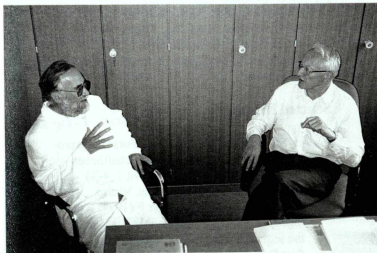


# Systematics and Evolution of Higher Plants

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## Research

1. Activities concentrate on the multidisciplinary exploration of the biology, diversity, eco-geographical differentiation, phylogeny and systematics of seed plant model groups, and of the parameters relevant for their evolution. Such a broad and synthetic approach has to be based on many methods (e.g. field, garden and laboratory work; morphology, biometrics, micro- and ultrastructure, karyology and genetics, phytochemistry, isozyme and DNA analyses, ecology and distribution, etc.) and on team-work in collaboration with other departments and institutions.
2. Model groups presently under study differ in respect to life forms (trees, perennials, annuals), genetic systems (out- and inbreeders, diploids and polyploids, sexuals and apomicts), phylogenetic status (ancient, isolated and relictual to recent, polymorphic and aggressive), habitats (tropical to arctic-alpine), distribution (local to wide-spread), etc. They include most diverse families, tribes and genera, mainly *Rubiaceae*, *Dipsacaceae*, *Asteraceae*-*Anthemideae* (milfoils, vermouth, ox-eye etc.), *Scrophulariaceae*-*Veronicinae*, *Caryophyllaceae*, *Quercus* (oaks), *Biscutella* (*Brassicaceae*). Further taxa under study are: *Rutaceae*, *Anemone*, *Festuca*, *Capsicum* (paprika), *Chenopodium*, *Suaeda*, *Ranunculus*, *Sorbus*, *Crocus*, *Helleborus*, *Thalictrum*, etc. How have these model groups been shaped under the influence of a wide array of different evolutionary parameters?
3. Higher plants constitute the most important component of the biological resources of terrestrial ecosystems. Nevertheless, their exploration and documentation still is far from being complete. Therefore, a working group was set up at the department to produce a first comprehensive and critical fern and seed plant Flora for Austria. The first of the three volumes of this Flora with keys, descriptions, taxonomical comments and data on the biology, ecology and distribution of all taxa is nearing completion. In addition, special contributions to other international and national Flora projects (e.g. "Flora

Iranica", "Flora of Pakistan", "Flora of Ethiopia", "Flora of Thailand", "Flora Neotropica") have been published or are in preparation. All these Floras are of basic importance for further research, for agriculture, forestry, pharmacy as well as for protection and conservation.

4. Considerable efforts are devoted to the production of botanical didactic literature. An example is the standard botany textbook for universities ("Strasburger") and an Excursion Flora of Austria.
5. Further activities include research in carpobiology (e.g. *Dipsacaceae*) and archaeobotany (mainly Egypt, Middle East, Austria), and the editing of scientific journals: "Plant Systematics and Evolution" (F. Ehrendorfer), "Florae Austriacae Novitates" (M.A. Fischer, E. Hörandl).

## Teaching

General Biology: Principles of evolution and systematics; major groups of plants and fungi (L); - Biodiversity, systematics, and importance of plants and fungi (L); - Systematics and morphology of higher plants with ecological excursions (L+P); - Biology, distribution and evolution of seed plants (S); - Systematics and floristics of European vascular plants (L+P+S); - Useful and medical plants (L); - The flora of Austria (taxonomy, geobotany, ethnobotany) (L); - Botanical and eco-floristic excursions in Austria (P) - Biometrical methods in systematic botany (L+P); - The plant world of the paleotropics (flora and vegetation; biology, distribution and evolution of exemplary angiosperm taxa) (L+P); - Evolution of tropical woody plant taxa (S); - Horizontal starch gel electrophoresis of plant isozymes (L+P); - Application of chloroplast and genomic DNA sequencing in plant systematics (L+P).

## International Cooperations

Prof. E Robbrecht, National Botanical Garden of Belgium, Meise: Systematics of the large and predominantly tropical coffee family (*Rubiaceae*).  
Dr. J-F Manen, Conservatoire et Jardin botaniques, Genève: Molecular systematics of *Rubiaceae*, *Dipsacaceae*, *Anemone*.  
Prof. H Meusel, Prof. E Jäger, Prof. A Kästner, Martin Luther-Universität Halle/Saale: Biosystematics of the Mediterranean-C. European genus *Carlina*; life form diversity and eco-geographical differentiation in European Angiosperms.  
Dr. E Moscone, Prof. A Hunziker, Instituto multidisciplinario de Biología vegetal, Univ. Córdoba, Argentina: Karyosystematics of wild and cultivated paprika (*Capsicum*).  
Dr. D Bedoshvili, Prof. G Nakhutsrishvili, Institute of Botany, Georgian Acad. Sci., Tbilisi: Biosystematics of Caucasian Angiosperms (*Festuca*, *Achillea*, *Cruciata*); affinities of the Alpine and Caucasian floras.

## Selected References

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- Puff C (ed) (1991) The genus *Paederia* L. (*Rubiaceae-Paederieae*): a multidisciplinary study. Opera Bot Belg 3 (376 pp.)
- Samuel R, Pinsker W, Ehrendorfer F (1995) Electrophoretic analysis of genetic variation within and between populations of *Quercus cerris*, *Q. pubescens*, *Q. petraea*, and *Q. robur* (*Fagaceae*) from Eastern Austria. Bot Acta 108: 290-299
- Sitte P, Ziegler H, Ehrendorfer F, Bresinsky A (1991) Lehrbuch der Botanik für Hochschulen ("Strasburger"), 33 Aufl., G Fischer-Verlag Stuttgart, Jena, New York