

## The Plants of Longwood Gardens<sup>©</sup>

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Longwood Gardens is a world class horticultural display garden created by industrialist Pierre S. du Pont in Kennett Square, Pennsylvania, USA. When du Pont purchased the property in 1906 it already contained a unique collection of trees, considered one of the finest in the country. The trees had been acquired mostly by Samuel and Joshua Peirce, great grandsons of George Peirce who purchased the property from William Penn's commissioners in 1700. Pierre du Pont purchased the property to save the collection of trees and subsequently created one of the most notable estate gardens in North America. Longwood Gardens first opened as a public garden in 1956, 2 years after Pierre du Pont's death.

Currently, the garden has about 4 acres of Conservatory display space and 300 acres of outdoor gardens open to the public. The plant collection contained in this space includes 8,900 permanent taxa, evenly divided between hardy and conservatory plants, and 1,000 taxa that change according to the season.

Plants in the Longwood Gardens collection come from a range of sources including: plant exploration efforts, Longwood's plant breeding and selection program, and nursery purchases. The plant exploration efforts were initiated by Longwood's first director, Dr. Russell Seibert, who had been involved in plant exploration for the United States Department of Agriculture (U.S.D.A.), where he worked prior to becoming the director of Longwood Gardens. Dr. Seibert began the program in 1956 and since that time Longwood has sponsored, led, or participated in 56 expeditions to about as many countries, on all continents except Antarctica. Longwood has collaborated with the U.S.D.A., University faculty, other public gardens, and nurseries to carry out these expeditions. Longwood has freely shared the plants collected through these expeditions and more than 13,000 ornamental plants were introduced into the United States through these efforts.

The plant exploration program was initiated to sponsor and participate in collection and introduction of "new" ornamental plants. The program served to: expand genetic diversity, understanding about plants and their native environments, and establish relationships for future plant exchange. Major contributors to the exploration efforts are listed in the Table 1 below along with the countries they focused on.

Table 1. Major contributors to the exploration efforts and the countries of focus.

Frank Kingdon Ward	Burma
John Creech	Japan, Nepal, USSR, 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	Japan, Singapore, Indonesia, Australia, New Zealand
Roger Lawson	
Bill Thomas	South Korea, China, Japan
Jim Ault	United Kingdom, South Africa, China
Tomasz Anisko	China, Tibet, Georgia, Chile, Azerbaijan, Greece, Russia, Australia, Argentina, Guyana
Jim Harbage	Argentina, Australia, Japan

Longwood's plant exploration efforts have taken two approaches: one focused on acquiring cultivated selections of ornamental plants that have not yet become available in the USA; and the other focused on plant collection in the wild. When new cultivars are developed and released in a particular country, for various reasons they may not be distributed to other countries for several years. This is often the case with countries like Japan, South Africa, and Australia. These countries have active plant development programs and so are targets for Longwood plant exploration focused on cultivated selections. However, many countries with a rich diversity of species do not have significant plant development programs. Longwood plant exploration to areas like this have focused on wild collected material to broaden the diversity of ornamental plants in the USA and to strengthen the gene pool of certain species already present in the USA but, represented by a single or very few original individuals.

An example of an expedition led by Longwood staff focused on acquiring cultivated selections was the 2003 trip to Australia. Australia has a wealth of plant diversity with about 24,000 plant species, 12,000 in West Australia alone. The trip goals were to: learn about Australian flora and its natural growing conditions by observing native flora in the wild and at botanical gardens (visited 11); obtain improved selections of native flora at specialty nurseries (visited 9); and make contacts with experts on Australian native flora.

During this expedition Longwood staff witnessed the amazing diversity of textures, from the coarse sawtoothed leaves of *Banksias* to the soft foliage of *Pimelea spectabilis*. Australia is also home to a tremendous diversity of flower color including the blues of *Alyogyne huegelii*, *Hovea elliptica*, *Conospermum coerulescens*, *Dampiera linearis*, *Hybanthus calycinus*. The intense sunlight received by much of the western part of Australia has led to numerous species with silver foliage and white flowers such as: *Lachnostachys eriobotrya*, *Actinotus helianthi*, *Eucalyptus pleurocarpa*, *Eremophila nivea*, *Leucophyta brownii*, and *Maireana sedifolia*. Many of the collections made in Australia can be found in the Longwood conservatories today.

A recent example of an expedition led by Longwood staff focused on acquiring new plants through collection in the wild is the 2008 Expedition to Argentina. This expedition focused on *Victoria cruziana* as well as subtropical species native to the Misiones province in northeastern Argentina. During this trip, along with many other species, seed of *V. cruziana* was collected from several locations including what is likely the southernmost provenance, which would be the coldest environment and shortest growing season for the plant. These collections were critical to maintaining the genetic health of Longwood's *Victoria* display, which features the interspecific hybrid first created by Longwood-staff in 1960 by crossing *V. cruziana* and *V. amazonica*, a process which is repeated annually to this day.

Plant exploration today is more complex than it was when Longwood initiated their program in 1956. Permits are required to access collection sites and import material collected. Plant material must receive a phytosanitary inspection in the host country and also by USDA-APHIS staff upon arrival in the USA. Many plants are not allowed to be imported into the USA from other countries for a number of reasons. Safety is a serious concern in some countries. Also the Convention on Biological Diversity guidelines on access and benefit sharing of genetic resources between the country where plants are native and the country collecting them often make it difficult or impossible to get the proper authority to use or share those wild collected plants. For these reasons Longwood obtains plants through a range of other sources besides plant exploration.

Longwood Gardens performs trials of plants obtained from: private individuals, nurseries, seed exchange programs, and breeders to supplement those acquired through plant exploration. These trials allow evaluation of a broad plant pallet to support a constant improvement of Longwood displays through enhanced diversity and use of cultivars with greater pest resistance and ornamental value. Trials of hardy trees, shrubs, and herbaceous perennials are performed in the field and non-hardy plants are trialed in research greenhouses. Occasionally, trials are initiated to focus on specific pest issues such as Dutch elm disease, American chestnut blight, and hemlock woolly adelgid.

Longwood plants have also come into the collection through internal breeding projects. Longwood-staff have engaged in breeding since 1960. Major breeding efforts in the past have included: New Guinea Impatiens cultivars, which were first named and released by Longwood; *Camellia*, with three cultivar releases; and *Canna*, with 14 cultivar releases to-date, among others.

Longwood has been involved in the naming of 136 cultivars since 1956 with about one half of them originating from Longwood's breeding and selection efforts. Notable cultivars developed by Longwood include; *Victoria* 'Longwood Hybrid', *Caryopteris* × *clandonensis* 'Longwood Blue', *Wisteria frutescens* 'Longwood Purple', *Buxus sempervirens* 'Longwood', *Viburnum nudum* 'Longwood', and *Clivia miniata* 'Longwood Debutante' and 'Longwood Fireworks'. Currently Longwood has selections ready for naming of: *Sarracenia*, *Daphniphyllum macropodum*, *C. miniata*, *Cornus kousa*, *Buxus*, and *Canna* × *generalis*.

While Longwood has developed a reputation for having many unique plants in their collection, sometimes what makes Longwood plants unique is how they are grown. Longwood Gardens has explored the world not only for plants but also for unique ways to grow plants. Perhaps the best example is with the techniques employed to grow the chrysanthemums used in the annual Chrysanthemum Festival held from late October to late November. During this time, the visitor to Longwood will see cascade chrysanthemums grown on columns, in giant baskets, in arches and many other forms. They will see tree forms, topiaries, and exhibition chrysanthemums using single stems, multi-stemmed disbudded plants, and spray forms. And they will see the grandest chrysanthemum of all, the 1000 Blooms Chrysanthemum with over 1000 perfectly placed flowers on a single 12-ft-diameter plant. Longwood staff have travelled to Japan and learned these techniques from Japanese chrysanthemum experts who have been refining these techniques for hundreds of years.

In the future Longwood staff will continue to search the world for new and unique plants to use in their displays and new and unique ways to grow the plants used in their displays. As in the past, Longwood will also continue to share the plants and the techniques used to grow them with the global horticulture community in an effort to keep people in touch with the wonders of the plant world.

