The romance and intrigue of plant discovery and acquisition continues to entice plant explorers, most often to remote and exotic places far away from the United States. Though early explorers and botanists (including the Bartrams, the Michauxs, Nuttall, Torrey, Gray, and Harper) described the vast richness of eastern North America’s flora, its range of diversity and adaptability continue to be underappreciated and understudied to this day. In efforts to more fully document and explore its potential, Mt. Cuba Center, near Wilmington, Delaware, is among a handful of public gardens currently active and engaged in exploring and promoting this rich flora.

**PLANT EXPLORATION WITH PURPOSE**

The forests of eastern North America are replete with a remarkable array of plant communities, habitats, and plant species. Through the vision and resources left by our founders, Mt. Cuba Center has dedicated significant energy

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The Dogwood Path forms an intimate canopy adjacent to Mt. Cuba Center's meadow. It showcases many plants in sophisticated layers, from tall trees to low-growing wildflowers.

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to exploring habitats throughout the eastern United States from Pennsylvania and Delaware through the Carolinas, Georgia, and Alabama. Throughout these states we have discovered that there is an enormous reserve of genetic diversity worthy of greater study and appreciation.

Plant exploration is an essential component of Mt. Cuba Center’s commitment to study and assess the adaptability of native plants for horticultural use. In addition to enriching the gardens with documented, wild-collected, seed-grown plants from a range of provenances, detailed field data gathered from this effort has provided us with a greater understanding of habitats, distribution, and plant associations. This documentation has potentially far-reaching implications for horticulture, landscape design, and conservation.

During the past 11 years, Mt. Cuba Center staff members have conducted nearly 80 field expeditions in the eastern and southeastern United States in 11 states. Over 1,150 documented collections have been made, representing 619 taxa of herbaceous and woody plants. Regular collaboration with numerous partners—including other public gardens, universities, state and federal agencies, industry, conservation organizations, and private individuals—has afforded us the opportunity to observe and sample plant diversity in a wide range of habitats.

In addition to broad-based sampling of herbaceous and woody taxa, Mt. Cuba Center’s field work in recent years has also focused on sampling specific taxa in order to obtain broader genetic diversity, obtain taxa from the edges of their ranges or from disjunct populations, and assess potential variation of selected plant species for wider landscape use. Some of the highest priority woody plant taxa for targeted sampling currently include: *Fothergilla gardenii*, *Fothergilla major*, *Halesia carolina*, *Halesia diptera*, *Gorge rhododendron* (*Rhododendron minus*).
The Copeland Family Legacy

MT. CUBA CENTER is the 589-acre former estate of Mr. and Mrs. Lammot du Pont Copeland. Over a 65-year period, beginning in 1937, gardening became a consuming passion for the Copelands.

During the formative years of their estate and garden, the Copelands engaged a number of designers including Thomas Sears, Marian Coffin, and Seth Kelsey to assist in creating a series of formal and informal landscapes surrounding their home. These provided structure and a unique identity to their ever-expanding gardening interests.

By the late 1970s Mr. and Mrs. Copeland had begun to refine their gardening interests, focusing more and more on native plants of the eastern United States. With passion, vision, and hands-on garden development, the Copelands and their staff, including their first director, Dr. Richard Lighty, created some of the mid-Atlantic region’s most attractive and diverse native plant gardens.

In 2002, a year after Mrs. Copeland’s death at age 94 (predeceased by Mr. Copeland in 1983), Mt. Cuba Center officially became a private non-profit organization, with a mission to display, study, and promote the broader use of the flora of the eastern United States, with particular emphasis on the Piedmont physiographic region. Today, a decade later, well documented and botanically diverse gardens, horticultural research and introduction programs, as well as extensive education and public tour programs are beginning to fulfill the Copelands’ hopes for their beloved estate.
Halesia tetrapetra, Illicium floridanum, Kalmia latifolia, Leucothoe axillaris, Leucothoe fontanesiana, Rhododendron catawbiense, Rhododendron colemanii, Rhododendron minus, Rhododendron prunifolium, Stewartia malacodendron, Stewartia ovata, Viburnum acerifolium, and several deciduous Rhododendron species.

SOME EXAMPLES OF INITIATIVES CURRENTLY UNDERWAY:

Sampling Stewartia Diversity

Silky camellia (Stewartia malacodendron) and mountain camellia (Stewartia ovata) are attractive native North American deciduous shrubs or small trees that have been underappreciated for their horticultural value and as biological indicators of stable, botanically rich habitats. Both species have highly attractive, non-fragrant, white flowers that open daily over a one to three week period from mid May to late June, depending upon the region.

The distribution of these two species is often discontinuous, with highly variable population sizes. Silky camellia is primarily found in the coastal plain and Piedmont from Virginia to Florida and west as far as eastern Texas. Mountain camellia is naturally distributed in the Piedmont and mountains from Virginia to Georgia and Alabama, reaching its western limit in southern Kentucky and Tennessee; a few disjunct populations can be found in the coastal plain of Virginia and North Carolina. While there are pockets of large populations, most populations are small and isolated, which is likely to have resulted in genetic isolation. North-central Alabama is one (possibly the only) place where the range of these two species overlaps, with plants of both species growing in close proximity to each other.

In 1999, Mt. Cuba Center began targeted field work to document populations and collect seeds of both species from across the breadth of their ranges. More than 120 documented seed collections of these two species from 7 states have since been made.

The Stewartia Working Group (SWG) was formed in 2007 as a collaboration to develop ex situ repositories for the extensive documented seed collections already made and to study, long-term, the variation in these two eastern
North American species. The SWG currently includes the Birmingham Botanical Garden, Alabama; Mt. Cuba Center, Delaware; Polly Hill Arboretum, Massachusetts; Smithgall Arboretum, Georgia; Yew Dell Gardens, Kentucky; and Heritage Seedlings nursery, Oregon.

Much of the success of the SWG is due to the knowledge, guidance, and assistance of stewartia authority Jack Johnston. He has systematically identified countless stewartia populations and guided the group to them in order to observe and sample both silky camellia and mountain camellia. As a result, a significant portion of the range of these two species has already been sampled. Much remains to be learned, though, about the variation, habitats, distribution, propagation, production, and adaptability in cultivation of both species. Even so, the SWG is making significant progress in representing a broad range of native stewartia diversity in cultivation.

Provenance-based collecting such as that with *Stewartia malacodendron* and *Stewartia ovata* offers an important window into the variation of species and potential preservation of genetic variation. It also affords emergent opportunities to encourage research as well as selection of superior forms. Some other important provenance-based collections of interest include *Leucothoe axillaris* (6 collections), *Leucothoe fontanesiana* (14 collections), *Rhododendron colemanii* (8 collections), and *Rhododendron prunifolium* (7 collections) to mention just a few.

In many cases these taxa are represented in cultivation by few or no known wild-documented populations. Documented collections in our public gardens are crucial for
expanding our appreciation of the variation in these species, properly identifying cultivated forms and hybrids of species, and providing documented, known-source material for horticulture and science.

ON THE EDGE

Unfortunately, much of our pre-conceived bias about plant adaptability is based upon limited experiences with plants from their core ranges. Assumptions about adaptability become rules regarding how plants perform in the landscape, but are not always correct. In eastern North America, the range of many species is frequently broader than we know and is not fully represented in cultivation.

Success and failure with a number of native plants in the garden at Mt. Cuba Center has informed our opinions about the need to more thoroughly explore the distribution of native eastern North American herbaceous and woody plant species. As a result, in the past several years field work has focused on locating, documenting, sampling, and growing a number of species from the edges of their ranges.

**Rhododendron minus**

Gorge rhododendron (*Rhododendron minus*) is found in the mountains of North Carolina, South Carolina, Georgia, and Tennessee, growing on well-drained slopes and outcrops. However, there are also many discontinuous populations of this species found into southern Alabama and Georgia. The location and environmental conditions of these southern populations places them under significantly greater heat and drought stress for extended periods throughout the growing season than mountain populations.
While gorge rhododendron and its close relative, Carolina rhododendron (*Rhododendron carolinianum*), are attractive broadleaved evergreen shrubs that have been exploited for breeding and selection for many decades, their summer adaptability to landscape stress in the mid-Atlantic has been suspect.

Over the past several years, Mt. Cuba Center has made 26 collections of *Rhododendron minus* from throughout the southern end of its range to observe garden adaptability and variation; this work continues. It is interesting to note that nearly all the populations of gorge rhododendron from the southern end of its range develop attractive pale to dark pink flower trusses that bloom later than mountain populations despite their southern nativity. Through the guidance of rhododendron expert Ron Miller, we have also obtained and grown seeds from isolated populations of white-flowering forms found in Alabama and Georgia.

It is our hope that long-term observation and assessment of these plants may yield opportunities for wider introduction of these southern genotypes into cultivation as well as breeding and selection work. Additionally, the inclusion of these plants in our living collection provides opportunities for continued taxonomic study of this interesting group of rhododendrons.

### Rhododendron catawbiense

Catawba rhododendron (*Rhododendron catawbiense*) generally ranges from the mountains and upper Piedmont of the Carolinas and Tennessee northeast into Virginia and West Virginia above elevations of 3,000 feet (914 meters). Because of hot and humid summers (especially the warm night temperatures) in the mid-Atlantic region, this rhododendron struggles to survive in the typical suburban landscape.

Again, with the knowledge and assistance of noted azalea and rhododendron expert, Ron Miller, we have been able to document and collect seeds from 12 populations along the extreme southern edge of the range of this rhododendron. In remote and difficult-to-access

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*Alabama populations of *Rhododendron minus* frequently produce attractive pink flower trusses.*
Creating a Haven for Herbaceous Plants

MT. CUBA CENTER’S garden and living collection is an integrated matrix of plants intended to delight and inspire guests. It is our goal to provide guests with an understanding of how beautiful gardens are created and maintained using environmentally appropriate landscape management practices. Through this approach the garden and living collection provides opportunities for sophisticated layers of herbaceous plants that play an important role in the structure of the garden, integrating with and complementing the woody plant layers throughout the growing season.

Our gardens are well-known for an extraordinary variety of herbaceous plant species and cultivars that contribute character to the woodland garden setting. Of Mrs. Copeland’s favorite wildflowers, trillium (Trillium spp.) was the queen. To this day, trilliums continue to be among the most coveted of all wildflowers grown in our garden.

Over the past 20 years, we have developed expertise in the propagation and production of trillium species from seed. In 2001, Mt. Cuba Center was recognized for significant plant expertise with trillium propagation, production, and ex situ preservation by receiving North American Plant Collections Consortium (NAPCC) member status as an official holder for the genus Trillium. At present, the collection includes 84 taxa represented by more than 470 accessions.

To broaden the genetic diversity of trilliums available in cultivation and to support ex situ preservation, we have continued to target trillium in our plant exploration activities. Over the past 11 years, we have made 110 collections of wild-documented trillium species, varieties, and unique forms. These include: Trillium catesbaei, T. cernuum, T. cuneatum, T. decumbens, T. discolor, T. erectum, T. flexipes, T. lancifolium, T. luteum, T. niveum, T. rugellii, T. stamineum, T. underwoodii, and T. vaseyi. A number of hybrids and unique forms of several trillium species have also been collected.

While trillium is an important focus, much work at Mt. Cuba Center continues on a very diverse assemblage of native herbaceous plants in order to contribute to the richness and diversity of plants worthy of wider use by the gardening public.
sites along rivers and ravines in northeastern Alabama, Catawba rhododendron grows on sandy benches at elevations ranging from 600 to 1,200 feet (183 to 366 meters). The climate of the Alabama Catawba rhododendron habitats is much warmer and more humid than higher altitude montane habitats farther north. Evaluation of seedlings from these populations is in the early stages, but as with gorge rhododendron, observation and assessment may provide opportunities for broader use of this species in cultivation along the mid-Atlantic seaboard or for incorporation into breeding schemes.

*Kalmia latifolia*

Mt. Cuba Center has had a long-standing love affair with mountain laurel (*Kalmia latifolia*) because natural populations occur on the property and, more importantly, because the Copelands used this attractive broadleaved evergreen frequently in their garden. Mountain laurel is common throughout the eastern and northeastern United States all the way to Maine. Interestingly, it is also distributed into southern Alabama, the Florida panhandle, and eastern Louisiana. While much selection and breeding work has been done with mountain laurel in the northeastern United States, there has been a limited emphasis on documenting, collecting, growing, and assessing the adaptability of mountain laurel from the extreme southern end of its range.

Unlike populations of *Kalmia latifolia* in our area that grow in dry, shady upland woodlands, populations of mountain laurel in the Deep South are frequently found in sandy, well-drained, shady riverine habitats, sometimes well within the flood zone of streams. Recently, 20 collections of mountain laurel from Alabama, Florida, and Louisiana were made to assess the long-term stress tolerance of these provenances compared
In the southern end of its range *Kalmia latifolia* is frequently found in riverine habitats where flooding is common.

Flowers of a *Kalmia latifolia* specimen growing in Coosa County, Alabama.
to widely cultivated forms. This work is in its infancy but represents an important long-term opportunity to assess adaptability, disease and pest resistance, and ornamental value.

**ASSESSING ADAPTABILITY**

Most gardeners in the mid-Atlantic region are unfamiliar with Florida anise (*Illicium floridanum*). For those who are, they usually consider it to be, at best, marginally hardy in our area. Despite this fact, Mrs. Copeland grew this lovely broadleaved evergreen shrub in her garden for nearly two decades. Its supple evergreen foliage, modestly formal upright habit, adaptability to shade and drought, as well as its attractive burgundy red flowers in early spring have made Florida anise a modern favorite of staff and visitors to this day.

Florida anise is common in bottomland forests, along lakes and streams, and on the edges of wetland communities throughout much of southern Mississippi and southern to central-northern Alabama. Despite its common name,
Florida anise is found only in the panhandle of Florida. In order to more systematically assess the garden adaptability and hardiness of *Illicium floridanum*, we began sampling populations on the northern edge of its range in Alabama several years ago. Through this work, 11 documented collections have been made, including samples from disjunct populations at the northern edge of the species’ range in Alabama. Through long-term evaluation and distribution, we hope to broaden the potential for using Florida anise in the mid-Atlantic and surrounding regions.

**WHAT’S NEXT?**

The flora of the eastern United States still has much to offer. The plants mentioned here are just a few of the many that deserve broader long-term study. Through Mt. Cuba Center’s long-term commitment to observing, documenting, and sampling the flora of the eastern United States, we hope that a broader segment of this flora will be appreciated and used by the gardening public.

Rick J. Lewandowski is Director of Mt. Cuba Center near Wilmington, Delaware.