

Kórnik Gardens were established in 1926 by the Foundation of Count Władysław Zamojski. After the World War II the existing Center for the Study of Trees and Forests was transformed into a research station of the Polish Academy of Sciences in 1952, to finally become the Institute of Dendrology in 1975



Piotr Kusłowski

## Focus on Trees and Shrubs

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**Because of the longevity and diversity of trees, dendrological studies often take many years. Research in Kórnik has been underway since 1926**

**R**esearch at the Institute of Dendrology relates to tree biology in the broad sense, encompassing genetics, biochemistry, physiology, phytopathology, ecology, systematics, phytogeography, as well as problems related to forestry and the propagation of woody plants. The main directions of the research carried out at our Institute include:

- *population genetics of forest trees*: the genetic structure of populations; genetic and phenotypic variation;

the transfer of genetic information in populations of forest trees;

- *forest tree breeding*: tree selection with the aim of improving forest productivity, mineral nutrition and high-quality seed production; the hormonal stimulation of flowering in seed orchards;
- *ecophysiological reactions of forest trees to environmental factors*: the impact of biotic and abiotic factors on tree growth, development and condition; the mechanisms of industrial pollution reactions; the physiological basis of trees and shrubs' reactions to stress factors;
- *phytopathology of trees and shrubs*: genetic and ecological aspects of forest decline; dendrochronological analysis of tree condition; abiotic and biotic factors associated with the occurrence of forest diseases; the pathogenicity of agents that cause serious tree diseases;
- *mycorrhizal symbioses of trees and shrubs*: the physiological role of growth regulators; the morphological and molecular structure of mycorrhizae; intraspecific

variation and selection of fungal strains in terms of resistance to various forms of human impact;

- *seed metabolism of trees and shrubs*: physiological and biochemical mechanisms of dormancy release and respiratory process activity; mechanisms of ageing; resistance to desiccation;
- *seed biology of trees and shrubs*: dormancy breaking, long-term storage and cryopreservation of seeds;
- *systematics and chorology of trees and shrubs*: the taxonomy of "difficult" genera, such as *Rosa*, *Rubus*, *Salix*, *Crataegus*, etc.; processes taking place in populations of endangered species; the systematic position of questionable taxa on the basis of biometric studies; geographical variation of taxa within their natural ranges; chorological characteristics of dendroflora in selected regions;
- *methods of tree and shrub propagation*: modern rooting methods; micropropagation;
- *tree and shrub acclimatization*: evaluating newly introduced varieties and populations of trees and shrubs.

### Evaluating new species

Apart from statutory research, the Institute conducts research on many other subjects, such as a commissioned project entitled "Biodiversity of ecosystems: genesis and function (mechanisms determining the species richness of herbs and soil-inhabiting organisms and its influence on the function of biocoenoses of 14 forest tree species," a joint Polish-American project entitled "Linking leaf and root traits to ecosystem structure and function in a common garden study of 14 temperate tree species," and 28 grants financed by the Polish State Committee for Scientific Research (KBN). Our Institute also receives grants from the State Forests Holding to solve current problems in forestry. One field of particular significance has been the gradual improvement of methods for long-term seed storage and dormancy breaking in species of trees and shrubs that are important in both economic and ecological terms. We also conduct studies on restoring areas that have been degraded by industry. Our applied research includes evaluating many new species and cultivars of trees and shrubs with respect to their usefulness for cultivation in Poland. As a result of this work, for example, many valuable poplar cultivars and hybrids have come to be cultivated in Poland on a large scale. Similar studies have concerned the Douglas fir (*Pseudotsuga menziesii*), giant fir (*Abies grandis*), Japanese larch (*Larix leptolepis*) as well as new cultivars of lilacs, forsythias, and ericaceous shrubs (heaths, heathers, azaleas, and evergreen rhododendrons).

### In print

The Institute's international cooperation program involves about 50 research centers from 30 countries and involves the exchange of plant materials and/or joint research projects. The fruits of this cooperation have been

presented in many joint publications. Special mention should be made of our staff's contributions to internationally renowned works, such as *Flora Europea*, *Flora Hellenica*, and *Flora of Turkey* or to textbooks on seed storage and the genetics of forest trees. Of particular importance are our ties to the International Union of Forest Research Organizations (IUFRO), in which employees of our Institute perform many functions and participate in the coordination of symposia and congresses.

The Institute publishes a scientific journal that bore the title *Arboretum Kórnickie* for 45 years, but was given a new title in 2000: *Dendrobiology*. All issues are available on our website. The Institute also publishes a unique book series entitled "Our Forest Trees," begun in 1970. So far, 17 of this series' planned 21 volumes have been published. Each of them deals with one species (or genus) of native forest trees.

Today the Institute of Dendrology employs a staff of 79, including 32 researchers (15 of whom are full or associate professors). Institute employees supervise 20 post-graduate students. ■



Tomasz Leski

A fundamental part of the Institute's research is closely related to the Kórnick Arboretum. With 3,500 taxa of woody plants, it is one of the richest collections of trees and shrubs in Central Europe. Every year it is visited by nearly 70,000 people