

Vegetation Ecology and Conservation Biology

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Research

Analysis and description of vegetation and landscapes (global vegetation, vegetation of Austria, comparative high mountain ecology, vegetation and ecology of wetlands, landscape ecology).

Based on the Central European tradition of phytosociology we describe plant communities according to their floristic composition, and study their habitat requirements.



Regional monographs and vegetation mapping as well as the treatment of particular types (alliances, orders, classes) are basic activities. Besides completing the picture of Austrian plant communities we supervise students from countries all over the world (e.g. deciduous forests of East Asia, plant communities of Kohistan, Pakistan).

We have introduced and developed advanced methods for sampling design and data analysis in vegetation science (numerical ordination and classification, stratified sampling techniques based on

GIS and DTM's). Being well equipped with powerful computer hard-and software we are certainly one of the most experienced working group in Central Europe regarding the application of the whole modern spectrum of methodologies in vegetation science.

Together with my collaborators I recently have drawn attention to climate change effects on high mountain environments. After having provided evidence that the ongoing warming has induced upward migration of high mountain plants we turn now to extensive modelling to study the migration processes in detail. By doing this we expect not only clearer ideas about warming effects but also a better understanding of the basic mechanisms of vegetation dynamics in high mountain environments.

The investigation of vegetation and habitat characters of wetlands, in particular mires, is a further focal point of our activities. The maintenance of traditional human made landscapes or cultural landscapes has become a matter of broad interest during recent years. We are exploring this field trying to find an objective way to classify the different landscapes of Austria, to analyze their structural and functional components, and to finally present solutions for the future development.

Conservation biology and applied vegetation ecology

Specific research in conservation biology is focussed on the naturalness of vegetation, on biodiversity hot spots in Austria, and gap analysis for conservation. In the Central European landscape nearly nothing is left untouched by man. However, different degrees of naturalness or hemeroby can be distinguished. For landscape management it is important to have a set of criteria to evaluate naturalness. As a pilot project we have developed such criteria for forests, and are testing them throughout Austria.

Searching for biodiversity hot spots defined on the basis of available data on floristic diversity, the occurrence of mires and species rich dry meadows, we were able to present first ideas where the centres of biodiversity have to be expected in Austria, and how they are protected by already applied conservation measures. The evaluation of the power of this strategy to establish a satisfying system of conservation areas is one of the main tasks for the next years.

How to apply vegetation ecology to landscape planning and nature conservation has always been a matter of special emphasis at the division. Many investigations have been carried out to evaluate the conservation value of particular areas. Comprehensive studies for managing river systems, na-

tional parks and other objects of conservation interest have been elaborated as pilot studies to provide a standard in conservation practice. We have been involved in most activities dealing with the inventory of rare biotopes in Austria.

Teaching

Besides being involved in elementary lectures and courses the staff members are responsible for lectures, courses and excursions in ecology and botany. The main lectures deal with vegetation and life zones of the earth, and with an introduction to vegetation ecology. A special group of lectures makes the student familiar with all the important vegetation types in Central Europe. Practical courses are offered to learn and train the methods in vegetation ecology, the most important being a course in applied vegetation ecology. During the last years a specific curriculum for those having special interest in nature conservation has been implemented.

International Cooperations

G. Grabherr is member of the advisory board of the International Association of Vegetation Science, member of the editorial board of the "Zeitschrift für Ökologie und Naturschutz", member of the scientific advisory board for the Flora-Fauna-Habitat Directive of the European Union, curator of the Reinhold Tüxen-foundation (Germany), curator of the Binding-foundation (Liechtenstein). Cooperation exists with the NINA (Norwegian Institute of Nature Research, Trondheim), Institute of Terrestrial Ecology (Monkswood, UK), Universities of Bern, Basel, Grenoble, Hannover. Univ. Doz. Steiner is one of the founders of the International Mire Conservation Group and now secretary general of this group.

Selected References

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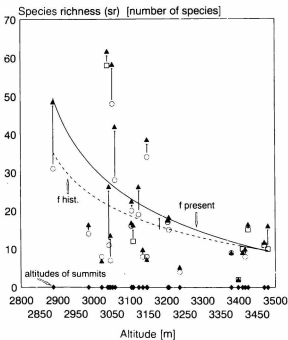


Fig. Species richness of historical and our present-day records at nival summits in the Alps plotted against altitude. Rare species are downweighted (0.25), species of moderate abundance were given the weight 0.5, frequent species the weight 1.0. Rare species were downweighted taking account of the comparatively high probability that they were overlooked by the original authors. Displayed are 24 summits with siliceous bedrock. Age of the historical records is 40 to 90 years (circles, 1895-1918; squares, 1947-53; triangles, present-day). Arrows, increase in species richness, which is pronounced at lower altitudes and low to moderate at higher altitudes. Most summits considered are climbed only occasionally, so the effect of humans is negligible