# Heidelberg Botanic Garden and Herbarium HEID

Director: Prof. Dr. Marcus A. Koch (since 2003) Custodian: Dr. Andreas Franzke (since 2007)

Only few institutions are as diverse in their scientific scope and public appearance as Botanical Gardens, serving as centres of interdisciplinary research and education, conservatories for endangered plants, havens of horticultural art, training centres for gardeners and specialty horticulturists as well as sources of recreation, contemplation, and tranquility. The Heidelberg Botanic Garden and Herbarium with their prestigious collections enjoy worldwide reputation and are continously developed into modern scientific facilities for contemporary plant research.

#### History

The Heidelberg University Botanic Garden was established in the vicinity of Heidelberg's famous castle as a garden of medical plants (*Hortus Medicus*) in 1593 by Henricus Smetius and is among the world's oldest Botanical Gardens. Despite this being a concept religiously employed by many

universities during the sixteenth and seventeenth centuries, it was not until the mid-nineteenth century that the garden was first administered by the Department of Botany at the University of Heidelberg. This is approximately at the same time as the herbarium was developed with some of the first noteworthy collections (see below).

Up until the twentieth century the Garden underwent several relocations and was displaced several times because of urban development. In 1915 the Garden was reopened at its present site in the Neuenheimer Feld. At that time the area was characterized by open fields.



Tropical hall

And again the establishment of the garden underwent another setback after the Second World War, when the entire collection was lost due to combat activities. Nowadays the Garden is placed in the centre of a high-technology and science campus and is continuously developed with modern scientific facilities for contemporary plant research and is frequently visited by tens of thousands of visitor every year.

## The living collections

Bearing in mind the loss of collections in the first half of the twentieth century, it is remarkable to consider how the living collections have been expanded to over 10,500 species in the short period of time between World War II and the Garden's present day inception. This is mostly due to the tireless efforts of Professor Werner Rauh, who was the director of the Garden from 1960 to 1982. During this period – and up until his death in 2000 – Rauh undertook countless expeditions to the tropical, subtropical and arid regions of the Americas, Asia, and Africa, bringing back a vast selection of succulents, orchids and bromeliads. Presently this means that the Garden possesses a treasure and a responsibility, but also an enormous work load, since the plants – either as living plants or herbarium vouchers - are accompanied by a huge amount of additional information - field books, travel guides and slides. Rauh discovered and described hundreds and hundreds of new species of plants on these adventures, and a great deal of the flora is named in his honour, such as the genus *Rauhia* (Amaryllis family), the cactus *Rauhocereus* from Peru, or the Brazilian orchid *Rauhiella*.



Tillandsia collection



His contribution to the Heidelberg plant collections exceeded 10,000 species, most of which are now housed in the greenhouse complex, and also in the herbarium where at least another 50,000 or even more vouchers are deposited. To date, these extensive collections have been serving as the basis for scientific numerous investigations and publications. Dr. Karlheinz Senghas, custodian of the Botanic Garden from 1960 to 1993, devoted for example extensive scientific work to describing, in particular, the remarkable Heidelberg orchid collection (photo left). The curiosity and uniqueness of the collections is also highlighted by the fact that the Garden is growing several hundreds of individual plants that directly refer to the original type material in the herbarium. Generally, type material is associated with "dead and dry" herbarium specimens only. However, the Heidelberg plant collection is a very rare case as it houses

hundreds of "living types" which are cloned offshoots of the respective real types. Furthermore, this collection at Heidelberg now holds an important collection of extinct and endangered species from

around the world. Many of these plants' natural habitats have been subject to a progressive sequence of destruction, and they have become all but obsolete in their tropical homelands. One such example is the Madagascar living plant collection representing one of the world's most famous collections of this fantastic and species-rich island and focusing on succulent plants such as the Aloes or the vegetation type of spiny *Didieraceae* forest with species of very spiny, columnar, cactus-like shrubs and trees.

Today all these collections are under the special auspices of the Administrative District Governmental Department at Karlsruhe, Germany, responsible for an endangered species conservation program.



Succulent hall

The University of Heidelberg Botanic Garden and Herbarium has been an important conservation reserve in that respect. Particular conservation programmes in progress at the site involve, amongst others, also various plants species from Central Europe, e.g. the *Cochlearia macrorrhiza*, now extinct in its natural habitat, an endemic species from Eastern Austria and several of its closest relatives or the pretty and well-known "rock garden plant" *Dianthus gratianopolitanus* (Cheddar Pink). With the establishment and development of a comprehensive collection of the mustard family (Brassicaceae) since 2003 many hundreds of species from temperate regions of Central Europe and all over the world have also come into the focus of the Botanic Garden and Herbarium. Here the Botanic Garden demonstrates its close affiliation with research institutions such as the department of "Biodiversity and Plant Systematics" with its head Prof. Marcus Koch also functioning as the director of the Botanic Garden and Herbarium.

The rare and tropical nature of the "older" collections and the important resources provided with the *Brassicaceae* collections have become an important background to modern botanical research in the twenty-first century, including plant systematics and evolution, molecular and developmental biology, ecology, and pharmaceutical botany.

#### The Herbarium HEID

The collection of higher plants encompasses at least 50,000 species, represented by more than 350,000 documents with a focus on South American taxa, especially from the Andes, and African taxa, mainly from Madagascar and Kenya. The 'old herbarium' originating from the early 19th century includes the private collections of G.W. Bischoff who became the first ordinarius for Botany in Heidelberg in 1839 and of its his famous successor W. Hofmeister, as well as specimens from H.G.L. Reichenbach (*Flora Germanica Exsiccata*) and his son H.G. Reichenbach. The extensive moss and lichen collection of W. Bausch (1804-1873) was recently transferred on loan to the Natural History Museum in Karlsruhe (Germany) where it is currently reviewed. And also the Heidelberg

professor and zoologist H.G. Bronn who provided the first German translation of the revolutionary "Origin of Species" by Charles Darwin contributed with a large private herbarium.

Important parts of the 'new herbarium' are 50,000 specimens, especially cacti, bromeliads and orchids, collected between 1950 and 1980 by W. Rauh, W. Hagemann und K. Senghas. Noteworthy is also the



type collection HEID that encompasses ca. 2,300 type specimens. Since 2003 great effort has been made to modernise the Herbarium to meet the requirements of state-of-the-art biodiversity research. Also, since 2003 a new collection focus is on the mustard family (Brassicaceae).

The Herbarium is also used for teaching purposes: The 'Students' Herbarium', collected during field excursions over the past 8 years actually includes more than 10,000 fully digitalized specimens.

### **Documentation and the Publicity**

Important progress is achieved not only by documenting but also by making the collections accessible to the public via databases and online tools. A first step in this direction was made several years ago with the Garden's participation in the African Plant Initiative. The African Plants content area comprises scientific data contributed by the African Plants Initiative (API), a collaboration project among more than 50 institutions in Africa, Europe, and the United States with the long-term goal to build a comprehensive online research tool aggregating and linking presently scattered scholarly resources about African plants, thereby dramatically improving access for students, scholars, and scientists around the globe.



The beech forest

Continuing this research and documentation work more recently the "Werner Rauh Heritage Project", initially funded by the Klaus-Tschira Foundation, has been launched. Here a knowledge database is built up providing a virtual platform to access all cross-referenced information on the plant material collected and documented by Werner Rauh.

The living collections of the Botanic Garden are also important for teaching purposes: Every year, the Garden supplies plant material for practical courses with hundreds of participants and nearly 1000 students are taught during 'excursions' in the garden's collections. Additionally, the Heidelberg Botanic Garden runs an extensive apprenticeship program with yearly seven new garden apprentices.

The past decade was also characterized by a paradigm shift. Many Botanic Gardens all around the world have witnessed increasing public demand for education in the various biological, ecological and botanical sectors. Thus the Heidelberg University Botanic Garden has proposed an expanded mission in response to this demand, and as one example a comprehensive programme to teach and educate more than 5000 children and adults per year has been established. Collaboration with other institutes and institutions has been started and activities at the Heidelberg Botanic Garden "*GrüneSchule*" (green school) have contributed significantly to the establishment of the "Heidelberg Young University".

The Garden is an academic facility that it is open to the public: the gardens 24 hours daily and about half of the total 4000 m<sup>2</sup> of greenhouse area six days a week. Each year more than 30,000 visitors enjoy all the Heidelberg Botanic Garden has to offer in addition to approximately 2,000 vistors at various "open house" events. Furthermore, the Botanic Garden also provides a diversity of community education programes that stretch from guided tours to horticultural workshops and even creative courses.



The Systematic Garden pond

# Facts and numbers

Founded: Greenhouses: Total size: Living collection: Herbarium:		1593 (moved to the present site in 1915) 4000 m <sup>2</sup> ; plus 440 m <sup>2</sup> for research collection from temperate regions appr. 2000 m <sup>2</sup> of glashouses are open to the public 3,7 ha appr. 10,500 species appr. 350,000 specimens	
Opening Hours:		Garden (excl. greenhouses): Greenhouses Monday to Thursday: Friday: Saturday: Sundays /Public holidays: No entrance fee	open 24 hours daily 9. a.m. – 4 p.m. 9. a.m. – 2:30 p.m. closed 10 a.m. – 5 p.m. (summer) 9 a.m. – 4 p.m. (winter)
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