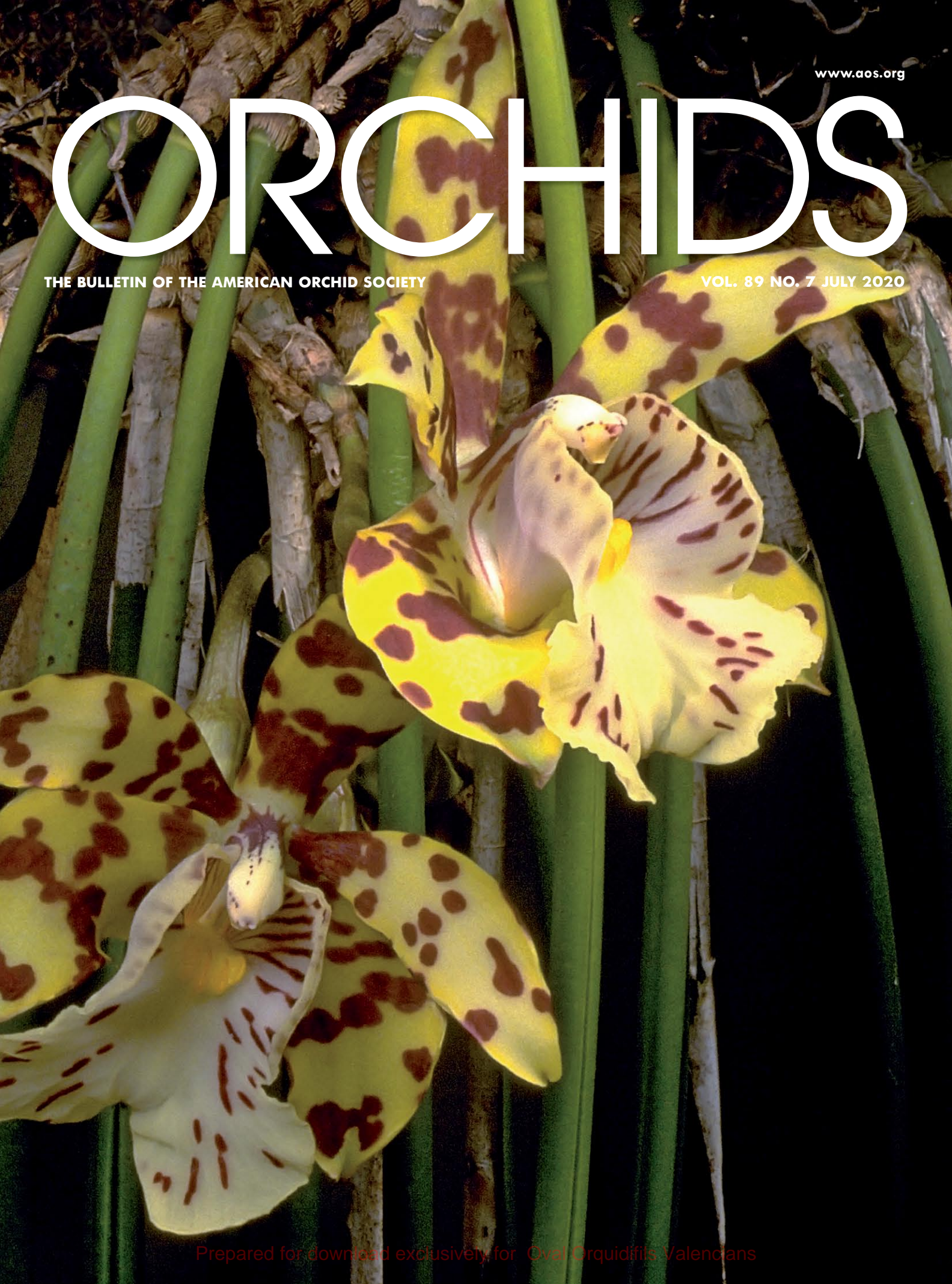


www.aos.org

ORCHIDS

THE BULLETIN OF THE AMERICAN ORCHID SOCIETY

VOL. 89 NO. 7 JULY 2020



Join us July 30th through August 1st, 2020 for an event featuring two days
of presentations on history, hybridizing, culture, and other
activities including AOS judging

10th Annual Odom's Orchids **CATTLEYA** **SYMPOSIUM**

Scheduled Speakers:

Jeff Bradley

John Finer

Courtney Hackney

Fred Clarke

Bill Rogerson

Jim Roberts

Ben Oliveras

and more!

Thursday Evening

Get to know your
fellow Cattleya
enthusiasts and enjoy
complimentary pizza!

Bic.
Albert Turner
'Odom's Orchids'

Friends and Cattleya Enthusiasts,

For everybody's safety during the Covid-19 epidemic, we have canceled our 2020 Cattleya Symposium. We are determined to assemble the same outstanding slate of speakers for next year and we look forward to seeing you in 2021 at Odom's Orchids Cattleya Symposium.

**Please take care,
Odom's Orchids**

ORCHIDS

The Bulletin of the American Orchid Society

RON MCHATTON
Chief Education and Science Officer
Editor, *Orchids Magazine*
rmchatton@aos.org

AWARDS REGISTRAR
Laura Newton
laura@aos.org

ADVERTISING
Kevin Hall
Advertising Sales Executive
Allen Press
810 East 10th Street
Lawrence, Kansas 66044
khal@allenpress.com
785-865-9143

SUBSCRIPTIONS AND MISSING ISSUES
Membership Services Department
Tel 305-740-2010 Fax 305-747-7154
membership@aos.org

EDITORIAL BOARD
Jean Allen-Ikeson, Chair
Greg Allikas, Sue Bottom,
Mark Chase, Phillip Cribb, Nile Dusdieker,
Wes Higgins, Carol Klonowski,
Judith Rapacz-Hasler, Larry Sexton
Send electronic submissions to jean.ikeson@gmail.com or
rmchatton@aos.org

PROOFREADERS
Laura Newton, Larry Sexton,
Olga Skoropad, Susan Wedegaertner

FORMER EDITORS
Dr. David Lumsden (1932–1940), Dr. Louis O.
Williams (1940–1943), Gordon Dillon (1943–1967;
1970–1973), Merle Reinikka (1968–1969),
Richard Peterson (1973–1984), Stephen R. Batchelor
(1984), Alec Pridgeon, PhD (1984–1988;
1989–1991), Chuck McCartney (1988–1989),
James B. Watson (1991–2013)

Volume 89, Number 7 July 2020 *Orchids* (ISSN 1087-1950) is published monthly by the American Orchid Society, Inc., at Fairchild Tropical Botanic Garden Editorial Office: 10901 Old Cutler Road, Coral Gables, Florida 33156 (telephone 305-740-2010; fax 305-747-7154; email theaos@aos.org; website www.aos.org). ©American Orchid Society, Inc. 2017. Printed by Allen Press, 810 East 10th Street, Lawrence, Kansas 66044. Subscription price of *Orchids* is \$79 a year within the US, \$99 Canada and Mexico and \$119 for all other countries. Single copies of current issue cost \$8.50 (plus shipping and handling). Prices are subject to change without notice. Although *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. Periodical postage paid at Miami, FL and additional offices. POSTMASTER: Send address changes to: *Orchids*, PO Box 565477, Miami, FL 33256. The American Orchid Society follows the *World Checklist of Selected Plant Families* with regard to questions of botanical nomenclature and synonymy in orchid species names and the International Orchid Register for hybrid nomenclature and parentage in editorial. The opinions and recommendations that appear in *Orchids* regarding the selection and use of specific plant-care products, including but not limited to pesticides, fungicides and herbicides, are those of the individual authors, and not those of the American Orchid Society, which neither adopts nor endorses such opinions and recommendations and disclaims all responsibility for them. When selecting and using such products, readers should seek and obtain the advice of the manufacturer and of responsible government agencies. Mail date: June 26, 2020.



Printed on 10 percent post-consumer recycled paper.

CONTENTS

July 2020 Volume 89 Number 7



516



530



534



542

FEATURES

530 ORCHIDS OF BHUTAN

The Genus Spathoglottis
Stig Dalström, Choki Gyeltshen, Nima Gyeltshen, Kezang Tobgay, Ngawang Gyeltshen and Bhakta Bahadur Ghalley

534 ORCHID TREASURES OF THE NORTHWEST AMAZON

The Search for Scuticaria steelei
Nicola S. Flanagan

540 ORCHID CABINET

Madeline Foerster

542 CUBAN TREASURES

The Ghostly Caribbean Treasures of Guanahacabibes National Park, Cuba
Lawrence W. Zettler, Ernesto Mújica and Alejandro Camejo Vergara

DEPARTMENTS

Tom's Monthly Checklist 504

July: *The Month of the Zoom*
Thomas Mirenda

For the Novice 506

Soluble Salts
Sue Bottom

Species Identification Task Force 513

Paphiopedilum primulinum var. *primulinum*
Joe Bryson and Ron McHatton

Collector's Item 516

Bulbophyllum Section *Lepidorhiza*
Charles Wilson

New Rufugium Botanicum 520

Encyclia alata
Diego Bogarin and Franco Pupulin
Watercolor by Sylvia Strigari

Conservation Committee 524

New Conservation Grants
Thomas Mirenda

Orchids Illustrated 526

Bulbophyllums of du Petit Thouars
Peggy Alrich and Wesley Higgins

Awards Gallery 554

Nomenclature Notes 548

Paphiopedilum villosum var. *laichaunum*
Nguyen Hoang Tuan, Nguyen Son Hai, Olaf Gruss and
Chu Xuan Canh

In This Issue

AOS MEMBERSHIP INFORMATION 498

AOS DIRECTORY OF SERVICES 498

PRONUNCIATION GUIDE 499

AOS NATIONAL VOLUNTEERS 500

GIFTS OF NOTE 501

PRESIDENT'S MESSAGE 502

WEBINARS 519

SELECTED BOTANICAL TERMS 523

USEFUL TIPS 522, 588, 590

CALENDAR 587

ORCHID MARKETPLACE 589

ORCHIDS CLASSIFIEDS 589

AD INDEX 591

PARTING SHOT 592

English Orchid Auctions of the 1890s
Arthur E. Chadwick

SIDEBARS

Reverse Osmosis Water 508

James Arnold

Rainwater Collection 510

Linda Stewart

FRONT COVER

Scuticaria steelei 'Roman Holiday' AM-CCM/AOS grown by Joseph Romans and awarded at the 1997 Miami International Orchid Show. The plant carried five flowers and three buds on five inflorescences and was photographed by Greg Allikas. For more on this very rare species, see Nicola Flanagan's feature article in this issue.

LAST MONTH'S COVER SPECIMEN: The name of the species featured on last month's cover, *Epidendrum escobarianum*, was unfortunately omitted from the cover caption. We sincerely regret the omission.

SUBSCRIBE TO ORCHIDS TEL 305-740-2010 EMAIL THEAOS@AOS.ORG WEBSITE WWW.AOS.ORG

Prepared for download exclusively for Oval Orquidifils Valencians

AMERICAN ORCHID SOCIETY

A 501(c)(3) Nonprofit Organization Founded in 1921

MISSION

The mission of the American Orchid Society is to promote and support the passion for orchids through education, conservation and research

VISION STATEMENT

The American Orchid Society provides leadership in orchids

Membership Information and Rates

Membership in the AOS includes a subscription to *Orchids* magazine that begins with the next available issue at the time of enrollment. For information on membership, please call 305-740-2010, email theaos@aos.org or join online at www.aos.org.

Payments must be made through a US bank in US funds or by International Money Order. MasterCard, American Express, Visa and Discover are accepted. Prices are subject to change without notice and memberships are nonrefundable or transferable. *Orchids* is distributed via periodicals-class mail. First-class delivery is available in the United States for an additional \$30 per year.

Membership Type	Silver		Gold	
	(Digital Only)	US Destination (Digital and Print)	Canada and Mexico (Digital and Print)	All Other Countries (Digital and Print)
Individual or vendor				
one year	\$54.00	\$79.00	\$99.00	\$119.00
two years	\$103.00	\$153.00	\$193.00	\$233.00
Joint, one year*	\$69.00	\$94.00	\$114.00	\$134.00
Joint, two years*	\$133.00	\$183.00	\$223.00	\$263.00
Youth, one year**	\$39.00	\$54.00	\$74.00	\$94.00
Youth, two years**	\$73.00	\$103.00	\$143.00	\$183.00
Society, one year***	N/A	\$79.00	\$99.00	\$119.00
Society, two year***	N/A	\$153.00	\$193.00	\$233.00

* Joint membership is for two individuals residing at the same address and includes only one subscription to the monthly magazine *Orchids*.

** Youth members must be under the age of 25

Valid proof of age required at time of application.

*** Affiliated Societies must appoint an AOS Representative who is also an AOS member.

Membership Benefits

Orchids — The Bulletin of the American Orchid Society

AOS *Orchid Source Directory* (growers, affiliated societies, judging centers)

Members-Only section of www.aos.org

Unlimited access to educational webinars

Discounts at select gardens and arboreta in the United States (see www.ahs.org)

10 percent discount on AOS publications

First-time members receive a free copy of *Your*

First Orchid and 15 percent off additional

AOS-produced books (plus shipping)

OrchidPro

Orchids — Replacement Copies

Any member who does not receive a scheduled issue of *Orchids* should notify the Membership Services Department (tel 305-740-2010; email membership@aos.org) within 60 days (US residents) or 90 days (nonUS residents) of date of issue to receive a replacement copy at no charge.

Membership Policy

Membership in the American Orchid Society is open to all individuals without regard to race, color, ethnicity, national origin, religion, gender, sexual orientation, disability or age. All activities of the American Orchid Society are conducted in accordance with the principles of nondiscrimination and mutual respect. Further, the American Orchid Society does not condone or endorse any conduct that is not in accord with these principles.



American Orchid Society
Education. Conservation. Research.

AMERICAN ORCHID SOCIETY
at Fairchild Tropical Botanic Garden

10901 Old Cutler Road, Coral Gables, Florida 33156
Mailing address: PO Box 565477, Miami, Florida 33256

Tel 305-740-2010

Email theaos@aos.org Website www.aos.org
Main Office Monday–Friday (by appointment only)



SERVICES

Ron McHatton, PhD (rmchatton@aos.org)
Chief Education and Science Officer (305-740-2010 ext 106)

Education

Nomenclature

Orchid Information

Orchids — Editorial

Publications — Books, Calendar, *Orchid*

Source Directory

Naya Marcano (naya@aos.org)

Director of Administration and Member Services (305-740-2010)

Administration

AOS Policy Information

Business Operations

Accounting (victor@aos.org)

Victor Parera (305-740-2010 ext 104)

Advertising (khall@allenpress.com)

Kevin Hall — Advertising Sales

Manager, Allen Press, Inc. (785-865-9143)

Orchids, *Orchid Source Directory*

Affiliated Societies (sandra@aos.org)

Sandra Kurzban (305-740-2010 ext 102)

Committee Volunteers

Shows

Contact Updates

Website listings

Awards Registrar (laura@aos.org)

Laura Newton

Award issues and questions

Certificates

Development (theaos@aos.org)

Annual Giving

Bequests

Major Gifts

Planned Giving

Membership Associates

Sandra Kurzban (sandra@aos.org)

Daniella Estrada (daniellae@aos.org)

OrchidPro

Membership renewals

Gift Memberships

Back Issues — *Orchids*

Book Sales

Change of Address

Damaged and Missing Issues

Membership Brochures and Benefits

Membership Questions

Remove Name from Mailing List

Website (login and password issues)

Information Technology (305-740-2010)

Website functionality

OrchidPro functionality

For questions not addressed above please contact theaos@aos.org or call 305-740-2010

PRONUNCIATION GUIDE

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

<i>Acianthera</i> (ay-see-AN-ther-a)	<i>formosum</i> (fore-MOH-sum)	<i>orthoglossum</i> (ore-tho-GLOS-sum)
<i>aerolatum</i> (air-oh-LAY-tum)	<i>fowliei</i> (FOW-lee-eye)	<i>pachyrrhizum</i> (pak-ee-RYE-zum)
<i>africana</i> (af-rih-KAN-a)	<i>fucata</i> (few-KAY-ta)	<i>Paphinia</i> (paff-IN-ee-a)
<i>Alamania</i> (al-a-MAN-ee-a)	<i>fuscroseum</i> (foo-sko-ROSE-ee-um)	<i>parviflora</i> (par-vee-FLORE-a)
<i>alata</i> (a-LAY-ta)	<i>fuscoviride</i> (foo-sko-VEER-ih-dee)	<i>pendiphylis</i> (pen-dih-FYE-lis)
<i>alexandrae</i> (al-leks-AN-dree)	<i>Gecarcinus</i> (gee-kar-SEE-nus)	<i>pendulum</i> (PEN-dew-lum)
<i>amphistomum</i> (am-FIS-toh-mum)	<i>geoffrensis</i> (jef-FREN-sis)	<i>Phloeophila</i> (flee-OH-fih-la)
<i>amplebracteatum</i> (am-ple-brak-tee-AY-tum)	<i>gracile</i> (GRAH-see-lee)	<i>Phoebe</i> (FEE-bee)
<i>annamense</i> (an-na-MEN-see)	<i>gracilophyllis</i> (grass-sil-oh-FYE-lis)	<i>phoenicia</i> (fee-NEE-see-a)
<i>Ansellia</i> (an-SEL-lee-a)	<i>Greenwoodiella</i> (green-wood-ee-EL-la)	<i>Phyllorchis</i> (fill-ORE-kis)
<i>Artorima</i> (ar-TORE-ee-ma)	<i>griesbachiana</i> (greez-bak-ee-AY-na)	<i>Platanthera</i> (plat-AN-ther-a)
<i>aurea</i> (AW-ree-ah)	<i>guanahacabibensis</i> (gwa-na-ha-ka-beeb-EN-sis)	<i>Pleurothallis</i> (plur-oh-THAL-lis)
<i>barrettiae</i> (bare-RET-ee-eye)	<i>guatemalensis</i> (gwa-teh-mal-EN-sis)	<i>plicata</i> (ply-KAY-ta)
<i>basisetum</i> (bas-ee-SEE-tum)	<i>gubertiana</i> (gwee-bert-ee-AY-na)	<i>Polystachya</i> (pol-ee-STAK-ee-a)
<i>bipapularis</i> (bye-pap-yew-LAIR-iss)	<i>hainanensis</i> (hye-nan-EN-sis)	<i>porrectus</i> (pore-REK-tus)
<i>Bletia</i> (BLEE-tee-a)	<i>helenae</i> (HEL-len-ee)	<i>praedicta</i> (pree-DIK-ta)
<i>bocourtii</i> (boh-KUR-tee-eye)	<i>Houlletia</i> (hoo-LET-tee-ah)	<i>preussi</i> (PROOS-ee)
<i>boothiana</i> (booth-ee-AY-na)	<i>Inia</i> (EE-nee-a)	<i>primus</i> (PRY-mus)
<i>boxallii</i> (boks-AL-lee-eye)	<i>integerrimum</i> (in-the-JER-ih-mum)	<i>prismaticum</i> (priz-MAT-ih-kum)
<i>Broughtonia</i> (brow-TOH-nee-ah)	<i>ixioides</i> (iks-ee-OY-deez)	<i>prismophyllis</i> (priz-moh-FYE-lis)
<i>Bulbophyllum</i> (bul-boh-FIL-lum)	<i>jetsuniae</i> (jet-SUN-ee-eye)	<i>Prosthechea</i> (pros-THEK-ee-a)
<i>caespitosum</i> (kase-pih-STOH-sum)	<i>karwinskii</i> (kar-WIN-skee-eye)	<i>pulchra</i> (PULL-kra)
<i>calocheilum</i> (kal-oh-KYE-lum)	<i>kraatzi</i> (KRAT-zee)	<i>punctatum</i> (punk-TAY-tum)
<i>Campylocentrum</i> (kamp-ee-loh-SEN-trum)	<i>labiata</i> (la-bee-AY-ta)	<i>purpurea</i> (per-PER-ee-a)
<i>capitellata</i> (kap-ih-tel-LAY-ta)	<i>Laeliinae</i> (lay-LEE-ee-nee)	<i>pyriformis</i> (pier-ih-FORE-miss)
<i>Carabus</i> (KAR-a-bus)	<i>laichanum</i> (lye-CHOW-num)	<i>radiata</i> (ray-dee-AY-ta)
<i>carunculatum</i> (kar-un-kew-LAY-tum)	<i>lanceolata</i> (lan-see-oh-LAY-ta)	<i>Ramphostus</i> (ram-FOS-tus)
<i>caymanensis</i> (kay-man-EN-sis)	<i>lemoniana</i> (lem-on-ee-AY-na)	<i>Rapanea</i> (rap-AN-ee-a)
<i>cespiphylis</i> (ses-pih-FYE-lis)	<i>Leopoldinia</i> (lee-oh-pol-DEE-nee-a)	<i>rigidum</i> (RIJ-ih-dum)
<i>chapmannii</i> (chap-MAN-ee-eye)	<i>Lepidorhiza</i> (lep-ih-doh-RYE-za)	<i>ruricola</i> (rur-IH-koh-la)
<i>clavatum</i> (kla-VAY-tum)	<i>levanae</i> (LEV-an-ee)	<i>Schomburgkia</i> (shom-BURG-kee-a)
<i>clavophyllis</i> (kla-voh-FYE-lis)	<i>lindenii</i> (lin-DEN-ee-eye)	<i>Scuticaria</i> (skoo-tih-KAR-ee-a)
<i>cochleata</i> (koh-klee-AY-ta)	<i>Liparis</i> (LIH-par-iss)	<i>sesquipedale</i> (ses-kwi-peh-DAY-lee)
<i>coerulea</i> (see-ROO-lee-ah)	<i>longipetalum</i> (lon-jee-PET-a-lum)	<i>Spathoglottis</i> (spath-oh-GLOT-tis)
<i>comersophyllis</i> (kom-er-soh-FYE-lis)	<i>lucayana</i> (loo-kay-AY-na)	<i>sphacelatum</i> (sfeh-sell-AY-tum)
<i>commersonii</i> (kom-mer-SON-ee-eye)	<i>maculatum</i> (mak-yew-LAY-tum)	<i>Spiranthes</i> (spy-RAN-theez)
<i>Comocladia</i> (koh-moh-KLADE-ee-a)	<i>mandibulare</i> (man-dib-yew-LAIR-ee)	<i>stamfordianum</i> (stam-ford-ee-AY-num)
<i>concreta</i> (kon-KREE-ta)	<i>Maxillaria</i> (maks-ill-LAIR-ee-a)	<i>steeliei</i> (STEEL-eye)
<i>cootesii</i> (KOOTS-ee-eye)	<i>Mecynorrhina</i> (meh-sin-oh-REE-na)	<i>Stephanocrates</i> (steh-fan-oh-KRAY-teez)
<i>crassinervis</i> (kras-see-NER-viss)	<i>mellisuga</i> (mel-LIS-yew-ga)	<i>tampensis</i> (tam-PEN-sis)
<i>crispum</i> (KRIS-pum)	<i>morganii</i> (more-GAN-ee-eye)	<i>Thrinax</i> (THRY-naks)
<i>cryptophyllis</i> (krypt-oh-FYE-lis)	<i>Myrmecophila</i> (mir-meh-KOF-il-la)	<i>tigrina</i> (tye-GRYE-na or tye-GREE-na)
<i>cubensis</i> (kew-BEN-sis)	<i>Natalus</i> (na-TAY-lus)	<i>Tolumnia</i> (toh-LUM-nee-a)
<i>Cyrtopodium</i> (sir-toh-POH-dee-um)	<i>nizandensis</i> (niz-an-DEN-sis)	<i>torta</i> (TORE-ta)
<i>Dendrophylax</i> (den-droh-FYE-laks)	<i>nocturnum</i> (nok-TUR-num)	<i>Trichocentrum</i> (trik-oh-SEN-trum)
<i>dentata</i> (den-TAY-ta)	<i>nodosa</i> (noh-DOH-sa)	<i>trigonosepalum</i> (trye-gone-oh-SEEP-a-lum)
<i>deserticola</i> (deh-zert-ih-KOH-lah)	<i>nuphyllis</i> (noo-FIL-lis)	<i>tucanus</i> (too-KAY-nus)
<i>dilloniana</i> (dil-lon-ee-AY-na)	<i>nutans</i> (NOO-tanz)	<i>undulatum</i> (und-yew-LAY-tum)
<i>Diospyros</i> (dye-OSS-pir-os)	<i>nymphopolitanum</i> (nim-foh-pol-ih-TAY-num)	<i>variegatum</i> (var-ee-eh-GAY-tum)
<i>echinolabium</i> (eh-kine-oh-LAY-bee-um)	<i>oblongum</i> (ob-LONG-gum)	<i>variophyllis</i> (var-ee-oh-FYE-lis)
<i>Encyclia</i> (en-SIK-lee-a)	<i>occultum</i> (ok-KUL-tum)	<i>venustum</i> (vee-NOOS-tum)
<i>Erythroxyllum</i> (err-ith-roh-ZYE-lum)	<i>Oeceoclades</i> (ee-see-oh-KLAY-deez)	<i>villosum</i> (vill-OH-sum)
<i>Euchile</i> (yew-KYE-lee)	<i>Oeonia</i> (ee-OH-nee-a)	<i>violacea</i> (vye-oh-LAY-see-a)
<i>fairrieanum</i> (fair-ee-AY-num)	<i>olympiae</i> (oh-LIMP-ee-eye)	<i>volucris</i> (vol-yew-KREP-iss)
<i>flabellifera</i> (flab-ell-IF-er-a)	<i>oricola</i> (ore-ee-KOH-la)	<i>Warrea</i> (WAR-a)
<i>formosanum</i> (fore-moh-SAY-num)	<i>ortgiesiana</i> (ort-geez-ee-AY-na)	<i>Xanthopan</i> (ZAN-tho-pan)

AMERICAN ORCHID SOCIETY NATIONAL VOLUNTEERS

Officers

Susan Wedegaertner
President

Robert Fuchs
Jean Hollebone
Vice Presidents

Cheryl Erins
Secretary

Graham Wood
Treasurer

Doris Asher
Assistant Treasurer

George Hatfield
Immediate Past President

Trustees

2017–2020

William Bodei, Theresa Kennedy,
Phyllis Prestia

2018–2021

Judy Bailey, James Heilig, PhD,
Brandon Tam, Linda Wilhelm

2019–2022

Jay Balchan, Greg Filter, Joyce Medcalf, Jeff
Saal

Honorary Vice Presidents

Roger Brown, Donna Craig, Peter R. Furniss,
Harry Gallis, MD, Ann Jesup,
Taylor Slaughter

Past Presidents

Albert C. Burrage, F. Eugene Dixon, Wharton
Sinkler, Rodney Wilcox Jones, Frederick T.
Bonham, George W. Butterworth Sr., Frank J.
Lind, Robert M. Scully Sr., G. Ferguson Beall,
Walter Slagle, Lewis C. Vaughn, Keith Shaffer,
Dr. Jonathan W. Williams, Norman B. Merkel,
Dr. Lawrence L. Vance, Merritt W. Huntington,
Raymond McCullough, William E. Farrell, Paul
B. Moore, Dr. David H. Brown, FL Stevenson,
Dr. J. Woodson Phillips, Donna Craig, Mary
Davidson Dunnell, Donald E. Herman, Peter R.
Furniss, Marvin Gerber, Milton O. Carpenter,
Roger Brown, Robert J. Griesbach, Art Moore,
Carlos Fighetti, Chris Rehmann, Sandra Tillisch
Svoboda, Franklin A. Smith, George Hatfield

Affiliated Societies Committee

affiliated_societies_committee@aos.org
Denise Lucero, Chair
Deborah Bodei, Chad Brinkerhuff, Lois
Dauelsberg, Melana Davison, Edna Hamilton,
Eileen Hector (vice-chair), Candace Hollinger,
Donna Pettitt, Alex Rodriguez
Staff liaisons: Naya Marcano, Laura Newton

Audit Committee

audit_committee@aos.org
James Heilig, PhD, Chair
Phyllis Prestia, Jeff Saal
Consulting member: Nancy Mountford

Conservation Committee

conservation_committee@aos.org
Tom Mirenda, Chair
Steve Beckendorf, David Horak, Ron Kaufmann,
Dave Nixon, Mark Sullivan, Brandon Tam, Linda
Wilhelm, Charles Wilson, Susan Wilson
Advisory members: William Rhodehamel, Judith
Rapacz

Development Committee

development_committee@aos.org
Cheryl Erins, Chair
Judy Bailey, Robert Fuchs (Centennial Task
Force chair), Harry Gallis, MD, Doug Hartong,
Jean Hollebone, John Ingram, Jennifer Reinoso,
Marian Sheehan, Frank Smith, Charles Wilson
(vice-chair)

Education Committee

education_committee@aos.org
Phyllis Prestia, Chair
Eron Borne, Cynthia Coty, Melana Davison,
Cheryl Erins, Bernice Magee, Barbara Schmidt,
Charles Wilson, Susan Wilson

Executive Committee

executive_committee@aos.org
Susan Wedegaertner, Chair
Doris Asher, Cheryl Erins, Robert Fuchs, George
Hatfield, Jean Hollebone, Graham Wood

Finance Committee

finance_committee@aos.org
Graham Wood, Chair
Doris Asher, Nancy Mountford
—Investment Task Force
Nancy Mountford, Chair
Doris Asher, Ron McHatton, Susan
Wedegaertner, Graham Wood
—Awards Task Force
Nancy Mountford, Chair
Robert Fuchs, Jean Hollebone

Governance Committee

governance_committee@aos.org
Jean Hollebone, Chair
Judy Bailey, Cheryl Erins, Harry Gallis, MD,
James Heilig, PhD, Theresa Kennedy, Taylor
Slaughter

Information Technology Committee

information_technology_committee@aos.org
Jay Balchan, Chair
William Bannon, Howard Bronstein, David
Edgley, Greg Filter, Ted Kellogg, Frank
Slaughter
Staff liaison: Laura Newton

Judging Committee

judging_committee@aos.org
Taylor Slaughter, Chair
Jean Allen-Ikeson, Nathan Bell, Howard
Bronstein, Lois Cinert, Judy Cook, André
Couture, Jim Davison, David Edgley, Robert
Fuchs, Alison Gallaway, Doug Hartong, Marilyn
Holloway, Bill Jasen, Karen Kimmerle, Japheth
Ko, Valerie Lowe, Joyce Medcalf, Alexa Noel,
Sarah Paterson, Ian Rich, Julio David Rios, Abu
Salleh, Bill Sanders, Dennis Seffernick, Bev
Tall, Al Taylor, Max Thompson, Mark Werther,
Robert Winkley
Staff liaisons: Ron McHatton, Laura Newton
—Species Identification Task Force (SITF)
awardid@aos.org
Randall Bayer, Joe Bryson, Alfonso Doucette,
Marc Hachadourian, Ron McHatton, Laura
Newton, Jay Norris, William Pinnix, Ken
Roberts, Jean Stefanik, Charles Wilson

Library/Archives Committee

library_committee@aos.org
Melana Davison, Chair
Doris Asher, Cheryl Erins, Carlos Fighetti,
Robert Fuchs (vice-chair), Gail Furniss, Claire
Garrett, Catherine Higgins, John Ingram, Chris
Rehmann, Dr. Kristen L. Uthus, Katherine
Weitz
Staff liaison: Laura Newton

Membership and Marketing Committee

membership_committee@aos.org
William (Bill) Bodei, Chair
Judy Bailey, Deb Bodei, Beth Davis, Eileen
Hector, Candace Hollinger, Graham Ramsey,
Jeff Saal, David Toyoshima, Linda Wilhelm
Staff liaison: Laura Newton

Nominating Committee nominating_committee@aos.org

Alan Koch, Chair
Judy Bailey, George Hatfield, Joyce Medcalf,
Bev Tall, Robert Winkley, Graham Wood

Research Committee

research_committee@aos.org
Dr. Daniel L. Geiger, Chair
Dr. Andy Cameron, Dr. Ken Cameron, Dr. R.J.
Griesbach, Dr. James Heilig, Dr. John Stommel
(vice-chair), Dr. Cynthia van der Wiele

Special Funding Committee

special_funding_committee@aos.org
Jennifer Reinoso, Chair
Alan Koch, Marian Sheehan

Gifts of Note

In addition to vital support through membership dues, the American Orchid Society relies on grants, bequests and other gifts to support its programs. We would like to thank the following donors for gifts received between May 1, 2020 and May 31, 2020.

Doris Asher
Vanessa Castleberry
Stephen Chang
Pamela DeLaquil
Cheryl Erins
Dora Facio
Greg Filter
Chris Finezeo and Michael Kay
Heather Finke
Harry Gallis, M.D.
Mayrie Grimm
Jean Hollebhone
Bruce Hugo
Doug and Theresa Kennedy
Kathylou Klein
James Knowles
Fred Missbach
Network for Good
Naoko Nojiri
Ronald O'Brien
Nadine Pedersen

Frank and Taylor Slaughter
Nicholas Swicegood
Venice Area Orchid Society
Susan Wedegaertner

In honor of
— **Eugene A. Casey**
Thomas F. Henry, Orchid de Oro
— **Bruce Hugo**
Carolyn Pedone and John Rose
— **Ron McHatton**
Gloria Vanderhorst

In memory of
— **Guy Pyron**
Central East Texas Orchid Society

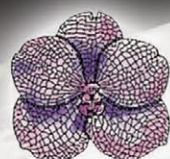
Permanently restricted
— **Conservation**
Michele Bournonville
Richard Palley
Heather Ferrill

— **Storm Award**
Venice Area Orchid Society

Temporarily restricted
— **Centennial Celebration**
Batavia Orchid Society
Chuck McCartney
Marilyn Strauss
Robert Fuchs
Naya Marcano-Cotarelo
— **Conservation**
Alexandra Palamara
Valerie Melanson
— **Research**
Valerie Melanson
— **Technology**
Greg Filter
Joyce Medcalf
Laura Newton

Orchids in Paradise

For the finest selection of quality orchids, exquisite gifts, stunning floral arrangements and more, visit R.F. Orchids, South Florida's oldest and most prestigious orchid firm. All of this awaits you in our tropical paradise.



R.F.
Orchids, Inc.

28100 SW 182 Ave. • Homestead FL 33030
T: 305-245-4570 • F: 305-247-6568 • www.rforchids.com



PRESIDENT'S MESSAGE

THIS IS MY last message as President of the American Orchid Society. As I write this, it is mid-May and most of us are still self-isolating and social distancing. There have been no shows or center judgments for the past two months. Judges are eager to get back to judging and hopefully by the time you read this message it will be safe to do so. Please support the orchid vendors you normally visit at shows by purchasing plants via email, phone or from their websites. We want and need our orchid vendors to survive during this time.

Also, because the spring 2020 AOS Members' Meeting was postponed, the election of officers did not take place as scheduled in April. The Board approved a bylaw change at its May meeting to allow electronic voting when a disaster such as the current COVID-19 pandemic occurs. You received a digital proxy for the election and a notice of the bylaw change in early June and I hope that you executed the proxy before the deadline. By the time you read this, the election will have taken place and our new officers taken their positions.

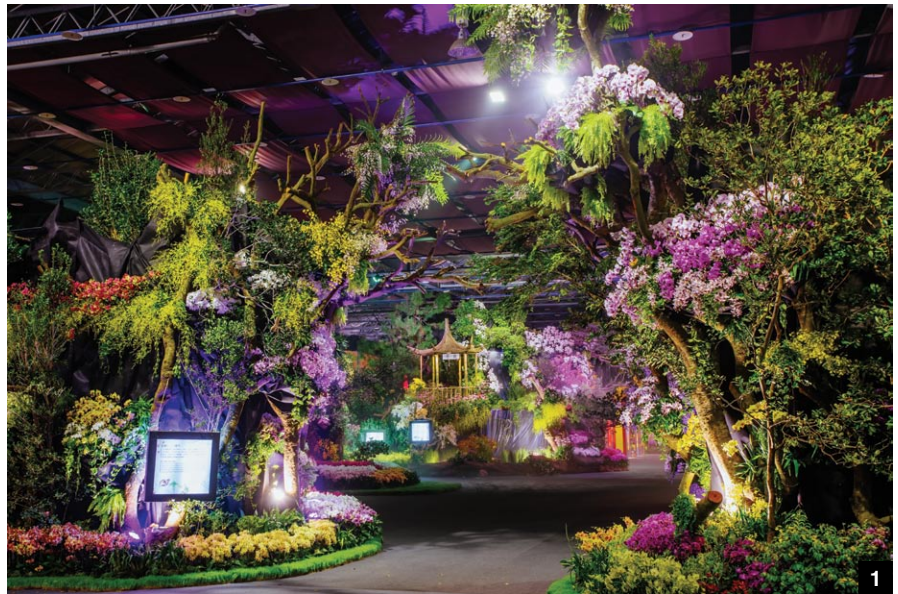
I hope you have enjoyed my messages for the last two years and two extra months, especially getting to know about the different committees that help the AOS survive and thrive. All committees have contributed to the growth of the AOS and for that I thank not only all of the committee members but the chairpersons who guide their committees.

Thank you to the Officers and the Trustees for your support while I was President. I appreciate your trust in me to guide the AOS for the past two years. And thank you for staying on some of those marathon go-to-meeting sessions we had. We always accomplished so much in those meetings.

To the Staff that not only works at our headquarters but also remotely from home, thank you all for what you do for the AOS. It has been a crazy year with shows and monthly judgments canceled.

On the bright side, we have increased our membership to just over 11,000 members. When I took over, we were just under 10,000. Our Facebook group membership has grown to over 41,000 in the same time period. Our hope is that some of those group members become members of the AOS. I am sure our Membership and Marketing Committee is working on a plan for those Facebook group members!

To you the members, I was proud to represent the AOS at the Taiwan



TAIWAN ORCHID GROWERS ASSOCIATION



SUSAN WEDEGAERTNER



NAYA MARCANO

International Orchid Show (once) and the Japan Grand Prix International Orchid and Flower show (Tokyo Dome show, twice). It was an honor to be introduced to the President of Taiwan last year and this year, to meet with the Emperor and Empress of Japan. Both shows are beyond belief in how the exhibitors build their exhibits and how well they grow their plants. I have made friends in both countries and I still correspond with them.

While your president, I was lucky enough to participate in the United States Post Office first release of the ten new native orchid stamps held at our AOS library at the Fairchild Tropical Botanic Garden. How many people can say they have done that? It was a fun event and all of the speeches had conservation as a theme. Also, who can forget the picture of me, directly in front of an orchid arrangement that makes it look like I am

- [1] Just one of the six landscapes making up the Taiwan Orchid Growers Association (TOGA) display at the 2018 Taiwan International Orchid Show. Photograph courtesy of TOGA.
- [2] A tiny piece of the massive show that is the Japan Grand Prix.
- [3] AOS President, Susan Wedegaertner, speaking at the USPS stamp reveal ceremony.

wearing an orchid headdress!

When I started growing orchids, I never imagined that I would one day become an orchid judge or become chair of a judging center or become the treasurer of the American Orchid Society and I really never imagined I would become its President. I am only a hobby grower who enjoyed growing orchids with my father. My dad had so much fun attending orchid

shows with me and getting to know the vendors who became friends. He attended monthly judgments with me and met more orchid people. He loved talking about orchids with people and increasing his knowledge. I am a lot like him, when it comes to meeting people and talking orchids.

So, thank you all for your support and confidence in me to be the President of the American Orchid Society.

— Susan Wedegaertner, AOS Immediate Past-President (email: susan@aos.org).


The American Orchid Society is proud to endorse the following Better-Gro® products:

- 4 and 8 quart special orchid mixes
- 8 quart phalaenopsis mix
- 8 quart orchid bark
- 1/8 BU. vanda mix
- orchid moss
- 1 pound orchid plus fertilizer
- 1 pound orchid plus bloom booster

See www.better-gro.com for a retail outlet in your area.



American Orchid Society
Education. Conservation. Research.



CYMBIDIUM SOCIETY OF AMERICA

A world of cymbidiums, paphiopedilums and phragmipediums

\$35/year US
\$55/year outside the US
CSA Membership
5710 Hollister Ave, #270
Goleta, CA 93117

www.cymbidium.org



DYNA-GRO
ADVANCED SCIENCE SIMPLIFIED



Orchid-Pro
LIQUID PLANT FOOD
7-8-6

The Only Complete Plant Nutrition Solution for Orchids

www.dyna-gro.com

IX International Conference on Orchid Conservation "Soroa 2021"

THE SOROA BOTANICAL and Orchid Garden and the University of Artemisa announce the IX International Conference on Orchid Conservation "Soroa -2021," which will take place November 22–27, 2021 at our facilities.

The Symposium will feature scientific panels addressing such topics such as:

- In situ and ex situ Conservation
- Ecology and Population Dynamics
- Systematic
- Invasive Species
- Biotechnology
- Environmental Education

The Organizing Committee consists of:

- Dr. Carlos E. Suárez Ponciano. Honorary President
- Ms.C. José Lázaro Bocourt Vigil, President of the Organizing Committee (bocourt@upr.edu.cu)
- Dr. Elaine González Hernández, Vice-president of the Organizing Committee (egh75@upr.edu.cu)
- Dr. Ernesto Mujica Benítez, Scientific Secretary of the Organizing Committee (emujica@upr.edu.cu)
- Ms.C. Esther Liliam Santa Cruz Cabrera, Executive Secretary of the Organizing Committee (lilyscruz@ecovida.cu)

For more information on the Conference, contact Dr. Lawrence W. Zettler (lwzettler@ic.edu) or Dr. Ernesto Mujica Benítez Scientific Secretary (emujica@upr.edu.cu).

Our sponsors:

- Red Nacional Jardines Botánicos – Cuba
- Grupo de Especialistas en Plantas Cubanas
- Sociedad Cubana de Botánica Planta!
- Jardín Botánico Nacional Universidad de La Habana
- UPSA Alejandro de Humboldt
- ECOVIDA
- Parque Nacional Guanahacabibes
- Iñales Parque Nacional
- Sierra del Rosario Reserva de la Biosfera
- Illinois College
- Reima Red Iberoamericana de Medio Ambiente
- Universidad de Alicante Departamento de Ecología
- Naples Orchid Society

July: The Month of Zoom

By Thomas Miranda

FOR BETTER OR worse, for richer or poorer, in sickness or in health, we have made a covenant with each other to pull ourselves out of our current situation. As the economy opens, we still do not know whether venturing out is the correct decision or not, but surely, either option has its drawbacks and devils. I, for one, lament the cancellation of so many orchid events, many of which I had been looking forward to for several years. These events bring us closer to friends, educate and inform us, and expose us to new species and marvels of horticultural prowess that inspire us, feeding our deep passion for the Orchidaceae. Nonetheless, our covenant with each other tacitly proclaims that even one unnecessary, preventable death is one too many.



Thomas Miranda

A type of tool has emerged to allow us to still engage with each other while practicing social distancing: digital meeting apps such as Webex and Zoom. Most of us have attended several virtual meetings in the past few months and probably have many more in our future. Our Society in Hilo still zooms regularly. With a little extra planning, we have fabulous presentations, AOS webinars, discussions, virtual nursery tours and even “show and tell” with each member sharing their best bloomers over their computer cameras. While this is certainly better than not meeting at all, and we should be grateful that such technology exists, humans are gregarious animals. We need our friends and social interaction to really thrive. I think we all appreciate our beautiful friends more than ever. I cannot wait to play with my orchid friends again! Let us hope that soon Zoom will return to being used for meetings we cannot attend due to geographical distances rather than social distancing.

CELEBRATIONS The summer, usually full of festivities, cookouts and vacations may be on hold for many of us. Even so, most orchid growers are also avid gardeners and are likely tending to the best plants and gardens in our lifetimes. Our homes have become our refuges. With so much beauty all around us why not do a small-scale celebration of close friends and family? There are fewer

orchids blooming in the heat of summer, but those that are can be amazing. Encyclias, schomburgkia-type laelias and myrmecophilas with their long-stemmed inflorescences are bursting with colorful blossoms, like fireworks exploding. Many showy oncidiums such as *Oncidium sphacelatum* are cascading from trees and overgrown pots. Other warmth-loving orchids such as vandas and many bulbophyllums are thriving and throwing new spikes all around us. Make sure blooming plants have adequate moisture during these hottest of days.

EMERGENCIES Most of your spring flowering orchids are rapidly putting on new growths and leaves. Cattleyas and dendrobiums appreciate some feeding this month as their new leads may be several inches long by this time. A little boost in nutrition will help those growths to mature and harden. At this time, such growths are often still tender, brittle and easily broken off, so make sure they have a stable place, safe from getting knocked over by the wind, by a strong stream of water, or by a dazed, distracted orchidist (you) zooming around in the growing area. Phalaenopsis should have one or two leaves emerging from their crowns by now. These are also usually quite tender and subject to pathogens and physical damage. Make sure that any water sitting in phalaenopsis crowns are either dried off by midday or tipped out so that no standing water is there later in the day. This is a surefire way to culture bacterial rots, particularly when the weather is warm.

CHILLING TIMES Many montane and temperate orchids do not deal very well with the stress of high temperatures that generally start to appear this month. Although many invest in expensive equipment to keep their temperatures in the normal, acceptable range for the species and hybrids they grow, there are a few strategies we can use to at least reduce those environmental pressures without breaking the bank. On the hottest days, make sure that most orchids are sheltered from direct sun. For many, even a deeper shade may be advisable. Here in Hawaii, the sun can be truly intense. Many plants that easily take bright light, such as many brassavolas, do much better shielded. Gentle air movement also alleviates heat stress so something as simple as a small



Epidendrum kockii ‘Marc’ AM/AOS. Apparently endemic to Ecuador, this attractive miniature, cool-growing species was only described in 1999. Briefly in cultivation around the time the species was described, it was not until 2013 when plants began to reappear in collections. Exhibited by Dennis Olivas at the 2019 California Sierra-Nevada Judging Center’s Speaker’s Day; photographer: Ramon de los Santos.

oscillating fan in the growing area can be helpful. Occasional light misting can also be beneficial; however, you must be aware that overdoing misting can also cause plants to open their stomata during the day, which will only cause them to desiccate faster and risk bacterial or fungal rot if not dry by dusk.

SHELTER IN PLACE Although I advise most Northern Hemisphere growers to keep their plants outside in dappled light for the summer, July and August temperatures can be brutal to cooler growing orchids. It may be advisable to bring truly heat-sensitive plants, such as miltoniopsis or masdevallias, into an air-conditioned room or windowsill, at least until the dog days are over.

— Thomas Miranda has been working professionally with orchids for over three decades. He is an AOS accredited judge and is the chairman of the American Orchid Society’s Conservation Committee (email: biophiliak@gmail.com).



American
Orchid Society

100th

ANNIVERSARY
1921-2021



American Orchid Society
Education. Conservation. Research.

Soluble Salts

Text by Sue Bottom/Photographs by Terry Bottom

GOOD QUALITY WATER is the holy grail for orchid growers. The better your water, the better your orchids will grow and the greater the variety of orchids you will be able to cultivate. Good quality water should contain a low level of soluble salts. Salts dissolved in water gradually accumulate in potting media and around roots with every watering cycle. If not flushed from the pot, salts can build up to toxic levels and cause root tip burn, which limits root growth.



Sue Bottom

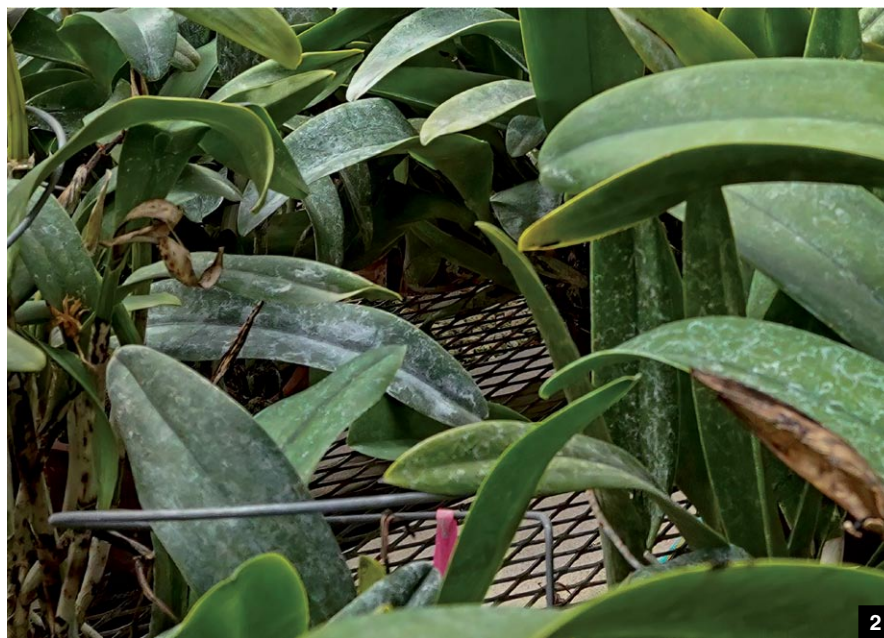
SOLUBLE SALTS There are two standard measures of the soluble salt content in water. Electrical conductivity (EC) is a measure of water's capacity to conduct electricity and a direct measure of the concentration of various ions in water, measured in mS/cm with an EC meter. Total dissolved solids (TDS) is most accurately measured in the laboratory by evaporating a fixed amount of water and weighing the solids left behind. Most hobbyist meters use a conversion factor to calculate TDS in parts per million from the measured EC. Knowing the soluble salts content is the first step in evaluating the suitability of your water for growing orchids.

Soluble salts can be beneficial, benign or potentially toxic. Calcium and magnesium are macronutrients required for essential plant growth processes but in high enough concentrations, they can interfere with the uptake of other nutrients. Bicarbonate and carbonate compounds (measured as alkalinity) are not nutrients. They act like lime and can accumulate in potting mixes, driving up pH and making important nutrients more difficult for roots to absorb. Some substances, such as sodium, chloride and boron, are required in very small amounts for plant metabolism, but are toxic for orchids even at levels where water is acceptable for human consumption. Saltwater intrusion is a major cause of high sodium chloride concentrations, but not the only one.

BEST WATER Water with EC levels below 0.25 mS/cm (a TDS less than 175 ppm) is considered excellent for orchids. With this high-quality water, you can grow



1



2

just about any type of orchid, even the cloud forest types such as pleurothallids that are sensitive to even low levels of soluble salts. Rainwater, distilled water and water produced in reverse osmosis units are very pure. Some fortunate individuals have wells or public water supplies that supply excellent water quality. Pure water contains very little buffering capacity to resist changes in pH. Over time, the degradation of organic materials in potting

- [1] The three most important aspects of orchid growing: water, water, water.
- [2] Hard water staining on orchid leaves is an early warning that your water contains elevated salt levels. Have your water analyzed!
- [3] If your water is high in soluble salts, avoid mixes containing peat or sphagnum moss, which tend to accumulate salts.

Quality	Electrical Conductivity (mho/cm)	Electrical Conductivity (mS/cm)	Total Dissolved Solids (ppm)
Excellent Quality, You Can Grow Everything	$<25 \times 10^{-5}$	<0.25	<175
Good Quality, You Can Grow Many Orchids	$25-75 \times 10^{-5}$	$0.25-0.75$	$175-525$
Questionable Quality, Grow Only Toughest Orchids	$75-125 \times 10^{-5}$	$0.75-1.25$	$525-875$
Unsatisfactory Quality, Find a New Water Source	$>125 \times 10^{-5}$	>1.25	>875

Conductivity is a measure of water's capability to conduct electricity, which is directly related to the concentration of ions in water. It is usually measured in microsiemens or millisiemens per centimeter ($\mu\text{S/cm}$ or mS/cm), although older references use the unit mho. One siemen is equal to one mho.

Total dissolved solids (TDS) is the amount of all ion particles dissolved in water, reported in units of mg/l or ppm. TDS can be measured by gravimetry (with an evaporation dish) or calculated by multiplying a conductivity value by an empirical factor, typically between 640 and 700 ppm TDS per unit of conductivity in mS/cm depending on which ions are present; the conversion above uses a factor of 700.

Sources: (Davidson 1967, Sheehan 2002).

media generates acidity and acid reaction fertilizers likewise increase acidity. Pure water requires a fertilizer that maintains the desired slightly acidic conditions around the roots, without imparting too much acidity. A Cal-Mag fertilizer such as a Peter's Excel 15-5-15-5-2 does best with this pure water. It has a slightly basic reaction and supplies necessary calcium and magnesium that are often absent from pure water sources.

GOOD WATER Good quality water ranges in EC from 0.25 to 0.75 mS/cm , roughly equivalent to a TDS level between 175 and 525 ppm. Many orchids will grow well with this good quality water, except perhaps for some of the more sensitive cloud forest types. Many municipal water supplies produce good quality water, although in our area of Florida only a few of the municipal systems meet this standard. Even with good quality water, the potential exists for sodium, chloride and boron levels to be present at excessive levels. Many fertilizers are suitable for good quality water. Choose one that has about 75% of its nitrogen in the nitrate form. Calcium and magnesium supplements may be necessary depending on the water quality analysis.

QUESTIONABLE WATER Water with an EC between 0.75 and 1.25 mS/cm (roughly equivalent to 525 to 825 ppm TDS) is considered marginally suitable for orchids. Questionable water quality will limit the types of orchids you can grow. Stick to the toughest genera, such as the cattleya alliance. Questionable water quality is typical of many private wells as well as the majority of the public water supply systems in our area of Florida. At these elevated EC levels, it is



imperative to know which soluble salts are present in the water. If there are high bicarbonate and carbonate levels (which could also be measured as alkalinity), you have the potential for the root zone to become more and more alkaline with each watering. Once the root zone pH becomes too high, essential elements will be insoluble and not available for uptake by the plant. For this type water, use a fertilizer in which the ammonium form of nitrogen comprises about 40% of the total nitrogen, the rest as nitrate nitrogen. Excessive amounts of sodium and chloride can be toxic to your orchids even at levels acceptable for human drinking water.

UNSUITABLE WATER Water with an EC over 1.25, equivalent to a TDS greater than 875 ppm, and water that contains toxic levels of sodium and chloride should not be used on your orchids. You should

find an alternate water source or treat your water to remove salts.

Consider having your water analyzed. The data will tell you whether you can modify your cultural practices to adapt to the limitations of your water, or whether there are specific ions present in toxic amounts that will force you to seek out an alternate water source. St. Augustine Orchid Society member Linda Stewart identified and corrected the problem with her excessively salty water by installing a rainwater collection system (read her companion article for details). James Arnold of the Jacksonville Orchid Society went a different route, installing a reverse osmosis system to remove salts. His companion article will give you some things to consider, should you decide to go that route.

The problem with elevated soluble

salt levels is that orchids are efficient scavengers of nutrients. In their natural environment, mineral nutrients are rare, so orchids have evolved to absorb every atom they encounter, potentially producing toxic levels in their tissues in cultivation. You can compensate to a degree for elevated salt levels with your cultural practices. Do not use this water for misting or for overhead watering. Use dilute fertilizer solutions. Water more frequently than you might otherwise to prevent the medium from completely drying out and concentrating salts. Use plastic containers that will not absorb salts. When you water, do so until water runs through pots and then water some more. Flush pots regularly. Salts can be flushed more easily from open, freely draining potting mixes than they can from water-retentive mixes containing sphagnum moss or peat, which tend to accumulate salts. Get in the habit of watering and fertilizing and then water a second time an hour later, ideally with rainwater if you have it. Move plants outdoors in the summer so they can be flushed naturally with rainwater.

I have struggled for many years with the quality of my well water. The EC/TDS levels are in the questionable range and

the alkalinity is very high. High alkalinity levels in water causes a buildup of lime salts (i.e., high pH in media). The pH around roots needs to be in the slightly acidic range for best absorption of nutrients. Many alternate water sources have been tried. The pond that acts like a big cistern produced good quality water, but pathogenic organisms were present in this surface water. Citric acid was added to well water to remove some bicarbonates but the elevated level of sodium and chloride ions made growing certain genera, such as dendrochilums, problematic. We have since installed a reverse osmosis system to treat the well water used in the house and in the greenhouse and are very pleased with the results.

If you know only one thing about your water, know what the soluble salt content is. Good quality water containing low levels of dissolved salts will allow you to grow many different genera of orchids. You can compensate for somewhat elevated levels by adjusting your potting mixes and watering habits. For those unlucky few whose water is unsuitable for orchids, collecting rainwater may be a cost-effective solution. Understanding the implications of the soluble salt level

in your water will help you grow the best and healthiest orchids.

— Sue Bottom started growing orchids in Houston in the mid-1990s after her husband Terry built her first greenhouse. They settled into St. Augustine, Florida, Sue with her orchids and Terry with his camera and are active in the St. Augustine Orchid Society, maintaining the society's website and publishing its monthly newsletter. Sue is also a member of the AOS Editorial Board (sbottom15@gmail.com).

Citations and Additional Reading

Davidson, O.W. 1967. Orchid Ailments Not Caused by Insects or Diseases. *Orchids*. 36(6):464-475.
 Gripp, P. 1965. A Gripp on Growing — Good Growing with Poor Water. *Orchids*. 34(10):887-888.
 Sheehan, T.J. 2002. Physiological Disorders of Orchids. p. 7. In: T.J. Watson, editor. *Orchid Pests and Diseases*, Rev. Ed. American Orchid Society, Delray Beach, Florida.
 Spechler, R.M. and P.S. Hampson. 1984. Ground-Water Resources of St. Johns County, Florida. Water-Resources Investigations Report 83-4187, US Geological Survey. <https://pubs.usgs.gov/wri/1983/4187/report.pdf>. Accessed February 20, 2019.
 Swistock, B.C. 2016. *Interpreting Irrigation Water Tests*. <https://extension.psu.edu/interpreting-irrigation-water-tests> Accessed January 30, 2019 from Penn State Extension.

Reverse Osmosis Water

AFTER A BITE from the orchid bug in 2006 I rather quickly found slipper orchids. Oh, I had others too but paphiopedilums and phragmipediums were my favorites. After some plants died and others were barely hanging by a thread, I became concerned that the chemicals added to the municipal water system were in part to blame.

I decided to switch to well water. What could be better than water from Mother Earth? After a few months of using well water, things got worse. Most of the plants stagnated and some died. I tried everything: more light, less light, different fertilizers. Nothing seemed to make much difference. A commercial grower suggested sending a sample of the well water to a lab for testing. After reviewing the results with a few commercial growers and fellow Society members, it became obvious that the well water was less than desirable. The high alkalinity coupled with the high calcium, sodium and chloride levels were not good for slipper orchids.

Time for more drastic changes. With the greenhouse filling up with more



and more expensive species and hybrids, I could no longer just let them limp by on water of questionable quality. I installed a 100-gallon (379-L) per day reverse osmosis (RO) system. Treated municipal water rather than the well water is first run through a water softener system to remove the calcium and magnesium

minerals responsible for fouling the membrane. The RO system is a three-stage unit with a sediment filter, carbon filter, and the RO membrane.

How does it work? Water is forced through the membrane with the help of a pressure-boosting pump. The pump increases the pressure 10 to 15

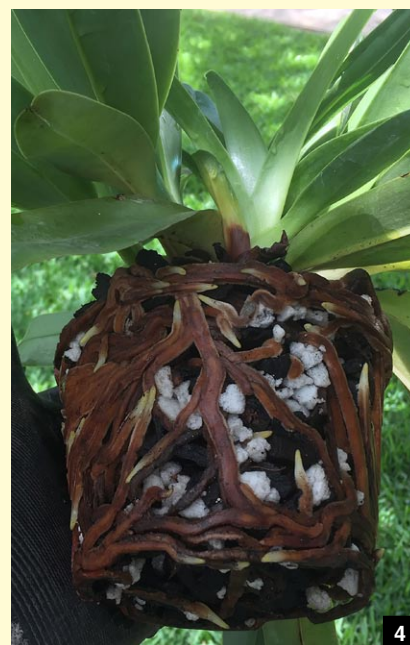
psi, a must in the winter when the source water is colder, which slows production. The membrane removes the solids that are dissolved in the water. Afterward, the water has less than 10 parts per million (ppm) total dissolved solids. The clean water is stored inside the greenhouse in a 100-gallon (379-L) container used on farms for watering livestock, covered with plywood to keep out the light and control algae growth. Water is pumped directly from the farm container with a ½-HP sump pump and a 20-foot (6.1-m) hose with a wand and low-pressure water breaker.

Reverse osmosis water is very pure so fertilizing is a must. I feed at every watering with 15-5-15-5-2 Cal-Mag formula at 50 ppm nitrogen. The calcium and magnesium in the fertilizer are in the nitrate forms. They are readily available to the plants. Because RO water has no buffering capacity, the pH of the diluted fertilizer mixture drops into the 3s, about the same as orange juice. A potassium silicate product is used to raise the pH back up to 5.5 or so. This also provides silica to the plants that was removed from the source water by the RO system.

In the winter the water may need to be heated, even when storing treated water in the greenhouse, which is kept at minimum 50 F (10 C). Cold water can shock plants and may slow or halt growth all together. Two 30-gallon (114-L) aquarium heaters are used to heat the water to 65–70 F (18.3–21.1 C).

The pH of the medium should be checked on a regular basis. High nitrate fertilizers may cause a rise in pH out of the desirable range of 5.4–6.2. A few plants are checked each month with the pour-through method using steam-distilled water. First, water the plants well, wait about half an hour then pour enough distilled water through the medium to get about an ounce (29.6 ml) of water. Test the water with a portable meter, such as the Blue Lab Combo meter. It may be necessary to rotate in a more acidic-formula fertilizer to help maintain the pH in desired range.

The RO system is not without its negatives. Storage of RO water can be an issue. If not for the space taken up by the RO container, there could be



another small table for seedlings. Waste is a concern; some units use 4 gallons (15 L) of water to make 1 gallon (3.8 L) of clean water, although the newer units may be more efficient. Water shortage could be a problem in the summer because the unit cannot meet the increased water requirements, so plan ahead and buy a bigger unit than you need today. Collections tend to grow and so will the water consumption. Also remember that in the winter it takes longer to produce because of cooler water temperatures. The sediment and carbon filters should be changed on a three-stage unit every three months, at a cost of about \$15. The membrane can last up to five years, but I change it every year, purchasing

- [1] The author's greenhouse from the inside.
- [2] The author's 100-gallon (379-L) per day RO unit.
- [3] A 100-gallon (379-L) container to hold RO water.
- [4] Typical root system of paphiopedilums grown with RO water.

a replacement on Amazon for approximately \$25.

Clean RO water has been good for my plants, rewarding me with a few AOS awards, four of which are cultural merit awards. Coupled with dedication and attention to detail, RO water might be the answer to your water woes.



James Arnold is an active member of the Jacksonville Orchid Society; 1851 Burkholder Lane, Jacksonville, Florida, 32216 (email: jgroundskeeper@aol.com).

— James Arnold grows a variety of orchids in his backyard greenhouse, and is particularly fond of *paphiopedilums*. He



Paphiopedilum Saint Swithin 'Jake Butler' AM-CCM/AOS. Photograph by Art Russell

Rainwater Collection A Solution for Poor Water Quality

MY ORCHIDS AND I moved late last summer, from living in the country with a small greenhouse to a home in town. Upon examining the City's most recent water quality report, it became clear that the local city water was no better than what I had experienced with well water impacted by salt water intrusion in an agricultural area. Since a rainwater collection system was the answer for my orchid collection there, the decision to duplicate it on a smaller scale here in town was an easy one.

COLLECTION SYSTEM There was a gutter system in place across the back of the house. The backyard is quite small and there was just no place to hide or disguise the rainwater collection tank, so it was placed at the far end of the gutter. I obtained a 330-gallon (1,250-L) rectangular, high-density polyethylene container, also known as an IBC tank, that had previously been used for rainwater collection. It was so full of algae that it had to be thoroughly cleaned and disinfected prior to being



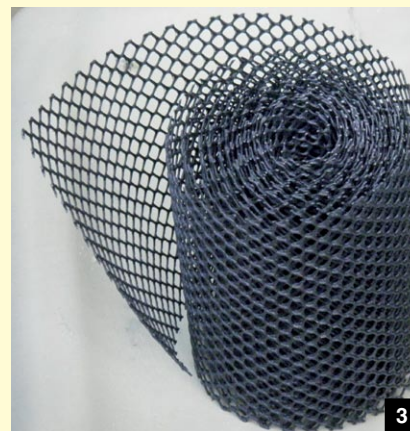
put into service. A strong pool algaecide was used, and once it was mounted on a cinderblock platform, the container was filled and left to soak for about a week, after which it was drained and pressure washed on the inside. Once dry, it was

[1] Rainwater collection tank ties into roof downspout.

painted to blend in with the house, using a paint that adheres to plastic. Painting not only helps to blend into the landscape, it will keep out sunlight and prevent algae buildup in the tank. The tank was connected to the downspout, using flexible downspout tubing and a debris catcher to prevent debris and oak leaves from entering the tank. A piece from a roll of downspout filter was placed in both ends of the gutter, right over the downspout connection to further inhibit the intrusion of debris and leaf litter.

If the water container is left unpainted or not completely enclosed, you may experience problems with algae, particularly during the hot summer months. This can be prevented by the addition of an algaecide such as GreenShield, Physan 20 or pool algaecide, all of which contain quaternary ammonium compounds. The Physan label recommends 1 teaspoon per 52 gallons (5 ml/197 L) of water for controlling algae in birdbaths, fountains and other water containers. Because my container is enclosed, algae issues are minimal, so I tend to use less and then only once or twice a year. Please bear in mind that this algaecide is not recommended to be used on food crops or with fish.

DELIVERY SYSTEM The next step was to get the rainwater to the orchids with enough water pressure to utilize a Hozon siphon system to automatically add fertilizer when watering. The IBC tank comes equipped with a gate valve at the bottom, so with the use of PVC reduction couplings, a PVC line was installed from the IBC tank, first to a filter to trap any sediment and then on to the pump. To prevent the pump from cycling too frequently, a 2-gallon (7.5-L) pressure tank was added between the pump and the homemade faucet. Because the small filter and the connection at the pump are both ½ inch (12.7 mm) in diameter, ½-inch (12.7-mm) PVC was used from the tank to the pump inlet valve. After the pump, the PVC diameter was increased to ¾ inch (19 mm) for better water pressure and Siphonex function. The Shurflo pump is a 3.0 gpm (11.4 lpm), 45 psi, ½ npsm, 115 V with electrical cord. The pump was mounted on a piece of wood to minimize vibration when the pump is running, and attached to the PVC with flexible connectors. The pump is housed



- [2] Flexible downspout tubing with debris catcher from gutter to tank.
- [3] Downspout filter placed in both ends of gutter to catch debris.
- [4] Pump to move water from storage with a bladder tank to help prevent pump from cycling.
- [5] Rain barrel used for handwatering orchids.
- [6] Miniatures on wire rack do well with rainwater.

under a large plastic bin with an opening cut into the side for ventilation. Please note that hose length for best utilization of the Siphonex system should not exceed 35 ft (10.7 m). Use a water breaker such as a Dramm 170.

I also have a 55-gallon (208-L) rain barrel to use for hand watering that I

brought from the old house. It was repainted to blend in with the new house, and placed on a cinder block platform at the opposite end of the gutter system. Although there are a number of brands and types of downspout converters available on the market today, a DIY Downspout Diverter was selected. The kit comes complete with a spigot, rubber grommets, hole saws, diverter, connection hose and a downspout cover for freezing weather. The diverter is inserted into a small hole drilled into the side of the downspout. When completed, the system is very unobtrusive and only requires ½ inch (12.7 mm) of rain to fill the drum. Once full, the rain diverts back to the downspout so the rain barrel never overflows.

Although my orchids are still adjusting to their new home, they have successfully survived their first winter. The addition of a rainwater collection and watering system has definitely minimized the impact of the environmental change from a semiautomated greenhouse to backyard growing.



Linda Stewart — Linda Stewart has grown orchids in many locations, as her career has taken her from Hawaii to Florida with a few stops in between. She is now happily growing her oddities in Palatka, Florida, where she is an active member of the St. Augustine Orchid Society; 1812 Diana Drive, Palatka, Florida, 32177 (email lindstew@hotmail.com).



- [7] Orchids on benches and hanging on rack by fence.
- [8] Orchids on benches under the eaves enjoying their new home.
- [9] The pergola is home to many orchids, covered with a retractable clear tarp during the winter months.

The SITF at Work

by Joe Bryson and Ron McHatton

Paphiopedilum primulinum var. *primulinum*

YOU MAY WONDER why the Species Identification Task Force (SITF) asks for such detailed information and photographs. Leaves, plant size and structure are usually key measurable characteristics that separate a species from similar species but sometimes a seemingly insignificant characteristic may be the key to a species' correct identification. For example, the placement of horns or teeth on the column of an *Encyclia* may clearly separate one species from others. If we cannot see the column clearly, we may not be able to properly identify the plant. Sometimes even the color of the roots or the surface texture separate species. Photographs of the plant with details of the leaves (are the tips of the leaves bilobed or acuminate?) and these "hidden" features are often missing from the information we get. Most are concerned with the flower images, because that generally is what prompted the judges to give the award. Another very useful bit of information, often overlooked, is the provenance of the plant. Many taxonomists will not even begin the search if they do not know the origin of the plant. For example, last month's discussion involved our verification of *Tainia latifolia* subsp. *elongata*. The critical piece of information allowing the determination of subspecies was the knowledge that the plant originated in Java. *Tainia latifolia* is widespread throughout Asia but subsp. *elongata* is only known from Java and Sumatra.

On to the topic of a *Paphiopedilum primulinum* submitted to SITF in April 2020. One of the most critical features in differentiation of *Paphiopedilum* species is the shape and texture of the staminode and one of the most often overlooked photographic subject. In addition, number of leaves, their shape and color, floral warts, hairs on the leaves or peduncle and number of flowers are important. In this particular case, the photography provided was superb; so sharply focused and of sufficient resolution that exacting details were clear. The measurements of our submission were provided along with several photographs. The description of *P. primulinum* stated the size of the flower varies from 2.4–3.1 inch to (6–8 cm) wide and this flower measured 3.1 in (8 cm) wide. A magnified close-up of the staminode was included and the



BRYAN RAMSAY

details were remarkable. The brilliant green staminode clearly showed a pebbly surface, like leather on a football, as well as the "shield" shape — an exact match to the line drawing (Cribb 1998). The hair on the staminode and petals was so clear and distinct that one could easily count them. A clear photograph of the plant leaves and inflorescence was provided. The leaves of *Paph. primulinum* are described as green with pale veining and cilia at the

[1] The superb photograph of *Paphiopedilum primulinum* var. *primulinum* 'Whalloper' AM/AOS grown by Ron Biancosino and awarded at the National Capital Judging Center monthly judging on March 7, 2020.



BRYAN RAMSAY

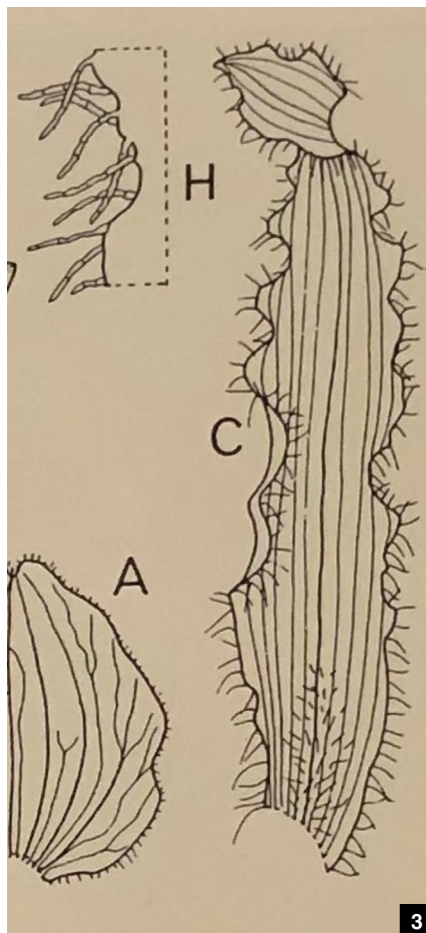
base; clearly visible in the photograph of the submitted plant. The description of the species indicates the inflorescence to be 7.9–13.8 in (20–35 cm) long, green and pubescent. That of the submitted plant is 10 in (25 cm) long and the pubescence of the inflorescence can easily be seen in the high resolution photograph of the plant.

The clear match of the staminode to published photographs and line drawings, as well as multiple other features of the foliage and flowers left no doubt that the submitted plant is *Paphiopedilum primulinum*. There are two described forms of the species; var. *primulinum* with clear yellow or green flowers devoid of purple markings, green peduncle and unmarked leaves and var. *purpurascens* distinguished by purple-flushed flowers, purple peduncle and leaves whose undersides are marked purple. The clear yellow flowers, green peduncle and unmarked leaves establish this plant as *Paphiopedilum primulinum* var. *primulinum*.

Start to finish, (award date to verification) six weeks. If only all our submissions were this easy.

References

Cribb, P. 1998. *Paphiopedilum primulinum*. The Genus *Paphiopedilum*, Second Edition, p. 206–209. Natural History Publications (Borneo), Kota Kinabalu in association with the Royal Botanic Gardens, Kew.



3

- [2] A superbly focused close-up photograph of the staminode and petals was instrumental in verifying the identity of the species. Note the clear match to the line drawings of both staminode and petal. The staminode clearly matches the more or less square lower corners, apiculate structure at the end of the staminode and the pattern of short hairs on the upper rim. The line drawing (inset) is the staminode of *Paphiopedilum primulinum* by Valerie Price from Cribb's *The Genus Paphiopedilum* Second Edition, page 208.
- [3] Line drawing of the petal, including marling detail, of *Paphiopedilum primulinum* by Valerie Price from Cribb's *The Genus of Paphiopedilum* Second Edition, page 208.

Spots and Stripes

Orchids supplement for 2020

coming this October!



featuring

Spotted Vandas
by Robert Fuchs

Harlequin Phalaenopsis
by Steve Gonzalez

Spotted and Striped Masdevallias
by Marguerite Webb

Cheetahs of the Cattleya World
by Laura Newton

***Dendrobium bifalce* and Striped Dendrobiums**
by Pam Porteous
and much more!

join today  www.aos.org

American Orchid Society
Education. Conservation. Research.

COLLECTORS' ITEM

Bulbophyllum Section *Lepidorhiza*

Text and photographs by Charles Wilson



MOST ORCHID GROWERS are always interested in flowers that last for a long time — or that bloom repetitively over a long time period. There is a section of the genus *Bulbophyllum* (*Lepidorhiza* Schlechter 1911) that fulfills these requirements with colorful flowers appearing successively over four to six months on an elongate inflorescence. On the down side, they regretfully do emit a bit of an offensive putrid odor, but to be offended you really have to put your nose in them. While the plants overall are somewhat on the larger size with leaves to 12 inches (30 cm), the 4-inch (10 cm) pseudobulbs grow very closely together, making them quite suitable for growing in a pot.

With about 28 species in the section, they occur in forests from sea level to about 6,200 feet (1,900 m) in Borneo, Sulawesi, the Philippines, Moluccas, New Guinea and the western Pacific Islands. Species in this section prefer warm growing conditions with minimum night temperatures of 65 F (18.3 C). The Philippines appears to be the center of distribution for this section, with 12 species recorded there.

Some taxonomic confusion may be encountered among some of the species that have historically been several species lumped into one, only to later be again divided into several species. Of particular note is the species *Bulbophyllum levanae* and its associated complex of closely related species (*Bulbophyllum basisetum*, *Bulbophyllum nymphopolitanum* and *Bulbophyllum trigonosepalum*), which can apparently only be discerned based on the distribution of papillae on the lip and the absence or presence of differently shaped and sized tiny appendages at the sides of the base of the lip. Interestingly, these tiny side lobes appear to serve to trap the pollinator from escaping by sideways movements, thus any struggling assures the sticky pollen mass is firmly attached (and hopefully later deposited on another flower).

And further taxonomic confusion may be encountered with *Bulbophyllum amplebracteatum* and its diverse listing of subspecies and varieties often found in the market labeled as full species (e.g., the subspecies *carunculatum* and *orthoglossum*).

The species of this section typically send out a basal inflorescence as long as 25 inches (65 cm) with as many as 12 or more sequential flowers emerging over six to eight months with each flower lasting two weeks or longer. Single flowers



range in vertical size from less than 2 inches (5 cm) with *Bulbophyllum cootesii* to an amazing 19 inches (48.5 cm) in *Bulbophyllum echinolabium*.

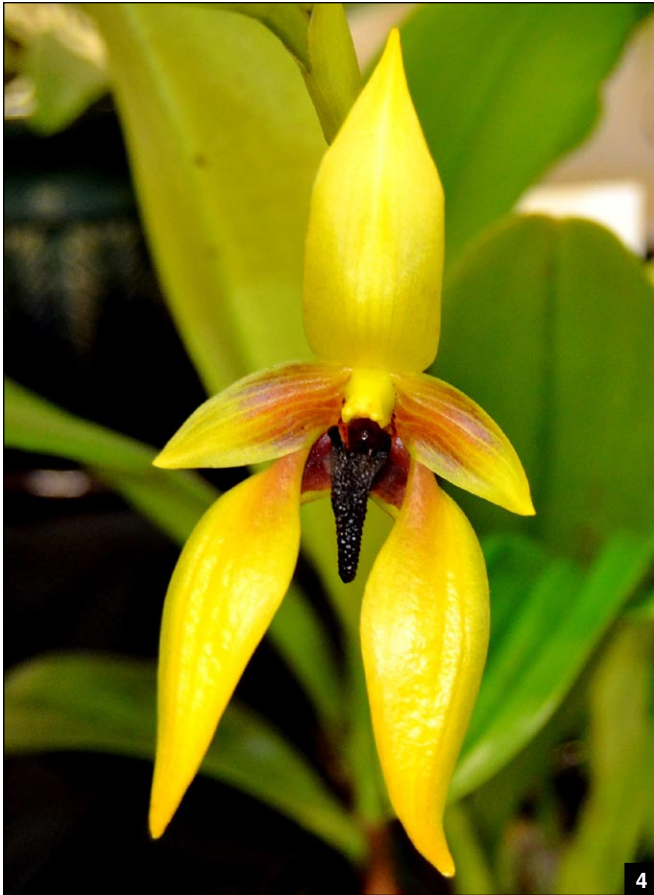
CULTURAL CONSIDERATIONS *Light level* Like most *Bulbophyllum*, members of this section thrive in bright, indirect light. Many actually can enjoy the higher light levels often appreciated by some species of *Cattleya* if adequate air movement and humidity is provided.

Temperature The species in this section prefer warm temperatures with nighttime minimums of 60 F (15.5 C) and

[1] *Bulbophyllum amplebracteatum*.

[2] *Bulbophyllum amplebracteatum* can provide as many as 13 or more somewhat stinky flowers over six months or longer from inflorescences to 25 inches (65 cm) long, with pseudobulb and leaf lengths totaling about 12 inches (30 cm).

[3] *Bulbophyllum levanae* lends itself well to pot culture, with close growing pseudobulbs topped with leaves on a mature plant to a total of about 11-inches (28-cm) tall producing inflorescences to 10 inches (25 cm).



4



5

can tolerate higher daytime temperatures even into the 90s F (≥ 32.2 C) provided they have excellent air movement and high humidity. These species will grow year-round if kept warm and properly watered. Temperatures below 55 F (13 C), generally slows growth and can retard blooming.

Potting and watering Because *Bulbophyllum* species have threadlike or fine fibrous roots, a shallow layer of potting mix (we use seven parts small bark, one part small perlite and one part small charcoal) or a quality sphagnum moss atop an ample bottom layer of expanded polystyrene “peanuts” in a shallow pot or basket will provide the needed perfect drainage. This shallow amount of medium allows the grower to water nearly every day without much worry of rotting the roots, as well as the potting medium. This method of shallow potting closely resembles the way *Bulbophyllum* grow in the wild — on top of branches and trunks that dry out quickly. The advantage of this shallow rooting in nature is in capitalizing on the high humidity of the tropics coupled with morning dew. In nature they seldom totally dry out for long periods, even in the drier seasons.



6

[4] *Bulbophyllum amplebracteatum* subsp. *orthoglossum*.

[5] *Bulbophyllum amplebracteatum* subsp. *carunculatum*.

[6] *Bulbophyllum echinolabium* ‘Cosmos’ Chasus’ AM/AOS, with flowers at 19 inches (48.5 cm) vertical height, and a close up of its “spiny lip” (the Latin meaning of *echinolabium*).



7

[7] The closely growing pseudobulbs as seen here in *Bulb. echinolabium* ‘Swamp-prad’ AM-CCM/AOS show how floriferous this species can be in a 10-inch (25 cm) pot with leaf and pseudobulb combined lengths totaling about 12 inches (30 cm).



8



Charles Wilson

— Charles Wilson, retired Director of the Memphis Zoo, is an accredited AOS judge in the Pacific Northwest Judging Center and has been growing orchids for over 40 years. He and his wife Susan, also an AOS judge, are members of both Conservation and Education Committees and he serves on the SITF. They have led many safaris worldwide to support conservation. His orchid interests vary, bulbophyllums to paphiopedilums, and about everything in between (email: zoomeritus@gmail.com).

and his wife Susan, also an AOS judge, are members of both Conservation and Education Committees and he serves on the SITF. They have led many safaris worldwide to support conservation. His orchid interests vary, bulbophyllums to paphiopedilums, and about everything in between (email: zoomeritus@gmail.com).



9

- [8] *Bulbophyllum mearnsii* from the remote Indonesian island of Sulawesi produces inflorescences to 22 inches (55 cm) long, each producing six or more sequential flowers with acutely reflexed petals that some authors speculate may be to protect the ovary from insect attacks.
- [9] *Bulbophyllum mandibulare* from Borneo is a compact growing species with combined pseudobulb and leaf length up 13 inches (33 cm) whose three to five sequential flowers are carried on inflorescences to 18 inches (45 cm). It is characteristic of the species that often the flowers do not appear to open fully.

The ultimate hobby-size fogging unit.

Hydro SS 700 series

Cool-Fog Units

- Tropical Humidification
- Evaporative Cooling
- Plug-In and Go
- 4 GPH Fogging
- Low Energy Cost
- Made in U.S.A.

AQUAFOG
1-888-889-4407 jaybird-mfg.com

Webinars-Coming Attractions!






When	July 14, 2020 8:30pm EST Tuesday	July 22, 2020 8:30pm EST Wednesday	August 26, 2020 8:30pm EST Wednesday	RECORDED WEBINARS at your convenience
Topic	Greenhouse Chat (Orchid Q&A) <i>Send in your Questions!</i>	Digital Resources Orchid Culture Insights from the Internet	<i>Maxillaria</i> Not just <i>tenuifolia</i> anymore	Culture, Judging, Pests and Diseases, Greenhouse Chats indexed by topic
Presenter	Ron McHatton Chief Education and Science Officer	Bill Bodei Committee Chair AOS Membership & Marketing, Technology Chair Deep Cut Orchid Society	Eric Sauer Awarded Maxillariaologist & Greenhouse Grower	AOS Members, Judges, Concerned Conservationists, Scientists & More

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

Cannot make it on the scheduled date or time? No need to worry. Register anyhow!
 Webinar announcements are posted to Facebook, Instagram and in the AOS Corner of your Affiliated Society's newsletter.
 We digitize the webinars and they are available to view at your leisure.
 GREENHOUSE CHAT Webinars are indexed by topic for future viewing.
 Send your Greenhouse Chat questions and photos to: greenhousechat@aos.org



Sylvia strigari

Encyclia alata

Text by Diego Bogarín and Franco Pupulin/Watercolor by Sylvia Strigari

Tribe Epidendreae
Sutribe Laeliinae
Genus *Encyclia* Hook.

Encyclia alata (Bateman) Schltr., *Orchideen*:201.1914. *Epidendrum alatum* Bateman, *Proc. Hort. Soc. London* 1838(2):25. 1838.; *The Orchidaceae of Mexico and Guatemala* t.18. 1841. Type: Habitat in Honduras prope Izabal, *G. U. Skinner s.n.* Holotype, K, not located; illustration of type in Bateman, 1840).

Epidendrum calocheilum Hook., *Bot. Mag.* 68:t.3898. 1841. Type: Guatemala, collected by G. Skinner, flowered at Woburn Abbey, 1839, *J. Russell s.n.* (K).

Epidendrum longipetalum Lindl. & Paxton, *Paxt. Fl. Gard.* 1:149, t.30. 1850, *nom. illeg.*, non A.Rich. & Galeotti, 1845. Type: Guatemala. Imported by Horticultural society, perhaps from *G. Skinner s.n.* (K).

Epidendrum formosum Klotzsch, *Allg. Gartenzeitung* 21:201. 1853. Type: Guatemala, *J. Warszewicz s.n.* (holotype, B, probably destroyed).

An epiphytic, caespitose *herb* with a short rhizome, to 90 cm tall. *Roots* white, produced from the base of the pseudobulb and the rhizome, 1.5–3.0 mm in diameter. *Pseudobulbs* conic–ovoid to pyriform, subtended by papery sheaths, shredded with age, 3–11 × 1.5–6.0 cm, two (rarely three) leaves at apex. *Leaves* two, rarely three on short tubular petioles at apex of pseudobulbs, ensate, linear–lanceolate, ligulate or elliptic, dorsally keeled, acute or subacute, conduplicate, coriaceous, the apex irregularly bilobed, 20–55 × 1.3–5.0 cm. *Inflorescence* apical, racemose, rarely branching and forming a compound raceme or panicle, exceeding the leaves, purplish, verruculose, peduncle cylindric, to 35–40 cm, scape bracts 5–3 mm, acute, scarious, surrounding scape; panicle 30–60 cm. *Floral bracts* 2–3 × 2.0–2.5 mm, triangular, basally clasping rachis, spreading. *Ovary and pedicel* terete, warty, 3.0–3.5 mm. *Flowers* showy, resupinate, spreading, scented, sepals and petals basally olive or pale green, distally dark red–brown; lip yellow or green, cream with yellow margins, veins dark red; the lateral lobes basally striped dark red, callus reddish spotted. *Sepals* subsimilar, oblanceolate–oblong to subspatulate, acute to subacute, slightly

revolute, dorsally weakly carinate. *Dorsal sepals* oblanceolate, acute or subobtuse, the margins revolute, 2.1–3.0 × 0.6–0.7 cm. *Lateral sepals*, elliptic–oblanceolate, acute or subobtuse, 2–3 × 0.4–0.7 mm. *Petals* spatulate–oblanceolate, acute or apiculate, unguiculate, revolute, 2.0–2.9 × 0.5–0.7 cm. Lip basally adnate to the column for 1.5 mm, deeply trilobed, unguiculate, 1.8–2.3 × 2.3–2.6 cm across the lateral lobes; lateral lobes unguiculate, obovate, obtuse, subfalcate, wider and broadly rounded toward the apex, erect, hiding and flanking the column in natural position, 1.3 × 0.8 cm; isthmus about 6.0 × 2.5 mm, subquadrate, minutely papillose on the lateral margins; midlobe suborbicular, flabellate or transversely oblong, the margin undulate–crisped, apically truncate or obtuse, blade with purple raised nerves that transition to broken verrucose terminations, 1.1 × 1.2 mm, the callus composed of three longitudinal fleshy keels which made up a fovea on the isthmus, ellipsoid, sulcate, joining at the base and extending onto the midlobe as thickened nerves, apically tridentate. *Column* straight, stout, obovate, semiterete, slightly arcuate at apex, truncate, 1.0 × 0.5 cm, winged, wings 2.5 × 2.0 mm, transversely subquadrate–oblong, basally provided with a nectary, apically with two lateral teeth. *Anther cap* widely ovate, cucullate, four-celled. *Pollinia* four in two pairs, obovate, strongly flattened, on narrowly linear, basally bifid caudicles. *Capsule* fusiform, warty.

James Bateman (1838) described *Epidendrum alatum* from a plant collected by Mr. George U. Skinner in the interior of Honduras on his return to Guatemala in 1837. This handsome species is particularly attractive because its exquisitely fragrant flowers last for several days, and the large lip has a striking, intense orange band on the edge. These features caught the attention of Bateman who sent plants and a memorandum to the ordinary meeting of the Royal Horticultural Society of London on June 19, 1838 stating that “it has continued in beauty for upwards six weeks. Scenting the whole house wherein it grew with one of the most delicate and delightful perfumes imaginable” (Bateman 1838). The species was transferred to the

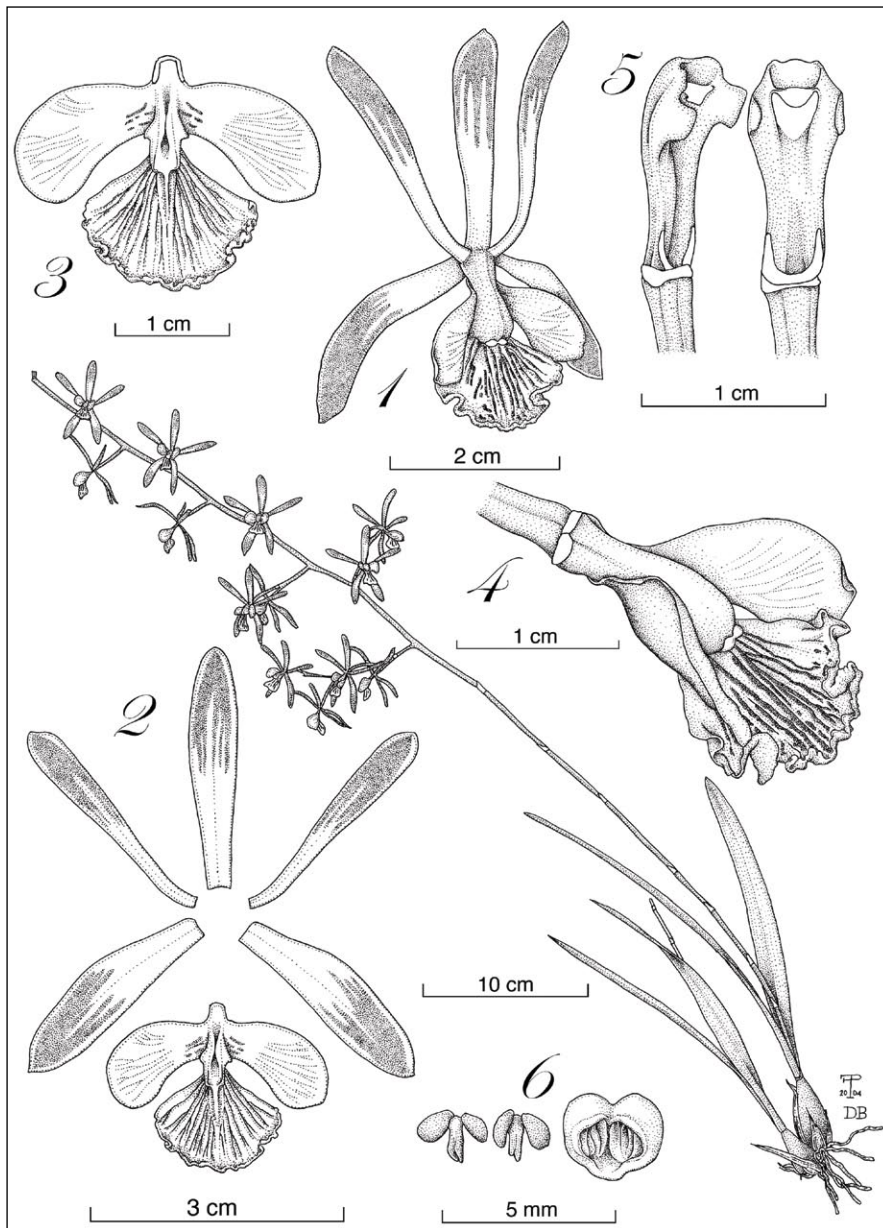
genus where it actually belongs by Rudolf Schlechter in 1914, and it is well-known as the “winged *Encyclia*.”

The species was described a second time in 1841 by Joseph D. Hooker, who also studied a collection by Skinner from Guatemala, that flowered in the famous collection of John Russell, 6th Duke of Bedford, at Woburn Abbey. *Curtis’s Botanical Magazine* offered a splendid illustration of the species, which is undoubtedly a synonym of Bateman’s *Epidendrum alatum* (Hooker 1841).

John Lindley and Joseph Paxton named the same species again in 1850 as *Epidendrum longipetalum*, a name that had been already used by Richard and Galeotti for a true — and pretty anomalous — species of *Epidendrum* endemic to Mexico. The specimen that typifies Lindley and Paxton’s *Epidendrum longipetalum* was imported from Guatemala, and the discussion in the protologue leaves the impression that it was collected there by Skinner for the Horticultural Society (Lindley and Paxton 1850).

Finally, Johann Friedrich Klotzsch proposed another description of *E. alata* in 1853, on the basis on a plant collected in Guatemala by Józef Warszewicz, then just at the beginning of his extraordinary career as a plant collector. The type of *Epidendrum formosum* was likely destroyed in the Botanical Museum of Berlin during World War II where Klotzsch deposited the primary set of his herbarium, but an analysis of the protologue (Klotzsch 1853) leaves no doubt about the identity of Klotzsch’s species as *E. alata*.

Encyclia alata is quite unmistakable among members of the genus. The species is easily distinguished by its racemose inflorescences, which can rarely be paniculate; the large, showy flowers with oblanceolate–oblong to subspatulate revolute sepals and petals that are basally olive or pale green and distally dark red–brown, and the lip with conspicuous lateral lobes that are widely rounded apically, hiding and flanking the column in natural position. The midlobe has raised purple nerves that transition to broken verrucose terminations with a remarkable undulate–crisped band of intense orange which skirts the front part of the lip.



Encyclia alata. The plant.

1. Flower.
2. Dissected perianth.
3. Lip, spread.
4. Column and lip, lateral view
5. Column, three quarters and ventral views.
6. Pollinarium (dorsal and ventral views) and anther cap.

All drawn from Pupulin 4369 by Franco Pupulin and Diego Bogarín.

The genus *Encyclia* is recognized as a monophyletic group of about 150 species ranging from Florida, the Antilles, Mexico through Central America, and the Andean range to southern Brazil, Paraguay, and northern Argentina. The genus is characterized by conical or subglobose pseudobulbs, mostly with two

ensiform leaves; inflorescences frequently paniculate, with the rachis and the ovaries variously verruculose; showy flowers with a conspicuously trilobed lip with thickened veins, and a forcipate callus (in a way, similar to a forceps) at the base. *Encyclia* is phylogenetically related to *Alamania* Lex., *Artorima* Dressler & G.E.Pollard, and *Prosthechea* Knowles & Westc. Recent studies have shown that the group diversified recently, around 12 million years ago, a pattern also observed in other clades within Laeliinae (Leopardi-Verde et al. 2016). The short divergence time in some groups is probably the most plausible explanation for the difficulties in separating species complexes even with the aid of molecular tools (Pupulin & Bogarín 2011). Also, *Encyclia* shows a strong association between the geographic distribution and

the phylogenetic relationships among clades (Leopardi-Verde et al. 2016). For instance, Mexico, southeast Brazil, Venezuela, and the Antilles are centers of species diversity of the genus, whereas Costa Rica, Panama, and lowland Colombia are relatively poor in species. However, few species such as *Encyclia alata* extend their range from the Antilles and Mexico to Central America. Particularly, *Encyclia alata* is closely related to several species native to the Mexico-Caribbean hotspot such as *Encyclia nizandensis* Pérez-García & Hágsater (a species ostensibly of hybrid origin) as well as *Encyclia bipapularis* (Rchb.f.) Acuña, *Encyclia bocourtii* Múj. Benítez & Pupulin, *Encyclia fucata* (Lindl.) Schltr., *Encyclia guatemalensis* (Klotzsch) Dressler & G.E.Pollard, *Encyclia parviflora* (Regel) Withner, and *Encyclia tampensis* (Lindl.) Small.

Plants of *Encyclia alata* range from Mexico and Belize to western Panama (Caribbean side) and inhabit the tropical wet forest, tropical moist forest and tropical wet forest basal belt transition, mostly from sea level to about 500 meters, with a few populations ranging up to 1,000 m. Although this species is usually restricted to the humid Caribbean plains of Central America, a population has been recorded in Costa Rica in the premontane moist forest, basal belt transition on the Pacific watershed, in the Cerros de Santa Elena in northern Guanacaste (Pupulin & Bogarín 2012), a much drier area than the usually preferred habitats of this species. Plants can be found growing in secondary vegetation and primary forest. Peculiarly, some populations are found growing in mangrove forests along the Caribbean coastlines of Belize, Guatemala, Honduras and Nicaragua often mixed with *Tillandsia* spp. (Bromeliaceae) and other orchids such as *Brassavola nodosa* (L.) Lindl. *Encyclia alata* is an easy-to-grow species quite popular because of the attractive, long-lasting fragrant flowers. In its natural habitats the species mostly grows epiphytically on trees in open forests, but individual plants have also been observed growing terrestrially in soil pockets. In cultivation, it grows best on slabs or pots with loose medium, abundant light, warm to intermediate temperatures, and high humidity. Water should be given regularly during the growing period and reduced after the new growth is well developed. According to its collector G.U. Skinner, the original specimen was found growing together with *Epidendrum stamfordianum* Bateman, to which Bateman (1841) added: "like that species, it seems to delight in a

greater degree of warmth and humidity than the majority of Mexican Orchidaceae require...if this circumstance be borne in mind, its cultivation will be found perfectly simple." Flowering of *Encyclia alata* is recorded from May to August, which in Central American grossly corresponds to the beginning of the rainy season.

References

- Bateman, J. 1838. *Epidendrum alatum* Bateman, *Proc. Hort. Soc. London* 1838(2):25.
- Bateman, J. 1841. *Epidendrum alatum* Bateman. *The Orchidaceae of Mexico and Guatemala* t. 18.
- Hooker, J. D. 1841. *Epidendrum calocheilum*. Beautiful-lipped *Epidendrum*. *Curtis's Botanical Magazine* 68: sub pl. 3898.
- Klotzsch, J. F. 1853. *Epidendrum (Encyclium) formosum* n. sp. *Allgemeine Gartenzeitung* 21(26):201–202.
- Leopardi-Verde, C., G. Carnevali, and G. A. Romero. 2016. A Phylogeny of the Genus *Encyclia* (Orchidaceae: Laeliinae), with Emphasis on the Species of the Northern Hemisphere. *Journal Systematics and Evolution* 9999:1–14. doi: 10.1111/jse.12225.
- Lindley, J. and J. Paxton. 1850. The Long-Petaled *Epidendrum*. *Epidendrum longipetalum*. *Paxton's Flower Garden* 1:sub pl. 30
- Pupulin, F. and D. Bogarín. 2011. Of Greenish *Encyclia*: Natural Variation, Taxonomy, Cleistogamy, and a Comment on DNA Barcoding. *Lankesteriana* 11:325–336.
- Pupulin, F. and D. Bogarín. 2012. A Taxonomic Revision of *Encyclia* (Orchidaceae: Laeliinae) in Costa Rica. *Botanical Journal of the Linnean Society* 168(4):395–448.

Too hot in the summer greenhouse?

Stick one side of Velcro disks a foot apart onto the outside of the west side of the greenhouse to fit the shape of the foil-covered, bubble-wrap-type batts like the material used as jackets for hot water heaters. It can be purchased in rolls. The foil will reflect the hot west sun and the bubble wrap will help insulate against the heat. It may also be used to insulate the north side of the greenhouse on the inside to keep heat in and reflect the light back into the greenhouse. — *Jean Allen-Ikeson (email: jean.ikeson@gmail.com).*

MAKE SURE PEOPLE CAN REACH YOUR AFFILIATED SOCIETY

Our records are only as good as the information our affiliates provide. We recommend our affiliates update their AOS record periodically — at least after every annual election — using our online form:

<http://affiliatedsocieties.americanorchidsociety.org/update/>

Pay particular attention to:

- proper points of contact
- accurate society information — we use this for the Affiliated Societies search on our website and preparation of the annual Orchid Source Directory listings

Help us ensure the AOS Corner, renewal notices and important correspondence reach you.

Selected Botanical Terms

acute – pointed
 adnate – fused
 apiculate – ending abruptly in a small point
 arcuate – shaped like a bow
 bifid – notched into two parts
 bilobed – two lobed
 caespitose – clumped together
 callus – thickened or raised structure; usually on the lip
 carinate – having a keel-like ridge
 caudicle – slender, stalklike appendage
 conduplicate – folded lengthwise
 conic – like a cone
 coriaceous – leathery
 cucullate – hooded
 elliptic – oval
 ensate – sword-shaped
 epiphyte – growing on another plant for support and not as a parasite
 falcate – sickle-shaped
 flabellate – fan-shaped
 forcipate – shaped like forceps
 fovea – depression or pit
 fusiform – spindle-shaped
 isthmus – narrow area usually joining two parts
 lanceolate – narrow oval tapering to a point at each end

ligulate – tongue-shaped
 linear – elongate and parallel-sided for most of its length; grass-like
 monophyletic – a group sharing only a single ancestor
 oblanceolate – narrow at attachment, rounded apically
 oblong – longer than wide, ends rounded
 obovate – egg-shaped with the wide end up
 obtuse – blunt or rounded
 orbicular – having a circular outline
 ovoid – egg-shaped, narrow end up
 papillose – covered with small protuberances; like a cat's tongue
 pedicel – a stem carrying a single flower
 peduncle – the lower part of the inflorescence below the first bud
 petiole – stalk connecting leaf to stem
 phylogenetic – evolutionary history
 pyriform – pear-shaped
 quadrate – more or less rectangular or square
 raceme – having flowers attached by short stalks at equal distances along a main stem
 rachis – portion of the inflorescence carrying flowers
 resupinate – rotated to bring the lip

lowermost
 revolute – rolled, especially along margins
 rhizome – modified stem joining growths
 scape – long internode forming the basal part (or entire) of the peduncle
 scarious – membranous, dry and brown in color
 spatulate – spoon-shaped
 sub - prefix meaning nearly or almost as in subpyriform - almost pear-shaped
 subtend – beneath or close to
 sulcate – marked with parallel grooves
 terete - cylindrical or pencil-shaped
 tridenate – having three toothlike structures
 trilobed – having three lobes
 truncate - abruptly terminated as if cut off
 unguiculate – having a claw-shaped base as in having an unguiculate petal
 verrucose – warty
 verruculose – having moderate-sized growths

CONSERVATION COMMITTEE

New Conservation Grants

THOMAS MIRENDA



THE WORLD WE share with orchids is changing, rather rapidly it seems, and in ways that are difficult to predict and interpret. The mission of the American Orchid Society is to promote, education, research and conservation of the plants we so admire and cherish. As one of the three pillars of the American Orchid Society, the Conservation Committee allocates funds each year to devote to worthy projects around the world. This year, the Committee had an unprecedented number of fine proposals to review and choose from. Of course, this is both good and bad. It indicates several things: conservation awareness has increased, probably due to our awareness of issues such as deforestation and climate change, that awareness has spread across the globe to orchid loving communities who want to preserve and protect their native species, and ultimately, that the need for conservation initiatives has never been greater. We had close to 30 proposals sent to us for review and due to a generous, but limited AOS budget, could only fund six of them. All of the proposals we received had tremendous merit, and we only wish we could have funded them all. In the coming months we will introduce *Orchids* magazine readers to these projects, both the ones we selected for grants and ones we could not fund. Perhaps you, and your orchid society, may want to adopt some of these fine proposals?

It gives me enormous pleasure to be able to assist some very special, unusual and groundbreaking orchid conservation projects this year. The first two I will feature are from North America:

***The Biocultural Restoration of Epiphytic Orchids in Oaxaca, Mexico: The Experimental Reintroduction of Prosthechea karwinskii After Ceremonial Utilization in Semana Santa* — Julia K. Douglas, University of Hawaii Botany Department**

This project involves the biocultural conservation of *Prosthechea karwinskii* (possibly better known as *Euchile karwinskii*), locally called “la monjita.” This species is traditionally harvested from the Oaxacan forest each spring by local people, and utilized for holiday decorations in Semana Santa (Easter). Climate change, deforestation, and unsustainable harvest have all contributed to the decline of these orchid populations. The project aims to collect the pseudobulbs that are typically discarded after the celebrations and reintroduce them to appropriate nearby sites in the pine-oak forest. Douglas hopes the effort will prevent the extirpation of



2

the species, and ensure the perpetuation of the region’s important cultural heritage of orchid harvest and usage. She is collaborating with local orchid-harvesters, colleagues at the University in Oaxaca (CIIDIR), and the community land management authorities of the region. The work will inform protocols for sustainable collection and reintroduction of this species and others across Mexico.

***Investigating the Role of Helper Bacteria in Mycorrhizal Associations of Platanthera chapmanii and the Ultra-rare Greenwoodiella deserticola* — Dr. Jyotsna Sharma, Texas Tech University**

This project covers the unfunded aspects of a larger orchid conservation program in Texas for the preservation, restoration, and propagation of the endangered *Platanthera chapmanii*, and the extremely rare and newly discovered *Greenwoodiella deserticola*. The project is unique in that it targets helper bacteria in addition to mycorrhizae. This is important as mycorrhizal fungi may lose their ability to germinate orchid seeds if the bacterial partners are absent. The project will develop protocols for habitat management,

[1] Julia Douglas with *Prosthechea (Euchile) karwinskii* growing in its native habitat.

The species grows in Mexico and Oaxaca states in Mexico in cool to cold oak and pine forests at elevations between 4,260 feet and 8,500 feet (1,300–2,600 m). The lefthand inset is an established plant growing in cultivation and the righthand inset (photograph courtesy of Gerardo Salazar) is a close-up of the flowers. The fragrant flowers are up to 3 ½ inches (8.7 cm) in diameter.

[2] *Greenwoodiella deserticola* photographed in situ by Jyotsna Sharma.

The inset is a close-up taken by Ronald Coleman.

restoration, and the integrated use of mycorrhizae and their bacterial partners to unlock germination for many other species beyond these two. — Thomas Mirenda has been working professionally with orchids for over three decades. He is an AOS accredited judge and is the chairman of the American Orchid Society’s Conservation Committee (email: biophilialk@gmail.com).

Orch. Afr. q. p. Sp. 1
 F. 2 q. u. Sp. 7.

Nº IV.



Fig. 2 *Phyllorchis Nuphyllis* Hab. les 3 Ner
 Fig. 1 *Epidorchis Volucre* Hab. Madag. et Bourb.
Phyllorchis Nactans
Epidendrum Volucre
 Leprotre pinx. Lanau Sculp.

Bulbophyllums of du Petit-Thouars by Peggy Alrich and Wesley Higgins



***Bulbophyllum* Thouars**

Hist. Orchid., Table 3, sub 3u, tt. 93–110 (1822).

The largest genus of the orchid family with an estimated 2,500 extraordinarily shaped, polymorphic, creeping epiphytes, lithophytes or uncommon terrestrials. The plants can vary in size from minute, often forming large mats, to often-massive climbers. They have a wide range of habitats throughout the tropical and subtropical regions of the globe. African species have small but occasionally quite striking plants and flowers. The American species have stiff, uninteresting plants with small, drab flowers. Asian species have multileaved plants, usually with delightful flowers. But the greatest diversity is found in New Guinea. These plants have small to large, single-noded, stout pseudobulbs (varying in shape), each with one to two leaves that develop along a creeping rhizome and have basally borne inflorescences. The enormously diverse flowers are often furnished with a strong fragrance, sometimes pleasant or sometimes foetid, but almost always suffocating in its intensity. Some flowers are so tiny they are only visible with the help of a magnifying lens. The dorsal sepal is free, the lateral sepals are often united and hinged to the column foot, and the petals are usually smaller than the sepals.

The flowers possess an extraordinary articulated, often fringed or hairy, thin to rigid, simple or trilobed lip that is sensitive to even the slightest touch or breeze. Its

function is to unbalance the visiting insect and tumble it against the short, erect column; thus the unsuspecting insect becomes attached to the pollinia and carries it to another flower. The dazzling, sensuous floral colors range through virtually every hue imaginable except blue.

Louis Marie Aubert du Petit Thouars (1758–1831) was a prominent French botanist known for his work collecting and describing orchids. Born at the Château de Boumais near Saumur, he grew up under the tutelage of his grandfather who was the jailer of Mr. Louis Kerguelen, an explorer who was in disgrace for his participation in the killing of large populations in Madagascar in order to establish a colony. Du Petit-Thouars attended the college of La Flèche (Anjou) and he studied the flora of the Tristan da Cunha Archipelago while on a search for Jean-François de La Pérouse, a French Naval officer who vanished in Oceania.

During the French Revolution du Petit-Thouars was exiled (1792–1802) to Madagascar, Réunion (Bourbon) and the Mauritius (Île de France) islands where he discovered a vast array of plant species. Ten years later and with a collection of over 2,000 plant specimens, he finally was able to return to France. His herbarium specimens were deposited at the Paris Museum of Natural History (although some species ended up at Kew). He became the Director of Horti imperialis (regii) pomologici Rouliensis

and a member of Société nationale des Antiquaires de France (1807), Académie d'Agriculture de France (1814), and was elected to the prestigious Académie des Sciences (1820).

Du Petit-Thouars is remembered for his pioneering botanical works. He published 118 names in *Histoire particulière des plantes orchidées recueillies sur les trois îles australes d'Afrique, de France, de Bourbon et de Madagascar* (1822) including 52 new species from Mauritius and 55 from La Réunion. He published 25 orchid genus names of which only five are in use today. *Bulbophyllum* Thouars is the best known of all these genera. Du Petit-Thouars created the genus describing 17 species, of which 15 are still accepted names today.

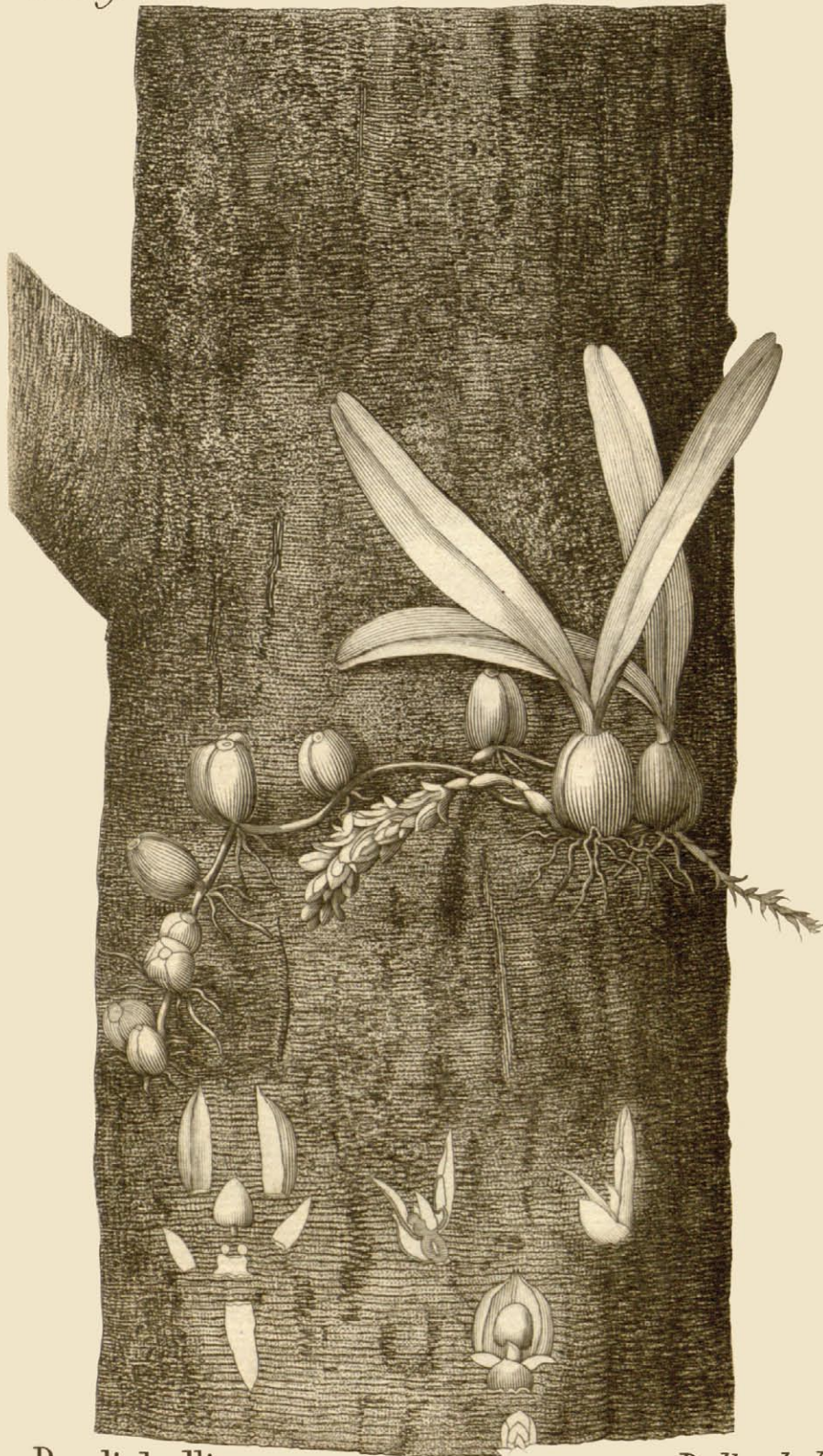
As a side note; his great-great-granddaughter Marie du Petit Thouars grew up making candles and experimenting with scents in her mother's greenhouse. She continues the family botanical legacy with a collection of unique floral fragrances for home and body (Maison Louis Marie).

— Peggy Alrich is a freelance graphic designer (email: sunflowerltd@earthlink.net).

— Wesley Higgins is an accredited AOS judge (email: wesley.higgins@comcast.net).

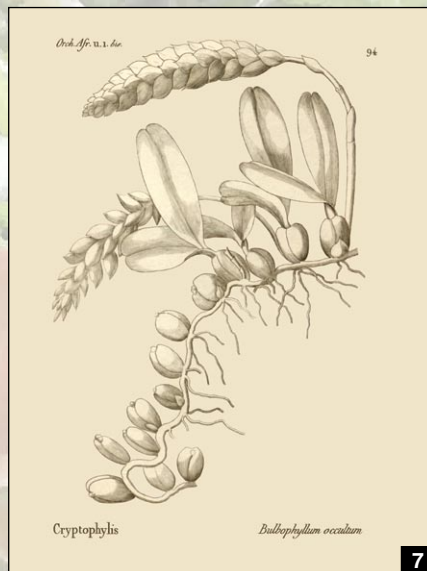
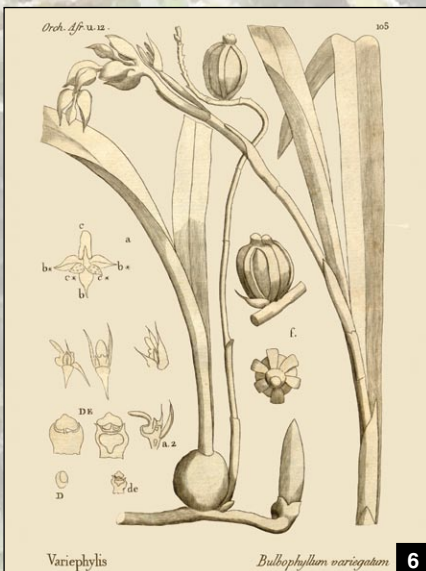
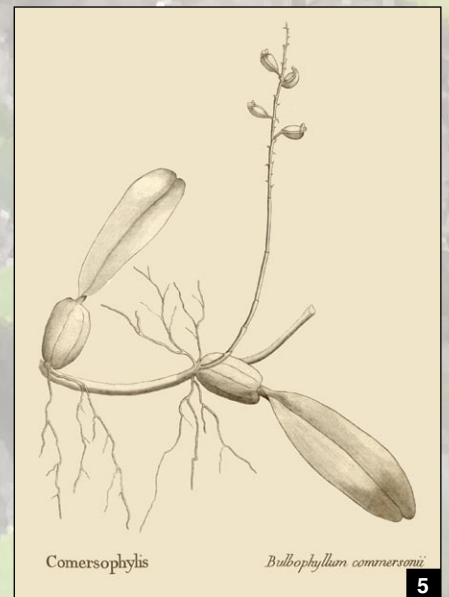
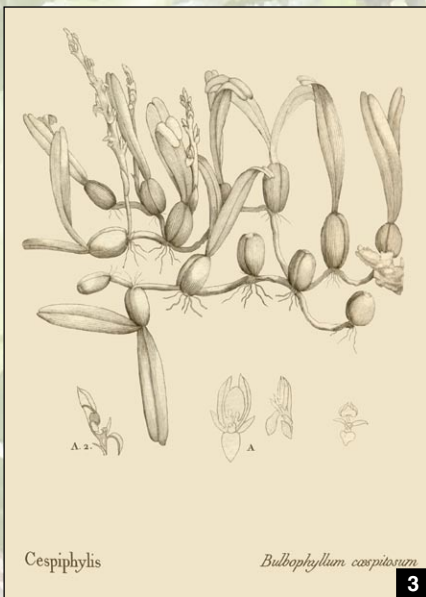
References

- Aubert du Petit-Thouars. *Hommes et Plantes, Revue du CCVS*, No. 61, pp. 14–15.
 Wikipedia. 2020. Louis-Marie Aubert du Petit-Thouars. https://en.wikipedia.org/wiki/Louis-Marie_Aubert_du_Petit-Thouars. Accessed May 13, 2020.



Pendiphyllis

Bulbophyllum pendulum



Antique Plates — Thouars

- [1] *Bulbophyllum nutans* Thouars as *Phyllorchis nuphyllis* and *Oeonia volucris* (Thouars) Sprengle as *Epidendrum volucrepis*.
- [2] *Bulbophyllum pendulum* Thouars as *Phyllorchis pendiphyllis*.
- [3] *Bulbophyllum caespitosum* Thouars as *Phyllorchis cespiphyllis*.
- [4] *Bulbophyllum clavatum* Thouars as *Phyllorchis clavophyllis*.
- [5] *Bulbophyllum comersonii* Thouars as *Phyllorchis comersophyllis*.
- [6] *Bulbophyllum variegatum* Thouars as *Phyllorchis variephyllis*.
- [7] *Bulbophyllum occultum* Thouars as *Phyllorchis cryptophyllis*.
- [8] *Bulbophyllum gracile* Thouars as *Phyllorchis gracilophyllis*.
- [9] *Bulbophyllum prismaticum* Thouars as *Phyllorchis prismophyllis*.
- [10] *Bulbophyllum nutans* Thouars as *Phyllorchis nuphyllis*.



Orchids of Bhutan

The genus *Spathoglottis*

STIG DALSTRÖM, CHOKI GYELTSHEN, NIMA GYELTSHEN, KEZANG TOBGAY, NGAWANG GYELTSHEN, AND BHAKTA BAHADUR GHALLEY



THE GENUS *SPATHOGLOTTIS* Blume was described by Karl Ludwig von Blume in 1825 in *Bijdragen tot de Flora van Nederlandsch Indië*. The genus currently consists of approximately 50 species with some additional varieties and natural hybrids, distributed in India, Nepal, Bhutan, throughout subtropical Southeast Asia, China, Indonesia, New Guinea, Australia and the Pacific Islands. Until recently, only *Spathoglottis ixiooides* (D. Don) Lindl., a rather small and yellow-flowered species was known from Bhutan. This particular species was discovered by Nathaniel Wallich, or one of his collectors, in the Gossain Than region of Nepal, and described scientifically as *Cymbidium ixiooides* by David Don in his *Prodromus Florae Nepalensis* in 1825. It was later transferred to *Spathoglottis ixiooides* by John Lindley in *The Genera and Species of Orchidaceous Plants*, in 1831. This species was reported from the Lachoong valley in Sikkim (today part of India) at 10,000 feet (3,053 m) by George King and Robert Pantling in their *Orchids of the Sikkim-Himalaya* in 1898, where it is mentioned that it flowers in July and August. They describe the flowers rather curiously as being of a “bright pale yellow,” which seems like an oxymoron at first but actually describes the color surprisingly well. In Bhutan we have found *Spathoglottis ixiooides* growing in warm to cool broadleaved forest, more or less exposed on grassy slopes, which makes the plants virtually invisible without the flowers, but also in thick moss cushions on cliffs and large boulders, and in humus-rich soil in deep shade along trails.

Until 2016 this charming little species was the only member of the genus known to exist in Bhutan. This was about to change dramatically, however, due to the recent discovery of a remarkable new species.

On November 3, 2016, the remote region of Ngangla-Kaktong in the Zhemgang district of southern Bhutan was explored by National Biodiversity Centre’s (NBC) Biodiversity Researchers Nima Gyeltshen and Kezang Tobgay, and former contract staff forest ranger Tandin Wangchuk. The objective was to collect seeds for the Tree Seed Conservation Project. During this work, small populations were discovered of the endangered orchids *Paphiopedilum fairrieanum* (Lindl.) Stein and *Paphiopedilum venustum* (Wall. ex Sims) Pfitzer. The NBC team therefore decided to make a survey to document the general species composition with a total of three



KEZANG TOBGAY

2



STIG DALSTRÖM

3



4

- [1] The striking flowers of *Spathoglottis jetsuniae*, a flower worthy of honoring Her Majesty the Gyaltsuen Jetsun Pema Wangchuck, also affectionately known as “The Dragon Queen” of Bhutan. In situ photograph courtesy of Nima Gyeltshen. Close-up by Kezang Tobgay.
- [2] Plants of *Spathoglottis ixiooides* can grow exposed in bright light on boulders as well as in deep shade.
- [3] *Spathoglottis ixiooides* growing in deep shade along a muddy jungle trail.
- [4] *Spathoglottis ixiooides*, from *Orchids of the Sikkim-Himalaya* by George King and Robert Pantling, plate 139 (1898).

plots where *Paphiopedilum* plants were present, with an area of about 1,000 ft² (100 m²) for tree vegetation and 43 ft² (4 m²) for the ground vegetation. During the composition survey of the ground vegetation, a striking and unknown terrestrial orchid in full bloom was discovered inside the selected plot, which was at 3,399 feet (1,038 m) elevation.

After returning to the base camp the unknown orchid specimen was processed and scanned and tentatively identified as an unusual *Spathoglottis* species. Photos were then sent for a positive identification to Dhan Bdr. Gurung (College of Natural Resources, Lobesa, Bhutan), and Stig Dalström who confirmed that the attractive flowers indeed belonged to a new and striking *Spathoglottis* species.

On November 8, 2016, the same NBC team made a trip to the remote villages of Martshala and Sarjung in the Samdrup Jongkhar district in southeastern Bhutan for additional tree seed collection and pre-collection assessments. Amazingly, another observation of the new *Spathoglottis* species was made growing on limestone cliffs together with *Paph. fairrieanum*. At this site only a single *Spathoglottis* plant was seen amid a larger population of the *Paphiopedilum*.

From having been completely invisible for so many years, all of a sudden a third report of this intriguing orchid appeared from the Samtse region in the extreme western part of Bhutan, this time reported by forest rangers Ngawang Gyeltshen and Bhakta Bdr. Ghalley, again while searching for *Paphiopedilum* species. A few blooming *Spathoglottis* plants were discovered growing rather exposed on a steep and grassy limestone outcropping together with plants of *Paph. fairrieanum*, and with a new population of the highly endangered *Paph. venustum* discovered approximately 164 feet (50 m) below.

For a number of years the members of the orchid team at the NBC have discussed the possibility of finding a new orchid species that could be named in honor of the young and beautiful queen, Her Majesty The Gyaltsuen Jetsun Pema Wangchuck of Bhutan, who has shown great interest in environmental issues in her country. It would have to be a very special orchid of course, and not just some minor brown-flowered *Liparis* species or something of that nature. But finding an orchid of “royal” quality is not easily encountered anywhere anytime, particularly in a small country such as Bhutan, so our hopes were not too great. But the discovery of this amazingly attractive and unusual-



STIG DALSTRÖM



KEZANG TOBGAY



NIMA GYELTSHEN



NIMA GYELTSHEN

looking *Spathoglottis* certainly changed all of that. It was scientifically described as *Spathoglottis jetsuniae* Gyeltshen, Tobgyel & Dalström in the Lankester Botanical Garden, University of Costa Rica's flagship journal *Lankesteriana* in

2017.

The discovery of the striking *Spathoglottis jetsuniae* was a welcome contribution to the continuously increasing number of known orchid species documented for the small country known

as the “Land of the Thunder Dragon.” The cultivation of this intriguing orchid is yet in its infant stage, but because it grows terrestrially in shallow soil on or below limestone cliffs at approximately 3,200–3,275 feet (980–1,000 m) elevation, with a soil pH of 7.1–7.8, (and in close proximity to *Paph. fairrieanum* and *Paph. venustum* populations), it should not be too difficult to accommodate the horticultural demands of this royal orchid.

The forest where these sympatric orchids grow is mostly dominated by evergreen trees, including *Rapanea capitellata* (Wall.) Mez. *Phoebe lanceolata* (Nees.) Nees. and *Acer oblongum* Wall. ex DC. The cultivation of *Spath. jetsuniae* at the Royal Botanic Garden at Serbithang near Thimphu has been relatively successful so far, at least in the short term, but we will have to see how this species can acclimatize to artificial conditions in the long term. The cultivation of *Spath. ixiooides* is most likely easier because it grows in a variety of habitats and any humus-rich and well-drained terrestrial mix might work, provided that a defined dry period from approximately December to May is respected. The light conditions for *Spath. ixiooides* and *Spath. jetsuniae* may not be so critical since both species grow in bright light as well as in deep shade in their natural habitats.

Acknowledgments

The authors thank the Program Director of the NBC, Tashi Y. Dorji, for her guidance and motivation. We also thank Tandin Wangchuk (Department of Forests and Park Services, Trashigang) and Thomas Höijer of Jakobsberg, Sweden, for assisted fieldwork, Dupchu Wangdi (NBC) for curating the live orchid collection at NBC, the Sarasota Orchid Society for continuous financial support and Wesley E. Higgins for viewing and commenting on the manuscript.

— *Stig Dalström, corresponding author, 2304 Ringling Boulevard, unit 119, Sarasota, Florida 34237; Lankester Botanical Garden, University of Costa Rica, Cartago, Costa Rica; The National Biodiversity Centre, Serbithang, Royal Government of Bhutan (email: stigdalstrom@gmail.com); Choki Gyeltshen, Senior Biodiversity Officer, National Biodiversity Centre, Ministry of Agriculture and Forests, Serbithang, Thimphu, Royal Government of Bhutan; Nima Gyeltshen, Biodiversity Supervisor, Royal Botanical Garden, National Biodiversity Centre, Ministry of Agriculture and Forests, Serbithang, Thimphu, Royal Government of Bhutan; Kezang Tobgay*



STIG DALSTRÖM



NGAWANG GYELTSHEN



STIG DALSTRÖM



KEZANG TOBGAY

Biodiversity Officer, Royal Botanic Garden, National Biodiversity Centre, Serbithang, Thimphu, Royal Government of Bhutan; Ngawang Gyeltshen Biodiversity Inventory Program, Wildlife Conservation Division, Department of Forests and Park Services, Ministry of Agriculture and Forests, Royal Government of Bhutan; Bhakta Bdr. Ghalley, Forest Ranger, Jigme Khesar Strict Nature Reserve, Haa Ministry of Agriculture and Forests, Royal Government of Bhutan.

- [5] The color of *Spathoglottis ixiooides* was once described as being “pale bright yellow,” which is surprisingly accurate.
- [6] Plants of the bizarre and vegetatively similar-looking *Anthogonium gracile* often grow together with *Spathoglottis ixiooides*. Close-up by Stig Dalström.
- [7] Tandin Wangchuk and Kezang Tobgay collecting data at the type locality of *Spathoglottis jetsuniae*.
- [8] Natural habitat of *Spathoglottis jetsuniae* in Zhemgang. Without leaves or flowers (inset photograph by Stig Dalström), the well-camouflaged dormant pseudobulbs of *Spathoglottis jetsuniae* are very difficult to spot; here, attached to a vertical limestone boulder.
- [9] The orchid team cautiously descends the exposed habitat of *Spathoglottis jetsuniae* and *Paphiopedilum fairrieanum* in western Bhutan.
- [10] A flowering plant of the amazing *Spathoglottis jetsuniae* from western Bhutan.
- [11] The visitation of the flowers of *Spathoglottis jetsuniae* by an unknown pollinator leaves its marks and seed capsules appear to be frequent, as well as plenty of tiny seedlings.
- [12] The cultivation of *Spathoglottis jetsuniae* at the Royal Botanic Garden, Serbithang, Thimphu, has been successful so far and artificial propagation is high on the list of horticultural priorities.

Orchid Treasures of the

The search for *Scuticaria steelei*

TEXT AND PHOTOGRAPHS BY NICOLA S. FLANAGAN



THE NORTHWEST AMAZON region is, today, a forgotten corner of tropical South America. Here, the territories of Brazil, Venezuela and Colombia meet on the very northern edge of the Amazon biome, where the forest naturally fragments, with increasingly larger savannah areas gradually merging into the grassland plains, or *Llanos*, in northeast Colombia and central Venezuela.

The Colombian Department of Guainía covers an area of 27,891 square miles (72,238 sq km) of still continuous forest. To the East, the Orinoco River forms the frontier with Venezuela, and further south the rivers Guainía and Isana change their names to the Rio Negro and Içana as they flow east over the border into Brazil. Three quarters of the populace of only 44,000 are indigenous peoples, mainly of Puinave and Curripaco ethnicity,

and more than half of the population lives in the departmental capital, Inírida. This small friendly town is accessible via an hour's flight from Bogota, or by a two-week voyage down the Guaviare River. Indigenous communities are scattered along the many rivers that meander through their forested territories.

With good reason, Guainía is known locally as the *Tierra de Mucha Agua* (Land of Plentiful Water). During the rainy season from May to November the rivers rise by up to 46 feet (14 m), flooding through the forests, collecting the tannins from decomposing vegetation, and giving rise to the so-called black water rivers. Here, the pink river dolphins (*Inia geoffrensis*) are frequently seen, and the toucan, *Rhampostus tucanus*, preaches his call loudly over the treetops — “*Dios te de, Dios te de*” (God gives to you, God

[1] *Scuticaria steelei* in flooded forest on the upper reaches of Caño Bocón, Guainía, Colombia.

[2] An illustration of Otterspool House undertaken for John Moss Esq.. The Liverpool Corporation bought the estate in 1925, and the house was demolished in 1931. Otterspool park still offers Liverpooldians a splendid riverside walk, with views across the River Mersey.

gives to you).

Prior to European colonization, the region was inhabited by a surprisingly numerous multiethnic society of Amerindian peoples in the Arawakan-speaking groups, who had migrated up the Orinoco from the Caribbean. During the mid-17th century, with the Portuguese and Spanish competing to take control over the Indian populations and regional trade systems

Northwest Amazon



of the Orinoco and Amazon Rivers, the Amerindian populations were decimated by disease and enslavement. By the end of 18th century, the upper Orinoco and upper Negro rivers were virtually uninhabited (Vidal 2000).

Although the geopolitics of the Orinoco and Amazon basins occupied European colonial forces during the 17th and 18th centuries, it was not until the turn of 19th century when the explorations of Hipolito Ruiz, 1777–1788, and Alexander von Humboldt, 1800–1804, heralded an explosion of interest in exotic flora in Europe, so opening the floodgates on an era of massive extraction, collection and study of tropical plant diversity.

SCUTICARIA STEELEI (HOOK.) LINDL. 1837
Otterspool Park, on the banks of

the River Mersey in the South Liverpool suburb of Aigburth seems a world away from the European–Amerindian conflicts in South America. The Park was originally part of the Ottersley Estate, purchased in 1811 by Mr. John Moss (1782–1858), the founder of the Liverpool bank Moss & Co., and a significant investor in British railways. John Moss was also a slave owner. On the death of his uncle James Moss, a Bahamian slave-owner, records show that between 1821 and 1825 John Moss exported from Crooked Island in the Bahamas 1,762 enslaved people (927 men and 835 women) to his sugar plantation, Ana Regina, in Demerara, in present day Guyana (Centre for the Study of the Legacies of British Slave-ownership).

In common with many wealthy

merchants at the beginning of the 19th century, John Moss, Esq. was also known as a gentleman’s gardener, and, through his many connections overseas, his collection of exotic plants at Ottersley was “fair to rival some of the many collections of orchidaceous plants, of which the country may well be proud” (Anon 1839). In July 1836, John Moss received from a Matthew Steele in Demerara a plant that, on flowering in his garden the following year, was illustrated by his daughter, Miss Moss.

The drawing and a dried sample of a plant was sent to William Jackson Hooker, Regius professor of Botany at Glasgow University, and later Director of the Royal Botanic Gardens, Kew, who described and named this “highly interesting

Orchidaceous plant” as *Maxillaria steelii* after its collector (Hooker 1837). The drawing by Miss Moss was sufficiently expert that Hooker used it to illustrate his published description, rather than call on the services of his customary illustrator, Walter Hood Fitch.

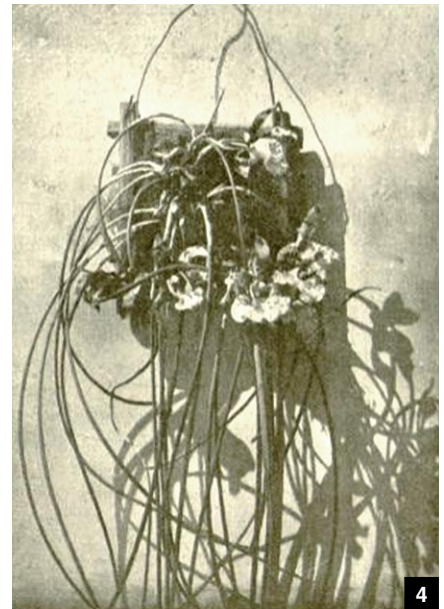
This was, in fact, not the first plant of this species to flower in England. In the same year, the renowned orchid taxonomist, John Lindley (1837) noted that: “when it first came over I called it *Maxillaria flabellifera*, in allusion to the thong-like leaves, and under that name it exists in many collections; but the name not having been published must, of course, give way to that of *M. steelii*, under which it was first described, in May last, by Sir W. Hooker.”

Hooker had recognized that although having “the flower of *Maxillaria*, it has a foliage quite at variance with any described species of that Genus [sic].” But, it was not until 1843 that Lindley undertook a revision of this diverse group, separating out several genera, including *Lycaste*, *Paphinia*, *Warrea* and *Scuticaria*. Lindley noted: “As for *Maxillaria steelii*, with its long thonged leaves and deficient pseudobulbs, it has nothing of the aspect of a *Maxillaria*, and having a pair of double pollen-masses sitting on a gland tapering to each end with the form of a gliding serpent, it may be advantageously struck off under the name *Scuticaria*.”

His chosen generic name alludes to the Latin *Scutica*, meaning whip, and, from this revision by Lindley, *Scuticaria steelii* became the type species for this genus (Lindley 1843).

Of note in the above text is the spelling of the specific epithet as *steelii*. Because Hooker named the species to honor its collector — Matthew Steele — the original Latinization should have been *steelei* rather than Hooker’s *steelii*, thereby creating an orthographical error that continued to be propagated in further influential publications, such as Veitch & Sons’ *A Manual of Orchidaceous Plants Cultivated Under Glass in Great Britain* (1887–1894), throughout the 19th century. Today such orthographic errors are simply corrected by convention and the accepted name of the species is *Scuticaria steelei*.

John Lindley (1837) remarked that the species “would seem common [in Demerara] if we are to judge from the large quantity of it that has been introduced within the last two years.” Certainly, *Scuticaria steelei* was sought after among orchid growers, and, in the



114 THE

SALES BY AUCTION.

Friday Next.
By order of Messrs. W. L. Lewis & Co., of Chase Side,
Southgate,
An Importation of about 700
CATTLEYA AUREA
(the Gem of all the Cattleyas),
Including many grand pieces in exceptionally fine condition ;
and having been gathered in districts whence such treasures
as *Cattleya Hardyana Massowanii* and kindred varieties
emanate, it is only reasonable to expect that many fine
hybrids and varieties will appear amongst these. All the
plants received are offered.
Also about 40 plants of *ODONTOGLOSSUM ROEZZII*, best
type, in magnificent order.

MESSRS. PROTHEROE AND MORRIS will
SELL the above by AUCTION, at their Central Sale
Rooms, 67 and 68, Cheapside, London, E.C., on **FRIDAY
NEXT, August 10, at half past 12 o'Clock.**
On view morning of Sale, and Catalogues had.

Friday Next.
Six Cases of ODONTOGLOSSUM ALEXANDRÆ (Pecho
variety), received direct for Unreserved Sale.
An importation of *LÆLIA TENEBROSA*, *CATTLEYA
CRISPA*, *SOPHRONIUS GRANDIFLORA*, *ONCIDIUM CON-
COLOR*, *O. FORBESI*, and *SCUTICARIA STEELI*, from
Messrs. F. Horsman & Co.

MESSRS. PROTHEROE AND MORRIS will
SELL the above by AUCTION, at their Central Sale
Rooms, 67 and 68, Cheapside, London, E.C., on **FRIDAY NEXT,
August 10, at half-past 12 o'Clock.**
On view morning of Sale, and Catalogues had.

5



second half of the century, the species was frequently listed for auction, together with other much-coveted species such as *Cattleya dowiana* var. *aurea* (then called simply *Cattleya aurea*) and *Oncidium alexandrae* (syn. *Odontoglossum crispum*; e.g., Anon August 4, 1894). In William Bull's 1895–1896 *A Catalogue of New, Rare and Beautiful Plants and Orchids*, plants from Brazil were offered at a price

- [3] The illustration by Miss Moss of *Scuticaria steelei* that accompanied the description by Hooker (1837). The plant is shown in an abnormal upright position, and the author's name is erroneously written as Miss Morse.
- [4] *Scuticaria steelei* cultivated on a block of wood in light conditions in the Royal Botanic Garden Glasnevin, Dublin (Anon

April 1918).

- [5] *Scuticaria steelei* offered at auction by the London auctioneers of Messrs. Protheroe and Morris. As announced in the *Gardeners' Chronicle* on (Anon, August 4, 1894).
- [6] *Scuticaria steelei* drawn by Margaret Mee on the upper reaches of the Rio Negro, Brazil. May 1972.

of 15 shillings, equivalent to two days' wages for a skilled tradesman. Although considerable, this was toward the lower end of asking prices for imported orchid plants. Varieties of *Onc. alexandrae*, for example, were valued at 4–6 times this amount.

The species, however, was not easily cultivated. Orchid grower W.H. White (1894) shared his tips: "*Scuticaria steelei* requires an East-India house temperature, and should be suspended well up to the roof glass in the lightest position." The plants "may be either attached to flat blocks of Teak-wood, with a little sphagnum about the roots, or be placed in shallow baskets. The success of cultivating them depends more on temperature and atmosphere of the house than on anything else. When in full growth they should be freely syringed, but during the resting season they will need to be dried, though it must not be carried so far as to cause the foliage to shrivel."

However, a 1904 article in the *Orchid Review* grumbled that "although large quantities have been introduced it cannot be called common in cultivation, partly, perhaps, because it is not a very accommodating plant," and attributed the lack of success to the fact that "very little is known of the conditions under which it grows in a wild state."

By 1918, the *Orchid Review* could observe that this species "has been known for upwards of eighty years, but is not often seen in good condition at the present time." To this day, *Scuticaria steelei* remains a challenge to cultivate, and is only rarely seen in private collections and orchid shows.

Despite, or perhaps because of, its abundance in shipments during the 19th century, the species is also now considered rare in nature. The first description of its habitat was provided by the explorers and natural historian brothers Schomburgk, during their exploration of British Guiana in 1840 to 1844, as "on the banks of the rivers Essequibo and Demerara, growing on the trunks of trees, and flowering in June and July (J. Veitch & Sons 1887–94). From subsequent botanical studies we know that its distribution stretches across northern South America, where it is found in seasonally flooded, lowland forests. However, it is rarely seen in the wild.

The British explorer and botanical illustrator, Margaret Mee, undertook more than 15 expeditions across the Brazilian Amazon between 1956 and 1988. Only in May 1972, while exploring the Rio Daraá in the upper reaches of the

Rio Negro, did she find and illustrate a flowering specimen growing on the jará palm (*Leopoldinia pulchra*). In her diaries she later wrote: "It has been a fantastic trip and my finds have been very good – many beautiful orchids including the lovely perfumed *Scuticaria steelei*, yellow, spotted with chestnut, whose cylindrical leaves hang a meter long" (Mee 1988).

In Colombia, herbarium collections have been made from both Guainía (Bernal et al. 2020) and also, in July 1951 by the ethnobotanist Richard Evans Schultes along the Rio Kananari, a tributary of the Apaporis River in the Amazon watershed (Ministerio de Ambiente y Desarrollo Sostenible y Universidad Nacional de Colombia 2015).

SCUTICARIA STEELEI IN GUAINÍA, COLOMBIA

In January 2017, I was sitting with Hugo Mateus, an ecotourism guide based in Guainía, on the terrace of the small marketplace in Inírida, Guainía, in the shade of a large *saman* or rain tree (*Samanea saman*). We had finished a lunch of the traditional *ajicero*, a fish broth generously flavored with Amazonian chili, and *casabe*, tortillas made from freshly harvested cassava, and were discussing our plan for a guide to the orchids of Guainía, inspired by the abundance of *Cattleya violacea* to be seen along the rivers.

Hugo pulled out his phone to show me a photo of a flower. The yellow, darkly spotted sepals strongly suggested *Scuticaria steelei*, although the quality was not the best. He had taken it three years previously, while exploring the headwaters of Caño Bocón, some two days' upriver from Inírida. To pass some rapids and continue their trip, the men had to pull their boat over the rocks and dry land, and it was then that Hugo noticed the bright yellow flower, more than 49 feet (15 m) up in a tree overhanging the water. The photo was taken at an unflattering angle, but the only possible one. Since this trip, Hugo had not returned to these rapids, nor had he seen the distinctive plant during his frequent excursions on other rivers in Guainía. We needed a better photo for the guide. We looked at each other, and he said "¡vamos!" (Let's go!). I needed no further persuasion.

It took, however, more than two years for the trip to crystallize, and finally, in June 2019, we had the boat packed up with supplies, and, most importantly, the five 20-gallon (75.7 L) tanks of gasoline needed to make the return trip to the *Saube* rapids. We were late starting, and

as dusk was falling we had passed four villages, but had still not reached Barranco Tigre, the last community upriver, where we had planned to stay the night.

Navigating at night is never recommended, and Hugo made the decision that we had to sleep on the river. With the high water, the only option was to find a sheltered inlet where the boat could be tied to a tree. Hugo took some time choosing the tree, to avoid the possibility, he told me, of snakes or even a jaguar coming into the boat. By the time we had inflated our mattresses and hung the mosquito nets from the boat canopy it was pitch dark. As I lay, marveling at the vast expanse of forest around me, I heard a soft movement in the water, and thought immediately of an anaconda. Then came a gentle call of greeting: the local village captain, who, while out fishing, had come to see what the noise was. To his great surprise, Hugo explained to him that we were heading to *Saube*. The Puinave rarely go that far upriver.

Accompanied by the early morning calls from the scarlet macaws flying high across the river, we made it to Barranco Tigre, where we stopped to request permission to continue through the indigenous reserve. Though we invited someone from the community to accompany us (and we had brought sufficient supplies with this in mind), our offer was politely declined, although permission was granted. Hugo is well trusted by the community, and Edgar, the village captain asked us to report back on the state of his summer camp further upriver.

Throughout the rest of the day we continued upriver, the blue sky and small cumulus clouds reflected perfectly in the black water. As the sun lowered, and the forested banks gradually drew nearer, clumps of foam appeared on the river surface, signaling our approach to the rapids. Sitting on the prow of the boat, I looked expectantly around each curve of the river until finally the rapids came roaring into sight. Since his arrival in Guainía in 1978, Hugo has nurtured a strong interest in indigenous mythology, and he shared this knowledge with me. The *Saube* Rapids are a sacred place, where according to Puinave mythology, the god of fishes, *Jun*, ordered his son, *Io*, to stand at this place so as to prevent the passage of the fish upriver. *Io* disobeyed his father, and, as punishment he was whipped and turned to stone. During the dry season this rock with whiplashes can be seen jutting from the rapids, close to

the entrance to the Anaconda's cave. Also sacred, the cave can only be entered after fasting and undertaking a purification ceremony with a *payé* (shaman). Now the river was in full flood, but there was still a small beach just below the rapids, where, with failing light, we quickly made camp.

The next morning, we crossed the river below the rapids to where Hugo had seen the *Scuticaria*. It took a while for him to find the tree again, and when he did, disappointingly, the long gray tresses hung limply with no sign of a flower. For two more days we explored the surrounding forest, to no avail. We saw no more *Scuticaria* plants, although there were other wonders to treasure. Passing through one small clearing, we surprised a large congregation of sulfur butterflies (*Pheobis* species) fluttering around a small patch of ground. Hugo explained, casually, "a jaguar passed by here last night." The butterflies were feeding on the salts in a patch of urine that marked her territory.

Eventually, we decided to return downriver and explore some of the smaller tributaries. However, our gasoline supply was down, and our reach was limited. We turned into a river that quickly narrowed into sharp meanders. Although late morning, the air was fresh from the small hills that now shaded the water. Navigating these serpentine rivers is hypnotic; one feels an insistent desire to see around the next curve. But, Hugo, watching the gas level slowly sink, started to call periodically from the motor at the back that we should think about turning around. I resisted, recklessly convinced we could easily paddle the boat down river.

Finally, of course, I spotted what we were looking for. But once again the striking, yellow mottled flowers were high up in the branches of a tree overhanging the water. We stopped, and tied the boat to various moorings while I stretched and strained to get photos from all possible angles. The sun was high and the plant was an unforgiving silhouette. I was not satisfied, and pleaded with Hugo for us to continue on just a few curves more. Reluctantly, he agreed, and my instinct paid off. Perhaps two curves further on, the river widened into a *rebalse*, an open flooded forest, and there, right in front of us, at eye level was a small population of *Scuticaria steelei* plants in flower, their long tresses dangling in the clear water. The trunks were shared with several other orchid species, including *Eriopsis* species. As we drew closer, and killed the motor, the sharp citrus smell wafted over the

water. It was a breathtaking moment.

It was tough to leave this spectacularly beautiful sight in the heart of the Northwest Amazon forest, nestled two days by river from the nearest human habitation. Promising to return, and explore further this orchid treasure trove, we retraced our route. Our gasoline did run out, and we did have to paddle for almost a day, and sleep again on the river, but, with our slow, silent pace the sounds of the forest grew louder, and the splashes of the inquisitive river dolphins kept us company. On reaching Barranco Tigre we were an object of intense curiosity. Almost, perhaps, as if they were not expecting us back. As the conversation flowed, I caught hold of the odd comment. "I would never think of going to *Saube* without at least six people." In *Saube* there is always a *tigre* (jaguar) guarding the rapids." I did wonder why all this had not been mentioned on our trip out. But, actually, I was pretty glad they had kept their own counsel.

Our explorations of the forests and rivers of Guainía continue, with, in more accessible areas, enthusiastic participation from the local Puinave and Curripaco communities with whom Hugo works closely to offer ecotourism trips. In April 2017 we produced a first field guide to the orchids of the region, as an aid for the community ecotourism guides (Ospina-Calderón et al. 2017).

This year we will publish a more extensive guide with close to 100 spectacular Amazon species. We hope that many more orchid enthusiasts will wish to see the remarkable orchid diversity still present in the forests of these indigenous territories. Through such ecotourism activities, the communities benefit from the local biodiversity, and are thereby incentivized to conserve it.

— Nicola S. Flanagan, PhD is an orchid conservation biologist based at the Pontificia Universidad Javeriana, Cali, Colombia (email: flanagan.ns@gmail.com).

References

- Anon. 1839. *Brassavola cuspidata*. The Spear-Lipped *Brassavola*. The *Floricultural Cabinet and Florist's Magazine* 7:140.
- _. April 1904. *Scuticaria steelei*. *Orchid Review* 12:105.
- _. April 1918. *Scuticaria steelei*. *Orchid Review* 26:88.
- _. August 4, 1894. Sales by Auction. *Gardeners' Chronicle Series* 3 16:114.
- Bernal, R., S.R. Gradstein, and M. Celis, editors. *Catálogo de Plantas y Líquenes*

de Colombia.

- Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá. <http://catalogoplantascobolombia.unal.edu.co>. Accessed March 15, 2020.
- Centre for the Study of the Legacies of British Slave-ownership. https://www.ucl.ac.uk/lbs/_ Accessed March 15, 2020.
- Hooker, W.J. 1837. *Maxillaria steelii*. Mr. Steele's *Maxillaria*. *Curtis's Botanical Magazine* 64:t.3573.
- J. Veitch & Sons. 1887–1894. *A Manual of Orchidaceous Plants Cultivated Under Glass in Great Britain: Vol. I: Epidendreae*. J. Veitch & Sons, London, England.
- Lindley, J. 1837. *Maxillaria steelii*. Mr. Steel's *Maxillaria*. *Edwards's Botanical Register* 23:t.1986.
- _. 1843. *Scuticaria*. *Edwards's Botanical Register* 29:misc.14
- Mee, M. 1988. In T. Morrison (ed.), *Margaret Mee in Search of Flowers of the Amazon Forests: Diaries of an English Artist Reveal the Beauty of the Vanishing Rainforest*. Nonesuch Expeditions Ltd., Woodbridge, England. p. 203.
- Ministerio de Ambiente y Desarrollo Sostenible y Universidad Nacional de Colombia. 2015. *Plan para el estudio y la conservación de las orquídeas en Colombia*. Textos: J. Betancur, H. Sarmiento-L., L. Toro-González, and J. Valencia. Ministerio de Ambiente y Desarrollo Sostenible y Universidad Nacional de Colombia, Bogotá D.C. p. 336.
- Ospina-Calderón, N.H., M. Mendoza, L.T. García Agapito, H.A. Mateus, J. Vásquez, C. Delgado-Mazuera, A.T. Mosquera-Espinosa, and N.S. Flanagan. 2017. *Guía a las Orquídeas de la Estrella Fluvial de Inírida, Guainía, norte de Amazonas, Colombia*. <http://fieldguides.fieldmuseum.org/guides/guide/932>. Last accessed May 26, 2020.
- Vidal, S.M. 2000. Kuwé Duwákalumi: The Arawak Sacred Routes of Migration, Trade, and Resistance. *Ethnohistory* 47(3):635–667
- White, W.H. 1894, Nov. 3. Orchid Grower, Burford, Dorking. *Gardeners' Chronicle Series* 3 16:535

Orchid Cabinet

MADELINE FOERSTER

I CREATED THIS painting to explore the beauty of orchids, and also how that beauty inspires an obsessive and sometimes fatal relationship with the human race. I understand this obsession, as I myself find orchids endlessly inspiring. But I felt that its darker side was a deserving topic for a painting. The orchids depicted come from many different regions of the world, but what they have in common is that they are zealously collected from the wild — and almost all are endangered for that reason.

Endangered-plant smuggling is worth up to \$6 billion a year worldwide, with orchids accounting for many millions of dollars. Often when a new species is discovered, poachers remove it and then destroy its original habitat in an attempt to increase its rarity. Illegal collectors may be wiping out species before they are even known to science.

The cabinet figure carved of ebony wood represents Mother Nature, packed and crated for shipment. On display are the following orchids, with their status from the International Union for Conservation of Nature (IUCN), or listing in the Convention on International Trade in Endangered Species (CITES) provided in parentheses:

Phalaenopsis hainanensis (Critically Endangered), China. Found growing on rocks in Hainan and Yunnan provinces of China in forests at elevations around 6,200 feet (1,900 m).

Houlletia tigrina (CITES Appendix II. Not IUCN listed, but locally extinct or endangered), Guatemala to western Ecuador.

Vanda coerulea (CITES Appendix II), India. This orchid is prized for its beauty and medicinal purposes. It was considered extremely rare in the wild, having only been recorded in the Khasia Hills of Assam, where it was overcollected and put at further risk by local charcoal production using the oak trees on which it

grows. It is now known to be widespread and relatively common in the Himalayan region. Consequently it has recently been removed from CITES Appendix I, although it faces continued threats from illegal wild collection and habitat destruction and the species remains on CITES Appendix II.

Cattleya labiata (Vulnerable), Brazil — the ruby-lipped cattleya. This orchid is considered the “mother” of all other cultivated *Cattleya* species. It was originally collected in the jungle in 1818, but was unfortunately not found again for 71 years, possibly because of deforestation for early plantations in Brazil. This story has unfortunately been repeated many times with other species (Wetter 2007).

Diagram showing mycorrhizal rhizoctonia: Orchid species have symbiotic relationships with special fungi specific to each species. These fungi, or mycorrhiza, nourish the germinating orchid seeds, and then receive nutrients from the growing plant in return (Dearnaley and Cameron 2016). The presence of a certain mycorrhiza can be absolutely necessary for the orchid’s growth, which explains why some orchids are so rare or only grow in a limited range — they are dependent on the unique fungal offerings of their habitat (Swarts et al. 2010). This is why conservation of orchid habitat, rather than trying to save species through collecting, is so critical.

Ansellia africana (Vulnerable) — the leopard orchid, found in neotropical and subtropical Africa. Although this orchid is native to a large geographic range, it is described as vulnerable because of constant harvesting. Moreover, whole trees or even entire areas are destroyed during its collection (Crook 2013).

Paphiopedilum fowliei (Critically Endangered), Philippines. The slipper orchids are some of the most threatened. Of the 70 known species of *Paphiopedilum*, more than half are at risk of extinction;

three are already extinct. Some plants can fetch prices running into thousands of dollars. All are listed in Appendix I of CITES.

Cypripedium formosanum (Endangered), Taiwan. This species is restricted to the central mountains of Taiwan, where it grows in mountain forests and bogs. Its population is decreasing, according to the IUCN, because of “ruthless collection” for horticultural and medicinal purposes.

Angraecum sesquipedale (CITES Appendix II) — Darwin’s orchid; an endemic of Madagascar. When Charles Darwin was sent a specimen of this orchid in 1862, he predicted that the long nectar spur (measuring up to 14 inches [35 cm]) must have co-evolved with a pollinating moth with an equally long proboscis. However, it was not until after Darwin’s death that the pollinator was eventually discovered — the Malagasy subspecies of the African hawkmoth — which was given the scientific name *Xanthopan morgani praedicta* in honor of his prediction. All of Madagascar’s orchids face loss of habitat, and the most beautiful and rarest species are threatened by overcollection (Unknown author 2018). Darwin’s orchid is protected under CITES for this reason. But fortunately, many specimens available in cultivation have been propagated from seed rather than taken from the wild.

A careful observer might notice that the hand of the figure is amputated from the body. This detail symbolizes our increasingly fragmented and shrinking wilderness, the existential threat to orchids worldwide.

The painting also includes three threatened beetles: like orchids, many beetles suffer the twin dangers of habitat loss and being “loved” to death. Although no beetle species are listed by CITES or have overcollection given as a reason for their endangerment by the IUCN, countless species are nevertheless

rapidly disappearing because of the beetle trade. Certain specimens can command thousands of dollars (Beeton 1997), and although the beetle trade can be an important source of income for poor communities in forest regions, current harvesting techniques are often unsustainable (Muafor et al. 2012). Shown here are *Mecynorrhina kraatzii* (left) and *Stephanocrates preussi* (right); both species endemic to mountain forest ecosystems of West Cameroon and described by researchers as “highly declining” (Muafor et al. 2012) and *Carabus olympiae* (Vulnerable; center), endemic to just one area of the Italian Alps, where its habitat is under threat from development.

The airline baggage label is intended as a reminder: every hour of the day, every day of the year endangered species of all kinds are being trafficked across the planet. You may well have shared a plane with a smuggled carnivorous plant, parrot, beetle, gecko, cactus, tropical fish, or orchid. Many or most of these living things will not survive the journey. How can you avoid being part of the problem? Do research and ask tough questions before you buy. Do not assume all sellers have high ethical standards: endangered, banned orchids are often openly displayed in prestigious nurseries (Kelsey 1992) or garden shows (Doyle 1995). Speak up when you see questionable wildlife products for sale. Finally, do we really need to “own” the rarest living things? Observing nature in the wild — even in your own locality — is also satisfying and provides a more compassionate, harmonious encounter with the natural world.

— Madeline von Foerster is an American painter living and working in Germany. Limited edition prints of *Orchid Cabinet* are available on her website, with 20% of proceeds being donated to orchid conservation. www.madelinevonfoerster.com.



www.madelinevonfoerster.com.

REFERENCES

Beeton, B. 1997. Editorial Comments: Quote Out of Context — Coloph. *TUGboat* 18(1):5–6.

Crook, V. 2013. *Ansellia africana*. *The IUCN Red List of Threatened Species 2013*: e.T44392142A44437667. <https://dx.doi.org/10.2305/IUCN.UK.2013-1.RLTS.T44392142A44437667.en>. Last accessed May 14, 2020.

Dearnaley, J., and D. Cameron. 2016. Nitrogen Transport in the Orchid Mycorrhizal Symbiosis — Further Evidence for a Mutualistic Association. *New Phytologist* 213(1):10–12.

Doyle, J. 1995. Black Market Orchids/A Global Underground Smuggling Network May Drive Some Rare Species Into Extinction. www.sfgate.net. Last accessed May 14, 2020.

Kelsey, T. 1992. Illegal Trade Threatens Rare Wild Flowers With Extinction: Widespread Smuggling Throughout

the European Community Is Putting the Future of Some Species of Orchids and Cacti in Jeopardy. www.independent.co.uk. Last accessed May 14, 2020.

Muafor, F.J., P. Levang, T.E. Angwafo, and P. Le Gall. 2012. Making a Living With Forest Insects: Beetles as an Income Source in Southwest Cameroon. *International Forestry Review* 14(4). Last accessed May 14, 2020.

Swarts, N.D., E.A. Sinclear, A. Francis, and K.W. Dixon. 2010. Ecological Specialization in Mycorrhizal Symbiosis Leads to Rarity in an Endangered Orchid. *Molecular Ecology* 19(15):3226–3242.

Unknown author. 2018. Darwin’s Orchid (*Angraecum sesquipedale*). www.arkive.org. Last accessed May 14, 2020.

Wetter, P.A. 2007. *CITES, Orchid Judging, and Endangered Species*. <http://www.aos.org/Orchid-Awards-and-Judging/Judges-Forum.aspx>. Accessed May 14, 2020.

Cuban Treasures

The Ghostly Caribbean Treasures of Guanahacabibes National Park, Cuba

LAWRENCE W. ZETTLER, ERNESTO MÚJICA AND ALEJANDRO CAMEJO VERGARA

IMAGINE A LONELY stretch of unspoiled tropical coastline where there are no hotels as far as the eye can see in any direction, and nesting sea turtles far outnumber the human inhabitants. The tallest building is an operational lighthouse originally built in the 1850s by the Spaniards. Running parallel to this coastline is a sun-battered two-lane road covered by thousands of red crabs (*Gecarcinus ruricola*) that march in step between land and sea during the breeding season in April and May. The road is shared by wild pigs that forage on fruits of fallen sea grapes, land iguanas that bolt across the road only to vanish into the thick foliage, and an occasional vintage American car seen sputtering along heading east in the direction of Havana, or west towards the sunset. Between the road and Caribbean Sea are clusters of dwarf thatch palms (*Thrinax radiata*) that almost seem as if they were transplanted out of the pages of a Dr. Seuss book onto the white sands of western Cuba. This is Guanahacabibes National Park, a UNESCO Biosphere Reserve — known for its unique biological diversity including the world's smallest bird, the bee hummingbird (*Mellisuga helenae*), the second smallest frog, and yes, orchids — lots of them.

Located on the westernmost tip of Cuba, Guanahacabibes National Park is only 375 miles (600 km) from the Florida Everglades and Fakahatchee Strand, but getting there legally or otherwise, is a challenge for most US citizens. Once there, visitors are immersed in a rich assemblage of biological diversity including several endemic plants and animals found nowhere else on Earth. The list includes 221 species of birds (26 Cuban endemics, 16 endemic to Guanahacabibes), 15 amphibians, 35 different kinds of reptiles, nearly 100 butterflies and 24 mammals including the Cuban greater funnel-eared bat (*Natalus primus*) endemic to a single cave on the peninsula. Offshore is a world-famous coral reef tract that harbors 42 different kinds of coral, 221 species of fish, 39 sponges and at least



1,000 mollusks, 10 of which are endemic. The orchid flora is represented by 32 species including three endemics found only in Guanahacabibes Peninsula, *Encyclia bocourtii* (Pupulin and Mújica 2005), *Acianthera* (*Phloeophila oricola*, and *Broughtonia* × *guanahacabibensis*, a natural hybrid of *Broughtonia cubensis* (Mújica et al. 2015).

Given Cuba's close proximity to southern Florida, there are a surprising number of epiphytic and terrestrial orchids found in both regions, including the rare ghost orchid (*Dendrophylax lindenii*), considered North America's signature orchid and the subject of considerable interest on a global stage. Carlyle Luer, in his epic book, *The Native Orchids of Florida* (1972), placed the number at roughly 60 species, most notably epiphytes such as the ribbon orchid (*Campylocentrum pachyrrhizum*), cigar orchid (*Cyrtopodium punctatum*), jingle bell orchid (*Dendrophylax porrectus*), night fragrant epidendrum (*Epidendrum nocturnum*), rigid epidendrum (*Epidendrum rigidum*), yellow helmet orchid (*Polystachya*



concreta), clamshell orchid (*Prosthechea cochleata*) and Florida dollar orchid (*Prosthechea boothiana*).

Among terrestrials, the southern ladies' tress (*Spiranthes torta*) frequents open sandy patches along the ground,

serving as a reminder that not all orchids in the tropics colonize trees. But what other orchids are found in Guanahacabibes National Park that are not found in southern Florida? And why are these orchids not also found in Florida? According to Luer (1972), “The climate is a barrier to migrations northward, and the climate is also a barrier to migrations southward within the [Florida] peninsula by species from the North” (p. 11). In southern Florida, cold-sensitive epiphytic orchids are typically found in cypress “domes” and strand swamps on the branches of woody trees rooted in standing water. It is assumed that the high relative humidity levels within the dome serve to insulate the orchids from occasional subfreezing temperatures, whereas in Cuba, subfreezing temperatures do not occur. Thus, it seems reasonable that Luer was correct but other factors are probably involved, otherwise there would likely be even more Cuban orchids in southern Florida. Given that many orchids are intimately tied to specific mycorrhizal fungi and insect pollinators to complete their life cycles, the lack of one or both biotic agents in Florida may explain why there are not more Cuban orchids there. Both of these agents are, themselves, closely tied to habitat, and this is where researchers should look for answers.

In November of 2012, we began a research collaboration aimed at studying the ghost orchid and its habitat in our respective countries. The genesis of this collaboration began on the equator in the port city of Guayaquil, Ecuador, at the 4th Andean Orchid Conference where we gave research talks. The purpose of the conference and others in the series, originally conceived in 2004 by Pepe Portilla and Alec Pridgeon, was to: (1) convene experts from the region to share their knowledge promoting orchid protection and preservation, and (2) help train students across the Americas in techniques that can be applied to orchid research in their own countries (Pridgeon 2013). Because both of our talks involved the ghost orchid, we were placed in the same session, and afterward we became better acquainted during our lunch break. With the help of Illinois College professor, Steven M. Gardner, who kindly bridged the language barrier for us, we were able to learn more about the orchids in our two countries, and the ghost orchid in particular. It soon became apparent that *Dlax. lindenii* occupied very different habitats, and yet it was rare. When Mújica was asked, “Do you



wear tall boots to avoid being bitten by venomous snakes when you’re studying orchids in Guanahacabibes?” he looked puzzled and responded, “What do you mean? There are no such snakes in Cuba.” Zettler then followed with, “Wow! That must be a relief. In Florida, you also have to be careful not to step on submerged alligators when wading in deep water to study the orchids.” Mújica’s facial expressions were priceless — a mixture of amusement, disbelief and horror. “We have crocodiles in Cuba, not alligators, and not where the orchids are found. Just sharp rocks, heat and mosquitoes.” Zettler followed with, “I find that hard to believe. You mean there is no standing water in Guanahacabibes? There has to be some way for me to see your sites in Cuba, even if it means swimming there myself from the Cayman Islands.” Mújica’s serious gaze quickly gave way to a smile — his first that day, and he ended our conversation with, “Don’t worry. I invite you to Cuba.”

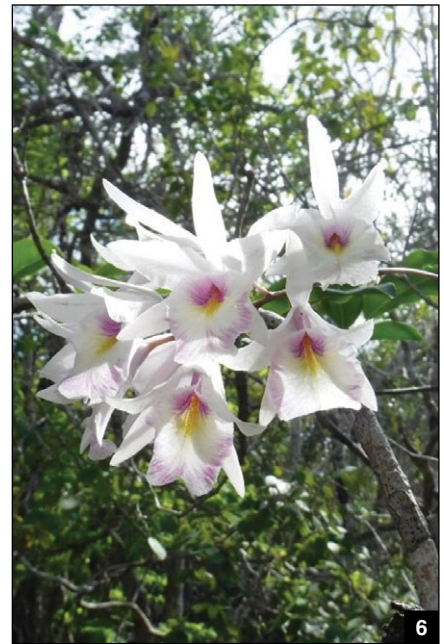
For US citizens, unrestricted travel to Cuba has remained largely forbidden for over half a century with one brief exception from 2014 to 2016, but now seems like a distant memory. For US researchers, however, travel to Cuba is permitted with proper documentation starting with an official letter of invitation. Mújica’s official invitation that was extended over lunch in 2012 led to Zettler’s first trip to Guanahacabibes National Park in August of 2013. This was followed by Mújica’s first trip to the US when he visited the Florida Panther National Wildlife Refuge in July of 2015, made possible by funds from the Naples Orchid Society. Mújica’s arrival

- [1] Coastline of Guanahacabibes National Park, Cuba looking east along the peninsula where 32 species of orchids are known to occur including three that are endemic to the peninsula.
- [2] *Encyilia bocourtii*. This recently described species, named in honor of José Bocourt — Director of Soroa Orchid Garden, is found throughout the park, but especially within 100 m of the shoreline. About 30% of *E. bocourtii* surveyed colonize dead woody branches. At midday, the flowers emit a fragrance reminiscent of cotton candy and are assumed to be pollinated by bees. This species is particularly vulnerable to sea level rise given that its habitat is in low lying areas close to shore.
- [3] Lawrence Zettler (right) and Steven Gardner (left) are pictured with Ernesto Mújica (center) at the entrance of Guanahacabibes National Park during the first trip to western Cuba in August 2013. The world’s smallest bird (bee hummingbird) was observed during the first day of the visit in the trees on the right. [Jennifer A. Zettler]

coincided with the warming of US–Cuban relations at the time and exemplified how researchers in both countries were just beginning to realize the importance of working together to save vulnerable species in the region from extinction. For members of the plant kingdom, the ghost orchid served as a perfect ambassador given its natural beauty and long-standing

prominence triggered by Susan Orlean's best-selling novel, *The Orchid Thief*, and the Hollywood movie, *Adaptation*, that ensued. When Mújica first arrived at the Panther Refuge, only 16 ghost orchids were known to occur there, scattered among different host trees in a handful of sites. When he returned to Cuba after four weeks of surveying, 100 new ghost orchids were documented in the Panther Refuge leading to an international media blitz that publicized his success. The survey also led to our first peer-reviewed scientific paper (Mújica et al. 2018) that documented *Dlax. lindenii*'s habitat in both countries, and identified some of the orchid's acute environmental needs, laying the groundwork for its long-term conservation. At the same time, critical breakthroughs were being made by Mike Kane's students at the University of Florida aimed at understanding *Dlax. lindenii*'s seed germination requirements (Hoang et al. 2017) and greenhouse establishment of seedlings for reintroduction (Coopman and Kane 2018).

To the eye, it is striking just how different the orchid habitats in Guanahacabibes are from the shaded, swampy cypress domes in southern Florida. The landscape in western Cuba is pockmarked by dangerously sharp, jagged reef limestone riddled with fossil sea creatures from a warmer bygone age. In some areas within the park, the limestone surface is continuous, forming a sizable dome or shield that appears to ripple from extreme heat in the afternoon sun — a scene reminiscent of the first photos transmitted to Earth by the Soviet Venera lander from the surface of Venus. Only a few stunted trees and lianas are able to colonize the forbidding surface serving as an anchor point for some of the showiest and unique orchids in all of Guanahacabibes. These include a natural hybrid between *Broughtonia cubensis* and *Broughtonia ortgiesiana* (Mújica 2015), *Encyclia fucata*, *Encyclia plicata* and three species of *Tolumnia* (*Tolu. guibertiana*, *Tolu. lemoniana*, *Tolu. lucayana*). Roughly 90 percent of the *Tolumnia* species on the peninsula colonize lianas that can be seen twisting vertically into overhanging branches, suggesting that these orchids may be associated with specific mycorrhizal fungi present in the bark of the vine needed for seed germination. If true, the lack of such vines and the mycorrhizal fungi they harbor may explain why these *Tolumnia* species are absent in southern Florida. On the edges of these rocky domes, where the rocks begin to



SAVANNAH RENKEN

crumble and fill with pockets of moist organic matter, a semideciduous forest begins to take root, serving as host trees for additional orchid species in the park. Unlike in southern Florida, where the epiphytic orchids are affixed to the bark of a handful of host tree species (e.g., pop ash, pond apple, bald cypress), more than two dozen host trees serve this purpose in Guanahacabibes, 18 of which support *Dlax. lindenii* as Mújica et al. (2018) revealed. Most of the peninsula's 200+ ghost orchids, however, colonize three tree species: *Diospyros crassinervis* (16.2 percent), *Erythroxylum aerolatum* (15.4 percent), and *Comocladia dentata* (14.9 percent), many of which grow within

[4–6] This sunbaked rocky landscape along the westernmost tip of Cuba caters to at least 16 of the 32 orchid species found on Guanahacabibes Peninsula including some of the most beautiful and well-known orchids in the Caribbean. Among these include *Encyclia bocourtii*, *E. plicata*, three *Tolumnia* species, and a recently described new natural hybrid of *Broughtonia cubensis* and *Broughtonia ortgiesiana* [6]. The semideciduous forest seen in the background consists of at least 18 different tree species that serve as host to Cuba's ghost orchid, *Dendrophylax lindenii*, assumed to be the same species found in southern Florida.

earshot of the rolling surf of nearby beaches.

Other orchids found in Guanahacabibes that are notably absent from Florida include two other *Broughtonia* species (*Bro. lindenii*, *Bro. ortgiesiana*) and five other *Encyclia* species (*E. bocourtii*, *E. fucata*, *E. grisebachiana*, *E. phoenicea* and *E. pyriformis*). Of these, *E. phoenicea* is well-known for its fragrant flowers reminiscent of milk chocolate. Orchids are famous for their unique floral fragrances that consist of a subtle blend of chemicals, yet surprisingly few (approx. 3 percent) of the world's 27,000+ orchid species have been analyzed with respect to their fragrance composition. This select list does, however, include a handful of species in southern Florida including *Dlax. lindenii* (Sadler et al. 2011), *Cyrtopodium punctatum* (Dutra et al. 2009) and *Prosthechea cochleata* (Ray et al. 2018), but Cuban orchids remain virtually unstudied. Given that the capture of volatile chemicals emitted by flowers does not involve the collection of orchid material, sampling the orchids in Guanahacabibes for their floral fragrance might be possible with minimal permit restrictions, and this aspect is currently being explored by at least one researcher in the US (Haleigh Ray, Stetson University). Of particular interest would be to analyze the fragrance of *E. phoenicea* and the endemics of Guanahacabibes. Also being discussed is the sampling of the Cuban ghost orchid population and comparing the chemical composition to *Dlax. lindenii* in Florida. All of these plans, of course, hinge on the immediate and long-term survival of the region's orchids, which are afforded protection within the boundaries of a national park. But are these species actually secure? And if so, for how long?

In Cuba and throughout the world, orchids are threatened by a multitude of factors that pose a grave threat to over half of the world's species. These factors typically include poaching, habitat destruction, invasive species, loss of pollinators and climate change — the same “fearsome five” that threaten the natural habitats of orchids. In Cuba, poaching remains an omnipresent threat, whereas climate change probably poses the greatest imminent threat in the decades ahead. When Zettler inquired about the specifics for someone who is convicted of poaching orchids in a Cuban national park, one wildlife biologist answered matter-of-factly, “They would not be seen for a very long time.” When the question was posed again to another Cuban expert just this



past year, he replied, “It would be a big fine and probably 10–15 years in prison — at least.” The effects of climate change are already being felt in Guanahacabibes evidenced by the frequency and severity of tropical cyclone activity. On September 13, 2004, for example, Hurricane Ivan passed directly over the park as a Category 5 storm resulting in a loss 60 percent of the ghost orchids at the site (Mújica 2007). Raventós et al. (2015) projected that ghost orchids in Guanahacabibes Peninsula could become extinct in the next 25 years if the annual probability of disturbances (e.g., hurricanes) exceeds 14 percent. Part of this conclusion was based on studies

- [7] *Encyclia plicata* seen in full bloom in August 2013 on the western tip of Cuba
- [8] A similar co-existing species, *Encyclia phoenicea*, is well-known for its fragrance that is said to smell like milk chocolate.
- [9] One of the three *Tolumnia* species, probably *Tolu. lemoniana*, clinging to the bark of a vine. Surveys by Mujica have revealed that ca. 90% of all *Tolumnia* species in Guanahacabibes Peninsula colonize the bark of twisting lianas, possibly due to specific mycorrhizal fungi that may be present on the vine to stimulate seed germination.

by Mújica et al. (2013) that monitored *Dlax. lindenii*'s slow recovery following Hurricane Ivan. They also concluded that *Dlax. lindenii* relied heavily on seedling recruitment for population numbers to rebound, but recovery was hampered by low fruit set probably because of the hurricane's negative impact on the community of pollinators.

Sea level rise adds insult to the injury inflicted by hurricanes. When Zettler returned from Cuba in 2013, he contacted the late Mark Whitten at the University of Florida by email and gave him an update on the Cuban ghost orchid population. The message that Whitten sent back reflected the harsh reality of the situation at hand: "Does anyone have a long-term management plan for [*Dlax.*] *lindenii* given that its habitat will probably be flooded by sea level rise this century?" Indeed, we are all guilty of focusing on small details when more pressing tasks await our attention. The Whitten email has since served as our motivation to understand the orchid habitats in Florida and Cuba so that we can make more informed decisions on how to manage orchid populations in the future in the wake of sea level rise, now at a pace of ⅛-inch per year (3.2-mm per yr) and accelerating, according to NASA. At the current rate, most of the low-lying areas in Guanahacabibes and in southwest Florida will be flooded by the end of the century, and we must now act quickly to identify new potential habitats on higher ground, and to conserve the biotic agents as much as we can.

Unfortunately, there is now a sixth member added to the "fearsome five," one that has blindsided us in our endeavor to survey ghost orchids in our two countries — political interference. To provide land managers in Florida and Cuba with an assessment of whether or not ghost orchid populations are stable, in decline or increasing in size, at least five consecutive years of survey data are needed from each population, in this case the Florida Panther NWR and Guanahacabibes National Park. The computer models generated based on these data will provide much needed confidence in making intelligent decisions for the long-term management of *Dlax. lindenii* and other rare orchid species in these two areas. Essentially, the surveys provide a kind of "blueprint" for moving forward in light of existing threats. During a two-year period (2016 and 2017), ghost orchid surveys in the Florida Panther NWR went according to plan under Mújica's direct supervision, as he was able to visit the US after securing a visa from the U.S.

Embassy in Havana for each trip. However, the subsequent closure of that embassy, and a new wave of political interference, prevented Mújica from entering the US during the worst possible time, (i.e., when data from 2018 and 2019 were sorely needed). With the help of Illinois College undergraduate students, and especially Adam Herdman (now a graduate student), we were able to collect just enough data to scrape by after receiving instructions from Mújica in Cuba via frequent email communication. Regrettably, the ongoing political interference continues to be a serious obstacle and may or may not be lifted in the foreseeable future. As a result, our ghost orchid surveys remain in a precarious and fragile state, meaning that the ghost orchid's long-term survival through sound management will continue to hang by a thread. History has shown that the people who make decisions today will be judged by future generations — perhaps harshly. It would be an unspeakable blemish in the historical record if North America's signature orchid was to become extinct in the wild due to politics, but this scenario is not out of the realm of possibility.

Acknowledgments

We gratefully acknowledge many of our friends and colleagues in the US and Cuba for their long-standing support and useful information for our efforts: Elaine González Hernández, José L. Bocourt Vigil, José M. de la Cruz Mora, José A. Camejo Lamas, Lázaro Márquez LLaugert, Kit and La Raw Maran, Mark Danaher, Larry Richardson, Kevin Godsea, Ben Nottingham, Mitch Barazowski, Mike Kane, Jameson Coopman, Nguyen Hoang, Chad Washburn, Nick Ewy, Haleigh Ray, Lynnaun Johnson, Jennifer Zettler, Adam Herdman, Shannon Skarha, Justin Mably, Rach Helmich, Jack Waggoner, Mike Weisenfelder, Eve Bahler, Connor Melton, Hannah Baker, Jiaqu Lu, Michael LaRusso, Molly Gearin, Savannah Renken, Steven Gardner, Elizabeth Rellinger Zettler, Bryan Arnold and Laura Corey. We are especially grateful to the Naples Orchid Society for their generous annual funding for Dr. Mújica and student interns at the Florida Panther NWR. We also appreciate other funding sources that made this collaboration possible: Illinois Orchid Society, Prairie State Orchid Society, Kentucky Orchid Society, Native Orchid Conference, Inc., and Illinois College's Tillery Faculty-Student Research Fund. We extend thanks to the Naples Botanical Garden for their ongoing collaboration in ghost orchid research and restoration. We

Table 1. The list of orchid species known to occur in Guanahacabibes National Park, Cuba. Roughly half (14) of the 32 naturally occurring species also occur in southern Florida, denoted in **bold**. This list is based on the Management Plan for Guanahacabibes National Park.

<i>Bletia purpurea</i> (Lam.) de Candolle
<i>Broughtonia cubensis</i> (Lindl.) Cogn.
<i>Broughtonia cubensis</i> × <i>guanahacabibensis</i> Mújica Benítez, González & Díaz
<i>Broughtonia lindenii</i> (Lindl.) Dressler
<i>Broughtonia ortgiesiana</i> (Rchb. f.) Dressler
<i>Campylocentrum pachyrrhizum</i> (Rchb. f.) Rolfe
<i>Catasetum integerrimum</i> Hooker
<i>Cyrtopodium punctatum</i> (L.) Lindl.
<i>Dendrophylax barrettiae</i> Fawc. & Rendle
<i>Dendrophylax lindenii</i> (Lindl.) Benth. ex Rolfe
<i>Dendrophylax porrectus</i> (Rchb. f.) Carlsward et Whitten
<i>Encyclia bocourtii</i> Mújica & Pupulin
<i>Encyclia fucata</i> (Lindl.) Britt. & Millsp.
<i>Encyclia grisebachiana</i> (Cogn.) Acuña
<i>Encyclia phoenicea</i> (Lindl.) Neum.
<i>Encyclia plicata</i> (Lindl.) Britt. & Millsp.
<i>Encyclia pyriformis</i> (Lindl.) Schlechter
<i>Epidendrum amphistomum</i> A. Rich.
<i>Epidendrum nocturnum</i> Jacq.
<i>Epidendrum rigidum</i> Jacq.
<i>Oeceoclades maculata</i> (Lindl.) Lindl. (naturalized)
<i>Pleurothallis caymanense</i> Adams
<i>Pleurothallis oricola</i> H. Stenzel (now regarded as <i>Phloeophila oricola</i>)
<i>Polystachya concreta</i> (Jacq.) Garay & Sw.
<i>Prosthechea boothiana</i> (Lindl.) Higg.
<i>Prosthechea cochleata</i> (L.) Higg.
<i>Spiranthes torta</i> (Thunb.) Garay & Sw.
<i>Tolumnia guibertiana</i> (A. Rich.) Braem
<i>Tolumnia lemoniana</i> (Lindl.) Braem
<i>Tolumnia lucayana</i> (Nash) Braem
<i>Trichocentrum undulatum</i> (Sw.) Ackerman & Chase
<i>Vanilla dilloniana</i> Correll



10

especially thank those at the American Orchid Society, especially Tom Mirenda and Ron McHatton, for their willingness to consider this article for publication.

References

- Coopman, J. and M.E. Kane. 2018. Greenhouse Acclimatization Methods for Field Establishment of *In Vitro*-Derived Ghost Orchid (*Dendrophylax lindenii*) Plants. *Native Plants Journal* 19(2):100–108.
- Dutra, D., M.E. Kane, C. Reinhardt Adams, and L. Richardson. 2009. Reproductive Biology of *Cyrtopodium punctatum* in situ: Implications for Conservation of an Endangered Florida orchid. *Plant Species Biology* 24:92–103.
- Hoang, N.H., M.E. Kane, E.N. Radcliffe, L.W. Zettler, and L.W. Richardson. 2017. Comparative Seed Germination and Seedling Development of the Ghost Orchid, *Dendrophylax lindenii* (Orchidaceae), and Molecular Identification of its Mycorrhizal Fungus from South Florida. *Annals of Botany* 119(3):379–393. doi: <https://doi.org/10.1093/aob/mcw220>.
- Luer, C.A. 1972. *The Native Orchids of Florida*. The New York Botanical Garden, New York.
- Mújica, E.B. 2007. Ecología de las Orquídeas Epifitas *Broughtonia cubensis* (Lindley) Cogniaux, *Dendrophylax lindenii* (Lindley) Bentham ex Rolfe y *Encyclia bocourtii* Mújica et Pupulin en el Cabo San Antonia, Peninsula de Guanahacabibes, Cuba. Análisis espacio-temporal e implicaciones del impacto de un fenómeno atmosférico severo. PhD thesis, University of Alicante, Spain.
- Mújica, E.B., E. González, J.L. Bocourt, E.L. Santacruz, and J.M. Díaz. 2015. A New Natural Hybrid of *Broughtonia* (Orchidaceae) from Cuba. *Lankesteriana* 15(3):183–185. doi: <https://doi.org/10.15517/lank.v15i3.21432>.
- Mújica, E.B., J.J. Mably, S.M. Skarha, L.L. Corey, L.W. Richardson, M. Danaher, E. Gonzalez, and L.W. Zettler. 2018. A Comparison of Ghost Orchid (*Dendrophylax lindenii*) Habitats in Florida and Cuba, with Special Reference to Seedling Recruitment and Mycorrhizal Fungi. *Botanical Journal Linnean Society* 186(4):572–586. doi: <https://doi.org/10.1093/botlinnean/box106>.
- Mújica, E.B., J. Raventós, E. González, and A. Bonet. 2013. Long-Term Hurricane Effects on Populations of Two Epiphytic Orchid Species from Guanahacabibes Peninsula, Cuba. *Lankesteriana* 13:47–55.
- Pridgeon, A.M. 2013. Preface to Proceedings of the Fourth Scientific Conference on Andean Orchids, Guayaquil, Ecuador (October 31–November 4, 2012). *Lankesteriana* 13(1–2):IX.
- Pupulin, F. and E. Mújica B. 2005. Another New Species of *Encyclia* (Orchidaceae: Laeliinae) from Cuba. *Harvard Papers in Botany* 10(2):227–230.
- Raventós, J., E. González, E.B. Mújica, and D.F. Doak. 2015. Population Viability Analysis of the Epiphytic Ghost Orchid (*Dendrophylax lindenii*) in Cuba. *Biotropica* 47:179–189.
- Ray, H.A. C.J. Stuhl, and J.L. Gillett-Kaufman. 2018. Floral Fragrance Analysis of *Prosthechea cochleata* (Orchidaceae), an Endangered, Native Epiphytic Orchid, in Florida. *Plant Signaling Behavior* 13(1):e1422461. doi: <https://doi.org/10.1080/15592324.2017.1422461>.
- Sadler, J.J., J.M. Smith, L.W. Zettler, H.T. Alborn, and L.W. Richardson. 2011. Fragrance Composition of *Dendrophylax lindenii* (Lindley) Bentham ex Rolfe (Orchidaceae), Using a Novel Technique Applied in situ. *European Journal Environmental Sciences* 1(2):137–141.
- Lawrence W. Zettler, PhD, (corresponding author) is a Professor of Biology at Illinois College, and Director of the Orchid Recovery Program that integrates undergraduate student learning with orchid conservation projects around the world. He specializes in isolating and using mycorrhizal fungi to propagate rare orchids from seed (email lwzettle@ic.edu). Ernesto Mujica, PhD, has studied orchids for 27 years. He works at Soroa Orchid Botanic Garden in Cuba, where he is the Dean of the Research Department, Manager of the Living Orchid Collection, and Curator of the Herbaria. He has described three new orchid species, a new combination, and a new natural hybrid for the Island of Cuba. He is currently involved with conservation projects in Cuba and southern Florida. Alejandro Camejo Vergara, MS candidate, is a biologist who has worked in Guanahacabibes National Park, Cuba, since 2007.

NOMENCLATURE NOTES

Paphiopedilum villosum var. *laichaunum*

A New Variety From Vietnam

NGUYEN HOANG TUAN, NGUYEN SON HAI,
OLAF GRUSS AND CHU XUAN CANH



Paphiopedilum villosum var. *laichaunum*. Photograph by H.T. Nguyen.

GRUSS AND CANH

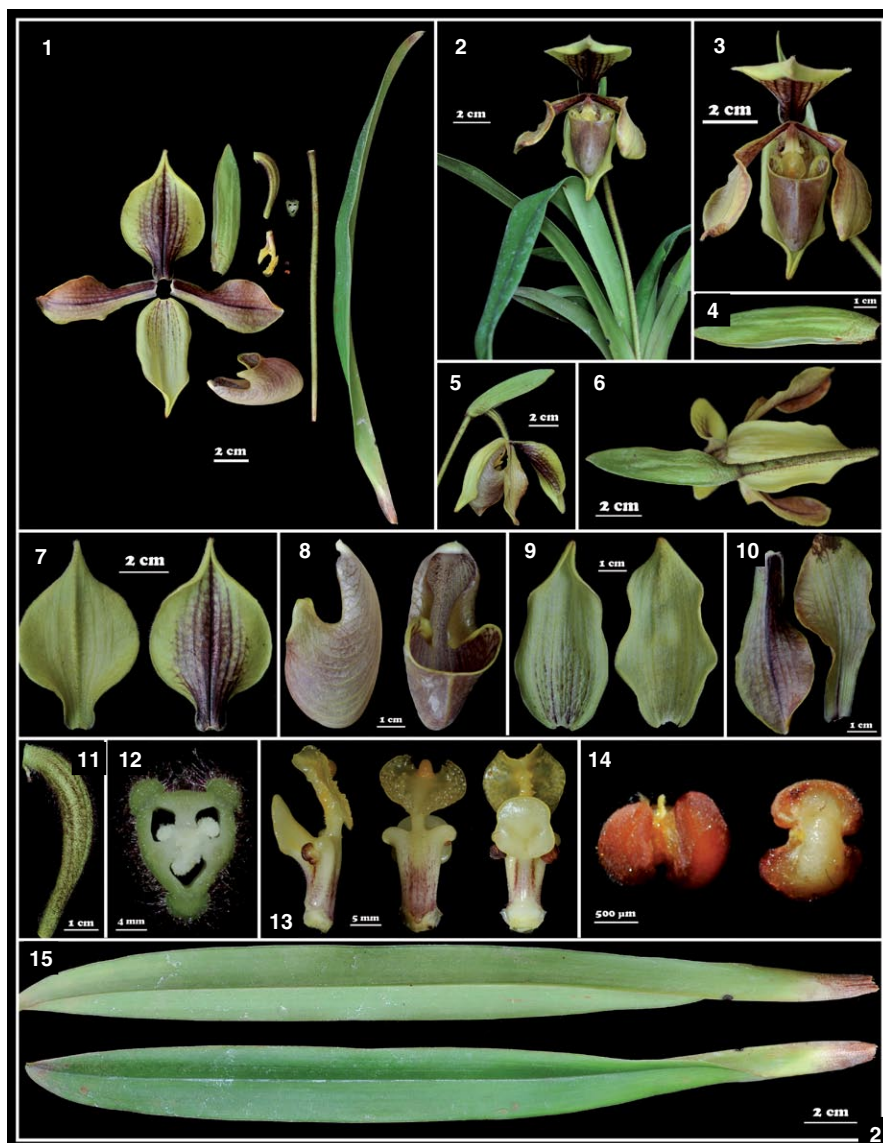
PAPHIOPEDILUM VILLOSUM (LINDL.) Stein was first discovered by Thomas Lobb in 1853 in the mountains near Moulmein in southeastern Myanmar (Burma). Later, the species was also discovered spread over a large area in many other regions. In Vietnam, the plants were found by a French scientist at the beginning of the last century. In 2003, 2004 and 2007, Leonid Averyanov and his collaborators in Vietnam identified four new varieties or forms of the species, namely *Paph. villosum* var. *boxallii*, *Paph. villosum* var. *annamense*, *Paph. villosum* f. *fuscroseum* and *Paph. villosum* f. *fuscoviride*. (*Paphiopedilum villosum* var. *fuscroseum* and *Paph. villosum* var. *fuscoviride* were revised in 2007 by Olaf Gruss and Manfred Wolff into forms: *Paph. villosum* f. *fuscroseum* (Aver.) O. Gruss et M. Wolff and *Paph. villosum* f. *fuscoviride* (Aver.) O. Gruss et M. Wolff.)

In 2015, we found several specimens of a plant population in Lai Chau that were different from all other forms of *Paph. villosum* in Vietnam. In this article we deal with the morphological characteristics of the species studied, analyze the differences of the sample compared to the published four forms or varieties and add a classification key.

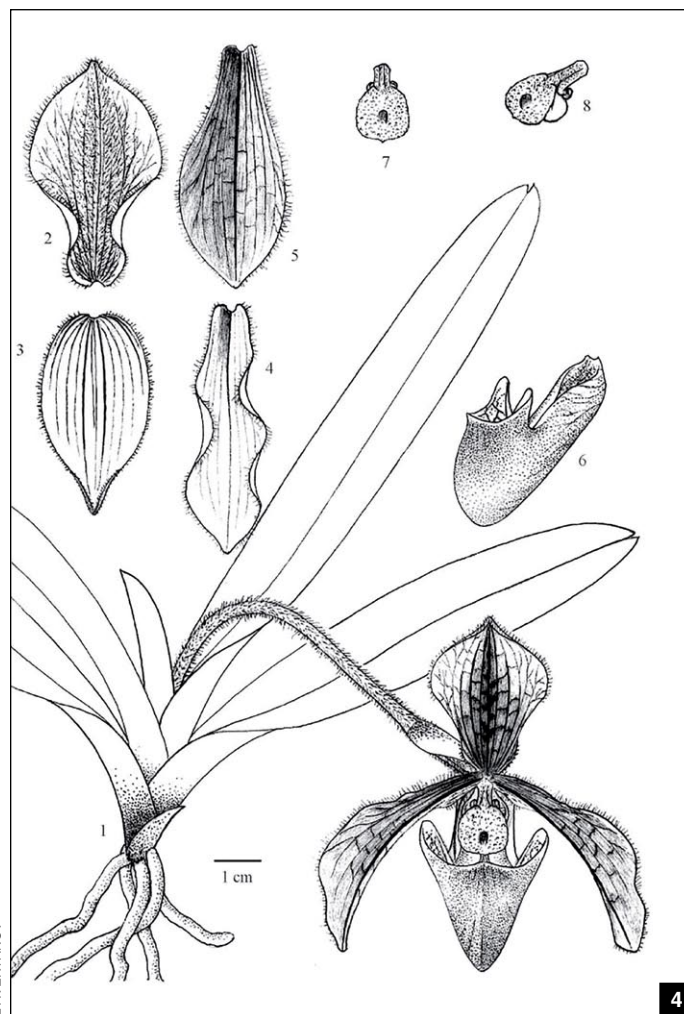
RESEARCH METHODS In September 2015, local residents collected about 300 plants after they had developed enough flowers and fruits in the municipality of Ta Phao, Sin Ho district, Lai Chau province. The results were summarized and stored in the Department of Medicine, Hanoi College of Pharmacy, code number FOP/09/2015. After analyzing the morphological characteristics, the scientific names were determined and compared with the information in the literature.

DESCRIPTION The herbaceous plants grow mainly on rocks or rarely epiphytically and often form large clusters. They develop four to five ligulate leaves. These are acuminate, irregularly bilobed, 5.5–9.4 inches (14–24 cm) long, 0.9–1.6 inches (2.4–4.0 cm) wide, light green on the bottom and lilac-purple at the base.

The upright to curved inflorescence, bearing one flower, is 2.8–9.4 inches (7–24 cm) long, green, often also purple bearing a white-to-dark-purple pubescence; the bracts are oval, folded around the stem, 1.6–2.8 inches (4–7 cm) long, 1.2–1.6 inches (3–4 cm) wide, light green, smooth and only slightly chestnut-colored at the base. The flowers are 3–5.3 inches (7.5–13.5 cm) wide and have yellowish to green-yellow petals with brown to



[1] *Paphiopedilum villosum* var. *laichaunum* growing epiphytically in wet forest.
 [2] *Paphiopedilum villosum* var. *laichaunum*: 1) flower and leaf; 2) flowering plant; 3) flower front view; 4) floral bract; 5) flower side view; 6) back of flower; 7) dorsal sepal, front and back; 8) lip; 9) synsepal; 10) petal; 11) ovary; 12) ovary, cross-section; 13) column; side, top and bottom view; 14) staminode; 15) leaf; top and bottom view.



reddish brown markings. The petals have a dark brown, horizontal midvein, the area above the midvein is brownish, below rather yellowish; they also have narrow brown veins. The back of the flower is slightly brighter. The synsepal is yellowish to green veined on the front with violet, the back blue. The lip varies in color from brownish to red, pink or yellow to even greenish and shows a dark brown vein.

The ovary is cylindrical, almost triangular in the cross-section, curved, 2–2.4 inches (5–6 cm) long, bright, greenish blue and bears shaggy purple hairs along the edges. The dorsal sepal is 2.4–2.8 inches (6–7 cm) long, 1.6–1.8 inches (4–4.6 cm) wide, circular, pointed at the front, close-fitting at the base, with no dots, dark brown in the center and at the base, paler toward the top. The veins are brown and spread outward from the center. The synsepal is large and wide, 2.8–3.1 inches (7–8 cm) long, 1.4–1.6 inches (3.5–4 cm) wide and frames the lip; the back is blue, the front has purple veins that run along the arch. The petals are 2.8–3.4 inches (7–8.6 cm) long, 1.2–1.5 inches (3–3.8

cm) wide, claw-shaped inward, oval to spatulate, broadly concave, almost hooded to the tip. The column and the base of the column are about 0.9 inches (2.3 cm) long, 0.6 inches (1.4 cm) wide, obovate, with downward-curved tip. The anthers are ovoid, notched in the middle, red, 0.06 inches (0.15 cm) long and 0.04 inches (0.1 cm) wide.

LOCATION The plants grow in a mixed, evergreen, dense-and-humid forest amid clouds or deciduous forest at altitudes of 4,265–6,562 feet (1,300–2,000 m).

FLOWERING September to November in Vietnam.

Table 1 lists the different morphological characteristics of the collected plant, *Paph. villosum* var. *laichaunum*, from those of the species, *Paph. villosum* var. *villosum*.

The striking features of the new variety are: the dorsal sepal is round, anterior pointed, the base is wavy, there are no spots on the front, and the middle is dark brown and fades toward the margin. The two petals are narrowly spatulate;

[3] *Paphiopedilum villosum* var. *villosum*

[4] *Paphiopedilum villosum* var. *villosum*: 1) flowering plant; 2) dorsal sepal; 3) synsepal; 4) adaxial view of petal; 5) abaxial view of petal; 6) lateral view of lip; 7) front view of column; 8) lateral view of column. (FOC 42; FRPS; 17:67. 1999. Reproduced from Liu Zhongjian, Chen Xinqi, Chen Lijun and Lei Sipeng, *The genus Paphiopedilum in China* 151. 2009).

the violet lines are concentrated in the upper half and to the base. The synsepal completely covers the lip, has a blue back and the front shows purple coloring along the arch.

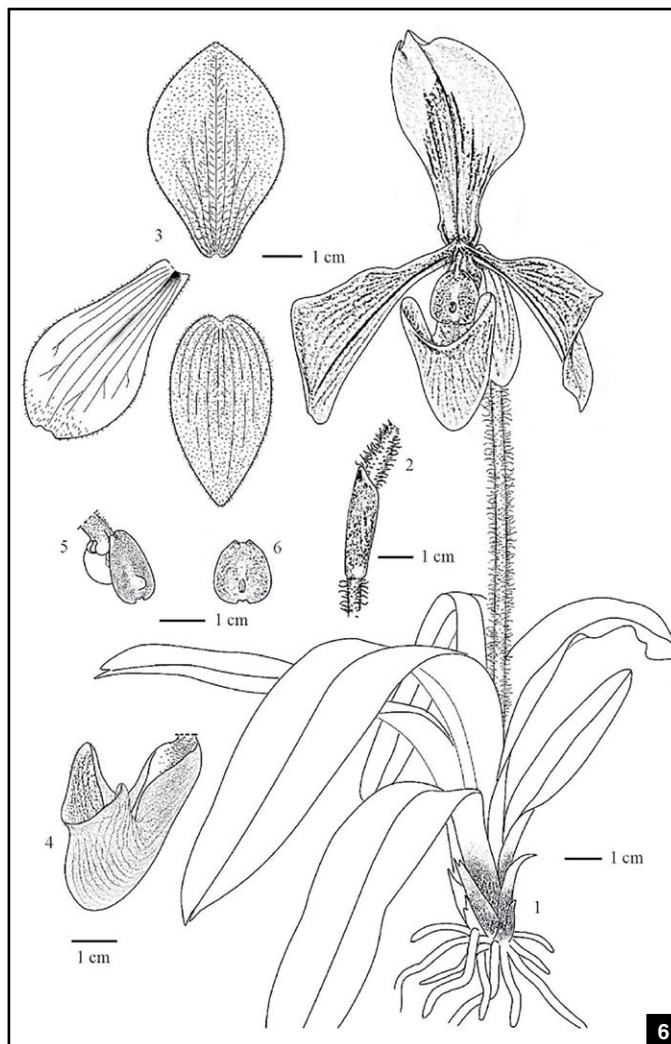
Key to the varieties and forms of *Paphiopedilum villosum* in Vietnam

1.—Narrow obovate to broad inversely lanceolate, light green dorsal sepal with dark brown, fused spots and full-length narrow white areas along the strongly recurved lateral margins; petals narrowly spatulate to the base, narrowly petiolate, often marked purple-brown, with dark



LAVERYANOV

5



6

purple stripes.....**var. boxallii**

—Dorsal sepal obovate to almost circular, without distinct spots, with strongly curved lateral edge in the basal part; petals without violet-brown spots, with a more-or-less wide, indistinct base.....**2**

2.—Dorsal sepal almost circular, dark brown with a more or less wide yellowish green to whitish margin.....**var. villosum**

1'.—Dorsal sepal bright yellowish green, faint pink to violet, or white with a more or less wide brown middle longitudinal stripe.....**3**

—Dorsal sepal circular, apex pointed, bottom wavy, exhibiting no stains, dark brown in the center and at the base, fading to the apex; dorsal sepal midvein brown and more centrally spread.....**5**

3.—Dorsal sepal white, with a more or less wide maroon stripe, sometimes with a wide dark-brown center and green margins.....**var. annamense**

—Central part of dorsal sepal faint pink to dark purple or faint yellowish green with light-brown along central vein.....**4**

4.—Central part of dorsal sepal pale pink

to dark purple, sometimes greenish at the base, margin of sepals mostly white.....

.....**f. fuscroseum**

Dorsal sepal yellowish green, light brown along the central vein, also with white or yellowish white margin.....

f. fuscoviride

5.—Petals narrowly spatulate, purple, obverse purple, reverse lemon yellow. Petals devoid of white margins unlike other varieties. Bracts twice as long as the ovary. Synsepal large and wide, framing lip, reverse blue, obverse veined purple along the arch. Leaves shorter and narrower those of *Paphiopedilum villosum* var. *villosum*.....**var. laichaunum**

Paphiopedilum villosum (Lindl.) Stein var. **laichaunum** Hai et Tuan var. nov.

DIAGNOSIS The new variety is similar to the typical variety of *Paph. villosum* (Lindl.) Stein, Stein's *Orchideenbuch*: 490, 1892, but distinctly differs from all known infraspecific taxa of *Paph. villosum* by the shorter and narrower leaves, the circular, pointed dorsal sepal, wavy base, without spots and a dark brown center fading to

[5] *Paphiopedilum villosum* var. *annamense*

[6] *Paphiopedilum villosum* var. *annamense*:

1) flowering plant; 2) bract and ovary; 3) dorsal sepal, petal and synsepal; 4) lateral view of lip; 5) column; 6) staminal node. (FOC 42; Reproduced from Liu Zhongjian, Chen Xinqi, Chen Lijun and Lei Sipeng, *The genus Paphiopedilum in China* 157. 2009).

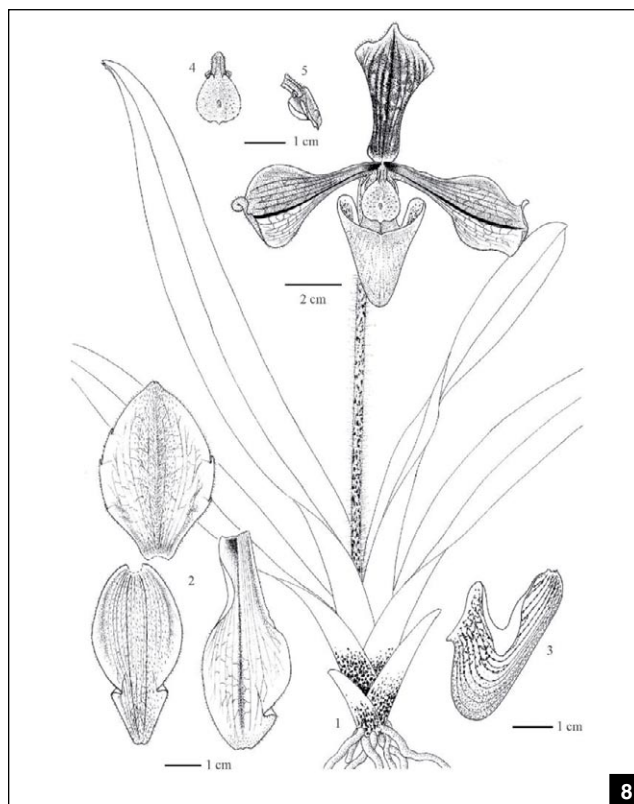
the tip, by a large and broad synsepal that is larger than the lip.

TYPE Northern Vietnam, Lai Châu province, Sin Hô district; coll. Nguyen Hoang Tuan and Nguyen Son Hai 2014; ex cult. 15-September-2015 (Holotype HNU/N. H. Tuan 014).

ETYMOLOGY *laichaunam*, named after the site Lai Châu in Vietnam.

Acknowledgments

Our special thanks go to Leonid Averyanov for the pictures provided. We also thank Judith Rapacz-Hasler for the German-to-English-translation.

7
L. AVERYANOV

8

References

- Averyanov, L. 2007. Variations of *Paphiopedilum villosum* in Vietnam. *Orchid Digest* 71:102–106.
- Averyanov, L., P.J. Cribb, P.K. Loc, and N.T. Hiep. 2004. *Lan Hải Việt Nam*, Nhà xuất bản Giao Thông vận tải (Lan Hai Vietnam, Transport Publishing House).
- Trần, V.O. 2005. *Thư tập thực vật và nhân thực cây thuốc*, Trung tâm thông tin-Thư viện, Trường đại học Dược Hà Nội (Practicing botanical material and plant practice, Information-Collecting Center, Hanoi University of Science and Technology).
- Tuan, N.H. and N.S. Hai. 2016. HAI kim lai châu - *Paphiopedilum villosum* (Lindley) Stein var. *laichanum* Hai & Tuan, var. n. một thu mới của Hai kim *Paphiopedilum villosum* (Lindley) Stein (ho lan - Orchidaceae) Viet Nam; *Paphiopedilum villosum* (Lindley) Stein var. *laichanum* Hai & Tuan, a new var. from Viet Nam. *Pharmaceutical Journal*, Vietnam 56:41–44.
- Tuan, N.H., N.S. Hai, O. Gruss and C.X. Canh. 2018. *Paphiopedilum villosum* (Lindl.) Stein var. *laichanum* Hai et Tuan, eine neue Varietät aus Vietnam; *Die Orchidee*, 4(15):105–113. E-Paper, ISSN-Internet 2366-0643.
- Võ, V.C. 2013. *Tu diên cây thuốc Việt Nam*, Tập I, tr. 1287, Nhà xuất bản Y Học (Vietnam Medicinal Plants, Episode I, p. 1287, Y Hoc Publishing House).
- Wu, Z., and P. Raven, editors. 2009. *Flora of China, Volume 25: Orchidaceae*. Missouri Botanical Garden Press, St. Louis, Missouri. See pages 34, 39, 40–42 and 44.

— Nguyen Hoang Tuan, Hanoi University of Pharmacy, 15 Le Thanh Tong, Hoan Kiem, Hanoi, Vietnam (email tuand150@yahoo.com). Nguyen Son Hai, Phu Tho Provincial Television; Nguyen Tat Thanh Street, Viet Tri City, Phu Tho Province (email sonhaivtytpt@gmail.com). Olaf Gruss, In der Au 48, 83224 Grassau, Germany (email a-o.gruss@t-online.de). Chu Xuan Canh, 92 Thanh Nhan Street, Hai Ba Trung District, Hanoi,



9

N.H. TUAN



L AVERYANOV

10



L AVERYANOV

11

[7] *Paphiopedilum villosum* var. *boxallii*,
 [8] *Paphiopedilum villosum* var. *boxallii*: 1) flowering plant, 2) dorsal sepal, petal and synsepal, 3) longitudinal section of the lip, 4) front view of the column, 5) lateral view of the column. (FOC 42; Reproduced from Liu Zhongjian, Chen Xinqi, Chen Lijun and Lei Sipeng, *The genus Paphiopedilum in China* 159. 2009).

[9] *Paphiopedilum villosum* var. *laichaunum* close-up and from a slight angle to clearly show the wide ventral sepal.
 [10] *Paphiopedilum villosum* f. *fuscroseum*
 [11] *Paphiopedilum villosum* f. *fuscoviride*

Table 1. Summary of Characteristic Differences Between the Varietal Forms of *Paphiopedilum villosum*.

Characteristic	<i>Paph. villosum</i> var. <i>laichaunum</i>	<i>Paph. villosum</i> var. <i>villosum</i>	<i>Paph. villosum</i> var. <i>boxallii</i>	<i>Paph. villosum</i> var. <i>annamense</i>	<i>Paph. villosum</i> f. <i>fuscroseum</i>	<i>Paph. villosum</i> f. <i>fuscoviride</i>
Dorsal Sepal	round, pointed in front, base crenate, no dots, stems, middle part brown, blade faded upwards, veins brown and wider, concentric	obovate until almost circular, without dots	narrow ovate, light green, with maroon spots and narrow white margin	obovate to ovate, white with a broad maroon midsection	center pale pink to dark purple, sometimes with green veins, margin and back often white	dull yellow to green, center light brown or greenish with tan overlay
Petal	narrow, spatulate, upper half purple, lower part lemon yellow, without white margin		spatulate with narrow base, red-brown with lilac-purple midline	obovate, spatulate, brownish gold at the narrow spot, purple-brown marking at the base, narrow in the middle		
Petals	longer than the ovary	longer than the ovary				
Sepals and Petals	twice as long as the ovary	longer than the ovary				
Ovary	with purple colored hair	with purple or white hair				
Synsepal	big and wide, the lip covered, backside blue, front with purple veins along the arch					
Leaves	shorter and narrower than at <i>Paph. villosum</i> var. <i>villosum</i>					





10



13



11



14



12



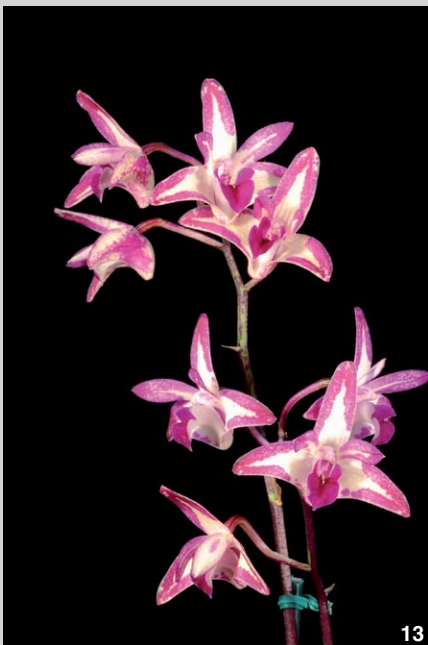
15



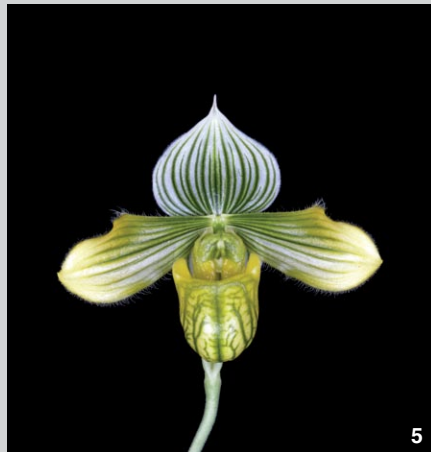
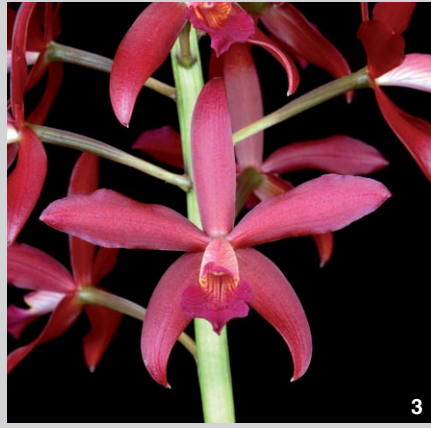
16

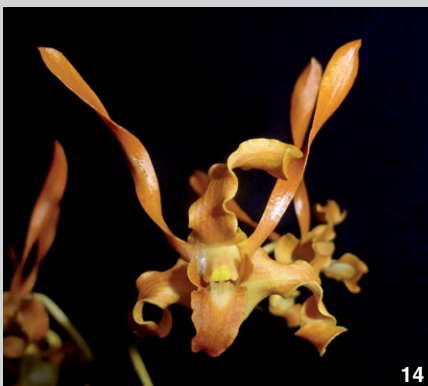
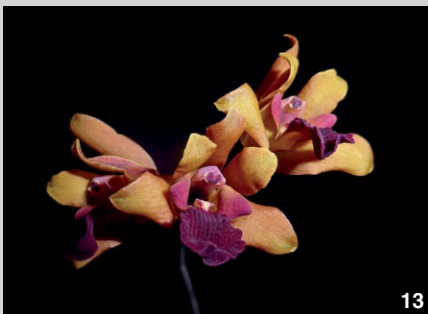
- [1] *Dendrobium* Roy Tokunaga 'Zebra' AM/AOS (*atrovioleaceum* x *johnsoniae*) 82 pts. Exhibitor: Marriott Orchids/Hadley Cash; photographer: Bryan Ramsay. National Capital Judging
- [2] *Dracula* *diana* 'Goddess of the Moon' CHM/AOS 83 pts. Exhibitor: Mary Ann Denver; photographer: Maurice Garvey. Northeast Judging
- [3] *Dendrobium* *calcariferum* 'Mimi' CHM/AOS 82 pts. Exhibitor: Al and Irene Messina; photographer: Maurice Garvey. Northeast Judging
- [4] *Angraecum* *chamaeanthus* 'Jane' CBR/AOS. Exhibitor: John Sullivan; photographer: Maurice Garvey. Northeast Judging
- [5] *Paphiopedilum* Lathamianum 'Princessa's Green Eye' AM/AOS (*spicerianum* x *villosum*) 82 pts. Exhibitor: Ty Triplett; photographer: Maurice Garvey. Northeast Judging
- [6] *Cymbidium* Whitney Houston 'Cavalier' AM/AOS (Karen Hawaiian x Ernest Hetherington) 84 pts. Exhibitor: Jason Douglass; photographer: Ken Jacobsen. Pacific Central Judging
- [7] *Gastrophaius* Micro Burst 'Gene Tobia' CCE/AOS (*Gastrochis pulchra* x *Phaius tankervilleae*) 91 pts. Exhibitor: Cesario Gene Tobia; photographer: Maurice Garvey. Northeast Judging
- [8] *Epidendrum* *nocturnum* 'Mattor's Maine Moonlight' AM/AOS 82 pts. Exhibitor: Harry Pringle; photographer: Robert Hesse. Northeast Judging
- [9] *Masdevallia* Bay Breeze 'Sake' AM/AOS (Fraseri x John Tomaschke) 83 pts. Exhibitor: John J. Leathers; photographer: Ken Jacobsen. Pacific Central Judging
- [10] *Dendrobium* *kingianum* 'Susan' HCC/AOS 79 pts. Exhibitor: Chuck and Sue Andersen; photographer: Robert Hesse. Northeast Judging
- [11] *Trichosalpinx* *nymphalis* 'Susan' CBR/AOS. Exhibitor: Chuck and Sue Andersen; photographer: Robert Hesse. Northeast Judging
- [12] *Paphiopedilum* Marble Christmas 'Haley Suzanne' AM/AOS (Mable Marie x Thunder Cat) 80 pts. Exhibitor: Glen Decker; photographer: Robert Hesse. Northeast Judging
- [13] *Masdevallia* *nikoleana* 'Susan' CBR/AOS. Exhibitor: Chuck and Sue Andersen; photographer: Robert Hesse. Northeast Judging
- [14] *Paphiopedilum* *malipoense* 'Haley Suzanne' HCC/AOS 76 pts. Exhibitor: Glen Decker; photographer: Robert Hesse. Northeast Judging
- [15] *Cattleya* *coccinea* 'Gracie' CCE/AOS 90 pts. Exhibitor: Amy and Ken Jacobsen; photographer: Ken Jacobsen. Pacific Central Judging
- [16] *Dendrobium* Lucky Girl 'Sweetheart' CCM/AOS (Romance x Happy Toy) 83 pts. Exhibitor: L. Ann Chepjian; photographer: Robert Hesse. Northeast Judging



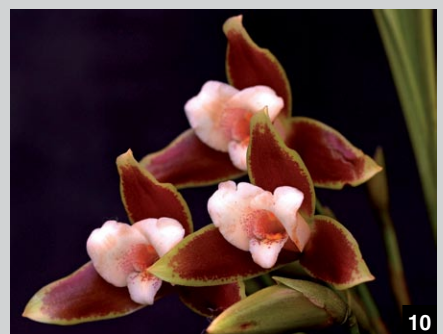
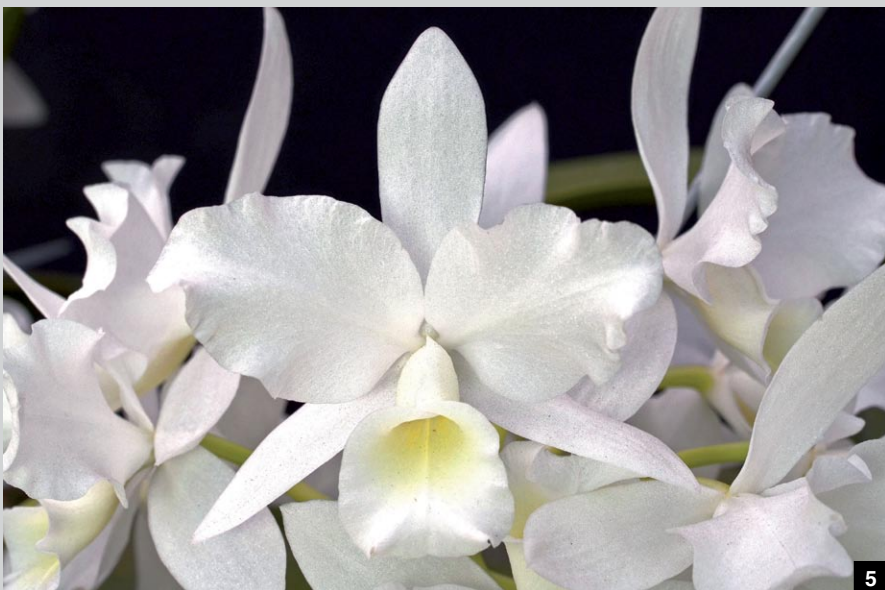
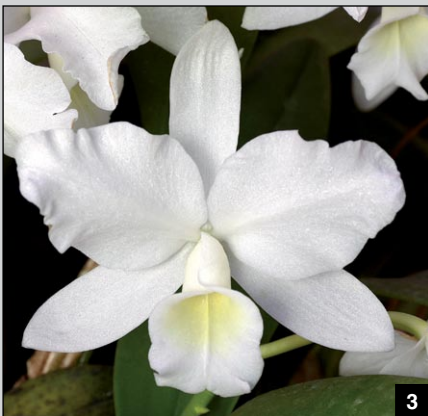
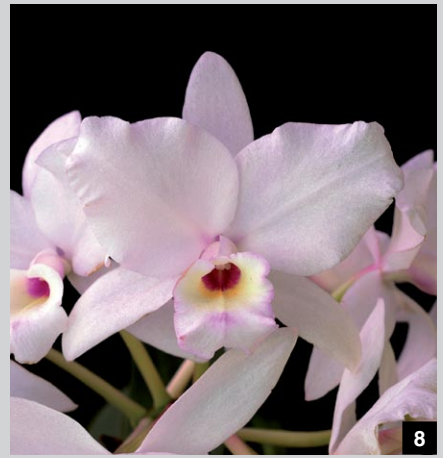


- [1] *Dendrobium* Silver King 'Buster' AM/AOS (Peter Shen x Silver Wings) 80 pts. Exhibitor: Golden Gate Orchids; photographer: Ken Jacobsen. Pacific Central Judging
- [2] *Cattleya* Po Hoon 'Mommy' AM/AOS (Koolau King x Circle of Life) 86 pts. Exhibitor: Japheth Ko; photographer: Ken Jacobsen. Pacific Central Judging
- [3] *Epidendrum* Pacific Charisma 'Ooo La La' AM/AOS (Pacific Challenge x Pacific Fairyland) 82 pts. Exhibitor: Cal-Orchid, Inc.; photographer: Arthur Pinkers. Pacific South Judging
- [4] *Dendrobium* Regal Vista 'Margaret Scott' AM/AOS (Regal Gillieston x *speciosum*) 80 pts. Exhibitor: Neal Grant; photographer: Arnold Gum. Pacific South Judging
- [5] *Amesiella* minor 'Windflower' AM/AOS 80 pts. Exhibitor: Betty Kelepecz; photographer: Arnold Gum. Pacific South Judging
- [6] *Dendrobium* Hilda Poxon 'Joan Mickelson' CCM/AOS (*speciosum* x *tetragonum*) 86 pts. Exhibitor: Tom Biggart; photographer: Arnold Gum. Pacific South Judging
- [7] *Lycaste* Alan Salzman 'Espie's Delight' AM/AOS (Island of Vulcorn x Shoalhaven) 80 pts. Exhibitor: Espie Quinn; photographer: Arthur Pinkers. Pacific South Judging
- [8] *Dendrobium chrysopterum* 'Alek Koomanoff' AM/AOS 82 pts. Exhibitor: Golden Gate Orchids; photographer: Ken Jacobsen. Pacific Central Judging
- [9] *Masdevallia* Jaime Posada 'Patriarch' AM/AOS (MacInnes' Golden Heart x *yungasensis*) 81 pts. Exhibitor: John J. Leathers; photographer: Ken Jacobsen. Pacific Central Judging
- [10] *Cymbidium tortisepalum* 'Da Fu Gui' AM/AOS 81 pts. Exhibitor: Baozhong Zhu; photographer: Arthur Pinkers. Pacific South Judging
- [11] *Dinema polybulbon* 'Maku'u' CCE/AOS 99 pts. Exhibitor: Gines Orchids; photographer: Ross Leach. Pacific Northwest Judging
- [12] *Cymbidium tortisepalum* var. *longibracteatum* 'Bi Long Yu Su' AM/AOS 83 pts. Exhibitor: Baozhong Zhu; photographer: Arthur Pinkers. Pacific South Judging
- [13] *Dendrobium* King Zip 'Gayle's Valentine' AM/AOS (Kathking x Zip) 82 pts. Exhibitor: Gayle Brodie; photographer: Larry Vierheilig. Pacific South Judging
- [14] *Paphiopedilum wilhelminae* 'Egger' AM/AOS 82 pts. Exhibitor: David Brown; photographer: Arnold Gum. Pacific South Judging
- [15] *Paphiopedilum* Macabre Venus 'SVO Royal Basin' HCC/AOS (Macabre x *venustum*) 78 pts. Exhibitor: Arthur Pinkers; photographer: Arnold Gum. Pacific South Judging
- [16] *Comparettia macroplectron* 'Huntington's Pinkie' HCC/AOS 77 pts. Exhibitor: Huntington Botanical Gardens; photographer: Arthur Pinkers. Pacific South Judging



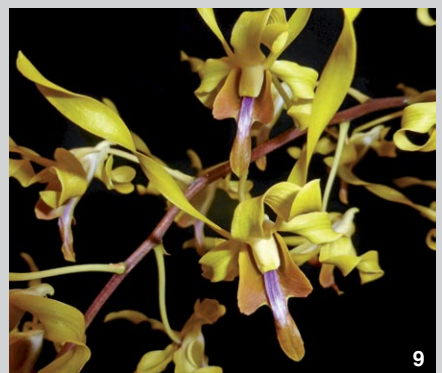


- [1] *Phragmipedium* Fliquet 'Ann's Candy' AM/AOS (Grande x Memoria Dick Clements) 80 pts. Exhibitor: Joe Rupp; photographer: Arthur Pinkers. Pacific South Judging
- [2] *Maxillaria carinulata* 'Violet Sunburst' CHM/AOS 82 pts. Exhibitor: Donald Goss; photographer: Arthur Pinkers. Pacific South Judging
- [3] *Cattleya* Florence Lin 'Wine' AM/AOS (*tigrina* x *milleri*) 82 pts. Exhibitor: Ruben Colmenares; photographer: Arthur Pinkers. Pacific South Judging
- [4] *Cattleya* Moonlight Dream 'Moonlight Kiss' AM/AOS (Love Knot x *intermedia*) 82 pts. Exhibitor: Fred Clarke; photographer: Arthur Pinkers. Pacific South Judging
- [5] *Paphiopedilum venustum* f. *measuresianum* (album) 'Venus Rising' AM/AOS 82 pts. Exhibitor: Harold Koopowitz- Paph Factory; photographer: Arthur Pinkers. Pacific South Judging
- [6] *Laeliocatanthe* Ruby Spire 'Super Red' AM/AOS (Hot Sauce x *Laelia* Splendid Spire) 80 pts. Exhibitor: Ruben Colmenares; photographer: Arthur Pinkers. Pacific South Judging
- [7] *Laelia anceps* var. *lineata* 'Four Feathers' AM/AOS 82 pts. Exhibitor: Ruben Colmenares; photographer: Arthur Pinkers. Pacific South Judging
- [8] *Cattleya* Mini Blue Star 'SVO Blues' HCC/AOS (Cornelia (1893) x Mini Purple) 78 pts. Exhibitor: Fred Clarke; photographer: Arthur Pinkers. Pacific South Judging
- [9] *Epidendrum* Pacific Prince 'Cerise' AM/AOS (Pacific Punch x Pacific Dragon) 80 pts. Exhibitor: Cal-Orchid, Inc.; photographer: Arthur Pinkers. Pacific South Judging
- [10] *Catasetum incurvum* 'Malaika' AM/AOS 80 pts. Exhibitor: Jose A. Izquierdo and Irma Saldaña; photographer: Irma Saldaña. Puerto Rico Judging
- [11] *Epidendrum* Pacific Blaze 'Mango' AM/AOS (Pacific Karma x Pacific Magic) 81 pts. Exhibitor: Cal-Orchid, Inc.; photographer: Arthur Pinkers. Pacific South Judging
- [12] *Paphiopedilum* Fumi's Delight 'SVO Canary Gold' AM/AOS (*armeniicum* x *micranthum*) 85 pts. Exhibitor: Fred Clarke; photographer: Arthur Pinkers. Pacific South Judging
- [13] *Psychilis olivacea* 'J A R R ' HCC/AOS 78 pts. Exhibitor: José Román; photographer: Irma Saldaña. Puerto Rico Judging
- [14] *Dendrobium* Malayan Orange 'Machiavelli' HCC/AOS (*tangerinum* x Liholiho) 77 pts. Exhibitor: René E. Garcia; photographer: Irma Saldaña. Puerto Rico Judging
- [15] *Paphiopedilum* Fumi's Delight 'SVO Sunshine' HCC/AOS (*armeniicum* x *micranthum*) 78 pts. Exhibitor: Fred Clarke; photographer: Arthur Pinkers. Pacific South Judging
- [16] *Gongora leucochila* 'Maruja Peña' HCC/AOS 78 pts. Exhibitor: Keith Uhlenhaut; photographer: Jorge Enrique Céspedes Trigueros. Puerto Rico Judging





- [1] *Dendrobium* Falling Embers 'Rising Sun' HCC/AOS (*fuliginosum* x *Ida Mary*) 79 pts. Exhibitor: Michelle Dobard-Anderson; photographer: Arthur Pinkers. Pacific South Judging
- [2] *Maxillaria sanguinea* (Luteo-Alba) 'Luis Daniel Blanco' CCM/AOS 80 pts. Exhibitor: Luis D. Blanco; photographer: Jorge Enrique Céspedes Trigueros. Puerto Rico Judging
- [3] *Guarianthe skinneri* f. *alba* 'Elisa Rojas' AM/AOS 84 pts. Exhibitor: Christopher Arias; photographer: Jorge Enrique Céspedes Trigueros. Puerto Rico Judging
- [4] *Dendrobium kingianum* 'Picotee Leaf' JC/AOS. Exhibitor: Jean Allen-Ikeson; photographer: Ed Cott. Toronto Judging
- [5] *Guarianthe skinneri* f. *alba* 'Carlos Magdiel' AM/AOS 86 pts. Exhibitor: Carlos Granados; photographer: Jorge Enrique Céspedes Trigueros. Puerto Rico Judging
- [6] *Guarianthe skinneri* 'Alejandro / La Amistad' AM/AOS 85 pts. Exhibitor: Alejandro Rodríguez Cheung; photographer: Jorge Enrique Céspedes Trigueros. Puerto Rico Judging
- [7] *Guarianthe skinneri* 'Margarita R / La Amistad' AM/AOS 84 pts. Exhibitor: Emanuel Quesada; photographer: Jorge Enrique Céspedes Trigueros. Puerto Rico Judging
- [8] *Guarianthe skinneri* (Oculata) 'Julia Rojas' AM/AOS 80 pts. Exhibitor: Juan J Zúñiga; photographer: Jorge Enrique Céspedes Trigueros. Puerto Rico Judging
- [9] *Dendrobium* Peter Shen 'Don Bin' HCC/AOS (*alexandrae* x *phalaenopsis*) 77 pts. Exhibitor: Edwin Bolaños; photographer: Jorge Enrique Céspedes Trigueros. Puerto Rico Judging
- [10] *Lycaste powellii* 'María Gabriela' AM/AOS 84 pts. Exhibitor: Mireya Cordero; photographer: Jorge Enrique Céspedes Trigueros. Puerto Rico Judging
- [11] *Mormodes fractiflexa* 'Don José' AM/AOS 84 pts. Exhibitor: Bernal Gonzalez; photographer: Jorge Enrique Céspedes Trigueros. Puerto Rico Judging
- [12] *Rhyncholaeliocattleya* Jeremy Quesada 'Amanda Sofia' AM/AOS (*Cattleya* Horace x *Memoria Cecil Barrier*) 82 pts. Exhibitor: Alejandro Rodríguez Cheung; photographer: Jorge Enrique Céspedes Trigueros. Puerto Rico Judging
- [13] *Epidendrum congestum* 'María Paula' CCM/AOS 83 pts. Exhibitor: Abraham Bolaños; photographer: Jorge Enrique Céspedes Trigueros. Puerto Rico Judging
- [14] *Mormodes lobulata* 'Rosibel - María' HCC/AOS 78 pts. Exhibitor: Bernal Gonzalez; photographer: Jorge Enrique Céspedes Trigueros. Puerto Rico Judging
- [15] *Guarianthe skinneri* (Oculata) 'Melissa R / La Amistad' CCM/AOS 84 pts. Exhibitor: Emanuel Quesada; photographer: Jorge Enrique Céspedes Trigueros. Puerto Rico Judging
- [16] *Rhyncattleanthe* Memoria Dr Rafael Sobrino 'Julio David' AM/AOS (*Cattleya* Melody Fair x *Fuchs Orange Nuggett*) 80 pts. Exhibitor: Dr. Julio David Rios; photographer: Irma Saldaña. Puerto Rico Judging





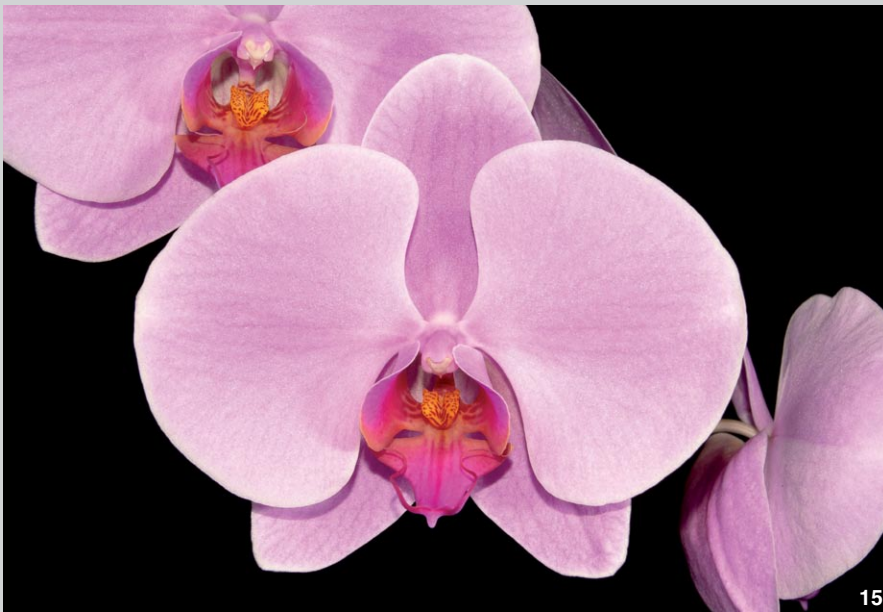
- [1] *Rhyncattleanthe* Tsiku Lily 'N N' HCC/AOS (Fuchs Orange Nuggett x *Cattlianthe* Trick or Treat) 78 pts. Exhibitor: Luther Edwards; photographer: Debra Tryon. Puerto Rico Judging
- [2] *Phragmipedium* Rouge Bouillon 'Ken Wilson' AM/AOS (*dalessandroi* x Memoria Dick Clements) 82 pts. Exhibitor: Kenneth S. Wilson; photographer: Mark Van der Woerd. Rocky Mountain Judging
- [3] *Paphiopedilum* Petula's Presence 'Louisiana' HCC/AOS (Magic Pulsar x Petula's Mystery) 77 pts. Exhibitor: Al Taylor; photographer: Wilton Guillory. Shreveport Judging
- [4] *Laeliocattleya* City Life 'Di Ciommo John Joseph' AM/AOS (Liptonii x *Cattleya* Circle of Life) 80 pts. Exhibitor: Di Ciommo's Orchids; photographer: Jay Norris. Toronto Judging
- [5] *Dendrobium* Snow Bells 'E Orchids White Crown' AM/AOS (Thomas Warne x *schuetzei*) 83 pts. Exhibitor: Edwin A. Perez; photographer: Irma Saldaña. Puerto Rico Judging
- [6] *Paphiopedilum* Liberty Taiwan 'Mysterious Valley Bubblegum' AM/AOS (*mircranthum* x *hangianum*) 80 pts. Exhibitor: Ian Rich; photographer: Mark Van der Woerd. Rocky Mountain Judging
- [7] *Paphiopedilum* Fiestalight 'Susan' HCC/AOS (Hanes Fiesta x Nulight) 78 pts. Exhibitor: Dr. E Busse; photographer: Ed Cott. Toronto Judging
- [8] *Epidendrum ciliare* 'Villa Creole' CCE/AOS 93 pts. Exhibitor: Jan McBean; photographer: Debra Tryon. Puerto Rico Judging
- [9] *Dendrobium* Nicha Natron 'Edwin's Golden Impala' AM/AOS (*tangerinum* x *sutiknoi*) 82 pts. Exhibitor: Edwin A. Perez; photographer: Irma Saldaña. Puerto Rico Judging
- [10] *Cattlianthe* Siamese Doll 'Kiwi' AM/AOS (Netrasiri Doll x *Cattleya* Netrasiri Beauty) 81 pts. Exhibitor: Noel Soler-Figueroa; photographer: Irma Saldaña. Puerto Rico Judging
- [11] *Paphiopedilum* Avalon Love Stone 'Antkaren' HCC/AOS (Stone Lovely x Avalon Mist) 77 pts. Exhibitor: Karen Armstrong; photographer: Guillory Wilton. Shreveport Judging
- [12] *Bulbophyllum grandiflorum* 'Shaun Finch' AM/AOS 84 pts. Exhibitor: Magda Finch; photographer: Debra Tryon. Puerto Rico Judging
- [13] *Phragmipedium* Amitabha 'Shirley' CCM/AOS (Patti MacHale x *besseae*) 86 pts. Exhibitor: Heinz Ernstberger; photographer: Jay Norris. Toronto Judging
- [14] *Rossioglossum* Rawdon Jester 'Maki' CCE/AOS (*grande* x *Williamsianum*) 92 pts. Exhibitor: Wilson Ng; photographer: Jay Norris. Toronto Judging
- [15] *Paphiopedilum* Berenice 'Rosanna' CCM/AOS (*lowii* x *philippinense*) 85 pts. Exhibitor: Rosanna Li; photographer: Jay Norris. Toronto Judging
- [16] *Oncidium* Twinkle 'Di Ciommo James Paul' CCM/AOS (*cheirophorum* x *so-toanum*) 83 pts. Exhibitor: Di Ciommo's Orchids; photographer: Jay Norris. Toronto Judging



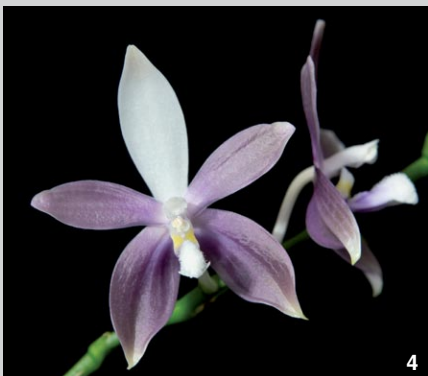


- [1] *Phragmipedium* Amitabha 'Shirley' CCM/AOS (Patti MacHale x *besseae*) 86 pts. Exhibitor: Heinz Ernstberger; photographer: Jay Norris. Toronto Judging
- [2] *Panisea* uniflora 'Jardin botanique de Montréal' AM/AOS 80 pts. Exhibitor: Jardin botanique de Montréal; photographer: Thang Dam. Toronto Judging
- [3] *Laeliocattleya* Caligula 'Gizmo Rho's Love' AM/AOS (*Cattleya percivaliana* x *Laelia anceps*) 81 pts. Exhibitor: Rho De Borja; photographer: Tom Kuligowski. West Palm Beach Judging
- [4] *Paphiopedilum* Excitingly Wood 'Synea' AM/AOS (Friedrich von Hayek x Wood Wonder) 80 pts. Exhibitor: Synea Tan; photographer: Jay Norris. Toronto Judging
- [5] *Brassocattleya* Hawaii Stars 'Paradise' CCM/AOS (*Brassavola* Little Stars x *Cattleya* Memoria Robert Strait) 80 pts. Exhibitor: Eunice Walker; photographer: Brian Monk. West Palm Beach Judging
- [6] *Oncidesa* Sweet Sugar 'Million Dollars' AM/AOS (Aloha Iwanaga x *Gomesa varicosa*) 83 pts. Exhibitor: Kathryn Romine; photographer: Brian Monk. West Palm Beach Judging
- [7] *Paphiopedilum* Hung Sheng Lucky Girl 'Lori's Surprise' HCC/AOS (Hung Sheng Bay x Shin-Yi Madura) 79 pts. Exhibitor: Lori Barrington; photographer: Judith Higham. Western Canada Judging
- [8] *Dendrobium atrovioleaceum* 'Emily Grace DJD' CCM/AOS 88 pts. Exhibitor: Everlidis Donawa; photographer: Tom Kuligowski. West Palm Beach Judging
- [9] *Dendrobium kingianum* 'Jardin botanique de Montréal' CCE/AOS 93 pts. Exhibitor: Jardin botanique de Montréal; photographer: Thang Dam. Toronto Judging
- [10] *Phragmipedium* QF Maria 'Lydia Brand' AM/AOS (*lindleyanum* x *dalessandroi*) 83 pts. Exhibitor: Ralph Brand; photographer: Brian Monk. West Palm Beach Judging
- [11] *Cattleya* Odom's Autumn Jewel 'Odom's Orchids' AM/AOS (Rita Renee x Desert Jewel) 82 pts. Exhibitor: Odom's Orchids, Inc.; photographer: Brian Monk. West Palm Beach Judging
- [12] *Lesueurara* Dick Pippen's SunCoast 'Nancy Ginocchio' AM/AOS (*Brassocattanthe* Little Mermaid x *Encyclia* Lorraine Smith) 81 pts. Exhibitor: Jim Roberts Florida SunCoast Orchids; photographer: Tom Kuligowski. West Palm Beach Judging
- [13] *Cattleya* Brabantiae 'Jim Krull' AM/AOS (*aclandiae* x *loddigesii*) 88 pts. Exhibitor: Krull-Smith; photographer: Tom Kuligowski. West Palm Beach Judging
- [14] *Rhynchomyrmeleya* SunCoast Love 'Unfailing' AM/AOS (*Rhyncholaeliocattleya* Waianae Leopard x *Myrmecophila christinae*) 84 pts. Exhibitor: Jim Roberts Florida SunCoast Orchids; photographer: Tom Kuligowski. West Palm Beach Judging
- [15] *Myrmecocattleya* Erin Courtney's Suncoast 'Joyful Heart' AM/AOS (*Cattleya* Lavender Lulu x Memoria Louise Fuchs) 81 pts. Exhibitor: Jim Roberts Florida SunCoast Orchids; photographer: Tom Kuligowski. West Palm Beach Judging
- [16] *Laeliocattanthe* Inge Graf 'OMA' AM/AOS (*Cattlianthe* Gold Digger x *Laelia undulata*) 83 pts. Exhibitor: Plantio La Orquidea; photographer: Tom Kuligowski. West Palm Beach Judging





- [1] *Lycaste virginalis* var. *alba* 'Memoria John R. Gunther' HCC/AOS 78 pts. Exhibitor: Fred Missbach; photographer: Jason R. Mills. Atlanta Judging
- [2] *Paphiopedilum* Petula's Sensation 'Laura' AM/AOS (Macabre Contrasts x Petula's Flame) 86 pts. Exhibitor: Stones River Orchids; photographer: Jason R. Mills. Atlanta Judging
- [3] *Cattleya* Yellow Warbler 'Mello Spirit' HCC/AOS (Love Fresh x *cernua*) 78 pts. Exhibitor: David Mellard; photographer: Jason R. Mills. Atlanta Judging
- [4] *Guaricyclia* Yucatan 'Magenta' HCC/AOS (*Guarianthe bowringiana* x *Encyclia* Gail Nakagaki) 78 pts. Exhibitor: Jaime Yu; photographer: Jason R. Mills. Atlanta Judging
- [5] *Dendrobium bellatulum* 'The Harbour City Glow' CCE/AOS 90 pts. Exhibitor: Alexey Tretyakov; photographer: Judith Higham. Western Canada Judging
- [6] *Paphiopedilum lowii* 'Aileen Garrison' CCM-AM/AOS 82-80 pts. Exhibitor: Fred Missbach; photographer: Jason R. Mills. Atlanta Judging
- [7] *Vanda luzonica* 'Bianca' HCC/AOS 78 pts. Exhibitor: Carson Barnes; photographer: Jason R. Mills. Atlanta Judging
- [8] *Paphiopedilum* Julius 'Starvin' Marvin' AM/AOS (*lowii* x *rothschildianum*) 83 pts. Exhibitor: Ann Truesdale; photographer: Jason R. Mills. Atlanta Judging
- [9] *Paphiopedilum* Kilkieran's Pride 'Nike' HCC/AOS (Saint Low x Angel Hair) 76 pts. Exhibitor: Ernie Barham; photographer: Tom Kuligowski. West Palm Beach Judging
- [10] *Paphiopedilum* Macabre in Pink 'Just Judy' AM/AOS (Luna Magic x Magically Macabre) 80 pts. Exhibitor: Judy Rush; photographer: Joseph Paine. Atlanta Judging
- [11] *Dendrobium* Lucky Bird 'Memory' AM/AOS (Silky White x Pianist) 81 pts. Exhibitor: Glen Ladhier; photographer: Joseph Paine. Atlanta Judging
- [12] *Rhynchoaeliocattleya* Sung Ya Green 'Dragon King' AM/AOS (Ports of Paradise x Meadow Morn) 84 pts. Exhibitor: Greg Mosely; photographer: Jason R. Mills. Atlanta Judging
- [13] *Paravanda* Golden Delight 'Crownfox' CCM/AOS (*Paraphalaenopsis denevei* x *Vanda* Suksamran Sunshine) 80 pts. Exhibitor: R.F. Orchids, Inc.; photographer: Tom Kuligowski. West Palm Beach Judging
- [14] *Phalaenopsis* Tying Shin Eastern Star 'Stones River' HCC/AOS (Sogo Genki x Yu Pin Easter Island) 79 pts. Exhibitor: Stones River Orchids; photographer: Jason R. Mills. Atlanta Judging
- [15] *Phalaenopsis* KS Happy Valentine 'Zenora Le' AM/AOS (KS Happy Venus x LeBio Valentine) 83 pts. Exhibitor: Geni Smith; photographer: Jason R. Mills. Atlanta Judging
- [16] *Lycaste* Rakuhoku 'Bia-Chi' AM/AOS (Auburn x Shoalhaven) 83 pts. Exhibitor: Jaime Yu; photographer: Jason R. Mills. Atlanta Judging





12



13



14



15



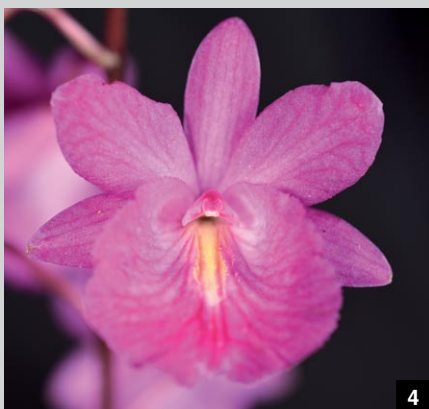
16

- [1] *Tolunnia* Jairak Rainbow 'Freckle Face' CCM/AOS (Tsiku Vanessa x Catherine Wilson) 83 pts. Exhibitor: Ann Truesdale; photographer: Jason R. Mills. Atlanta Judging
- [2] *Phalaenopsis* Ho's Little Caroline 'Sairey Hill' CCM/AOS (Be Glad x Carmela's Pixie) 81 pts. Exhibitor: Ann Truesdale; photographer: Jason R. Mills. Atlanta Judging
- [3] *Phalaenopsis* YangYang Blue Angel 'La Grenouille' AM/AOS (*Phalaenopsis* YangYang Blueberry x *Phalaenopsis violacea*) 85 pts. Exhibitor: Xavier Hung; photographer: Ramon de los Santos. California Sierra Nevada Judging
- [4] *Phalaenopsis tetraspis* f. *livida* 'Pendragon' AM/AOS 81 pts. Exhibitor: Bryan Goddard; photographer: Jeremy Losaw. Carolinas Judging
- [5] *Maxillaria pumila* 'In Situ' CCE/AOS 95 pts. Exhibitor: Jeff Tyler; photographer: Ramon de los Santos. California Sierra Nevada Judging
- [6] *Paphiopedilum* Palani Quintal 'Memoria Katherine Norton' HCC/AOS (Memoria Miguel Medina x *philippinense*) 77 pts. Exhibitor: Ben Belton; photographer: James Harris. Carolinas Judging
- [7] *Phalaenopsis tetraspis* f. *livida* 'Soaring-free' HCC/AOS 76 pts. Exhibitor: Bryan Goddard; photographer: Jeremy Losaw. Carolinas Judging
- [8] *Lysudamuloa* Red Jewel 'Gervais' CCM/AOS (*Lycamerlycaste* Geysler Gold x *Angulocaste* Red Jade) 82 pts. Exhibitor: Cary Chamblee; photographer: James Harris. Carolinas Judging
- [9] *Maxillaria cacaoensis* 'Napa Valley' AM/AOS 83 pts. Exhibitor: Tom Pickford; photographer: Ramon de los Santos. California Sierra Nevada Judging
- [10] *Cymbidium* Amelian Doll 'Jaybee' HCC/AOS (Hungarian Red Doll x Memoria Amelia Earhart) 78 pts. Exhibitor: Ed Dumaguin; photographer: Ramon de los Santos. California Sierra Nevada Judging
- [11] *Phalaenopsis tetraspis* f. *livida* 'McBee' AM/AOS 81 pts. Exhibitor: Bryan Goddard; photographer: Jeremy Losaw. Carolinas Judging
- [12] *Campanulorchis globifera* 'In Situ' CCM/AOS 87 pts. Exhibitor: Jeff Tyler; photographer: Ramon de los Santos. California Sierra Nevada Judging
- [13] *Dendrobium obtusipetalum* 'In Situ' AM/AOS 81 pts. Exhibitor: Jeff Tyler; photographer: Ramon de los Santos. California Sierra Nevada Judging
- [14] *Cymbidium* Red Cross 'Orchid Lane' HCC/AOS (Via Ambarino x Red Beauty) 79 pts. Exhibitor: Dan Asbell; photographer: Cecil Bullard. California Sierra Nevada Judging
- [15] *Phalaenopsis* Pylo's Giga Eagle 'Blue Ridge' AM/AOS (*gigantea* x Dragon Tree Eagle) 81 pts. Exhibitor: Mike Mims; photographer: James Harris. Carolinas Judging
- [16] *Cattleya* Pink Sapphire 'Mistaken Identity' CCM/AOS (Isabelle Stone x *wittigiana*) 82 pts. Exhibitor: William Jeff Trimble; photographer: Ramon de los Santos. California Sierra Nevada Judging



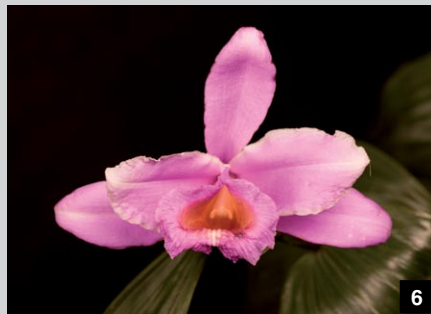


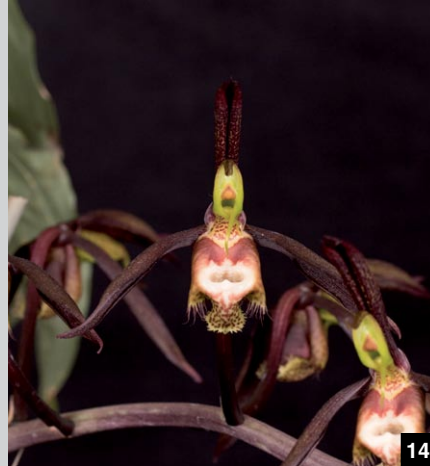
- [1] *Masdevallia anisomorpha* 'Aidan' CBR/AOS. Exhibitor: John Stuckert; photographer: Katie Payeur. Chicago Judging
- [2] *Pleurothallis troglodytes* 'Orkiddoc' CBR/AOS. Exhibitor: Larry Sexton; photographer: Katie Payeur. Chicago Judging
- [3] *Paphiopedilum* Hampshire Alien 'Heavy Metal' HCC/AOS (Hsinying Alien x *sukhakulii*) 76 pts. Exhibitor: Arnold J. Klehm, Grower; photographer: Katie Payeur. Chicago Judging
- [4] *Phalaenopsis* Fuller's 3545 'FL89014' AM/AOS (Fuller's Purple Queen x OX King) 85 pts. Exhibitor: Roy and Lauren Lenz; photographer: Katie Payeur. Chicago Judging
- [5] *Barkeria scandens* 'Lorraine's Surprise' CCE/AOS 92 pts. Exhibitor: Lorraine Heyden; photographer: Katie Payeur. Chicago Judging
- [6] *Platystele viridis* 'Orkiddoc' CCM/AOS 85 pts. Exhibitor: Larry Sexton; photographer: Katie Payeur. Chicago Judging
- [7] *Dendrobium* Royal Wings 'Kathleen' AM/AOS (Roy Tokunaga x Silver Wings) 82 pts. Exhibitor: Pat Calvey; photographer: Katie Payeur. Chicago Judging
- [8] *Paphiopedilum* Hampshire Cloud 'Hampshire' HCC/AOS (Hampshire Cocoa Bean x Hsinying Cloud) 79 pts. Exhibitor: Arnold J. Klehm, Grower; photographer: Arnold Klehm. Chicago Judging
- [9] *Trichopilia gracilis* 'Orchid Court' CBR/AOS. Exhibitor: Tennis Maynard; photographer: Ann DePrez. Cincinnati Judging
- [10] *Paphiopedilum appletonianum* 'Eva' AM/AOS 81 pts. Exhibitor: Alexander Manuel; photographer: Katie Payeur. Chicago Judging
- [11] *Phalaenopsis* Lioulin Diana Lip 'Iowa' AM/AOS (Lioulin Thick Lip x KS Big Diana) 81 pts. Exhibitor: Robert Bannister; photographer: Nile Dusdieker. Chicago Judging
- [12] *Aerangis hildebrandtii* 'Silas' CCM/AOS 86 pts. Exhibitor: Walter E. Crawford; photographer: Alison Fortney. Chicago Judging
- [13] *Paphiopedilum* Macabre Magical Moon 'Kathy' HCC/AOS (Macabre Magical Spots x Luna Magic) 76 pts. Exhibitor: Bruce Byorum; photographer: Nile Dusdieker. Chicago Judging
- [14] *Phragmipedium* Wössner Super-grande 'Michael Olbrich' CCM/AOS (*longifolium* x *humboldtii*) 82 pts. Exhibitor: Olbrich Botanic Garden; photographer: Nile Dusdieker. Chicago Judging
- [15] *Phragmipedium* Saint Peter 'Owl's Prize' AM/AOS (Eric Young x *longifolium*) 82 pts. Exhibitor: Anne O'Connell-Null; photographer: Ann DePrez. Cincinnati Judging
- [16] *Corybas geminigibbus* 'Ruby Whiskers' CBR/AOS. Exhibitor: John and Cheryl Jaworski; photographer: Ann DePrez. Cincinnati Judging



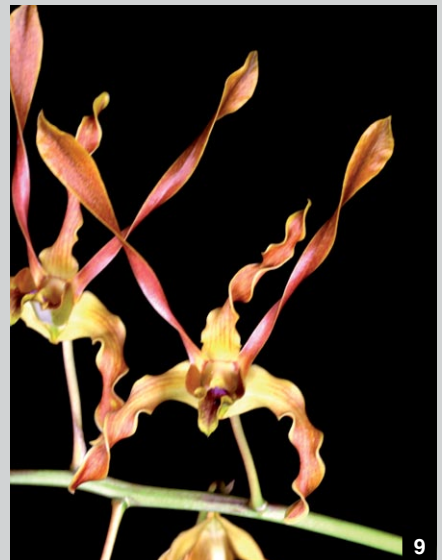
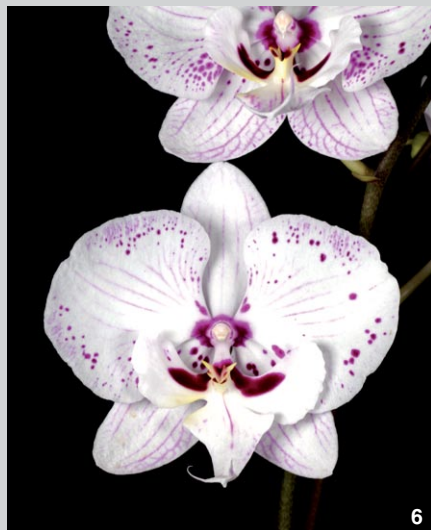


- [1] *Dendrobium parishii* 'Lili' AM/AOS 82 pts. Exhibitor: Stephen Helbling; photographer: Ann DePrez. Cincinnati Judging
- [2] *Masdevallia* Peach Allure 'Sweet Uleta' CCM-AM/AOS (Keiko Komoda x Peach Fuzz) 81-86 pts. Exhibitor: Tom Stinson; photographer: Ann DePrez. Cincinnati Judging
- [3] *Tetralthechea* Gunther Schott 'Alanna' AM/AOS (*Tetramicra canaliculata* x *Prosthechea cochleata*) 84 pts. Exhibitor: Milda Sanchez; photographer: Raul Emilio Asencio Moris. Dallas Judging
- [4] *Tetratonia* Mimi 'Francia Manolita' AM/AOS (*Broughtonia sanguinea* x Candystripe) 83 pts. Exhibitor: Francia Perez; photographer: Raul Emilio Asencio Moris. Dallas Judging
- [5] *Bulbophyllum* Emily Clarkson 'Trident' AM/AOS (*oblongum* x *pictum*) 82 pts. Exhibitor: John and Cheryl Jaworski; photographer: Ann DePrez. Cincinnati Judging
- [6] *Paphiopedilum* Saint Swithin 'Peggy' AM/AOS (*philippinense* x *rothschildianum*) 82 pts. Exhibitor: Michael Hinshaw; photographer: Ann DePrez. Cincinnati Judging
- [7] *Cattlianthe* Melana's Fire 'Kane' AM/AOS (Rojo x *Laelia schultzei*) 83 pts. Exhibitor: Yife Tien; photographer: Carmen Johnston. Florida-Caribbean Judging
- [8] *Oncidium* Golden Rialto 'Yellow Bird' HCC/AOS (Pacific Gold (1974) x Rialto) 77 pts. Exhibitor: New Vision Orchids; photographer: Ann DePrez. Cincinnati Judging
- [9] *Rhyncattleanthe* Zul 'Bill Williams' CCM/AOS (*Guarianthe skinneri* x Orange Nuggett) 85 pts. Exhibitor: Angeles Martinez; photographer: Raul Emilio Asencio Moris. Dallas Judging
- [10] *Maxillaria pendula* 'River Valley' CBR/AOS. Exhibitor: Eric Sauer; photographer: Janice Yates. Cincinnati Judging
- [11] *Phragmipedium* Clementine Louise 'Sharpshooter' HCC/AOS (Praying Mantis x *pearcei*) 76 pts. Exhibitor: George A. Bogard; photographer: David Gould. Dallas Judging
- [12] *Dendrobium* Greg Scott 'Maira' CCM/AOS (*helix* x *mirbelianum*) 86 pts. Exhibitor: Maira Ovalles; photographer: Raul Emilio Asencio Moris. Dallas Judging
- [13] *Vanda* Siriratana 'Paulina' AM/AOS (*denisoniana* x *curvifolia*) 84 pts. Exhibitor: Angeles Martinez; photographer: Raul Emilio Asencio Moris. Dallas Judging
- [14] *Dendrobium anosmum* var. *album* 'Isabella' AM/AOS 82 pts. Exhibitor: Ana Consuelo Soto; photographer: Raul Emilio Asencio Moris. Dallas Judging
- [15] *Psychillus rubeniana* 'J. Hurst' CCM/AOS 85 pts. Exhibitor: Jaime Hurst; photographer: Raul Emilio Asencio Moris. Dallas Judging
- [16] *Scaphyglottis fusiformis* 'Rancho Bariloche' CCM/AOS 85 pts. Exhibitor: Fausto Cruz; photographer: Raul Emilio Asencio Moris. Dallas Judging



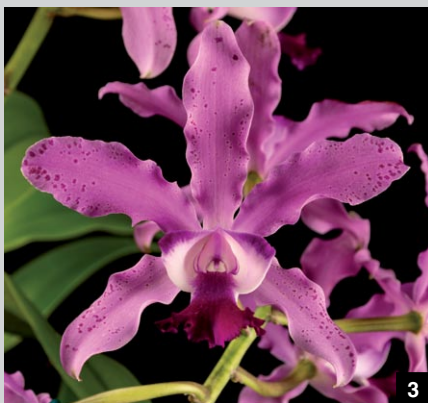


- [1] *Guarianthe aurantiaca* 'Margarita' AM/AOS 82 pts. Exhibitor: Angeles Martinez; photographer: Raul Emilio Asencio Moris. Dallas Judging
- [2] *Paphiopedilum* Mountain Mama 'Apopka' AM/AOS (Hsinying Franz x *adductum*) 80 pts. Exhibitor: Krull-Smith; photographer: Carmen Johnston. Florida-Caribbean Judging
- [3] *Cattleya* Quest Picante 'Segundo Cuesta' AM/AOS (Pradit Spot x Nestor (1914)) 81 pts. Exhibitor: Quest Orchids, Inc; photographer: Carmen Johnston. Florida-Caribbean Judging
- [4] *Phalaenopsis* Krull's Scarlet Prince 'Little James Krull' HCC/AOS (Tying Shin Golden Rose x H. P. Norton) 78 pts. Exhibitor: Krull-Smith; photographer: Carmen Johnston. Florida-Caribbean Judging
- [5] *Rhyncholaelia glauca* 'Quest' CCM/AOS 83 pts. Exhibitor: Quest Orchids, Inc; photographer: Carmen Johnston. Florida-Caribbean Judging
- [6] *Sobralia decora* 'Bielecki's Morning Surprise' HCC/AOS 78 pts. Exhibitor: Thad Bielecki; photographer: Carmen Johnston. Florida-Caribbean Judging
- [7] *Perreirara* Thai After Glow 'Betty Boo' HCC/AOS (Bangkok Sunset x *Vanda* Pralor) 78 pts. Exhibitor: Betty Chung; photographer: Claude W. Hamilton. Florida-Caribbean Judging
- [8] *Cattlianthe* Red Imp 'Florida Beauty' CCM/AOS (Red Gold x *Guarianthe aurantiaca*) 80 pts. Exhibitor: Stelmar Gardens; photographer: Carmen Johnston. Florida-Caribbean Judging
- [9] *Trichoglottis rosea* var. *breviracema* 'Quest' CCM/AOS 83 pts. Exhibitor: Quest Orchids, Inc; photographer: Carmen Johnston. Florida-Caribbean Judging
- [10] *Rhyncholaelia* Aristocrat 'Pierina Demorizi' AM/AOS (*glauca* x *digbyana*) 83 pts. Exhibitor: Melida Demorizi; photographer: Carmen Johnston. Florida-Caribbean Judging
- [11] *Dendrobium jenkinsii* 'Karina Motes' AM/AOS 80 pts. Exhibitor: Motes Orchids; photographer: Carmen Johnston. Florida-Caribbean Judging
- [12] *Cattleya schroederiae* 'Thaleia' HCC/AOS 77 pts. Exhibitor: Juraj Kojcs; photographer: Carmen Johnston. Florida-Caribbean Judging
- [13] *Vanda* Hollis Presnell 'Thad's Favorite' AM/AOS (Bill Burke x Paki) 86 pts. Exhibitor: Thad Bielecki; photographer: Carmen Johnston. Florida-Caribbean Judging
- [14] *Catasetum saccatum* 'Mickey Chan' AM/AOS 81 pts. Exhibitor: Larry Feldman; photographer: Carmen Johnston. Florida-Caribbean Judging
- [15] *Guarianthe* Guatemalensis 'Hamlyn' AM/AOS (*aurantiaca* x *skinneri*) 81 pts. Exhibitor: Claude W. Hamilton; photographer: Claude W. Hamilton. Florida-Caribbean Judging
- [16] *Rechingerara* Alexandra Kontos 'Ruby' AM/AOS (*Laelia colombiana* x *Rhyncatleanthe* Fuchs Orange Nuggett) 87 pts. Exhibitor: Faith Simms; photographer: Claude W. Hamilton. Florida-Caribbean Judging





- [1] *Vanda* Herziana 'Guisy Maffessanti' AM/AOS (*coerulea* x *suavis*) 81 pts. Exhibitor: Giusy Maffessanti; photographer: Claude W. Hamilton. Florida-Caribbean Judging
- [2] *Rhyncho brassoleya* Henry Ford Baber 'Hamlyn' AM/AOS (*Brassavola nodosa* x *Rhyncholaeliocattleya* Goldenzelle) 83 pts. Exhibitor: Claude W. Hamilton; photographer: Claude W. Hamilton. Florida-Caribbean Judging
- [3] *Broughtonia sanguinea* 'Hamlyn's Treasure' AM/AOS 87 pts. Exhibitor: Claude W. Hamilton; photographer: Claude W. Hamilton. Florida-Caribbean Judging
- [4] *Encyclia hamiltonii* 'Hamlyn' AM/AOS 83 pts. Exhibitor: Claude W. Hamilton; photographer: Claude W. Hamilton. Florida-Caribbean Judging
- [5] *Dendrobium* Adastra 'Pinky' CCM/AOS (*aphyllum* x *anosmum*) 85 pts. Exhibitor: Stephanie McConnell; photographer: Claude W. Hamilton. Florida-Caribbean Judging
- [6] *Phalaenopsis* Fuller's C-Plus 'Kisha Simpson' AM/AOS (Yu Pin Fireworks x Fuller's Balloon) 80 pts. Exhibitor: Kisha Simpson; photographer: Claude W. Hamilton. Florida-Caribbean Judging
- [7] *Guaricattonia* Michael Sampson 'Phyllis Dorothy' AM/AOS (Ernest Cromwell x Starrlyn) 82 pts. Exhibitor: Richard Phillips; photographer: Claude W. Hamilton. Florida-Caribbean Judging
- [8] *Ludisia discolor* 'E. J. Hunt' CCE/AOS 90 pts. Exhibitor: Melanie Bitter; photographer: Claude W. Hamilton. Florida-Caribbean Judging
- [9] *Dendrobium* Memoria Eugene Laurent 'Lucas Lyn' HCC/AOS (Dulcie Groeneveld x Nicha Natron) 78 pts. Exhibitor: Glendon Nam; photographer: Claude W. Hamilton. Florida-Caribbean Judging
- [10] *Rechingera* Alexandra Kontos 'Opal' CCM/AOS (*Laelia colombiana* x *Rhyncattleanthe* Fuchs Orange Nuggett) 81 pts. Exhibitor: Brian Lam; photographer: Claude W. Hamilton. Florida-Caribbean Judging
- [11] *Papilionanda* Betty Chung 'Kirk' HCC/AOS (Mevr. L. Velthuis x *Vanda* Adisak) 78 pts. Exhibitor: Kirk Hoo; photographer: Claude W. Hamilton. Florida-Caribbean Judging
- [12] *Cattleya amethystoglossa* 'Fajen's Orchids Too' AM/AOS 81 pts. Exhibitor: Fajen's Orchids; photographer: Wes Newton. Florida North-Central Judging
- [13] *Cattleya nobilior* 'Winter Haven' AM/AOS 81 pts. Exhibitor: Keith and Dina Emig - Winter Haven Orchid Nursery; photographer: Wes Newton. Florida North-Central Judging
- [14] *Perreiraara* Thai After Glow 'Kirk' AM/AOS (Bangkok Sunset x *Vanda* Pralor) 82 pts. Exhibitor: Kirk Hoo; photographer: Claude W. Hamilton. Florida-Caribbean Judging
- [15] *Rhynchovola* Jimminey Cricket 'Wing-Dreams' HCC/AOS (*Brassavola nodosa* x *Rhyncholaelia digbyana*) 79 pts. Exhibitor: Julio and Eileen Hector; photographer: Wes Newton. Florida North-Central Judging
- [16] *Cattlianthe* Carolyn Reid 'Donna Marie' HCC/AOS (*Guarlianthe aurantiaca* x *Cattleya* Twinkle Star) 79 pts. Exhibitor: Ed Murphy; photographer: Jay Loeffler. Florida North-Central Judging
- [17] *Phragmipedium* China Dragon 'Fajen's Orchids' AM/AOS (Grande x *besseae*) 86 pts. Exhibitor: Fajen's Orchids; photographer: Wes Newton. Florida North-Central Judging





12



13



14



15

- [1] *Paphiopedilum* Fajen's Fiesta 'Rock-bend' AM/AOS (*henryanum* x *moquet-teanum*) 82 pts. Exhibitor: Fajen's Orchids; photographer: Wes Newton. Florida North-Central Judging
- [2] *Paphiopedilum* Tristar Mabo 'Losgar' HCC/AOS (Macabre x Hsinying Web) 77 pts. Exhibitor: Nancy Losgar; photographer: Wes Newton. Florida North-Central Judging
- [3] *Myrmecocattleya* Erin Courtney's Suncoast 'Soulful' AM/AOS (*Cattleya* Lavender Lulu x Memoria Louise Fuchs) 85 pts. Exhibitor: Jim Roberts Florida SunCoast Orchids; photographer: H. A. Russell III. Florida North-Central Judging
- [4] *Bulbophyllum echinolabium* 'Johnny Hicks' AM/AOS 86 pts. Exhibitor: Keith and Dina Emig - Winter Haven Orchid Nursery; photographer: Wes Newton. Florida North-Central Judging
- [5] *Paphiopedilum micranthum* (Eburneum) 'Fajen's Orchids Again' HCC/AOS 78 pts. Exhibitor: Fajen's Orchids; photographer: H. A. Russell III. Florida North-Central Judging
- [6] *Dendrobium* Little Andree 'Brenda' CCE/AOS (*normanbyense* x *convolutum*) 92 pts. Exhibitor: John "Jack" Vernam III; photographer: Wes Newton. Florida North-Central Judging
- [7] *Phalaenopsis* Krull's Scarlet Prince 'Electric' AM/AOS (Tying Shin Golden Rose x H. P. Norton) 84 pts. Exhibitor: Krull-Smith; photographer: Wes Newton. Florida North-Central Judging
- [8] *Epidendrum ciliare* 'Carolyn's Joy' CCM/AOS 84 pts. Exhibitor: Carolyn Robinson; photographer: H. A. Russell III. Florida North-Central Judging
- [9] *Cattleya loddigesii* 'Carnoustie' HCC/AOS 76 pts. Exhibitor: Robert M. Scully, Jr.; photographer: Jay Loeffler. Florida North-Central Judging
- [10] *Cattlianthe* Secret Love 'Angel' HCC/AOS (Candy Tuft x *Cattleya* Mini Purple) 78 pts. Exhibitor: Art Stone Orchids; photographer: Wes Newton. Florida North-Central Judging
- [11] *Dendrobium amethystoglossum* 'Kevin' CCE/AOS 90 pts. Exhibitor: Mac's Orchids; photographer: H. A. Russell III. Florida North-Central Judging
- [12] *Paphiopedilum* Moustache 'Leonard Smith' CCE-AM/AOS (*philippinense* x Saint Swithin) 91-85 pts. Exhibitor: Krull-Smith; photographer: H. A. Russell III. Florida North-Central Judging
- [13] *Phalaenopsis* Stuart Henderson 'Memoria Harold Smith' AM/AOS (John Naugle x Crystelle Smith) 86 pts. Exhibitor: Krull-Smith; photographer: Wes Newton. Florida North-Central Judging
- [14] *Phalaenopsis* Stuart Henderson 'Eileen Hector' HCC/AOS (John Naugle x Crystelle Smith) 78 pts. Exhibitor: Krull-Smith; photographer: Wes Newton. Florida North-Central Judging
- [15] *Epicattleya* Ren e Marqu es 'Flame Thrower' CCM/AOS (*Epidendrum pseudepidendrum* x *Cattleya* Claesiana) 82 pts. Exhibitor: Joanna Shaw; photographer: Jay Loeffler. Florida North-Central Judging





- [1] *Paphiopedilum* Krull's Prometheus 'Krull-Smith' AM/AOS (Jan Ragan x *rothschildianum*) 85 pts. Exhibitor: Krull-Smith; photographer: Wes Newton. Florida North-Central Judging
- [2] *Brassocattleya* Jamie XOXO 'Jackie XOXO' HCC/AOS (*Cattleya labiata* x *Brassavola cucullata*) 77 pts. Exhibitor: Jamie and Jackie Lawson; photographer: Beth Lamb. Florida North-Central Judging
- [3] *Paphiopedilum* Krull's Prometheus 'Jim Krull' AM/AOS (Jan Ragan x *rothschildianum*) 84 pts. Exhibitor: Krull-Smith; photographer: Wes Newton. Florida North-Central Judging
- [4] *Cattleya intermedia* (Alba) 'Miranda's Neve' HCC/AOS 77 pts. Exhibitor: Miranda Orchids; photographer: Wes Newton. Florida North-Central Judging
- [5] *Paphiopedilum* Sander's Duck 'Crystelle' AM/AOS (Sander's Pride x *adductum*) 86 pts. Exhibitor: Krull-Smith; photographer: Wes Newton. Florida North-Central Judging
- [6] *Phalaenopsis* Laura Newton 'Crystelle' AM/AOS (Krull's Butterfly x *amabilis*) 85 pts. Exhibitor: Krull-Smith; photographer: Wes Newton. Florida North-Central Judging
- [7] *Phalaenopsis* Krull's Scarlet Prince 'Bronze Age' HCC/AOS (Tying Shin Golden Rose x H. P. Norton) 79 pts. Exhibitor: Krull-Smith; photographer: Wes Newton. Florida North-Central Judging
- [8] *Phalaenopsis* Jordan Winter 'Electric' AM/AOS (Citrus Candy x Krull's Red Bird) 83 pts. Exhibitor: Krull-Smith; photographer: Wes Newton. Florida North-Central Judging
- [9] *Vanda* Motes Lemon Tart 'MV Gliese' HCC/AOS (*cristata* x Miami Snowdrop) 79 pts. Exhibitor: Stuart Henderson; photographer: Wes Newton. Florida North-Central Judging
- [10] *Laelia rosea* 'Ruth's Just an Accent' CCM/AOS 80 pts. Exhibitor: Accent Orchids; photographer: Wes Newton. Florida North-Central Judging
- [11] *Paphiopedilum* Shen-Liu William Ani 'Crystelle' AM/AOS (William Ambler x *anitum*) 86 pts. Exhibitor: Krull-Smith; photographer: Wes Newton. Florida North-Central Judging
- [12] *Aeridovanda* Sagarik's Legacy 'Garrett's Vandaland' AM/AOS (*Aerides lawrenceae* x *Vanda* Sagarik Gold) 81 pts. Exhibitor: Sharon and David Garrett; photographer: Beth Lamb. Florida North-Central Judging
- [13] *Phalaenopsis* Krull's Red Flyer 'James Krull' HCC/AOS (Krull's Red Bird x Hot Embers) 78 pts. Exhibitor: Krull-Smith; photographer: Wes Newton. Florida North-Central Judging
- [14] *Cattleya* Bright Spark 'Precocious 1' AM-JC/AOS (*Cattleya* Tiny Rubies x *Cattleya cernua*) 82 pts. Exhibitor: Beth Lamb; photographer: Beth Lamb. Florida North-Central Judging
- [15] *Phragmipedium* Umbriel 'Red Hawk Tails' AM/AOS (Grande x *sargentianum*) 80 pts. Exhibitor: Sheri Liggett-Macchia and Red Hawk Nursery; photographer: Beth Lamb. Florida North-Central Judging
- [16] *Brassocattleya* Theresa Ricci 'Red Hawk' AM/AOS (Hippodamia x *Cattleya aclandiae*) 80 pts. Exhibitor: Victor Elliott; photographer: Beth Lamb. Florida North-Central Judging





11



12



13



16



14



15

- [1] *Catyclia* Kasey Ray's SunCoast 'Porter' HCC/AOS (*Cattleya* Peckaviensis x *Encyclia* Paula Gross) 76 pts. Exhibitor: Susan Gerhardt; photographer: Kay Clark. Florida North-Central Judging
- [2] *Phalaenopsis* Gan Lin Fairy 'Holy Cross' HCC/AOS (Chian Xen Pearl x Mount Lip) 78 pts. Exhibitor: Susan Gerhardt; photographer: Kay Clark. Florida North-Central Judging
- [3] *Phalaenopsis* Little One 'Krull-Smith' AM/AOS (*hygrochila* x *japonica*) 80 pts. Exhibitor: Krull-Smith; photographer: Wes Newton. Florida North-Central Judging
- [4] *Paphiopedilum* Virgo 'Whisper Hundred Acre Wood' HCC/AOS (*godefroyae* x *Psyche*) 76 pts. Exhibitor: Laura and Wes Newton; photographer: Kay Clark. Florida North-Central Judging
- [5] *Paphiopedilum* Spring Sunset 'Whisper 101 Dalmatians' HCC/AOS (Spring Moonbeam x *mastersianum*) 75 pts. Exhibitor: Laura and Wes Newton; photographer: Wes Newton. Florida North-Central Judging
- [6] *Phragmipedium* Professor Braem 'Deanna's Blush' AM/AOS (*longifolium* x *schlimii* var. *manzurii*) 84 pts. Exhibitor: Darlene Thompson; photographer: John Dunkelberger. Great Lakes Judging
- [7] *Polystachya* *ottoniana* 'Bryon' CCM/AOS 85 pts. Exhibitor: Bryon K. Rinke; photographer: Bryon Rinke. Great Plains Judging
- [8] *Dendrobium* Fire Wings 'Cora' CCM-AM/AOS (Big Alex x Silver Wings) 81-80 pts. Exhibitor: Susan Gerhardt; photographer: Kay Clark. Florida North-Central Judging
- [9] *Rhyncholaeliocattleya* Emily's Jim 'Jim/Ryan' HCC/AOS (*Cattleya* Circle of Life x Robert Ferguson) 77 pts. Exhibitor: Bill Nunez; photographer: Wes Newton. Florida North-Central Judging
- [10] *Bulbophyllum* Karen Lewis 'MV Andromeda' AM/AOS (*phalaenopsis* x *echinolabium*) 83 pts. Exhibitor: Stuart Henderson; photographer: Wes Newton. Florida North-Central Judging
- [11] *Paphiopedilum* Hung Sheng Zebra 'Bob Senior Surprise' AM/AOS (*spicerianum* x Winston Churchill) 81 pts. Exhibitor: Bob Galaska Sr; photographer: John Dunkelberger. Great Lakes Judging
- [12] *Phaius* *tankervilleae* 'Pam' AM/AOS 85 pts. Exhibitor: Jeffrey Rundell; photographer: Wes Newton. Florida North-Central Judging
- [13] *Cattleya* *maxima* (Coerulea) 'Inez' AM/AOS 80 pts. Exhibitor: Jerrie Nichols; photographer: Katie Payeur. Great Lakes Judging
- [14] *Paphiopedilum* Lefty Kei 'Sam's Choice' CCM-FCC/AOS (William Ambler x *sanderianum*) 87-90 pts. Exhibitor: Orchid Inn, Ltd.; photographer: Katie Payeur. Great Lakes Judging
- [15] *Paphiopedilum* Ho Chi Minh 'Pink March' CCM-AM/AOS (*delenatii* x *vietnammense*) 88-83 pts. Exhibitor: Orchids by Hausermann, Inc.; photographer: Patti DeMaire. Great Lakes Judging
- [16] *Paphiopedilum* Think Pink 'Hawaiian Surprise' AM/AOS (Deperle x *glaucophyllum*) 81 pts. Exhibitor: Gwen and Paul Zimmerman; photographer: Katie Payeur. Great Lakes Judging





13



14



15

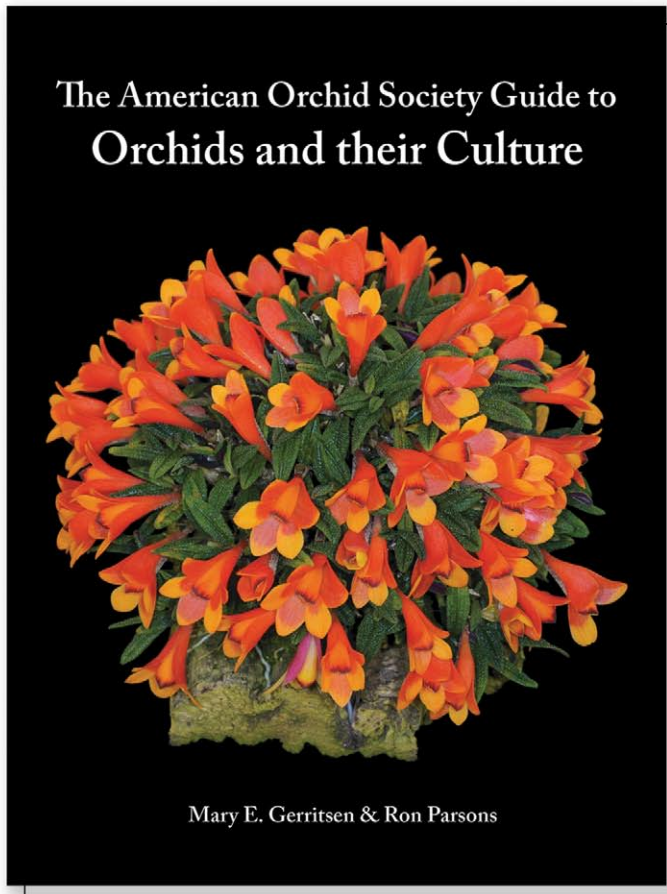
- [1] *Rossioglossum* Rawdon Jester 'Lucy Isabelle' AM/AOS (*grande* x *Williamsonianum*) 85 pts. Exhibitor: Orchids by Hausermann, Inc.; photographer: Patti DeMaire. Great Lakes Judging
- [2] *Rhyncattleanthe* Walnut Valley 'Santiago' AM/AOS (*Rhyncholaeliocattleya* Delta King x *Free Spirit*) 80 pts. Exhibitor: Max C. Thompson; photographer: Bryon Rinke. Great Plains Judging
- [3] *Paphiopedilum* Magical Peacock 'Slipper Zone Breathtaking' AM/AOS (*Presidential Magic* x *Petula's Peacock*) 81 pts. Exhibitor: Lehua Orchids; photographer: Glen Barfield. Hawaii Judging
- [4] *Paphiopedilum* Macabre Wonder 'Slipper Zone Karen Lynn Muir' HCC/AOS (*Mr Wonderful* x *Macabre Presence*) 76 pts. Exhibitor: Lehua Orchids; photographer: Glen Barfield. Hawaii Judging
- [5] *Dendrobium* Gowan's Tangelo 'Max' AM/AOS (*mohlianum* x *melinanthum*) 81 pts. Exhibitor: Max C. Thompson; photographer: Bryon Rinke. Great Plains Judging
- [6] *Paphiopedilum philippinense* 'Wacousta' AM-CCM/AOS 82-88 pts. Exhibitor: Dot Potter Barnett; photographer: Patti DeMaire. Great Lakes Judging
- [7] *Dendrobium* Gaëtan Minet 'Bryon' AM/AOS (*aphanochilum* x *cuthbertsonii*) 80 pts. Exhibitor: Bryon K. Rinke; photographer: Bryon Rinke. Great Plains Judging
- [8] *Paphiopedilum* Hawaiian Volcano 'Slipper Zone Red at Last' AM/AOS (*Hawaiian Illusion* x *Memoria Jacob Jake Piloto*) 82 pts. Exhibitor: Lehua Orchids; photographer: Glen Barfield. Hawaii Judging
- [9] *Sarcolexia* Sea Foam 'Bryon' CCM-AM/AOS (*Sarcoglottis sceptrodes* x *Pelexia olivacea*) 89-86 pts. Exhibitor: Bryon K. Rinke; photographer: Bryon Rinke. Great Plains Judging
- [10] *Paphiopedilum* Delightfully Macabre 'Slipper Zone Dorsal Galore' AM/AOS (*Luna Magic* x *Macabre Delight*) 80 pts. Exhibitor: Lehua Orchids; photographer: Glen Barfield. Hawaii Judging
- [11] *Paphiopedilum* Blushing Petula 'Slipper Zone Eruption' AM/AOS (*President Fred* x *Petula's Peacock*) 83 pts. Exhibitor: Lehua Orchids; photographer: Glen Barfield. Hawaii Judging
- [12] *Cattleya nobilior* (Semi-Alba) 'In the Vein' JC/AOS. Exhibitor: Ben Oliveros and Orchid Eros; photographer: Glen Barfield. Hawaii Judging
- [13] *Bulbophyllum picturatum* 'Timbucktoo' AM/AOS 82 pts. Exhibitor: Sarah Pratt; photographer: Bryon Rinke. Great Plains Judging
- [14] *Paphiopedilum* Luna Spots 'Slipper Zone Spotted Boldness' AM/AOS (*Luna Magic* x *Spots Galore*) 80 pts. Exhibitor: Lehua Orchids; photographer: Glen Barfield. Hawaii Judging
- [15] *Coelogyne xyrekes* 'Jungle Mist Jewel' AM/AOS 83 pts. Exhibitor: Jungle Mist Orchids; photographer: Glen Barfield. Hawaii Judging

Now in stock!



American Orchid Society
Education. Conservation. Research.

\$24.95
10% discount
to AOS Members



*The American Orchid Society Guide to
Orchids and their Culture*

by Mary E. Gerritsen & Ron Parsons

Covers all aspects of the hobby from what makes an orchid, to repotting, to semi-hydroponics. Includes controlling common insect pests and a pictorial section on today's popular orchids. Printed by Redfern Natural History Productions, Dorset, England. 6" x 8.5" paperback; 249 pages, 450 color images

Order from our online shop at www.aos.org

DUE TO CORONAVIRUS CONCERNS, AOS JUDGING WAS SUSPENDED AND SPRING SHOWS CANCELED OR POSTPONED. AS JUDGING AND SHOWS RETURN, PLEASE REFER TO THE AOS ONLINE CALENDAR AND BEFORE PLANNING TO VISIT ANY SHOW, PLEASE EMAIL OR PHONE THE PERSON OF CONTACT TO FIND OUT THE CURRENT STATUS OF THE EVENT.

Have Orchids Delivered

Give the gift of *Orchids* magazine every month, twelve issues (print and/or digital format)

U.S. Individual — one year \$79 • U.S. Joint — one year \$94
Plus, access to special “members’ only” educational opportunities



For American Orchid Society membership information and benefits, please go to www.aos.org, call the membership office at 305-740-2010 or email TheAOS@AOS.org.



American Orchid Society
Education, Conservation, Research

All that's new in orchids from the world's oldest authority



The Orchid Review is essential reading – it is the world's oldest, most influential orchid magazine. Published by the RHS four times a year, each issue is packed with inspiring articles such as:

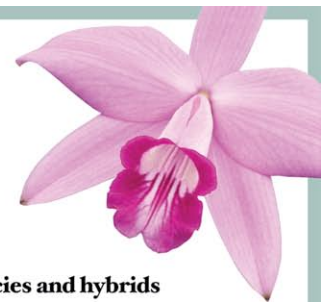
- Profiles of orchid genera, species and hybrids
- Orchids in the wild, and conservation projects
- The first descriptions of new orchid species
- RHS awarded orchids, with tips from the growers
- Orchid advice, the latest news, book reviews & events

• **Four issues with** the Orchid Hybrid List, UK £34, overseas airmail **£44**

• **Four issues without** Orchid Hybrid List, UK £29, overseas airmail **£37**

Subscribe online or by telephone

Quarterly supplements to Sander's List of Orchid Hybrids, supplied by the Royal Horticultural Society as International Cultivar Registration Authority, can be included for a small annual fee.



Sharing the best in Gardening

Website: www.rhs.org.uk/orchidreview

Tel: 00 44 20 7821 3401

Email: membership@rhs.org.uk

THE AFRICAN VIOLET MAGAZINE

*A must for all
African Violet Growers*

Six 64-page issues with color
Full of Growing Information

USA – \$35.00 Canada – \$40.00
International – \$60.00

Order Today

409-839-4725 * 1-800-770-AVSA

The African Violet Society of
America, Inc.
2375 North Street,
Beaumont, Texas 77702

"We make growing ... easy!"



Join for Two Years and Receive a \$30 Orchid Certificate

Join the AOS for two years or renew
your membership for two years and you'll
receive a certificate good for \$30 off a retail plant
purchase of \$100 or more at one of these nurseries:

- Carmela Orchids • Carter and Holmes • Gold Country Orchids
- Hillsview Gardens • Indoor Gardening Supplies • Krull-Smith
- Kelley's Korner Orchid Supplies • Little Brook Orchids • Mountain View Orchids
- New Earth Orchids • OFE International • Orchid Doctor • Orchid Inn
- Orchids In Our Tropics • Quest Orchids • R. F. Orchids • Ravenvision
- Soraa Orchids • Sunset Valley Orchids • Tropical Gardens Orchids

You will receive your \$30 certificate in your new member/renewal packet. The certificate is good for six months. The certificate is not good for any advertised specials, taxes or shipping and handling charges.

Don't delay! Act now!

Email membership@aos.org • Website www.aos.org

American Orchid Society
at Fairchild Tropical Botanic Garden
10901 Old Cutler Road
Coral Gables, FL 33156



American Orchid Society
Education. Conservation. Research.

Yellow Sticky Cards for Bush Snails

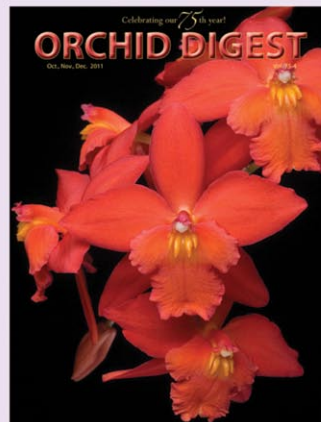
A little trick I learned a few years ago: to catch those nasty bush snails which do not seem to respond to any other method: cut a piece of yellow sticky card and insert it into the orchid pot. If you have bush snails they will be attracted to the card and get stuck. You will not get them all but you will get an amazing number of them.

I came to this solution sort of by accident; I do not like to use chemical solutions if I do not have to and bush snails are almost impossible to get rid of. I had stuck a piece of a yellow card in a pot to catch fungus gnats and was amazed to see about 20 bush snails on the card as well. Now I try to keep a card in every one of my pots.

— Sara Johnson, Concord,
California

Become a member of...

Orchid Digest



Award winning
orchid journalism
for the
serious
grower.

Published
quarterly in full
color.

www.orchiddigest.org

US addresses: \$39 per year
Addresses outside the US: \$55 per year

Join online or mail check or credit card information in US funds only to:

Orchid Digest
PO Box 6966
Laguna Niguel, CA 92607-6966

Visa, Mastercard accepted, please include your name as it appears on the card, card number and expiration date. The Orchid Digest is a 501(c)3 organization.

ORCHID MARKETPLACE

KULTANA
Orchids
www.orchid.in.th
Pricelist Available Upon Request

Thailand's
Major Orchids
Producer.
Specialized
in Vanda
and Tropical
Orchids

Tel.: + 662 5655463
WhatsApp: # 6681 6419901
Email: kultanaorchids@gmail.com

Durable, affordable, & made in the USA!
• Now with rounded corners •



PAW PAW
EVERLAST
LABEL COMPANY

INTRODUCTORY OFFER
Sample pack of 8 styles plus a marking pencil
JUST \$6

PO Box 93, Paw Paw, MI 49079, 269-657-4921
www.EverlastLabel.com

Gothic Arch Greenhouses 

Catch the Sunshine!

- Greenhouse Kits
- Equipment • Supplies

800-531-GROW (4769)
GothicArchGreenhouses.com

REDWOOD OR ALUMINUM GREENHOUSES
America's BEST Values!




robsbg@aol.com • www.sbgreenhouse.com
FREE COLOR CATALOG (800) 544-5276
SANTA BARBARA GREENHOUSES
721 RICHMOND AVE.-A, OXNARD, CA 93030


REXIOUS
ORCHID BARK



dans@rexius.com
888-4-REXIUS
one pallet minimum

Heat-Treated Douglas Fir Bark

 **New World Orchids**
Specializing in miniature orchid species from around the world



Large selection of *Neofinetia*,
Dendrobium, *Bulbophyllum*, *Vanda*
and South American species

Follow us on Facebook, Instagram, and Twitter
734-369-1776 (call or text)

www.newworldorchids.com

ORCHIDS CLASSIFIEDS

SALES

NEW VISION ORCHIDS — Specializing in phalaenopsis: standards, novelties. Odontoglossums, intergenerics, lycastes and vandaceous. Russ Vernon — hybridizer. Divisions of select, awarded plants available. Flasks and plants. Tel.: 765-749-5809. E-mail: newvisionorchids@aol.com, www.newvisionorchids.com.

SALES

SELLING MY PRIVATE collection after 28 years; 2,500 sq ft of overgrown cattleyas and 500 sq ft of overgrown dendrobiums are available in Titusville, Fl. Contact: Kenny Yii @ 321-720-7337.

OLYMPIC ORCHIDS—Pacific Northwest grower specializing in species, miniatures, seedlings and hard-to-find orchids. Quality plants at reasonable prices. Please visit our Website at <http://orchidfinders.com>.

SALES

BROWARD ORCHID SUPPLY — we carry fertilizers, fungicides, pesticides, pots, baskets, growing media, tree fern, cork, wire goods, labels, pruners and more. For our complete product line, visit our website at www.browardorchidsupply.com. Call 954-925-2021 for our catalog or questions. AOS members receive a 10% discount. We cater to the hobbyist.

Classified ads are \$55 for five lines (45 characters/spaces per line) and \$15 for each additional line. \$25 for first three words in red. \$25 to include logo. The first three words can be in all caps, if requested.

Where to Place Baskets



MY NEW YEAR'S resolution was to enhance my skills and become knowledgeable about my orchid collection. Lately, I have been rearranging my orchids by cultural requirements and creating growing environments that will promote better vigor and growth in my plants. I am at the point where I am not killing my plants but they are just not growing or blooming as well as I would like them to.

As a result, I have been organizing some of my orchids into wire baskets. The medium-to-high light-loving orchids hang from the ceiling of my greenhouse with a retractable plant pulley (available from Amazon for about \$10.00/2-pack) so they are easy to pull down to check on them. My shade-tolerant orchids are in baskets sitting on the floor. Plants are further segregated by potting medium: moss vs bark. I water my bark baskets more often than my moss baskets. I am learning more about the individual requirements of my collection with this system plus I can fit more orchids into a small space. Who would not love that!

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

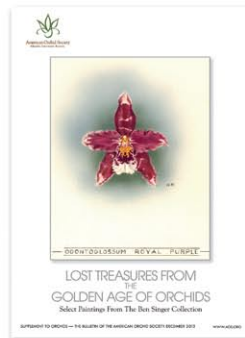
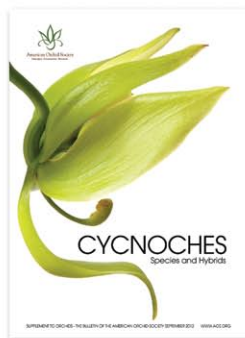
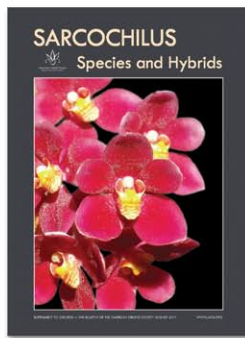
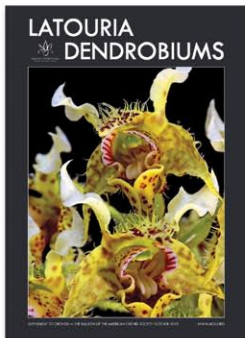
Discover a World of Diversity
American Begonia Society
www.begonias.org
amerbegmembership@gmail.com

Membership: (Paper subscription) \$25;
 (Digital subscription) \$15 US, Mexico, and Canada;
 \$45 Overseas airmail except Mexico and Canada.



American Orchid Society
 Education. Conservation. Research.

Supplement your library with AOS specialist publications



Each year the AOS annual supplement provides an in-depth look at a particular subject. Written by experts, these publications are your resource on orchids and their culture. If you have missed any, complete the set. They make great gifts too! Available online at www.aos.org/store/

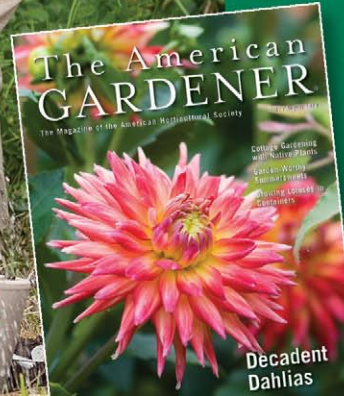




The American Horticultural Society (AHS) is a national membership organization that supports sustainable and earth-friendly gardening.

Member benefits include:

- Six issues of *The American Gardener* magazine
- Opportunity to participate in the annual AHS Seed Exchange program
- Access to members-only area of website
- Free admission and other discounts at 300 public gardens and arboreta



Join the
American
Horticultural
Society

JOIN TODAY!
Visit
www.ahsgardening.org/join

AD INDEX

African Violet Society.....	588
American Begonia Society.....	590
American Horticultural Society	591
American Orchid Society	
American Orchid Society Guide to	
Orchids and Their Culture	586
2020 Annual Supplement	
Supplement	515
Better Grow.....	503
Centennial Celebration	
Save-the-Date.....	505
Classified Ads	589
Compendium of Orchid	
Genera.....	Inside Back Cover
Easy Money	588
Membership	587
Past Supplements	590
Webinars	519
10th Annual Odom's Orchids	
Cattleya Symposium.....	Inside Front Cover
Cymbidium Society of America.....	503
Dyna-Gro Nutrition Solutions	503
Everlast Label Company.....	589
Gothic Arch.....	589
IX International Conference on Orchid	
Conservation "Sorora 2020"	503
Jaybird Manufacturing	519
Kultana Orchids	589

Orchiata.....	591
Orchid Digest	588
Orchid Review	587
New World Orchids.....	589
Rexius	589
R.F. Orchids	501
Santa Barbara Greenhouses	589



**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.

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.

English Orchid Auctions of the 1890s

Text and photograph Arthur E. Chadwick

"AT THE STROKE of half past twelve, the auctioneer mounts his rostrum." And so begins London's weekly orchid sale of the 1890s, where hundreds of exotic specimens are put up for bid. Amateurs, professionals and their agents gather in the bustling Cheapside commercial district to peruse the epiphytes just brought in from the jungles.

I stumbled upon this firsthand account while leafing through my father's library of century-old horticulture books, many of which are leather-bound and adorned in gold lettering. Frederick Boyle's *About Orchids: A Chat*, published in 1893, caught my eye and revealed what it was like to grow these tropical specimens at a time when new species were first being discovered.

Boyle was a prolific author with dozens of books to his credit. He was keen on plants and would later write *The Woodlands Orchids* in 1901 and *The Culture of Greenhouse Orchids* in 1902. Each week, he attended the auctions hoping to add to his collection.

Fortunes were made and lost at those early orchid sales. A rarely seen species might command "the fanciest of prices" or plummet from "a guinea a leaf to a fraction of a shilling" (a drop of a factor of about 20), depending on whether a plant hunter returned from the jungles with a bounty. Wild monetary swings were the norm and were driven by supply, demand and a lot of hype.

The early auctioneers embellished their botanical descriptions in order to attract interest. It was common to hear that an item up for bid was the "most attractive of plants" or "destined to be a gem in any collection." The orchid's value rose even higher if it came from "parts unknown" and, therefore, could not be easily found again.

It would have been tempting to explore the rainforests looking for exotic plants to sell at the weekly auction, but there were dangers. Native peoples roamed the hillsides and were not too happy with Westerners taking their plants. "Only last week, we heard that Mr White of Winchmore Hill perished in the search for *Dendrobium phalaenopsis*."



Orchid growing in the late 1800s was vastly different that it is today. Hybridizing was in its infancy and most collectors raised species that had been imported from the jungles and purchased through auction houses. Author Frederick Boyle explains the process in his 1893 book, *About Orchids: A Chat*. Pictured is a rare 1888 hybrid, *Cattleya Empress Frederick* (*dowiana* × *mossiae*) that would have been in bloom during this period. Photograph by Arthur E. Chadwick.

In one unusual case, rare orchids were observed growing among the bones of a native graveyard in New Guinea. The explorer had to bribe the natives and, after a lengthy trip at sea, thousands of plants arrived in London. One variety was auctioned off still attached to a skull.

Springtime sales were the most heavily attended because the growing season was just beginning. Britain had six or seven months of sunlight and warm weather ahead so that the plants could "recover from the effects of a long voyage and uncomfortable quarters." Orchid survival rates were greatly improved if the plants could get settled in and rooted before winter.

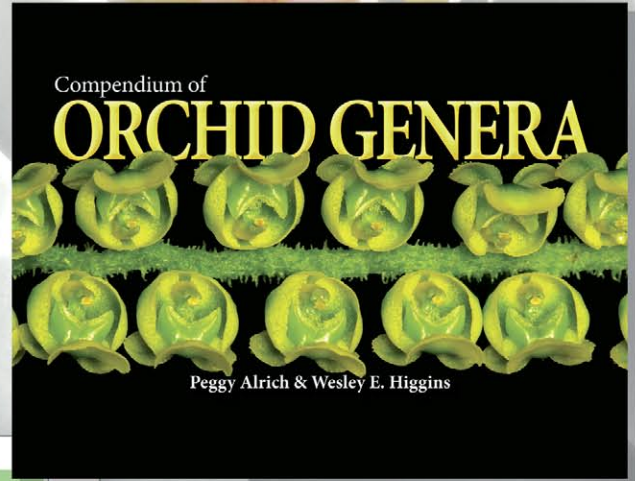
Today, of course, collectors have the luxury of buying their plants at nurseries, floral shops, and over the Internet. Yet, it is fascinating to learn what the early days of orchid raising was like and it gives hobbyists a greater appreciation for these

time-tested epiphytes. Firsthand accounts such as Frederick Boyle's make all of this possible.

— Arthur E. Chadwick is a coauthor of *The Classic Cattleyas that describes the large-flowered species that make up today's hybrids*. He is president of *Chadwick & Son Orchids*, which operates 11 greenhouses in Powhatan County, a retail store in Richmond, Virginia and boards over 13,000 orchids for local clients (email: art@chadwickorchids.com; website www.chadwickorchids.com).

Presenting

The Compendium of Orchid Genera by Peggy Alrich and Wesley Higgins



Angraecum Boyer

Voy. Bot. Afrique, 3: 336, 1-19 (1846).

Epithet: *Angraecum* - *Angracina*

Etymology: From the Latinized form of the Maldiv word (*Angre* or *Angre*) for the epiphytic orchids that resemble *Azadir* and *Vanda* in habit. The name *Angraecum* originated with Georg Eberhard Rumphius (1628-1702), who coined it from the word *Angre*, a name or title given by the Maldivers to parasitical *Epiphydra* plants, the meaning of which has not been discovered. From Engelbert Koenig (1853-1716) we learn that *Angre* or *Angre* is also the name used by the Javanese for these plants.

Genotype: *Angraecum elaeagnifolium* Boerl.

Distribution: *Angracina* Boerl.

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, savanna to montane evergreen forests of mainly tropical Africa (Senegal 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, channeled, unequally bilobed, usually distichous leaves. The ones 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 span 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; it has more or less encircles the column, and it has a central callus. The flowers have a very short, rootless 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.

Valid Angraecum Synonyms

Aerobion Kuntze ex Spreng (*Syst. Veg. Sprengii*, ed. 16, 3: 679 & 718 (1826)).
Etymology: Greek for air and life. Referring to the epiphytic habit of the plants.
Lectotype: *Aerobion asperifolium* (Thouars) Spreng (*Angraecum asperifolium* Thouars) *Angre* to *Angre*, *Ann. Bot.* 38(2): 49 (1875).
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 (Cadenano) Schlachter, Mytnik & Goeckeckia *Biodivers. Res. Conservation*, 29: 9 (2013).
Etymology: *Angraecum*, a genus of orchids, and Greek for likeness or form. Refers to a similarity to *Angraecum*.
Type Species: *Angraecoides pugnat* (Fragaria) Schlachter, Mytnik & Goeckeckia (*Angracina pugnat* Fragaria).
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 (Schlechter) Schlachter, Mytnik & Goeckeckia *Biodivers. Res. Conservation*, 29: 11 (2013).
Etymology: Greek for spider and *Angraecum*, a genus of orchids. Refers to the long, spider like segments.
Type Species: *Arachnangraecum ramosum* (Thouars) Schlachter, Mytnik & Goeckeckia (*Angracina ramosum* 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.

Borniera Condoner *Bot. Göt. Bot.* 11: 416, 8: 10-11 (1899).
Etymology: In appreciation of Eugène Marie Gaston Bonnier (1852-1922), a French botanist, editor of *Revue Générale de Botanique* and publisher of *Gardener's Notes* on the orchids of Réunion.
Type Species: *Ninia digitatifolia*.
Now recognized as belonging to the genus *Angraecum*. *Borniera* was previously considered to include two epiphytes found in mid to upper elevation, bushy montane rain forests of Réunion.

Boryangraecum (Schlechter) Schlachter, Mytnik & Goeckeckia *Biodivers. Res. Conservation*, 29: 12 (2013).
Etymology: Named for Jean Baptiste Bory de Saint-Vincent (1778-1846) a French naturalist and author of *Voyage dans les îles d'Hydre*. And *Angraecum*, a genus of orchids.
Type Species: *Boryangraecum pumillo* (Schlechter) Schlachter, Mytnik & Goeckeckia (*Angracina pumillo* Schlechter).
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.

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 compete with citations. This book will be a welcome and beautiful addition to any orchid grower's library, a stunning work and artistic treasure.


American Orchid Society
Education. Conservation. Research.

Order now for \$99.00*

Available online at www.aos.org

*Plus shipping and insurance. AOS members receive a 10% discount.

Prepared for download exclusively for Oval Orquidifils Valencians

