

Plant Exploration: Gamble for the Big Payoffs®

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Longwood Gardens is a world premier horticultural display garden created by Pierre DuPont between 1906 and 1954. The gardens opened to the public in 1956. About 250 acres out of a total 1050 are display gardens open to public viewing and include about 4 acres of heated conservatories. The display gardens have over 10,000 plant accessions in a mixture of permanent and seasonal plantings. There are an additional 3,000 plus accessions in research trials at any given time. The seasonal plantings are changed an average of four times per year outdoors and six times per year in the conservatories.

Longwood Gardens has engaged in plant exploration since 1956 and has sponsored over 50 trips to as many countries in the past 50 years. Expeditions have encompassed every continent except Antarctica.

Explorer	Destination
Frank Kingdon Ward	Burma
John Creech	Japan, Union of Soviet Socialist Republics, Nepal, Taiwan
Walter Hodge	Australia, Indonesia, West Indies
Russell Siebert	South America, South Africa, Peru, Mexico, West Indies, Costa Rica, Honduras
Richard Lighty	South Korea, Honduras, Costa Rica
Rick Darke	South Africa, Japan, Germany, Australia, United Kingdom
Darrel Apps	South Korea, United Kingdom
Robert Armstrong and Roger Lawson	Japan, Singapore, Indonesia, Australia, New Zealand
Bill Thomas	South Korea, China, Japan
Jim Ault	United Kingdom, South Africa, China
Tomasz Anisko	China, Tibet, Georgia, Chile, Azerbaijan, Greece, Russia, Australia

The most recent trips have been to Australia, Chile, China, Greece, Guyana, and Russia.

Thousands of plant collections have been made, and a few notable ones are: *Trochodendron aralioides*, *Ilex crenata* 'Sky Pencil', *Pericallis papyracea* (cineraria), New Guinea impatiens, *Tsuga chinensis*, and many camellias including *Camellia azalea*.

Longwood Garden's emphasis on plant exploration has occurred for a number of reasons. One reason is that Longwood's mission includes an emphasis on performing research that will make positive contributions to the horticultural community. Longwood is also continually searching for plants that can be used to keep their displays ever-changing and extraordinary. Participation in plant exploration trips also

gives Longwood staff a first-hand opportunity to observe potentially useful plants in their native environment before attempting to cultivate them. And lastly, plant exploration often provides excellent personal contacts for future germplasm exchanges. Plant exploration and distribution will become increasingly important to maintain genetic diversity as native species around the world are being eliminated due to habitat destruction for land development and intensive agriculture.

Plant exploration is becoming more of a gamble as a result of the globalization of agriculture. Many nations have announced ownership of their genetic resources and are strictly controlling export of them. This concept gained wide acceptance as a result of the Convention on Biological Diversity (CBD). The intent of the CBD is to allow each nation to be the first to benefit economically from its own genetic resources. While this concept will no doubt prove to be morally right in the future, the complexity of implementing it is significantly slowing the pace of germplasm rescue. As a result, plant collecting is now more complicated or not possible in many countries.

Another increasing concern around the world is the spread of "invasive exotics." In this country, this has led the United States Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) to reevaluate its regulations governing the import of plants for planting (commonly called Q-37). One option being considered for the revised guidelines is to prevent the import of some or all plants for planting until regulated testing has taken place to assure there is no risk of invasiveness from the imported plant material. While this also is idealistically the right measure to protect against serious negative germplasm invasions, it is quite possible that implementing and regulating the evaluation procedures will be a significant challenge and drastically change the rate at which plants move across national boundaries for some time.

For these and other reasons, it is increasingly important that thorough planning go into any plant exploration effort before it takes place to reduce the risk that initial expectations are not met. A recent plant exploration trip undertaken by Longwood Gardens can be used as an example of some of the challenges that should be considered when planning an expedition.

In 2004 Longwood staff agreed a plant exploration trip to Australia was warranted. Reasons for the trip included:

- Observation of species in their native habitat to help developing cultivation techniques.
- Acquisition of untried species.
- Acquisition of new cultivars not currently available in the U.S.A.
- Making new personal contacts with plant experts in Australia for information and plant exchange.

It had been 13 years since Longwood staff had traveled to Australia, and the garden was using and planning expanded use of Australian native flora in current and future displays.

Longwood staff Tomasz Anisko and Jim Harbage planned a trip that would take 3 weeks and would spend roughly two-thirds of the trip observing native flora in the field (bush) and the last third of the trip acquiring plants. The trip would start in Perth and make a large circuit in West Australia (road) going north, staying close to the coast, as far as Kalbarri National Park and then traveling back south, somewhat further inland, as far south as Mount Barker and visiting the Sterling Range.

This loop would cover an area of intense biodiversity. Australia is home to around 24,000 species, and about 10,000 occur in West Australia. The trip would then proceed by air east to Adelaide where it would continue by road to Melbourne. From Melbourne they would fly to Sydney where they would complete the trip by touring the area around Sydney. Melbourne and Sydney have the greatest concentration of nurseries in Australia. The plans also called for visiting nine botanic gardens and eleven nurseries (specializing in native plants) during the course of the trip.

The initial investigations indicated there would not be an opportunity to collect plants from the wild without signing agreements requiring extensive post-collection permits for redistribution or plant naming/release efforts. So the plan was to simply purchase commercially available plants at nurseries. Arrangements were made to have the plants delivered to an Australian nursery, which would then ship cuttings back to Longwood at a later date.

Several lessons were learned during the course of this trip. We learned that the environment many of the plants live in is very harsh, with minimal precipitation, low humidity, and high daytime temperatures. The soils were often very thin with little organic matter and were frequently made up of gravel over clay.

The Australian native flora was spectacular, with tremendous variation in texture, color, and habit. Examples of unusual texture included foliage and flowers of *Dryandra*, *Grevillea*, and *Banksia* species. Flower colors were also very diverse. There seemed to be an exceptionally large number of blue-flowered plants including *Lechenaultia*, *Dampiera*, *Hybanthus*, *Conospermum*, and *Hovea* species. Plants with silver foliage also predominated such as species of *Eremophila*, *Lachnostachys*, *Eucalyptus*, *Conospermum*, and *Leucophyta*. There were also many plants with vibrant red and orange flowers such as a red-flowered *Lechnaultia*, *Banksia coccinea*, *Chorizema glycinifolium*, *Telopea speciosissima*, *Eucalyptus caesia*, and the bizarre *Swainsona formosa*.

We learned we could not import plants with Plant Breeder's Rights without special written permission from the license holder. We also could not import members of the genus *Acacia* or the *Rutaceae* family due to U.S.D.A. restrictions.

Australian Botanic Gardens have vigorously adopted the tenants articulated at the Convention on Biological Diversity (CBD). However, most Australian Nursery Owners don't know or care about the CBD. Australian Plant Selectors are fearful of losing their newly released plants to the U.S.A., but feel it is too expensive for them to pursue patenting them in the U.S.A.

We imported cuttings of 72 different plants and seeds of another 30 different plants from Australia, which we are now propagating and growing in our research trials. We expect many of these plants to be exciting new additions to our conservatory displays in the future.