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# ORCHIDS

THE BULLETIN OF THE AMERICAN ORCHID SOCIETY

VOL. 90 NO. 9 SEPTEMBER 2021





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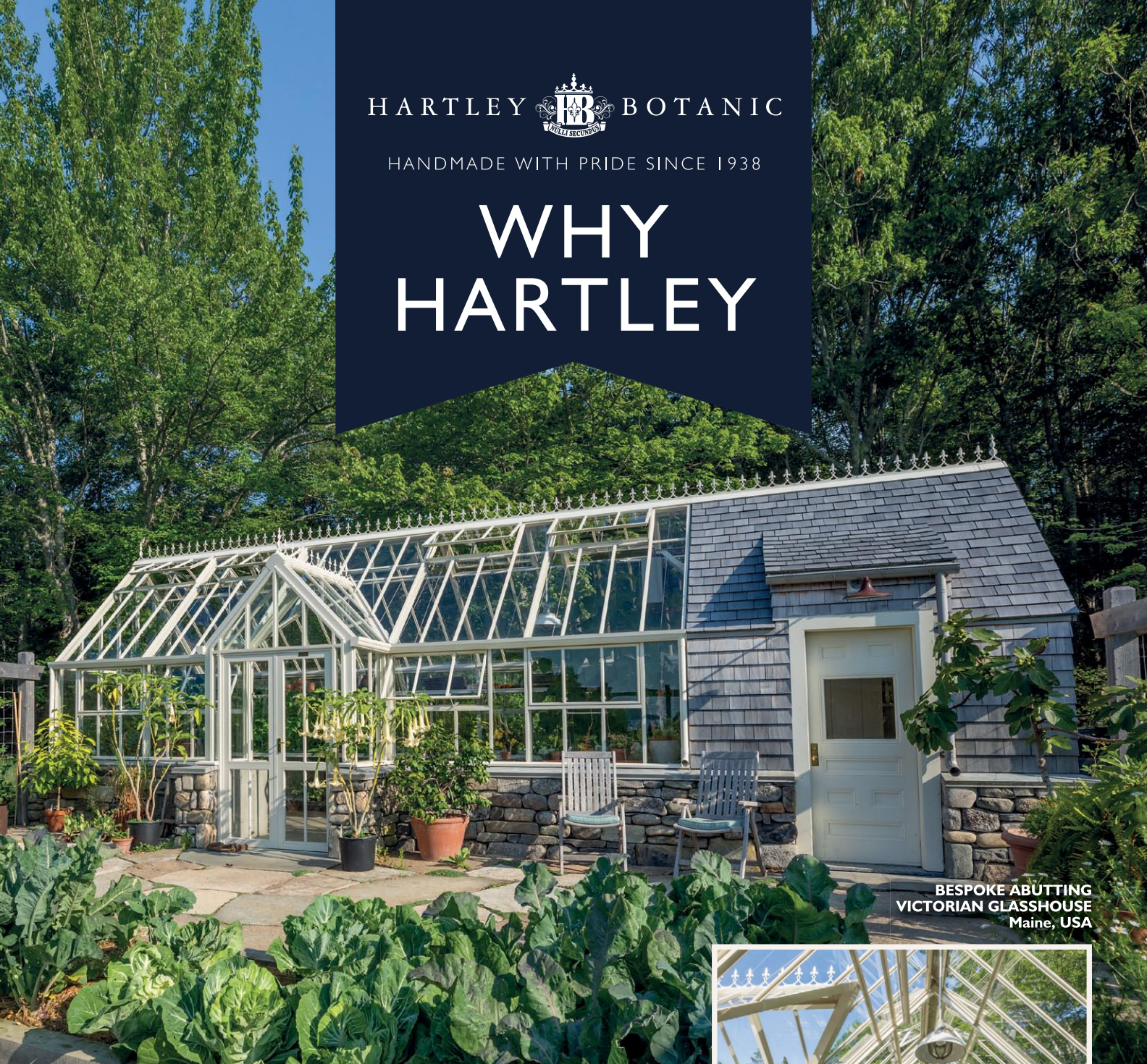
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The Bulletin of the American Orchid Society

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## PRONUNCIATION GUIDE

Pronunciation of orchid names can be daunting for the novice and experienced grower alike. Presented below is a simplified pronunciation guide specific to the names found in this issue of *Orchids* magazine. An attempt has been made to represent each syllable using easily recognized sounds or words separated by hyphens and not standard phonetic symbols. Check out the Orchidist's Glossary on our website at <https://www.aos.org/orchids/orchidists-glossary.aspx>.

<i>acmodontum</i> (ak-moh-DON-tum)	<i>lanceolata</i> (lan-see-oh-LAY-ta)	<i>sphacelatum</i> (sfeh-seh-LAY-tum)
<i>Aerangis</i> (ay-er-ANG-iss)	<i>lankesteriana</i> (lan-kes-ter-ee-AY-na)	<i>spicerianum</i> (spy-ser-ee-AY-num)
<i>Aganisia</i> (ag-an-EE-see-a)	<i>laxa</i> (LAKS-a)	<i>Spiranthes</i> (spy-RAN-theez)
<i>albertinae</i> (al-ber-TEE-nee)	<i>lendyana</i> (len-dee-AY-na)	<i>Stenotyla</i> (sten-oh-TYE-la)
<i>Anoectochilus</i> (an-ek-toh-KYE-luss)	<i>Lepanthes</i> (leh-PAN-theez)	<i>suavis</i> (SWAH-viss)
<i>aureum</i> (AW-ree-um)	<i>lindleyanus</i> (lin-lee-AY-nus)	<i>sukhakulii</i> (soo-kah-KOO-lee-eye)
<i>barbatum</i> (bar-BAY-tum)	<i>Lophiaris</i> (loh-fee-AIR-iss)	<i>Talpinaria</i> (tall-pin-AIR-ee-a)
<i>barbigerum</i> (bar-BIJ-er-um)	<i>malipoense</i> (mal-ee-poh-EN-see)	<i>tortilis</i> (tore-TEE-liss)
<i>Batemannia</i> (bate-MAN-ee-a)	<i>marginata</i> (mar-gin-AY-ta)	<i> trianae</i> (TREE-an-ee)
<i>bellatulum</i> (bell-LA-tew-lum)	<i>Masonara</i> (may-son-ARE-a)	<i>tricarunculata</i> (try-kar-unk-yew-LAY-ta)
<i>Benzingia</i> (ben-ZING-ee-a)	<i>micranthum</i> (mye-KRAN-thum)	<i>Trichocentrum</i> (trik-oh-SEN-trum)
<i>bivalvis</i> (bye-VAL-vis)	<i>monteverdensis</i> (mon-teh-verd-EN-sis)	<i>Trichopilia</i> (trik-oh-PEE-lee-a)
<i>Brachypetalum</i> (brak-ee-PET-a-lum)	<i>Nanodes</i> (nan-OH-deez)	Trochilidae (troh-KILL-ih-dee)
<i>brevis</i> (BREV-iss)	<i>Nasua</i> (NAY-soo-a)	<i>turalbae</i> (tour-ee-AL-bee)
<i>caloglossa</i> (kal-oh-GLOSS-sa)	<i>Nasuella</i> (nay-soo-ELL-la)	<i>Vanda</i> (VAN-da)
<i>canhii</i> (KAN-ee-eye)	<i>Neolehmannia</i> (nee-oh-lay-MAN-ee-a)	<i>Vanilla</i> (van-ILL-la)
<i>carthagenense</i> (car-ta-hane-YEN-see)	<i>niveum</i> (NEE-vee-um)	<i>villosum</i> (vill-LOH-sum)
<i>Cattleya</i> (KAT-lee-a)	<i>notonianum</i> (noh-ton-ee-AY-num)	<i>Warszewiczella</i> (war-shuh-vitz-ee-ELL-la)
<i>Chaubardiella</i> (shaw-bard-ee-ELL-la)	<i>Odontoglossum</i> (oh-don-toh-GLOSS-sum)	<i>Zygomum</i> (ZYE-goh-lum)
<i>Chondrorhyncha</i> (kon-droh-RINK-a)	<i>oicophylax</i> (oy-koh-FYE-laks)	<i>Zygonisia</i> (zye-goh-NEE-see-a)
<i>coccinea</i> (kok-SIN-ee-ah)	<i>Oncidiinae</i> (on-sih-DEE-ih-nee)	Zygopetalinae (zye-goh-pet-a-LEE-nee)
<i>Cochleanthes</i> (koke-lee-AN-theez)	<i>Oncidium</i> (on-SID-ee-um)	<i>Zygopetalum</i> (zye-goh-PET-a-lum)
<i>Comparettia</i> (kom-par-ET-tee-a)	<i>Otostylis</i> (oh-toh-STYE-liss)	<i>Zygosepalum</i> (zye-goh-SEEP-a-lum)
<i>Coryanthes</i> (kore-ee-AN-theez)	<i>Pabanisia</i> (pab-an-EE-see-a)	
<i>cribbii</i> (KRIB-ee-eye)	<i>Pabstia</i> (PAB-stee-a)	
<i>cryptocera</i> (krip-toh-SAIR-a)	<i>Paphiopedilum</i> (paff-ee-oh-PED-ih-lum)	
<i>Cyclopogon</i> (sy-eh-kloh-POH-gon)	<i>Parvisepalum</i> (par-vee-SEEP-a-lum)	
Cymbidieae (sim-BID-ee-ee)	<i>pedunculata</i> (pee-dunk-yew-LAY-ta)	
<i>Cymbidium</i> (sim-BID-ee-um)	<i>peschutteri</i> (peh-SHOOT-ter-ee)	
<i>Daiotyla</i> (dye-oh-TYE-la)	<i>Phalaenopsis</i> (fail-en-OP-sis)	
<i>delenatii</i> (del-en-AT-ee-eye)	<i>picta</i> (PIK-ta)	
<i>delicatum</i> (del-ih-KAY-tum)	<i>planifolia</i> (plan-ih-FOLL-ee-a)	
<i>Dendrobium</i> (den-DROH-bee-um)	<i>Pleurothallis</i> (plur-oh-THAL-liss)	
<i>discolor</i> (DIS-kul-ur)	<i>Polyantha</i> (pol-ee-AN-tha)	
<i>ehrenbergii</i> (err-en-BERG-ee-eye)	<i>Procnias</i> (PROK-nee-as)	
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<i>falx-bellica</i> (falks-BELL-ih-ka)	<i>punctata</i> (punk-TAY-ta)	
<i>fragrans</i> (FRAY-grans)	<i>punicea</i> (pun-ik-ee-a)	
<i>Guarianthe</i> (gwar-ee-AN-thee)	<i>Rhynchoglossum</i> (rink-oh-GLOSS-sum)	
<i>Helcia</i> (HELL-see-a)	<i>Rhyncholaeliocattleya</i> (rink-oh-lay-lee-oh-KAT-lee-a)	
<i>helenae</i> (HELL-en-ee)	<i>Rhynchopera</i> (rink-oh-PER-a)	
<i>hennisiana</i> (hen-niss-ee-AY-na)	<i>Rhynchostele</i> (rink-oh-STEE-lee)	
<i>Hirtzia</i> (HERTZ-ee-a)	<i>roxburghii</i> (roks-BERG-ee-eye)	
<i>Huntleya</i> (HUNT-lee-a)	<i>rungsuriyanum</i> (rung-suh-reh-YAY-num)	
<i>lanclarkara</i> (ee-an-KLARK-are-a)	<i>Sacoila</i> (sah-KOY-la)	
<i>Insigne</i> (in-SIG-nee)	<i>Sanguinolenta</i> (san-gwin-oh-LEN-ta)	
<i>Ionopsis</i> (eye-on-OP-sis)	<i>Sigmatopetalum</i> (sig-mat-oh-PET-a-lum)	
<i>Kefersteinia</i> (kef-fer-STYE-nee-a)	<i>skinneri</i> (SKIN-ner-eye)	
<i>Klugia</i> (KLOO-gee-a)		



## *Gifts of Note*

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# Webinars-Coming Attractions!



When	September 02, 2021 8:30pm EDT Thursday	September 16, 2021 8:30pm EDT Thursday	October 05, 2021 8:30pm EDT Tuesday	October 21, 2021 8:30pm EDT Thursday
Topic	Greenhouse Chat (Orchid Q&A) <i>Send in your Questions!</i>	Sarcochilus Australian Miniatures	Greenhouse Chat (Orchid Q&A) <i>Send in your Questions!</i>	Black Orchids The Lure, The Lust and Licentiousness
Presenter	Ron McHatton Chief Education and Science Officer	Jean Allen-Ikeson JC National Education Coordinator, AOS Editorial Board Chair	Ron McHatton Chief Education and Science Officer	Dr. Leslie Ee, ND Associate Judge, President of COC

**REGISTRATION REQUIRED:** <http://www.aos.org/orchids/webinars.aspx>

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## Vegetable Starter Trays for Orchid Seedlings

I USE SEEDLING starter trays with humidity domes in the fall and spring for my vegetables. It did not occur to me to use them in the greenhouse for my orchids but when I deflasked my first orchid seedlings a couple of months ago, I needed a place, protected from the elements, to put the fragile seedlings. I keep a small amount of water in the tray and the humidity dome on top with both vents open. It sits on a shelf in my Arizona greenhouse in the southeast corner. After the first month, my seedlings doubled in size (the seedlings are pictured in the larger containers). So, I decided to move a few of my more fragile orchid divisions into the tray to see if I could encourage strength and growth. After another month, I noticed new growth and better color on the leaves (the divisions are pictured in the smaller pots).

I feed them every other week with MSU high-potassium fertilizer. Once a week, I leave the lid off for several hours just to increase the airflow and prevent mold or fungi from growing. If you grow indoors, this would be a great place



for orchids needing higher humidity or those that are more fragile. We often get small divisions or purchase orchids in 2-inch (5-cm) pots because they are cheaper. This tray and dome will keep them protected as they grow. It fits well under a counter and you can even mount a grow light under the counter if you are growing in a more shaded environment. These seedling starter trays with humidity domes cost under \$10. Be sure to get the heavy weight tray so that it will not collapse when moved.

— Cindy Jepsen (email: [cindyjepsen@cox.net](mailto:cindyjepsen@cox.net)).

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## PRESIDENT'S MESSAGE

THE EXCITEMENT OVER the upcoming Centennial Celebration of the 100th anniversary of the American Orchid Society is reaching a fever pitch! With just one month to go, all of the committees are working hard to make sure everything is perfect for the most amazing week in the history of the AOS. Rest assured, we are monitoring the Covid-19 situation and following the CDC guidelines to ensure the safety of the guests. This is not a problem for the vaccinated, so I urge all of you who have not been vaccinated, to get your vaccination as soon as possible.

Over the past few months, you have heard about the many events that will take place during the days before the Centennial Gala and about the gala itself. None of this would be possible without the amazing support team volunteering their time and talents to make this the very best AOS Members' Meeting of all time. I feel that this year is even more meaningful given the events of the past year. This 100th anniversary celebration will be the first in-person meeting in two years. I have spoken to many AOS members who want to get their lives back to normal and this will be a big step in that direction. I am very much looking forward to this celebration.

Beginning on day one of the meeting, the hospitality committee, headed by Bonnie Riley, will be there to welcome you to the meeting. The members of her team, Joan Connors, Deb Bodei, Valerie Smith, John Storch, Tere Camacho, Naya Marcano, Sandra Kurzban and Daniella Estrada are rolling out the red carpet for all registrants of the meeting. You will receive your welcome package in a beautiful reusable gift bag that will include all sorts of gift items to use during your visit here in South Florida or to take back and use in your gardens. A schedule of the events with dates, times and location will be included, and all of this will start with a meet-and-greet from 5–6 pm, for registrants only. The hospitality committee will be at all the events and available to answer any of your questions.

Ron McHatton and Jean Allen-Ikeson are producing a booklet about the history of the AOS that will be included in the welcome package for all registrants and at each place setting for the guests at the Gala celebration.

The morning of October 28, from 9 am to noon, the committee meetings will be held at the Biltmore. The Hospitality Committee will also be in charge of transporting judges and guests to the



East Everglades Orchid Society show on Thursday, October 28. Judges and guests will be picked up at noon and a box lunch will be provided during the trip. After the judging ends, the bus will return at 5 pm to take everyone back to the Biltmore Hotel. In the evening, at 8 pm, there will be a Judges' Forum. All of this information will be in the event booklet.

A member of the Hospitality Committee will attend most events.

The AOS Board of Trustees will be meeting on Friday, October 29, from 9 am to noon. During the Members' Meeting on the 29th, from 2–4 pm, we will present some videos of past AOS Members' Meetings to show how far the AOS has come. The Archives and Publication, Video Presentation Committee is run by Alex Rodriguez and his crew. You can only imagine the number of hours they have worked to put together a video. Many of us do not realize how much work goes into a 10-minute presentation. They must look at every photo, select the best ones, put them in order and add music. It sounds easy, but it is not. It is a lot of work. We are truly blessed to have Alex and his creative talents spearheading this amazing work.

It is time for the Auction Committee to step into the limelight. One hundred years of the American Orchid Society can bring a mind-staggering number of collectibles. This year will prove that. Chris Morales, chair of the Auction Committee, is joined by Judy Mezey, Tim Brooks, Marian Sheehan and Jennifer Reinoso, to bring us a treasure trove of items for the auction. Each piece was carefully selected, photographed by Tom Kuligowski, an AOS photographer, and cataloged for the event. The *pièce de résistance* of the auction may very well be the original watercolor by Angela Mirro she painted for the centennial poster, but there will be many, many items on which to bid. There will be numerous award-



Photographs courtesy of the Biltmore Hotel, Coral Gables, Florida

winning plants donated by some of our wonderful commercial firms who have always supported the AOS.

Speaking of the centennial poster, 150 signed and numbered posters were made available for purchase by the Fundraising Committee as part of their work. The Chair of the Fundraising Committee is Cheryl Erins and with the help of her team and Bill Bodei, they have come up with some very innovative ideas to bring more revenue to the Celebration. All 150 signed and numbered posters, as I mentioned earlier, sold in two days! Other items made available include wine glasses etched with the AOS logo and most recently, AOS polo shirts that come in men's and women's sizes and are available in four different colors. The members of this committee make up a think tank that would rival any mega-corporation! Thanks to their efforts, the AOS will be able to do more for conservation.

On Saturday morning, October 30, the lecture series begins. Dr. Will Riley will be coordinating the speakers for the day which include, in no particular order, Michael Tibbs, Larry Zettler, Roger

Hammer, Dennis Whigham and Tom Mirenda. Without fail, AOS speakers always teach us something we did not know about the orchid world. With the proceeds of the Celebration going toward orchid conservation, the speakers will be engaging the listeners about different aspects of orchid conservation and Orchids of the Americas, the theme of this Centennial.

The American Orchid Society is all about orchids. These plants, discovered centuries ago, have captivated the world ever since. That being said, we cannot have an AOS Centennial Celebration Gala without flowers. This is where the Gala Flower Committee enters the picture. Michael Coronado, Michael Tibbs, Carol DeBiase, Vicki Hallock, Alexandria Mianma, Javier Rios and Bayron Pineda make up this amazing committee. They will be working with flowers from all over the world to make those amazing centerpieces and arrangements that will take your breath away.

An organization such as the American Orchid Society, recognized worldwide, has a support network of members and crusaders to help us get our message across. This global society is fortunate to have regional liaisons all over the world so folks in those regions can reach out with questions or concerns. The following

is a list of those liaisons and I am grateful for the work they do for the AOS:

- George Hatfield – Southwest US
- Carol Zoltowski – Northwest US
- Cheryl Erins – Midwest US
- Jeanne Hollebne – Canada
- Karen Armstrong – Mid-South US
- Nancy Mountford – Northeast US
- Lowell Jacks – Southeast US
- Carlos Fighetti – Caribbean
- Silvia Palmieri – Central America
- Norman Fang – Asia
- Michael Tibbs – Europe, Africa
- Juan Felipe Posada – South America

I cannot thank all these people enough for everything they are doing for the AOS and the Centennial Celebration. Each and every committee is a powerhouse. These folks are focused and driven to make the 100th anniversary of the American Orchid Society the best for you and for the AOS.

Time is quickly running out. If you have not registered for the Members' Meeting or for the Gala Celebration, do it now. Go to [www.aos.org](http://www.aos.org), and register today. As I have mentioned in the past, many of the events have limited seating. Trust me, you will not want to miss a thing!

See you at the Biltmore! — *Bob Fuchs, AOS President (email: bob@rforchids.com).*

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# September: The Month of Transition

By Thomas Miranda

WHILE I DO not exactly know precisely when I became addicted to orchids, I do know it has been a really long time — decades certainly. You would think after all the thousands of hours spent repotting, fertilizing and watering, not to mention all the hiking boots and sweat socks ruined slogging down muddy rainforest trails and bogs in search of them, that orchids would have lost some of their magic by now. Certainly some enthusiasts burn out, or get bored or overwhelmed, either by orchids themselves or by life's vicissitudes, and give up. Even so, once bitten by orchids, most of us end up with a lifelong fascination and love affair



Thomas Miranda

with them. Even larger than the orchidists' hobby, is that of birders. Astonishing numbers of people go out on treks to see birds all over the world and keep extensive life lists, "collections" of sightings, if you will, to the point of obsession. I have often wondered why this is. Even though there are fewer orchidists than birders, some of the same reasoning applies to us. There is the joy of collecting, the beauty and colors of our respective subjects, the excitement of exploration and discovery, the science and mystery of their forms and habits, and the camaraderie of like-minded individuals as well as that bit of friendly competition involved in growing and showing them. There is one more factor that may make you laugh, but I think is part of the fun and appeal of orchids: the "unicorn effect." Birders talk about this as well. Seeing an orchid for the first time in the wild, or blooming a newly acquired orchid that you have only seen in a book, is a bit similar to seeing a celebrity on the street. So it is for me every time a new orchid blooms in my presence. It is as if some mythological creature I recognize from a storybook or movie has suddenly appeared on a remote trail or in my greenhouse or on my windowsill and allowed me to hold it and admire it up close and personal. Orchids are definitely the celebrities of the plant world — they bring a little of their magic into our world every day. Their presence in my life thrills me.

**SUMMER BLOCKBUSTERS** A long

hot summer has finally ended and cooler temperatures are starting to prevail. Whether your orchids summered outside or in, the return of cool nights triggers many orchids to initiate flower spikes. The summer heat, particularly hot nights, can be stressful for many intermediate-growing species and hybrids. Often plants that may have stopped growing in July and August will now resume as temperatures begin to replicate those of their montane habitats. Look at plants carefully now for new tender emerging spikes and renewed root growth.

**THE CONCESSION STAND** No, do not give your orchids hot buttered popcorn and gigantic sodas. But they do want nutrients this month, so do not forget to fertilize them just because it has gotten cooler. If you have young plants that are not old enough to bloom, you can still fertilize with a higher nitrogen formula and let them continue to grow vegetatively. However, if your plants are blooming size, you may want to get away from high nitrogen formulas at this time or you could inhibit blooming on cymbidiums, dendrobiums and phalaenopsis, which should be forming spikes soon as the long nights increase and the nighttime temperatures drop.

**GOTTA WEAR SHADES** Orchids continue to need shade as protection from the hot and sunny days that are still likely to occur this month. Do not be lulled into thinking that direct sun will not harm your plants. Even though the effects of high light are lessened when temperatures are cooler, there is still potential for plants to burn. Careful attention must be paid during this transition period. Weather becomes less stable and predictable. It is even possible that some cold or violent weather can appear. So, it is always best to be prepared for this eventuality.

**BACK IN THE MANSION** Orchids have been summering outside and now is the time to begin prepping the indoor growing area for their return. Whether it is a greenhouse, a windowsill, a light room or a terrarium, a little preplanning cleaning, sterilizing and organizing will allow for carefree transitions of the plants as the cold season approaches. It is also advisable to check the plants for hitchhikers such as weeds, insects and parasites. You want a "star pad" for your



*Cattleya Fredis J. Refunjol 'Paris' HCC/AOS (harpophylla × tigrina); exhibitor: Lindsey Paris; photographer: Wes Newton.*

orchids, not for oxalis or mealybugs. Take some time to individually go through those plants outside and find and treat any critters that may be thinking they are part of the entourage. Expel them now before they move in and take over.

**PAPARAZZI** With the blooming season about to resume, you should make sure cameras are ready for what will likely be an excellent set of blooms on your collection, for your newer plants, the approaching blooms are anticipated as much as long-awaited film premiers and their red-carpet moments. This is also a chance to document your successes and failures. Keep a notebook of your orchids each year. It is fun to see how they progress, especially if you have raised them from baby plants into spectacular or hulking specimens. It is almost like following your favorite stars from early independent films to wildly successful Hollywood blockbusters. Yes, you knew them "when." But you have the added joy of knowing you helped them get where they are today.

— Tom Miranda has been working professionally with orchids for over three decades and is the past chair of the AOS Conservation Committee. He is an AOS accredited judge in the Hawaii Center (email: biophilak@gmail.com).



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## QUESTIONS AND ANSWERS

### PREPARING TO MOVE INDOORS

#### QUESTION

What do you need to do when bringing in orchids for the fall?

#### ANSWER

First watch your weather. When your preparations need to start will depend on where you live. The farther north (and in traditionally cold areas), the earlier you need to begin preparing. For example, in the central Midwest, the latter two weeks of August is not too early. Focus first on the warmer growing plants — in some areas they may need to be in by Labor Day in a colder year; mid-September in warmer years.

At least two weeks before you start bringing plants in, start pest control projects. This includes spraying with a fungicide and an insecticide. If you start early enough or the weather remains warm long enough, two applications about a week apart of one insecticide and then another two sprayings a week apart of a second will afford better control for the winter months, but at a minimum, two weeks out from your target bring-in date, spray and then about a week later, repeat the spraying of all outside plants with a second product. For instance, you might spray first with Orthene and follow with an imidacloprid product for the second spraying — just remember that Orthene has a powerful smell that lingers. Also, do not forget that which lurks below the potting mix. You do not want to provide a warm home for slugs and snails so this is also the time for a final application of molluscicide.

Now the warm growing orchids are ready to bring in. Inspect every plant for pest damage (and living pests). Remove all litter accumulated in the pots or baskets, trim off any damaged leaves, check for slugs (yes again), and make sure all drainage holes in the bottom of the pot are open. Now is also the time to check new leads or developing inflorescences. It is an easy time to fix little problems such as inflorescences caught in leaf axils rather than waiting until they have become rigid and badly twisted. I know this is hard to do but now is also the time to dispose of those plants you put out last spring hoping they would improve and have not. They take up valuable space and will not likely get any better given another winter

indoors. Do yourself a favor and, as you bring plants in, organize your inside space so plants that need similar watering cycles are grouped together. Easier now than after everything is crammed in. If you are like the rest of us — no willpower — the collection has grown during its summer sabbatical so there will not be a lot of space left once it is all in.

Once the warm growers are comfortably in, time to start on the intermediate growers. These are the plants that come in when the nights are regularly hitting the low 50s F (10–12.8 C) — mid-40s F (7.2–10 C) if you are brave. If you sprayed everything before the warm growers came in, the intermediate growers will only need inspection, cleaning up and organizing. Last to come in are the cool growers. For these plants, you need to closely monitor weather changes. Many of these plants need decidedly cool nights to flower well (cool-growing cymbidiums especially) but they can freeze. When you start seeing forecasts of nights in the upper 30s F (3–4 C), everything should be in. The temperature of surfaces when dew suddenly forms can be several degrees colder than the ambient air temperature (think frost on rooftops and grass even though the air temperature is still 36 F [2.2 C]). Do not flirt with a freeze.

#### HOW LONG IS LONG ENOUGH?



#### QUESTION

How long of an isolation period is long enough?

#### ANSWER

The short answer is it can take a long period of isolation to keep your collection protected from new plant introductions. I personally believe that it is important to treat ALL new plants as if they are infested with EVERYTHING, even if the plant shows no visible insects. Take for example the plant in the first picture. This plant came,



in flower, from a local grocery store and was produced by a well-known wholesale supplier. It was kept indoors, in complete isolation from the rest of my collection for over three months. The mealybugs (second photograph) began to appear two to three months after purchase. Obviously, isolation for a couple of weeks wouldn't have been enough. If you have to mix new plants with your existing collection, be prepared to treat those new plants.

Also, keep in mind that topical treatments (alcohol, soap, malathion, etc.) DO NOT eliminate mealybugs and scale that are feeding on the roots. Insects on the roots of epiphytes are quite common. If you have scale and mealybugs on your leaves, you have to assume they are also on the roots.

If you have ever dealt with scale and mealybugs, you know it is not easy to get rid of them. My personal go-to process stretches out six weeks involving two applications each of three different insecticides and it is covered in a number of our recorded webinars.

Be diligent and look at your plants frequently. Good observation goes a long way toward good protection.

#### VIRUS

#### QUESTION

I have had this orchid for over a decade and this is the first year that I have seen this problem with the flowers. Could this be a virused plant?

---

These questions were part of one or more recent monthly webinar Q&As and compiled by Larry Sexton for inclusion here. Each month, a Q&A webinar is held during the first two weeks of the month. To view recorded Greenhouse Chats (Q&A webinars) or register for a future one, see <https://www.aos.org/orchids/webinars.aspx>. Send questions to [greenhousechat@aos.org](mailto:greenhousechat@aos.org) — Ron McHatton, AOS Chief Education and Science Officer.



ANSWER

Color expression in the petals of some cattleyas is not always an indication of virus infection. In some cases heat or cold stress can dramatically affect the appearance of flowers as can pesticide application at the right time. For instance, *Cattleya trianae* 'Jungle Feather' JC/AOS (lower photograph courtesy of Monroe Kokin) is a wild-collected plant whose petals express the color pattern reminiscent of the lip and the plant is not virused. The extent of the liplike markings appears to be temperature dependent; plants grown warm may show very little and those kept under cooler conditions much more patterning. But note how regular that color patterning is.



Unfortunately, what you have here (upper photograph) is likely the result of a virus. Your flowers show major color irregularities (not just patterning reminiscent of the pattern in the lip) in *both* the sepals and petals, as well as in the lip if you look closely. Coupled with those questionable brown streaks and spots on the foliage are all suggestive of virus infection. I would test this plant for the common viruses, but keep in mind

that these tests do not pick up all virus families. If it tests positive, you have a definitive answer. If the test is inconclusive or negative, mark the tag with the date of the virus test and continue to monitor it. Most viruses eventually weaken the plant and they go downhill over a period of time. If this happens you can retest and make the decision as to whether or not to toss it.

Yellow Sticky Cards for Bush Snails

Plagued by those tiny pesky snails that are nearly impossible to eradicate?

Here's a little trick I learned a few years ago:

cut a piece of the yellow sticky cards sold in agricultural supply houses for trapping small flying insects and insert it into the pot. Wait a couple of days. If you have bush snails they will be attracted to the card and get stuck. You will not get them all but you will get an amazing number of them.

— Sara Johnson

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# Annual Seminars Useful for AOS Judges

By Jean Allen-Ikeson

EDUCATION IS NOT just for students or associate judges — the Handbook on Judging states that education is a *life-long* endeavor for all judges. American Orchid Society judges are required to attend a *minimum* of 12 hours of education a year. Many centers accomplish this within the center; others do not. Either way, the following list is a useful way to enrich your knowledge. Perhaps you are traveling on business or to visit relatives or just on vacation. Here is a way to expand your knowledge in addition to watching AOS Webinars, some of which have a judging content. As far as I know, all these following seminars are open to the public, not just judges, and some are not solely about judging topics, but may include culture. Some seminars are free; others have a modest fee.

During the pandemic, some of the seminars on this list have become virtual. For example, the Great Lakes Judging Center produced an outstanding speakers' weekend virtually on slipper orchids in June. More than 145 people registered for it.

Note: The quality of speakers *in terms of usefulness for judging education* may vary from year to year for these seminars. Some may be more culture oriented. For judging education credit, a talk should have content that supports judging education. Contact each sponsor directly. This list is meant to make you aware of educational possibilities. If there are any that are missed, please contact jean.ikeson@gmail.com

## JANUARY

– **Paphiopedilum Guild.** Sponsored by Orchid Digest. Usually held in California. <https://sites.google.com/site/paphiopedilumguild/>

– **Paph Forum. (Or February)** Sponsored by National Capital Judging Center. National Arboretum, Washington, DC. Includes AOS judging. [www.ncos.us/paph-forum/](http://www.ncos.us/paph-forum/)

## FEBRUARY

– **Tri-center Judges Seminar.** Sponsored by Houston JC, Louisiana JC and Dallas JC. Includes AOS Judging. Dates and locations vary from year to year as the three centers take turns hosting it. For contacts at these centers, see <https://www.aos.org/orchid-awards-judging/aos-judging-centers.aspx>

## MARCH/APRIL

### MAY/JUNE

– **Great Lakes Judging Center.** Third weekend in June. Small fee includes Saturday evening meal. AOS judging Saturday afternoon followed by talks and an auction in the evening and talks continue Sunday morning. Out-of-town and local speakers, two vendors. For information, see <http://www.gljc.org/> and Facebook.

### JULY

– **Cattleya Symposium.** Late July or early August. Speakers (four or more), vendors, auction. Fee plus pizza party. Sponsored by Odom's Orchids in Florida: <https://odoms.com>

## AUGUST

– **International Phalaenopsis Alliance.** Usually held in July or August. Includes AOS judging, speakers and vendors. [www.phal.org](http://www.phal.org)

## SEPTEMBER, OCTOBER

– **International Speaker's Day.** Sponsored by Orchid Digest. Fee.

[Orchiddigest.org](http://Orchiddigest.org) NOTE: *These are occurring in additional months — check the website frequently.*

## NOVEMBER

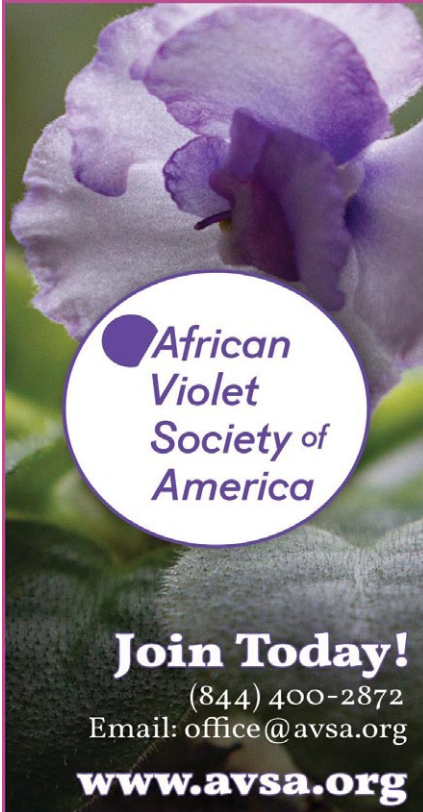
– **First International Vanda & Slipper Symposium.** Hosted by Krull-Smith Orchids, Apopka, FL. Two days. Includes vendors, AOS judging. <https://www.slippersymposium.com/>

## DECEMBER

– **International Phalaenopsis Alliance Seminars and Regional Phal Days.** Dates vary. Speakers, vendors, may have AOS judging in conjunction with host center or orchid society. Separate event held in the summer in Apopka, FL. [phal.org/symposium.htm](http://phal.org/symposium.htm)

– **Mid-America Orchid Congress.** Dates vary; various locations. AOS judging, speakers. [midamericanorchids.org](http://midamericanorchids.org).

– **All-State (Michigan) Orchid Societies Annual Conference.** Dates vary. Speakers. <https://www.miorchidsociety.com/events>



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COLLECTOR'S ITEM

# *Epidendrum porpax* Rchb. f. 1885

A “must have” miniature orchid

By Judith Rapacz-Hasler



*Epidendrum porpax* grown by Dora Gerhard and photographed by the author. The species is found from Mexico to northern Venezuela and Bolivia. Over the years, several attempts have been made to reclassify this group so you may find this little jewel called *Nanodes porpax* or *Neolehmannia porpax* as well.



## RAPACZ-HASLER

*EPIDENDRUM PORPAX* IS native from Mexico through northern Venezuela, Colombia and Bolivia, growing in pine and oak forests at altitudes of 1,970–8,860 feet (600–2,700 m) as a dwarf, epiphytic, warm-to-cold growing orchid, which forms large mats of clustered, leafy stems carrying coriaceous-fleshy, distichous, oblong, obtuse or emarginate leaves and can bloom at any time with large, one-to-a-few flowers on a terminal inflorescence emerging from between the apical leaves and subtended by bracts. The flowers appear like bees or flies. These plants can become very nice specimens over time and will flower twice per year, with the flowers lasting for a couple of months or more. Mist when the mount on which it is growing is just dry.

*Epidendrum porpax* is a fairly tolerant easy-going orchid; however, this miniature orchid species favors intermediate-to-warm temperatures, with bright, filtered, diffused light, and high humidity. *Epidendrum porpax* enjoys a slightly drier winter period in its native environment, so for best results reduce the dose of water you apply to your plants during the winter to ensure that your plants have dried out somewhat by nightfall.

*Epidendrum porpax* can be grown mounted on cork bark or grown on tree fern so it can then grow out and over the edge of the mount. It makes an impressive display when blooming.

Alternatively, it can be grown in a suspended pot with a coarse mix to allow the roots to get air. This species has no pseudobulbs; instead, the growths are stem-like reaching up to 3 inches (8 cm) long with a series of alternating, succulent leaves suffused with purple if given bright light.

The ideal summer temperatures are 75–77 F, maximum 79 F (24–25, maximum 26 C) during the day and 64–66 F (18–19 C) at night; during the winter 72–75 F (22–24 C) during the day and 57–61 F (14–16 C) at night is adequate. This species loves high humidity, especially if it is grown bare root: in this case it must be at least 75%, ideally 80–85% at all times. If the plant is potted, 65–70% is adequate.

During the growing period (March to November) watering must be frequent, as soon as the substrate has dried well but before it has become completely dry.

From March to November, plants can be fertilized every three days watering with one-third the dose indicated on the bottle of a special liquid fertilizer for orchids. Before fertilizing, it is important to water to avoid the harmful effect of

the fertilizer on the dry roots. During the winter months less fertilizer is required, one-eighth to one-tenth the labeled dose, one to two times a month will be fine.

From December to February, watering is replaced with a daily misting of the stems and the upper part of the substrate. Misting should be done early in the day to allow the plant to dry before evening.

— *Judith Rapacz-Hasler is a member of the AOS editorial board, spending half the year on Florida's west coast and the remainder in Europe (email: jorapacz@wisc.edu).*

CORRECTION TO THE COLLECTOR'S ITEM FEATURED IN THE AUGUST, 2021 *Orchids* ISSUE:

The plant featured, *Aerangis punctata*, and the photographs were inadvertently attributed to the author, Judith Rapacz-Hasler. The photograph was taken by Ms. Rapacz-Hasler but the plant was grown by Dora Gerhard. We regret this unfortunate error. — *Ron McHatton*

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GENUS OF THE MONTH

*Trichopilia* by Thomas Mirenda





I AM SUCH a lucky dude. Blessed with having a brother who settled in Costa Rica many decades ago, with a lovely home and beautiful family, I have had many opportunities to travel there and explore this beautiful, orchid-rich nation. On most trips I make it a point to visit the incredible orchid garden and collection at Jardín Botánico Lankester and I am never disappointed by what I find growing there. The amazing Orchid Garden at Bosque de Paz is another orchid destination one should not miss on any trip to this lush and diverse Central American country. Indeed, orchid gardens are among the most alluring of attractions to ecotourists visiting Costa Rica and they are springing up all over. And their native species are truly exceptional. Although I have not been able to go since Covid-19 molested our world and our plans, I still have, vivid in my memory, some gorgeous Mesoamerican orchid species that everyone should be growing. At the various beloved orchid shows that occur seasonally and frequently you will find massive specimens of well-known species such as “Guaria Morada” (*Guarianthe* [*Cattleya*] *skinneri*) and massive examples of “Lluvia d’oro” (“Showers of gold”; *Oncidium sphacelatum* and related species). Nestled among these huge showy specimens, however, are outstanding species of more modest dimensions that the average showgoer will just pass by. Among the most thrilling once noticed, is the spectacular *Trichopilia suavis*. I had forgotten just how beautiful and colorful these flowers could be. A denizen of middle elevation (3,280–5,580 feet [1,000–1,700 m]) mossy oak forests in Costa Rica, *Trpla. suavis* grows easily in the intermediate house (72–80 F [22–27 C] days; 55–65 F [13–18 C] nights), but for me has been a somewhat shy bloomer. I discovered that its natural habitat has an extensive dry period from December to April. After giving it more of a winter rest (i.e., less water and fertilizer starting in late fall) I found the key to making it bloom well.

While *Trpla. suavis* may be the most colorful species, many other *Trichopilia* species have been quite exciting and floriferous, including *Trichopilia tortilis*, with its unusual twisted, broadly spreading sepals and petals framing a tubular cattleya-like labellum. *Trichopilia fragrans* boasts large white flowers with a yellow tube and the fragrance of sweet almonds. Among the most visually striking species are *Trichopilia marginata* (*coccinea*), which has large showy flowers



JORGE ENRIQUE CÉSPEDES TRIGUEROS

2



JORGE CARLOS

3

with a deep-rose-infused lip color. Some wonderful miniatures such as *Trichopilia laxa* and *Trichopilia turialbae* are also among the most reliable and prolific bloomers. Another new favorite trichopilia hails from the area around Machu Picchu in Peru. Found throughout the Orchid Garden at Inkaterra, this gorgeous nocturnally fragrant species has been thought to be an extremely robust form of *Trichopilia fragrans*. But, before her untimely passing from Covid-

[1] *Trpla. punicea* ‘Dark Beauty’ CBR/AOS; exhibitor: Tennis Maynard. Photograph by Richard Noel.

[2] *Trpla. suavis* ‘Mariela Arguedas’ AM/AOS; exhibitor: Daniel Arguedas Balaños.

[3] *Trpla. tortilis* ‘Eswin Rauos’ AM/AOS; exhibitor: Eswin Rauos.





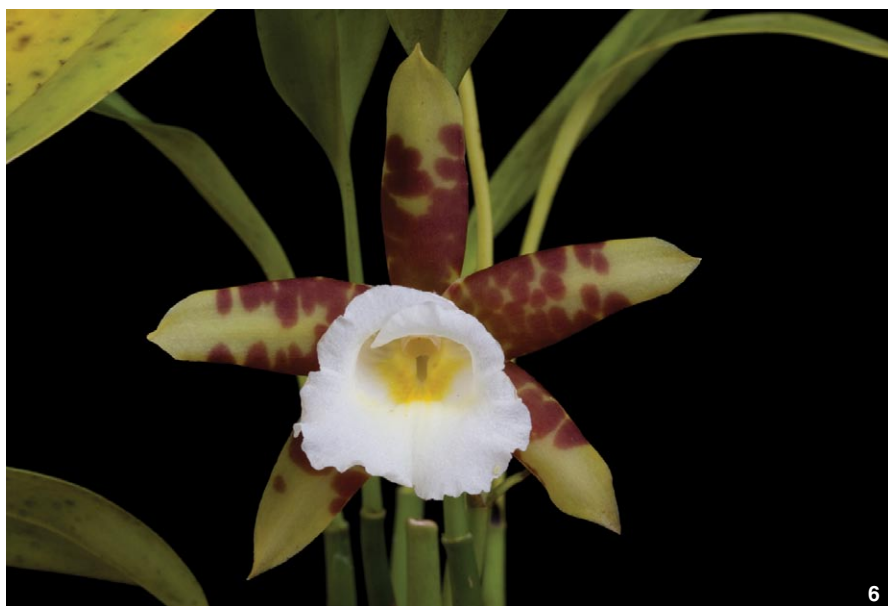
4

AOS AWARD ARCHIVES



5

THOMAS MIRENDA



6

JERRY SUFFOLK



7

ROBERT HESSE

- [4] *Trpla. sanguinolenta* 'Lil' CBR/AOS; exhibitor: Henry J. Severin.
- [5] The potential new *Trichopilia* species growing at Inkaterra, Peru.
- [6] *Trpla. brevis* 'Betty B' CHM/AOS; exhibitor: Betty Berthiaume.
- [7] *Trpla.* Apache 'Leon' AM/AOS; exhibitor: Phil and Ann Jesup.
- [8] *Trpla. marginata* 'Royston on the Edge' CCM/AOS; exhibitor: Bill Porter, Porter's Orchids.
- [9] *Trpla. fragrans* 'Christine's Crystal' HCC/AOS; exhibitor: Wojciech Kliikunas, PhD.
- [10] *Trpla. hennisiana* 'Sage Nicholas' CCM/AOS; exhibitor: Lester Lieberman.
- [11] *Trpla. turialbae*
- [12] *Trpla. oicophylax* 'Memoria Joe Deifel' CHM/AOS; exhibitor: Wojciech Kliikunas, PhD.





KATIE PAYEUR

8



JAMES MCCULLOCH

9



JAMES MCCULLOCH

10



ERIC HUNT

11

19 earlier this year, Inkaterra's chief biologist, Carmen Soto, was seeking to have it described as a segregate species. I hope to help this get accomplished in the coming year.

Because of the rather showy blooms, many are surprised and intrigued to find out that they are rather atypical members of the Oncidiinae. *Trichopilia* do not have the usual tall inflorescence of smallish flowers common in this group, but rather, short, basal, few-flowered inflorescences that arch gracefully from tidy clustered and flattened pseudobulbs, making for charming compact floral displays. Currently over 40 species have been described and all are compelling subjects for cultivation. DNA sequencing has shown that some genera previously thought to be segregates from *Trichopilia* are probably within the genus after all. One example is the genus *Helcia*. Differing

from *Trichopilia* only in that the lip is not fused to the column, it is generally agreed that the easily grown and widely cultivated *Helcia sanguinolenta* and the spectacular *Helcia brevis* are also members of this delightful genus. With only a few hybrids, most made by Dr. Woji Klikunas, the breeding potential of these exquisite easily grown orchids has only just begun to be explored. One of my all-time favorite hybrids *Trichopilia Apache (suavis x sanguinolenta)* was made by the incomparable Dr. Leon Glicenstein, and received a well-deserved AM/AOS for its very colorful and interesting flowers that appear twice each year.

— Tom Mirenda has been working professionally with orchids for over three decades and is the past chair of the AOS Conservation Committee. He is an AOS accredited judge in the Hawaii Center (email: [biophiliak@gmail.com](mailto:biophiliak@gmail.com)).



AOS AWARD ARCHIVES

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# The 2021 Fall Members Meeting will be held in conjunction with the AOS Centennial Celebration.

We are looking forward to welcoming all AOS Members and Friends to our first "in-person" meeting since 2019! Help us celebrate 100 years of Orchids in Coral Gables, Florida this October.

All manner of activities are planned for the Members Meeting - AOS Judging, Orchid Conservation speakers, a Live Auction, and more!

To Commemorate our Centennial, a special Celebration Gala\* will be held on Saturday, October 30th at the historic Biltmore Hotel.

## *Your Registration fee includes:*

- Goodie bag
- Exclusive Meet & Greet Reception - Wednesday, October 27th @ 6:00 PM
- Complimentary transportation to and from East Everglades OS show (including box lunch) on Thursday, October 28th
- Preferred seating at the auction
- Access to all lectures



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**Register at <https://secure.aos.org/event/register>**

*\*Gala tickets sold separately*



# Nominations for AOS Conservation Awards

By Charles Wilson

DO YOU KNOW someone, an agency or society who has done something notable in the interest of orchid conservation? You have an opportunity to nominate them for recognition for their efforts!

- The Philip E. Keenan Award was established to recognize and reward individuals, groups, or affiliated societies for outstanding work in the field of orchid conservation, restricted to North America.
- The AOS Conservation Recognition Award was similarly established to recognize and reward individuals, groups, or Affiliated Societies worldwide for outstanding work in the field of orchid conservation.

Two \$500.00 first-place awards and two \$250.00 second-place awards may be given in each category each year.

**The application period for both of these awards has been extended to December 1, 2021.**

Applications for these prestigious awards should include a nomination statement, a short biography of the proposed recipient when it concerns an individual's efforts, or a short history of the nominated group, organization or affiliated society. A concise description (no more than two pages) of the project or endeavor and its effectiveness must be submitted along with the nomination. Several photographs of the conservation work should be included, as well as no more than three letters of recommendation from individuals who are familiar with the work. It is hoped that we can feature these projects in regular articles in *Orchids* as a reward for the recipients' good work and to encourage conservation efforts. Nominations or questions should be sent to [conservation\\_committee@aos.org](mailto:conservation_committee@aos.org).

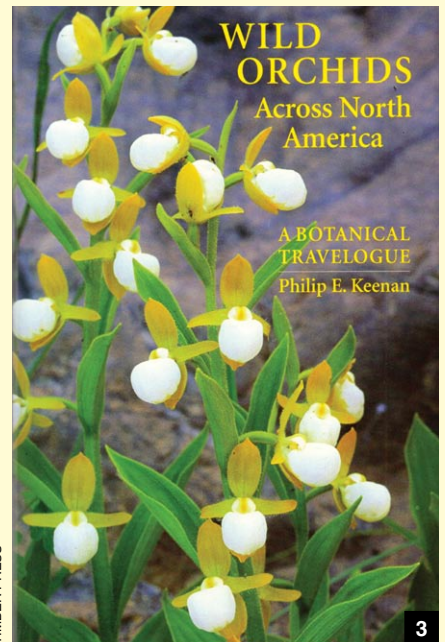
— Charles Wilson, AOS Conservation Committee Chair (email: [conservation\\_committee@aos.org](mailto:conservation_committee@aos.org)).



DR. ANDY HUBER



JENNIFER REINOSO



TIMBER PRESS

[1] Grande Ronde Overlook Wildflower Institute Serving Ecological Restoration (GROWISER) is a 260 acre (105 ha) native plant conservation area in Northeast Oregon. It protects 220 acres (89 ha) of land located 5 miles (8 km) north of Summerville, and 40 acres (16 ha) located 2 miles (3.2 km) east of Cove, Oregon. Their objective is to create an area with only the plant species that were here 200 years ago.

[2] *Sacola lanceolata* growing in central Florida. Jennifer Reinoso's work with the protection of this species in Volusia County, Florida was recognized with a Keenan Award in 2020.  
 [3] *Wild Orchids Across North American* by Philip E. Keenan was published in 1998 by Timber Press, Portland, Oregon. Although out of print, it is still possible to locate copies in good condition from various sources on the internet.



# CALL FOR NOMINATIONS — 2022 ELECTION

The American Orchid Society Nominating Committee seeks nominations to fill four positions on the Board of Trustees (three year terms, 2022–2025) and all six officers (two year terms, 2022–2024). AOS members in good standing may nominate any AOS member in good standing, including themselves, and shall provide a rationale as to why the nominee should be considered. All nominations will be evaluated by the nominating committee and the membership will be provided a slate, in accordance with the Society’s Bylaws, prior to the election to be held at the spring 2022 Members’ Meeting Sacramento, California. The following competencies have been determined by the Board and will be used in the evaluation:

**All nominees shall:**

- be members of the AOS, and embrace the mission and priorities of the AOS;
- exhibit integrity and ethical behavior;
- possess strong interpersonal and communications skills;
- have board experience, preferably with a non-profit organization.

**Expertise in some of the following is desirable and will weigh in the evaluation:**

- finance, business and/or investment strategies,
- legal background;
- development/fund raising;
- strategic planning and implementation;
- marketing;
- conservation, research or education.

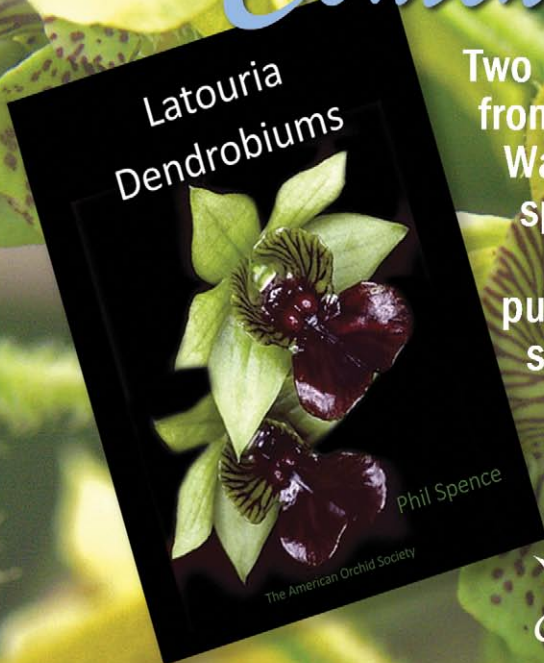
**Responsibilities:**

- attend conference-call type meetings when called (up to two per month for officers, one for trustees);
- attend two face-to-face members’ meetings annually (must pay own travel expenses, compensation is not provided);
- actively participate and contribute in Board activities and work;
- financially support the organization in a manner commensurate with one’s ability, while seeking additional financial support elsewhere;
- advocate on behalf of the organization and be ambassadors to the orchid community.

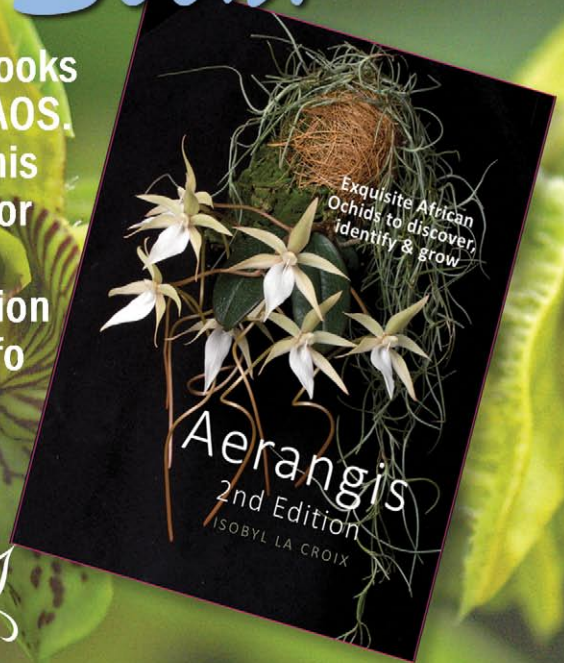
Send nominations to [nominating\\_committee@aos.org](mailto:nominating_committee@aos.org).

**NOMINATIONS WILL BE ACCEPTED UP TO THE CLOSE OF BUSINESS SEPTEMBER 25, 2021.**

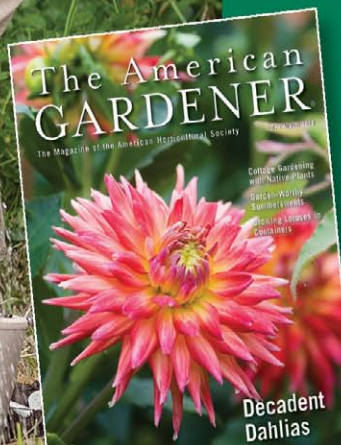
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Sylvia Strigari

# Stenotyla picta

Text by Franco Pupulin/Watercolor by Sylvia Strigari

Tribe CYMBIDIEAE  
Sutribae ZYGOPETALINAE  
Genus STENOTYLA Dressler

**Stenotyla picta** (Rchb.f.) Dressler, *Lankesteriana* 5:96. 2005. *Warszewiczella picta* Rchb.f., *Gard. Chron.*, n.s., 20:8. 1883. *Zygopetalum pictum* Rchb.f., *Gard. Chron.*, n.s., 20:8. 1883. *Chondrorhyncha picta* (Rchb.f.) Senghas, *Orchidee (Hamburg)* 41(3):94. 1990. SYNTYPES: Costa Rica. A. R. Endrés s.n. (W-R); R. Pfau s.n. (W-R). *Chondrorhyncha estrellensis* Ames, *Sched. Orch.* 4:54–56. 1923. TYPE: Costa Rica. Estrella de Cartago, 10 Jan. 1923, C.H. Lankester & A. Sancho 396 (holotype, AMES). *Warszewiczella caloglossa* Schltr., *Repert. Spec. Nov. Regni Veg.* 12:216. 1913. *Chondrorhyncha caloglossa* (Schltr.) P.H. Allen, *Ann. Missouri Bot. Gard.* 36(1):85. 1949. SYNTYPES: Panama. Chiriquí: feuchte Wälder von Cuesta de las Palmas an der Südseite von Cerro de la Horqueta, 1700–2100 m, Mar. 1911, H. Pittier (B.S.P.C.Z. 3214) (B, destroyed); Panama. Mar 1911, W. R. Maxon (B.S.P.C.Z. 5510) [B, destroyed; drawings of a syntype, selected by Pupulin (2010) as the lectotype, AMES 26811].

An epiphytic, erect, caespitose herb, to 30 cm tall. Roots flexuous, glabrous. Pseudobulb ovoid, complanate, hidden by the leaf-sheaths, provided at apex with a rudimentary leaf and enclosed by 5–9 distichous sheaths, the upper ones foliaceous. Leaves membranaceous, oblanceolate to linear-lanceolate, attenuate, obscurely ribbed abaxially, 15–30 × 1.0–2.5 cm, contracted at the base into a conduplicate petiole ca. 2 cm long. Inflorescences 1–2, each erect, single-flowered, lateral, produced from the base of the stem and arising from the axil of basal cataphylls; peduncle terete, 7–10 cm long, provided with an ovate, acute, infundibular bract, 6–8 mm long. Floral bract double, the external one lanceolate, acute, 8–10 × 5–6 mm, the internal bractlet narrowly lanceolate, acuminate, 13–16 × 3–4 mm. Ovary clavate, arcuate, winged, 2 cm long including the pedicel. Flowers not completely spreading, cream to pale yellow, the lip pale yellow, finely striped with dark purple up to the apex, the stripes sometimes reticulate, the callus yellow. Dorsal sepal lanceolate, acute, concave, dorsally subcarinate, 2.3–2.6 × 3 × 0.7–0.9 cm. Lateral sepals lanceolate, subfalcate,

acute-attenuate, connate with the base of the column foot, strongly concave, the margins convolute at the inflexed base, 2.6–2.8 × 0.8–0.9 cm. Petals obliquely elliptic, acute, with revolute apex, 2.7–2.8 × 1–1.3 cm. Lip trilobate (sometimes obscurely), broadly ovate when spread, obtuse-truncate, obscurely cordate at the base, 2.5–3.0 × 2.8–3.1 cm; the basal lobes erect to flank the column, the margins of the midlobe undulate; the disk provided at the base with a raised, deltoid, minutely sulcate callus, four- to six-toothed at apex, sometimes with smaller lateral teeth. Column straight, semiterete, widening toward the stigma, with a foot, 1.4 cm long. Anther cap cucullate, obovate-complanate, bilocular. Pollinia four, obovate, in two pairs of different sizes, on an obdeltoid stipe scarcely distinct from the shield-shaped, hyaline viscidium.

Species of the Zygopetalinae, mainly in the group of *Zygopetalum* and those allied to *Huntleya*, and even more in the *Chondrorhyncha* complex, have been proficiently portrayed in the classic illustrated books and journals of the nineteenth century up to the work of contemporary botanical artists, and the *New Refugium Botanicum* is no exception. The plants of the genera close to *Chondrorhyncha* have usually beautifully elegant, dark green, matte foliage — more rarely of a bright and lustrous grass-green — and they are mostly medium to small in size. In contrast, the solitary flowers, sometimes produced in a profusion of simultaneous inflorescences, are often brightly colored and large, when not disproportionately large with respect to the size of the plant, and usually deliciously fragrant. On the dark background of the fan-shaped foliage, they produce a delicate and attractive contrast, which made of these plants quite a group of darlings in orchid collections around the world, both in the past and up to our times. Although true *Zygopetalum* species have mostly green flowers overlaid with chocolate brown and white lips marked with indigo blue, born on relatively large plants, the Zygopetalinae also includes genera with small to miniature species (such as *Aganisia*, *Pabstia*, *Promenaea*, etc.), which in the last 30 years or so have been bred with zygopetalums to produce a vast array of plants varying in size, types of inflorescences, and flower shapes and colors. Intergeneric

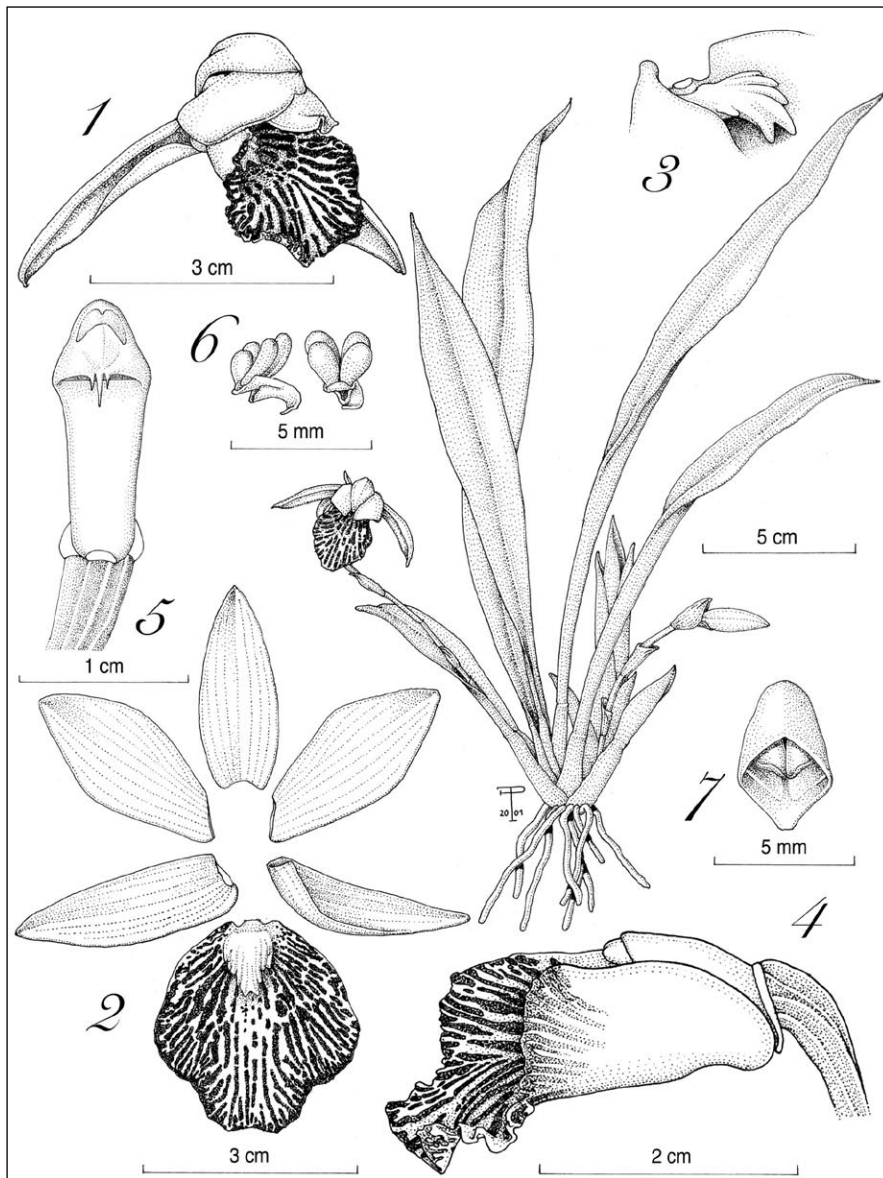
hybrids such as *Zygonisia*, *Pabanisia*, *Zygolum* and *Propetalum*, but also more complex creations such as the tetrageneric *lanclarkara*, up to intergenerics made up of seven Zygopetalinae genera such as *Masonara* (*Aganisia* × *Batemannia* × *Otostylis* × *Pabstia* × *Promenaea* × *Zygopetalum* × *Zygosepalum*), have gained popularity as house plants with flowers varying from white to yellow spotted red or purple to green flowers overlaid with mahogany, to solid, dark, almost black, purple.

Cultivation of the species in the *Chondrorhyncha* complex has proven to be more challenging. The loosely fanlike growths, made up of a few soft leaves (usually four to five) clasping at their bases, mostly require a well-drained epiphytic medium that should never be allowed to dry out completely, making them poor candidates for home growing.

Interestingly, plants of this group are not commonly found in the field either — with a few exceptions. Although species of *Kefersteinia* may be locally abundant, and *Warszewiczella discolor* is truly a common epiphyte, others such as *Benzingia*, *Cochleanthes*, *Chaubardiella*, and *Stenotyla*, are quite rare to find, and species of *Daiotyla* are usually known only by a few wild specimens. We described *Stenotyla lankesteriana* from a specimen with no collecting data, which had been cultivated for years at the Lankester Botanical Garden, and the first plant we found in the field was encountered more than five years later; up to now, we only know less than 10 plants of this species with a known locality.

Even the protagonist of this chapter of the *New Refugium Botanicum*, *Stenotyla picta*, is not a common plant. Heinrich Gustav Reichenbach described it based on two different specimens, both from Costa Rica, where they had been collected by two very different explorers and orchidologists, Auguste R. Endrés before, and Richard Pfau later. In the short note he published in the *Gardener's Chronicle*, Reichenbach compared the new species with *Warszewiczella discolor*, noting however that is “much rarer” (Reichenbach 1883), and distinguishing it mainly by the shape of the lip and the callus. In fact, the callus of *Stenotyla picta*, as well as other species of *Stenotyla* and *Daiotyla*, is flattened and





*Stenotyla picta*. The plant.

1. Flower.
2. Dissected perianth.
3. Callus of the lip.
4. Apex of ovary, column, and lip, lateral view.
5. Column, ventral.
6. Pollinarium (two views)
7. Anther cap.

All drawn from *Pupulin* 3027 by F. Pupulin.

bilobed, while in *Warszewiczella* the callus is raised and provided with digitate keels. Unlike other genera in the *Chondrorhyncha* complex, species of *Stenotyla* also present a rudimentary pseudobulb, almost completely hidden by the basal sheaths of the leaves, topped by the rudiment of a small, vestigial leaf (Pupulin 2010).

As was his characteristic custom, the great Endrés had finely illustrated, in various sketches and a fair copy drawing, a plant he had collected on Cerro de los Guatusos (today Arenal volcano), but he had also indicated in a note that the species was more common on the southern slopes of the Irazú and Turrialba volcanoes, in central Costa Rica. He had also sent to the German botanist H.G. Reichenbach, various, very detailed descriptions of the species, including a precise description of the pollinarium (now preserved in Vienna together with the drawings), of which

Reichenbach did not make use in his protologue. Reichenbach instead reused, almost without changes, the “fair copy” of Endrés’s illustration to have a plate engraved for his series *Xenia Orchidacea*, under the name of *Zygopetalum pictum*, but this drawing and the corresponding text were never published.

The generic relationships of *Stenotyla* with the complex of species traditionally treated as *Chondrorhyncha* were discussed in another chapter of the *New Refugium Botanicum*, dedicated to *Sty. lankesteriana*. Among other *Zygopetalinae* of the *Huntleya* clade, *Stenotyla* may be distinguished by the narrow, laminar callus at the base of the lip (not in the middle) and the short chin on the rear of the lip. It was Bob Dressler (2000) who first noted the distinctiveness of the “*Chondrorhyncha*” species allied to *Chondrorhyncha lendyana*, keying out the group based on the column without wings and the narrow, toothed callus. His hypothesis was confirmed by the phylogenetic analyses based on DNA sequences carried out by Mark Whitten and collaborators (2005), which placed the species of *Stenotyla* in a clade with strong bootstrap support, in turn moderately supported as sister to *Cochleanthes*.

The few known species of *Stenotyla* (five or possibly six) are strictly Central American in distribution, ranging from southern Mexico to western Panama, where they occur as epiphytes adapted to shady environments, in premontane to submontane, wet and cloud forests, at elevations of 1,100–2,100 m (Pupulin 2009). *Stenotyla picta* is only known from Costa Rica and western Panama, where it has been rarely collected on shaded trunks and large branches covered with mosses in wet and cloud forests at 1,400–2,100 m elevation. It mostly flowers during the dry season, from December through April.

A recent paper by Carlos Nunes and collaborators (2017) underlined several different scent-pollination syndromes in the *Zygopetalinae*, besides the already known attraction of male euglossine bees, establishing a phylogenetic link of this pollination system to pollination by deceit by other bees. We do not have any direct evidence about the actual pollinator of *Stenotyla picta*, but Roman Kaiser (1993) reported that the analysis of the floral fragrance of the northern *Sty. lendyana* revealed 3,5-dimethoxytoluene as a major component, a scent said to be reminiscent of an insect’s defensive secretions.

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## Yellow Sticky Traps



YELLOW STICKY CARDS are widely used to attract and capture the adult life stage (winged) insect pests including fungus gnats, leafminers, shore flies, thrips, winged aphids and whiteflies. If you don't have a ready source of these cards, you can easily make yellow sticky traps using readily available materials. Simply take a yellow plastic cup, cover the outside with Vaseline or Tanglefoot® (sold in most garden centers and big-box stores) and place the cup upside down on a stake tall enough to put the cup opening at just above foliage level. The cups should be replaced periodically because of either trapped insects in the coating or loss of stickiness over time.

Thank you to Laura Newton, AOS Awards Registrar, for bringing this homemade alternative to my attention. — Ron McHatton ([rmchatton@aos.org](mailto:rmchatton@aos.org)).

### Selected Botanical Terms

abaxial – underside  
 adaxial – top or upper surface  
 acuminate – tapering to a long point  
 acute – pointed  
 apical – at or from the top  
 arcuate – bow-shaped; curved  
 attenuate – gradually tapered  
 bilocular – having two chambers  
 bract – modified or specialized leaf  
 caespitose – clumped or clumping  
 callus – thickened tissue on the lip  
 carinate – having a keel-like ridge  
 cataphyll – reduced leaf; often clasping the petiole  
 clavate – club-shaped  
 column foot – basal extension of the column often to which the lip or lateral sepals may be fused  
 complanate – lying in a single plane  
 concave – curved inward like the inside of a sphere  
 conduplicate – folded lengthwise with upper surfaces facing each other  
 connate – united so as to form a single structure  
 convex – shaped like the outside of a sphere  
 convolute – rolled around

cordate – heart-shaped  
 cucullate – hooded  
 deltoid – triangular  
 distichous – arranged in two rows  
 dorsal surface – upper surface  
 elliptic – oval  
 epiphyte – a plant that uses another plant as a means of support  
 falcate – sickle-shaped  
 flexuous – curvy  
 foliaceous – leaflike  
 glabrous – smooth  
 hyaline – having a glassy, translucent appearance  
 inflexed – bent or folded downward or inward  
 infundibular – funnel-shaped  
 lanceolate – narrow oval tapering to a point at each end  
 linear – slender  
 membranaceous – thin; like a membrane  
 ob – prefix meaning inverted; for example obcordate is a heart-shaped structure with the pointed end of the heart uppermost.  
 obtuse – blunt  
 ovate – egg-shaped

ovoid – more or less egg-shaped  
 pedicel – a stalk attaching the flower to the inflorescence  
 peduncle – the part of an inflorescence before the rachis or section to which the flowers are attached  
 petiole – stem joining leaf to stem;  
 leafstalk  
 reticulate – netted; network  
 revolute – curved backward or downward  
 semi – half; also as a prefix to mean more or less.  
 sub – somewhat less than; i.e., subspherical would refer to almost but not quite a sphere  
 subtend – beneath or close to as in subtended by a bract.  
 sulcate – marked with parallel grooves  
 terete – cylindrical or pencil-shaped  
 trilobate – three-lobed  
 truncate – abruptly cut off or terminated  
 viscidium – sticky pad to which the pollinia are attached





# Vandaceous Orchids

Supplement to volume 90, Orchids magazine

- ROBERT FUCHS** *Large-flowered Vandas*  
**ROBERT FUCHS** *Smaller Flowers, Dazzling Color: Breeding with the Former Ascocentrum*  
**MARTIN MOTES** *The Other Vandas: New Directions in Breeding*  
**JIM COOTES** *Philippine Renanthera Species*  
**PATRICK VUURMAN** *Rhynchostylis and its Hybrids*  
**GARY YONG GEE** *Aerides*  
**STIG DALSTÖM** *Cool-growing Vandaceous Orchids of Bhutan*  
**KEN JACOBSEN** *Growing Award-winning Sarcochilus*  
**JASON FISCHER** *Influenced by the Wind Orchids: Hybrids of the Former Neofinetia*  
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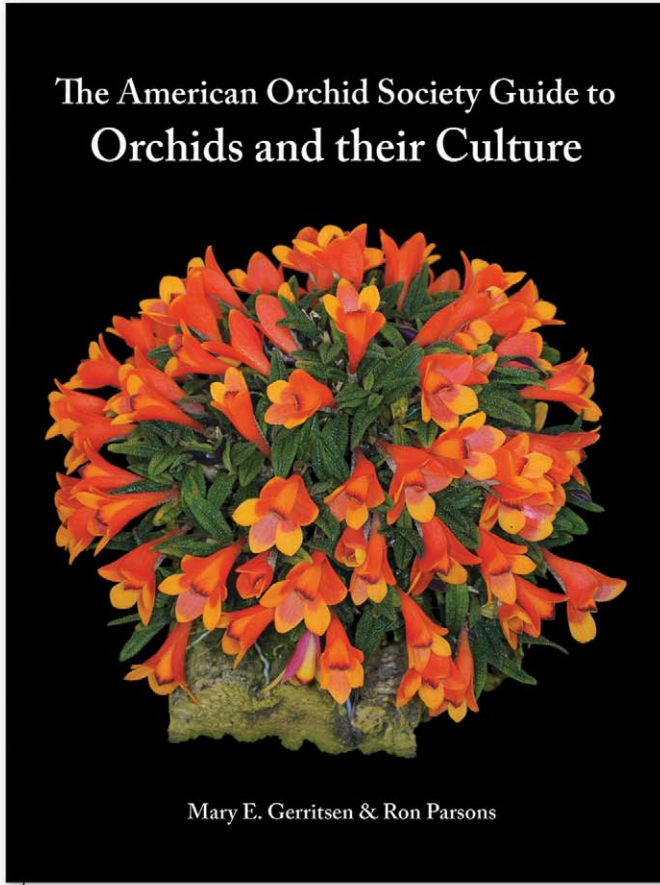


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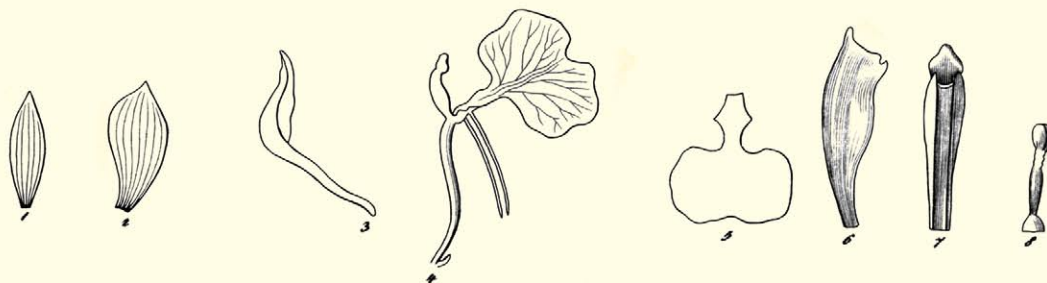
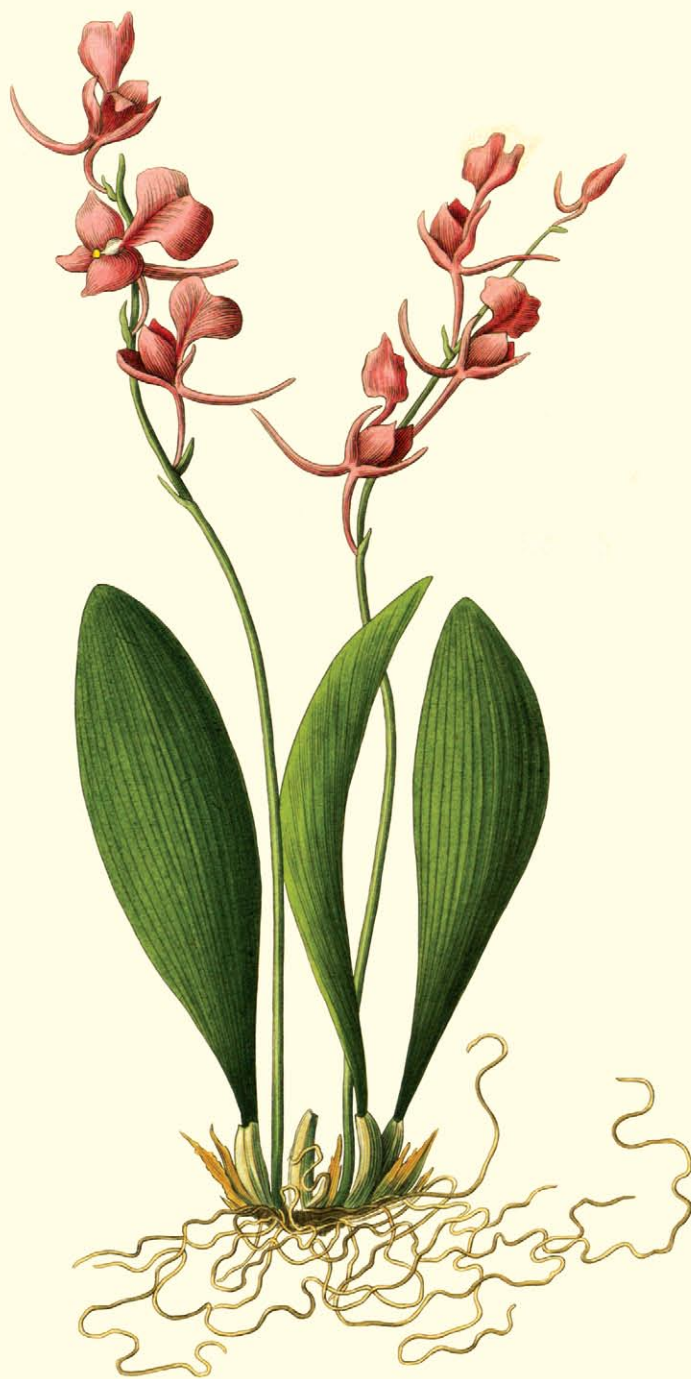
by Mary E. Gerritsen & Ron Parsons



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*Comporetia falcata.*

# Comparettia

by Wesley Higgins and Peggy Alrich

A Tropical American Genus



**COMPARETTIA** PLANTS WITH short rhizomes, small pseudobulbs and a single flat leathery leaf at first glance resemble *Trichocentrum* or *Lophiaris* (part of *Trichocentrum*). The flowers of *Comparettia* have slender spurs that distinguish them from the other genera included in the Oncidiinae. The plants have caespitose growth, producing new shoots in a clump, often forming a thick mat. These plants, like *Ionopsis*, thrive very well on low-leaf trees such as coffee, guava and citrus trees. The genus was published by Poeppig and Endlicher in *Nova Genera ac Species Plantarum*, 1:42 in 1836. The name *Comparettia* is dedicated to Andrea Comparetti (1745–1801), an Italian botanist, explorer, plant physiologist, professor of botany at the University of Padua.

Seventy-nine sympodial epiphytes or lithophytes are found in low to upper elevation, hill scrub to montane rain forests from Cuba to Trinidad, central Mexico to Panama with the greatest diversity occurring in the Andes of Venezuela,

Colombia to Bolivia and Brazil.

These small plants have tiny, densely clustered, flattened pseudobulbs, each with a solitary, fleshy, proportionately large leaf. The long, wiry, arching, simple-to-branched, numerous- to few-flowered inflorescence arises from the base of the pseudobulb, with nodding, brightly colored flowers with small sepals and petals. Color ranges from rose-purple, red, orange to yellow and some of the flowers can be spotted with magenta or white. The lateral sepals are extended into a spurlike bifurcated sheath into which the spur of the lip is inserted. The uniquely structured, spreading, shortly clawed, trilobed lip has two tail-like spurs at the base that in turn are enclosed by the long, lateral sepals, thus appearing as if three spurs are present. The lip blade is much longer than the sepals or petals. The flowers have a moderately long, straight, wingless, footless column with a large anther.

*Comparettia*, along with *Ionopsis* and *Hirtzia* (now considered to be

part of *Pterostemma*), form one of the subclades of small genera within the Oncidiinae subtribe. In the Strict Consensus tree *Comparettia* is sister to *Ionopsis* and *Hirtzia*. However, there are some differences in topology of the Maximum Likelihood tree, *Hirtzia* is sister to *Ionopsis* and *Comparettia*. According to phylogenetic criteria, the relationships between these genera are still not well defined. (Freudenstein and Chase 2015).

**CULTURE** Provide a minimum temperature between 50–60 F (10–15 C), about 70% shade and 60–80% humidity. The plants should never be allowed to completely dry out. Plants can be grown in small pots or baskets with tree fern or bark, or mounted on cork or tree fern slabs.

#### Reference

Freudenstein, J.V. and M.W. Chase. 2015. Phylogenetic Relationships in Epidendroideae (Orchidaceae). One of the Great Flowering Plant Radiations: Progressive Specialization and Diversification. *Annals of Botany*, 115:665–681.





COMPARETTIA COCCINEA. Lindl.  
Brésil (serre-chaude)

P. Stroobant, fils, ad. nat. pinx. in Horto. Verschaffelt. A. Verschaffelt, publ. Etab. Lith. de L. Stroobant, à Gand.

2



*Comparetia coccinea.*

3



Lith. de G. Severeyns

1. *Comparetia cryptocera* Morr. 2. *Klugia notoniana* Dec.

4

# Comparetia

## ANTIQUE PLATES

- [1] *Comparetia falcata*, Nova Genera ac Species Plantarum, 1: t.73 (1835).
- [2] *Comparetia coccinea*, L'illustration Horticole, 13: t.472 (1886).
- [3] *Comparetia coccinea*, The Botanist, 4: t.186 (1840).
- [4] *Comparetia falcata* var. *falcata* as *Comparetia cryptocera* & *Rhynchoglossum notonianum* as *Klugia notoniana*, Belgique Horticole, 2: pg.309 (1852).
- [5] *Comparetia falcata*, Monograph of the Trochilidæ, 5: t.296 (1861).





# Let There be Light

## Part 3: Measuring Artificial Light Without a Quantum PAR Meter

TEXT AND PHOTOGRAPHS BY KELLY MCCRACKEN

THIS IS THE third in a five-part series of articles intended to be an introduction to growing orchids under artificial light.

Some of the feedback I heard from my previous articles was this: “OK, you gave me some great info about PPF, but I do not have a PAR meter! How can I put those numbers you gave me to use?” Lucky for you, here are a few ways to use PAR data as a home grower.

**BUY A LAMP THAT ADVERTISES ITS BRIGHTNESS IN PPF** There is an amazing variety of specialty grow-light bulbs on the market today. With a little digging, you can find one that will advertise its brightness in PPF. The most common way lower-end companies advertise their bulb’s brightness is in a unit called lumens or lux. Lumen is a unit of brightness that favors wavelengths that human eyes see best and ignores a great deal of photosynthetic light. Buying a light with a high lumen output does not necessarily mean that your plants will receive much light from which they can photosynthesize. This is explained in depth in part 1 of this series “An Introduction to PAR, PPF and Why You Should Forget Lumens” (McCracken 2021a).

For example, I took my quantum PAR meter (I have the Apogee MQ-500) into a bathroom without any windows. The only light source in the bathroom was a three-bulb fixture with typical fluorescent 40-watt bulbs. I put my PAR meter 8 inches (20 cm) or so below the bulb and got incredibly low PPF readings. The readings varied from 4–6 PPF, well below any light level I would recommend for growing even the shadiest plants. These bulbs appeared bright to my eyes; they illuminated the entire room. And yet there was hardly any photosynthetic light emitted from them.

Therefore, as an artificial-light grower, you should avoid buying bulbs that only advertise their brightness in lux or lumens. The brightness of the bulbs can be deceptive to our human eyes! Conversely, one comment I often hear

Table 1. Barrina LED PPF values, Advertised vs. Actual.

Distance from fixture (meter placed at center of the fixture, directly underneath: 0,0)	Measured PPF in $\mu\text{mol}/\text{m}^2/\text{s}$	Advertised PPF in $\mu\text{mol}/\text{m}^2/\text{s}$	Percent difference
4 in	299	Not advertised	—
8 in	150	220	32%
12 in	99	132.1	25%
20 in	57	69.3	18%



about our grow lights at the High Desert Orchids indoor greenhouse is how dim they seem. And yet, I am growing very high-light-loving brassavolas and bifoliate cattleyas successfully and blooming them beautifully. Do not trust your eyes to measure how much PAR your plants are getting.

For research purposes, I looked pretty carefully at Barrina. The model I looked at was the 42Watt Full Spectrum 4 ft. T8 Growing Lamp Fixture. These are readily available on Amazon and on the Barrina website. I was interested in this particular product because they have a nice diagram mapping out the brightness of their bulbs in PPF.



[1] *Cattleya* Mirabelle Fleur bloomed under LED Lights set to 250  $\mu\text{mol}/\text{m}^2/\text{s}$  on a 12-hour photoperiod.

[2] *Paphiopedilum* (Wood Wonder ‘150’ x Hsinying Leopard ‘Black Pearl’) bloomed under LED lights at 125  $\mu\text{mol}/\text{m}^2/\text{s}$  on a 12-hour photoperiod.

I mapped out the PPF values using our PAR meter just like they have in their marketing materials. I elevated the fixture above a grid on the floor and took measurements just as had been outlined in the Barrina marketing diagram. The results of this exercise are displayed in Table 1.


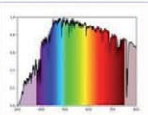

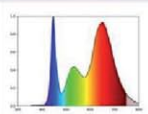

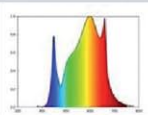

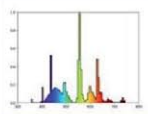

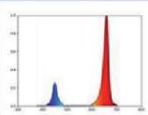
Light Source	Normalized Power Spectrum	PPFD conversion factor (SI) ( $\mu\text{mol}/\text{m}^2/\text{s}$ ) / lux	PPFD conversion factor (mixed) ( $\mu\text{mol}/\text{m}^2/\text{s}$ ) / foot-candle
Sunlight 		0.017	0.184
Barrina 		0.021	
Photobio T S4 		0.014	
Philips 6500K Fluorescent 		0.014	0.154
GE Arize Element PPB 		0.067	

Table 2. Lux to PPFD Conversion Factor

As you can see, the values I measured were 18–32 percent lower than the advertised values. I did check the calibration on my PAR meter to ensure the meter was working properly. I then emailed the company asking for an explanation. Barrina simply stated that their experiment was done under laboratory conditions and offered no further explanation for the discrepancy. The “laboratory conditions” they speak of is probably the fixture being sealed in an integrating sphere. But you’re not growing in an integrating sphere, you are growing in your living room, such as how I had my experiment set up. Because of this, I recommend buying slightly more light than you actually anticipate using. You can easily reduce light by elevating the bulbs, but it is a little more difficult to add more light later on. Some LEDs also offer a dimming feature, which can be useful.

Even though the advertised brightness was slightly higher than what I measured, this is still incredibly valuable information. As I mentioned previously, brightness of bulbs can be deceptive, appearing bright to our eyes, but providing little photosynthetic light. Having some information about the expected PPFD output of your bulbs is better than the incredibly useless lumen output that most fixtures advertise.

USE MY POOR-MAN’S PAR

METER For info on why you cannot use lux to measure artificial light directly, please read my article “An Introduction into PAR, PPFD and Why You Should Forget Lumens” (McCracken 2021a). You can, however, convert lux into PPFD based on the spectrum of the bulb you are using. You will need a lux meter; your smartphone can work for this.

To test this method, I used an app called Photone and iPhone 11 Pro Max. The Photone light-meter app requires a diffuser to work properly. If you do not have a professional diffuser, the app recommends cutting a strip of paper ½ inch (1.3 cm) × the width required to wrap around your phone. (I used Amazon basics standard office paper.) Tape the strip of paper around your phone over the camera, and, voila!: you have a diffuser. This sounds totally sketchy, but to my surprise it actually worked.

Make sure you are measuring in lux, not foot-candles. Using the Photone app with the diffusing paper, take a lux measurement and multiply it by the conversion factor in the table provided here. I included several lights in the table, mostly for illustration purpose, to show how the conversion factor changes based on the spectrum emitted by each bulb.

The conversion factor in my table is specific to the spectrum that the light produces. To apply this to a different light, you can calculate your own conversion

factor from the equation:

$$\frac{\int_{400 \times 10^{-9}}^{700 \times 10^{-9}} f(\lambda) \left(\frac{\lambda}{hc}\right) \left(\frac{10^6}{N_A}\right) d\lambda}{\int_0^\infty f(\lambda) V(\lambda) K d\lambda}$$

- $\lambda$  = Wavelength (m)
- $f(\lambda)$  = Light power per unit area per wavelength ( $\text{W}/\text{m}^3$ )
- $h$  = Planck constant (Js)
- $c$  = Speed of light (m/s)
- $N_A$  = Avogadro constant (photons/mol)
- $V(\lambda)$  = Luminous efficiency function (dimensionless); use the Energy (linear) function published by the UCL Colour & Vision Research Laboratory.
- $K$  = Lumens per Watt ratio, defined to be 683 lm/W at 555 nm, the wavelength of maximum luminous efficiency.

The power unit of the  $f(\lambda)$  curve does not affect this calculation because  $f$  occurs in both the numerator and the denominator. For example, you can use a normalized  $f(\lambda)$  curve (where the maximum is set to 1.0), which is what the light manufacturers typically advertise.

I tested the conversion on the Barrina LED bulbs and our PhotoBio bulbs. As you might expect, it is not perfect. The Barrina result was accurate to within about 15 percent, while the PhotoBio result was accurate to within about 5 percent. Since the accuracy of this



equation depends heavily on the spectral data, and an iPhone with a piece of paper taped over it is hardly a precise scientific instrument, these readings will never be perfect. Even this imperfect information can help you avoid a situation where you have insufficient light. Orchids and houseplants often do not reveal the effects of insufficient light for many months.

**PHOTONE'S PAR METER** Photone does offer a paid add-on PAR meter. It requires the diffuser, and still is not a perfect instrument. Again, this can help you avoid a situation where you have too little light and can get you in the ballpark of where you want to be. Photone is likely using a similar conversion factor equation to mine above (Figure 3). As the conversion factor changes drastically depending on the spectral data, you will not get a perfect result, and it will be less accurate than calculating your own conversion factor.

Table 3 presents measurements taken with the Photone app and my Apogee Quantum PAR meter, to compare the accuracy. Close, but not exact.

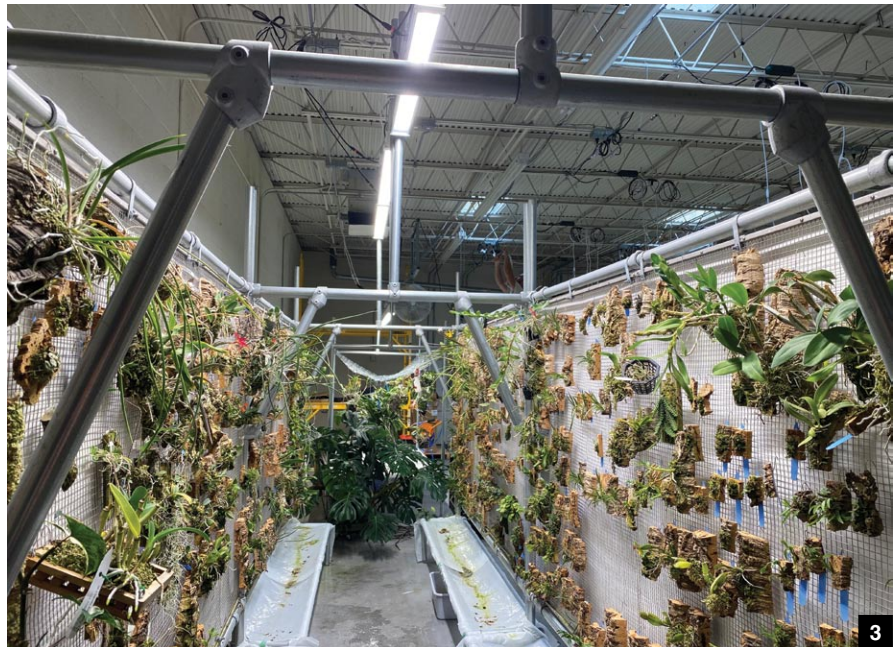
**USE A LUX METER OR PHONE PAR METER TO PRODUCE A RELATIVE INTENSITY MAP OF YOUR BULB** You do not have a PAR meter and are wildly confused by my conversion-factor equation? That is ok. You can still use your smartphone to give you a good deal of information about the relative brightness of your bulbs. With almost any light fixture, the light emitted from it is going to have bright spots and weak spots. You can plot these out using a lux meter and place your bright-growing plants in the places with the highest readings and the lower-light-growing plants in the places with the lowest readings.

Since you can only evaluate the relative intensity, these data are only useful if you are comfortable with your bulbs and know what you are able to grow under the brightest parts of the bulb. These data will not help you avoid a situation where you have drastically little light. But, if you have grown (and flowered, if you are growing orchids) a light-loving plant under that bulb, you can better understand the relative bright and dim spots produced by that fixture. Part 4 will explain how to optimize your growing space to best make use of these bright and dim spots.

For information about what we are growing at what PPFD value, read the article, "Target PPFD for Orchids and Tropical Houseplants" (McCracken

Table 3. Photone vs PAR Meter

Light Meter	Photone App	Apogee PAR Meter
Bench 1	114 $\mu\text{mol}/\text{m}^2/\text{s}$	93 $\mu\text{mol}/\text{m}^2/\text{s}$
Bench 2	287 $\mu\text{mol}/\text{m}^2/\text{s}$	207 $\mu\text{mol}/\text{m}^2/\text{s}$
Bench 3	282 $\mu\text{mol}/\text{m}^2/\text{s}$	200 $\mu\text{mol}/\text{m}^2/\text{s}$



2021b).

#### References

McCracken, K. 2021a. An Introduction into PAR, PPFD and Why You Should Forget Lumens. *Orchids* 90(7):520–521.

— 2021b. Target PPFD for Orchids and Tropical Houseplants. *Orchids* 90(8):596–597.

— Kelly McCracken is the owner of High Desert Orchids in Albuquerque, New Mexico. She is an avid grower, breeder and seller of orchids. Currently, she is growing in a 3,000 square foot (280  $\text{m}^2$ ), high-bay warehouse space, all under artificial light. Kelly also does orchid society talks on lighting and other orchid-related topics (email [kelly@highdesertorchids.com](mailto:kelly@highdesertorchids.com)).

[3] HDO Light Tunnel. Lights are 40 inches (101.6 cm) above mounted plants, light values range from 250  $\mu\text{mol}/\text{m}^2/\text{s}$  - 100  $\mu\text{mol}/\text{m}^2/\text{s}$ .

[4] *Anoectochilus roxburghii* grown at 40  $\mu\text{mol}/\text{m}^2/\text{s}$ .

[5] *Rhyncholaeliocattleya* Martha Clarke 'Sandia Pink' bloomed under LED lights at 250  $\mu\text{mol}/\text{m}^2/\text{s}$  on a 12-hour photoperiod.

com, website [highdesertorchids.com](http://highdesertorchids.com), Instagram @hdorchids).



# *Paphiopedilum fairrieianum*

## Part 2: The Hybrids

CHRISTELLE KAPFER

*PAPHIOPEDILUM FAIRRIEANUM* IS a unifloral species that rarely has two flowers on the same inflorescence, and even more seldom blooms with those two flowers at the same time. It also has the reputation of being somewhat difficult to grow well reflected in the fact that there are many more quality awards to the species than cultural awards. However, under the right conditions, it can become quite an amazing specimen with dozens of flowers open at the same time. It has received to date 13 AOS cultural awards, all granted before 1982. The average statistics for cultural awards are plants with 16 flowers and six buds on 18 inflorescences with a range of 11–38 flowers. The clone ‘Maybrook’ is the most floriferous specimen ever awarded with 38 flowers. Because the beauty of the flower in this species is of more interest than the number of them, it was simply a matter of time before hybridizers began to experiment.

**BREEDING WITH PAPHIOPEDILUM FAIRRIEANUM** Hybridization of slipper orchids began in the 1860s when *Paphiopedilum harrisianum* (*villosum* × *barbatum*) was created by John Dominy, a British horticulturist and plant hybridizer who was working at the Veitch’s Royal Exotic Nursery in Chelsea, England. It flowered for the first time in 1866, by mere coincidence the same year as the original publication of Mendel’s laws of heredity (Cash 1991). It is also John Dominy that registered, for the Veitch nursery only four years later, a first hybrid of *Paph. fairrieianum*, named *Paphiopedilum vexillarium* (× *barbatum*). *Paphiopedilum fairrieianum* was used as the pollen parent. Interestingly, it almost never was used as the seed parent in the three first decades of breeding (Hill 2016).

*Paphiopedilum fairrieianum* has to date 67 registered primary hybrids and a total progeny of 9,480 hybrids over 13 generations. However, although this number is high for the genus, it does not breed successfully with all subgenera in



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the genus, as shown by Stephen Manza (2019). To this date, it was mainly crossed with species of the sections *Paphiopedilum* (of which it is part), *Brachypetalum*, *Parvisepalum* and *Sigmatopetalum* subgenera (Stephen Manza uses Braem’s classification, see pg. 599 of the August, 2021 issue of *Orchids*). It does not breed well with members of subgenus *Polyantha*. A review of genealogical trees of today’s complex hybrids with *Paph. fairrieianum* in the background shows the presence of almost always the same three hybrids, shown later in this section, registered in the beginning of the 19th century, that had the capacity to breed on. As a rule, the first-generation hybrids with *Paph. fairrieianum* have shown low fertility rates.

Recently, work has been done by hybridizers to induce polyploidy in *Paph. fairrieianum* (Hill, pers. comm.) by using oryzalin, a substance that is normally used as a herbicide. As *Paph. fairrieianum* is a diploid, and the complex hybrids are generally polyploids, when crossed together, the result is sterility in the hybrids. The production of a polyploid *Paph. fairrieianum* could open the door to fertile hybrids that could breed on.



CHARLES MARDEN FITCH

- [1] *Paph. fairrieianum* ‘Maybrook’ CCM/AOS; exhibitor: G.A.Wright. Although not easy to grow well, when conditions are right *Paph. fairrieianum* makes spectacular specimens.
- [2] *Paph. Vexillarium* ‘Orchidloft’ AM/AOS; exhibitor: Stanley P. Samuel.

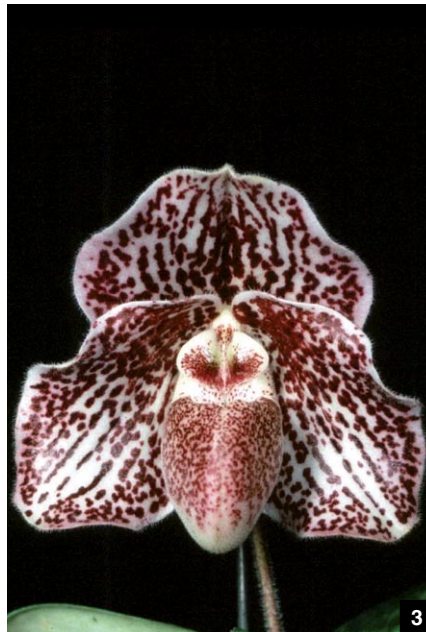


This method has proven to be efficient in the Rosaceae (Crespel and Meynet 2017) and in the Cucurbitaceae (Chimeze et al. 2015) families, but also in a few orchid genera such as *Dendrobium*, *Epidendrum*, *Oncidium* and *Phalaenopsis* (Miguel and Leonhardt 2011). Besides fertility restoration of hybrids, the induced polyploidy results in flowers that are usually larger in size with a rounder conformation and greater substance than the diploids. Changes such as intensification of color and fragrance were also reported in some cases (de Mello e Silva et al. 2000).

Despite obvious challenges in breeding using the species, *Paph. fairrieanum* is highly regarded as a parent and is known to have created a good number of charming hybrids. However, although its influence is obvious in primary and first-generation hybrids, it is quickly lost in more complex hybrids. It has often been used in the last decades to backcross complex hybrids. In the next pages, some of the most interesting primary hybrids and lines of breeding will be presented.

**PRIMARY HYBRIDS** Crosses between *Paph. fairrieanum* and species from subgenus *Brachypetalum* tend to give excellent seedlings (Koopowitz 2008). The most-awarded primary hybrid of *Paph. fairrieanum* is *Paphiopedilum lona*, a cross with *Paphiopedilum bellatulum*. It has so far received 73 AOS awards. The cross was created in 1913, but its popularity only peaked when it was remade at the end of the 1970s and it lasted until the beginning of the 1990s. Is it now unusual to see this impressive hybrid on our judging tables or in shows. *Paphiopedilum lona* shows an interesting color pattern in which *Paph. fairrieanum* intensifies and reddens the purple spots and blotches of *Paph. bellatulum*. The dots are also smaller and placed in lines, which is a typical effect of breeding using *Paph. fairrieanum*. However, the most obvious influence of *Paph. fairrieanum* is the shape of the petals, which are elongated and more pointed than in the *bellatulum* parent giving the plant an overall triangular shape instead of a round one. Regrettably, the short and lax inflorescence of *Paph. bellatulum* is inherited in the hybrid. The plant is also short-lived. *Paphiopedilum lona* has two registered progeny, one having been awarded once (*Paphiopedilum New Frontier*, a cross of *lona* with *Paphiopedilum delenatii*).

The influence of *Paph. fairrieanum*



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JOHN STUBBINGS

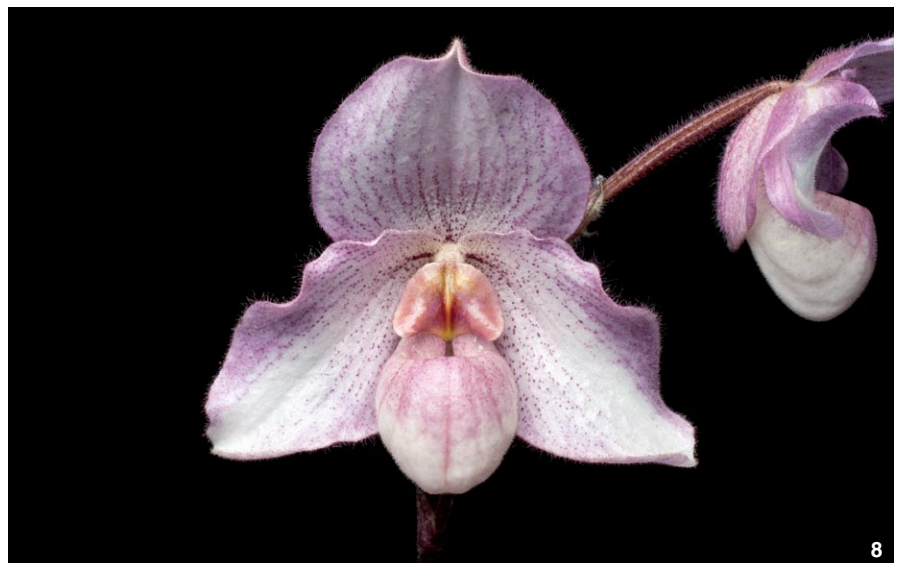


PAUL BUJAK

- [3] *Paph. lona* 'Belladonna' HCC/AOS; exhibitor: Dragonstone Orchids.
- [4] *Paph. New Frontier* 'Lavender 'n Lace' HCC/AOS; exhibitor: Cal-Orchid, Inc.
- [5] *Paph. Angela* 'Angel' AM/AOS; exhibitor: Ruey Hua Orchids.
- [6] *Paph. Tanya Pinkepank* 'Lauren Moses' AM/AOS; exhibitor: Clown Alley Orchids.
- [7] *Paph. Jade Dragon* 'Red Eye' AM/AOS; exhibitor: Barbara Ford.
- [8] *Paph. Black Diamond* 'Elektra' HCC/AOS; exhibitor: Larry Cox.
- [9] *Paph. Papa Röhl* 'Arnie' AM/AOS; exhibitor: Arnold Gum.
- [10] *Paph. Niobe* 'Pink Frost' HCC/AOS; exhibitor: Breckenridge Orchids.

on *Paphiopedilum lona* is similar to that with primary hybrids made with other *Brachypetalum* species. *Paphiopedilum Angela*, a cross with *Paphiopedilum niveum*, is also a successful hybrid that has received 50 AOS awards. The awards received are distributed over time from the 1970s to the 2010s and, contrarily to *Paphiopedilum lona*, it does have recent awards. The petals are clearly elongated and down-swept, and the flower is nicely overlaid with a nice dark pink, quite saturated over the pouch, inherited from *Paph. fairrieianum*. Primary hybrids with section *Parvisepalum* species are also interesting although, unfortunately, many of the seedlings give crippled flowers (Koopowitz 2008).

*Paphiopedilum Tanya Pinkepank* is a cross with *Paphiopedilum micranthum*, *Paphiopedilum Jade Dragon* is a cross with *Paphiopedilum malipoense*, and *Paphiopedilum Black Diamond* is a cross with *Paph. delenatii*. It is interesting to note that although various characteristics of the three *Parvisepalum* species are clearly seen in the primary hybrids (big pouch of *Paph. micranthum* in *Tanya Pinkepank*, green color of *Paph. malipoense* in *Jade Dragon*, and white and pink coloration of *Paph. delenatii* in *Black Diamond*), the influence of *Paph. fairrieianum* is, however, quite constant in all three hybrids: the down-swept elongated petals, the ruffling of the upper edge of the petals, the enlarged dorsal sepal, and the suffusion of the pink color. Unfortunately, as mentioned earlier, primary hybrids created from crosses between *Paph. fairrieianum* and section *Parvisepalum* do not breed well. The primary hybrids made with species of the *Sigmatopetalum* subgenus (according to Braem's classification) are interesting but not as successful, in terms of further breeding or AOS awards granted. We have already seen at the beginning of this section *Paph. Vexillarium*, a cross with *Paph. barbatum*. This hybrid, although it is the oldest cross made with *Paph. fairrieianum*, was awarded only three times and has a total progeny of 23 hybrids. One successful exception would be the impressive *Paphiopedilum Papa Röhl* (*sukhakulii* × *fairrieianum*) with its 20 AOS awards. This grex is an excellent example of a hybrid that shows improvement over both parents. It exhibits excellent proportions of segments, an interesting striped pattern to the spotting, as well as an outstanding size and coloring. *Paphiopedilum fairrieianum* exerts its influence for red



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coloring and by increasing scape length (Cash 1991).

The cross of *Paphiopedilum acmodontum*, a species discovered in 1976 also classified in the *Sigmatopetalum* subgenus, and *Paphiopedilum fairrieianum* was registered in 2017 as *Paphiopedilum Memoria Carmen Coll*. *Paphiopedilum acmodontum* is an interesting species with its pink-to-red-colored petals and an appreciable natural spread of 3.5–3.9 inches (9–10 cm), and this new hybrid might show interesting potential. Primary hybrids made with species within the same subgenus as *Paph. fairrieianum*, that is the subgenus *Paphiopedilum*, have also given interesting results. Among these crosses, *Paphiopedilum Arthurianum* (*fairrieianum* × *insigne*) and *Paphiopedilum Niobe* (*fairrieianum* × *spicerianum*), which will

be discussed in the next section, were among the first crosses made within the *Paphiopedilum* genus at the end of the 20th century.

**COMPLEX HYBRIDS** As mentioned earlier, *Paph. fairrieianum* has to date a total progeny of more than 9,000 hybrids over 13 generations. Four hybrids are present in the background of most of those hybrids. They are *Paphiopedilum Monte*, *Paphiopedilum Freya*, *Paphiopedilum Thisbe* and *Paph. Niobe*. *Paphiopedilum Monte* is a cross of *Paph. fairrieianum* and *Paphiopedilum Nitens* (a primary hybrid of *Paph. insigne* by *Paph. villosum*, both in subgenus *Paphiopedilum*, as is *Paph. fairrieianum*). It was registered in 1912 by Armstrong and Brown in Kent, United Kingdom. *Paphiopedilum Freya* is a cross of *Paph. Monte* and *Paphiopedilum Golden Fleece*, a complex hybrid that is



composed of *Paph. insigne*, *Paph. villosum* and *Paph. spicerianum*, registered in 1930 by H.G. Alexander Ltd in Avon, United Kingdom. They have a total progeny of nearly 3,900 hybrids, which is almost half the progeny of *Paph. fairrieianum*. It is interesting to note that *Paph. insigne*, *Paph. spicerianum* and *Paph. villosum* are in the subgenus *Paphiopedilum*, the same subgenus as *Paph. fairrieianum*, which could explain the better fertility of the hybrids.

*Paphiopedilum* Thisbe is a cross *Paph. fairrieianum* by *Paphiopedilum* Cymatodes (a cross of *Paphiopedilum curtisii* and *Paphiopedilum superbiens*, two species in the subgenus *Sigmatopetalum*), that was registered in 1911, and like *Paph. Monte*, by Armstrong and Brown. *Paph. Thisbe* has more than 2,800 hybrids in its list of progeny.

*Paphiopedilum* Niobe is a cross of *Paph. fairrieianum* and *Paph. spicerianum*. It is the third cross realized with *Paph. fairrieianum* and was registered in 1889 by Veitch. It is a successful hybrid to breed on and has a total progeny of nearly 2,400 hybrids. *Paphiopedilum* Niobe is an important early parent. It had considerable amount of red-purple in its flowers, and inherited the large dorsal sepal and straighter petals of *Paph. spicerianum*. The petals and pouch were often deep burgundy, and this flower was considered a good first step for making red complex hybrids (Koopowitz 2008).

If we take a closer look at the *Paph. Monte* and *Paph. Freya* progeny, the most awarded hybrids are *Paphiopedilum* Lippewunder, *Paphiopedilum* Valerie Tonkin and *Paphiopedilum* Icy Icy Wind, while the hybrids that were most used in further breeding are *Paphiopedilum* Hellas, *Paphiopedilum* Golden Acres, and *Paphiopedilum* Stone Lovely. Although many other species and hybrids have brought their influence to these hybrids, and hence it is not possible to conclude that this is due to the *fairrieianum* background from a few generations earlier, it is interesting to note that successful hybrids in this line of breeding are mostly yellow, green and orange hybrids.

The most awarded hybrids in *Paph. Thisbe*'s progeny are *Paphiopedilum* Beatrice Ernst, *Paphiopedilum* Keyeshill and *Paphiopedilum* Valwin. The two last were also among the hybrids most used to breed on, along with *Paphiopedilum* Small World. This line of breeding shows a lot of dark-red complex hybrids with a white picotee and some green and red



JAMES OSEN



JAMES OSEN



GLEN BARFIELD



MILTON WITTMANN



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hybrids.

*Paphiopedilum* Valwin and *Paph. Beatrice Ernst* also have *Paph. Niobe* in their background. Interesting descendants of *Paph. Niobe* are *Paphiopedilum* Gigi, a good hybrid to breed on, and *Paphiopedilum* Sioux, a successful hybrid for breeding, which was also awarded many times. It is difficult to nearly impossible to see the influence of *Paph. fairrieianum* in hybrids after three to four generations, although some characteristics sometimes found in complex hybrids, such as the ruffled upper petal edge and the white picotee on the dorsal sepal are characteristic and could be inherited from *Paph. fairrieianum*. *Paphiopedilum fairrieianum* has, however, broadly been used to backcross on many types of paphiopedilums with the objective to strengthen or to obtain desirable characteristics.

**RED INFLUENCE AND ALBINO FLOWERS** The parents of the hybrids backcrossed with *Paph. fairrieianum* in

- [11] *Paph. Valerie Tonkin* 'Exception' AM/AOS; exhibitor: Marriott Orchids.  
 [12] *Paph. Icy Icy Wind* 'Ingleby Snow' HCC/AOS; exhibitor: Woodstream Orchids.  
 [13] *Paph. Lipperwunder* 'John' HCC/AOS; exhibitor: Hilo Orchid Farm.  
 [14] *Paph. Stone Lovely* 'Sunprarie' AM/AOS; exhibitor: Bill Nelson.  
 [15] *Paph. Beatrice Ernst* 'Red Rhythm' HCC/AOS; exhibitor: Anne and Gene Boyd.  
 [16] *Paph. Keyeshill* 'Thanksgiving' HCC/AOS; exhibitor: Stewart Orchids.

this line of breeding have mainly species of the *Sigmatopetalum* subgenus, such as *Paphiopedilum callosum*, *Paphiopedilum lawrenceanum* and *Paph. curtisii* in their background. These hybrids show great vigor and mature rapidly (Koopowitz 2008). However, the drawback is that the parent species are difficult to grow and thus are not easy to produce. Originally, mainly vinicolors were produced in this

line of breeding. Later however, the trend became the use of albino forms of the same parents to produce white and green flowers. A good example of this is *Paphiopedilum* Friedrich Mellin, a cross of *Paph. fairrieianum* with *Paphiopedilum* Alma Gevaert. Up to 1994, mainly vinicolors were produced in that grex. The cross was remade in the 1990s but this time with albino parents, and since 1997, only albino clones have been awarded. In the vinicolor form, *Paph. fairrieianum* blends and spreads the red color, so that it entirely covers the dorsal sepal.

It is difficult to obtain good white and green forms when breeding this type of paphiopedilum. *Paphiopedilum* Friedrich Mellin however gave a few excellent clones (Koopowitz 2008). However, when crossing the albino *Paph. fairrieianum* with albino *Maudiae* types, the result is usually flowers with a pale flush of soft pink in the dorsal sepals, petals or pouch. This can be quite attractive even if disappointing when trying to get pure white and green flowers. Koopowitz (2008) describes this problem as an incompatibility between the parents. *Paphiopedilum* Faire-Maud is another good example of vinicolor cross remade in the white and green colors. It is a successful cross, with 82 AOS awards to date. The intensity of the red and purple in vinicolors is so dark that it is sometimes likened to being black. *Paphiopedilum* Faire-Maud has a relatively high number of progeny with 20 hybrids, considering the usual sterility of this kind of hybrid. An outstanding cross that is worth mentioning in this category is certainly *Paphiopedilum* Varvara, a cross of *Paph. fairrieianum* with *Paphiopedilum* Clair de Lune. The beautiful and characteristic pattern of the large dark-burgundy dots over striping and the white picotee are consistent through all clones of this grex.

**LARGE-FLOWERED COMPLEX HYBRIDS** From the late 1970s to the 1990s, a lot of backcrosses have been realized with *Paphiopedilum fairrieianum* over complex, bulldog-type hybrids. A characteristic shape of flower was obtained, with a large, rounded, but elongated dorsal sepal and a ruffled, upper petal edge. As for other hybrids previously shown, when markings are present, they are displayed as small dots in longitudinal rows. The petals have characteristic down-swept shoulders. When the albino form of *Paph. fairrieianum* is crossed with an albino or near-albino complex hybrid, it is usual for the resulting hybrid to have a bronze cast or, in some cases, warm



autumn tones as the flower ages. When a colored *Paph. fairrieianum* is mated with a white complex flower, it results in a white flower with light purple markings arranged in longitudinal rows (Koopowitz 2008).

Beautiful examples that show the aforementioned typical characteristics are *Paphiopedilum* Dragon Bronze (Hellas ×); *Paphiopedilum* Scarborough Fair (× Greenvale), which turned out to be a fertile hybrid; *Paphiopedilum* Hsinying Hugo (× Carneros Creek); *Paphiopedilum* Fairy Lace (White Legacy ×) and *Paphiopedilum* Plumfairie (× Plumly), among many others.

**CONCLUSION** *Paphiopedilum fairrieianum* is certainly an elegant and beautiful species that awakens admiration and delight in people, orchid lovers or not. It is often found in the list of judges' favorite orchids. It is fascinating to see that even at the beginning of the 20th century, it was so appreciated and admired that orchid growers would be willing to pay large amounts of money to obtain the plant and that orchid hunters would even risk their lives to rediscover



- [17] *Paph.* Valwin 'Triumph' AM/AOS; exhibitor: Hanes Orchids of Distinction.  
 [18] *Paph.* Gigi 'Claymore' AM/AOS; exhibitor: Robert I. Ballinger, Jr.  
 [19] *Paph.* Sioux 'Dove' AM/AOS; exhibitor: Valerie and Jack Tonkin.  
 [20] *Paph.* Friedrich Mellin 'Canaima' AM/AOS; exhibitor: Michael Sinn.  
 [21] *Paph.* Varvara 'Huntington's Midnight' AM/AOS; exhibitor: Huntington Botanical Gardens.  
 [22] *Paph.* Faire-Maud 'Jin's Dragon' HCC/AOS; exhibitor: Orchid Dynasty.



its location in remote mountains of India and Bhutan.

Having been known in the West for more than 150 years, significant advances have been accomplished in breeding this charming species. It respectfully has over 9,000 hybrids registered over 13 generations, and its influence over other types of paphiopedilums is well known today. Orchid breeders know how to use it to obtain desirable traits such as contrast and deep-red color or an elongated and pleasing shape. However, considering the difficulty to breed further than the first generation of hybrids, lines of breeding with *Paph. fairrieianum* are somewhat limited. The use of oryzalin to induce polyploidy in *Paph. fairrieianum* is currently being explored. This could provide more fertile offspring to cross with complex hybrids, many of which are polyploids. This could help push the boundaries further in *Paph. fairrieianum* breeding.

However, *Paph. fairrieianum* could be an adequate species to use in the so-called “teacup” line of breeding, that is, breeding for cute, small and well-balanced flowers. It would be interesting too to breed it with new species of *Paphiopedilum* discovered in recent years, such as *Paph. acmodontum*, *Paphiopedilum rungsuriyanum* or *Paphiopedilum canhii*. Unfortunately, the love and admiration for this orchid also led to its near-extinction in the wild. Let us hope that local conservation and protection programs as well as its reinsertion in the wild will be successful and that *Paph. fairrieianum* will continue to prosper in its natural habitat, not just in cultivation.

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- [24] *Paph. Fairy Lace 'Tapestry'* AM/AOS; exhibitor: Marriott Orchids.
- [25] *Paph. Hsinying Hugo 'Hsinying'* AM/AOS; exhibitor: Ching Hua Orchids.
- [26] *Paph. Dragon Bronze 'Big Top'* AM/AOS; exhibitor: Cal-Orchid, Inc. Photograph from the AOS Award Archives.

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# Do *Lepanthes* Use Fungal Friends

TEXT AND PHOTOGRAPHS BY PIOTR TUCZAPSKI

CLIMBING THE STEEP muddy road up to Cerro Amigos in Costa Rica for the first time, I was astonished by the view that suddenly appeared in front of me — the enormous cloud forest of Monteverde. The elevation gain was only about 273 yards (250 m) but as I was weighed down by the sampling equipment and a camera in my backpack, this climb would take about two hours. I frequently stopped, gasping for air. These breaks gave me the chance to take a good look at the ancient, mossy trees around me with their branches standing out against the background of the lush forest canopy like a vein system of some enormous organism. It gave a slightly eerie look to this special place, and the velvety grey clouds cocooned the forest — almost as if they were purposely hiding discoveries yet to be made.

The impact Monteverde's cloud forest has on the imagination is perhaps one of the reasons why so many biologists are attracted to the area. I was tired and soaking wet on this rainy afternoon, but the cold wind brushing my face kept me awake. Along the trail, there were spots with scattered trees, and you could use them as entryways to the forest. It was in one of these places that I saw a small, dark green, hand-sized plant suspended from the trunk of a nearby tree. I felt my heart beating faster as I realized it was my first *Lepanthes*, an orchid I had been searching for. My eyes followed the branches of the tree, and I noticed they were full of orchids with similar leaves. These could be potentially another species, since many *Lepanthes* can be distinguished only by the tiny, colorful flowers. Excited, I jumped forward to inspect them closely. Could there be more than one *Lepanthes* species?

I was here to find three *Lepanthes* orchids that are endemic to the region. My goal was to collect root samples and I knew that I had to act fast once I picked them off. That is because it was not the roots I was after — I was looking for microscopic organisms inside the roots: mycorrhizal fungi, which deteriorate if not frozen quickly. These fungi are beneficial partners of orchids and of most (80–90 percent) other land plants. They



[1] Overview of the Monteverde Cloud Forest Biological Preserve.

are critical in allowing plants to colonize the land by enabling their access to new sources of nutrients (Smith and Read 2010). However, orchids rely on them even more than most plants.

In contrast to most other plant seeds, orchid seeds lack the food reserves for their seedlings to grow. As a result, all orchids depend on a fungal partner (mycorrhizae) to provide the resources for their seeds to germinate. These fungi are free-living in the environment independently of orchids. An orchid seed must thus land on the surface with the required fungi to grow. The landing site is especially important for seeds of orchids that grow on the tree branches (epiphytes) like *Lepanthes* because they probably need a particular fungal partner that would allow them to survive in extremely harsh conditions (since there are few nutrients on tree trunks, drastic fluctuations of moisture, etc.),

I was thrilled to see that indeed all three of my *Lepanthes* species occupied the same tree. I carefully collected the roots, placed them in the labeled glass vials, and hurried to my field station where I could process my samples.

MONTEVERDE My fieldwork site is in a truly remarkable setting — Monteverde's tropical-mountain cloud

forest in Costa Rica. Monteverde is placed in the Cordillera de Tilarán mountain range, which stretches southeast from Cerro Nubes at 3,346 feet (1,020 m) through Cerro Amigo at 6,043 feet (1,842 m). Its unique position between the Pacific and Atlantic oceans, together with relatively high altitude, has created ideal conditions for the extraordinarily high floral diversity including an estimated 600 species of orchids. It is an astonishingly large portion of the region's flora (approximately 1,700 species) (Nadkarni and Wheelwright 2000). The area experiences wet, transitional and dry seasons, and, during the latter two, trade winds bring moisture from the Caribbean Sea, immersing higher elevations of Monteverde in clouds (Johnson et al. 2005).

My story with Monteverde began three years ago (2018) when I contacted Diego Bogarín, PhD. I was starting my PhD program, and I knew I wanted to study orchid mycorrhizae in *Lepanthes*, a huge Neotropical genus of miniature orchids of over 1,200 species. Diego was finishing his PhD on *Lepanthes* phylogeny (relationships) at the time in Lankester Botanical Garden, and I knew that if anyone could help to pull off my project, it was him.

He suggested Monteverde as a study

# to Live in Harmony?

site, as it is home to around 20 *Lepanthes* species including several that are endemic. A few months later, Javier Espeleta, PhD, an alumnus of the Plant Biology department at the University of Georgia, was a guest speaker at the departmental seminar. I had the pleasure to meet Javier before his talk, and it turned out he is the former director of the Tropical Science Center and Monteverde Cloud Forest Reserve (MCFR). He kindly offered to put me in contact with the head of research at MCFR to start applying for permits. At that moment, everything came together – and the rest is history. Javier mentioned that Monteverde has a unique community and history, but I was not aware of the full meaning of this at the time.

Monteverde's history starts in 1951 with the arrival of 44 members of the Quaker community (or Friends, as they refer to themselves) from Fairhope, Alabama. They decided to move to Costa Rica for political and religious reasons in the USA and took advantage of the favorable political situation for them (the Costa Rican president at the time invited foreigners to come and help develop the country). The Quakers established a community that agreed on a visionary plan to leave a third of their land untouched to protect headwaters that serve as a source of fresh water for their farms. They called it Watershed Property, which is thought to be the first private reserve in Costa Rica.

In the 1960s, biologists started visiting the region, and, in 1970, George and Harriett Powell, graduate students from California, arrived introducing a new concept of conservation. The rate of deforestation in the area was high enough at the time to alarm the Powells, who raised enough money to buy out parcels of land from the local homesteaders. Together with the land donated by Quakers' Watershed Property, these parcels became Monteverde Reserve, which now covers around nearly 26,000 acres (10,500 ha) and is administered by a scientific research organization called the Tropical Science Center.

Today, Monteverde has a thriving community consisting of local people, tourists, descendants of the Quaker



[2] Fragment of the trunk of an oak from the first site we visited hosting a large population of *Lepanthes monteverdensis* and *Lepanthes falx-bellica*. What a relief this sighting was: there are enough plants to sample without hurting the population, and they are within reach.

settlers, and scientists. The region has institutes that host graduate and undergraduate courses in tropical biology. There is no shortage of students who come to experience homestays, learn Spanish, and intern in cultural events organized by Monteverde Friends School, which was established by the original settlers!

**THE PROJECT** I still had an important mission before the expedition could begin in Costa Rica. I had to find a way to obtain a crucial component to store my samples – liquid nitrogen. When I arrived in San Jose, I was surprised by how the city's architecture, and the candidness and friendliness of local people reminded me of my home country, Poland. I was still frantically trying to make last-minute arrangements with a colleague from Lankester when my advisor's plane arrived.

"We will pick up liquid nitrogen from a cattle farm I am friends with," she said. Now that is a lab supplier I have not thought of! Soon we were driving a gravel road winding through the undulating foothills of the Cordillera de Tilarán, with the nitrogen hissing ominously on

the steeper parts of the approach as the container tilted. Upon our arrival, we were welcomed by Tarsicio and Marianela, our hosts, together with Mike, a retired chemist who, captivated by the Quaker values of the community, had decided to become an indefinite resident.

We rushed to meet our guide and to scout the area for orchids. As we arrived at the first site, a pasture with two magnificent old oaks, we noticed their trunks were covered with a dense mat of what must have been dozens of *Lepanthes* plants. We looked at each other and smiled. Such a big population of orchids on one tree was indicating that there must be many more *Lepanthes* in the area. For the first time, it became obvious that my project was feasible.

What is my graduate project? I want to determine the mycorrhizal partners of three *Lepanthes* species: *Lepanthes monteverdensis*, *Lepanthes falx-bellica* and *Lepanthes cribbii*.

Most of the information on orchid–fungal interactions comes from studies on terrestrial orchids from temperate regions (McCormick and Jacquemyn 2014), even

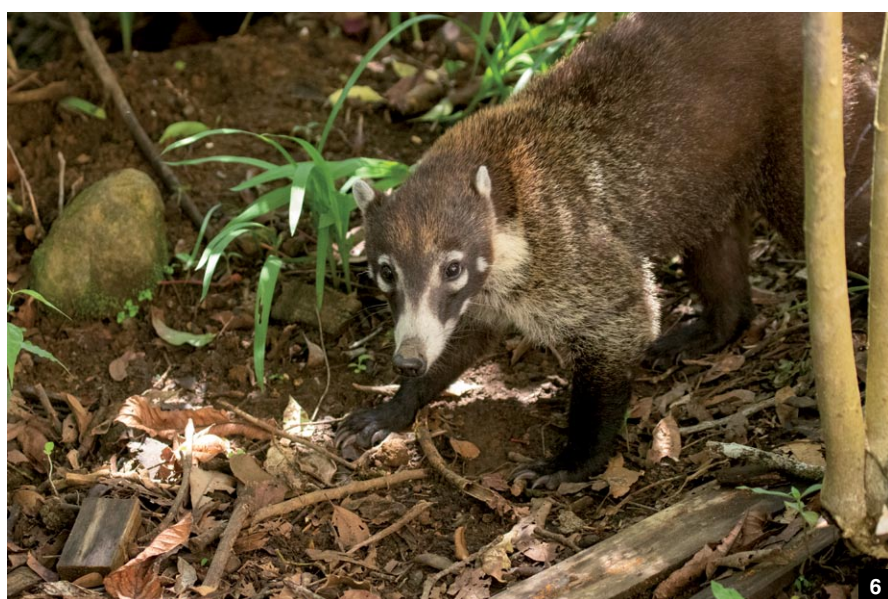




though an astounding 70 percent of all orchids are tropical epiphytes. I am interested in whether such specialization could partly explain the astonishing diversity of orchids in cloud forests, allowing multiple orchids to co-occur by partitioning resources via partnering with different fungal partners.

*Lepanthes* is a fantastic genus upon which to study this idea since it has undergone rapid speciation, with 1,200 species that radiated in the last 2.5 million years (which is considered a short time) (Pérez-Escobar et al. 2017). Given that fungi are necessary for orchids to develop from seeds, I hypothesize that orchids need to tap into different fungi to coexist. That way, these plants would be able to access different nutrient sources. It could partly explain why so many of them can share the same tree or even a single branch as I witnessed many times in Monteverde. I decided to focus on endemic *Lepanthes* species since they are more likely to have profoundly distinct fungal communities. This is because they have likely all originated in the same area, to which they are limited. Since establishing an interaction with particular fungi is needed for germination, if a given population of plants switched to different fungi, it could presumably even lead to the rise of a new orchid species over time.

There are a few studies documenting this phenomenon of partitioning fungi between co-occurring orchids (Waterman et al. 2011; Jacquemyn et al. 2012a, 2012b; Cevallos et al. 2017), which suggest that orchids specialize on preferred partners. Now we have an exciting opportunity to better understand whether orchids associate with specific fungi and if this, in turn, impacts their



distribution and scarcity. Next-generation sequencing (a group of techniques that provide information on the DNA sequence of a target organism) is becoming more affordable, and scientists now can more accurately capture a full array of fungi that live in the orchid root. Thanks to this improvement in technology, researchers now begin to realize that even the orchids that previously were thought not to be picky in choice of a partner actually specialize with one or two of a broad spectrum of fungi (Shefferson et al. 2019).

Over the weeks in Monteverde, my everyday routine was similar; however, it was by no means monotonous. I would wake up early in Tarsicio and Marianela's cabin at around 4,600 feet in elevation (1,400 m) and then explore nearby steep forest trails searching for *Lepanthes*. Even though Monteverde is a popular

[3] *Lepanthes monteverdensis*

[4] *Lepanthes falx-bellica*

[5] *Lepanthes cribbii*

[6] One of the visiting coatis.

tourist attraction, it remains largely uninvestigated. There is no information about how many *Lepanthes* species are in the area and how large the populations are. You must locate these plants first, and it was my job. I would hike surrounding areas searching for *Lepanthes*, and quite quickly my vision fine-tuned to shady conditions of the understory, scanning for a distinctive pattern of tiny *Lepanthes* leaves wiggling from the tree branches. Since my advisor had to return to her duties at the university shortly, I did most of these excursions on my own. Only 3 percent of Monteverde Reserve is open to the public, and it does not take a long hike to find oneself in the wilderness. I was not



alone though, as amidst the forest you could occasionally hear a hummingbird buzz somewhere above your head in the canopy or an outwardly metallic “boink” sound of the three-wattled bellbird (*Procnias tricarunculata*), and I was frequently visited by coatis (*Nasua* and *Nasuella* sp.) trying to steal my lunch from the backpack.

I would often find several species of *Lepanthes* growing on the same tree with not a single individual in the surrounding forest. I collected root samples only from big populations unlikely to be negatively impacted by disturbance. The descent was much easier than climbing and would take me only about 20 minutes, but the “workday” was not over yet, as roots had to be quickly processed and stored to preserve mycorrhizal fungi.

**SIGNIFICANCE** The extreme dependency of orchids on their ability to form mycorrhizae with specific fungal partners could partly explain why many orchids are found only in small fragments of the forest. This idea must, however, be investigated further because the findings might be tremendously important for orchid conservation. The group of *Lepanthes* orchids in Monteverde provides an unprecedented opportunity for an insight into whether fungal mutualists can be a potential factor contributing to orchid diversity, which has been often suggested but rarely studied. Information about which fungi can sustain orchids and affect the distribution of their populations is becoming increasingly important to orchid conservation as these plants lose their habitat due to human activity. Even though all orchids are protected under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and many by national regulations, the areas where they grow are often not. This is a huge problem because many forests are being cleared and fragmented for agriculture, mining for the oil industry, and road construction. With rainforests gone, so are the fungi necessary for orchids to grow. While Costa Rica has a reputation as a leader in successfully implementing conservation goals, the numbers are not optimistic. Overall deforestation in Costa Rica still outpaces reforestation, even though the province of Puntarenas (including Monteverde) registered a net increase in forest cover for the last 20 years (Zahawi et al. 2015). If we want to save the orchids we definitely need to know which fungal friends they need to sustain them and whether different orchids use different



fungal partners or compete for the same ones.

#### Acknowledgment

I thank the Plant Biology department at the UGA, Monteverde Cloud Forest Biological Preserve, Lankester Botanical Garden, Tinker Foundation and Monteverde Orchid Garden for supporting this project.

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[7] Entrance to the Monteverde Cloud Forest Reserve where the Tropical Science Center station kindly provided the author with a workspace to process samples.

[8] The author collecting samples.

[9] *Lepanthes monteverdensis* individual labeled for sampling (green dot).

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# Carl Friedrich Schmidt

## Botanist and Artist

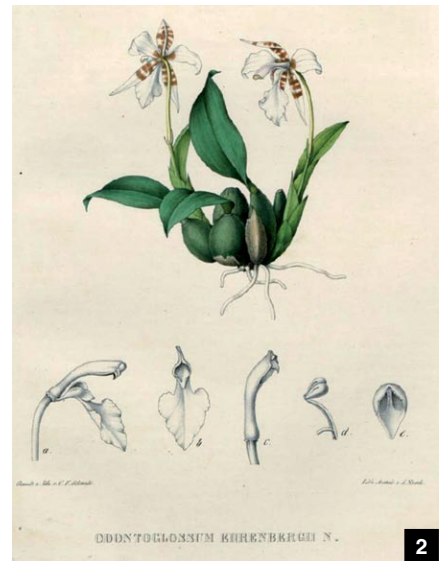
BY RUDOLF JENNY

CARL FRIEDRICH SCHMIDT was born on December 22, 1811 in Stettin, Germany. His uncle Carl Röthig was drawing teacher at the "Gärtnerlehranstalt" (Gardening School) in Schöneberg, Berlin, who, above all, was interested in drawing flowers and plants. Röthig was the one who introduced young Carl Schmidt to the art of botanical drawings and based on this training, Schmidt was accepted at the Academy of Arts in Berlin in 1831. He finished his studies in 1838 with the degree of an Academic Artist. During his studies he also came in contact with the relatively new technology of lithography and years later he perfected this technology in his own atelier. During a short time at the Academy of Arts in Munich, Schmidt met Philipp von Martius and back in Berlin he also got in contact with Johann Heinrich Friedrich Link and Diedrich Franz Leonhard von Schlechtendahl, both famous botanists. All three were impressed by Schmidt's skills and later used his services. In 1840, he married Christiane Johanne Kast and in 1843 he followed his uncle Carl Röthig as drawing teacher at the Gardening School in Schöneberg, a position he kept until 1853. From 1853 to 1887 he acted as teacher at the Friedrich Werderschen high school. Beside his occupation as teacher, in 1859 Schmidt founded his own lithographic atelier, which he announced in 1859 in *Botanische Zeitung* and in 1860 in *Bonplandia*. In 1865, he received the title Professor in recognition of his services as a natural history draftsman and lithographer. Up to his death on April 8, 1892 he produced thousands of drawings and lithographs, and following several authors of his time, he was one of the best and most productive botanical artists in Europe.

Schmidt illustrated a series of books from different authors, and some of his drawings of orchids from famous botanical books will give a good impression of his great skills in drawing and lithography. An example is the drawing of *Rhynchopera pedunculata* from *Icones Plantarum*



1



2

*Rariorum Horti Regii Botanici Berolinensis*, published in 1844 by Johann Heinrich Friedrich Link, Johann Friedrich Klotzsch and Christoph Friedrich Otto. The two volumes were published in eight parts from 1840 to 1844 and include a total of 48 colored lithographs of plants from the collections of the Botanical Garden Berlin, made after Schmidt's original drawings. *Rhynchopera pedunculata* was described as a new species by Klotzsch, and Reichenbach recombined it in 1850 in *Linnaea* to *Pleurothallis pedunculata*. Several other plates of orchids were included in the book, for example, *Oncidium carthagenense* (*Trichocentrum carthagenense*), *Spiranthes lindleyana* (*Cyclopogon lindleyanus*) and *Odontoglossum ehrenbergii* (*Rhynchostele ehrenbergii*).

Another example is the beautiful plate of *Coryanthes albertinae* from *Auswahl neuer und schön blühender Gewächse Venezuelas*. This book was published by Gustav Karl Wilhelm Hermann Karsten in two deliveries and 12 colored lithographs after Schmidt's drawings. Karsten collected in Venezuela and came back with a collection of living plants, and he wrote that the drawing was made after living plants in the collections of



3  
RUDOLF JENNY

[1] Portrait of Carl Friedrich Schmidt.

[2] Schmidt's drawing of *Rhynchostele ehrenbergii* (as *Odontoglossum ehrenbergii*) from *Icones Plantarum Rariorum Horti Regii Botanici Berolinensis*.

[3] Flower of *Rhynchostele ehrenbergii*.



4

WIEL DRIESSEN



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7

GÜNTER GERLACH



8

RUDOLF JENNY



9

Rudolf Ludwig Decker in Berlin and John Cornelius Booth in Hamburg. *Coryanthes albertinae*, described by Karsten, is today still accepted as his own species. Eleven years later, in 1859, Karsten started with the publication of his *Florae Columbiae terrarumque adiacentium specimen selecta*. The two volumes were published from 1859 to 1869 in a total of 10 parts, each with 20 plates. The plates were based on drawings of Schmidt and of Düwel. Karsten described *Talpinaria bivalvis* as new species in Part 4 of Volume 1 in 1861 (t.76). Reichenbach included Karsten's taxon in 1886 in *Flora* in the genus *Pleurothallis* but had to give it a new epithet (species name) because *Pleurothallis bivalvis* already existed, so

he named it *Pleurothallis talpinaria*.

Plants played a very important role in medicine and for a long time most books about botany were mainly about plants of medicinal use. When Otto Carl Berg, professor of pharmaceutical botany, and Carl Friedrich Schmidt published their *Darstellung und Beschreibung sämtlicher in der Pharmacopoea Borussica aufgeführten Offizinellen Gewächse* from 1858 to 1863 (translated: Presentation and description of all medical plants listed in the Prussian Pharmacopoeia), they showed only one orchid: *Vanilla planifolia*. The work was published in four volumes with a total of 204 lithographs, 198 of them in color, and all prepared from Schmidt's drawings.

[4] Schmidt's drawing of *Pleurothallis pedunculata* (as *Rhynchopora pedunculata*) from *Icones Plantarum Rariorum Horti Regii Botanici Berlinensis*.

[5] Flower of *Pleurothallis pedunculata*.

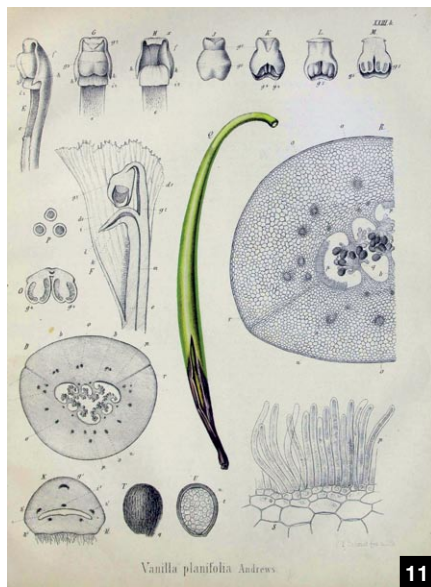
[6] Drawing of *Coryanthes albertinae* from Karsten's *Auswahl neuer und schön blühender Gewächse Venezuelas*, 1848.

[7] Flower of *Coryanthes albertinae* Karsten.

[8] Drawing of *Pleurothallis talpinaria* (as *Talpinaria bivalvis*) by Schmidt from *Florae Columbiae terrarumque adiacentium specimen selecta*, 1861.

[9] Flower of *Pleurothallis talpinaria*.





There are two plates of *Vanilla planifolia*, one of the plant with inflorescence and open flower (t.23a) and a second one with morphological details of the flower and the seed capsule (t.23b). Benjamin Dayton Jackson described the work as “A thoroughly good book, probably the very best of its class; both in text and illustrations.”. Another drawing of *Vanilla planifolia* by Schmidt was published in 1890 in *Köhler’s Medizinal-Pflanzen in naturgetreuen Abbildungen mit kurz erläuterndem Texte*. The work was published by Gustav Pabst and Fritz Elsner in two volumes in 50 deliveries with a total of 203 lithographs. Not all of the plates were from Schmidt; Walther Müller also delivered a series of drawings. As Sitwell and Blunt stated in 1990: “From the botanical standpoint the finest and most useful series of illustrations of medicinal plants.”

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- [10–11] Schmidt’s drawings of *Vanilla planifolia* from *Darstellung und Beschreibung sämtlicher in der Pharmacopoea Borussica* aufgeführten Offizinellen Gewächse, 1861.
- [12] Drawing of *Vanilla planifolia* from Köhler’s *Medizinal-Pflanzen in naturgetreuen Abbildungen mit kurz erläuterndem Texte*, 1890.
- [13] Flower *Vanilla planifolia*.

ADAM KARREMANIS

# *Paphiopedilum helenae*

## The story of its discovery

BY OLAF GRUSS AND LEONID AVERYANOV

*PAPHIOPEDILUM HELENAE* WAS found in northern Vietnam in the Cao Bang province near the border with China in September 1995 by Leonid Averyanov. For many years, only a few species of the genus *Paphiopedilum* were known from Vietnam. Therefore, this discovery of the location of the long-lost *Paphiopedilum delenatii*, which was first found between 1913 or 1914 by a French soldier in Tonkin in what was then French Indochina near Hanoi, was outstanding.

*Paphiopedilum delenatii* was found in 1922 by Poilane at NhaTrang, a French collector in Annam, who brought the plants to Europe. Some of these plants were cultivated by Délénat and later by Mornay, the head gardener of the Fleuriste Municipal de la Ville de Paris. The Vacherot & Lecoufle nursery received a plant from this collection. Dr. Guillaumin mentioned this new species in 1924 in the *Bulletin Société Botanique de France* and then described it in 1925 in the *Journal de la Société National d'Horticole*. He named the plant after the first cultivator, Délénat.

Since these first two collections, no further discoveries were made until about 1990. On the one hand, the war in this region resulted in extensive destruction of the natural environment and, on the other hand, after the liberation from the colonial power of France, a political re-education camp was created in the area.

All plants of *Paph. delenatii*, which had been in cultivation until then, were progeny from the original collection and culture of Vacherot & Lecoufle. After the end of the Vietnam War, there was an expectation that the location of this coveted species would be found. Other locations became known only in the early 1990s.

About the same time, Leonid Averyanov, from what is today St. Petersburg in Russia, began to intensively explore the orchid flora with his Vietnamese colleagues. At a meeting in China, he told me a detailed story about the discovery of another outstanding



species of lady's slippers from northern Vietnam.

*"The story of the discovery of Paphiopedilum helenae is easy to tell. In September 1995, I came with my Vietnamese friends Nguyen Tien Hiep*

[1] Painting of *Paphiopedilum delenatii* from *Revue Horticole* 1926.



and Dzuong Duc Huyen to the karst region of the province of Cao Bang near the border with China. I expected to find additional plants of *Paph. hirsutissimum*. At this time, no other species were known from this region. But tales from the local population suggested that there might possibly be other species to be found. We traveled around for a few days and were very tired since exploring this landscape was extremely difficult. There were karstic lakes, streams, deep gorges, vertical walls and cliffs, many karst caves, many stalactites and stalagmites, caves, etc. Nevertheless, our efforts in exploring numerous elevations of the karstic peaks of the plateau were unsuccessful and my companions had already lost hope of finding any lady's slipper orchids. I was also very disappointed that our hopes were not fulfilled. On the last day, I climbed alone to a nearby summit. My friends saw no chance of success there and, therefore, waited for me at the foot of the mountain.

Climbing the very steep, rocky, often almost vertical slopes was quite difficult and every 325 feet (100 m), I needed a short break, especially as I got closer to the summit, which was usually ended by a vertical cliff. I always had to find cracks or crevices to step into to reach the summit. It was not an easy trip, and it took a long time and lots of strength. Near the mountaintop, I was so tired that I laid down in the shade on rocky ground and closed my eyes for a few minutes to catch my breath and, also to calm my trembling legs. When I was lying on my back, I looked up and was stunned. All the mossy cliffs that were just 100–130 feet (30–40-m) high up to the summit were covered with hundreds of tiny, unknown lady's slippers. The plants were in full bloom and were incredibly beautiful with rigid, bluish leaves that were only 0.9–1.6 inches (2–4 cm) long.

The pale yellow flowers were 1.6–2 inches (4–5 cm) across. It was a fantastic picture and exceeded my wildest dreams. It really does not happen every day and not to everyone who explores landscapes. All the cliffs were brightly lit by the afternoon sun. I took photos, collected a few plants, and quickly started the decent as the darkness was getting closer and thus dangerous. Shortly before it was completely dark, I reached my friends on the lake shore below the mountain. They did not expect anything interesting and were, therefore, completely surprised by my discovery, especially when I showed them the collected plants.



2

OLAF GRUSS



3

C.X. CANH

A few days later we returned to Hanoi. There I then made a drawing of the new species and prepared the description. I decided to name this new species after my wife, who is similarly pretty, small and elegant and has golden-yellow hair like the flower color of the newly discovered species of lady's slippers, which is now known as *Paphiopedilum helenae*.

The fate of the species at this location was sad. Only two months after the

[2] *Paphiopedilum delenatii* 'Grassau'

[3] *Paphiopedilum delenatii* in situ in Vietnam.

[4–5] In northern Vietnam in search of new *Paphiopedilum* species.

[6] Leonid Averyanov in northern Vietnam, 1995. Photograph courtesy of L. Averyanov.

[7–9] Habitat typical of *Paphiopedilum helenae*.



publication of the description, orchid dealers engaged the locals to collect the plants. As a result, all plants, including seedlings, were completely collected in a few weeks. Several years later, the local authorities built the highway on the site and transformed the whole area into a “beautiful tourist region.”

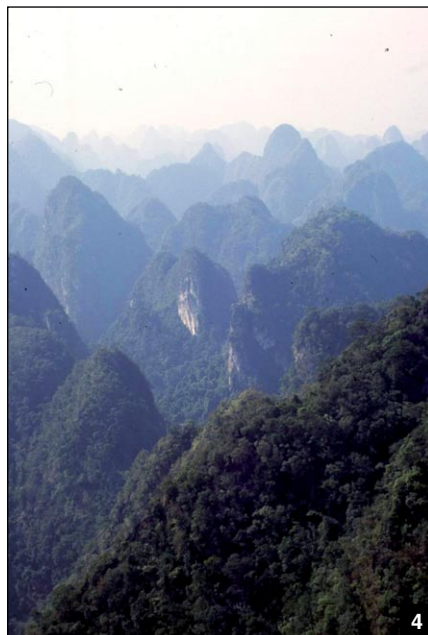
As a result, old virgin coniferous forests were completely cut down, burned and replaced by ornamental exotic trees and shrubs. The original natural environment was completely destroyed in 10 years. The stalactites and stalagmites from the many nearby caves were also thrown into the street gravel. When I visited this place 12 years later, I found another planet that had nothing to do with the past.

Meanwhile, the discovery of *Paph. helenae* has had a great impact. The exploration of the limestone area in northern Vietnam has been accelerated. It really opened an era of great *paphiopedilum* discoveries, which was evident in the discovery of many amazing new species in North Vietnam. Each of these new species in turn has its own story of discovery.”

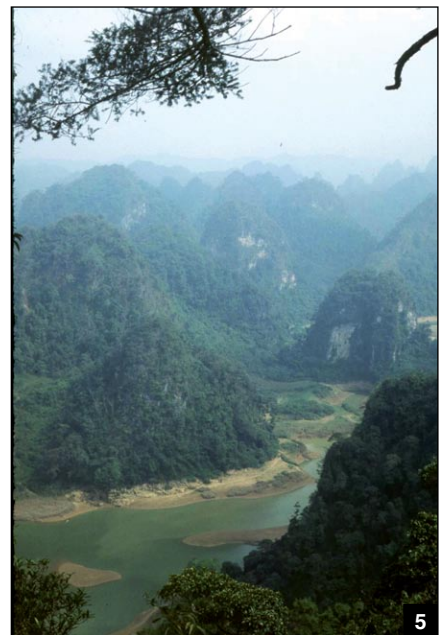
More than 20 years later, isolated occurrences of the species can be found in the habitat or in the vicinity, as C.X. Canh keeps sharing the results of his explorations at various locations in Vietnam again and again on Facebook with outstanding pictures and lets us participate in his explorations. For this purpose, the species was also seed propagated in large numbers, so that it is not necessary to remove plants from the habitat.

The species varies greatly in the shape and color of the flower, as well as the size of the leaves. The flower color ranges from intense yellow to slightly brownish. There are regional occurrences of plants with almost succulent small leaves, but also some in which the leaves are almost like those of *Paphiopedilum barbigerum*.

In 1999, Gruss and Roeth described the pure yellow form as *Paphiopedilum helenae* f. *aureum*. These pure yellow clones are also somewhat variable in their shape and in the intensity of their color. They can also be more greenish with a fine or pronounced white border on the dorsal sepal. In 2001, Liu and Zhang described a “new” species of the genus *Paphiopedilum* and named it *Paphiopedilum delicatum* after the coloring of the flowers. The black and white drawing showed the typical plant and flower of *Paph. helenae*. No color



LEONID AVERYANOV



LEONID AVERYANOV



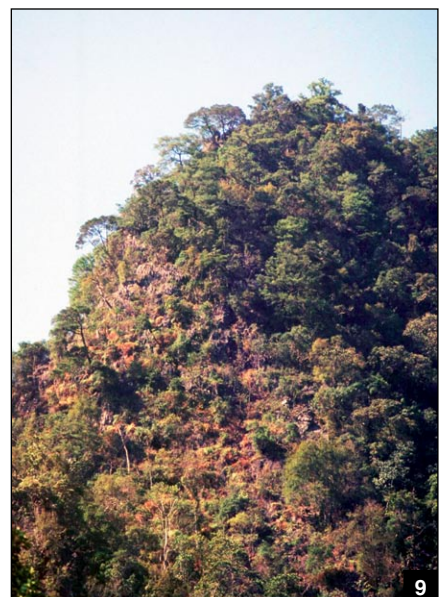
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[10] *Paphiopedilum helenae* in situ. Photograph by Leonid Averyanov.

[11] The karst region of northern Vietnam is riddled with caves such as this one accessible only by boat. Photograph courtesy of L. Averyanov.

[12] *Paphiopedilum helenae*, photographed by Olaf Gruss, artificially propagated in China. Inset photograph, by Franz Glanz, of a group propagated in Europe by Franz Glanz.





OLAF GRUSS





13 C.X. CANH



14 OLAF GRUSS

image was shown in the description nor in any other publication. So, this name is synonymous with the typical *Paph. helenae*.

Olaf Gruss and Franz Fuchs downgraded *Paph. delicatum* to a color form of *Paph. helenae*. Such plants bloomed in the Botanical Garden in Linz. In the recombination, the two authors wrote:

“The surprise was great when plants appeared that largely have the same plant and flower shape as *Paph. helenae*, but showed a pink-violet coloring of the flowers. The difference from the normal form do not justify maintaining it as a new species. But [sic] it makes sense to classify this unusual color form as an independent form.”

Therefore, the official name of this attractive color form is today:

***Paphiopedilum helenae* Aver. f. *delicatum*** (Z.J. Liu et J.Y. Zhang) O. Gruss et Fuchs.

Basionym: *Paphiopedilum delicatum* Z.J. Liu et J.Y. Zhang.

In 2010, Jürgen Roeth described another variety of the species based on a plant that had bloomed at Wolfgang Peschutter in Dochtersen in Germany as *Paph. helenae* var. *peschutteri* (Roeth). According to the descriptor, this plant differed from the typical species in that it had longer leaves with red-brown spots at the base, short-haired edges, white-haired peduncle and ovary, and elliptical dorsal sepal with a white tip, elongated, egg-shaped staminode with a small tip at the front and a wide-elongated wart on the staminode. The characteristics of this individual clone are in the normal range of *Paph. helenae* and are not sufficient to establish a new variety.

#### Acknowledgments

On the one hand, I thank the many photographers who made their material available to me, and on the other hand the gardeners and orchid friends who gave me the opportunity to take photographs of their collections. My thanks to Judith Rapacz-Hasler for the German-to-English translation.

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FRANZ GLANZ

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Naturelle, *Journal de la Société Nationale d'Horticulture*, Ser.1 (31):263–264.

Liu, Z.-J. and J.-Y. Zhang. 2001. *Paphiopedilum delicatum* sp.nov., a New Orchid from Central Vietnam. *Acta Phytotaxonomica Sinica* 39(1):78–79.

— Olaf Gruss is internationally recognized for his work with *paphiopedilums*, *phragmipediums* and *phalaenopsis*. He has written books about the genus *Phalaenopsis* and the *albino* forms of the genus *Paphiopedilum*, as well as a book and a booklet about the genus *Phragmipedium*. He has been a member of the editorial board of the journal of the German Orchid Society, *Die Orchidee*. Gruss resides in Germany and lectures throughout Europe, Japan, Taiwan, China and the U.S. In der Au 48, 83224, Grassau, Germany (email: a-o.gruss@t-online.de).

— Leonid V. Averyanov is president of the Russian Botanical Society and professor in the Herbarium of the Komarov Botanical Institute of the Russian Academy of Sciences in St. Petersburg, Russia. His main scientific interests are plant taxonomy, plant geography and nature

[13] *Paphiopedilum helenae* f. *aureum* photographed by C.X. Canh in situ.

[14] Comparison of the *aureum* form with typically colored forms.

[15] *Paphiopedilum helenae* f. *delicatum* [Franz Fuchs]

protection with particular interest in orchids and other monocots of Russia and Vietnam. He is author of about 600 scientific publications, including *Slipper Orchids of Vietnam*. Komarov Botanical Institute of the Russian Academy of Science, Prof. Popov Str. 2, St. Petersburg, 197376, Russian Federation (email: av\_leonid@yahoo.com).









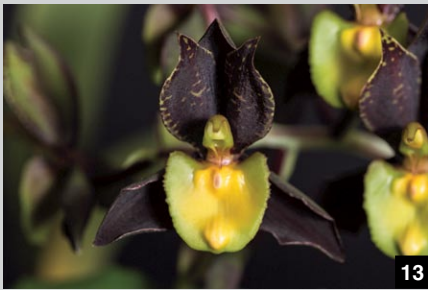
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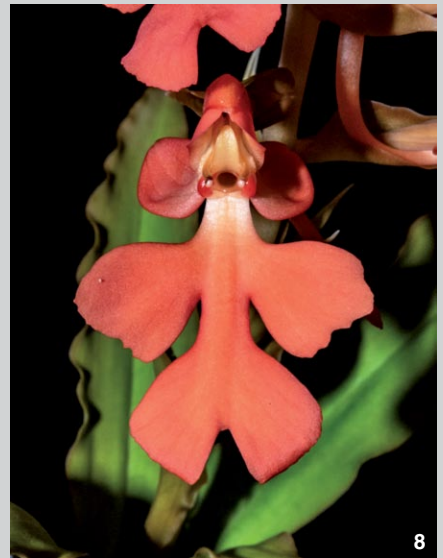
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- [1] *Masdevallia veitchiana* 'Entre Flores' AM/AOS 82 pts. Exhibitor: Daniel Piedrahita; Photographer: Juan Carlos Uribe. West Palm Beach Judging
- [2] *Cattleya* Landate 'Ponkan' HCC/AOS (*aclandiae* x *guttata*) 77 pts. Exhibitor: Krull-Smith; photographer: Wes Newton. Florida North-Central Judging
- [3] *Cattleya cernua* 'Bubbly Kalena' CCM/AOS 86 pts. Exhibitor: Charles and Jane High; photographer: Anne Kotowski. Chicago Judging
- [4] *Renanopsis* Lion's Splendor 'Helen' CCE/AOS (Lena Rowold x *Renanthera* Kalsom) 90 pts. Exhibitor: Mac's Orchids; Photographer: Tom Kuligowski. West Palm Beach Judging
- [5] *Rhyncatlaelia* Empress Pride 'Grass Valley' AM/AOS (*Laelia anceps* x *Rhyncholaeliocattleya* Pink Empress) 86 pts. Exhibitor: Ted McClellan; photographer: Ramon de los Santos. California Sierra Nevada Judging
- [6] *Clowesetum* Diane Drisch 'Caroline's 18th' HCC/AOS (*Clowesia* Grace Dunn x *Catasetum tigrinum*) 75 pts. Exhibitor: Mark Margolis; photographer: Carmen Johnston. Florida-Caribbean Judging
- [7] *Paphiopedilum* Hawaiian Charisma 'Slipper Zone Green Aura' AM/AOS (Hawaiian Contrasts x Petula's Presence) 80 pts. Exhibitor: Lehua Orchids; photographer: Wes Newton. Florida North-Central Judging
- [8] *Paphiopedilum wenshanense* 'Benchmark' HCC/AOS 79 pts. Exhibitor: T. Anthony Curtis; photographer: Sarah Patterson. Carolinas Judging
- [9] *Pleurothallis languida* 'Orkiddoc' CBR/AOS. Exhibitor: Larry Sexton; photographer: Anne Kotowski. Chicago Judging
- [10] *Catasetum* Dreamboat 'Erin' AM/AOS (Penang x Chuck Taylor) 86 pts. Exhibitor: Jordan Hawley; photographer: Richard Noel. Cincinnati Judging
- [11] *Paphiopedilum* Hawaiian Star 'Slipper Zone Dark Star' AM/AOS (Memoria Barbara Duncan x Hawaiian Treasure) 80 pts. Exhibitor: Lehua Orchids; photographer: Ramon de los Santos. California Sierra Nevada Judging
- [12] *Papilionanda* Bruce's Evelyn 'Purple Delight' HCC/AOS (*Vanda* John De Biase x Arjuna) 78 pts. Exhibitor: Charles Whetstone; photographer: Kay Clark. Florida North-Central Judging
- [13] *Catasetum* Joseito's Moonlight 'Corinne's on a Roll!' AM/AOS (*tenebrosum* x Double Down) 85 pts. Exhibitor: Corinne Arnold; photographer: Kay Clark. Florida North-Central Judging
- [14] *Paphiopedilum* Petula's Allure 'Slipper Zone Coloratum Plus' AM/AOS (Petula's Presence x President Fred) 80 pts. Exhibitor: Lehua Orchids; photographer: Wes Newton. Florida North-Central Judging
- [15] *Paphiopedilum* Delightfully Contrasting 'Slipper Zone Petal Boldness' AM/AOS (Delightfully Wood x Macabre Contrasts) 82 pts. Exhibitor: Lehua Orchids; photographer: Wes Newton. Florida North-Central Judging
- [16] *Cycnodes* Taiwan Gold 'GC WOC 12' CCM-HCC/AOS (*Cycnoches chlo-rochilon* x *Mormodes badia*) 82-77 pts. Exhibitor: Cheryl Erins; photographer: Anne Kotowski. Chicago Judging





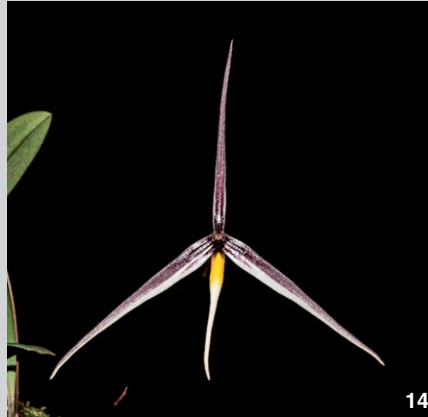




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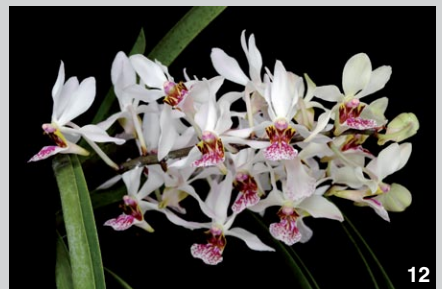
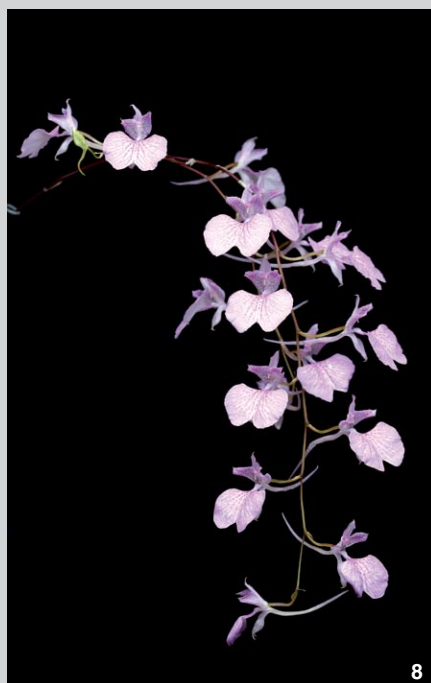
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- [1] *Dendrochilum cobbianum* 'Chuck's Fancy' CCM/AOS 83 pts. Exhibitor: Jane Barr; Photographer: Wes Newton. Florida North-Central Judging
- [2] *Paphiopedilum* Macabre Majesty 'Slipper Zone Almost Got There' HCC/AOS (Macabre in Pink x Presidential Moon) 79 pts. Exhibitor: Lehua Orchids; Photographer: Kay Clark. Florida North-Central Judging
- [3] *Paphiopedilum* Hawaiian Peacock 'Adam' HCC/AOS (Hawaiian Illusion x Petula's Peacock) 79 pts. Exhibitor: Max C. Thompson; Photographer: Bryon Rinke. Great Plains Judging
- [4] *Bulbophyllum* Laura Newton 'Whisper Nick Buckley' HCC/AOS (agastor x macrobulbum) 78 pts. Exhibitor: Laura and Wes Newton; Photographer: Wes Newton. Florida North-Central Judging
- [5] *Rhynchostylis gigantea* 'Florida Rose' AM/AOS 85 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging
- [6] *Rhynchostylis gigantea* 'Krull's Rose' AM/AOS 85 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging
- [7] *Aerides odorata* 'Gavin' AM/AOS 80 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging
- [8] *Habenaria rhodocheila* subsp. *rhodocheila* 'Bryon's Roebelenii' HCC/AOS 78 pts. Exhibitor: Bryon K. Rinke; Photographer: Bryon Rinke. Great Plains Judging
- [9] *Pleurothallis* Memoria Carlyle Luer 'Bryon' HCC/AOS (*teaguei* x *bivalvis*) 78 pts. Exhibitor: Bryon K. Rinke; Photographer: Bryon K. Rinke. Great Plains Judging
- [10] *Epidendrum hugomedinae* 'Bryon Rinke' CCE/AOS 90 pts. Exhibitor: Bryon K. Rinke; Photographer: Bryon Rinke. Great Plains Judging
- [11] *Epicattleya* Veitchii (1890) 'Bryon' AM/AOS (*Epidendrum radicans* x *Cattleya coccinea*) 80 pts. Exhibitor: Bryon K. Rinke; Photographer: Bryon K. Rinke. Great Plains Judging
- [12] *Bulbophyllum* Meen Mercury Sandal 'Timbucktoo' AM/AOS (*lasiorchilum* x *annandalei*) 80 pts. Exhibitor: Sarah Pratt; Photographer: Bryon Rinke. Great Plains Judging
- [13] *Cyrtocidium* Nittany Ruby 'Cat's Meow' AM/AOS (Golden Ruffles x *Oncidium* Lois Posey) 81 pts. Exhibitor: Shawn Wood; Photographer: Bryan Ramsay. National Capital Judging
- [14] *Bulbophyllum speciosum* 'Timbucktoo' AM/AOS 80 pts. Exhibitor: Sarah Pratt; Photographer: Bryon Rinke. Great Plains Judging
- [15] *Paphiopedilum* Hilo Shamrock 'Green Diamond' AM/AOS (Pacific Shamrock x Hsinying Gold) 86 pts. Exhibitor: Hilo Orchid Farm; Photographer: Glen Barfield. Hawaii Judging
- [16] *Paphiopedilum* Turangi Wunder 'NFR 2019' AM/AOS (Turangi Valley x Lippewunder) 81 pts. Exhibitor: Hilo Orchid Farm; Photographer: Glen Barfield. Hawaii Judging









- [1] *Paphiopedilum* Harvey Man Hee Wong 'Perfection' AM/AOS (*Shun-Fa Golden x armeniacum*) 88 pts. Exhibitor: Hilo Orchid Farm; Photographer: Glen Barfield. Hawaii Judging
- [2] *Rhyncholaeliocattleya* Remar's Harmony 'Memoria Aunt Sis' HCC/AOS (Oro Verde Sutil x Marlene Lundquist) 76 pts. Exhibitor: Steve Moffitt; Photographer: Malcolm McCorquodale. Houston Judging
- [3] *Cattleya coccinea* 'Waterford' HCC/AOS 76 pts. Exhibitor: Bayard Saraduke; Photographer: Bayard Saraduke. Mid-Atlantic Judging
- [4] *Mormodes skinneri* 'Pisgah' HCC/AOS 75 pts. Exhibitor: Svetlana Malayev; Photographer: Maurice Garvey. Northeast Judging
- [5] *Paphiopedilum* Wilbur Chang 'Legendary' HCC/AOS (*malipoense* x *Fanaticum*) 78 pts. Exhibitor: Hilo Orchid Farm; Photographer: Glen Barfield. Hawaii Judging
- [6] *Cycnodes* Wild Sunsets 'Spotted Dragon' HCC/AOS (*Cycnoches lehmannii* x *Mormodes* Wild Rainbow) 79 pts. Exhibitor: Steve Moffitt; Photographer: Malcolm McCorquodale. Houston Judging
- [7] *Cattleya walkeriana* 'Waterford' AM/AOS 82 pts. Exhibitor: Bayard Saraduke; Photographer: Bayard Saraduke. Mid-Atlantic Judging
- [8] *Comparettia macroplectron* 'Wanda Lankard' AM/AOS 83 pts. Exhibitor: Shawn Wood; Photographer: Bryan Ramsay. National Capital Judging
- [9] *Maxthompsonara* Bryon Rinke 'Elaine' AM/AOS (*Galabstia* Green Tyger x *Batemannia colleyi*) 81 pts. Exhibitor: Derek Lowenstein; Photographer: Malcolm McCorquodale. Houston Judging
- [10] *Paphiopedilum* Luna Hijinks 'Ruth Luethans' HCC/AOS (Luna Magic x Luna Shadow) 78 pts. Exhibitor: Tod Luethans; Photographer: Matthew Nutt. Mid-America Judging
- [11] *Cochlezeella* Tsiku Chuchango 'Windy Hill' AM/AOS (*Warczewiczella amazonica* x *Amazing*) 83 pts. Exhibitor: Marilyn LeDoux; Photographer: Matthew Nutt. Mid-America Judging
- [12] *Holcostylis* Wu Gift 'Maxted' AM/AOS (*Holcoglossum wangii* x *Rhynchostylis gigantea*) 80 pts. Exhibitor: Catherine Higgins; Photographer: Bayard Saraduke. Mid-Atlantic Judging
- [13] *Brassia whewellii* 'Irene' CHM/AOS 83 pts. Exhibitor: Al & Irene Messina; Photographer: Bayard Saraduke. Mid-Atlantic Judging
- [14] *Maxillaria luteograndiflora* 'Windy Hill' HCC/AOS 77 pts. Exhibitor: Marilyn LeDoux; Photographer: Matthew Nutt. Mid-America Judging
- [15] *Rhyncholaeliocattleya* Judith Lynn Hausermann 'Marty' AM/AOS (Hausermann's Treasure x Marquette's Canary) 84 pts. Exhibitor: Bayard Saraduke; Photographer: Bayard Saraduke. Mid-Atlantic Judging
- [16] *Fredclarkeara* After Dark 'SVO Black Pearl' CCE/AOS (*Mormodia* Painted Desert x *Catasetum* Donna Wise) 97 pts. Exhibitor: Andy Braun; Photographer: Bayard Saraduke. Mid-Atlantic Judging







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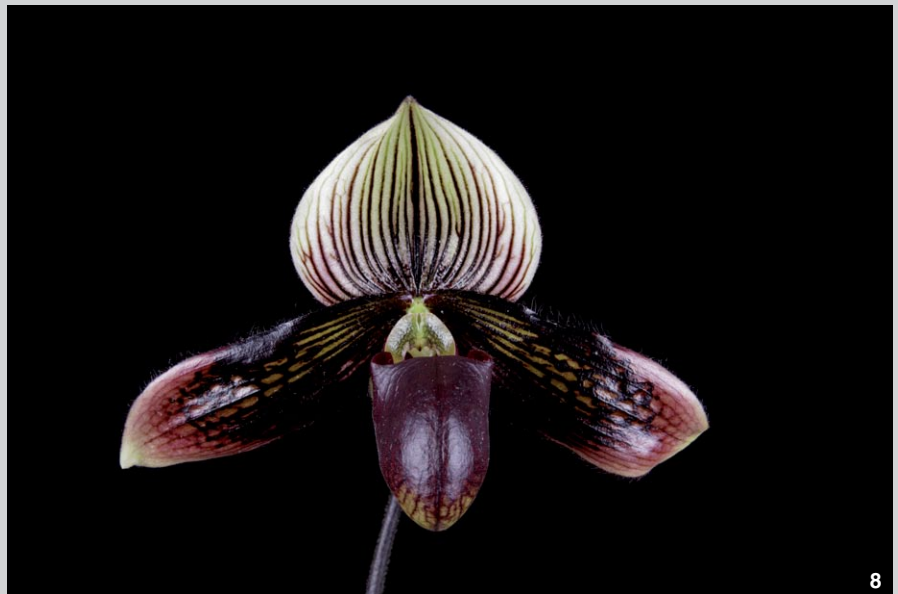
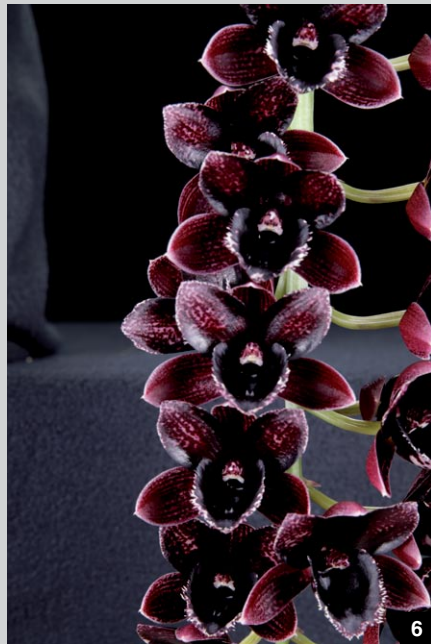
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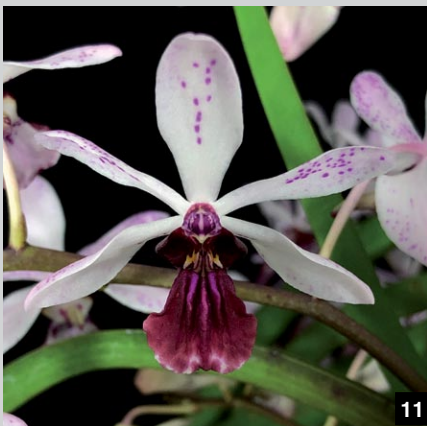
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- [1] *Paphiopedilum* Fairly Dreamy 'Perky' AM/AOS (Dreaming Green x *fairreanum*) 81 pts. Exhibitor: Catherine Higgins; Photographer: Bayard Saraduke. Mid-Atlantic Judging
- [2] *Paphiopedilum* Oriental Aura 'Slipper Zone Lucky SOB' HCC/AOS (Oriental Jewel x Fred's Aura) 77 pts. Exhibitor: Lehua Orchids; Photographer: Chaunie Langland. Pacific Central Judging
- [3] *Paphiopedilum purpuratum* 'Katherine' HCC/AOS 79 pts. Exhibitor: David Brown; Photographer: Arnold Gum. Pacific South Judging
- [4] *Cyrtocidium* Nittany Ruby 'Bloodgood' AM/AOS (Golden Ruffles x *Oncidium* Lois Posey) 81 pts. Exhibitor: Shawn Wood; Photographer: Bryan Ramsay. National Capital Judging
- [5] *Paphiopedilum* Hawaiian Tea 'Susan J.' HCC/AOS (Hilo Green Tea x Hsinying Citron) 78 pts. Exhibitor: Robert Travers; Photographer: Bryan Ramsay. National Capital Judging
- [6] *Habenaria* Regnieri 'Fleming' AM/AOS (*carnea* x *rhodocheila*) 84 pts. Exhibitor: R. J. Griesbach; Photographer: Bryan Ramsay. National Capital Judging
- [7] *Paphiopedilum* Golden Storm 'Eiswein' HCC/AOS (Gege Hughes x Golden Emperor) 78 pts. Exhibitor: Dave Sorokowsky; Photographer: Chaunie Langland. Pacific Central Judging
- [8] *Cahuzacara* Dogashima Paradise 'Strawberry' AM/AOS (*Rhyncholaeliocattleya* Gordon Siu x *Brassanthe* Maikai) 82 pts. Exhibitor: Deborah Halliday; Photographer: Arnold Gum. Pacific South Judging
- [9] *Paphiopedilum* Arnold J. Klehm 'Baby Jake' HCC/AOS (*venustum* x *primulinum* var. *primulinum*) 76 pts. Exhibitor: Daryl Yerdon; Photographer: Robert Hesse. Northeast Judging
- [10] *Paphiopedilum victoria-regina* 'Beaujolais Nouveau' AM/AOS 84 pts. Exhibitor: Dave Sorokowsky; Photographer: Chaunie Langland. Pacific Central Judging
- [11] *Paphiopedilum* Fred's Illusion 'Slipper Zone Monster Double' AM/AOS (Macbeth's Ghost x Friedrich von Hayek) 83 pts. Exhibitor: Lehua Orchids; Photographer: Chaunie Langland. Pacific Central Judging
- [12] *Coelogyne flexuosa* 'Jolah's Chasus' CHM/AOS 80 pts. Exhibitor: Charles and Susan Wilson; Photographer: Ross Leach. Pacific Northwest Judging
- [13] *Paphiopedilum henryanum* 'Arnie' HCC/AOS 78 pts. Exhibitor: Arnold Gum; Photographer: Arnold Gum. Pacific South Judging
- [14] *Paphiopedilum* Worthy Fred 'Slipper Zone Coloratum Triumph' AM/AOS (President Fred x *charlesworthii*) 80 pts. Exhibitor: Lehua Orchids; Photographer: Chaunie Langland. Pacific Central Judging
- [15] *Miltonia moreliana* 'Robert C' CCM/AOS 85 pts. Exhibitor: Robert Travers; Photographer: Bryan Ramsay. National Capital Judging
- [16] *Paphiopedilum charlesworthii* 'Dark Skies' HCC/AOS 79 pts. Exhibitor: Marc Kiriou; Photographer: Bryan Ramsay. National Capital Judging









- [1] *Paphiopedilum* California Girl 'Sweetie' AM/AOS (My Daughter x Jenna Marie) 84 pts. Exhibitor: Fred Capriccio; Photographer: Arthur Pinkers. Pacific South Judging
- [2] *Dendrobium* Fire Wings 'Memoria Luis Rivero' AM/AOS (Big Alex x Silver Wings) 82 pts. Exhibitor: José Fernández; Photographer: Irma Saldaña. Puerto Rico Judging
- [3] *Rhynchodena* Magic Wand 'Crown-fox Sapphire' AM/AOS (*Rhynchostylis coelestis* x *Seidenfadения mitrata*) 82 pts. Exhibitor: R. F. Orchids, Inc.; Photographer: Tom Kuligowski. West Palm Beach Judging
- [4] *Rhynchostylis gigantea* 'Frank Smith' CCM-FCC/AOS 82-93 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging
- [5] *Fredclarkeara* L'amour de vie de Sue 'Sunset Valley Orchids' HCC/AOS (*Mormodia* Painted Desert x *Catasetum* Louise Clarke) 79 pts. Exhibitor: Fred Clarke; Photographer: Arthur Pinkers. Pacific South Judging
- [6] *Fredclarkeara* Gemstones 'Sunset Valley Orchids' HCC/AOS (*Mormodia* Painted Desert x *Catasetum* Orchidglade) 79 pts. Exhibitor: Fred Clarke; Photographer: Arthur Pinkers. Pacific South Judging
- [7] *Fredclarkeara* Turning Point 'Jack Weatherford' CCE/AOS (*Mormodia* Lime Tiger x *Catasetum expansum*) 90 pts. Exhibitor: Robert Stroozas; Photographer: Tom Kuligowski. West Palm Beach Judging
- [8] *Paphiopedilum* Mystically Contrasting 'Slipper Zone Monster' AM/AOS (Mystically Wood x Macabre Contrasts) 80 pts. Exhibitor: Lehua Orchids; Photographer: Arthur Pinkers. Pacific South Judging
- [9] *Rhyncholaeliocattleya* Fantasy Circle 'Poppy's Premier Noel' HCC/AOS (Golden Circle x *Cattleya* Angel's Fantasy) 79 pts. Exhibitor: John Vermeer; Photographer: Ed Cott. Toronto Judging
- [10] *Paphiopedilum* Hung Sheng Wild Cat 'Fajen's Orchids' AM/AOS (*bellatulum* x *anitum*) 86 pts. Exhibitor: Fajen's Orchids; Photographer: Wes Newton. Florida North-Central Judging
- [11] *Holcostylis* Wu Gift 'MV Capricorn Nights' AM/AOS (*Holcoglossum wangii* x *Rhynchostylis gigantea*) 80 pts. Exhibitor: Stuart Henderson; Photographer: Wes Newton. Florida North-Central Judging
- [12] *Rhynchostylis gigantea* 'Jim Krull' CCM-FCC/AOS 87-91 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging
- [13] *Cycnoches* Brown's Choice 'Sunset Valley Orchids' HCC/AOS (Swan Cascade x Richard Brandon) 79 pts. Exhibitor: Fred Clarke; Photographer: Arthur Pinkers. Pacific South Judging
- [14] *Dendrobium* Champagne 'Don Fernandez' AM/AOS (*discolor* x *mirbelianum*) 82 pts. Exhibitor: José Fernández; Photographer: Irma Saldaña. Puerto Rico Judging
- [15] *Paphiopedilum* Happy Shamrock 'Golden Child' AM/AOS (Be Happy x Pacific Shamrock) 80 pts. Exhibitor: Fred Capriccio; Photographer: Arthur Pinkers. Pacific South Judging
- [16] *Phragmipedium* Grande 'Titan' HCC/AOS (*longifolium* x *humboldtii*) 76 pts. Exhibitor: Daniel Scher; Photographer: Ed Cott. Toronto Judging









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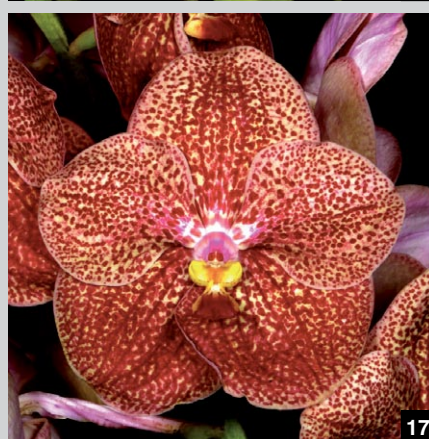
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- [1] *Papilionanda* Naoki Kawamura 'Naoki's Orange Passion' AM/AOS (Arjuna x *Vanda cristata*) 84 pts. Exhibitor: Naoki Kawamura; Photographer: Wes Newton. Florida North-Central Judging
- [2] *Paphiopedilum* Memoria Serafin Perez 'Springwater' AM/AOS (Hilo Leopard x *callosum*) 81 pts. Exhibitor: Springwater Orchids & Thanh Nguyen; Photographer: Wes Newton. Florida North-Central Judging
- [3] *Vanda* Memoria V. Sue Cushingberry 'Marion's Glowing Embers' AM/AOS (Weeravan x Doctor Anek) 82 pts. Exhibitor: Marion Steele; Photographer: Kay Clark. Florida North-Central Judging
- [4] *Bulbophyllum chrysotes* 'Whisper Paisley Golden Girl' CBR/AOS. Exhibitor: Laura and Wes Newton; Photographer: Wes Newton. Florida North-Central Judging
- [5] *Clowesetum* Joy Prout 'Corinne's Lime Joy' AM/AOS (*Clowesia* Rebecca Northen x *Catasetum semicirculatum*) 84 pts. Exhibitor: Corinne Arnold; Photographer: Wes Newton. Florida North-Central Judging
- [6] *Paphiopedilum* Krull's Magic Touch 'Golden' AM/AOS (Booth's Stone-Lady x *philippinense*) 86 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging
- [7] *Renantanda* Memoria Marie Thérèse St Come 'Guardian' AM/AOS (*Renanthera* Kalsom x *Vanda Wilas*) 81 pts. Exhibitor: B. L. Orchids; Photographer: Tom Kuligowski. West Palm Beach Judging
- [8] *Renanopsis* Lion's Splendor 'Inferno' AM/AOS (Lena Rowold x *Renanthera* Kalsom) 84 pts. Exhibitor: Naoki Kawamura; Photographer: Wes Newton. Florida North-Central Judging
- [9] *Bulbophyllum lasiochilum* 'Five Marys' CCM-AM/AOS 87-83 pts. Exhibitor: Laurie Stoner; Photographer: Wes Newton. Florida North-Central Judging
- [10] *Acianthera pectinata* 'Del Favero Orchids' AM/AOS 83 pts. Exhibitor: Louis Del Favero; Photographer: Kay Clark. Florida North-Central Judging
- [11] *Dendrobium goldschmidtianum* 'My Girl Ellie' CCE/AOS 90 pts. Exhibitor: Leslie Belew; Photographer: Kay Clark. Florida North-Central Judging
- [12] *Bulbophyllum averyanovii* 'Whisper Fuzzy Dice' CBR/AOS. Exhibitor: Laura and Wes Newton; Photographer: Kay Clark. Florida North-Central Judging
- [13] *Rhynchoaeliocattleya* Krull's Dragon Fire 'Seminole Queen' AM/AOS (Carolina Splendor x Theresa Hill) 80 pts. Exhibitor: Krull-Smith; Photographer: Tom Kuligowski. West Palm Beach Judging
- [14] *Vanda* MV Milky Way 'MV Moon Lit' AM/AOS (Pinchai x Gordon Dillon) 82 pts. Exhibitor: Stuart Henderson; Photographer: Tom Kuligowski. West Palm Beach Judging
- [15] *Vanda* Kulwadee Fragrance 'Chad's Wonder Spot' AM/AOS (Gordon Dillon x Guo Chia Long) 83 pts. Exhibitor: Chad Whetstone; Photographer: Kay Clark. Florida North-Central Judging
- [16] *Cattleya trianae* (Coerulea) 'Orchid Eros' AM/AOS 82 pts. Exhibitor: Fred Missbach; Photographer: Carson Barnes. Atlanta Judging
- [17] *Vanda* Jim Krull 'Ponkan' HCC/AOS (Kulwadee Fragrance x Somsri Gold) 77 pts. Exhibitor: Krull-Smith; Photographer: Tom Kuligowski. West Palm Beach Judging









13



14



15



16

- [1] *Vanda lamellata* var. *boxallii* 'Milan Kojs' AM/AOS 86 pts. Exhibitor: Juraj Kojs; Photographer: Tom Kuligowski. West Palm Beach Judging
- [2] *Cattleya* Shurlezo 'Tony Millet' AM/AOS (Aloha Case x *bicalhoi*) 82 pts. Exhibitor: Tony Millet; Photographer: Tom Kuligowski. West Palm Beach Judging
- [3] *Vanda* Christa Collins 'Starburst Beauty' AM/AOS (Fuchs Delight x Rosie O'Donnell) 88 pts. Exhibitor: R. F. Orchids, Inc.; Photographer: Tom Kuligowski. West Palm Beach Judging
- [4] *Lepanthes lophius* 'Cheryl's Joy' CBR/AOS. Exhibitor: Cheryl Erins; Photographer: Nile Dusdieker. Chicago Judging
- [5] *Vanda* Ben Fantasy 'Carolyn' CCM/AOS (*Violeta* x *denisoniana*) 82 pts. Exhibitor: David De Santi; Photographer: Tom Kuligowski. West Palm Beach Judging
- [6] *Paphiopedilum tranlienicum* 'Mello Spirit' AM/AOS 80 pts. Exhibitor: David Mellard; Photographer: Carson Barnes. Atlanta Judging
- [7] *Rhyncholaeliocattleya* Jump for Joy 'Whopper' AM/AOS (*Cattleya* Melody Fair x Tokyo Bay) 85 pts. Exhibitor: Fred Missbach; Photographer: Carson Barnes. Atlanta Judging
- [8] *Paphiopedilum* Charmingly Stoned 'Charles Mans' AM-CCE/AOS (Stone Lovely x In-Charm Topaz) 82-90 pts. Exhibitor: Ross Hella; Photographer: Bill Johnson. Chicago Judging
- [9] *Rhyncholaeliocattleya* Dawn's Child 'Catherine' AM/AOS (Paradise Rose x Higher Multiplier) 83 pts. Exhibitor: Joseph Paine; Photographer: Larry Hennessey. Atlanta Judging
- [10] *Fredclarkera* Doubtless 'Margaret Vinet' AM/AOS (No Doubt x *Catasetum* Orchidglade) 80 pts. Exhibitor: Patty Granier; Photographer: Larry Hennessey. Atlanta Judging
- [11] *Pescatoria wallisii* 'Bonheur' CHM/AOS 83 pts. Exhibitor: Lynne Murrell; Photographer: Cecil Bullard. California Sierra Nevada Judging
- [12] *Paphiopedilum* Mountain Lass '5 Patonyos' HCC/AOS (Mountain Meadow x *helena*) 75 pts. Exhibitor: Dave Sorokowsky; Photographer: Cecil Bullard. California Sierra Nevada Judging
- [13] *Dendrobium* Green Flash 'Alan' AM/AOS (André Millar x *convolutum*) 80 pts. Exhibitor: Cheryl Jones; Photographer: Cecil Bullard. California Sierra Nevada Judging
- [14] *Restrepia purpurea* 'Orkiddoc' CBR/AOS. Exhibitor: Larry Sexton; Photographer: Nile Dusdieker. Chicago Judging
- [15] *Phragmipedium* Jason Fischer 'Love' AM/AOS (Memoria Dick Clements x *besseae*) 87 pts. Exhibitor: Orchids Limited; Photographer: Bill Johnson. Chicago Judging
- [16] *Clowesetum* Amazing Grace 'Dusty's Lemonade' AM/AOS (*Clowesia* Grace Dunn x *Catasetum* Orchidglade) 82 pts. Exhibitor: Nile & Lois Dusdieker; Photographer: Nile Dusdieker. Chicago Judging









- [1] *Phragmipedium* Fritz Schomburg 'Pucker Up' AM/AOS (*kovachii* x *besseae*) 84 pts. Exhibitor: Orchids Limited; Photographer: Bill Johnson. Chicago Judging
- [2] *Paphiopedilum* Cranberry Boba 'Holly' AM/AOS (Hilo Leopard x Captivatingly Wood) 84 pts. Exhibitor: Orchids Limited; Photographer: Bill Johnson. Chicago Judging
- [3] *Phragmipedium* Rocquier 'Yvonne's Surprise' AM/AOS (Nicholle Tower x Eric Young) 81 pts. Exhibitor: Oakwood Orchids; Photographer: Richard Noel. Cincinnati Judging
- [4] *Phalaenopsis* Pylo's Novelty 'Orchid Konnection Red' HCC/AOS (Mituo King Bellina x Brother Ambo Passion) 76 pts. Exhibitor: The Orchid Konnection; Photographer: David Gould. Dallas Judging
- [5] *Dendrobium nemorale* 'Buckboard' HCC/AOS 78 pts. Exhibitor: Karl Varian; Photographer: David Gould. Dallas Judging
- [6] *Papilionanda* Teo Reyes 'Brother' AM/AOS (Mevr. L. Velthuis x *Vanda* Pirchmai Beauty) 80 pts. Exhibitor: B. L. Orchids; Photographer: Carmen Johnston. Florida-Caribbean Judging
- [7] *Dendrobium convolutum* 'Soroa's Green Lantern' HCC/AOS 77 pts. Exhibitor: Soroa Orchids, Inc.; Photographer: Carmen Johnston. Florida-Caribbean Judging
- [8] *Dendrobium* Bruce Gordon 'Jane H. Jones' HCC/AOS (*alexandrae* x *eximium*) 78 pts. Exhibitor: Barry & Jane Jones; Photographer: Richard Noel. Cincinnati Judging
- [9] *Dendrobium* Andrew Rinke 'Bryon' CCM/AOS (Gillieston Aura x Hamilton) 83 pts. Exhibitor: Hideka Kobayashi; Photographer: Richard Noel. Cincinnati Judging
- [10] *Cattleya rupestris* 'OK' HCC/AOS 76 pts. Exhibitor: Stephen & Jeanette Benjamin; Photographer: Richard Noel. Cincinnati Judging
- [11] *Cattleya loddigesii* 'OK' HCC/AOS 77 pts. Exhibitor: Stephen & Jeanette Benjamin; Photographer: Richard Noel. Cincinnati Judging
- [12] *Phragmipedium* America 'George's Delight' AM/AOS (*Les Dirouilles* x *kovachii*) 83 pts. Exhibitor: George A. Bogard; Photographer: David Gould. Dallas Judging
- [13] *Dendrobium rutriferum* 'Seward Splash' CCE-CBR/AOS 90 pts. Exhibitor: Matt Pfeiffer; Photographer: Bill Johnson. Chicago Judging
- [14] *Brassocatanthe* Hilda Takamatsu 'Pakte Chan' HCC/AOS (*Cattleya* Mari's Song x *Brassanthe* Maikai) 76 pts. Exhibitor: Larry Atwood; Photographer: Richard Noel. Cincinnati Judging
- [15] *Paphiopedilum gigantifolium* 'Crystelle' HCC/AOS 79 pts. Exhibitor: Krull-Smith; Photographer: Carmen Johnston. Florida-Caribbean Judging
- [16] *Lesueurara* Dick Pippen's SunCoast 'Nancy Ginocchio' CCE/AOS (*Brassocatanthe* Little Mermaid x *Encyclia* Lorraine Smith) 90 pts. Exhibitor: Jim Roberts Florida SunCoast Orchids; Photographer: Carmen Johnston. Florida-Caribbean Judging



## CALENDAR

### SEPTEMBER

**11–12—Kentucky Orchid Society Show,** St. Matthew's Episcopal Church, 330 N Hubbards Ln, Louisville, KY; Contact: Richard Humke/Catherine Luckett, 502-299-1231/502-893-9282; richardhumke@gmail.com/catluckett@gmail.com

**17–19—Alabama Orchid Society 37th Show and Sale,** Birmingham Botanical Gardens, 2612 Lane Park Rd, Mountain Brook, AL; Contact: Beverly VonderPool, 205-821-0689; bvonderpool@yahoo.com

**17–18—Great Divide Orchid Society Show and Sale,** Wingate of Helena, 2007 N Oakes, Helena, MT; Contact: Nancy Horn, 406-459-9252; nancylhorn@outlook.com

**25–26—Tampa Orchid Club Expo,** U.S.F. Botanical Gardens, 4202 E Fowler Ave, Tampa, FL; Contact: Cheryl Crilly, 813-244-7564; cents4me@aol.com

**28–October 3—Festival de Orquideas de Oeste,** Mayaguez Mall, 975 Ave Eugenio María de Hostos, Mayaguez, PR; Contact: Julio David Rios, 787-649-2655; david1156@hotmail.com

### OCTOBER

**1–3—Miami Orchid Society's "Tamiami International Orchid Festival,"** Redland Fruit and Spice Park, 18701 SW 248 St, Homestead, FL; Contact: Martin Motes, 305-282-7520; martinmotes@gmail.com

**2–3—Oklahoma Orchid Society's "Bewitched by Orchids" OOS/SWROGA Show & Sale,** Will Rogers Gardens Exhibition Center, 3400 NW 36th Street, Oklahoma City, OK; Contact: Douglas Needham, 610-563-8988; oos\_showchair@okorchidsociety.org

**2–3—The 2021 Morongo Basin Orchid Festival,** Gubler Orchids, 2200 Belfield Blvd, Landers, CA; Contact: Ronald Lang, 951-663-5237; rflangx25@gmail.com

**2–3—Northwest Orchid Society Fall Show and Sale,** Volunteer Park Conservatory, 1400 East Galer Street, Seattle, WA; Contact: Susan Burgess, 206-365-6406; fosterpierce@comcast.net

**6–17—Central California Orchid Society's "The Big Fresno Fair,"** Fresno Home and Garden Show, Fresno Fairgrounds, Garden Pavilion, 1121 South Chance Ave, Fresno, CA; Contact: Gordon Wolf, 209-999-0181; gwsangca@yahoo.com

**9–10—Illinois Orchid Society's "All You Need Is Orchids,"** Chicago Botanic Garden, Regenstein Center, 1000 Lake Cook Rd, Glencoe, IL; Contact: David Kirk, 847-563-0212; david.kirk.a@gmail.com

**9—\*Deep Cut Orchid Society Annual Orchid Auction,** Belford Engine Fire Company, 739 Main Street, Belford, NJ. Contact: Joan Mesander, 732-778-0922; jmesand22@gmail.com

**22–24—Massachusetts Orchid Society's "World of Orchids – Caribbean,"** Sons of Italy, 117 Swanton St, Winchester, MA; Contact: Brigitte Fortin, 617-838-8682; bfortin425@msn.com

**22–24—New Mexico Orchid Guild's**

**"Paint with Orchids,"** Albuquerque Garden Center, 10120 Lomas Blvd NE, Albuquerque, NM; Contact: Keith Mead, 505-379-6786; orchidsinabq@gmail.com

**23–24—Ridge Orchid Society 59th Show "The Sound of Orchids,"** WH Stuart Center, 1702 US Hwy 17 S, Bartow, FL; Contact: Keith Emig, 863-412-4762; dkemig@gmail.com

**23–24—Gainesville Orchid Society's "Orchids in the Garden,"** Kanapaha Botanical Gardens, 4700 SW 58th Dr, Gainesville, FL; Contact: Joan MacLeod, 352-665-2640; nealmacleod@bellsouth.net

**23–24—Eastern Iowa Orchid Society's "Orchids are a Scream Returns,"** Elk Lodge Hall, 801 33rd Ave SW, Cedar Rapids, IA; Contact: Andy Coghill-Behrends, 319-512-8076; mistercoghill@hotmail.com

**28–31—East Everglades Orchid Society's "Fall in Love with Orchids" Show & Sale,** R.F. Orchids, 28100 SW 182 Ave., Homestead, FL; Contact: Tere Camacho, 305-245-4570; tere@rforchids.com

### NOVEMBER

**5–7—1st International Vanda & Slipper Orchid Symposium,** Hilton Garden Inn Apopka City Center, 580 E Main St, Apopka, FL; Contact: Frank Smith, 407-463-9396; orchidfrank@aol.com

**6–7—Kansas Orchid Society Fall Show and Sale,** Botanica, the Wichita Gardens, 701 Amidon St, Wichita, KS; Contact: Sarah Pratt,

316-655-0572; svcsjp@gmail.com

**6–7—Utah Orchid Society's "Fall Splendor,"** Red Butte Garden, 300 Wakara Way, Salt Lake City, UT; Contact: Shawn Quealy, 801-831-7359; shquealy@comcast.net

**13–14—Deerfield Beach Orchid Society's "Orchid Obsession,"** Safe Schools Institute, 1790 Spanish River Blvd, Boca Raton, FL; Contact: Cheryl Babcock, 954-464-8996; babcockc@nova.edu

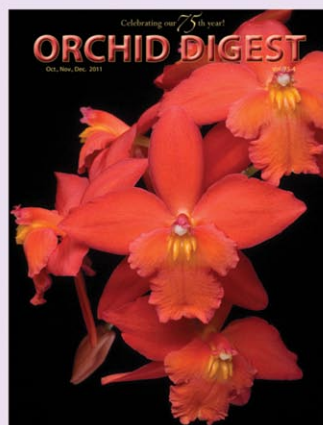
**13–14—Fort Pierce Orchid Society Show and Sale,** Botanica, the Wichita Gardens, 701 Amidon St, Wichita, KS; Contact: Sarah Pratt, 316-655-0572; svcsjp@gmail.com

**19–21—Atlanta Orchid Society Show and Sale,** Atlanta Botanic Garden, 1345 Piedmont Ave NE, Atlanta, GA; Contact: Danny Lentz, 770-362-0575; dblgongora@bellsouth.net

As of press time, all AOS judging centers with the exception of Toronto and Montreal are holding at least limited in-person judging. Please contact the appropriate judging center chair for location and time before taking plants (<https://www.aos.org/orchid-awards-judging/aos-judging-centers.aspx>).

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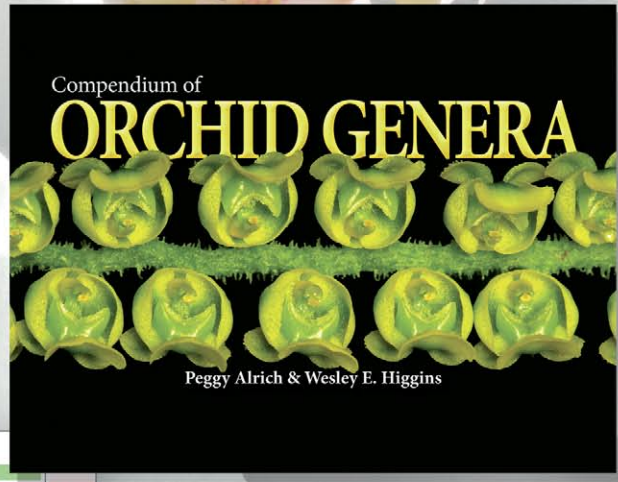
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**Valid *Angraecum* Synonyms**

**Aerobion** Kaeuffer ex Sprengel  
 Syn. Dig. (Sprengel), ed. 16, No. 479 & 734 (1820).  
 Etymology: Greek for air and life. Referring to the epiphytic habit of the plants.  
 Lectotype: *Aerobion asperum* (Thunberg) Sprengel (*Angraecum asperum* Thunberg) designated by C. G. Hill, 2010, 0010173.

New recognized as belonging to the genus *Angraecum*. *Aerobion* was previously considered to include twenty-four epiphytes found in warm, mid elevation, montane forests of Madagascar and the Mascarene Islands.

**Angraecoides** (Candolle) Schachtelii, Mytnik & Goechko  
 Biol. Bot. Res. Conservation, 29: 11 (2013).

Etymology: *Angraecum*, a genus of orchids, and Greek for likeness or form. Refers to a similarity to *Angraecum*.

**Ten Sees** *Angraecoides pinguis* (Sprengel) Schachtelii, Mytnik & Goechko (*Angraecum pingue* Sprengel)

New recognized as belonging to the genus *Angraecum*. *Angraecoides* was previously considered to include twenty-five epiphytes found in cool, mid elevation, hill scrub and montane forests in northeastern Madagascar, Mauritius and Réunion.

**Arachnangraecum** (Schachtelii) Schachtelii, Mytnik & Goechko  
 Biol. Bot. Res. Conservation, 29: 11 (2013).

Etymology: Greek for spider and *Angraecum*, a genus of orchids. Refers to the long, spider-like appendages.

**Ten Sees** *Arachnangraecum rufum* (Thunberg) Schachtelii, Mytnik & Goechko (*Angraecum rufum* Thunberg)

New recognized as belonging to the genus *Angraecum*. *Arachnangraecum* was previously considered to include thirteen epiphytes found in cool, mid elevation, hill scrub and montane forests in found in northeastern Madagascar, Mauritius and Réunion.

**Bonniers** Cokerley  
 Zan. Kakt. Bot., 11: 616, f. 10-11 (1899).

Etymology: In appreciation of Eugène Marie Gaston Bonnier (1853-1923), a French botanist, editor of *Revue Générale de Botanique* and publisher of Candolle's notes on the orchids of Réunion.

**Ten Sees** None designated

New recognized as belonging to the genus *Angraecum*. *Bonniers* was previously considered to include two epiphytes found in mid to upper elevation, bushy montane east forests of Réunion.

**Boryangraecum** (Schachtelii) Schachtelii, Mytnik & Goechko  
 Biol. Bot. Res. Conservation, 29: 12 (2013).

Etymology: Named for Jean Baptiste Bory de Saint-Vincent (1776-1844) a French naturalist and author of *Voyage dans les îles d'Afrique*. And *Angraecum*, a genus of orchids.

**Ten Sees** *Boryangraecum pumilio* (Schachtelii) Schachtelii, Mytnik & Goechko (*Angraecum pumilio* Schachtelii)

New recognized as belonging to the genus *Angraecum*. *Boryangraecum* was previously considered to include thirteen epiphytes found in cool, mid elevation, hill scrub and montane forests in found in Madagascar, Mauritius and Réunion.



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### Submission of articles for *ORCHIDS* magazine

The AOS welcomes the submission of manuscripts for publication in *Orchids* magazine from members and non-members alike. Articles should be about orchids or related topics and cultural articles are always especially welcome. These can run the gamut from major feature-length articles on such topics as growing under lights, windowsills and thorough discussions of a species, genus or habitat to shorter, focused articles on a single species or hybrid to run under the Collector’s Item banner. The AOS follows the World Checklist of Selected Plant Families with respect to species nomenclature and the Royal Horticultural Society Orchid Hybrid Register for questions of hybrid nomenclature. The AOS style guide and usage guides can be downloaded from <http://www.aos.org/about-us/article-submissions/style-guide-for-aos-publications.aspx>. Articles as well as inquiries regarding suitability of proposed articles should be sent to [jean.ikeson@gmail.com](mailto:jean.ikeson@gmail.com) or the editor at [rmchatton@aos.org](mailto:rmchatton@aos.org).

## 2021 Dillon/Peterson Essay Prize

THE AOS IS celebrating its Centennial Anniversary in 2021. To join in the fun, the Dillon-Peterson Essay Contest is asking for in-depth articles relating to significant people, events, programs or even plants or technology changes that have helped shape the direction of the AOS or are likely to in the future. Was there someone special in the AOS who mentored and inspired you and others? Did an AOS award you received plant the seed that resulted in you becoming involved in judging—could you tie that into how the judging program has helped shape the AOS and Affiliated Societies? Perhaps it is technological changes that the AOS has adopted that have changed and will change the AOS and your enjoyment of orchids? Share why the AOS has had and will have an enormous influence over lifetimes.

Membership in the American Orchid Society is not necessary to enter the contest.

**The deadline is November 30, 2021.** The winning entry, if any, will be published in the June issue of the following year. For complete contest rules see <http://www.aos.org/about-us/article-submissions/essay-contest-winners.aspx>

Submit all entries to the Dillon/Peterson Memorial Essay Prize at AOS headquarters: Ron McHatton, American Orchid Society at Fairchild Tropical Botanic Garden, PO Box 565477, Miami, Florida 33256 (email [rmchatton@aos.org](mailto:rmchatton@aos.org)).

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# New Developments in Orchid Cloning

Text and photographs by Arthur E. Chadwick

MY FATHER, A.A. Chadwick, was a collector of historical cattleyas — many of which are more than a century old. Over the years, a small number of these heirlooms have acquired a virus, which is a disease that can adversely affect the flowers or foliage and is highly contagious. He quarantined these infected plants on a separate bench in his greenhouse where they could not come in contact with the rest of the collection.

He continued to keep the distressed orchids because they are a window into the past, when the earliest fine varieties of species were being discovered or the very first hybrids were being introduced. In most cases, the blooms can still be photographed and even pollinated for future generations of pedigree cattleyas. But what he had always hoped for is to return the heirlooms to their original condition — when they were vigorous and healthy — before the virus zapped their strength and tarnished their fine attributes.

There had always been rumors of a few sophisticated hobbyists who had managed to grow a clean plant from a virus-infected plant, but the stories could never be verified. And every so often, an article would appear in an orchid magazine about a university or government researcher who had achieved some success, but the technique was far beyond the reach of the everyday enthusiast. Perhaps all this chatter was in the back of my father's mind as he diligently maintained his bench of infected orchids.

In 2014, I attended an orchid conference in Florida and heard a speaker give a lecture on removing viruses from ornamentals. She had had a very high success rate with cloning on a small scale and was looking for important historic cattleyas for the next, bigger phase of her project. My father's special bench was volunteered.

Cloned orchids have been the bedrock of the industry for the past half century and millions of identical plants are now being produced. The process of creating exact duplicates began in 1960, with a clever laboratory technique developed by Dr. G.S. Morel. Soon after, the French firm Vacherot & Lecoufle pioneered the procedure on a grand scale and mass distributed clones worldwide.



However, some mother plants were found to be difficult to clone, especially if they had a virus. It was also critical that a virus did not get passed on to the offspring. As a result of these complications, many of the most famous cattleyas were not cloned.

Our speaker at the conference addressed these concerns. Beth Lamb operates a small business that propagates orchids from seed and tissue culture. She relies heavily on her degrees in plant pathology and virology as well as her experience as an advisor to a large citrus producer and explains how cloning is performed: "Orchid tissue cultures are started by dissecting a tiny growing point less than 1 mm from the mother plant. This apical meristem is often free of pathogens due to the uneven distribution of virus within the mother plant. This culture may be combined with other methods such as heat treatment, cryotherapy, and chemotherapy to improve the odds of recovering clean plants."

That is easy for her to say. The cloning process is highly technical and requires advanced laboratory equipment and know-how. Lamb is, no doubt, on the cutting edge.

Just last week, the very first clones of my father's diseased plants started to bloom at our nursery. Not only do the flowers and foliage look great, but the plants all test negative for virus. My father was ecstatic.

Lamb's work has far-reaching implications for both industry and hobbyists. The rare historic cattleyas that have been relegated to a few private collections for so long may now return to the market as virus-free clones — a



- [1] The French firm Vacherot & Lecoufle was the first to pioneer cloning on a grand scale. Their *C. Culminant* 'La Tuilerie' AM/AOS from 1957 was sold worldwide and can still be found in collections today.
- [2] Flasks full of virus-free cloned orchids await planting at the nursery. It will be another four to five years before they bloom.
- [3] The very first blooming of a virus-free clone from the classic white cut-flower, *Cattleya* Alice B. DuPont 'Waldor', occurred this month and was the result of a new advanced cloning technique.

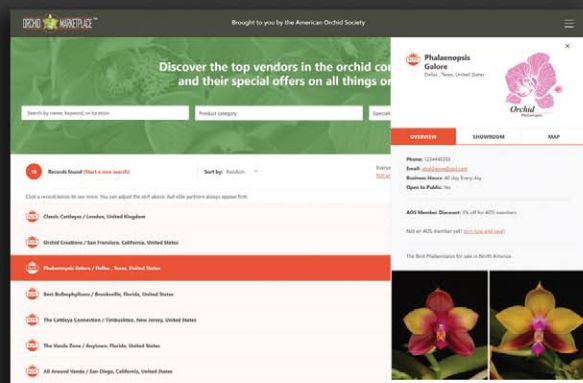
century or more after they were first introduced. These are the plants that people have only read about and may, one day, be coming to a floral shop near you.


— Arthur E. Chadwick (email: [art@chadwickorchids.com](mailto:art@chadwickorchids.com)).

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