. Unfortunately, little is known about the taxonomy of this group in Switzerland and, in particular, about the special habitats of its populations that are sometimes described as separate species. A modern taxonomic investigation of these different populations is needed, and the populations especially in the southern part of Switzerland should be protected and monitored.

The aim of the following presentation is to show how the management of populations of rare plant species works in a small but politically very diversified country. There is no difference between preserving high genetic variability in species which are assumed to be wild relatives of crop plants and doing so for all other wild species.

Nature conservation in Switzerland

Nature conservation in Switzerland lies principally within the responsability of the cantons, and these duties are partly delegated to the communities in many cantons. However, it is the Confederation which issues guidelines which the cantons have to follow. These guidelines are defined in a law and a decree for the protection of nature and homeland (NHG 1991). This decree includes a list of attractive protected Federal plants which are not allowed to be dug up or picked. In addition, each canton has its own list of such species. The so-called Red Data Books are even more important for the preservation of rare wild plants. There is a national Red Data Book for wild plant species published by the Confederation (Landolt 1991) in which the status of threat to each species in Switzerland and in the 10 different phytogeographic regions (Fig. 1) is indicated. Some cantons have their own Red Data Books.

The principle of preserving biodiversity is formulated in the decree for the protection of nature (NHG 1991, Ausführungsverordnung § 13) as follows: 'The protection of native plant and animal species has to be ensured possibly by suitable agricultural and forest managements of their biotopes'. The Swiss Federation makes inventories of all biotope types (e.g. river forests, marshes, fens, dry meadows) which include rare species and are of national importance, the same work being done on cantonal level. Besides the protection of diverse or rare biotopes, the creation of 'ecological compensation areas' is required under this law (see below).

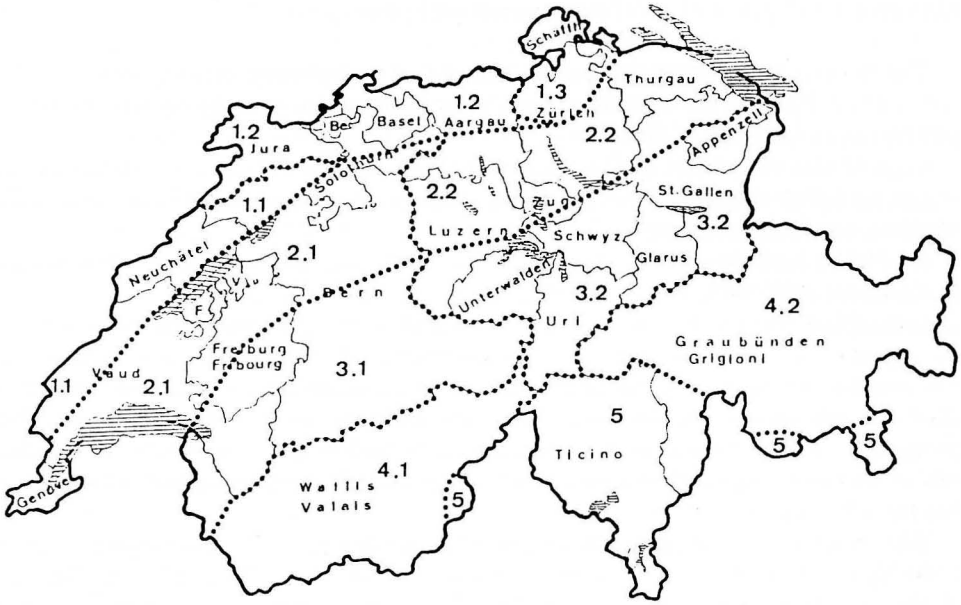

Fig. 1. Phytogeographical regions of Switzerland.

1.1 Western Jura	3.1 Northern Alps (west)
1.2 Northern Jura	3.2 Northern Alps (east)
1.3 Northeastern Switzerland	4.1 Central Alps (west)
2.1 Western Midlands	4.2 Central Alps (east)
2.2 Eastern Midlands	5 Southern Alps

Each canton has its own office for nature conservation which is responsible for the performance of Federal and cantonal laws and decrees in relation to the protection of nature. Unfortunately, financial and personnel restrictions at all levels prevent the optimal operation of theseoffices.

The legal measures for preserving biodiversity in Switzerland are good, but the execution is often unsatisfactory. Before the legally planned management is enforced, some of the biotopes and the rare organisms with them may have already disappeared. Another problem is posed by the long-term supervision of effective management which is very costly and therefore not sufficiently well carried out in most cantons. As a result, many populations disappear though their habitats are legally protected.

Private initiative is very important for preserving biodiversity in Switzerland. Many private associations for nature conservation at national, cantonal and communal level own biotopes throughout the whole country; for the most part, these areas are properly managed and ensure the successful maintenance of rare and endangered species. Also, these organisation monitor the performance of the laws and undertake initiatives for better legislation.

The Swiss Committee for the Preservation of Wild Plants (SKEW) and the management of populations of endangered wild plant species

The successful management of populations of rare wild plant species requires:

- precise data on the taxonomy, population biology and ecology as well as on the present day occurrences of the taxa
- an organization which will initiate, coordinate and survey every action to save the endangered plant species and inform all interested institutions about new experiences and scientific results in nature preservation.

In 1991 a committee of the Swiss Botanical Society, the Swiss Committee for the Preservation of Wild Plants, was founded in order to prevent the extinction and the decline of native plant species. It is also intended to encourage the cultivation and propagation of endangered taxa. This body is expected to coordinate all efforts of the rare plant species conservation, and to inform interested associations and authorities of the occurrence of plants *in situ* and of the possible places of cultivation *ex situ* of these plants. The committee consists of botanists from universities and botanic gardens, officials from official and private nature conservancy authorities, as well as representatives of agronomy and forestry (Fig. 2).

It has a part-time secretariat in Nyon (c/o Monique Derron, RAC, case postale 254, CH-1260 Nyon). It works closely together with the Centre of the Swiss Floristic Network (CRSF) in Geneva which provides a data-bank of all geographical and ecological datas of the Swiss flora. Financial support comes partly from the Swiss Confederation and partly from other institutions.

The conservation of plant species still occurring in Switzerland, but endangered at a European level have the first priority of the committee. An extensive inventory of all plant populations still existing in Switzerland is proceeding. Population size, exact habitat requirements, environmental conditions and present management of the habitat as well as the actual danger to the populations are recorded. This work is based on information from cantonal offices of nature conservation, from literature, and from professional and amateur botanists all over the country. However, the main work consists of observations in the field. Necessary management for optimal and long-term conservation is worked out for each locality. The results will be passed on the offices for nature conservation of the respective cantons. These are responsible for ensuring that the necessary and urgent measures are taken for suitable management. In cases where the ecology of the species or the necessary management procedures to preserve a population are not sufficiently known, university institutes will be asked to perform appropriateinvestigations. If the populations become very small, botanic gardens in neighbouring areas are asked to grow the species from seeds originating from respective areas.

The committees has worked out instructions how to collect and to deal with populations for *ex situ* cultures. The cantons concerned are expected to create favourable biotopes where seeds from those cultivated populations can be sown out afterwards. All the data of this inventory are collected by the committee and stored in a central databank at the CRSF in Geneva.

A second step will be a survey of the nationally endangered and rare species (nearly 900 species) in a decreasing order from the most endangered species to rare ones.

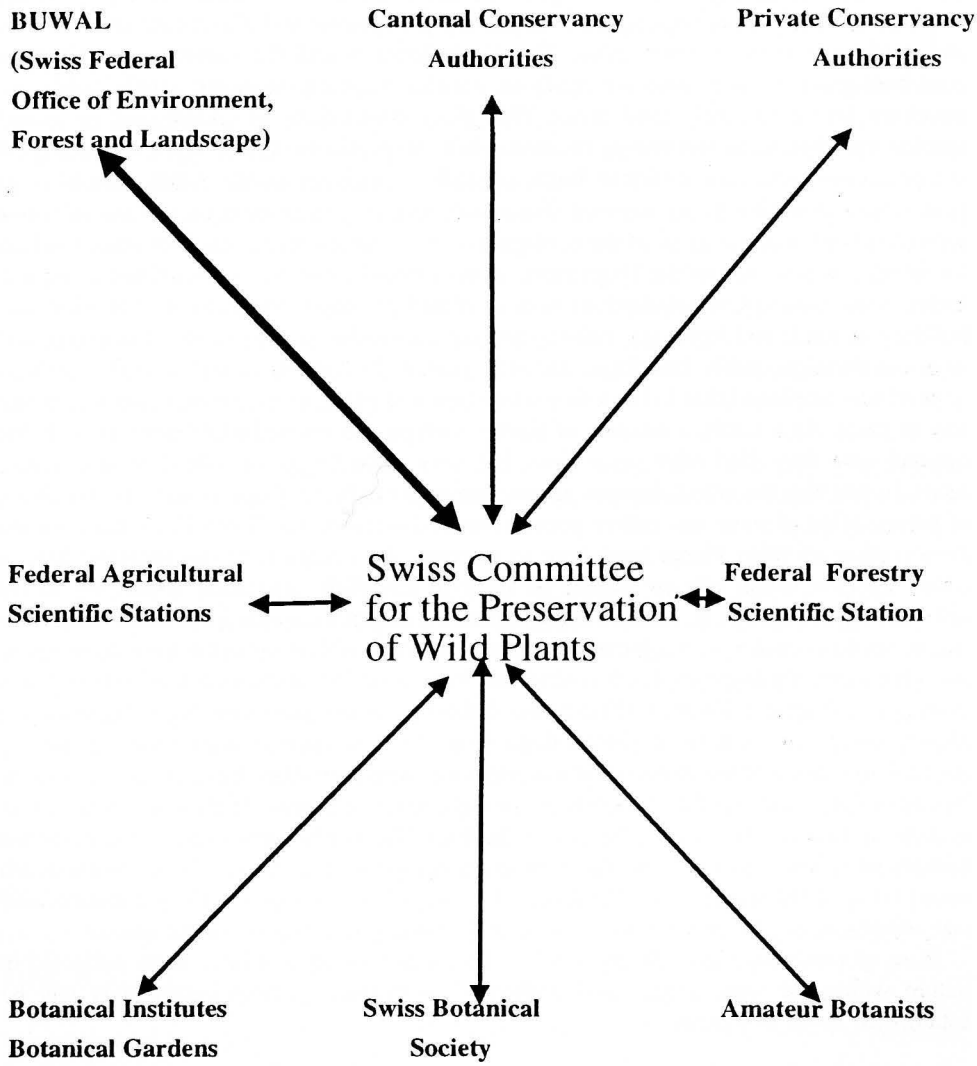

Fig. 2. Interrelations between the Swiss Committee for the Preservation of Wild Plants and official and private institutions.

In this context there is also the possibility of initiating the inventory, protection and management of populations of rare wild relatives of cultivated plants e.g. the above-mentioned populations of *Narcissus poeticus* s.l.

The conservation of regionally endangered species can only be advised on by the committee and the Confederation, but has to be done and promoted by the cantons and the communities.

To keep the genetic pool of native populations of rare plants pure the strict use of seeds or plants of local or regional origin is necessary for seeding and plantations in recreation and ecological compensation areas. The Confederation and the cantons give financial contributions to farmers who are ready to transfer intensely managed arable fields and meadows into extensively used areas. This gives populations of endangered or extinct species the chance to recover or to reestablish, respectively. Other types of ecological compensation areas are different kinds of fallow strips in arable fields in which no pesticides and fertilizers are allowed. Financial support is dependent on the use of native seed (or plant) material in all of the ecological compensation areas. Also for other projects for which a permission of the Federation, of the cantons or of the communities is needed, native seed material is required to restore disturbed areas. Projects of this kind are: building of roads and highways, railway projects, agricultural improvement, drainage and river canalization, public buildings, machine-graded ski runs etc. Until recently any kind of seed was employed that led to a fast stabilizing and greening of the area and which was low in price. As a result, a mixture of mostly foreign species and races were used. In the optimal case they died after some time, but very often began to hybridize with native races. In this way the autochthonous genetic material might be changed, and the possibility of preservation of some rare native populations endangered. The Swiss Committee for the Preservation of Wild Plants tried here to improve the situation. It put together lists of native species which can or should be used to establish vegetation according to the different types of projects. It also circumscribed the origin from which the seeds have to be taken. Seed of species with a great ecological and geographical variation have to originate from the same phytogeographical region and from a similar altitudinal level (three levels distinguished: up to 1400 m, 1100 m to the timberline, above the timberline). There are ten phytogeographical regions in Switzerland (Fig. 1). For species with little variation a restriction to three different geographical areas viz. Southern Alps, Central Alps as well as Northern Alps, Jura and the Midlands are thought to be sufficient. The control of the seeds is done by Federal Agricultural Scientific Stations. The seeds approved are offered to the farmers at a lower price. With the ecological compensation areas, which should reach about 10 % of the whole agricultural area, it is hoped to provide a sufficient number and size of habitats for the restoration of many of the endangered and rare plant species.

Rare species which have disappeared in the vicinity of an area have to be collected in nature within the same region and multiplied in botanic gardens before they can be established in the new areas.

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