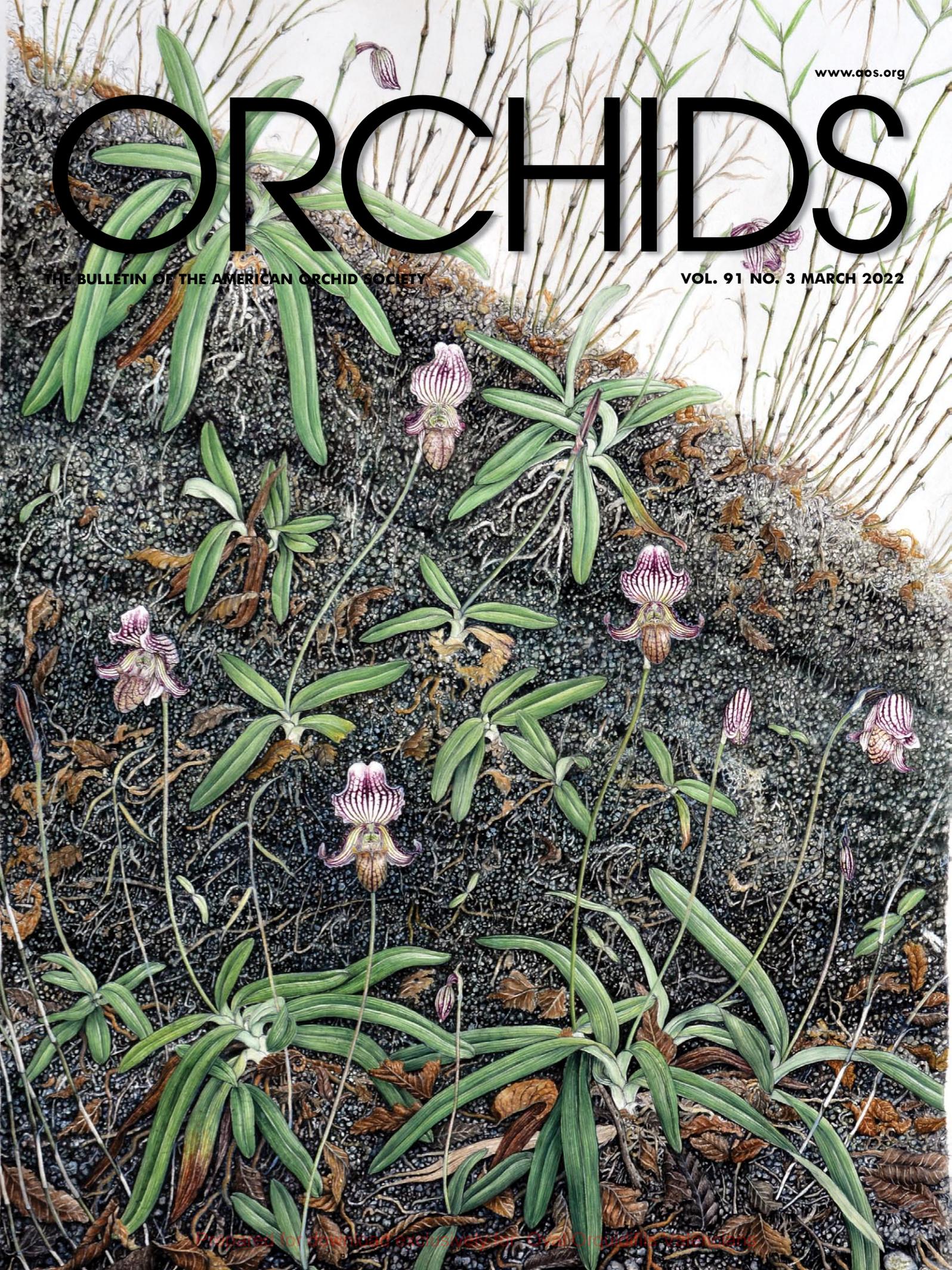


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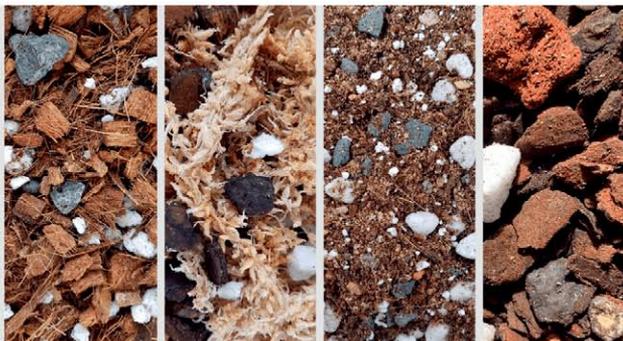
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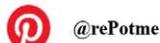
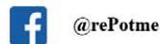
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The Bulletin of the American Orchid Society

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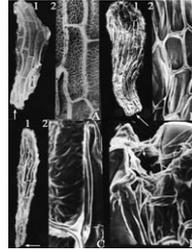
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Paphiopedilum fairrieianum, expertly painted by Hemlata Pradhan from sketches made during an expedition to find the species in-situ in India.

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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>.

- albertii* (al-BERT-ee-eye)
alborosea (al-boh-ROZE-ee-a)
albus (AL-buss)
aloifolium (al-oh-ee-FOLE-ee-um)
ambigua (am-BIG-yew-a)
amboinense (am-boh-in EN-see)
amethystina (am-eh-THISS-tee-na)
Angraecum (an-GRAY-kum)
Anoectochilus (an-ek-toh-KYE-luss)
Anthraxose (an-THRAK-nos)
Arachnanthe (a-rack-NAN-thee)
Arachnis (a-RACK-niss)
Armodorum (ar-moh-DORE-um)
Aryncium (a-RINK-ee-um)
aurantiaca (aw-ran-tee-AY-ka)
bergonii (ber-GONE-ee-eye)
beyrichii (bay-RIK-ee-eye)
bilinguis (bye-LING-yew-iss)
Bletia (BLEE-tee-a)
bouffordii (boo-FORD-ee-eye)
Brassia (BRASS-ee-a)
calceolus (kal-see-OH-luss)
carica (KAR-ee-ka)
Catasetum (kat-a-SEE-tum)
cathcartii (kath-KART-ee-eye)
Cattleya (KAT-lee-a)
Cattlianthe (kat-lee-AN-thee)
Cercospora (sir-koh-SPORE-a)
chlorochilon (klore-oh-KYE-lon)
clarkei (KLARK-eye or KLARK-ee)
coccinea (kok-SIN-ee-a)
cordigera (kore-DIJ-er-a)
Coryanthes (kore-ee-AN-theez)
crassifolium (krass-ee-FOLE-ee-um)
cretica (KREET-ih-ka)
Cycnoches (SIK-noh-keez)
Cymbidium (sim-BID-ee-um)
cyprica (SIP-rih-ka)
Cypripedium (sip-rih-PEED-ee-um)
Cyrtochilum (sir-toh-KYE-lum)
Dendrobium (den-DROH-bee-um)
Dichaea (dye-KEE-a)
dilemma (dye-LEM-ma)
eburneum (ee-BURN-ee-um)
elatum (ee-LAY-tum)
Elleanthus (ell-ee-AN-thuss)
elongatum (ee-long-AY-tum)
Epicattleya (ep-ee-KAT-lee-a)
Epidendreae (eh-pih-DEN-dre-ee)
Epidendroideae (ep-ih-den-DROY-de-ee)
Epidendrum (ep-ih-DEN-drum)
Epipactis (ep-ih-PAK-tiss)
Epistephium (ep-ih-STEFF-ee-um)
Erycina (err-ee-SEE-na)
Euglossa (yew-GLOSS-a)
euxina (yew-ZEE-na)
fairrieianum (fair-ee-AY-num)
- forbesii* (FORBS-ee-eye)
fruticosa (frook-tih-KOH-sa)
Galeandra (gal-ee-AN-dra)
garganica (gar-GAN-ih-ka)
glossomystax (gloss-soh-MISS-taks)
godferyi (god-FER-ee-eye)
Gongora (GONE-gore-a)
Govenia (goh-VEEN-ee-a)
grandis (GRAN-diss)
Guarechea (gwar-EK-ee-a)
Guarianthe (gwar-ee-AN-thee)
Habachia (hab-ee-NARE-ee-a)
halacsyana (hal-ak-see-AY-na)
halicarnassia (hal-ee-kar-NASS-ee-a)
helleborine (hell-eh-BORE-in-ee)
imbricata (im-bree-KAY-ta)
intermedia (in-ter-MEED-ee-a)
ionoptera (eye-on-OP-ter-a)
istriaca (is-tree-AY-ka)
kelleri (KEL-ler-eye or KEL-ler-ee)
Koellensteinia (kehl-en-STINE-ee-ah)
labiata (la-bee-AY-ta)
labrosa (la-BROH-ta)
Laeliinae (lay-lee-EE-nee)
lawrenceana (law-rens-AY-na)
levantina (lev-AN-tee-na)
Limodorum (lim-oh-DORE-um)
lingua (LING-yew-a)
longipetala (lonj-ih-PET-a-la)
lupiensis (loo-pee-EN-sis)
macrantha (mak-RAN-tha)
Macroclinium (mak-roh-KLINN-ee-um)
Maxillaria (maks-ill-AIR-ee-a)
meridionalis (mer-id-ee-on-AY-liss)
militaris (mil-ih-TARE-iss)
morio (MORE-ee-oh)
Mycelium (my-SEE-lee-um)
nasuta (NAY-soo-ta)
neglecta (neh-GLEK-ta)
Neottia (nee-OTT-ee-a)
nobile (NOH-bill-ee)
nudus-avis (NOO-duss-AY-viss)
Odontoglossum (oh-don-toh-GLOSS-um)
olbia (OL-bee-a)
Oncidium (on-SID-ee-um)
Orcheomyces (ore-kee-oh-MY-sees)
Orchidaceae (ore-kih-DAY-see-ee)
Orchis (ORE-kiss)
orientalis (ore-ee-en-TAY-liss)
Ornithocephalus (ore-nith-oh-SEFF-a-luss)
oulmesiaca (ol-me-zee-AY-ka)
palustris (pa-LUS-triss)
Pandanus (pan-DAN-us)
panormosana (pan-ore-mos-AY-na)
Paphiopedilum (paff-ee-oh-PED-ih-lum)
parviflora (par-vee-FLORE-a)
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Phalaenopsis (fail-en-OP-sis)
Phloeophila (flee-OH-fih-la)
politisi (pol-ih-TISS-ee-eye)
Prosthechea (pros-THEK-ee-a)
provincialis (pro-vin-see-AY-liss)
pseudepidendrum (sood-ep-ih-DEN-drum)
pulae (PEW-lee)
pumila (PEW-mil-a)
purpurea (per-PUR-ee-a)
radicans (RAD-ih-kans)
radicis (RAD-ih-kis)
rainei (RAYN-ee or RAYN-eye)
Renanthera (ren-AN-ther-a)
Rhyncattleanthe (rin-kat-lee-AN-thee)
Rhyncholaeliocattleya (rink-oh-lay-lee-oh-KAT-lee-a)
Scaphyglottis (skaf-ee-GLOT-tiss)
Serapias (ser-AP-ee-as)
Sergioara (ser-gee-oh-ARE-a)
Sobralia (so-BRAL-ee-a)
Sophranitis (sof-ron-EYE-tiss)
sphacelatum (sfah-sell-AY-tum)
Tectona (tek-TOH-na)
todaroi (toh-DAR-oh-ee or toh-DAR-oh-eye)
triplicata (trip-lih-KAY-ta)
Turialvae (tour-ee-AL-vee)
Vanda (VAN-da)
verecundum (ver-eh-KUN-dum)
verrucosa (ver-oo-KOH-sa)
viridissima (veer-ih-DISS-ih-ma)
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walkeriana (walk-er-ee-AY-na)
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— **Education**

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— **Library**

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— **Research**

Theresa Hill
 Valerie Melanson

— **Technology**

Anonymous (3)
 Greg Filter
 Catherine Higgins
 Mickey O'Brien
 Joyce Medcalf
 John Nakakihara
 Graham Ramsey
 Laura and Wes Newton

CORRIGENDA

In the February issue, the donation from John Sullivan should have been listed as a donatoin in memory of Diane Strack. We sincerely regret this error

— *Ron McHatton*

Jack's FERTILIZERS

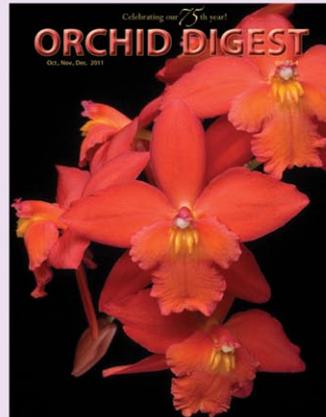


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PRESIDENT'S MESSAGE

IN JUST A month we will be celebrating the American Orchid Society's 100th anniversary. Through a collaboration of work from many, this will certainly be an event worth the wait. So many people have worked tirelessly to make this happen, and they will forever have my gratitude.

It is not so much that the AOS has lasted 100 years, it is that it has lasted through these last 100 years. The change that the world has seen during this time is astounding. The American Orchid Society has proven itself adaptive to changes and to grow as an organization moving forward with time. The AOS has gone from carbon paper to cloud storage and will be ready when the next innovation is created.

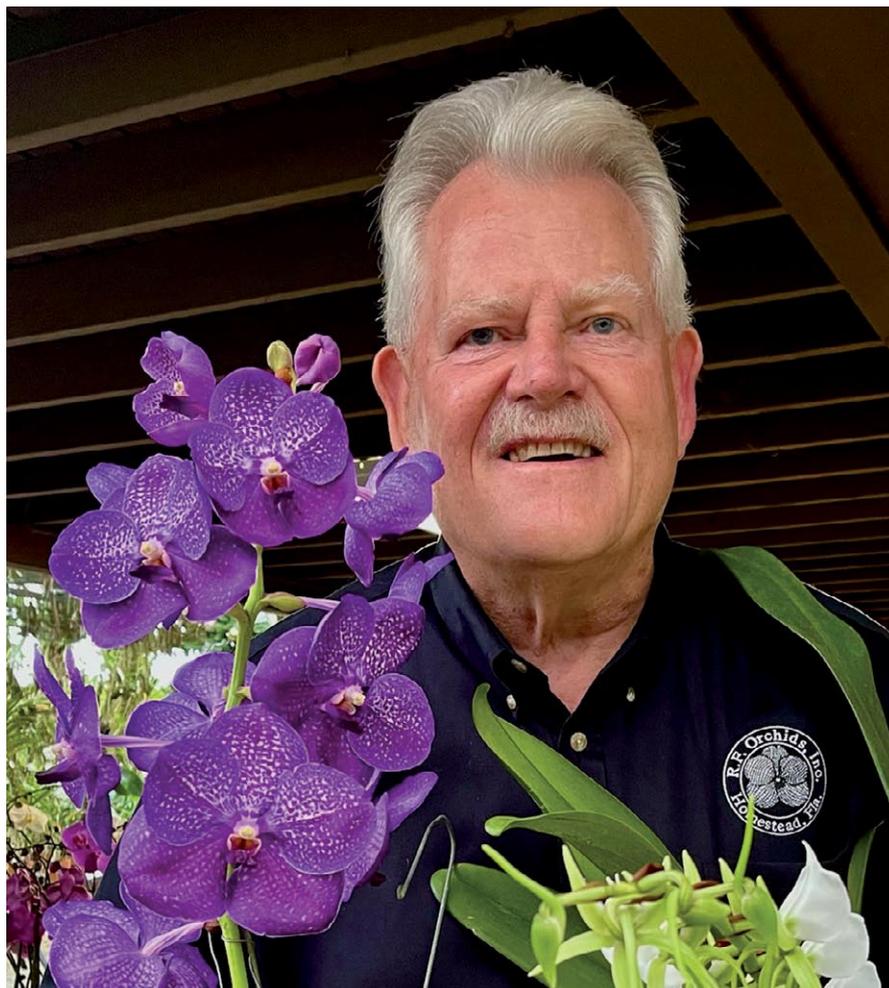
The Members' Meeting and Centennial Celebration will be a journey of orchids — their history, orchids today and a look to their future. The speakers will give us an insight into their involvement with orchids and help give us a greater understanding of their value.

On Thursday, April 7th, there will be a bus trip to Fairchild Tropical Botanical Gardens (FTBG). Registrants will be picked up at 12:30 pm at the Biltmore Hotel and taken to the FTBG (complimentary admission and optional lunch) where they can enjoy the gardens and explore the AOS library. The bus will pick up the registrants at 4:00 pm and return them to the hotel.

There will be an auction with many never-before-seen items that will entice and attract many bidders. Registered guests will enjoy preferred seating at the auction. It is destined to be quite an enjoyable evening. The crown jewel of the week will be the spectacular gala to be held on Saturday, April 9, 2022. Members and guests will be entertained with music and dancing that evening and will be served a very delicious gourmet meal. The whole evening will be amazing.

In addition to all the scheduled events mentioned already, this members' meeting will have the traditional elements of other members' meetings including the always popular town hall meeting where so much information is shared in order that members may be informed of what is happening with the AOS. This year it will be live and virtual, in an effort to reach as many members as possible.

It would be wonderful to have a record number of members attending this meeting, given that the AOS has been operating mostly virtually for the last two years. South Florida has the pandemic



AOS President Bob Fuchs with *Vanda Fuchs Blue* (left) and *Angraecum eburneum* (right).

under control and in-person meetings are becoming the norm once again. This will give us an opportunity to meet with old friends and create new ones. I, for one, am looking forward to this event as I am sure many of you are as well.

As evidence of this, we are definitely seeing an increase in the number of shows and judgments. I have been fortunate enough to travel to many of these and without exception the folks involved were always so enthusiastic and welcoming. I am confident this will be a trend for the remainder of this year.

These last two years have been very trying for many. It is a welcome sight to see a slow and deliberate return to the normal life we enjoyed before. Despite the difficulties of the last two years, the AOS has learned new ways to inform members, and this is something positive that has come out of this situation. More information is getting out there, reaching many more folks on what is happening in the orchid world today.

I am very excited about the spring Members' Meeting and the Centennial

Celebration. It will be an evening to remember.

You can get more information on the event directly from the AOS website: www.aos.org.

See you there!

— Bob Fuchs, AOS President (email: bob@rforchids.com).

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Notice of the Annual Meeting of Members and Report of the AOS Nominating Committee for 2022

The 2022 Annual Meeting of Members will be held April 8, 2022, at the Biltmore Hotel, 1200 Anastasia Avenue, Coral Gables, FL in conjunction with the Society's Centennial Celebration.

The AOS Nominating Committee respectfully submits the following nominations for officers and trustees. Voting will be strictly by electronic ballot to be distributed by email to all voting members 30 days prior to the election.

OFFICERS

President: Jay Balchan
Vice President: Cheryl Erins
Treasurer: Julio Hector

Secretary: Theresa Kennedy
Vice President: Alison Gallaway
Assistant Treasurer: Nancy Mountford

TRUSTEES (TERM ENDING 2025)

Catherine Higgins

Denise Lucero

Thomas Miranda

Dr. Larry Sexton

TRUSTEES (TERM ENDING 2023)

Russ Vernon

TRUSTEES (TERM ENDING 2024)

Jurahame Leyva

Respectfully submitted: William Riley, chair, Tim Brooks, David Edgley, Edna Hamilton-Cirilo, George Hatfield, Joyce Medcalf, Susan Wedegaertner

Brief biographies for the above slate may be found at www.aos.org.

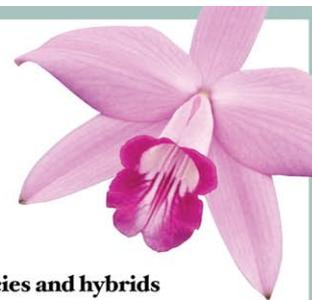
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March: The Month of Fasting

By Thomas Miranda

IN THIS WORLD of plenty, it can be counterintuitive to willfully do without things. Even so, sometimes it can be for the best to do so. The abundance we are so fortunate to have can lead to health issues and the detoxification of an occasional fast can help our bodies to purge the poisons we may inadvertently, or gleefully, consume. Even our orchids tend to fast during their dormant season with less or no water and nutrients only to revive with renewed vigor when spring approaches. I was reminded of the benefits of fasting during my fantastic, recent off-grid experience in Viracochasi, Peru. While I certainly did not do without food — indeed, the meals prepared by Maria Serrano Pacheco were wonderfully tasty, wholesome and nutritious, and superbly fueled our journeys into the forest looking for wild orchids. No, the fasting I refer to was of a totally different kind.



Thomas Miranda

Without the use of my phone and access to the internet and social media, and the accompanying daily barrage of outrageous distractions, I could focus, in an almost surreal way, on the beauty and wonder that surrounded me. Our attention has been redirected to other people's priorities, and our love of nature, the earth, our families and of course our orchids is eclipsed by the daily drumbeat of outrage and tribalism. The solution to this is to just take a break, a "news fast" if you will. We have the advantage of having the world's greatest plants to devote our attentions to. I have found that after these periodic fasts, my mental health is improved and anxiety is greatly reduced, and I can appreciate all the great things that populate my life significantly more. I highly recommend this kind of intermittent fasting for mental and even physical well-being. In case you are afraid of missing out on something important by tuning out, I assure you that the problems of the world will still be there when you return. You will just be in a better and more positive space to cope with them.

WAKING It has been a cold dark winter for many of us with extreme and anomalous weather. Despite the fears that these are manifestations of a changing

climate, spring is most assuredly on its way. March tends to be one of the most tempestuous of months with variable, often harsh weather intermixed with placid warmer days as our plants awaken from dormancy. It is still rather early for many dormant plants such as catasetums and habenarias to be drenched with water. Watching such plants closely each day will give you clues to their progress and when to resume more rigorous care. Even if roots are forming, it is still best to hold off a few more weeks before ramping up watering and feeding to avoid rotting off tender new growths and roots not quite ready for the deluge of moisture and nutrients. A little caution on these plants while they are fasting is warranted.

POSITIVE OUTLOOK Despite the fact that so many plants, such as phalaenopsis and cymbidiums, are in a state of semidormancy needing less care, even while in bloom, focusing on them now is incredibly therapeutic. A greenhouse full of these beauties in March is a sight to behold, and it is impossible to feel sad around such exuberant beauty. For these plants currently in full bloom, focus on their presentation. Make sure they are well staked, spent leaves removed, and positioned with care in the growing space so inflorescences can mature fully and gracefully. This is your chance to detach from the mundane and depressing winter doldrums into the sublime.

LOOK TO THE FUTURE The new growing season is almost upon us whispering promises of new marvels and surprises. New growths and inflorescences are imminent, and it is best to be prepared for any eventuality. Therefore, while things are still calm, you should assess your supplies of pots, baskets, planting media and fertilizers. Garden centers have generally already been stocked in preparation for the onslaught of spring plantings and customers. Its best to get your supplies now while stock is fresh and plentiful. You do not want to be caught with low supplies when you will surely need them in the next few months. If you are the thrifty type that commendably reuses and recycles, make sure you have disinfected and thoroughly clean any pots, stakes or wire products to minimize the possibility of spreading virus. Never reuse old media, except maybe as mulch



LAURA NEWTON

Guarechea Black Comet 'Whisper Dark Matter' AM/AOS (Miva Etoile Noire x *Prosthechea cochleata*) grown by Laura and Wes Newton.

in your garden. It is also time to organize and sanitize outdoor or other growing areas in preparation for spring.

LETTING GO Although we all wish for the best in the coming year, invariably things happen that may trouble us and set us back. One of the reasons we love our orchids as much as we do, is that they offer some respite from these ever-present anxieties and woes. Allow your orchids to enfold you into their fascinating, resplendent world. It will bring you peace, joy, patience, and gratitude for the wonders of this planet and the creation we are so blessed to have in our lives. Take a break from the bleak and bitter world appearing on our multitude of screens and embrace instead the positive and engrossing world of nature and orchids that literally surround us every day. They tell us in their own reassuring way that the world is good, and worthy of our love and attention. We only need to look beyond the daunting headlines and see their pervasive truths.

— 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: biophiliak@gmail.com).



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When	March 16, 2022 8:30pm EDT Wednesday	March 22, 2022 8:30pm EDT Tuesday	April 19, 2022 8:30pm EDT Tuesday	April 27, 2022 8:30pm EDT Wednesday
Topic	The Story of Jewel Orchids Glistening Gems of the Forest Floor	Greenhouse Chat (Orchid Q&A) <i>Send in your Questions!</i>	More on Modern LED Lighting Answering Your Questions	Greenhouse Chat (Orchid Q&A) <i>Send in your Questions!</i>
Presenter	Nicholas Rust Orchid hybridizer with a passion for terrestrials	Ron McHatton Chief Education and Science Officer	Kelly McCracken Owner High Desert Orchids, Miniature Orchid Specialist	Ron McHatton Chief Education and Science Officer

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QUESTIONS AND ANSWERS

LEAF PROBLEM



QUESTION

What are these spots that developed on this orchid in my greenhouse?

ANSWER

This appears to be a semi-deciduous dendrobium — probably a complex hybrid nobile-type. These plants drop some or all of their foliage on older canes just before or during flowering. These leaves look like they are confined to the older growths and the two new growths I can see in the picture look beautiful. If this spotting is confined to old canes (growth) that have flowered before or are reaching the end of their lifetime, this is generally nothing more than end-stage leaf drop. As leaf metabolism on old dendrobium canes begins to shut down, the chlorophyll in the leaf is oxidized and bleaches over time causing the leaf to yellow. As the leaf dies, advantageous fungi that feed on dead or dying tissue can take over and produce brown or black spots and in some plants, curious dark green polka-dots may also appear surrounded by yellow leaf. In all it is similar to the processes that take place in the leaves of deciduous trees.



It is also possible that the damage is the result of a mite infestation and you should also look for their presence. Mites tend to attack the mature leaves over those of new growths. We tend to think of spider mites that spin webs but there are many mites that do not make webs. They can be extremely tiny and difficult to see but sometimes you can wipe the leaves with a white cloth or paper towel and make out the mites you remove.

It is hard to see from the photographs but take a look underneath the affected leaves. If the leaf surface looks silvered or as if it has been finely sandpapered, it would strongly suggest the involvement of mites.

If this spreads to the new

growth you do have some type of fungal problem that you will need to treat. Thiomyl and Daconil are good, inexpensive fungicides that work well on these types of infections. Fungal leaf spotting is fostered by lack of air movement, lower light levels, high humidity and cooler temperatures and many growers apply fungicides prophylactically during the fall and winter to control their spread.

VANDA LEAF LOSS

QUESTION

Damage to my vanda leaves starts at the tips and extends down into the leaf with multiple color changes but not every leaf shows this. What is this and will it kill the leaf or the whole plant outright?

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 — Ron McHatton, AOS Chief Education and Science Officer.

QUESTIONS AND ANSWERS

I grow this in a mesh basket in pure organic charcoal and water daily with a weak fertilizer. I grow in a greenhouse with an average humidity around 73 percent.

ANSWER

This is most likely one of the leaf-damaging fungi such as anthracnose or *Cercospora*. In *Oncidium Alliance* plants, anthracnose looks exactly like what you have in this picture. The key here is the top leaf where at the leaf tip it is brown-black with a dry paper texture, then a blackish band, then a band of orange, and finally a band of yellow. The tip end is dead tissue, and the next three bands represent the live fungus attacking the leaf tissue. The tip of the lowest leaf where the black spots are, also shows an active fungal problem.

You can rule out plant dehydration as the rest of the leaf looks plump and you can rule out simple sunburn. Sunburn appears very fast (1–2 days), will always appear in the plant tissues that are perpendicular to the direction of the light (where the leaf gets hottest) and will be

sharply delineated without rings or bands of discoloring tissue. Fungal and bacterial infections will continue to increase in size with time and are characterized by these colored bands.

I would approach this as a fungal infection and remove all discolored tissue. I would add to my regular orchid culture a regime of fungicide especially during periods when fungi can be most problematic; mid-summer when it is wet and humid, and winter when air movement is less. If left untreated, infected leaves will continue to die back and newer leaves will become infected over time and may ultimately kill the plant. Effective broad-spectrum fungicides that should work here include Thiomyl, Banrot, Heritage (Azoxystrobin) and Pageant (Pyraclostrobin + Boscalid) are good fungicides that should work here.

SCALE INSECTS

QUESTION

Is this fungus on the leaves? Should I spray the rest of my



collection?

ANSWER

You should spray your collection, but this is not fungus. The white patch on the top left leaf pictured, and the yellowish cream area on the center right leaf (arrows) are healthy colonies of Boisduval scale. This is a very common problem in *Cattleya* collections. Just when you think you have rid your collection of scale, you lift up a leaf and look under only to find multiple scale colonies! Sometimes colonies hiding

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QUESTIONS AND ANSWERS

under the leaves will produce hazy circular discoloration on the top of leaves that look like early fungal infections.

Boisduval scale are not easy to eradicate but now is the perfect time, before the infestation gets out of control, to get ahead of the outbreak. First, I suggest you find the pest management webinar on our website (<https://www.aos.org/orchids/webinars.aspx?p=22#recorded>) for review. Small infestations can be controlled but not eliminated using rubbing alcohol and a cotton swab or a mixture of alcohol, water, and 409 Cleaner. Neem oil, used regularly will also keep populations to a minimum.

First, remove all the visible scale. Eggs are found under the hard waxy shells of the female insects and pesticides do not kill them. One systemic scheme that seems to work fairly well is Orthene, Imidacloprid, and an insect growth inhibitor (IGR) such as Distance. Start with Orthene once a week for two weeks, then

Imidacloprid once a week for two weeks. This gets the active infection about 99% under control. Use the insect growth inhibitor once a week for an additional two weeks. The scale is also on the root system so make sure this area also gets treated. The insect growth regulator applied at about six-month intervals should be sufficient to maintain control at that point.

The reasoning behind this sort of pesticide application rather than a single one is that it targets different

modes of action so those insects not killed by the first one are likely killed by the second and then any eggs that hatched are controlled by the IGR. Insect growth regulators are not inexpensive but they are very useful and much less toxic to anything other than the target insects. You do not need to use one in your rotation, just make sure that the three chosen have different activity modes. As an example, Neem could be substituted for the growth regulator.



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Registration opens March 1st, 2022 and is limited to the first 150 participants. For more information and the full itinerary, please visit the IPS website, www.palms.org.

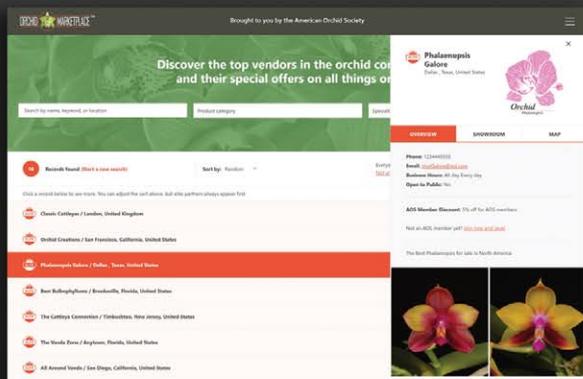


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COLLECTOR'S ITEM

Epidendrum pseudepidendrum

Rchb. f. 1856

By Judith Rapacz-Hasler



Epidendrum pseudepidendrum 'Harford's Best' AM/AOS grown by Tom McBride and The Little Greenhouse. Photograph by James Osen.

RAPACZ-HASLER

FAMILY Orchidaceae
SUBFAMILY Epidendroideae
TRIBE Epidendreae
SUBTRIBE Laeliinae.
GENUS *Epidendrum*
GROUP Pseudepidendrum
SUBGROUP Turialvae

SYNONYMS *Pseudepidendrum spectabile* Rchb. f. 1852

Epidendrum pseudepidendrum, also known as the false epidendrum, is native to Costa Rica and Panama growing exclusively in or on trees in lowland and foothill rainforests at elevations of 1,300 to 6,560 feet (400–2,000 m). In Panama, it grows in the Chirique province at an elevation of 3,940 feet (1,200 m). Although it is quite popular in cultivation, today it is rarely found in nature, mainly due to destruction of its natural habitats. Like many epidendrums, this species produces long reedy stems that produce flowers on terminal inflorescences. Additionally, the flowers have a fringed lip that is fused to the flower's column to form a hidden nectary. It is a warm-to-cool growing, tall epiphytic species with elliptic leaves and few-flowered, apical inflorescences. The large flowers with dark-green to apple-green sepals and petals and a solid, lustrous, orange lip with the column basally green and apex red to violaceous makes this plant a must for every exotic plant lover.

Generally, *Epi. pseudepidendrum* blooms in late winter, early spring or even later on a terminal, loose, semi-erect to arching, to 5.9 inch (15 cm) long, three-flowered raceme arising on a newly mature cane with several, basal, imbricate bracts and weakly scented, simultaneously opening flowers.

CULTURE These orchids grow in trees in their natural habitat, so growing them mounted on cork or slabs of wood is ideal. Strong air movement should be ensured at all times. Alternatively, these plants can be grown in shallow, hanging pots or baskets filled with loose, quickly drying substrate. The substrate must allow quick root drying after watering. Repotting or dividing the plants should be done when the growth of new roots begins. This allows the plants to acclimatize in a relatively short time and provides them with the least stress.

The species does well with daytime temperatures between 65 F and 75 F (18–24 C). They can comfortably tolerate temperatures that stay around 50 F (10 C), but they will not grow at this temperature. During the nighttime hours,



BRYAN RAMSAY

the plants respond to an approximately 10 F drop in temperature (55–60 F [13–16 C]). Moderate temperature fluctuations during the daytime and nighttime hours are tolerated without sustaining damage. They like bright light and unvarying short periods of slightly filtered or scattered sunlight for blooming.

During the period from late spring to autumn, rainfall is moderate to heavy. As winter arrives, rainfall drops sharply and a four-month dry season begins, lasting until the beginning of spring. The cultivation, plants should be kept moist drying only slightly between waterings. In late autumn, watering should be gradually reduced. With the onset of winter, plants should be allowed to dry between waterings, but should not remain dry for a longer period. In most cases, this can be ensured by sporadic fogging in the early morning and light watering once every two-three weeks.

Watering is most beneficial during bright, sunny weather. Fertilization should be reduced or eliminated until new growths appear and the abundance of spring watering begins. While in active growth, plants should be fertilized about once a week at $\frac{1}{4}$ – $\frac{1}{2}$ the manufacturer's recommended dose.

References

Phillips A. and C. Hill. 1998. Back to Basics: Reed-Stem Epidendrums. *Orchids* 67(9):911–919.
Pfahl, J. *Epidendrum pseudepidendrum*. Internet Orchid



BRYAN RAMSAY

[1–2] *Epidendrum* species are exceptionally dominant in their hybrids. Here are two examples: *Sergioara* Yokosuka Story 'Canary' AM/AOS [1], a cross of *Rhyncatleanthe* Free Spirit and *Epicattleya* René Marqués grown by Ron Biancosino. And, *Epicattleya* René Marqués 'Tyler' AM/AOS [2] grown by David Genovese, a cross of *Epidendrum pseudepidendrum* and *Cattleya* Claesiana.

Species Encyclopedia (IOSPE): <http://orchidspecies.com>. Last accessed October, 2021.

— 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).

ORCHID PLACES

Viracochasi Peru

By Thomas Miranda

Photographs by Edson Serrano Pacheco
unless otherwise credited

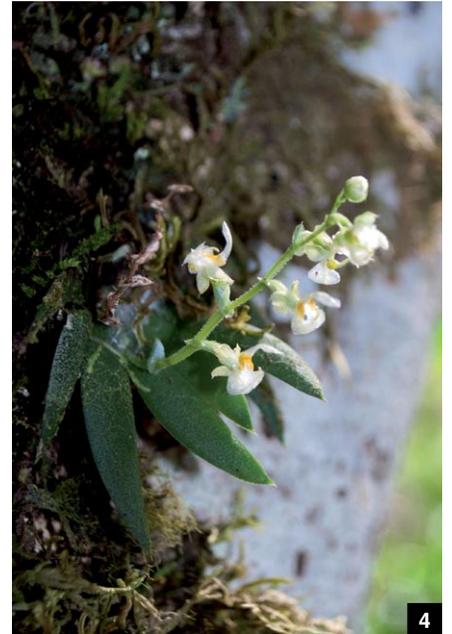


We were stunned to awaken at dawn to the glory of these 8 foot (2.4 m) tall epistephiums, just beginning their successive blooming cycle for the year. Like sobralias, their individual flowers last only a day, but they produce up to 15 over about two months and are deliciously fragrant and vibrant beyond belief. Photograph by Tom Miranda.

THIS MORNING I found myself in the most magical of places, perched on a mountaintop in central Peru, with a majestic 360 degree panorama of Andean peaks. In the distance, the call of the military (macaws!) resounded on a refreshing mountain breeze. While we were slumbering, a natural fragrant garden of epistephium and sobralia blossoms were unfurling in anticipation of greeting us with resplendent delight at dawn. The Orchid and People Garden in Viracochasi, Peru was proving to be a most exhilarating place to be on a brisk, January morning. How did I manage to be so fortunate to arrive at this spectacular place?

Back in 2018 I had the pleasure of traveling in the Cusco region, with Carmen Soto who was then the director of the ecotourism program at Inkaterra, near Machu Picchu. She insisted that I give my talk on orchid pollination to a group of students at her university. At the time, I was the chair of the AOS conservation committee and I mentioned at the close of my talk that there were funds available for orchid conservation projects. On returning home I received a query from a young man in attendance, Edson Serrano Pacheco. He expressed his great love of the natural world and especially the amazing and spectacular orchids that inhabited his beloved village and environs surrounding his family farm, as well as his desire to honor and protect them. After a bit of encouragement, he delivered a fine grant application in which he and his father Angel were seeking to build a repository of the myriad local species that would serve as a conservation resource for the area, which is threatened with deforestation and copper mining projects. Angel, Maria, Edson and his brother Bruce were the rare family that could understand the value of the biodiversity of their land and sought to preserve it rather than exploit it. I am pleased to say that the AOS granted them seed money for their project, and I was eager to see their progress. I was not disappointed.

After the tragic passing of Carmen Soto from COVID-19 a year ago, I was not sure if I would ever again have the facility to visit Peru. But happily, Jose Koechlin, the founder of Inkaterra, promoted a fine, knowledgeable young fellow, Daxs Herson Coayla, to manage their renowned orchid garden. Having met this promising young orchidist on a previous visit, I asked him if we might visit Viracochasi together while I was traveling in Latin America in



January.

I thought Daxs and Edson would become fast friends with their mutual passion for orchids and might continue networking for orchid conservation projects in Peru. Indeed, I believe they are going to do a lot of great work in the coming years to promote orchid biodiversity in Peru far into the future.

I was unprepared for the rustic nature of Viracochasi, an 8-hour drive from Cusco, and an additional hour's drive up a steep mountain road full of switchbacks, took an entire day of travel. There was very limited electricity, and running water was supplied by tapping into local streams. There was of course, no internet or phone service! Incredibly, Edson and Angel, upon hearing of our imminent visit, constructed a shelter for us to sleep

- [2] *Erycina* cf. *glossomystax*. These lovely twig epiphytes occur in nearby abandoned coffee and citrus relic groves and are a favorite of Angel and Edson.
- [3] *Elleanthus* sp. (possibly *amethystina*) were common in the local landscape with several species both epiphytic and terrestrial represented.
- [4] *Ornithocephalus* species were usually hanging on the undersides of tree branches where they completely avoid any direct sunlight. The flowers offer an oil reward to their pollinators.

in, completed just prior to our arrival. While it had dirt floors and ample “air conditioning” through the porous walls, we were exceedingly comfortable in the beds they built for us and enjoyed the open-air shower they provided. Angel’s wife, Maria, treated us to flavorful and nutritious meals and some of the most delicious coffee I have ever had, all grown and harvested on their property. The Serrano-Pacheco family lives a completely healthy, sustainable and self-sufficient existence on their beautiful farm, as well as an enviable quality of life few of us city dwellers will ever know.

Angel developed his appreciation for orchids from his father, Antonio Pacheco Diaz, who settled Viracochasi decades ago and passed that love of plants to his own sons, Edson and Bruce. Their orchid project is a wonder with hundreds of plants rescued from regional “development” all thriving in their circa situm environment. While the garden is rustic as you would expect, the plants are getting most everything they need from Mother Nature. Many genera are represented there with a preponderance of maxillarias, dichaeas, epidendrums, prosthecheas, catasetums, gongoras, sobralias and elleanthus species, and a healthy array of *Oncidium* Alliance plants including giant 5 ft (1.5 m) brassias, odontoglossum-type oncidiums, cyrtochilums, to miniature erycinas, macrocliniums and ornithocephalus. A very shady section of the garden had some thriving terrestrial species including govenias and probable habenarias. One of the biggest surprises though, was a natural, unplanted area that had a large patch of an outstanding plant resembling what is known as *Galeandra beyrichii*, a quite widespread South American species. I have always thought this plant could not possibly be a true *Galeandra* as its habit is strictly terrestrial with an underground pseudobulb similar to those of *Bletia* or *Phaius*, however genetic analyses support its inclusion in *Galeandra* and the unusual growth habit appears to be due to an evolutionary adaptation to habitat. The species appears to be quite rare in Peru and I am reasonably sure it is a new record there. This plant is rarely encountered, as it is leafless while in bloom and possibly very cryptic while in leaf, resembling a common grass. We were very fortunate to find them just beginning to bloom or we might never have known they were there.

Indeed, I believe it is probable that there are many new records in this garden,



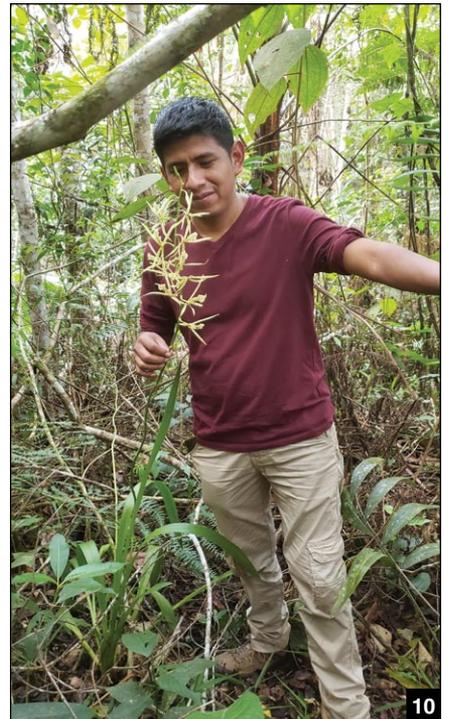
and likely some undescribed species as well. In the subsequent days of our visit, we explored the adjacent habitats that are threatened by the building of encroaching cell phone and electric towers as well as farming monocultures. On these trips we collected some unusual plants that were not yet included in the Garden. Although I cannot be certain of the tentative identifications without seeing the flowers, we discovered some fantastic new maxillarias, a gigantic epidendrum as well as what seemed to be cochleanthes, huntleyas and paphinias (or close relatives). I am excited to see what these plants turn out to be. If we are lucky, something new to science will emerge. I will of course be keeping in touch with Edson and Angel and should have updates soon.

It is my belief that if we are to preserve orchid biodiversity for our children and



their children, it is only projects such as these that have the best chance of doing so. Our Earth's ecosystems will continue to be compromised as long as we humans continue to degrade and exploit them. There is much to be learned by emulating the ways of people we might feel are living provincial or even primitive lives. The truth is, their way of life has survived because of the wisdom and knowledge of elders and their respect for the land that is passed on to new generations of naturalists, truly caring and loving individuals. I believe Edson and his family are models for the conservation world. I celebrate the existence of such passionate, exuberant and reverent people. We should help them take this project to the next level, with additional contributions supportive of sustainable infrastructure, visits by scientific investigators, conservation biologists and ecotourists. I am in awe of their accomplishments and anxious to see their progress in the coming years. In actuality, it is not magic but the spectacular reality of life on this incredibly beautiful planet. Such places should be cherished, revered and preserved for generations to come.

— 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: biophilialk@gmail.com).



- [5] All of us were pleasantly surprised to see the tall stems of *Galeandra beyrichii*, previously unknown in Peru, volunteering in an unplanted section of the garden. Photograph by Daxs Herson Coayla.
- [6] *Maxillaria nasuta* is a striking species with a glossy red lip. There is a resin secreted from it ostensibly as a pollination lure that will permanently stain clothes.
- [7] *Sobralias* brighten the landscape around Viracochasi and bloom synchronously, a technique they use to assure intraspecific pollination.
- [8] A frequent inhabitant around the forests of Viracochasi, *Scaphyglottis imbricata* bears a larger and very colorful, brilliant red bloom compared to others in its genus. Photograph by Tom Mirenda.
- [9] This *Phloeophila* species, one of several fascinating miniature pleurothallids we observed on the shady lower branches.
- [10] Daxs Herson Coayla admires an extremely large inflorescence on this spectacular terrestrial brassia! Photograph by Tom Mirenda.
- [11] These lovely *Koellensteinia ionoptera* grow near the summit in the open, but just out of direct sun on the forest margin.

Conservation Recognition Award

The Guatemala Orchid Society

By Charles Wilson

Photographs courtesy of the Guatemala Orchid Society and Asuncion Ecological Park

IT IS WITH a great deal of excitement and congratulations that the American Orchid Society (AOS) announces that the Guatemalan Orchid Society has been awarded a \$1,000 Conservation Recognition Award for their extensive conservation work in reclaiming a former dumpsite in cooperation with the municipal government to establish it as a nature park. In 2015, the site was little more than a bulldozed barren clay lot. The park now includes the orchid reserve as well as sports fields and playground equipment.

Thanks to far-sighted society members, the orchid reserve of the Guatemalan Orchid Society was created within the Ecological Park La Asuncion, after the city of Guatemala removed 80 tons (72,574 kg) of garbage from the former dumpsite. The park was expanded to approximately 27 acres (11 ha) by combining it via an interpretive trail uphill to an adjacent area of native oak forest where nine species of remaining native orchids have been found and identified, notably *Sobralia macrantha* and *Bletia purpurea*. Over 200 in-vitro produced seedlings of *Guarianthe aurantiaca* have been planted throughout the park as well as *Oncidium sphacelatum* and *Epidendrium radicans*.

Not only has the Guatemalan Orchid Society planted trees with the long-term vision of supplementing the remnant native forest of the park, they are reintroducing orchids (donated from the private collections of its society members as well as orchids rescued from construction sites), creating educational graphics (in cooperation with a nearby university) and hosting guided tours for local school children. The funding for the orchid reserve is provided from the membership dues of the society and a 10% committed contribution from their annual orchid show.

In 2019 over 6,000 people visited the park, including 4,000 school children. The objective is to teach the importance of preserving natural habitats, how to dispose of garbage, and recycling. In 2020 the park was closed due to the pandemic but reopened with restricted visiting times



[1] Arches of native plantings welcome visitors to the orchid reserve at Ecological Park La Asuncion.

[2] In 2014, the former dump site was graded level prior to restoration by the Guatemala Orchid Society.

[3] *Epidendrum radicans*, a Guatemalan native, is rapidly colonizing disturbed areas.

[4] *Brassia verrucosa*, a Guatemalan native, has been established in the Park.

[5] Dunkin' Donuts time with the park rangers.

[6] *Sobralia macrantha* occurs in several original patches within the park.



in 2021. The Guatemalan Orchid Society has been an AOS affiliated society since 1978. Through the dedication and hard work of the members of the Guatemalan Orchid Society, Guatemala City has a very successful orchid reserve project to inspire other Central American municipalities. The project has been so popular and successful, the City of Guatemala has asked the orchid society to partner with them in restoring orchids in another city park.

— *Charles Wilson, Chair, AOS Conservation Committee (email: zooemeritus@gmail.com).*



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- Complimentary transportation to and from the Fairchild Tropical Botanic Garden (including admission to the Garden) Thursday afternoon, April 7th.
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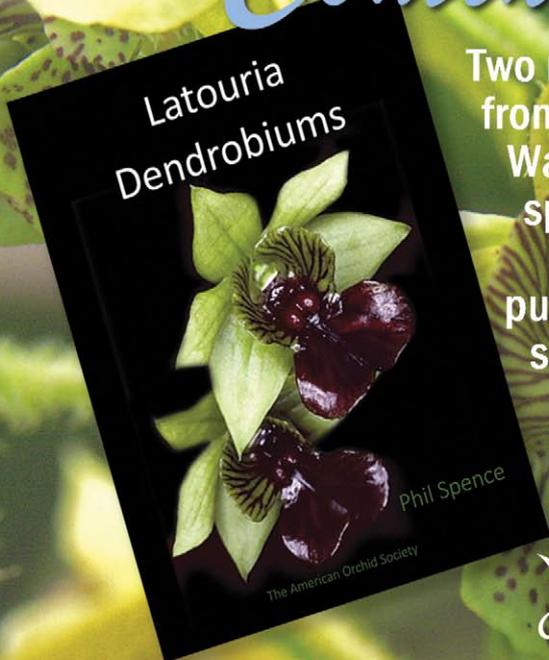
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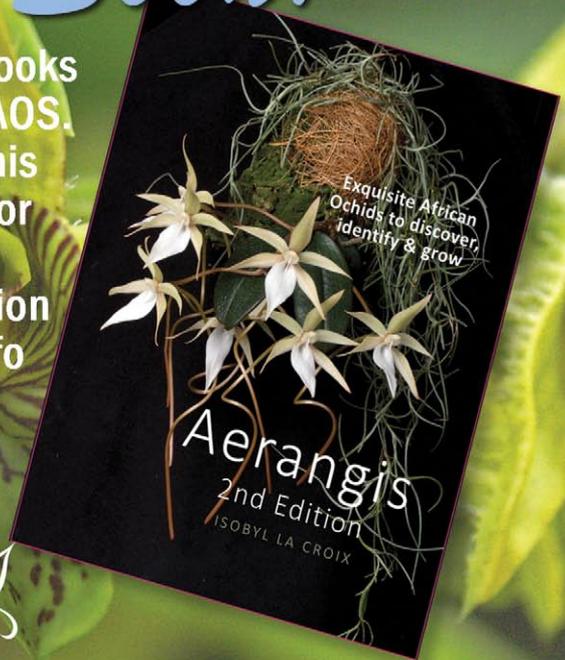
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*Gala tickets sold separately

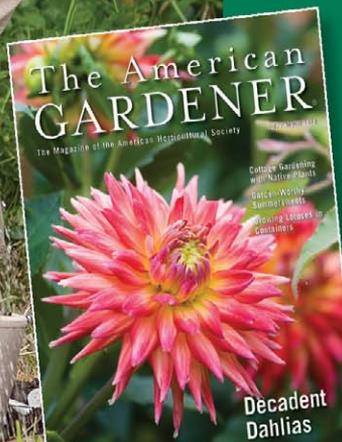
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Phototropism in Cattleya Alliance

Preliminary Notes

Text and photographs by Larry M. Litwin

IN JANUARY, 1992, the *AOS Bulletin* published an article I wrote about floral phototropism in *Phalaenopsis* (Litwin 1992). Phototropism is the resulting orientation of a plant or flower to light. Since then, I have been observing this in Cattleya Alliance inflorescences. I feel this is an important aspect of flowering. Light for windowsill-grown plants is fairly unidirectional in the sense it always illuminates most strongly from the side of the plant facing the window. This can be true for greenhouse plants, during winter, grown in mid-to-northern regions as well. Even in summer, at high latitudes, the sun illuminates mostly from one side.

The responses to light that I have been able to observe, across the limited number of cattleyas in my collection, appear much more complex than those in *Phalaenopsis*. In at least some of the former, the floral parts (sepals, petals, and perhaps the lip as well) seem to be phototropic in addition to the vegetative parts of the inflorescence itself (peduncle and pedicel). Adding to the complexity is the observation that the different parts of a flower or inflorescence may be phototropic at different times and for different lengths of time. Moreover, some parts show both negative and positive phototropism at different stages of their development. At one point, they will orient away from the light and, at another, toward the light.

An example of this is seen in *Cattleya* Michelle's High Bid (Sierra Doll × Mini Purple). This plant is windowsill grown, potted in osmunda fiber and in a clay pot. Just as the flower started to open, the dorsal sepal exhibited strong negative phototropism. A day later, the dorsal sepal had become positively phototropic and aligned in its proper position.

Had I reoriented the flower before the second (positive) response to the direction of the light, the dorsal sepal would most likely have been pushed even farther back. The tips of the petals at this point are reflexed, as if they were negatively phototropic. I cannot be sure, at the current time, if this was caused by the direction of the light or if it is the normal morphology.

To make observations even more



Inflorescences

complicated, some parts of the inflorescence seem to be more affected by early or morning light, while other parts seem to be more affected by afternoon or evening light. If moved before orientation is complete, the quality of the display can be affected adversely. Depending on the stage of development, the flower itself may be deformed or the arrangement of the flowers on the inflorescence may be distorted.

Cattlianthe Jupiter Drops 'Another Tequila Sunrise' illustrates the latter point. It also is windowsill grown, and potted in osmunda in a clay pot. Parents of this complex grex are *Cattlianthe* Tiny Treasure and *Cattlianthe* Orchidglade. Unfortunately, I moved this plant too soon from where it was growing with flowers facing toward the window to a bay window to display it with the flowers facing in toward the room. Light then came from the side opposite of the original orientation.

The first photograph shows the flowers well oriented at the time it was moved. The second photograph shows the flowers after they partially reoriented toward the new direction of the light.

The floral parts had apparently set or are not phototropic in this plant and show no reorientation. However, the pedicel of each flower reoriented to the extent it could, causing the flowers to face upward rather than forward. Returning the plant to its original orientation did not allow the inflorescence to recover because the pedicels had already set and were no longer phototropic. If I had waited a few days more before moving the plant, the inflorescence would have been fine. Had I moved the plant a few days earlier, it is possible that the flowers themselves would have been distorted as well. I should also point out that both the peduncle and pedicel may be (probably are) phototropic long before the bud begins to open. It seems to be wise not to reorient the plant once buds can be seen in the sheath.

I am still studying how the direction of light affects the individual floral parts and the inflorescence as a whole during the development and opening of the flowers in the cattleyas. It is complex and not completely uniform across the



- [1] *Cattleya* Michelle's High Bid exhibiting negative phototropism as the flowers first open.
- [2] The same flower showing return of the dorsal sepal apex to its upright position and the reflexing of the petal tips.
- [3] *Cattlianthe* Jupiter Drops exhibiting excellent presentation before the plant was prematurely moved.
- [4] Moving the plant altered the direction of the light resulting in distortion of the flower presentation.

Cattleya Alliance. That makes it far more difficult to draw conclusions. Additionally, observations can be made only once or twice a year on each grex.

Some movements during the development of the blooms can be observed without reorienting them with respect to light direction. Others can only be observed by reorienting a plant too soon, deliberately spoiling the display. I am reticent to do that making it slow to accumulate information. If I had a greenhouse and several hundred of each grex on which to experiment, data would accumulate much more quickly.

My limited observations lead me to believe that, in general, complex hybrid “mini-cats” have little to no floral phototropism, especially those with significant contribution from former *Sophranitis* in their background. However, some miniature species, for example *Cattleya pumila* and *Cattleya walkeriana*, show a strong floral response to light direction, as do at least some of their primary hybrids such as *Cattleya* Mini Purple. Even more complex hybrids such as the pictured *C. Michelle’s High Bid* can show decided orientation with respect to the direction of light. The *C. Sierra Doll* parent is 50 percent *C. walkeriana* and 25 percent *C. pumila* and the *C. Mini Purple* parent is 50 percent *C. walkeriana* and 50 percent *Cattleya pumila*. *Cattleya Sierra Doll* is especially complex, having no less than 10 species in its background. Still, it has high proportions of *C. walkeriana* and *C. pumila*. Many compact and standard cattleyas seem to have floral phototropic responses to varying degrees as well.

The single recommendation that I can make is that it is much better to leave a *Cattleya Alliance* plant undisturbed for some time once the flowers have completely opened. I wait two-to-five days after blooms are fully open before I move the plant to be displayed. If the flowers or inflorescence changes after I move it, I take notes on what parts were affected, how they were affected, and how long it was after the flower opened that I moved it. I then leave the plant undisturbed a bit longer on the next flowering.

Henry Oakeley apparently recommends putting a black background to the plant to get it to orient properly. That stops the plant from getting light or reflected light from behind or to the sides somewhat. The black of course absorbs rather than reflects the light (Allen-Ikeson, pers. comm.) This is something worth trying.

Another suggestion is that you should watch carefully as each inflorescence

develops, if possible, checking several times a day. Look for signs of the inflorescence or parts of the inflorescence orienting to the direction of light. Watch to see if flower parts seem to move in relation to light. Note if it happens in the morning, midday or evening. Especially try to observe if any part moves away then toward the light or the opposite. By doing this, you can identify plants that have phototropic tendencies and be especially careful not to disturb their orientation during their development.

My third suggestion is not limited to phototropism but might be the most important recommendation I can make. Keep some sort of record. It should be just detailed enough to keep your interest but not so detailed that it becomes a chore. Do not get caught up in forcing yourself to make “standard entries” or to adhere rigidly to a specific set of observations. Your perception of what is meaningful will change over time. Use the record as a scratch pad to make note of things that you notice about a particular plant, its response to conditions, anything out of the ordinary or anything which you suspect might be important.

I use a 3 × 5-inch (7.6 × 12.7-cm) index card for each plant in my collection. The note cards allow me to keep track of anything I want to remember. Next time a plant is starting buds, I can check to see what happened the last time and treat it accordingly. Beside notes about flower orientation, I also record when rooting starts and at what stage the plant was. That provides me with a heads up for plants that could use repotting. Having notes to consult allows you to anticipate what to expect and to adjust your culture ahead of time, if necessary.

References:

Litwin, L.M. 1992. Into the Light. *AOS Bulletin*. 61(1):38–43.

— *Larry Litwin received a BA natural sciences and mathematics from Edinburgh University in 1969 with a major in biology. He received his MA in biology from Bucknell University in 1972 with a concentration in plant physiology. He retired from the New York State Department of Health in 2007 after 30-plus years as a software engineer and applications analyst. He has grown orchids since 1970 and, though employed outside the field of botany, never stopped investigating and experimenting. His primary interests are the physiology of epiphytic orchids as it relates to their culture and the tropisms exhibited by orchids (email: lmlitwin@nycap.rr.com).*

HOME REMEDIES

— Rather than expensive and potentially dangerous herbicides, spray full-strength vinegar to kill weeds between pavers and on greenhouse floors. (Do not spray on orchids.)

— Aspirin (just ¼ of one 325 mg tablet per gallon of water) helps protect plants from fungal and viral pathogens when used as a spray. More is NOT better. Do not exceed this amount.

— Homemade insecticide (mix in a 1 gallon [3.8 L] jug): 1 pint (0.5 L) rubbing alcohol, 1 pint (0.5 L) 409 spray cleaner, and 3 quarts (2.8 L) water. Apply as a spray.

— Isopropyl (rubbing) alcohol can be put into an empty spray bottle and used to treat scale, mealybugs, thrips, aphids, red spider mites and perhaps other pests. It works only while wet and must contact the insect.

— Neosporin has been reportedly used to treat orchid crown rot; remove rotted area of plant before treatment.

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FOR THE NOVICE

Cork and Mounted Orchids

Text and photographs by Arthur E. Chadwick



HOBBYISTS HAVE LONG used pieces of cork to mount those orchids which like to dry out quickly or, simply, for that naturalized look. Yet, few people know where this media comes from or what it takes to bring it to market. In many respects, the cork industry is a glimpse back in time when old fashioned ingredients were king.

For much of the 20th century, cork was used in everything from wine stoppers and office boards to automotive gaskets and bird decoys. This was big business and at one time, there were as many as 1200 processors in the United States. Slowly, however, cheaper, and easier alternatives were found and, for the most part, cork went the way of the dinosaur.

Recently, I visited a production facility in rural Maryland that still grinds cork. In fact, it is the only remaining facility in the country — the lone survivor in a nearly extinct industry. The name needs no explanation — Maryland Cork Company.

Founded in 1947 on a former military depot site, the facility consists of massive silos and warehouses, now long faded and in need of some love. A fine cork dust covers everything. This could pass as a Hollywood movie set.

There was a small office sign that led me to the president of the company, George Hocker, who has been there since 1974 and gave me the tour. We walked into the first building that was stacked to the ceiling with 50-pound (22.7 kg) bags of cork powder. Through the door was the deafening roar of huge grinders.

Mr. Hocker showed me samples of the various grades of cork that his company makes ranging from one inch down to a fine mesh. The raw material comes from Portugal and is a combination of large bark chunks harvested from old trees as well as leftover pieces from the wine stopper industry. Cork is a renewable crop that takes nine years to grow back.

Family-owned groves are maintained just for cork production and are passed down from generations. Workers paint the age of each tree on the trunk, so they know when it is ready to collect. The very first cutting, called virgin bark, occurs at 30 years, and commands a premium.

Hobbyists are most interested in virgin bark that has not been ground up into little pieces and is about the size of a sneaker. Sympodial orchids such as cattleyas, dendrobiums, and oncidiums with their multiple pseudobulbs can be tied on with fishing line or pantyhose to allow for many years of future growth. Roots emerge soon and tightly wrap around the media.

Mounted orchids are commonly grown as hanging plants — inside, near windows, or outside from tree limbs or in slat houses. Daily watering is required because the media holds little moisture. A well grown specimen can look as though it was plucked right out of the rainforest.

Botanical gardens and conservatories are keen on even larger pieces of bark that can measure up to six feet long and three feet wide. Applied to a wire mesh frame, these slabs can give the appearance of an old tree growing in the jungle complete with vanilla vines covering the trunk. Flower pot sized holes are hollowed out in the limbs so that blooming orchids can be dropped in for effect and that over-the-top visitor experience.

Mr. Hocker was a convincing salesman and I left with a 100-pound (45.5 kg) roll of medium sized bark slabs which I suspect will last me a lifetime. It is nice to know that there are still tried and true industries out there that remind us of simpler days gone by. Every orchid that we mount from here on is a little memento from my day at the cork factory.

— Arthur E. Chadwick is president of Chadwick & Son Orchids and a coauthor of *The Classic Cattleyas*. His next book, *First Ladies and their Cattleyas: A Century of Namesake Orchids, is due out this fall.* (email: art@chadwickorchids.com; Website www.chadwickorchids.com).



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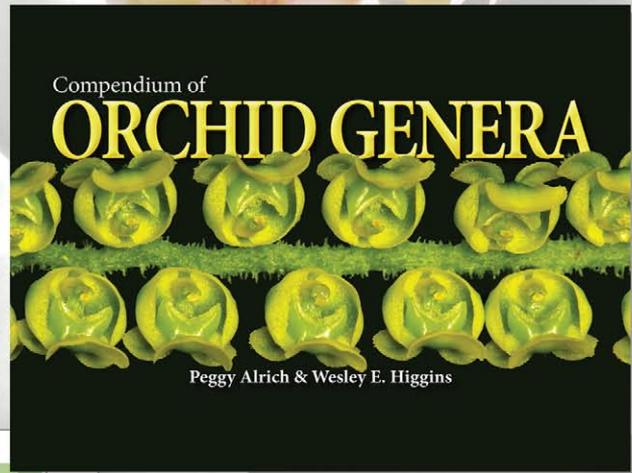
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[1] Bark slabs come in all sizes and can be broken into pieces as needed. They are ideal for mounting sympodial orchids such as cattleyas.

[2] An established orchid will completely cover a cork piece with roots. Mounted plants should be watered every day and will dry out quickly.

[3] Leftover pieces from the wine stopper industry can be reground then pressed back into usable corks.

Presenting
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by Peggy Alrich
and Wesley Higgins



Valid *Angraecum* Synonyms

Aerobion Kämpfer ex Sprengel
Syn. Veg. Sprengel, ed. 36, 3: 679 & 716 (1826).
Errores: Greek for air and life, referring to the epiphytic habit of the plants.
LECTOTYPE: *Aerobion asperum* (Thouars) Sprengel (*Angraecum asperum* Thouars) (*Angraecum* Cates. *det. det.*, 2003, 10: 1071).

Now 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 (Cadenot) Schachler, Mynik & Grochocka
Biodivers. Res. Conservation, 20: 9 (2013).

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

Two Seces: *Angraecoides piperis* (Frappet) Schachler, Mynik & Grochocka (*Angraecum piperis* Frappet)

Now 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 (Schachler) Schachler, Mynik & Grochocka
Biodivers. Res. Conservation, 20: 11 (2013).

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

Two Seces: *Arachnangraecum ramanantsoa* (Thouars) Schachler, Mynik & Grochocka (*Angraecum ramanantsoa* Thouars)

Now 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.

Bonnieria Cadenot
Rev. Gén. Bot., 11: 416, 31: 10-11 (1899).

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

Two Seces: None designated

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

Boryangraecum (Schachler) Schachler, Mynik & Grochocka
Biodivers. Res. Conservation, 29: 12 (2013).

Errores: Named for Jean Baptiste Bory de Saint-Vincent (1778-1846) a French naturalist and author of *Voyage dans les îles d'Afrique*. And *Angraecum*, a genus of orchids.

Two Seces: *Boryangraecum panellei* (Schachler) Schachler, Mynik & Grochocka (*Angraecum panellei* Schachler)

Now 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.

Angraecum Bory
Voy. Ins. Afrique, 1: 336 & 19 (1846).

Epitheloides: VanDer *Angraecum*

ETYMOLOGY: From the Latinized form of the Malayan word (*Angrak* or *Angrok*) for the epiphytic orchids that resemble *Azadirachta* and *Tillandsia* in habit. The name *Angraecum* originated with Georg Eberhard Rumphius (1628-1702), who coined the word *Angrak*, a name or title given by the Malaysians to parasitical *Epitheloides* plants, the meaning of which has not been discovered. From Fagholft Kämpfer (1651-1716) we learn that *Angrak* or *Angrok* is also the name used by the Javanese for these plants.

GENETICS: *Angraecum eburnaceum* Bory
Biodivers. Res. Conservation

More than two hundred twenty-one, very small to very large monopodial epiphytes, a few lithophytes or rare terrestrials have a wide range of distribution in humid, low to mid elevation, coastal to hill scrub, savannas to montane evergreen forests of mainly tropical Africa (Guinea to Somalia, Gabon to Zimbabwe and South Africa), Madagascar, Mauritius to Réunion, although one species is found as far away as the Seychelles and Sri Lanka. These miniature to large, rambling to clump forming, warm to cool growing plants are vegetatively and florally quite diverse. The short to long, sometimes branched stems are leafy throughout with fleshy to leathery, channelled, unequally bilobed, usually dichotomous leaves. The one to several, short to long, solitary to few-flowered inflorescences have long-lasting, small to large flowers in shades of white, ivory or green with sepals and petals free, usually spreading. The flowers are noted for their spots of widely varying lengths from quite long to short. The flowers have a thick, almost leathery texture, an exceptionally long flowering period, and an extraordinarily heavy nocturnal fragrance (usually within the long spurred species) and the lip is larger than the other segments. The shell or boat-shaped, simple or obscurely lobed lip is usually quite concave, its base more or less encloses the column, and it has a central callus. The flowers have a very short, foetal-like column with deeply divided lobes.

POLLINIA: 2, waxy, each attached to its own narrow or elliptic viscidium.

Culture: Growing conditions and habitat options vary widely from species to species. Generally they do best mounted on a fern slab with good drainage and most of the species benefit from a resting period of reduced watering. Provide intermediate conditions, bright to diffused light, high humidity and good air movement.

Angraecum asperum
Biodivers. Res. Conservation, 20: 9 (2013)

Angraecum humboldtii
Biodivers. Res. Conservation, 29: 12 (2013)

A



More than 200 orchid genera are presented with the original orchid discoverer and date as well as the etymology and an easy to read description of growth habit. The book is illustrated with antique color plates, many from an original publication, all complete with citations. This book will be a welcome and beautiful addition to any orchid grower's library, a stunning work and artistic treasure.



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*Void where prohibited by law.



Serapias longipetala. Pollin.

V. Fussat. pinx. et lithogr.

Lithographie A. Gillrils Lea Imp.

Serapias by Wesley Higgins and Peggy Alrich

Macaronesia, South-Central Europe, Mediterranean Region to the Caucasus



THE GENUS *SERAPIAS* was described by Linnaeus in *Sp. Pl. (Linnaeus)*, ed. 1, 2:949 (1753), and *Gen. Pl.*, ed. 5, 406 (1754). The name and type are ICN conserved. Not *Serapias* Persoon, *Syn. Pl. (Persoon)*, 2:512 (1807).

ETYMOLOGY Egyptian Mythology. Serapia was an Egyptian god known for his lack of sexual restraint. His cult rose to its greatest significance in the city of Alexandria during the reign of Ptolemy I (323–285 BC); this cult later died out after the destruction of the Alexandrian temple in AD 391.

Or Greek Mythology: Serapis was the goddess of fertility, medicine and ruler of the dead. Referring to the supposed aphrodisiac qualities of the roots.

Sixteen perennial sympodial terrestrial species are found in low- to middle elevation, cold to cool, hill scrub, sand dunes, wet marshes, damp meadows and open montane savannas from Britain to Italy, Sardinia, Corsica to Crete, Greece, northern Africa (Morocco to Tunisia), the Canary Islands and extending into Turkey, Syria, Iraq, Armenia and the Republic of Georgia.

These small plants have two oval-shaped to ovoid tubers; erect, short to long, slender to stout, smooth, unbranched stems, each with narrow,

erect or sometimes folded and curved leaves that have spotted or unspotted sheathing bases. The few-flowered inflorescence has large, leafy, gray floral bracts often exceeding the gray-purple flowers. The narrow sepals and petals converge, forming a sharply pointed to tapering hood, heavily veined in dark purple. The purple suffused, prominent, trilobed lip has a one to two lobed, densely hairy callus located between the erect side lobes, and has a hanging, tongue-shaped midlobe. The flowers have a long, erect, mealy column.

Systematic studies of *Serapias* by Venhuis et al. (2007) yielded two main groups: a small-flowered *Serapias parviflora* group and a large-flowered *Serapias vomeracea* group that were not concordant with the taxonomic classifications of Baumann and Künkele (1989) or Delforge (1995, 2002). The relative DNA content was used to infer information on species ploidy levels: diploid (2n = 36), tetraploid (2n = 72) and hexaploid (2n = 108). The authors discuss hypothesizes as to the origin of the different ploidy levels within *Serapias*.

The species in this genus frequently interbreed producing 20 natural hybrids:

- Serapias* × *albertii* (*neglecta* × *vomeracea*)
- Serapias* × *ambigua* (*cordigera* × *lingua*)

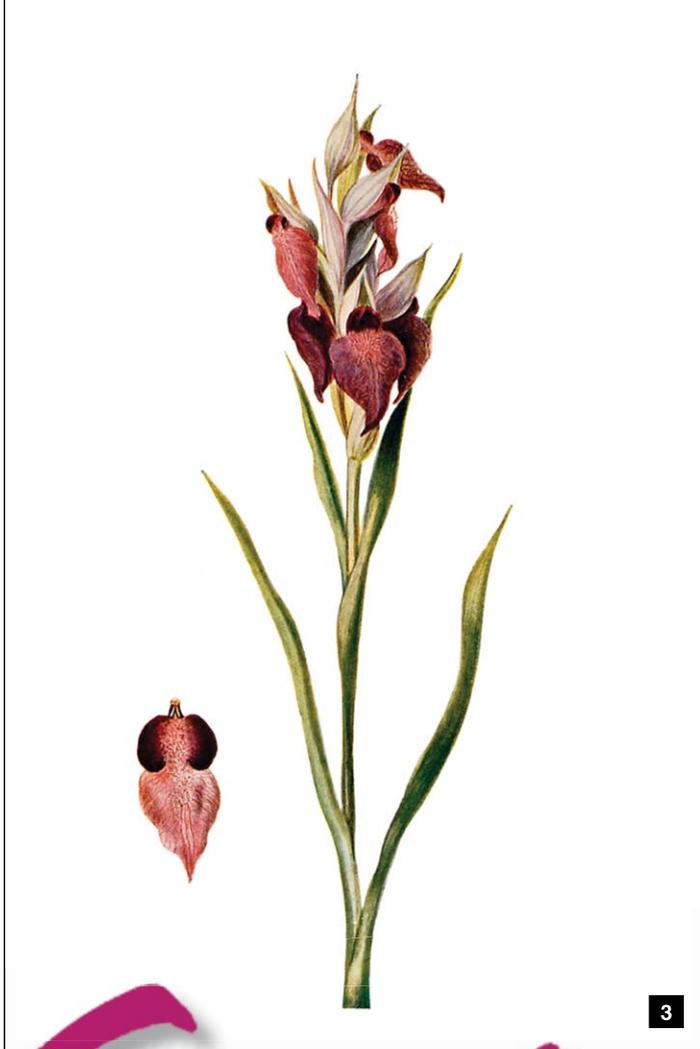
- Serapias* × *ambigua* subsp. *ambigua* (*cordigera* × *lingua*)
- Serapias* × *ambigua* subsp. *panormosana* (*cordigera* subsp. *cretica* × *lingua*)
- Serapias* × *cyprica* (*bergonii* × *orientalis* subsp. *levantina*)
- Serapias* × *euxina* (*bergonii* × *orientalis*)
- Serapias* × *garganica* (*orientalis* × *vomeracea*)
- Serapias* × *godferyi* (*cordigera* × *neglecta*)
- Serapias* × *halacsyana* (*bergonii* × *cordigera*)
- Serapias* × *halicarnassia* (*bergonii* × *orientalis* subsp. *carica*)
- Serapias* × *intermedia* (*lingua* × *vomeracea*)
- Serapias* × *kelleri* (*cordigera* × *vomeracea*)
- Serapias* × *lupiensis* (*lingua* × *politisi*)
- Serapias* × *meridionalis* (*lingua* × *neglecta*)
- Serapias* × *oulmesiaca* (*lingua* × *cordigera* subsp. *cordigera*)
- Serapias* × *provincialis* (*cordigera* × *olbia*)
- Serapias* × *pulae* (*istriaca* × *lingua*)
- Serapias* × *rainei* (*cordigera* × *parviflora*)
- Serapias* × *todaroi* (*lingua* × *parviflora*)
- Serapias* × *walravensiana* (*orientalis* subsp. *carica* × *lingua*)

Reference

C. Venhuis, P. Venhuis, J.G.B. Oostermeijer, and P.H. van Tienderen. 2007. Morphological Systematics of *Serapias* L. (Orchidaceae) in Southwest Europe., *Pl. Syst. Evol.* doi: 10.1007/s00606-007-0519-0.



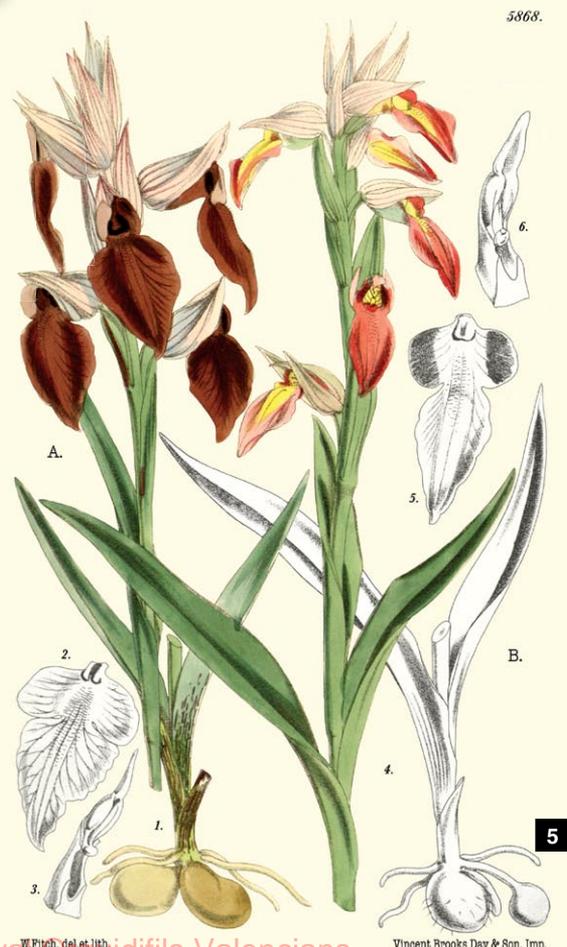
Serapias cordigera



Serapias

ANTIQUÉ PLATES

- [1] *Serapias vomeracea* as *Serapias longipetala*, *Flore illustré de Nice et des Alpes-maritimes. Iconographie des Orchidées*, t.18 (1868).
- [2] *Serapias cordigera*, *Botanist's Repository*, 7: t.475 (1806).
- [3] *Serapias cordigera*, *Album des Orchidées d'Europe*, t.62 (1923).
- [4] *Serapias lingua*, *Exotic Flora*, 1: t.11 (1823).
- [5] *Serapias cordigera* and *Serapias lingua*, *Botanical Magazine*, 96: t.5868 (1870).



Orchids of Bhutan

Arachnis (the “Esmeraldas”)

By Stig Dalström, Choki Gyeltshen, Nima Gyeltshen,
Kezang Tobgay, Pem Zam, Tandin Wangchuk,
Kezang Rinzin, and Bhakta Bdr. Ghalley

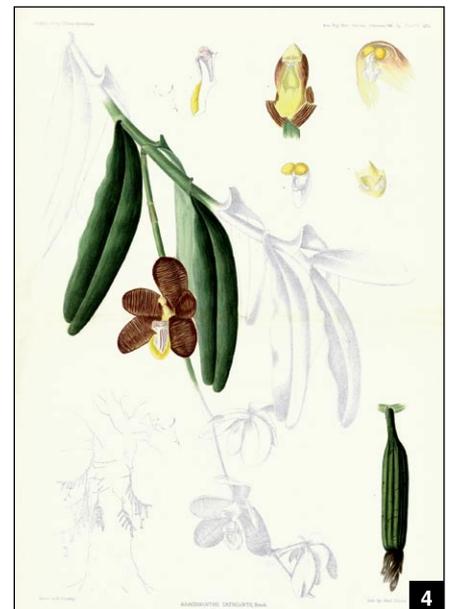
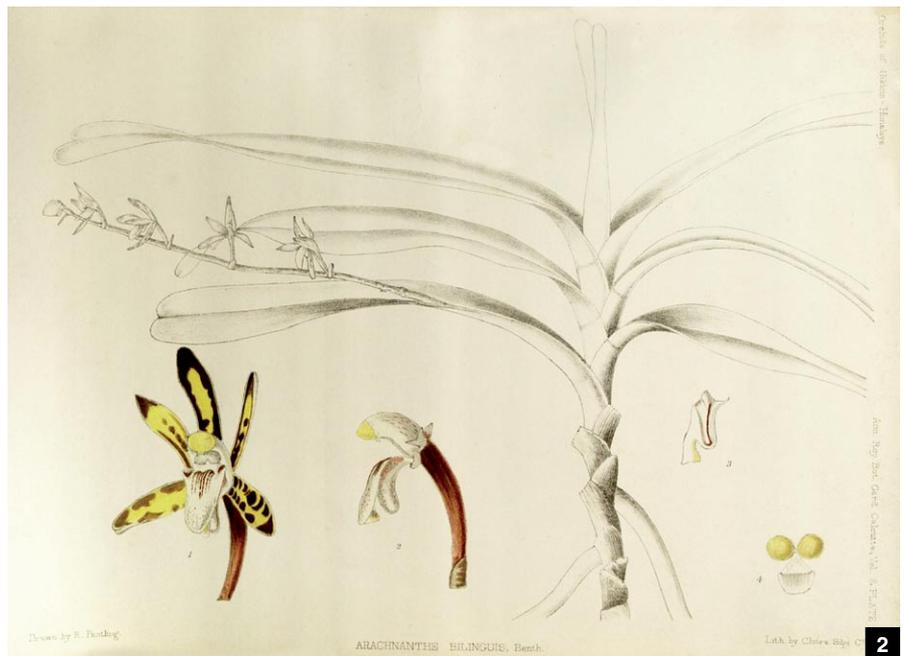


THE GENUS WITH the delightful name *Esmeralda* Rchb.f., was created by Heinrich Gustav Reichenbach in his *Xenia Orchidacea* (1862) without an explanation for his choice of name. As a type species he used a plant that was described earlier by John Lindley as *Vanda cathcartii* Lindl. Lindley writes:

“No more remarkable Orchid has been found in Northern India, and therefore it is selected to bear the name of J. F. Cathcart, Esq., who caused a noble collection of drawings to be made in Sikkim, some account of which it is to be hoped that the public will have in time from Dr. Hooker.” (Lindley 1853)

When seeing the striking flowers of *Esmeralda cathcartii* (Lindl.) Rchb.f., it is easy to understand Lindley’s excitement. However, as charming as the name “*Esmeralda*” may be, it has not survived the scrutinizing eyes of orchid taxonomists. Or perhaps it is more accurate to say orchid “laboratorians” in this case, since it is because of molecular research that the two magnificent Bhutanese *Esmeralda* species; *Em. cathcartii* and *Em. clarkei* Rchb.f., have been transferred to the previously described *Arachnis* Blume. The generic name refers to the imaginary similarity of some of the species to spiders or scorpions. This latter genus consists of 16 accepted species, two “varieties” and one natural hybrid that are distributed over much of the tropical parts of the Himalayan region, Southeast Asia and China, New Guinea and the Pacific Islands (WCSP 2021, Pearce and Cribb 2002). In Bhutan the two former *Esmeralda* species are presumably accompanied by *Arachnis labrosa* (Lindl. & Paxton) Rchb. f., originally described as *Arynchium labrosum* Lindl. & Paxton (1850), later changed to *Armadorum labrosum* (Lindl. & Paxton) Schltr. (Schlechter 1911), and finally to *Arachnis labrosa* by Reichenbach (1886). This is an enigmatic species and we have not seen any living or preserved Bhutanese material of it. In the original description of *Arynchium labrosum* Lindley writes:

“An inconspicuous stove epiphyte, with small brown and yellow flowers.” ... “For a couple of flowers of this curious little orchid, we are indebted to Sir Philip Egerton, with whom it flowered in the middle of October. It was purchased two or three years since, by Mr. Cornwall Legh, at one of Stevens’s sales of East Indian orchids; but nothing further is known of its history.” ... “No known genus can receive this singular plant, unless it is thrown into the crowd of Saccolabes,



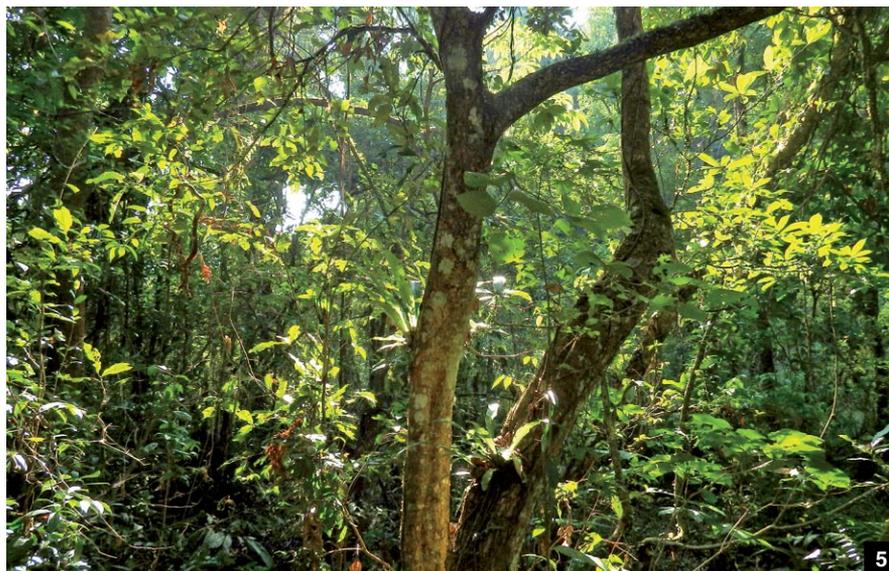
among which, however, it would scarcely be sought;” ... (Lindley 1850).

Arachnis labrosa is included in *The Orchids of Bhutan* by Nicholas Pearce and Phillip Cribb (2002), but only as an “unlocalised record” cited from an orchid list published in an article by Marcus Würmli (1973). Würmli’s list of orchids in the Kingdom of Bhutan is based on his own research and older collections, and the citation for *Arachnis* (as “*Armadorum*”) *labrosa* is based on George King and Robert Pantling’s (1898) note for *Arachnanthe bilinguis* Benth., in their *Orchids of the Sikkim-Himalaya*, which reads: “Bhotan near the Sikkim frontier in the Rumpiti Valley at a low elevation.” The name “*Arachnanthe bilinguis*” is currently not accepted however, because it was

- [1] *Arachnis cathcartii* from Pelingtsho. Photograph by Nima Gyeltshen.
- [2] *Arachnis* (as *Arachnanthe*) *bilinguis*, plate 280 from George King and Robert Pantling’s (1898) *Orchids of the Sikkim-Himalaya*, in the *Annals of the Royal Botanic Garden of Calcutta*.
- [3] *Arachnis* (as *Vanda*) *cathcartii*, plate 23 from Joseph Dalton Hooker’s (1855) *Illustrations of Himalayan Plants*.
- [4] *Arachnis* (as *Esmeralda*) *cathcartii*, plate 278 from George King and Robert Pantling’s (1898) *Orchids of the Sikkim-Himalaya*, in *Annals of the Royal Botanic Garden of Calcutta*.

invalidly published by George Bentham (1881). Bentham just declares his opinion that "*Renanthera bilinguis* Rchb.f., would be included in the genus *Esmeralda*" by him, but no official transfer was ever made. However, the combination "*Arachnanthe bilinguis* Benth." is apparently accepted by King and Pantling (1898), who include it in *The Orchids of Sikkim-Himalaya*. But because this taxon is considered to be the same as the earlier published *Arachnis labrosa* there is no "harm" done, just some additional taxonomic confusion. The illustration of this species in *Orchids of Bhutan* is compiled from many separate dried specimens of various collections, of which none apparently originate in Bhutan (Pearce and Cribb 2002). There is however, a colored plate of "*Arachnanthe bilinguis*" (hence *Arachnis labrosa*) in King and Pantling's (1898) *The Orchids of Sikkim-Himalaya*, which presumably correlates with what they cite as coming from the Rumpti Valley, and shows very clearly what this orchid looks like. Unfortunately, the Rumpti Valley is today located on the Sikkim side of the border with Bhutan, which means that no real documentation of this species from inside Bhutan exists. In other words, we are back to square one in the case of treating the "Esmeraldas" and can only accept *Arach. cathcartii* and *Arach. clarkei* as current Bhutanese species. We do expect that *Arach. labrosa* will appear inside the Bhutanese borders someday but may have to wait a long time for that to happen since the extreme western part of Bhutan is both difficult to reach and poorly explored botanically.

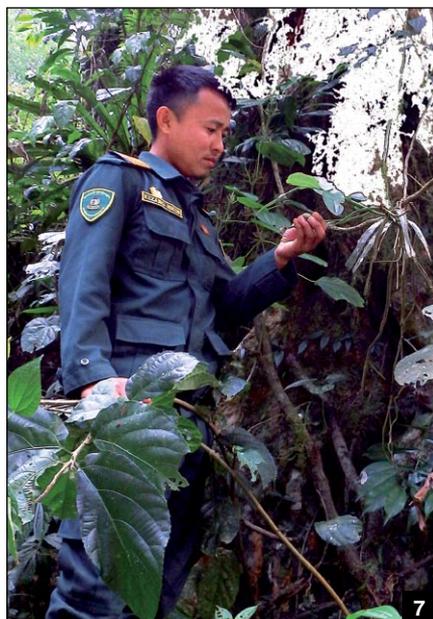
Arachnis cathcartii (Lindl.) J.J.Sm., was originally described as *Vanda cathcartii* by John Lindley, based on a collection by Joseph Dalton Hooker at 3,000 feet (1,000 m) in the hot jungles of the state of Sikkim, India. It is a striking species that unfortunately is seldom seen in cultivation. It also appears to be rather rare in the wild, at least in Bhutan. We have seen plants in the warmer region of the country in the forests surrounding the town of Nganglam, not far from the border with the state of Assam, India. It seems to prefer a shady and well-protected habitat growing as an epiphyte rather close to the ground. The long stems are semipendent and the large and strikingly colored flowers hang below the spreading leaves and face the ground. The sepals and petals are white externally and boldly striped with brown internally, and with a white lip, centrally striped with purple, and with an orange-brown fleshy callosity along the edges on the front lobe. It is



STIG DALSTRÖM



DORJI GYELTSHEN



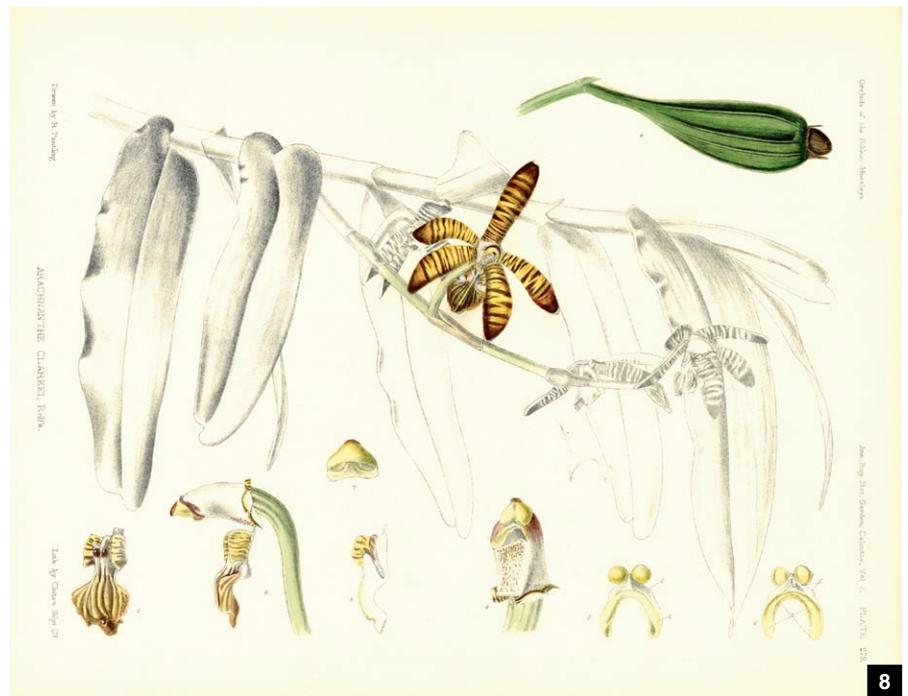
STIG DALSTRÖM

- [5] The hot and humid rainforest near the Indian border is the home of *Arachnis cathcartii* in Bhutan.
- [6] A healthy plant of *Arachnis cathcartii* from Pelingsho.
- [7] Forest Ranger Kezang Rinzin is stationed in the border town of Nganglam and knows where the rare *Arachnis cathcartii* grows.
- [8] *Arachnis* (as *Esmeralda*) *clarkei*, plate 279 from George King and Robert Pantling's (1898) *Orchids of the Sikkim-Himalaya*, in *Annals of the Royal Botanic Garden of Calcutta*.
- [9] Natural habitat of *Arachnis clarkei* from Trongsa.

quite understandable that Lindley was excited by this discovery.

Arachnis clarkei (Rchb.f.) J.J.Sm., was originally described by Reichenbach as *Esmeralda clarkei* Rchb.f. (1886), just to be transferred to *Vanda clarkei* (Rchb.f.) N.E.Br., in 1888 by Nicholas Edward Brown. It was then transferred to *Arachnis* by Johannes Jacobus Smith in 1912. But this orchid has generally been treated as *Esmeralda clarkei* and it was not until recently that molecular research revealed it should be included in *Arachnis* again. Perhaps the last word has yet to be spoken about the validity of these genera, but we follow the latest version of available nomenclatural lists here. In any case, *Arach. clarkei* is a striking species well worth cultivating for its boldly colored flowers. As opposed to *Arach. cathcartii*, which appears to have a very restricted distribution in the warmer tropics of the foothills of the Himalayas in Bhutan and nearby regions of India, *Arach. clarkei* is listed as having a very large area of distribution, which is listed as Nepal, northern parts of India, Southeast Asia and China (Pearce and Cribb 2002, Seidenfaden 1988, WCSP 2021). This large distribution must be taken with some caution however, because the documentation from China probably refers to a different species described by Paul Ormerod (2014) as *Arachnis bouffordii* Ormerod. This particular species comes from Hainan Island and differs from *Arach. clarkei* by having a white lip spotted with purple, among other details. Ormerod also mentions the existence of an “undescribed doppelgänger” in Yunnan, China, which is illustrated in *The Wild Orchids of Yunnan* (Xu et al. 2010) as “*Esmeralda clarkei*.” The Yunnan plant supposedly differs from *Arach. bouffordii* in having a thick callus projecting over the base of the spur (Ormerod 2014). In Bhutan, *Arach. clarkei* occurs at a slightly higher elevation than *Arach. cathcartii* and can be described as an intermediate- to slightly cool-growing orchid and may be easier to cultivate for that reason. We have found it growing as an epiphyte in rather shady conditions with the elongate stems hanging more-or-less pendent with sometimes only a few roots attached to its host and short few-flowered inflorescences displaying boldly striped “scorpion-looking” flowers.

In an article by Dr. Geoffrey Alton Craig Herklots at the British Embassy, Kathmandu, Nepal, and published in the *American Orchid Society Bulletin* of December 1964, a key to the cultivation of *Arach. clarkei* is provided: “This orchid



is of easy cultivation and may be grown successfully in a basket containing broken brick, dried cow dung and living moss, which eventually clothes most of the roots, and kept damp in at least 50% shade.” A similar culture will probably work for *Arach. cathcartii* as well, but this species needs to be kept considerably warmer.

Acknowledgments

The authors thank the Royal Government of Bhutan, the Ministry of Works and Human Settlements, and the Ministry of Agriculture and Forests for

providing administrative support. We also thank the Department of Forest and Park Services for the permits to visit Protected Areas. A special thank you goes to Dr. Dhan Bdr. Gurung for invaluable information, Dupchu Wangdi and Thomas Höijer for excellent field companionship, the Sarasota Orchid Society for financial support, the late Rudolf Jenny for providing valuable information from his extensive Bibliorquidia library, and Wesley E. Higgins for viewing and improving the manuscript. Finally, we thank Sharon and Russell Stephens of Sarasota, Florida,



DUPCHU WANGDI

[10] The Thunder Dragon Orchid Team at the *Arachnis cathcartii* habitat near Nganglam. From left: Choki Gyeltshen, Pem Zam, Tandin Wangchuk, Stig Dalström, Kezang Rinzin.

for contributing travel funds for the first author through Grant 20201631 from the Friends of Orchid Research Fund, administrated by the Community Foundation of Sarasota County.

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Orchid Seeds

First Observations, Illustrations, and Germination

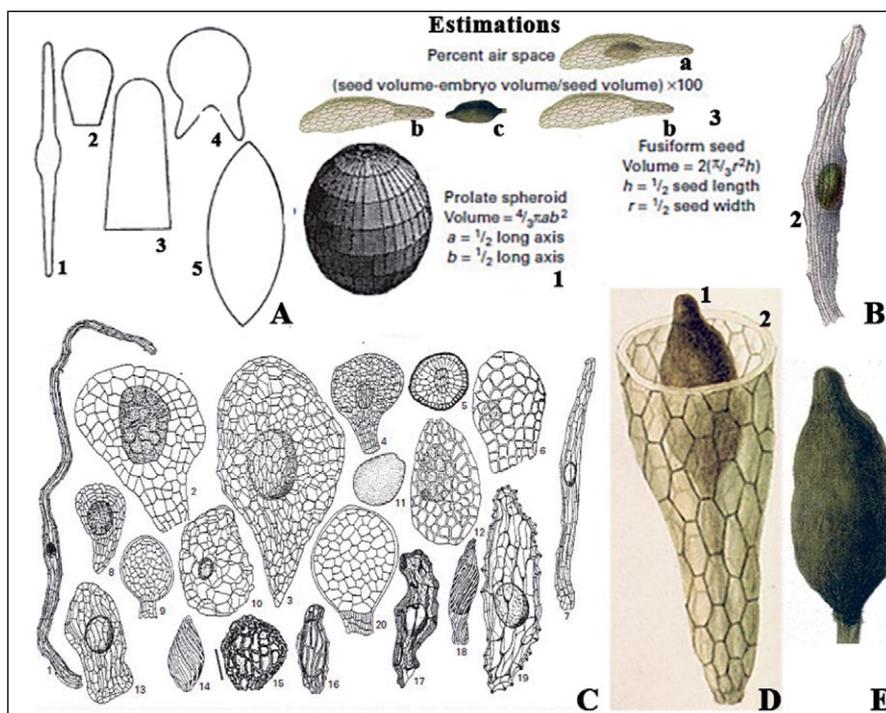
BY JOSEPH ARDITTI

ORCHID SEEDS HAVE been called dust seeds because they are tiny. Most of them are 0.04–0.06 inch (1–1.5 mm) in length and 0.02–0.03 inch (0.5–0.8 mm) in diameter, and conform (more or less) to five basic shapes, but are mostly fusiform (for reviews see Arditti 1984; Arditti and Abdul Ghani 2000; Yam et al. 2002). They can be of several colors. Seed coats (“testae”; “testa” is the singular) are coriaceous and one cell thick. Their walls can be plain or partially or fully reticulated. One end, called the suspensor end, is open. Embryos can be green or yellow, rarely white in color and oval or somewhat elongated, but mostly approximate in shape a prolate spheroid, most certainly not an oblate spheroid as suggested erroneously (Stoutamire 1981). The difference in shapes is important in calculating embryo volume and air space in orchid seeds. Embryos are generally small, measuring 0.004–0.01 inch (0.1–0.25 mm) in length and 0.08–0.20 mm in diameter. In most orchid seeds, the embryos occupy 2.5–80 percent of the air space inside the testa. In effect, orchid seeds are tiny balloons with a pay load (embryo) inside.

Because of their small size, orchid seeds were ignored, not observed, or misidentified for a long time. The Swiss physician and naturalist Conrad Gessner (sometimes spelled Gesner; 1516–1565) illustrated both ovaries and seed capsules. And, sometime after 1540, he was probably (“probably” is needed because there are orchid illustrations in *incunabulae* — an early form of publishing a manuscript — not all of which have been fully studied) the first to draw orchid seeds (Wehner et al. 2002). Christophori Iacobi Trew and Casimirus Christophorus Schmidel published his *Opera Botanica* (now digitized and available free online) in 1751, nearly 200 years after his death (Gessner 1751). Gessner also invented the pencil. According to Professor Choy sin Hew, now retired from the National University of Singapore, an expert in Chinese orchid art, ancient Chinese orchid

Table 1. Some orchid seed characteristics

Species	Length × width (mm)	Total per fruit weight [mg] or number	Weight per seed (µg)
<i>Calanthe</i>	0.77 ± 0.21 × 0.2 ± 0.1	25–100 mg	0.5
<i>Cycnoches chlorochilon</i>		4,000,000	
<i>Cypripedium calceolus</i>	0.94 ± 0.29 × 0.2 ± 0.1	3,158	2.0
<i>Epipactis</i>	1.16 ± 0.38 × 0.25 ± 0.07	4,500	
<i>Epipactis helleborine</i>	1.15 ± 0.15 × 0.25 ± 0.02		
<i>Epipactis palustris</i>	1.38 ± 0.42 × 0.26 ± 0.08		
<i>Phaius</i>	0.96 ± 0.18		3.53



Orchid seeds. **A.** Basic shapes of orchid seed. Shapes 1 and 5 are most common. Less common are 2 and 3. Form 4 is rare (Clifford and Smith 1969). **B.** Fusiform seed (**B2**, **B3a**), prolate embryo (**B1**, **B3c**), testa (**3Bb**) and formulas to estimate the volume of prolate embryos (**B1**) and fusiform seeds (**B2**), and percentage of air space in seeds (**B3a**; World Wide Web). **C.** Line drawings of orchid seeds (sources: 1, 3, 5, 7, 10, 12–14 from Burgeff 1936; 2, 8, 9, 20 from Poddubnaya–Arnoldi and Selezneva 1957; 6, 11 from Curtiss 1893; 15 from Kurzweil 1993). **D.** Cross section of testa (**2**) showing embryo (**1**). **E.** Orchid embryo (source for D and E, paintings of British orchids by Franz Bauer, 1792–1817, reproduced from Knapp 2021).

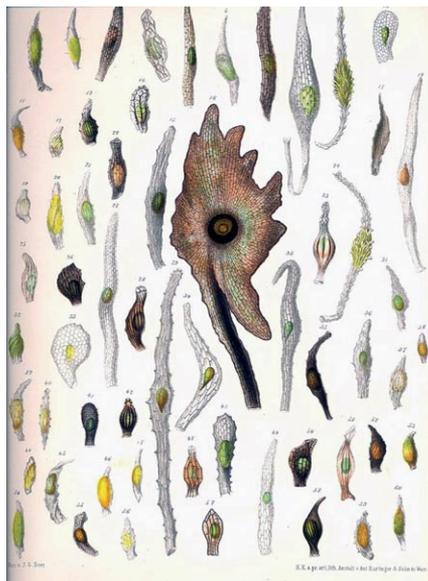
paintings do not include seeds.

Jeremy Bock (also known as Hieronymus Tragus; 1498–1554) suggested that orchids arise from semen of birds (others thought it was goats), which fell to the ground and fermented. He saw seeds in orchid fruit but did not recognize them as such: “As soon as the flowers abscise little pods arise in which no more is found that pure dust or flour” (Bock 1546). By “flowers abscise,” he probably referred to the death and disintegration of the perianth following pollination. This happens often, but in some orchids, parts of perianth (dead or alive, but modified) remain on the fruit.

Georgius Everhardus Rumphius (1627–1702) in Ambon, Maluku Archipelago, Indonesia (de Wit 1977; Wehner et al. 2002; Beckman 2003), noticed orchid seeds sometime after 1650 and before 1670 when he became blind. Perhaps because he was losing his sight, Rumphius did not draw any seeds, but only noted their colors (de Wit 1977) and referred to them as “meal” or “flour” in his descriptions of several orchids (Beckman 2003). For example, he drew *Phaius amboinense*, showing flowers and fruits on an inflorescence, but described its seeds as “yellowish meal, which turns gray” (Beckman 2003). In the case of *Calanthe triplicata*, he wrote that the plant “forms a rather longish, striped, and angular pod an inch long... that hides small sandy seed” (Beckman 2003). He drew an inflorescence with several flowers and capsules and a little bird called “Cacopit.” These illustrations are included in Rumphius’ *Herbarium Amboinense*, which was published in the Netherlands between 1741 and 1750 (now digitized and available free online at www.biodiversitylibrary.org); an English translation was published).

About 50 years after Rumphius’ books were published, Samuel Johann Naumburg (1758–1799) drew orchid seeds (Naumburg 1794). His drawing does not show details despite a caption, which states that the “seed dust [is] magnified.” Naumburg’s description is accurate, “the seed container is a capsule . . . the capsules contain many very small seeds.” His writings interested the forester Johann Karl Augustin Wachter (1773–1846), who may have been the first to hand-pollinate orchids. He reported that *Orchis militaris* produced a “great many seeds” (Wachter 1799–1801).

Orchid seeds do not germinate like those of other plants. This eluded even Charles Darwin (1809–1882), who had “a



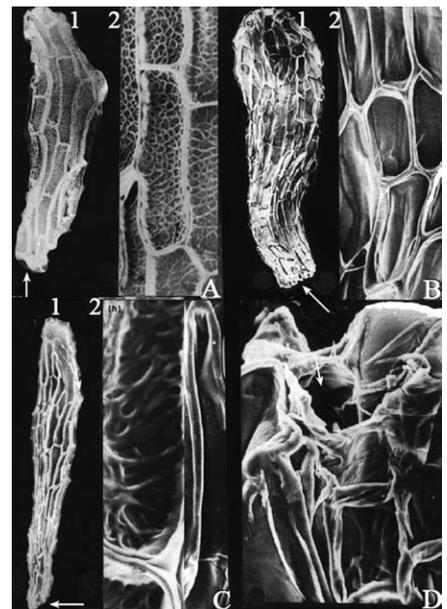
passion to grow the seeds” and it gave him “great pleasure to fancy that I see radicles of orchid-seed penetrating the sphagnum; I know I shall not & therefore shall not be disappointed” (Darwin 1863). If he could germinate orchid seeds, Darwin would have been disappointed because they do not produce radicles. Despite not seeing any germinating orchid seeds, Darwin predicted that their germination in nature would require association with a fungus.

Others, even before Darwin, may have also looked for radicles being produced by orchid seeds and, of course, failed to find them. Maybe this is one reason why orchid seedlings in the wild were not reported and illustrated for about 250 years after seeds were first observed.

At this point, it is necessary to digress because the term mycorrhiza needs to be introduced. It means “root fungus” and refers to fungi that live in the roots of plants. The term was coined by Albert Bernard Frank (1839–1900; Frank 1885).

Richard Anthony Salisbury (1761–1829), a contemporary of the discoverer of plant nuclei, Robert Brown (1773–1858), and John Lindley (1799–1864), the so-called father of orchidology, and a man no stranger to scandal and conflicts with his contemporaries (for more details see Yam et al. 2002), presented a talk to the Linnean Society of London on January 5, 1802, in which he described seedlings of *Orchis morio* and *Limodorum verecundum* (now *Bletia purpurea*). The lecture was published with illustrations two years later (Salisbury 1804). The illustrations do not show mycorrhizal fungi.

Using a lens, which magnified only 180 times, Heinrich Friedrich Link (1767–1851) studied protocorms (the term



Above left: Paintings of orchid seeds (Beer 1863).

Above right: Scanning electron photographs of orchid seeds. A. *Calypso bulbosa* from Colorado. B. *Cypripedium reginae*. C. *Coralorhiza maculata*. D. Opening in suspensor end of *Paphiopedilum* (Susan Tucker × *parishii*). Arrows point to opening in suspensor end, which is large enough to allow entry by fungal hyphae. In all illustrations 1 is a whole seed; 2 is magnification of testa wall. [Source: these scanning electron microscope photographs were taken in Joseph Arditto’s laboratory; both the laboratory and the originals no longer exist.]

did not exist in those days), whole and in cross-section. He observed and even drew fungal masses (darker areas within cells) but did not recognize their nature (Link 1840).

Orchid seeds were no longer a rarity by the mid-1800s, although growers still did not know how to germinate them, some were attempting to do so. One of those trying was David Moore (1807–1879), director of the Glasnevin Botanical Garden. He produced seeds by pollinating *Epidendrum elongatum*, *Epidendrum crassifolium*, *Cattleya forbesii* and *Phaius albus*. His germination method was to collect seeds from mature capsules and shake them “gently over the surfaces of the other Orchid-pots” (Moore 1849). The pots contained mycorrhizal fungi, which colonized the seeds and brought about symbiotic germination, but neither Moore nor other orchid growers at the time realized that.

Another digression is needed to

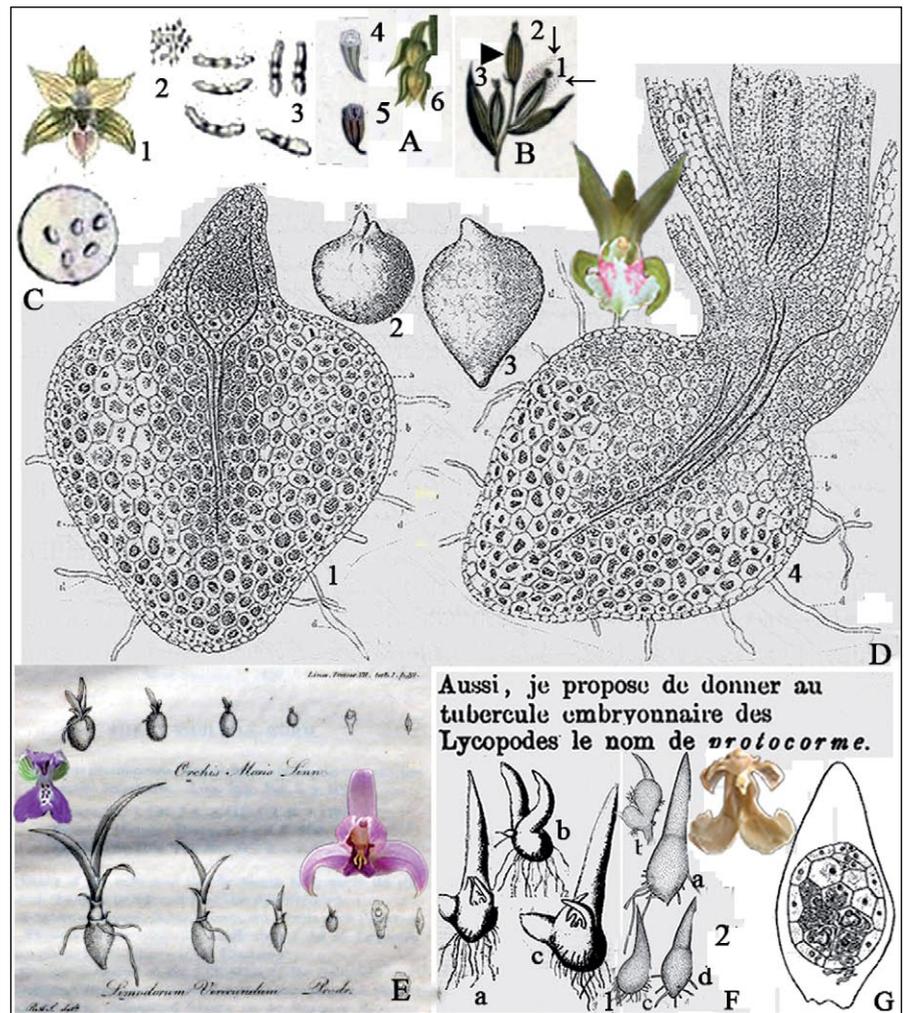
introduce an additional term. This term was not coined for orchids, but at present is closely associated with orchid seed germination. The term is “protocorm.” It was coined as “protocorme” by Melchior Treub (1851–1910), long time director of the Bogor Botanical Gardens in Indonesia (Treub 1890), not Noël Bernard (1874–1911) as has been suggested erroneously (Cribb 1999). Treub coined the term to describe early embryonic stages of lycopods, which resemble the early stages of germinating orchid seeds.

Noël Bernard (1874–1911) was 24 years old when he had a chance to observe “the first stages of germination from seed to 5-mm-long seedlings” of *Neottia nidus-avis* and saw that “some layers of cells are almost entirely full with a tight clump of mycelial filaments” (Jacquet 2007). He concluded that “mycorrhizae are required by the plant during germination” and thus made one of the most notable, important, and significant discoveries in orchid biology. Bernard’s observations and conclusions were published in the journal of the French Academy of Sciences in 1899 (for a translation of this paper and other writings by Bernard, see Jacquet 2007).

Noël Bernard’s son, Professor Francis Bernard, a well-known marine biologist, and myrmecologist, described him as the “Mozart of plant biology” (F. Bernard 1990; Jacquet and Arditti 2007) because both the great composer and the brilliant orchid scientist died at the age of 36. The similarity between early embryonic structures in lycopod development and bodies produced by germinating orchid seeds led to the application of the term “protocorm” to what Noël Bernard initially called spherules. He was familiar (translations by Jacquet 2007) with Treub’s paper on lycopods (Treub 1890). Therefore, it is not surprising that he applied Treub’s term “protocorme,” which eventually became “protocorm,” to a stage in orchid seed germination.

Bernard continued to study orchids for his remaining dozen years of life. He developed methods for symbiotic germination of orchid seeds and was working on asymbiotic procedures when tuberculosis put an end to his life (translations by Jacquet 2007). It is reasonable to assume that had he lived long enough, Bernard would have developed methods for asymbiotic orchid seed germination in vitro.

A number of investigators continued Bernard’s work on orchid mycorrhiza (for more information see Yam et al.



Orchid seeds and seedlings. A. *Epipactis helleborine* flower. 1. Flower. 2. Seeds, not magnified. 3. Seeds, magnified. The two dark lines in every seed may be shadows cast by the embryo. 4. Ovary. 5. Seed capsule. 6. Pollinated flower with swelling ovary. B. *Epipactis palustris*. 1. Split caspsule releasing seeds (arrow). 2. Mature ovary, not split. 3. Mature ovary, split (Gessner 1751). C. Seeds, magnified (Naumburg 1794). D. *Oeceoclades maculata* (flower shown in color). 1, 4. Cross sections of protocorms (the term was coined in 1890) showing mycorrhiza, which was not recognized as such at the time, as dark masses in centers of cells. 2, 3. Protocorms (Link 1840). E. First drawings of British orchids, *Orchis morio* (top and color image on left, and bottom and color image in right) *Limodorum abortivum* seedlings (Salisbury 1804). F. Formulation of the term “protocorm” by Melchior Treub. In free translation, “I propose to give the name ‘protocorme’ to the embryonic stage tubercle of lycopods.” 1a–c. Lycopods (Treub, 1890). 2a–d. Orchids (Poddubnaya–Arnoldi and Selezneva 1957). G. *Neottia nidus-avis* flower (color) and embryo at start of germination (line drawing) showing fungal hyphae at bottom left (Bernard 1902).

2002 and the literature cited therein). An investigator who produced a large amount of research on mycorrhiza was Hans Edmund Nikola Burgeff (1883–1976) in Germany. He isolated many orchid endophytes, believed that they belonged to a specific group, the *Orcheomyces*, and developed a cumbersome nomenclature system, which consisted of the words *Mycelium radices* followed by the name of the orchids from which the fungus was

isolated, for example *Mycelium radices Cattleya labiata*. The whole idea was incorrect, and Burgeff’s nomenclatural system never took hold. Burgeff also tried to develop an asymbiotic orchid seed germination procedure but failed.

For both Bernard and Burgeff, developing an asymbiotic seed germination method was a matter of natural progression from symbiosis (i.e., participation of a fungus in the process)

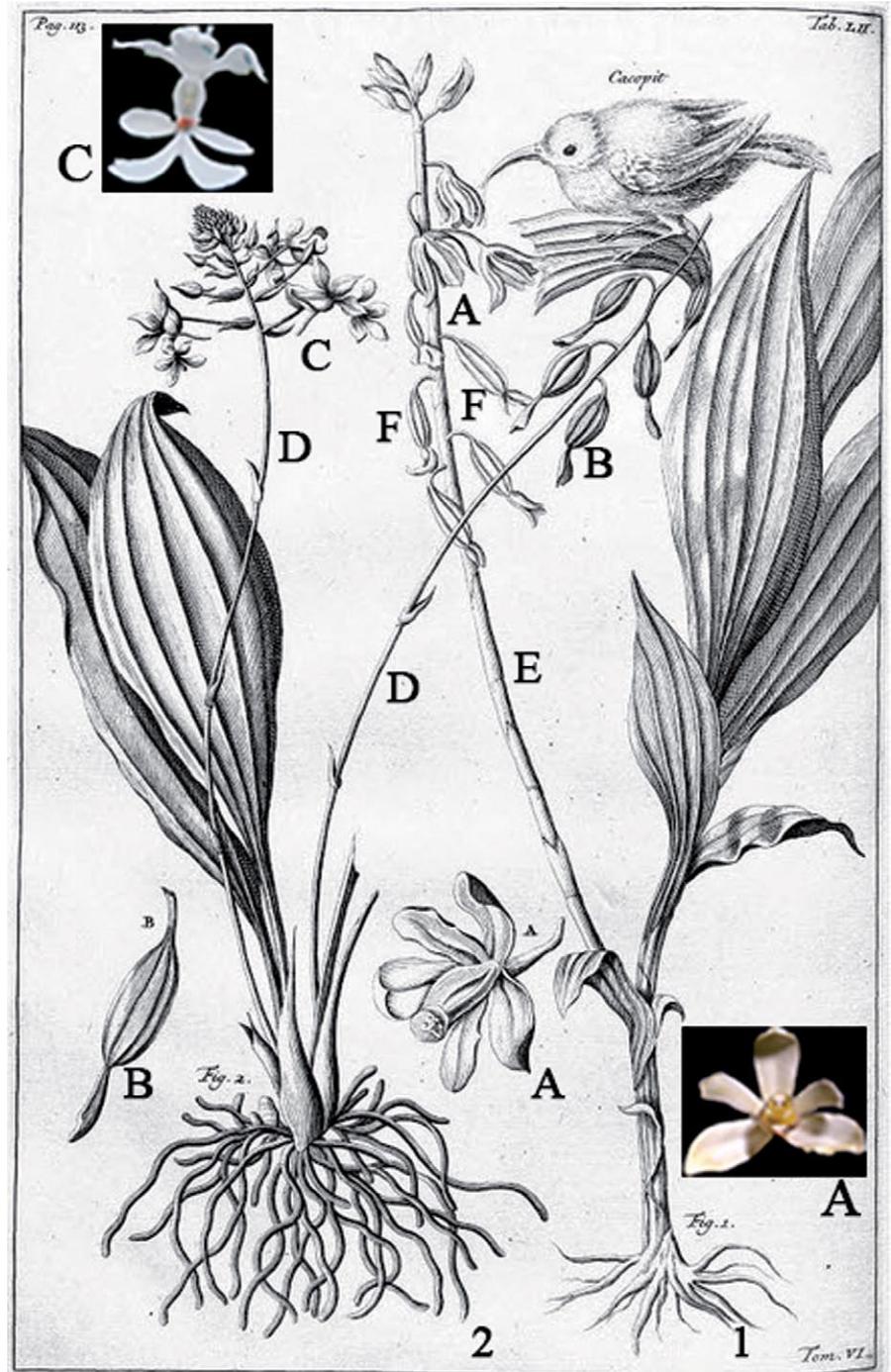
to asymbiosis (no fungus).

A 38-year-old professor of plant physiology at Cornell University, Lewis Knudson (1884–1958), reasoned differently: “the fungus might . . . digest some of the starch, pentosans and nitrogenous substances, which digestion products, together with secretions from or produced on decomposition of the fungus might be the cause for germination” and that “it is conceivable that germination is induced not by any action of the fungus within the embryo, but by products produced externally on digestion or secreted by the fungus” (Knudson 1922). Knudson’s conclusion, based on this reasoning, was that “germination of orchid seeds might be obtained by the use of certain sugars” (Knudson 1922). His reasoning was and still is correct regarding tropical epiphytic orchids (Arditti 1990). Temperate-climate terrestrial species may have different requirements.

On July 18, 1919, Knudson placed seeds of *Cattleya* (*intermedia* × *lawrenceana*) on a simple solution of minerals, which contained sucrose or glucose (his Knudson B medium). By June 9, 1920, there were developed seedlings on his sugar-containing, but by then dehydrated, media (one with sucrose, another with glucose). Knudson had just invented asymbiotic orchid seed germination! A year short of a quarter of a century after publishing his medium B, Knudson published his improved medium C (Knudson 1946).

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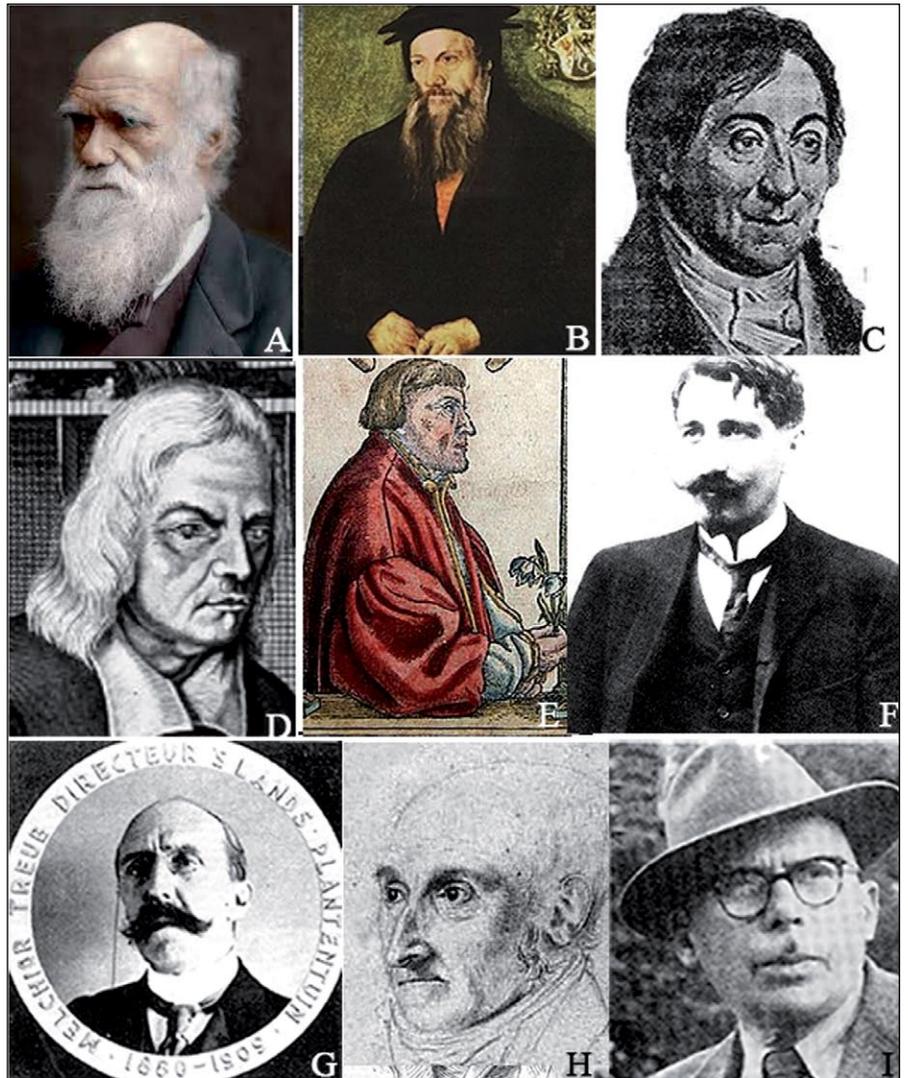
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Dedication

Dr. Arditti dedicates this article to Eric Kim, MD DDS, dental surgeon, and implant specialist par excellence.

—Joseph Arditti is Professor of Biology Emeritus at the University of California, Irvine. Dr. Arditti received his doctorate from the University of Southern California in 1965, accepted a position at UCI in 1966 and retired in 2001. He devoted his career to research on orchids.



Facing page, top: Students of orchids—II. A. David Moore (1807–1879). B. Albert Bernard Frank (1839–1900). C. Lewis Knudson (1884–1958).

Facing page, bottom: Plate LII (52) in Rumphius' *Herbarium Amboinense*. 1. The first ground Angrek (sometimes spelled Anggrek), *Phaius amboinense*. It produces in capsules, “yellowish meal, which turns gray.” 2. The triple flower, *Calanthe triplicata*. “If one opens the unripe pod, and rubs the seed between one’s fingers, it will turn the color of lead.” Rumphius recognized the content of a capsule to be seeds (Rumphius 1750)! Explanation of symbols: A, flowers of *Phaius amboinense*; B, fruit of *Calanthe triplicata*; C, flowers of *Calanthe triplicata*; D, inflorescence axis of *Calanthe triplicata*; E, inflorescence axis of *Phaius amboinense*; F, fruits of *Phaius amboinense*. The little bird “Cacopit” sits on the inflorescence of *Calanthe triplicata*.

Above: Students of orchids—I. A. Charles Darwin (1809–1882). B. Conrad Gessner (sometimes spelled Gesner, 1516–1565). C. Heinrich Friedrich Link (1767–1851). D. Georgius Everhardus Rumphius (1627–1702). E. Jeremy Bock (also known as Hieronymus Tragus; 1498–1554). F. Noël Bernard (1874–1911). G. Melchior Treub (1851–1910). H. Richard Anthony Salisbury (1761–1829). I. Hans Edmund Nikola Burgeff (1883–1976).

A Tryst with *Paphiopedilum fairrieanum*

BY UDAI C. PRADHAN AND HEMI LATA PRADHAN



PRADHAN AND PRADHAN

AS MEMBERS OF the Indian Subcontinent Regional Orchid Specialist Group of the International Union for Conservation of Nature and Natural Resources Species Survival Commission, my daughter, Hemlata Pradhan, and I were keen to study *Paphiopedilum fairrieianum* in its natural habitat. In 2012, we brought together a small but enthusiastic team led by me along with an old family acquaintance (Kancha Daju) who was passionate about orchids and had been traveling and observing orchids in their habitats for many years.

We arrived at our lodge, the Jaldapara Jungle Camp, from where we headed toward our destination: Totopara (“para” means “village” in the Bengali language). Totos are considered the smallest tribe of India. They were initially Bhutanese people who had moved away looking for a more peaceful place during the wars in Bhutan. They had no intention of entering India — but because they were not aware of the border, they unknowingly ended up in that country. Today, they have been granted citizenship in India and are protected by the Indian government.

En route, we had to cross five wide, dry and rocky riverbeds that were actually normal routes connecting two roads! Out of curiosity, we asked Kancha Daju what happened during monsoons when the river flooded. He informed us that people crossed by foot (as the water was shallow). As for vehicles, only local buses and trucks made it through and, according to him, they drove blindly not minding what lay beneath the murky monsoon waters!

After some time, the bumps and shakes gave way to sighs of admiration as the beauty of the forests began to speak to us. The teak (*Tectona grandis*) and sal (*Shorea robusta*) trees were covered with species of tropical orchids such as *Cymbidium aloifolium*, dendrobiums, vandas, etc. Along the edges of the riverbeds, we caught sight of wild lemons and flaming red flowers of dhataki (*Woodfordia fruticosa*). As we approached Totopara, the roads became narrow and dusty. Teak and sal trees now gave way to grooves of palm trees. Almost all the houses we saw were neatly kept. What was surprising to us were the way the pigs (hogs actually) were tied to trees and fences like dogs.

Finally, we hit a dead end. The road that was supposed to reach farther on had been converted into a marketplace. From there on, we traveled by foot. Daju had informed us that it was just half an hour of flat roads from the river. We later came



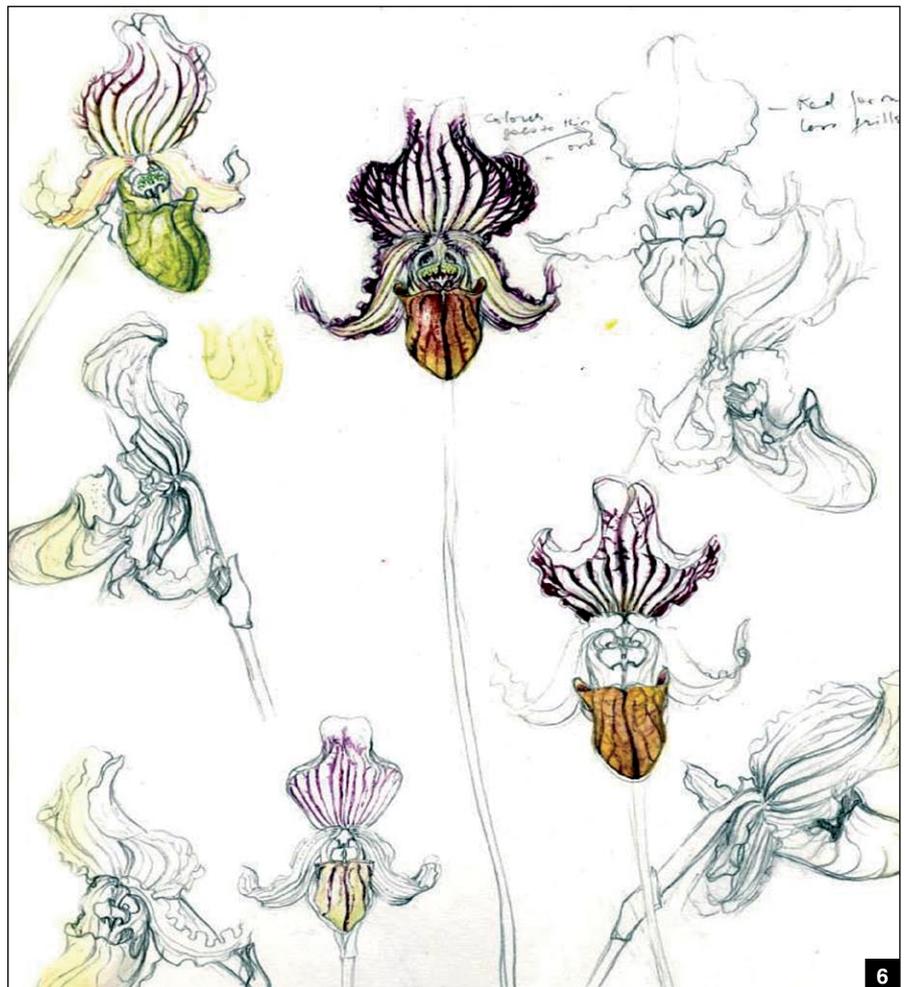
- [1] *Paphiopedilum fairrieianum* photographed in its native habitat.
- [2] The author's team.
- [3] An unusual *Colocasia* sp.
- [4] *Paphiopedilum fairrieianum* growing on rocks in a ravine near water.



to realize that half an hour of straight roads for him was actually three hours of a steep uphill trek for us! The local people conversed in their own dialect, which we had never heard before. Throughout, Daju kept us entertained with short stories and anecdotes of his travels to orchid habitats (some of the stories as wacky as 12 elephants surrounding him while he was stranded on a tree — and that is why he could not look an elephant in the eye even today).

We had been walking uphill for almost an hour when we reached a “chowtara,” a small sitting place made on the roadsides for travelers to rest. Daju announced that the climb from here on would be very easy. It was indeed a gentle climb downhill (although still quite rocky) until 20 minutes later the trees started to thin out and what lay before us was a sudden steep slope that looked more like a landslide of green, pink and white rubble that ended down the riverbed! The black graphite stones that we had sighted earlier were nowhere to be seen. At one point we came across a curious-looking rock. It had holes and marks unlike other rocks we had seen. It reminded us of the “Kollong Rock” in Shillong, Meghalaya, India, which Hooker had discovered with different species of orchids so many years ago.

We found old but sturdy pieces of

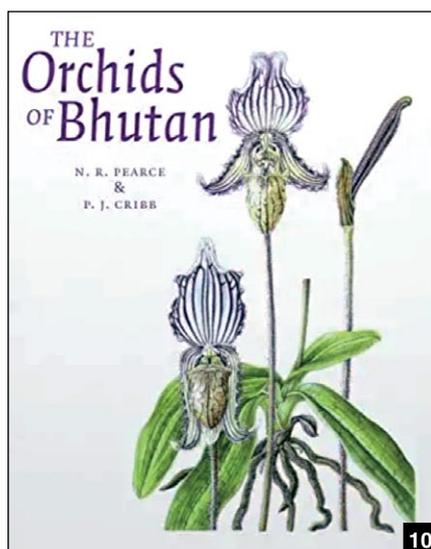


driftwood on the banks of the river, which we used as walking sticks. Along the way, we caught sight of a colony of *Colocasia* that looked quite different from the ones we commonly saw in our hometown of Kalimpong. These had pointed and elongated leaves and were darker in color. As we approached the underlying bushes and thickets, there was no sound except for our labored breathing, crunches from the rocks moving underneath our feet and the river gurgling below. After what felt like an eternity, we came across a little stream cutting its way through slippery red-brown slimy rocks. Surprisingly, it was the only water source to be seen in the area. And then suddenly, we sighted our first *Paphiopedilum fairrieianum* peeping at us right out of the slippery rock in the stream.

Our excitement knew no bounds as we climbed higher in search of denser habitats. The hill became dangerously steeper and more challenging. White crumbly rubble of dolomite replaced the solid rocks and stones, which meant that we had to be careful where we tread. We spotted another colony just beside the stream, a few yards (meters) away from the first sighting. Here, the plants were mostly in bud stage. Daju informed us that there were better colonies a little higher up and so we moved on, testing, and treading our way slowly and carefully, clutching to branches of thickets and whatever we could hold onto until we came to a point where there was an extremely steep slope covered with rubble. There was hardly anything to hold onto or use as support until the thickets gave way to patches of grass species (that looked ornamental, like miniature bamboos) and smaller plants growing sparsely. Just before we reached the top, we sighted a wonderful population of the species, partly in flower and partly in bud stage.

While the men with us busied themselves observing and photographing the plants, Hemlata began to contemplate how best to maintain her balance while she made her sketches. The space where she was standing was no bigger than 2 feet (60 cm) and just about enough for her to half-squat and paint. A plant of *Pandanus* (locally called "tarika") saved her day as it lent her firm support on the dangerous ledge.

She noted that the slipper orchids she observed here were far superior to the ones she had seen in cultivation. The dorsal sepals were rounder and larger with stems as long as 15 inches (38 cm) or more. What was also surprising was that



- [5] Hemlata sketching *Paph. fairrieianum* in habitat.
- [6] Some of Hemlata's older sketches.
- [7] Close-up of Hemlata's in-habitat sketches.
- [8] Hemlata's final sketch.
- [9] Hemlata's first attempt at painting *Paph. fairrieianum* as a school girl.
- [10] Hemlata's cover painting for the book *Orchids of Bhutan* by N.R. Pearce and P.J. Cribb.

PRADHAN AND PRADHAN

they were growing in dry conditions. The root systems of these *paphiopedilums*, however, were amazingly strong and formed a strong grip on the rubble. The tiny stream and the river below provided enough moisture to tide them over the winter months. Long tropical grasses and a few other plants grew alongside the *paphiopedilums*. Beside the ants and the tiny (fruit) flies that took the opportunity to feed on us every now and then, we did not notice any other insect life around.

Somewhere over our shoulders, we could hear the rest of the team discussing the condition of the plants that they had spotted. They were in larger colonies, but many had been trampled, most probably by smaller animals such as goats and deer. Below the ledge they were standing on was a massive landslide that ended at the bottom of the other hill. We managed to make good records through drawings and color charts, as well as photographs.

At around 3:00 pm, we began to feel hungry. We had carried limited food and water. Kancha Daju announced that the sun would be setting soon. We were not geared up to spend the night in the forest, so we packed up and began to make our way slowly downhill. There were moments where we literally slid down the rubbly slopes! As we approached the base of the hill, we came across a single plant of an *Anoectochilus* species.

We reached the riverbed and took a few minutes to wash our faces and hands in the cool river water after which we resumed the long trek toward the next hill. By then fatigue had gotten the best of us and, just to motivate us, Daju switched on his mobile radio that played some really catchy Hindi and Nepalese songs. We finally spotted the tea shop we had passed by earlier where we made a quick stop to catch some warm tea and noodles. A few local people were chit-chatting in front of the shop, relieving their fatigue with glasses of local toddy. They had baskets of gigantic bulbs of *Alocasia* next to them. When we asked what they were for, they told us they were pig fodder! Along the way, Kancha Daju showed us the border between Bhutan and India...it was just a tree trunk that had been cut and white-washed with lime. The sun had begun to set in the hills. If we made haste, we would be just in time to reach our jeep before darkness set in.

Note: In my tryst with *Paph. fairrieanum*, I have come across intriguing varieties and clones in the past, some of which I had cultivated. Unfortunately, during the long period of the Gorkhaland



movement, I could not save them. How wonderful it would be if some of these exceptional clones and varieties of *Paph. fairrieatum* were reintroduced into cultivation by interested individuals, institutes and organizations! It would definitely create an interest in the orchid world.

— *Udai graduated from Allahabad Agriculture Institute in 1972 with Gold Medal. He did his post-graduate training (1971–1972) on Orchids from Royal Botanic Gardens, Kew, England. He learned meristem tissue culture from Professor Georges Morel at Versailles, France and internship with H. Wichmann Orchideen at Celle, Germany. For the last 50 years he has been breeding and registering orchid hybrids. Pradhan is interested in biology, conservation and cultivation of orchids and nominated as a member of IUCN Orchid Specialist Group from 1984. He chaired the Indian Subcontinent Regional Orchid Specialist Group from 1999–2012 and is a life Member of American Orchid Society and the Orchid Society of India (email: ucpradhan@hotmail.com).*

Additional Reading

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14



15



16



17



18

- [11] Sliding down the rubbly slope.
- [12] An *Anoectochilus* species found growing near the base of those rubbly slopes.
- [13] The authors at the border of India and Bhutan; here marked by a single tree trunk.
- [14–18] Some of the author's selected clones of *Paph. fairrieatum*: [14] 'Bhunti', [15] 'Durga', [16] 'Parvathy', [17] 'Kali' and [18] *Paph. fairrieatum* f. *bohlmannianum* 'Saraswati'.

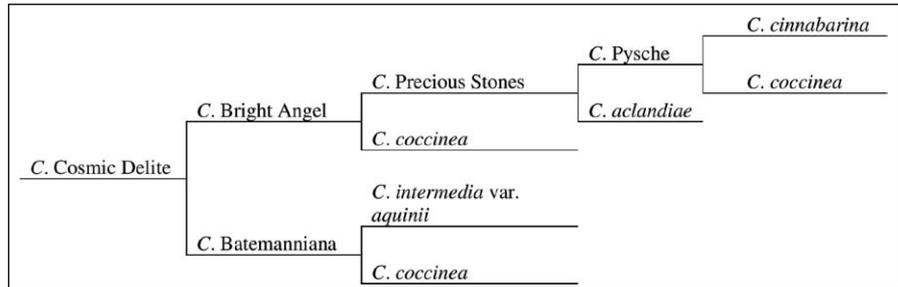
Candy-Striped Mini-Catts

BY FRED CLARKE

ALL ORCHID HOBBYISTS and hybridizers stand on the shoulders of those who came before them. During my early years, I became a member of the American Orchid Society. *Orchids* magazine, called the *AOS Bulletin* back then, had many great articles on orchid growing and breeding and the articles in *Orchids* today are just as important and informative as they were then.

In one of those early issues there was an announcement for an upcoming AOS Members' Meeting in Texas. One of the scheduled speakers, Roy Tokunaga of H&R Orchids, was giving a talk entitled "Genome Breeding and Genetics." That was a talk I needed to hear, so off to Texas I went. An important point he shared was that mini-Catts are difficult to clone. Basically, he said "become an excellent breeder and make hybrids that are as good as clones." Boom — that was enlightening! He then strongly recommended I read the book *Breeding Dendrobium Orchids in Hawaii* by Haruyuki Kamemoto. Following the philosophy outlined in his talk would enable me to develop breeding lines that consistently produce a high percentage of good quality plants and flowers, avoiding the need for cloning.

The introduction to the talk included a short presentation entitled *How to Start Your Orchid Business*. I will never forget his three main points: 1) love what you do, 2) do your own lab work, and 3) go out and meet your customers. One important way to accomplish this is by giving talks. After Roy's presentation, I mustered the nerve to strike up a conversation with him about starting an orchid business and about orchid breeding. He explained that having your own lab gives you control of your production and allows you to pick out the fast growing plants and move them along sooner. These should flower sooner than the rest of the cross, and if the plant's traits are what you want, breeding with these fast growing, early blooming plants generally helps and leads to the next generation having these same traits. With my mind expanded and my homework assigned, the path was set. I just had to study, begin selling plants, begin giving talks to orchid societies, and start making good hybrids. No problem. As they say, the



rest is history.

That first encounter with Roy and the wealth of knowledge he shared about genetics, breeding traits and the orchid business, have been invaluable. Over the years, Roy and H&R Nurseries explored many breeding directions. One mini-catt in particular caught my attention. The catalog description read something like "miniature plants, red flowers with petals veined yellow." That sounded unusual, because most flowers had the reverse: yellow flowers with a red splash. I could only imagine how exotic the offspring would be from the advertised cross: *Cattleya* Bright Angel (Precious Stones × *coccinea*) with *Cattleya* Batemanniana (*intermedia* × *coccinea*) using the so-called aquinii form of *C. intermedia*.

One of Roy's important lessons involved the breeding characteristics of *C. intermedia* var. *aquinii*. The flower of the *aquinii* form has a genetic mutation in which lip color, markings and shape are expressed on the petals. Understanding this trait allows it to be used effectively in the development of hybrids with flared petals. Roy told me several times: "Remember, it is the lip color and markings that are expressed on the petals. All you need to do is pick out the lip colors you are interested in placing on the petals." Look for this trait in the photos — it is evident in most of the pictures.

The family tree of *Cattleya* Cosmic Delite shows *C. coccinea* appearing three times in the lineage and *C. intermedia* var. *aquinii* only once, yet the latter plays a significant role in producing flared flowers.

We had been breeding flared flowers for many years, but there was something interesting about a flared mini-catt flower,

and there were very few in existence at that time. The development of *C. Cosmic Delite* showed that it was possible and that the results were outstanding.

With this important parent in hand, we began to work on developing this flower color pattern, which we began calling "candy-striped," since it reminded me a bit of salt water taffy. In these flowers, the petals are a lighter color with darker veins on top, and the veining creates a "candy-striped" pattern. Although this breeding is still in its early stages, we are seeing promising results already. The flower colors and patterns are new and different, and many produce flowers twice a year. Plants grow well across a range of cultural conditions and start blooming at a young age.

Candy-stripe breeding is in its infancy, and there is still much to accomplish. We are working on developing intense petal color with dark contrasting veining. Each of the hybrid seedlings is distinct and unique, making each plant different from its siblings. This quality makes seeing the plant you purchase bloom for the first time a special experience, in that you are the first person to ever see flowers with that particular combination of color and pattern. We like the mini-catt plant habit, though we would prefer somewhat larger flowers in the 3 inch (7.5 cm) range on plants that bloom twice a year. Stay tuned — they are in the pipeline.

Thanks to all the orchid breeders who have come before me. Thanks for their passion, creativity and willingness to share their observations. It is their combined accomplishments that enable the next generation to build upon their body of work.

CLARKE

Acknowledgments

I am indebted to Ron Kaufmann and Sue Bottom and honored to have them as my editors. Their combined insight and wisdom truly are beneficial.

—Fred Clarke owns and operates Sunset Valley Orchids, dedicated to developing

hybrids and producing select species for the orchid enthusiast. He has been growing orchids for over 40 years and hybridizing for 38 of those years. He is committed to the education of orchid hobbyists around the world in the culture of their plants. Fred is an accredited American Orchid

Society judge in the Pacific South Judging Region. His hybrids have received hundreds of quality awards for orchid enthusiasts from the American Orchid Society and other orchid societies worldwide (website: www.sunsetvalleyorchids.com; email: fred.clarke@att.net).



C. Precious Stones 'True Beauty' AM/AOS

X



C. coccinea 'Brilliant Jewel' HCC/AOS

=



C. Bright Angel 'Ronald' AM/AOS



C. intermedia var. aquinii 'Sunset Valley Orchids' HCC/AOS

X



C. coccinea 'Brilliant Jewel' HCC/AOS

=



C. Batemania 'Betty' 4n



C. Bright Angel 'Ronald' AM/AOS

X



C. Batemania 'Betty' 4n

=



C. Cosmic Delite 'Sunset Valley Orchids' HCC/AOS

The cross was registered in 2000 as *Slc. Cosmic Delite* (*Slc. Bright Angel* × *Slc. Batemania*). I wondered about the spelling of Delite vs. Delight, but what does that matter? I purchased four or five plants, and they grew well and flowered easily. One was awarded, and of course we named it 'Sunset Valley Orchids' HCC/AOS.



C. Cosmic Delite 'Cosmic Sparks'



C. Cosmic Delite 'Candy Splash'



C. Cosmic Delite 'Summer Splash'

Examples of variation in *C. Cosmic Delite*. The flowers of *C. Cosmic Delite* have flared petals, and the plants are mini-catts, standing just 4–5 inches (10–12.5 cm) tall with flowers about 2 inches (5 cm) across. This grex has other desirable characteristics: they bloom twice a year and are vigorous growers.



Rhyncholaeliocattleya Golden Circle 'OPRL'



C. Cosmic Delite 'Sunset Valley Orchids' HCC/AOS



Rlc. Cosmic Sparks 'Candy Stripes'

This cross was made to improve flower form of the 'Candy Stripe' breeding line. *Rhyncholaeliocattleya* Golden Circle has a very flat flower and has proven to be a reliable breeder. When this cross, *Rlc. Cosmic Sparks* (Golden Circle x *C. Cosmic Delite*), first bloomed we knew we were on to something. The petals were wide and beautifully veined, and the lip also showed a nice improvement in size. Plants are 6 inches (15 cm) tall, and the flowers are 3 inches (7.5 cm) across.



C. Angel's Fantasy 'Solar Flare' FCC/AOS



C. Cosmic Delite 'Sunset Valley Orchids' HCC/AOS



C. Cosmic Angel 'Candy Stripes'

The cross *C. Cosmic Angel* (Angel's Fantasy x *Cosmic Delite*) seemed to be a perfect combination. The expectations were for bright yellow flowers with red veins — in other words, really good "candy stripes." One of the drawbacks of being a vendor is that I only got to see a few of these flower. We really liked the 'Candy Stripes' cultivar. The petals are white with deep rose veins, and the shape improved nicely. This mini-catt is a reliable grower and bloomer.



C. Circle of Life 'Trailblazer'

X



C. Cosmic Delite 'Sunset Valley Orchids' HCC/AOS

=



C. (Circle of Life x Cosmic Delite) 'Summer Candy'

In this cross of *C. Circle of Life* x *C. Cosmic Delite* we once again realized the hybridizing value of Circle of Life and its well-documented history of imparting wide petals to its progeny. The petals on this unregistered hybrid are "crazy wide," even overlapping a bit. The soft pink base color with darker rose-pink veins and full lip make this a very attractive combination. Plants are 6–7 inches (15–17.5 cm) tall and typically bloom twice a year.



C. Tangerine Jewel 'Vi' HCC/AOS

X



C. Cosmic Delite 'Sunset Valley Orchids' HCC/AOS

=



C. Memoria Trudi Marsh 'Sun Flair'

This was one of the first crosses we made with *C. Cosmic Delite*. The objective was to breed for small plant size, and we expected about half of the offspring would show flared flowers. When *C. Memoria Trudi Marsh* (Tangerine Jewel x Cosmic Delite) began to flower, we were surprised to find that almost all were flared, with only one of our plants bearing a solid red flower. This cross inspired the term "candy-striped" — the bright yellow color and dark red veins really pop! Plants of *C. Memoria Trudi Marsh* are easy to grow and bloom, and a well-grown plant will flower 2–3 times a year. All these qualities make *C. Memoria Trudi Marsh* a very successful hybrid. As one of the first crosses, this has been used as a parent in several promising new hybrids, including *Cattleya Candy Sparks*, *Rhyncholaeliocattleya Candy Flare*, and several yet-to-be-named crosses.



C. Memoria Trudi Marsh 'SVO'

X



C. Memoria Trudi Marsh 'SVO A+'

=



C. Memoria Trudi Marsh 'Red'



C. Memoria Trudi Marsh 'Sun Flair'



C. Angel's Fantasy 'Solar Flair' FCC/AOS



C. Candy Sparks 'Super Spark'

After seeing the outcome of *C. Memoria Trudi Marsh*, we could not wait to use it as a parent. One of the first crosses combined this new candy striped parent with *C. Angel's Fantasy* (Fire Fantasy × Bright Angel). We keep remaking *C. Candy Sparks* because of the variety of brilliant flower colors, ease of growth and twice-a-year blooming habit. As a bonus, the plants are quite happy to bloom in a 3-inch (7.5 cm) pot.



C. Candy Sparks 'SVO'



C. Candy Sparks 'Sweet Candy'



C. Candy Sparks 'Gold Spark'



Rlc. Golden Circle 'OPRL'



C. Memoria Trudi Marsh 'Sun Flair'



Rlc. Candy Flare 'SVO'

The expectation here was for *Rlc. Golden Circle* to impart its large, flat flower and full shape. When the first *Rlc. Candy Flare* began to bloom we recognized the contributions of *Rlc. Golden Circle*, as the petals exhibited the anticipated fullness. Plants from this cross produce orange flowers with red veins, a new color combination in the candy-stripe category. Plants are 6 inches (15 cm) tall with flowers 3 inches (7.5 cm) across.



C. Memoria Trudi Marsh 'Sun Flair'

X



Cattleya Sunrise Fantasy 'Diamond Orchids'
AM/AOS (Pole-Star x Fire Fantasy)

=



Cattleya Laszlo's Spark 'Plug Tray Flare'

Understanding lip color is important in candy striped breeding. We expected *C. Memoria Trudi Marsh* to pair well with the appropriately colored lip of *C. Sunrise Fantasy* (Pole-Star x Fire Fantasy). The first plants to flower from this cross bloomed just 10 months from flask, when they were still in plug trays! Impressive, and it provided the name for the first cultivar to bloom!



Cattleya Cosmic Angel 'Candy Stripe'

X



Cattleya Katherine Clarkson

=



Cattleya (Cosmic Angel x Katherine Clarkson) 'Sun Sparks'



Cattleya (Cosmic Angel x Katherine Clarkson) 'Fire Flare'



Cattleya (Cosmic Angel x Katherine Clarkson) 'Fire Spots'



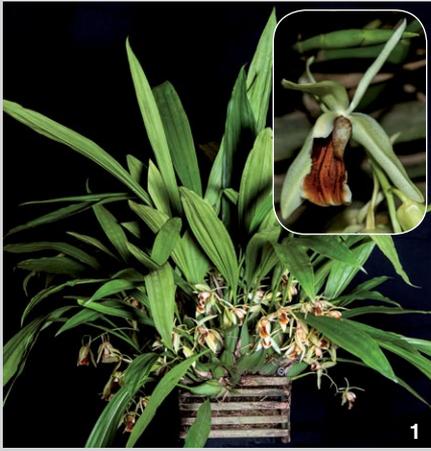
Cattleya (Cosmic Angel x Katherine Clarkson) 'What!'

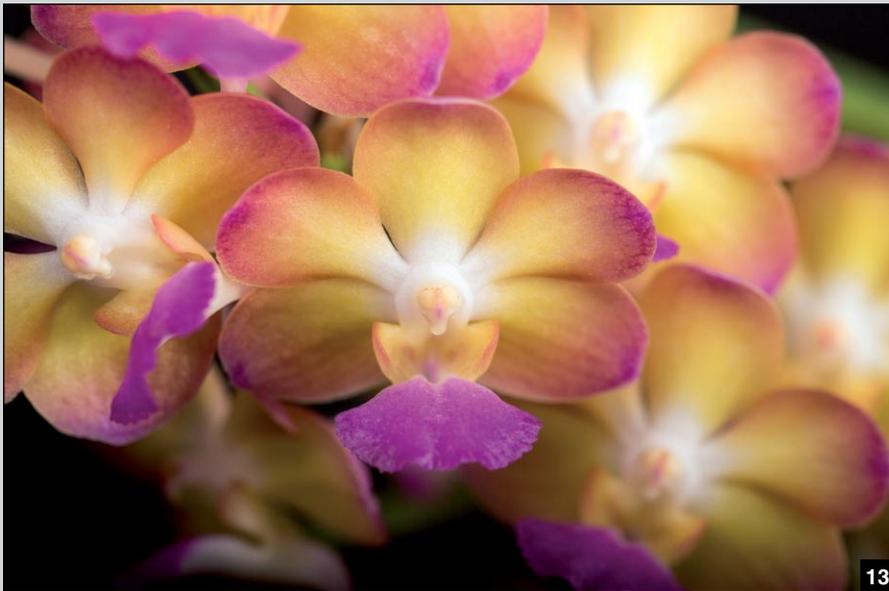
The exploration of new directions in candy-striped mini-catt breeding has just begun. Expanding the cutting edge of this genre has proven to be exciting, rewarding and surprising. Roy Tokunaga explanation that "the lip color and markings are expressed on the petals" suggests the sepals are not influenced by the "aquini" pattern of the lip and petals. This brings up an interesting question: can you breed flowers with spotted sepals and flared petals? The as-yet-unregistered hybrid of *C. (Cosmic Angel x Katherine Clarkson)* put this concept to the test. I will let you judge the results.





- [1] *Paphiopedilum* Hawaiian Skies 'Slipper Zone Graceful Duo' HCC/AOS (Luna Pleasure x Hawaiian Wonder) 77 pts. Exhibitor: Lehua Orchids; Photographer: Glen Barfield. Hawaii Judging
- [2] *Cattlianthe* Bactata 'Aka's Best' AM/AOS (Bactia x *Cattleya guttata*) 81 pts. Exhibitor: Aka's Orchids Hawaii; Photographer: Glen Barfield. Hawaii Judging
- [3] *Cattlianthe* Memoria Helen Buckman 'Aka's Best' HCC/AOS (Bactia x *Cattleya* Maui Plum) 79 pts. Exhibitor: Aka's Orchids Hawaii; Photographer: Glen Barfield. Hawaii Judging
- [4] *Cattleya violacea* (Coerulea) 'Popa Chubby' AM/AOS 85 pts. Exhibitor: Ben Oliveros and Orchid Eros; Photographer: Glen Barfield. Hawaii Judging
- [5] *Paphiopedilum* Odette's Presence 'Slipper Zone Should Meet' HCC/AOS (Odette Divine x Petula's Presence) 78 pts. Exhibitor: Lehua Orchids; Photographer: Glen Barfield. Hawaii Judging
- [6] *Paphiopedilum* Windswept Blackhawk 'Knight Rider' AM/AOS (Lyro Blackhawk x Michael Koopowitz) 84 pts. Exhibitor: Jungle Mist Orchids; Photographer: Glen Barfield. Hawaii Judging
- [7] *Paphiopedilum* Fred's Enchantment 'Slipper Zone Winning Economy' AM/AOS (Friedrich von Hayek x Magically Wood) 81 pts. Exhibitor: Lehua Orchids; Photographer: Glen Barfield. Hawaii Judging
- [8] *Laelia anceps* 'Sebastian' AM/AOS 83 pts. Exhibitor: Ben Oliveros and Orchid Eros; Photographer: Glen Barfield. Hawaii Judging
- [9] *Cattleya schofieldiana* 'Shogun Hawaii Green King' AM/AOS 82 pts. Exhibitor: Shogun Hawaii- Matthias Seelis; Photographer: Glen Barfield. Hawaii Judging
- [10] *Paphiopedilum* Moira Theresa Konopka 'Slipper Zone The One' HCC/AOS (Baroness Byford x Mele Star) 79 pts. Exhibitor: Lehua Orchids; Photographer: Glen Barfield. Hawaii Judging
- [11] *Phragmipedium* Young Lindley 'Dave Marinelli' CCM-AM/AOS (Eric Young x *lindleyanum*) 83-81 pts. Exhibitor: Elizabeth Marinelli; Photographer: Maurice Garvey. Northeast Judging
- [12] *Phalaenopsis* Summer Rose 'Blue Star' HCC/AOS (Kenneth Schubert x *equestris*) 79 pts. Exhibitor: Ginna Plude; Photographer: Maurice Garvey. Northeast Judging
- [13] *Grammatophyllum* *ravanii* 'Irene' CHM/AOS 82 pts. Exhibitor: Al and Irene Messina; Photographer: Maurice Garvey. Northeast Judging
- [14] *Tolumnia* Orchidom Happy Spots 'Kris's Freckles' HCC/AOS (Orchidom Happy x Aleka) 78 pts. Exhibitor: Nathaniel (Nate) DePinto; Photographer: Maurice Garvey. Northeast Judging
- [15] *Paphiopedilum* Mount Low 'Virtual Reality' CCM/AOS (*lowii* x Mount Toro) 83 pts. Exhibitor: Sergey Skoropad; Photographer: Maurice Garvey. Northeast Judging
- [16] *Dendrobium* Nagomi 'Jane' CCM/AOS (*cuthbertsonii* x *bracteosum*) 81 pts. Exhibitor: John Sullivan; Photographer: Maurice Garvey. Northeast Judging





- [1] *Coelogyne tommyi* 'Little Tommy J' CCM/AOS 83 pts. Exhibitor: Al and Irene Messina; Photographer: Maurice Garvey. Northeast Judging
- [2] *Paphiopedilum vejvarutianum* 'Maximus' AM/AOS 84 pts. Exhibitor: Fred Allen; Photographer: Maurice Garvey. Northeast Judging
- [3] *Rhyncholaeliocattleya* Shigeko Abe 'Willistene's Brushstroke' AM/AOS (Ronald Hausermann x Fred Stewart) 84 pts. Exhibitor: Eron Borne; Photographer: Wilton Guillory. Shreveport Judging
- [4] *Vanda falcata* (Chaehong) 'Dude' JC/AOS. Exhibitor: Mary Mancini; Photographer: Wilton Guillory. Shreveport Judging
- [5] *Dendrobium subacaule* 'Susan' CCM/AOS 82 pts. Exhibitor: Chuck and Sue Andersen; Photographer: Joseph Maciaszek. Northeast Judging
- [6] *Perreiraara* Rapeepath 'Passion Fruit' AM/AOS (Bangkok Sunset x *Vandachostylis* Pine Rivers) 83 pts. Photographer: Ed Cott. Toronto Judging
- [7] *Paphiopedilum* Leeanum 'Linda Will' HCC/AOS (*insigne* x *spicerianum*) 77 pts. Exhibitor: Linda Will; Photographer: Ed Cott. Toronto Judging
- [8] *Dendrobium* Cream Cascade 'Snookie' HCC/AOS (*densiflorum* x *thyrsoflorum*) 76 pts. Exhibitor: Mary Mancini; Photographer: Wilton Guillory. Shreveport Judging
- [9] *Habenaria rhodocheila* 'Louisiana' CCM-AM/AOS 83-84 pts. Exhibitor: Alan Taylor; Photographer: Wilton Guillory. Shreveport Judging
- [10] *Vanda falcata* (Manjushage) 'Benin' AM/AOS 82 pts. Exhibitor: Mary Mancini; Photographer: Wilton Guillory. Shreveport Judging
- [11] *Papilionanda* Ben Fragrance 'Garrett's Beam Me Up Spotty' AM/AOS (*Vanda* Memoria Thianchai x Mimi Palmer) 83 pts. Exhibitor: Sharon and David Garrett; Photographer: Wes Newton. Florida North-Central Judging
- [12] *Pomatocalpa angustifolium* 'Annie' CHM/AOS 83 pts. Exhibitor: Robert Vanderheyden; Photographer: Ed Cott. Toronto Judging
- [13] *Perreiraara* Lovey Dovey 'Winter Haven' AM/AOS (Bangkok Sunset x *Vandachostylis* Fuchs Precious Jewel) 81 pts. Exhibitor: Keith and Dina Emig - Winter Haven Orchid Nursery; Photographer: Kay Clark. Florida North-Central Judging
- [14] *Dendrobium lasianthera* 'Krull-Smith' AM/AOS 86 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging
- [15] *Dendrobium lasianthera* 'Krull's Twisted Sister' AM/AOS 86 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging
- [16] *Specklinia tribuloides* 'Pat's Persistence' CCM/AOS 83 pts. Exhibitor: Pat and Lynda Vuurman; Photographer: Ed Cott. Toronto Judging





- [1] *Vandachostylis* Janice Allison 'Garrett's Out of the Blue' AM/AOS (*Vanda* Phairots Sand x *Rhynchostylis coelestis*) 83 pts. Exhibitor: Sharon and David Garrett; Photographer: Wes Newton. Florida North-Central Judging
- [2] *Paravanda* Carlos Ochoa 'Krull-Smith' AM/AOS (*Paraphalaenopsis laycockii* x *Vanda* Laksi) 84 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging
- [3] *Vanda* Wapme 'Garrett's Sunset' AM/AOS (Wanpen x Meda Arnold) 82 pts. Exhibitor: Sharon and David Garrett; Photographer: Wes Newton. Florida North-Central Judging
- [4] *Vandachostylis* Blue Star 'Wild Blue Yonder' AM-AD/AOS (Lou Sneary x *Vanda coerulea*) 83 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging
- [5] *Vandachostylis* Luke Thai 'Garrett's Lil Green Thing' HCC/AOS (*Vanda* Vieng Ping x *Rhynchostylis coelestis*) 78 pts. Exhibitor: Sharon and David Garrett; Photographer: Wes Newton. Florida North-Central Judging
- [6] *Catasetum* Diana's Dots 'Corinne's Dazzling Sun' AM/AOS (Orchidglade x *tigrinum*) 88 pts. Exhibitor: Corinne Arnold; Photographer: Wes Newton. Florida North-Central Judging
- [7] *Paphiopedilum* Worthy Fred 'Big Bear' AM/AOS (President Fred x *charlesworthii*) 83 pts. Exhibitor: Ryan Kowalczyk; Photographer: Kay Clark. Florida North-Central Judging
- [8] *Vanda* No Fooling 'Chad's Red Delicious' AM/AOS (Nopawan x Peggy Foo) 84 pts. Exhibitor: Charles Whetstone; Photographer: Kay Clark. Florida North-Central Judging
- [9] *Aerides lawrenceae* 'Krull's Bold King' AM/AOS 85 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging
- [10] *Aerides lawrenceae* 'Krull's Elegance' AM/AOS 84 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging
- [11] *Paphiopedilum* Raingreen's Fuzzbuster 'WingDreams Whiskers' HCC/AOS (*moquetteanum* x Concon Bell) 76 pts. Exhibitor: Julio and Eileen Hector; Photographer: Kay Clark. Florida North-Central Judging
- [12] *Cattlianthe* Ploenpit Fantasy 'Wanda Wow' HCC/AOS (Kauai Starbright x Loog Tone) 77 pts. Exhibitor: Alison Gallaway; Photographer: Charlotte Randolph. Alamo Judging
- [13] *Procatavola* Key Lime Stars 'Neblina's Sour Pucker' AM/AOS (*Cattleychea* Lime Sherbet x *Brassavola nodosa*) 84 pts. Exhibitor: Adeljean Ho (Neblina Orchids); Photographer: Kay Clark. Florida North-Central Judging
- [14] *Cattleya walkeriana* 'Winter Haven' HCC/AOS 78 pts. Exhibitor: Keith and Dina Emig - Winter Haven Orchid Nursery; Photographer: Kay Clark. Florida North-Central Judging
- [15] *Paphiopedilum* Alpine Pleasure 'Crystelle' AM/AOS (Alpine Glow x Luna Pleasure) 86 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging
- [16] *Paphiopedilum* helenae 'Fajen's Green Elf' HCC/AOS 78 pts. Exhibitor: Fajen's Orchids; Photographer: Kay Clark. Florida North-Central Judging





- [1] *Bulbophyllum fascinator* (Semiaureum) 'Monica's Eden' HCC/AOS 79 pts. Exhibitor: Monica Gaylord; Photographer: Charlotte Randolph. Alamo Judging
- [2] *Dendrobium puniceum* 'Madison F' CBR/AOS. Exhibitor: Douglas Kubo; Photographer: Kathy Barrett. California Sierra Nevada Judging
- [3] *Paphiopedilum* Paradise Gem 'Prosecco' AM/AOS (In-Charm Topaz x Pacific Rainbow) 81 pts. Exhibitor: Dave Sorokowsky; Photographer: Kathy Barrett. California Sierra Nevada Judging
- [4] *Phalaenopsis* Yaphon Love Song 'Blue Ridge' AM/AOS (Mituo Golden Tiger x Yaphon Lover) 86 pts. Exhibitor: Mike Mims; Photographer: Jeremy Losaw. Carolinas Judging
- [5] *Cattleya* Gold Country Fire 'Red Gold' HCC/AOS (Rimfire x *briegeri*) 77 pts. Exhibitor: Gold Country Orchids/Alan Koch; Photographer: Kathy Barrett. California Sierra Nevada Judging
- [6] *Brassidomesa* Golden Stars 'Keith' AM/AOS (*Gomesa echinata* x *Brassidium* Shooting Star) 83 pts. Exhibitor: Brenda Ruedy; Photographer: Kathy Barrett. California Sierra Nevada Judging
- [7] *Catasetum* Logan Archer 'Ibasco Googe' AM/AOS (*saccatum* x Frilly Doris) 80 pts. Exhibitor: Jonathan Ibasco; Photographer: Jeremy Losaw. Carolinas Judging
- [8] *Cycnoches* Edith Bruce 'Memoria Joyce Gabriel' HCC/AOS (Anne-Kathrin Berger x Jean E. Monnier) 77 pts. Exhibitor: Ryan Gabriel; Photographer: Jeremy Losaw. Carolinas Judging
- [9] *Masdevallia* Panguña 'Orkiddoc' AM/AOS (*peristeria* x *uniflora*) 84 pts. Exhibitor: Larry Sexton; Photographer: Anne Kotowski. Chicago Judging
- [10] *Phalaenopsis* Yaphon Love Song 'Blue Ridge Lemon' AM/AOS (Mituo Golden Tiger x Yaphon Lover) 88 pts. Exhibitor: Mike Mims; Photographer: Jeremy Losaw. Carolinas Judging
- [11] *Vanda* Kristina Gossman Ducanes 'Yellow Splash' HCC/AOS (Bronze Butterfly x Memoria Thianchai) 77 pts. Exhibitor: R.F. Orchids, Inc.; Photographer: Anne Kotowski. Chicago Judging
- [12] *Caucaea sanguinolenta* 'Lolita' CHM/AOS 80 pts. Exhibitor: Mary Ann Denver; Photographer: Maurice Garvey. Northeast Judging
- [13] *Cycnoches* Richard Brandon 'Cheryl's Joy' AM/AOS (*warszewiczii* x Jean E. Monnier) 81 pts. Exhibitor: Cheryl Erins; Photographer: Anne Kotowski. Chicago Judging
- [14] *Vanda* Kulwadee Fragrance 'Grapette' AM/AOS (Gordon Dillon x Guo Chia Long) 81 pts. Exhibitor: R.F. Orchids, Inc.; Photographer: Anne Kotowski. Chicago Judging
- [15] *Vanda* Kulwadee Fragrance 'Redland Midnight' AM/AOS (Gordon Dillon x Guo Chia Long) 80 pts. Exhibitor: R.F. Orchids, Inc.; Photographer: Anne Kotowski. Chicago Judging
- [16] *Dendrobium* Curtis' Twinkle 'Royal Purple' AM/AOS (Blue Twinkle x Minnie) 81 pts. Exhibitor: Orchids Limited; Photographer: Anne Kotowski. Chicago Judging
- [17] *Habenaria rhodocheila* 'Claire Mae's Birthday Surprise' CCM-AM/AOS 87-81 pts. Exhibitor: John and Cheryl Jaworski; Photographer: Richard Noel. Cincinnati Judging





- [1] *Cattleya* Cella Bella 'Dos Olmos' HCC/AOS (Mrs. Mahler x *aclandiae*) 78 pts. Exhibitor: Jim Williams; Photographer: David Gould. Dallas Judging
- [2] *Phalaenopsis* *violacea* 'Orchid Konnection' AM/AOS 81 pts. Exhibitor: Orchid Konnection; Photographer: David Gould. Dallas Judging
- [3] *Perreiraara* Rapeepath 'Nauti Carol' AM/AOS (Bangkok Sunset x *Vandachostylis* Pine Rivers) 82 pts. Exhibitor: Deborah and William Bodei; Photographer: Maurice Garvey. Northeast Judging
- [4] *Coelogyne* *exalata* 'Irene' CBR/AOS. Exhibitor: Al and Irene Messina; Photographer: Maurice Garvey. Northeast Judging
- [5] *Vandachostylis* October Twenty Second 'Nyi Nyi Tham Henne' AM/AOS (*Vanda tessellata* x Pine Rivers) 80 pts. Exhibitor: Mei Ling Clemens; Photographer: Lynn O'Shaughnessy. Great Lakes Judging
- [6] *Bulbophyllum* *longisteliidum* 'Susan' CHM/AOS 83 pts. Exhibitor: Chuck and Sue Andersen; Photographer: Joseph Maciaszek. Northeast Judging
- [7] *Catasetum* Karen Armstrong 'Jonah Simon' AM/AOS (Susan Fuchs x *denticulatum*) 87 pts. Exhibitor: Lowell Jacobs; Photographer: Maurice Garvey. Northeast Judging
- [8] *Laelia* Finckeniana 'Roberts' HCC/AOS (*albida* x *anceps*) 77 pts. Exhibitor: Roberts Flower Supply; Photographer: Lynn O'Shaughnessy. Great Lakes Judging
- [9] *Bulbophyllum* Santa Claus 'Memoria Stanley Maciaszek' HCC/AOS (Elizabeth Ann x *fascinator*) 79 pts. Exhibitor: Joseph Maciaszek; Photographer: Maurice Garvey. Northeast Judging
- [10] *Liparis* *pseudodisticha* 'Irene' CBR/AOS. Exhibitor: Al and Irene Messina; Photographer: Maurice Garvey. Northeast Judging
- [11] *Dendrobium* Enobi Purple 'Victoria' CCM/AOS (Enobi Komachi x Laguna Princess) 85 pts. Exhibitor: Joanne Engle; Photographer: Maurice Garvey. Northeast Judging
- [12] *Paphiopedilum* *villosum* var. *laichau-num* 'Caelin' AM/AOS 82 pts. Exhibitor: Fred Allen; Photographer: Maurice Garvey. Northeast Judging
- [13] *Specklinia* *grobyi* 'Windflower' CCE/AOS 91 pts. Exhibitor: Betty Kelepecz; Photographer: Arthur Pinkers. Pacific South Judging
- [14] *Dendrobium* *sulphureum* 'Susan' CCM/AOS 83 pts. Exhibitor: Chuck and Sue Andersen; Photographer: Joseph Maciaszek. Northeast Judging
- [15] *Bulbophyllum* *sanguineomaculatum* 'Irene' CBR/AOS. Exhibitor: Al and Irene Messina; Photographer: Maurice Garvey. Northeast Judging





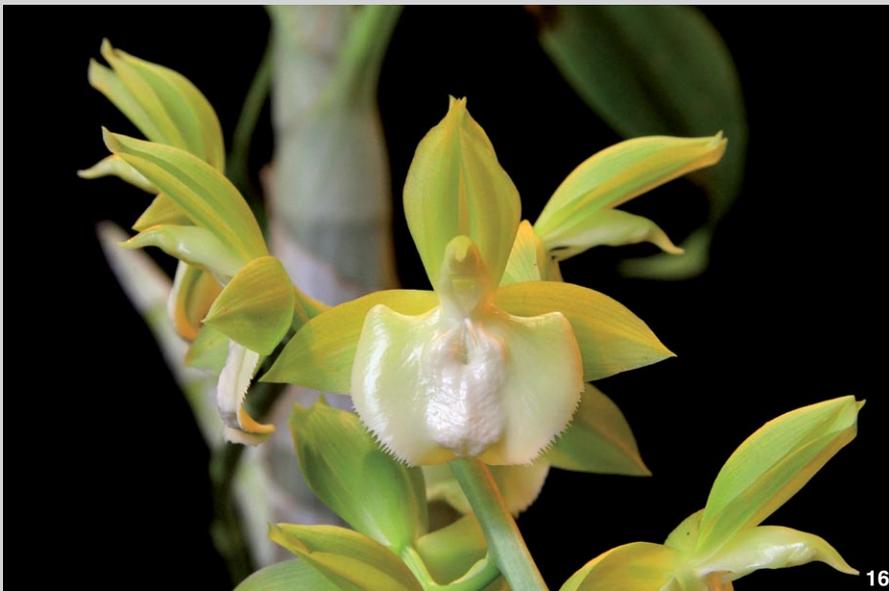
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- [1] *Vanda* Greg Scott 'Dark Lady' AM/AOS (*merrillii* x *tessellata*) 82 pts. Exhibitor: Naoki Kawamura; Photographer: Wes Newton. Florida North-Central Judging
- [2] *Vanda* Jim Krull 'Thanksgiving Day' AM/AOS (Kulwadee Fragrance x Somsri Gold) 85 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging
- [3] *Clowesetum* Sofia Margolis 'Corinne's Burgundy Wine' AM/AOS (*Clowesia* Rebecca Northen x *Catasetum cirrhaeoides*) 80 pts. Exhibitor: Corinne Arnold; Photographer: Wes Newton. Florida North-Central Judging
- [4] *Papilionanda* Mimi Palmer 'Garrett's Dark Knight' AM/AOS (Tan Chay Yan x *Vanda tessellata*) 83 pts. Exhibitor: Sharon and David Garrett; Photographer: Wes Newton. Florida North-Central Judging
- [5] *Vanda* Pachara Delight 'Janis Pink Delight' AM/AOS (Karulea x Gordon Dillon) 81 pts. Exhibitor: Chad Whetstone; Photographer: Wes Newton. Florida North-Central Judging
- [6] *Vanda* Merlot 'Garrett's Brown Sugar' HCC/AOS (Emily Elizabeth x *merrillii*) 78 pts. Exhibitor: Sharon and David Garrett; Photographer: Wes Newton. Florida North-Central Judging
- [7] *Catasetum* Diana's Dots 'Corinne's Burgundy Love' AM/AOS (Orchidglade x *tigrinum*) 82 pts. Exhibitor: Corinne Arnold; Photographer: Kay Clark. Florida North-Central Judging
- [8] *Phalaenopsis* Valentini 'Perla' AM/AOS (*cornu-cervi* x *violacea*) 80 pts. Exhibitor: Carlos Fighetti; Photographer: Marínés Torres. Puerto Rico Judging
- [9] *Vanda* Kultana Violet 'Chad's Purple Magic' AM/AOS (Pat Delight x Doctor Anek) 84 pts. Exhibitor: Chad Whetstone; Photographer: Wes Newton. Florida North-Central Judging
- [10] *Vanda* Brighton Jade 'Garrett's Sunny Days' AM/AOS (Rasri Gold x Tubtim Velvet) 82 pts. Exhibitor: Sharon and David Garrett; Photographer: Wes Newton. Florida North-Central Judging
- [11] *Psychilis olivacea* 'J.A.R.R. II' AM/AOS 80 pts. Exhibitor: José Román; Photographer: Marínés Torres. Puerto Rico Judging
- [12] *Brassocatanthe* Fong Cing 'A New Hope' HCC/AOS (*Brassavola nodosa* x *Cattlianthe* Cynthia Martel Utuado) 77 pts. Exhibitor: Fong Cing Li; Photographer: Marínés Torres. Puerto Rico Judging
- [13] *Rhynchovola* Bashful Fimbria 'Neblina Dush'i Lamunchi' AM/AOS (Jimminey Cricket x *Rhynchoaelia digbyana*) 84 pts. Exhibitor: Adeljean Ho (Neblina Orchids); Photographer: Kay Clark. Florida North-Central Judging
- [14] *Mormodes* Mark Mills 'Machiavelli' AM/AOS (Jumbo Bacia x Virgen del Valle) 82 pts. Exhibitor: René E. Garcia; Photographer: Marínés Torres. Puerto Rico Judging
- [15] *Catasetum* Double Down 'Eric Perkins' AM/AOS (Chuck Taylor x *kleberianum*) 81 pts. Exhibitor: William Caldwell; Photographer: Wilton Guillory. Shreveport Judging
- [16] *Catasetum* Memoria I. H. Shirley 'Beauregard' AM/AOS (Portagee Star x *lucis*) 83 pts. Exhibitor: John Schwarze; Photographer: Wilton Guillory. Shreveport Judging





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- [1] *Angraecum* Lai's Star 'Venus De Milo' HCC/AOS (Lemförde White Beauty x *sesquipedale*) 76 pts. Exhibitor: Helen (H. B.) Blythe-Hart; Photographer: Helen Blythe Hart. Atlanta Judging
- [2] *Paphiopedilum* *spicerianum* 'Peridot Blush' HCC/AOS 76 pts. Exhibitor: Helen (H. B.) Blythe-Hart; Photographer: Helen Blythe Hart. Atlanta Judging
- [3] *Dracula* *nycterina* 'Reagan Lynn' HCC/AOS 75 pts. Exhibitor: Tyler M. Albrecht; Photographer: Ramon de los Santos. California Sierra Nevada Judging
- [4] *Paphiopedilum* Alpine Pleasure 'Slipper Zone Crowning Glory' HCC/AOS (Alpine Glow x Luna Pleasure) 75 pts. Exhibitor: Lehua Orchids; Photographer: Ramon de los Santos. California Sierra Nevada Judging
- [5] *Paphiopedilum* Hawaiian Spring 'Slipper Zone Printemps' AM/AOS (Hawaiian Illusion x Spring Fever) 80 pts. Exhibitor: Lehua Orchids; Photographer: Ramon de los Santos. California Sierra Nevada Judging
- [6] *Phalaenopsis* *tetraspis* f. *imperatrix* 'Monster' AM/AOS 84 pts. Exhibitor: Ramon de los Santos; Photographer: Ramon de los Santos. California Sierra Nevada Judging
- [7] *Paphiopedilum* California Burgundy 'Clar-et' AM/AOS (California Girl x Bandwagon) 81 pts. Exhibitor: Dave Sorokowsky; Photographer: Ramon de los Santos. California Sierra Nevada Judging
- [8] *Dendrobium* *trinervium* 'Bliss' HCC/AOS 79 pts. Exhibitor: Brenda Ruedy; Photographer: Ramon de los Santos. California Sierra Nevada Judging
- [9] *Phalaenopsis* Germaine Vincent 'Grem-lin' HCC/AOS (*violacea* x *tetraspis* f. *speciosa*) 78 pts. Exhibitor: Ramon de los Santos; Photographer: Ramon de los Santos. California Sierra Nevada Judging
- [10] *Masdevallia* *minuta* 'Kristen P' CCM/AOS 85 pts. Exhibitor: Douglas Kubo; Photographer: Ramon de los Santos. California Sierra Nevada Judging
- [11] *Paphiopedilum* Ford Hutchcraft 'Pinot Blanc' HCC/AOS (Golden-Prem x *primulinum*) 78 pts. Exhibitor: Dave Sorokowsky; Photographer: Ramon de los Santos. California Sierra Nevada Judging
- [12] *Cattleya* *dormaniana* 'Shane' CCM/AOS 86 pts. Exhibitor: William Rogerson; Photographer: Anne Kotowski. Chicago Judging
- [13] *Epidendrum* *hugomedinae* 'I Know Him' AM/AOS 80 pts. Exhibitor: Larry Sexton; Photographer: Lois Cinert. Chicago Judging
- [14] *Phragmipedium* Lilja Myhre 'Sophie' AM/AOS (Rosalie Dixler x *caudatum*) 86 pts. Exhibitor: Hausermann's Orchids, Inc.; Photographer: Anne Kotowski. Chicago Judging
- [15] *Paphiopedilum* Angel Hair 'Andrea' AM/AOS (Saint Swithin x *sanderianum*) 85 pts. Exhibitor: Hausermann's Orchids, Inc.; Photographer: Anne Kotowski. Chicago Judging
- [16] *Phragmipedium* Noirmont 'Sangria' HCC/AOS (Memoria Dick Clements x *longifolium*) 76 pts. Exhibitor: Dave Sorokowsky; Photographer: Ramon de los Santos. California Sierra Nevada Judging





- [1] *Vanda* Theptong 'Garrett's Happy Sunset' AM/AOS (Sunkist (1966) x *denisoniana*) 84 pts. Exhibitor: Sharon and David Garrett; Photographer: Wes Newton. Florida North-Central Judging
- [2] *Vanda* Golden Peddler 'Garrett's Creamsicle' AM/AOS (Rasri Gold x *denisoniana*) 83 pts. Exhibitor: Sharon and David Garrett; Photographer: Wes Newton. Florida North-Central Judging
- [3] *Catasetum saccatum* 'Cheryl's Joy' AM/AOS 80 pts. Exhibitor: Cheryl Erins; Photographer: Anne Kotowski. Chicago Judging
- [4] *Vandachostylis* Banjong Pearl 'Garrett's Pink Sensation' AM/AOS (Seng x *Vanda* Memoria Choo Laikeun) 82 pts. Exhibitor: Sharon and David Garrett; Photographer: Wes Newton. Florida North-Central Judging
- [5] *Cattleya guttata* 'Claire' HCC/AOS 76 pts. Exhibitor: William Rogerson; Photographer: Anne Kotowski. Chicago Judging
- [6] *Spathoglottis affinis* 'Bryon' HCC/AOS 78 pts. Exhibitor: Bryon K. Rinke; Photographer: Bryon Rinke. Great Plains Judging
- [7] *Habenaria rhodocheila* 'Bryon Kelly Rinke' AM/AOS 83 pts. Exhibitor: Bryon K. Rinke; Photographer: Bryon Rinke. Great Plains Judging
- [8] *Paphiopedilum* Memoria Robert Wimmer 'Max' AM/AOS (Rainbow Sky x Coconut Candy) 80 pts. Exhibitor: Max C. Thompson; Photographer: Bryon Rinke. Great Plains Judging
- [9] *Paphiopedilum* Memoria Robert Wimmer 'Bryon' HCC/AOS (Rainbow Sky x Coconut Candy) 79 pts. Exhibitor: Max C. Thompson; Photographer: Bryon Rinke. Great Plains Judging
- [10] *Rhyncattleanthe* Memoria Luciano Pavarotti 'Julio David' AM/AOS (Memoria Mario Lanza x *Rhyncholaeliocattleya* Murray Spencer) 85 pts. Exhibitor: Julio David Rios; Photographer: Marinés Torres. Puerto Rico Judging
- [11] *Myrmecocattleya* Monte Bello 'Julio David' AM/AOS (*Cattleya purpurata* x *Myrmecophila tibicinis*) 80 pts. Exhibitor: Julio David Rios; Photographer: Marinés Torres. Puerto Rico Judging
- [12] *Dendrobium* Memoria Jose Izquierdo Rivera 'Julio David' AM/AOS (Louise's Gem x Field King) 81 pts. Exhibitor: Julio David Rios; Photographer: Julio D. Rios. Puerto Rico Judging
- [13] *Cattleya* Fuchsia Doll 'Louisiana' HCC/AOS (*sincorana* x Sierra Doll) 78 pts. Exhibitor: Alan Taylor; Photographer: Wilton Guillory. Shreveport Judging
- [14] *Polystachya neobenthamia* 'Bryon' HCC/AOS 78 pts. Exhibitor: Bryon K. Rinke; Photographer: Bryon Rinke. Great Plains Judging
- [15] *Maxillaria picta* 'Golden Claw' AM/AOS 81 pts. Exhibitor: Nathan Bell; Photographer: Bryon K Rinke. Great Plains Judging
- [16] *Maxillaria schunkeana* 'Black Bird' CCM/AOS 85 pts. Exhibitor: Nathan Bell; Photographer: Bryon Rinke. Great Plains Judging

MARCH

4–5—Englewood Area Orchid Society’s “Orchids to the Rescue,” Ann & Chuck Dever Regional Park, 6961 San Casa Drive, Englewood, FL; Contact: Mary Anne DiGrazia, 941–697–9237; tommaryanne@centurylink.net

4–6—Virginia Orchid Society Show, Lewis Ginter Botanical Garden, 1800 Lakeside Ave, Henrico, VA; Contact: Donna Poland, 757–846–0981; in2gifted@gmail.com

4–6—Martin County Orchid Society’s “Orchid Safari,” Martin County Fairgrounds, Bldg. G, 2616 SE Dixie Hwy, Stuart, FL; Contact: Nancy Speedy, 772–485–5310; aspeedy@bellsouth.net

4–6—Central Vancouver Island Orchid Society’s “Spring Treasures,” Nanaimo North Town Center, 4750 Rutherford Road, Nanaimo, BC, V9T 4K6, Canada; Contact: Darlene Rathwell, 250–802–3960; islandar11@live.com

4–6—Orchid Society of the Ozark’s “11th Annual Orchids in the Garden,” Botanical Garden of the Ozarks, 4703 N Crossover Road, Fayetteville, AR; Contact: Stephen Marak, 479–841–4275; samarak@cox.net

4–6—“Fresno Home and Garden Show,” Fresno Fairgrounds, 1121 S Chance Ave, Fresno, CA; Contact: Gordon Wolf, 209–999–0181; gwsangca@yahoo.com

5–6—Tampa Bay Orchid Society’s “Orchids by the Bay,” Tampa Scottish Rite, 5500 Memorial Hwy, Tampa, FL; Contact: Pat Solakian, 203–214–7042; psolakian@gmail.com

5–6—Greater Akron Orchid Society Spring Show, Dayton Nursery, 3459 Cleveland–Massillon Rd, Norton, OH; Contact: Barbara Ford, 330–644–3168; baf67427@sbcglobal.net

5–6—Wisconsin Orchid Society’s “A Blooming Joy,” Milaeger’s, 4838 Douglas Ave, Racine, WI; Contact: Richard Odders and Bil Nelson, 262–632–3008 and 414–467–6642; odders2445@gmail.com and qorchids@att.net

5–6—Tucson Orchid Society’s “Fiesta De Las Flores,” Mesquite Valley Growers, 8005 E Broadway Blvd, Tucson, AZ; Contact: Wes Addison, 520–305–6150; wesadd@cwa-cpa.com

5–6—Mount Baker Orchid Society Show, Christianson’s Nursery, 15806 Best Road, Mount Vernon, WA; Contact: Harvey Brenneise, 909–786–6419; harvey.brenneise@gmail.com

10–13—Asociación Costarricense de Orquideología “Exposición Nacional de Orquídeas 2022,” Jardín Botánico Lankester, 5 km (3,7 millas) al este de Cartago, carretera a Paraiso, distrito: Dulce

Nombre, Cartago, Costa Rica; Contact: Marie Celeste Merazzo Rivera, 506–8380–5292; celmera@gmail.com

10–13—Maryland Orchid Society Show and Sale, Maryland State Fair Grounds/Maryland Home and Garden Show, 2200 York Rd, Lutherville–Timonium, MD; Contact: Marc Kiriou, 443–509–0084; gothiclord01@yahoo.com

11–13—Triad Orchid Society’s “Orchids in the Palm Room,” Reynolda Gardens Greenhouse, 100 Reynolda Village, Winston-Salem, NC; Contact: Will Bottoms, 336–420–8872; wlbottoms@gmail.com

12–13—Orchid Society of Coral Gables’ “Fairchild Orchid Festival,” Fairchild Tropical Botanic Garden, 10901 Old Cutler Road, Coral Gables, FL; Contact: Melana Davison, 760–212–8919; orchidiva@att.net

17–20—Puerto Rico Orchid Society’s “71 Exhibición de Orquídeas,” Jardín Botánico de Caguas, PR 156, Caguas, PR; Contact: Rafael Lopez, 787–585–0013; rafiberma79@hotmail.com

18–20—San Diego Orchid Society’s “Orchid Magic,” Scottish Rite Event Center, 1895 Camino del Rio South, San Diego, CA; Contact: Deborah Halliday, 858–756–3578; debhallid@gmail.com

19–20—Nature Coast Orchid Society Spring Show 2022, VFW Post 8681, 18940 Drayton Street, Spring Hill, FL; Contact: Steve Mattana, 218–556–1895; stevemattana123@gmail.com

19–20—Jacksonville Orchid Show 2022, Mandarin Garden Club, 2892 Loretto Rd, Jacksonville, FL; Contact: Lorraine Conover, 561–302–6010; lorrainesorchids@gmail.com

19–20—Orchid Society of Western Pennsylvania’s “The Joy of Orchids,” Crowne Plaza Hotel, 164 Fort Couch Road, Pittsburgh, PA; Contact: Sheila Nathanson, 412–576–1704; msnsan@gmail.com

19–20—*South Bay Orchid Society Spring Show and Sale, Palos Verdes Art Center, 5504 Crestridge Road, Rancho Palos Verdes, CA; Contact: Arthur Hazboun, 310–995–1592; webmaster@southbayorchidsociety.com

19–20—Nutmeg State Orchid Society’s “Come See Our Bloomers,” West Hartford Meeting and Conference Center, 50 South Main Street, West Hartford, CT; Contact: Sandy Myhalik, 860–677–0504; myhalik@comcast.net

19–20—Springfield Orchid Society Show, Springfield Greene Co Botanical Center, 2400 South Scenic, Springfield, MO; Contact: Nathan Bell, 660–888–0225; nbell@cofo.edu

25–27—Calcasieu Orchid Society’s

“ORCHIDS Go To The Movies – Cinematic Spectacles,” Historic City Hall, 1001 Ryan Street, Lake Charles, LA; Contact: R. Keith Joiner, 318–614–3516; kjoiner2000@yahoo.com

25–27—New Hampshire Orchid Society’s “A Bounty of Orchids,” The Event Center at the Courtyard Marriott, 2200 Southwood Drive, Nashua, NH; Contact: Brenda Campbell, 603–540–8195; Bbcampbell139@comcast.net

25–27—Gulf Coast Orchid Society’s “Galaxy of Orchids,” North Collier Regional Park, 15000 Livingston Rd, Naples, FL; Contact: Jim Longwell, 239–340–5520; jlongwell1@comcast.net

25–27—Mobile Area Orchid Society 44th Show, Bellingrath Gardens and Home, 12401 Bellingrath Road, Theodore, AL; Contact: Joseph Paine, 251–209–1008; joe6w@aol.com

25–27—The St. Croix Orchid Society’s “A Crucian Orchid Jubilee!,” Great Hall, St. George Village Botanical Garden, 127 Estate St. George, Frederiksted, VI; Contact: Susan Kraeger, 340–332–5845; stcroixorchidsociety@yahoo.com

26–27—Orchid Society of Highlands County’s “Pete’s Magical Orchid Show,” Agri–Civic Center, 4509 George Blvd, Sebring, FL; Contact: Susie Whitehead, 863–381–0522; susan_whitehead@hotmail.com

26–27—Michigan Orchid Society’s Show and Sale, United Plumber Union Hall, 555 Horace Brown Dr, Madison Heights, MI; Contact: Joe Peterson, 248–528–1453; jandjandabbey@aol.com

26–27—Sonoma County Orchid Society’s Orchid Expo and Sale, Santa Rosa Veteran’s Building, 1351 Maple Avenue, Santa Rosa, CA; Contact: Karen Wofford, 707–975–4299; kwofford@sonic.net

26–27—Greater Omaha Orchid Society Show, Lauritzen Gardens, 100 Bancroft St, Omaha, NE; Contact: Jim Pyrzynski, 402–734–4112; jpyrzynski@cox.net

26–27—Central Pennsylvania Orchid Society’s 55th Annual Orchid Show, Penn State University, Arena, 800 E Park Ave, State College, PA; Contact: Wade Hollenbach, 570–837–9157; wadeh@ptd.net

APRIL

1–3—Genesee Region Orchid Society 46th Annual Orchid Show, Eisenhart Auditorium, Rochester Museum & Science Center, 657 East Avenue, Rochester, NY; Contact: Jeanne Kaeding, 585–442–3202; jekaeding@gmail.com

2–3—Desert Valley Orchid Society Show, Berridge Nursery, 4647 E Camelback Rd,

CANCELLED

Phoenix, AZ; Contact: Beverly Tall, 480-816-4722; bevtall@gmail.com

2-3—Utah Orchid Society, "Springtime for Orchids," Red Butte Garden, 300 Wakara Way, Salt Lake City, UT; Contact: Shawn Quealy, 801-831-7359; shquealy@comcast.net

8-10—Southeastern Pennsylvania Orchid Society International Orchid Show and Sale, Oaks Expo Center, 100 Station Ave, Oaks, PA; Contact: Bob Sprague, 484-919-2922; bobsatcyndal@aol.com

9-10—Spokane Orchid Society Show and Sale, Spokane Community College Student Lair, 1810 N Greene St, Spokane, WA; Contact: Jim Pearce, 509-299-5152; joel.mattes21@gmail.com

9-10—Greater Cincinnati Orchid Society Show and Sale, Dan Beard Council Boy Scouts of America, 10078 Reading Rd, Cincinnati, OH; Contact: Joel Mattes, 513-680-2157; jpearce821@gmail.com

16-17—Flamingo Gardens Orchid Society Show, Flamingo Gardens, 3750 S Flamingo Road, Davie, FL; Contact: Antonio Torres, 954-913-1628; ajtorresp@gmail.com

23-24—West Shore Orchid Society Spring Show, Strongsville Recreation Center, 18100 Royalton Rd, Strongsville, OH; Contact: Chester Kieliszek, 330-467-3731; kieliszek@aol.com

23-24—Treasure Valley Orchid Society Show and Sale, Hilton Garden Inn, 7699 W Spectrum, Boise, ID; Contact: Carolyn Watts, 208-841-0264; daintree@earthlink.net

23-24—Vero Beach Orchid Society Annual Show "Orchid Rainbow," Riverside Park, 3001 Riverside Park Drive, Vero Beach, FL; Contact: Carolyn Greene, 321-506-3909; vbosnewsletter@hotmail.com

23-24—Central Indiana Orchid Society Show, Garfield Park Conservatory, 2505 Conservatory Drive, Indianapolis, IN; Contact: Foster Flint, 317-601-2649; flintlowell@hotmail.com

23-24—Southern Tier Orchid Society's "Orchids at the Museum," Roberson Museum, 30 Front St, Binghamton, NY; Contact: Carol Bayles, 607-275-9090; cjb5@cornell.edu

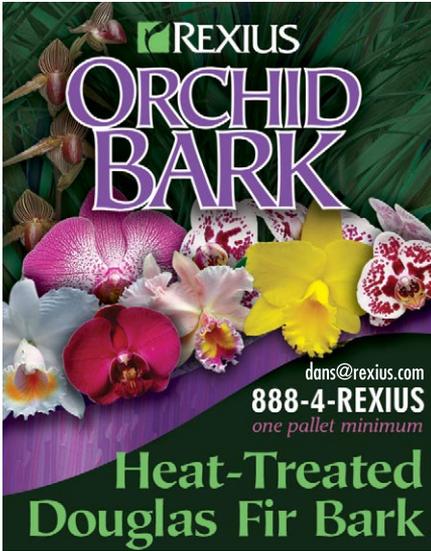
29-1—Platinum Coast Orchid Society Show "A Rainbow of Orchids," Kiwanis Island Park Gymnasium, 951 Kiwanis Island Park Road, Merritt Island, FL; Contact: Laura Blackmon, 321-745-9046; leblackmon@bledsoe.net

29-30—New Mexico Orchid Guild "A World of Orchids," Albuquerque Garden Center, 10120 Lomas Blvd NE, Albuquerque, NM; Contact: Keith Mead, 505-379-6786; orchidsinabq@gmail.com

29-30—Blue Ridge Orchid Society

"Orchids in the Square," Center in the Square, 1 Market Street SE, Roanoke, VA; Contact: Lillian Gillespie, 434-610-9183; gillespielgh@rsnet.org

30-1—Kansas Orchid Society's Spring



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2022 Show and Sale (Hosting SWROGA), The Wichita Gardens, 701 Amidon St, Wichita, KS; Contact: Sarah Pratt, 316-655-0572; svcsjp@gmail.com



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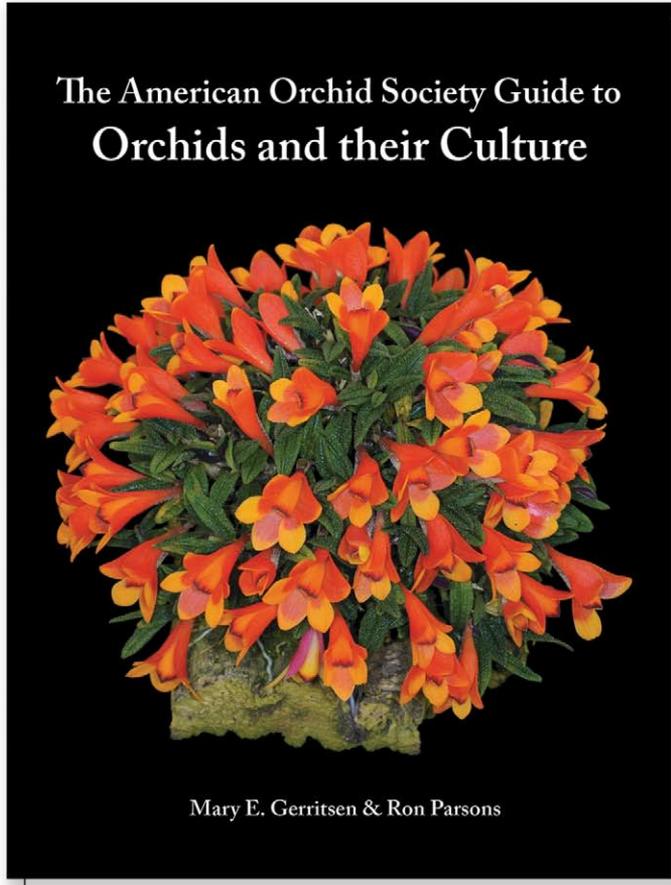

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Submission of articles for *ORCHIDS* magazine

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 or the editor at rmchatton@aos.org.

IX International Conference on Orchid Conservation "Soroa 2022"

NEW DATES

THE SOROA BOTANICAL and Orchid Garden and the University of Artemisa IX International Conference on Orchid Conservation "Soroa -2022," has been postponed from February 2022 to **NOVEMBER 2022** with exact dates to be determined soon.

This second postponement has become necessary due to damage caused by a recent tropical weather system as well as the COVID-19 pandemic situation in Cuba. Vaccinations are underway in Cuba but February will be too soon to safely hold the Conference.

**For Advertising Information,
Contact: Kevin Hall,
khall@allenpress.com**

The American Orchid Society, in congruence with its stated conservation aims and with the full approval of the AOS Trustees, prohibits advertisements for wild-collected orchids and orchid-collecting tours in the pages of *Orchids*. By submitting advertisements for orchid species, vendors are thereby asserting that plants advertised are either artificially propagated (from seed or meristem) or are nursery-grown divisions of legally acquired stock. While *Orchids* endeavors to assure the reliability of its advertising, neither *Orchids* nor the American Orchid Society, Inc., can assume responsibility for any transactions between our advertisers and our readers.

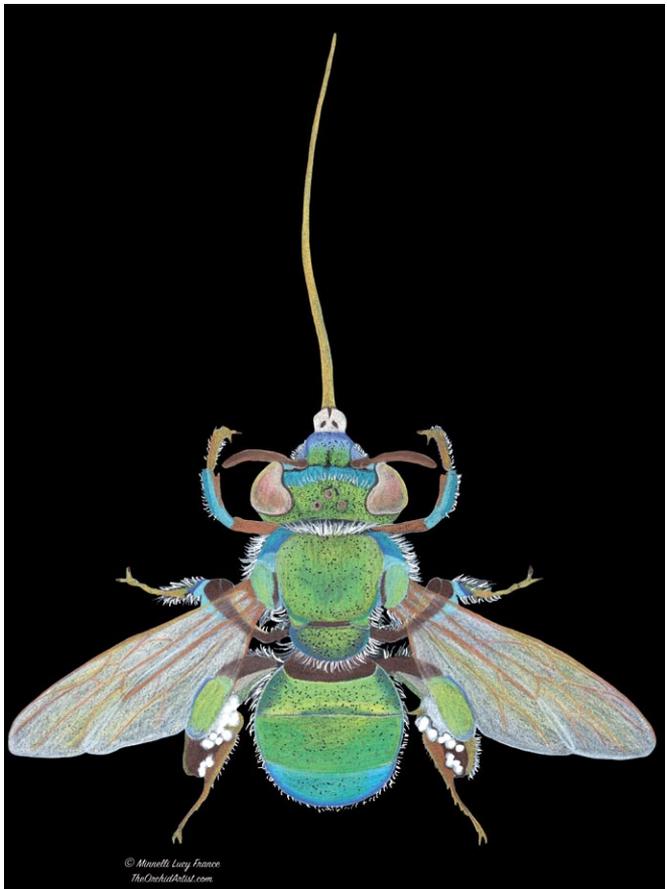
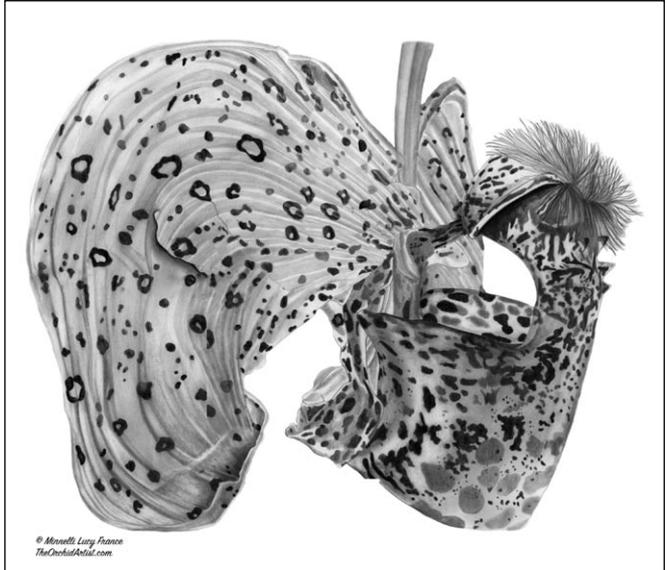
Coryanthes and Orchid Bees

Text and art by Minelli Lucy France

BUCKET ORCHIDS, FROM the genus *Coryanthes*, comprise about 43 species. These epiphytic orchids are native to the Neotropical rainforests of Central and South America, Mexico and Trinidad. The species illustrated in graphite is the Peruvian *Coryanthes alborosea*. Bucket orchids have a symbiotic relationship with their pollinator, the orchid bee. They use a coevolutionary pollination method with specific species of orchid bees. Many species of *Coryanthes* have mutualistic relationships with ant colonies as well.

The green orchid bee (*Euglossa dilemma*), native to Central America, was introduced into South Florida and first discovered in 2003 (in Broward County). *Euglossa dilemma* is a newly described cryptic species complex having three teeth on its mandibles, and is closely related to *Euglossa viridissima*, a species having only two such teeth.

— Minelli Lucy France. All rights to artwork appearing in this article are reserved (website: TheOrchidArtist.com; email: theorchidartist@outlook.com).



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