



Orchid Digest

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Rhycattleanthe
Smithsonian Sunburst 175th

AMERICA'S ORCHID COLLECTION OF THE SMITHSONIAN INSTITUTION

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DID YOU KNOW we all own a roughly 5000-plant orchid collection? In a government complex in Suitland, Maryland, sits a series of 14 greenhouses where the Smithsonian Gardens grows and houses plants for their many displays and landscaped areas. This complex has four large greenhouses with a growing area of 15,000 square feet. The greenhouses are dedicated to growing and expanding an exquisite orchid collection that is part of the Smithsonian Institution.

The collection began with a bequest of orchid plants to the Smithsonian from the philanthropist Marjorie Merriweather Post in 1974. Under the watchful care of highly talented growers, this collection has expanded to become one of the most species-diverse collections in the world.

The Smithsonian Garden Orchid Collection (SGOC) is masterfully grown under the guidance of Lead Horticulturist Justin Kondrat. He is assisted by a rotating group of interns and volunteers, as well as Sarah Hedeau, the Living Collections Manager, who oversees the digitization of the collection. The care and attention to detail they employ are rewarded with thousands of diverse, beautifully grown orchids.



Justin Kondrat, Lead Horticulturist.

The Greenhouses

In 2010, the collection moved from an old, crumbling greenhouse where the collection was maintained from the 1970s to the current state-of-the-art facility. The greenhouses are metal and polycarbonate structures that soar twenty feet overhead. There is a rainwater collection system to provide pure water for the orchids. Each greenhouse has a climate-control system to simulate the climates where the wide varieties of orchids thrive. There is a high-light intermediate greenhouse, a lower-light intermediate greenhouse, a warm, humid tropical greenhouse, and a seasonally cool greenhouse. In addition to controlling the greenhouse climate, they have developed some very ingenious ways to provide specialized micro-climates for their more finicky plants.

Sitting on many of the benches among the plants are portable shade structures designed to shade plants more sensitive to high light conditions than their neighbors while residing on the same bench, a very interesting feature. These are constructed of a metal frame, connected to form cubes covered with shade cloth. The cube can be customized using the appropriate shade cloth to allow the appropriate light transmission for the plant(s) needs. The cloth sides can also be rolled up and tied open when desired. The cubes protect the plants and can be moved around in the greenhouse to provide the most favorable conditions without needing to build specialized spaces.

Humidity is maintained by an electronic sensor that turns on the reverse osmosis (R/O) misting system when the humidity drops too low. The heat and humidity are monitored and maintained according to the specifications set for each house. In addition, the temperature can be lowered by unrolling electronically controlled shade panels built on tracks near the ceiling, opening ceiling panels, activating swamp coolers, misting, and increasing air circulation via fans, including large exhaust fans. The systems are designed to self-regulate; alarm sensors alert the growers if systems fail so that corrective measures can be taken.

Upon entering the greenhouses, one of the first things you notice is the near-surgical cleanliness of the buildings. Hand sweeping and pressure washers are used, and sleek concrete floors with periodic floor drains permit the growers to remove debris from under the benches.

Strict cleanliness standards are employed when dealing with the plants. Boxes of compostable, bio-based gloves sit around on benches for the growers to wear when handling a plant and are changed when moving from plant to plant. Anything that touches the plants is carefully cleaned between uses or is single use.



Ansellia africana and Caroline Stokes, a former Smithsonian horticulturist.



Shade structures.



Greenhouse with shade cloth partially opened.



Intermediate growing area.



Hot growing area overview.

Rigorous cleaning protocols protect the plants from fungal and bacterial pathogens, and especially viruses. Detergents and disinfectants are used to clean tools and display pots, and clean away debris on benches. Surfaces are wiped with disposable towels soaked with a greenhouse disinfectant. Stainless steel tools are autoclaved after cleaning for sterility. Plastic moss is used to disguise the pots when plants are displayed and can be sanitized. Staff use chemical-resistant nitrile gloves when dealing with chemicals.

The plants are positioned on the benches to ensure they are not crowded; acrylic risers elevate plants on the bench. Plastic catering plates protect the plant from contact with the bench as needed, such as when they are moved to a new area.

Plants are inspected weekly to monitor their health and look for possible pathogens. This inspection enables any problems to be caught and treated before spreading throughout the collection. The integrated pest management system involves keeping the plants growing their best so that their natural defenses can prevent pest problems from taking hold. Thrips are considered the most dangerous pest because of their ability to transmit viruses. Special predatory mites that prey on orchid insect pests are released and minimize the use of toxic chemicals. There are also sheets of sticky paper placed periodically on the benches to attract and trap any insects moving about. These are effective not only in trap-

ping the insects so they can do no damage but also in allowing for the definitive identification of the pests.

A key feature that enables staff to give the plants consistent, efficient, tailored care is using multicolored tape placed on the benches. Whole benches can be marked, or specific sections can be taped off to delineate smaller areas to differentiate the care required. Each color has a different meaning. They can designate plants needing to be kept dry, plants isolated because of possible or identified disease, plants earmarked for specific use (such as to be placed in displays), or any other special treatment.

A metal embossed tag secured directly to the plant is the primary label. The label contains the accession number, plant name, sourcing, whether a species or hybrid,



Embossed metal tag that is attached to each plant.



Bulbophyllum fletcherianum and Justin Kondrat.

and the house where it belongs. In addition, there are barcoding tags that enable the growers to access care specifics, health information (including any observed issues or problems), and other details that would be useful regarding culture information. This is a far more efficient and convenient way to provide personalized care to the plants and is proving very successful.

Sporadic colorful flags stick up above the foliage and are used to identify plants being treated for specific pests, such as ants, mealybugs, etc., identifying the specific problems. They have even marked a special section for the plants to be saved first in the event of a catastrophe. Particularly valuable plants receive a reflective red flag in their pot so rescuers can find them readily. These include highly endangered plants, botanically significant plants, or any irreplaceable plants. These measures are invaluable when many people are managing the collection.

All plants in the collection have been virus-tested. Rapid testing is performed against Cymbidium Mosaic Virus and Odontoglossum Ringspot Virus, while some are tested for Tobacco Mosaic Virus, Potyvirus, and Cucumber Mosaic Virus. All newly introduced plants are isolated and tested for viruses. They are tested again after six months and then given final testing after a year, at which point they will be introduced to the general population. All plants are tested for viruses every two years unless there is a suspicion of a problem. Any suspected virus-positive plants will have a tissue sample taken and lab-tested for a definitive diagnosis. If a plant



Laelia anceps, a Mexican species.



Catasetum Graham Wood, a Collection hybrid.



Rhyncattleanthe Smithsonian Sunburst 175th

seems to be growing poorly or produces flowers suggestive of a virus, they are isolated, tested, and monitored. They are deemed clean and returned to the regular bench if they seem stable after two growing cycles or bloomings. Plants are removed from the collection, even if they test negative for a virus, if they fail to flourish under specific care, and if the plant does not have botanical or historical significance.

Another interesting and useful approach to growing the orchid collection is using wheeled coatracks to support hanging baskets with pendulous orchids. They are especially valuable for the species that send their inflorescences down through the pot, such as in the genus *Stanhopea*. They can be easily moved to any location without disrupting the spikes.

Orchids in the Collection

The collection contains plants from a variety of sources. Some were added by private collectors, such as a bench full of different varieties of *Laelia anceps*. Other plants were acquired through trade with botanical gardens to preserve germplasm and expand or fill in collections. Many were purchased from vendors, always aware of the provenance so as not to support poach-

ing in the wild. Some special orchids, jungle-collected by Smithsonian field researchers, have also been preserved in herbaria collections and have special scientific interest to the Institution.

One of the stars of the collection is a gigantic specimen of *Bulbophyllum fletcherianum*, a lithophytic species found in New Guinea, that weighs over 100 pounds. It was acquired in 2015, bearing only three leaves. It is so large now that a special cart was designed to move it, requiring at least four staff members to lift it. It now sits on a specially designed stainless steel plant stand. Horticulturist Justin Kondrat uses it as a dramatic example of how growing success can be achieved by providing proper light, temperature, fertilizer, and water quality. To emphasize the importance of water quality, Justin noted that some species that had not bloomed in many years finally bloomed when they began using rainwater.

As the collection continues to grow and improve, the goal is to focus on species, especially those from Florida, Mexico, and the Caribbean Islands, with an additional emphasis on worldwide endangered species. The collection also maintains a 25% baseline of hybrid orchids. The hybrid collection ensures a steady supply of showy, recognizable orchids for public displays.

The hybrids that recognize national figures or events are of particular interest, such as the FLOTUS orchid hybrids named for the First Ladies of the United States; 15 such orchids are currently being grown in the collection. One is named for Mamie Eisenhower, a huge fan of orchids and rarely seen without a cattleya orchid corsage. She enhanced popular interest in orchids. Another special hybrid orchid in the collection is *Rhyncattleanthe* Smithsonian Sunburst 175th, which was named in honor of the 175th anniversary of the Smithsonian Institution. The color is a vibrant golden yellow chosen to represent and mirror the distinctive sun logo of the Smithsonian Institution.

Having 5,000 plants to maintain presents documentation problems. The growers kept a record book when the collection began in the 1970s. Records were computerized in the early 80s when computers became widely available. This system was used until the 2000s when the records were professionally digitized and completed by 2010, coinciding with the move to the new facility.

The public can view the Smithsonian Gardens orchid collection during the Annual Orchid Exhibit, jointly hosted with the U.S. Botanic Garden, from January to April. There are also smaller pop-up displays available for viewing throughout the year. When traveling to Washington, DC, look on the Smithsonian Institution website for any orchid events to experience this remarkable collection. If traveling is not possible, take advantage of the wonderful photographs of the collection online from the comfort of your easy chair. You won't be disappointed.✿



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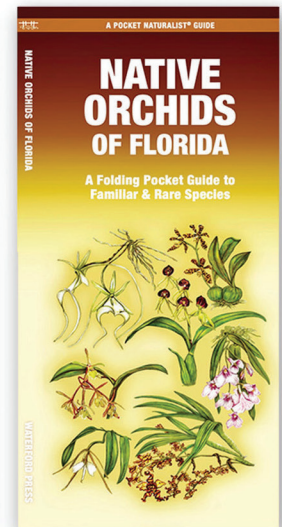
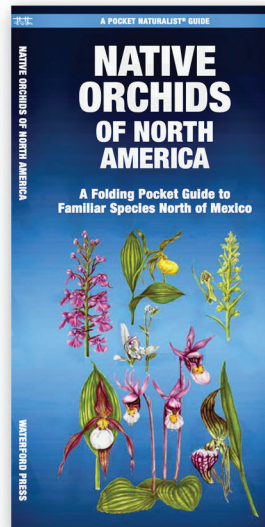
FLOTUS hybrid *Cattleya* Michelle Obama.

About the Author



Cindy Coty is a long-time judge in the American Orchid Society and past regional judging chair of the Pacific South Judging region. Cindy is a member of the *Orchid Digest* Editorial Board and a frequent contributor to the *Orchid Digest*. In real life, Cindy provides business development consulting help to companies in the biotechnology and in vitro diagnostics industries.

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