# SLIPPER ORCHIDS

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# *PAPHIOPEDILUM EMERSONII:*
## The Species and Its Hybrids
**By Olaf Gruss**

The species *Paphiopedilum emersonii* is part of the *Parvisepalum* group. From China and Vietnam, *P. emersonii* continues the seemingly magical parade of recently-described paphs extending the possibilities in form and color. In this series, we will discuss the species, its primary hybrids and further hybridization with *P. emersonii*.

### Part I: The Species

***Paphiopedilum emersonii* Koopowitz & Cribb 1986,** *The Orchid Advocate* 12(3): 84-86, 1986

**Synonym:** *Paphiopedilum huonglanae* N.T.Tich, *Hoa Canh* (3): 10, 1998, nom. inval.

**Distribution:** Southeast China, Yunnan, Guangxi, southeast of the Guizhou Plateau and possibly also in Guangdong province; Vietnam in Tuyen Quang province

*P. emersonii,* Type plant from southern Yunnan
*Orchid Digest* 54(1): 40; 1990

*P. emersonii*, Guangxi, China
Photo: Franz Fuchs

*Paphiopedilum emersonii* habitat in China. Photo: Zhong-Jian Liu

**Habitat:**

The plants grow in crevices and niches in moist moss in thin loose humus layers, which is interspersed with sand, clay and calcareous stones. The altitude is about 2,625-3,937 ft (800-1,200 m) above sea level. The plants grow on a northeastern slope, fully exposed to the morning sun, but in shade after noon, when they get only indirect light which is reflected off the rocks. There is some distance between individual plants, so that when the humus layer slides down, there are still plants remaining at the original location.

These limestone mountains in southwest China contain white cliff-like cuts in the rock, which were formed over millennia by flowing rivers. Near these white vertical cliffs grow plants of *Paph. emersonii.*

Colonies of *Paphiopedilum emersonii* grow in moss on damp concretions of marl, sand, humus and redeposited limestone in sheltered areas of the limestone cliffs. Here, *P. emersonii* sends out stolons to produce additional plantlets.

All pictures *Orchid Digest* 54(1): 40-43; 1990

Photos: Dr. Jack Fowlie

**Climate in the habitat:**

There is regular rainfall from March to October; a dry season follows from November to February. In January, extremely cold north winds induce flowering. In the summer, temperatures rise to 68-77° F (20-25° C) in the daytime and drop as low as 50° F (10° C) at night. During the winter, the daytime temperature increases to 59-64° F (15-18° C) and at night drops to 54-61° F (12-14° C), but sometimes down to 32° F (0° C).

*Paphiopedilum emersonii* 'Top'

**History:**

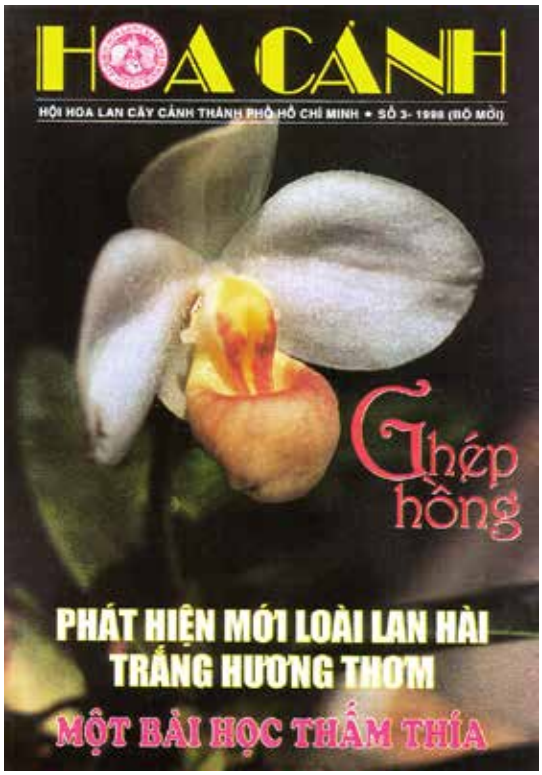
In the spring of 1985, orchid collectors brought several hundred plants from Guangxi to Maisie Orchids in Hong Kong. They came, according to the collectors, from an area of Hai Num in the province of Ghuizou in southeast China. Since the plants were in very bad condition, the owner of Maisie Orchids, Law Ka Kai, rejected the purchase of the plants. Another enterprise, Diamond Farm, took over the collection and sold it to Emerson "Doc" Charles in Costa Mesa, California. The first plant flowered in his nursery in April, 1986.

In the May/June, 1986, issue of *The Orchid Advocate,* Harold Koopowitz and Phillip Cribb described this new species and named it after the successful grower, Emerson "Doc" Charles.

Dr. Jack Fowlie reported details on the locations and the variability of *Paph. emersonii* in *Orchid Digest* as part of his series of articles, "China - Awash in the Bitter Sea" Part IV, 1990.

*Paphiopedilum emersonii* 'Unterwössen'

With the opening of North Vietnam, occurrences of this species were also found there. In the Vietnamese magazine *Hoa Canh* of March, 1998, an article by Nuguyen Thien Tich of Ho Chi Minh University presented a new species of the genus *Paphiopedilum* under the name *P. huonglanae*; however, it was published without a description and without a Latin diagnosis. He named it after the fragrance of the bloom and the name of his daughter. Later, he learned that this species already had been described as *Paph. emersonii*. Therefore, in the journal for April he changed the name of his plant to *Paph. emersonii* var. *huonglanae*, again without a Latin diagnosis.




*Paphiopedilum emersonii* as *Paphiopedilum huonglanae*
*Hoa Canh* (3): 10, 1998

In past years pictures of these new plants were shown on the Internet, and some plants made their way to Europe, Japan, Taiwan and the USA. The blooms corresponded to the typical form. There were, however, two crucial differences: the plants had longer upright inflorescences and larger leaves.

In 2006 a natural hybrid between *Paph. emersonii* and *Paph. micranthum* flowered in the nursery of Franz Glanz in Germany. The plant was described by Olaf Gruss and Holger Perner in *Die Orchidee* 57: 315; 2006 as *Paphiopedilum* ×*glanzii* O. Gruss & Perner.

*Paphiopedilum* ×*glanzii*
Natural hybrid:
*emersonii* x *micranthum*

**Etymology:**

*emersonii* = named in honor of Emerson "Doc" Charles, a well-known California paphiopedilum grower, who flowered the specimen in his collection in April, 1986

*kwang-nanensis* = from Kwang Nan in southwest Yunnan, China

*guangxiensis* = from the province of Guangxi, China

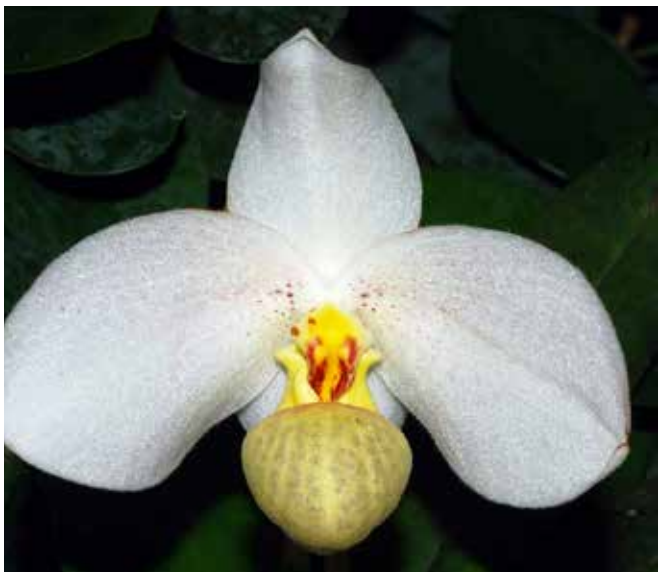
*angustipetalum* = with narrow petals

*glanzii* = named in honor of Franz Glanz, the cultivator of the natural hybrid

*huonglanae* = named by Tich for his daughter and the scent of the plant

**Plant Description:**

The **plant** may grow up to 7 in (18 cm) high, with about 4-6 leaves per shoot, which enclose the very short stem with its base overlapping like a roof tile. There are compactly growing clones with only a short distance between the new plantlets, and others which have up to 2 in (5 cm) long distances. The tongue-shaped **leaves** are dull, up to 9.8 in (25 cm) long and about 1.6 in (4 cm) wide, leathery, the upper side solid green, underside light green and slightly keeled; the upright **inflorescence** is almost always single-flowered, about 3.9-4.7 in (10-12 cm) high, 0.16 in (4 mm) in diameter, cream-colored, slightly fluffy hairy; the **flower bract** is elliptic, pointed and folded, up to 1.2 in (3 cm) long and 0.79 in (2 cm) wide, white, paper-like; the **ovary** is petiolate, cylindrical, about 1.2 in (3 cm) long, fluffy, velvety hair, pale yellowish.



*Paphiopedilum emersonii* 'Fallersleben'

The **flower** may be 3.94 in (10 cm) in diameter, appearing very large in relation to the whole plant; the **dorsal sepal** is 1.57-197 in (4-5 cm) long and 1.18-1.21 in (3-3.5 cm) wide, elliptic-oval, dull, hairy on both sides, outside keeled and forward inclined, with curved side edges, white, relatively firm texture, on the base pink- to red-colored and sometimes slightly dotted; the **petals** are round to oval, outwardly obtuse, up to 1.7 in (4.5 cm) long and 0.78-1.57 in (2-4 cm) wide, on both sides fluffy hair, with increased hair to the base, white; the **synsepal** is elliptic - almost circular, obtuse, about 1.21 in (3.5 cm) wide and long, hairy on both sides and keeled on the outside, white; the **lip** is inverted helmet-shaped, distinctly inflated, obliquely forward, with strongly inwardly folded edges, about 1.21 in (3.5 cm) long and 1.18 in (3 cm) wide, cream to yellow with a purple edge, translucent spots and intense purple spots inside, which slowly fade, on the surface along the veins which are clearly furrowed; the convex **staminode** is oblong triangular, 0.79 in (2 cm) long and 0.39 in (1 cm) wide with a deep longitudinal furrow widening toward the tip, yellow with intense red color.

**Scent:** In many clones the flowers smell like raspberry during the day, but when withering rather like a horse.

**Chromosome number**: unknown

Above six images: *Paphiopedilum emersonii* 'Grassau'

**Variability:**

The species varies in the size, stance and color of the bloom. Varieties or special forms were at first not described officially, and those variabilities were represented only with pictures and a short English description in *Orchid Digest*. For this approach J.A. Fowlie is to be praised, since these forms represent only geographical deviations of the species, which lie within the normal variation of the typical form. The small deviations do not justify the naming of varieties or forms. The following horticultural varieties were mentioned by Fowlie:

Right**:** *P. emersonii* var. ***kwang-nanensis*** Hort. – It differs from the typical form only by a more rounded flower and beautiful deep red-purple marks at the base of the petals and the dorsal sepal. No morphological differences to the typical form are present. This form originates from Kwang Nan in southwest Yunnan and was sold in the USA briefly as *Paph*. *kwangnanensis* but was never described officially.

Left: *P. emersonii* var. ***guangxiensis*** Hort. - from the southwest of the province Guangxi with bright-colored lip and staminode and narrower petals

*P. emersonii* var. ***angustipetalum*** - shows elongated, floppy petals. The plants grow in the western part of "Cloud Opening Big Mountains" (yun kai dah san) west of Canton near Yang Chun. But the flowers vary also in coloration. A clone with yellowish petals is known. A yellow form without any red colour was described by Dr. Guido Braem in *The Australian Orchid Review* 66(1): 6 (2001) as *Paphiopedilum emersonii* forma *luteum* Braem**.**

*P. emersonii* var. *angustipetalum*

*Paphiopedilum emersonii*
A clone with yellow petals

*P. emersonii* f. *luteum*
Photo: Dr. Guido Braem

An albino form was described by Olaf Gruss and Aree Petchleung in *Die Orchidee* 53(2): 220 (2002) as *Paphiopedilum emersonii* forma *album* Gruss & Petchleung.

Below: three images *of Paphiopedilum emersonii* f. *album*

Photo: Aree Petchleung

*P.emersonii* f. *album, Type*

Right**:** Two different pale clones of *Paphiopedilum emersonii* from Vietnam with pinkish pouch color and interesting staminodes
Photos: Leonid Averyanov

It has been discussed whether it makes sense to describe the Vietnamese representatives of the species as a separate variety or form. These differences include a significantly elongated inflorescence and sometimes significantly larger flowers. It was waived, because these differences are not clear enough. Nevertheless, plants repeatedly appear in the trade as var. *huonglanae*.

Left: *Paphiopedilum emersonii* 'Wössen'

**Possibilities of misidentification:** Unlikely.

**Special culture requirements:** A bright, but not sunny, place with moderate temperature; approximately 64-72° F (18-22° C) with night temperature 61-64° F (16-18° C). In the winter the temperatures should be somewhat lower for bloom induction; watering must also be reduced. Attention should be paid that no water remains in the leaf sheaths, since this would lead to rot.

**Flowering period:** In the habitat at the end of April to May, in culture between January and April; the flowers last approximately six weeks.

**"Breeding with *Paphiopedilum emersonii*" will be published in *Slipper Orchids*, Spring, 2019.**

*Paphiopedilum emersonii* 'Wössner Giant' Clone from Vietnam - 6.5 in (13.5 cm) in diameter, petals 2.2 in (5.2 cm) wide

### ABOUT THE AUTHOR

Olaf Gruss is internationally recognized for his work with paphiopedilums, phragmipediums and phalaenopsis. He has written books about the genus *Phalaenopsis* and the albino forms of the genus *Paphiopedilum*, as well as a booklet about the genus *Phragmipedium*. He has been a member of the editorial board of the journal of the German Orchid Society, *Die Orchidee*. Gruss resides in Germany and lectures throughout Europe, Japan, Taiwan, China, Canada and the U.S. All photos are by the author unless otherwise noted.

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### BOTANICAL STUDY TOUR TO NORTHWEST YUNNAN IN SOUTHWEST CHINA

Hengduan Mountains Biotechnology has announced a tour to Northwest Yunnan in China, June 18 to July 1, 2019, led by Wenqing Perner and Dr. Hong Jiang. It will feature majestic mountain ranges with spectacular travertine formations, unique wildlife, Tibetan and Lili ethnic groups with their colorful culture, and the richest temperate flora in Asia, including cypripediums and alpine plants.

Contact Wenqing at: info@hengduanbiotech.com.

## UPCOMING EVENTS

**39TH ANNUAL PAPHIOPEDILUM FORUM**

January 26, 2019

U.S. National Arboretum, Washington, DC

Contact: Roddy Gabel, President of NCOS, at

former_zygote@hotmail.com

Information: www.ncos.us

**AOS SPRING MEMBERS MEETING**

March 20-24, 2019

Activities at the Hilton Mission Valley, San Diego, CA

In conjunction with the San Diego County

Orchid Society Annual Show at the

Scottish Rite Event Center

www.aos.org

**OCA TRIP TO YUNNAN, CHINA**

April 16-27, 2019

Contact: Mary Gerritsen at

mary@orchidconservationalliance.org

**TOUR TO NORTHWEST YUNNAN, CHINA**

June 18-July 1, 2019

Hengduan Mountains Biotechnology

Led by Wenqing Perner and Dr. Hong Jiang

info@hengduanbiotech.com.

# "GLASS SLIPPERS ON PARADE"

**By Cheryl LeBlanc**

Photo: Cheryl LeBlanc

For 47 years, the Ball State University Orchid Collection has been an educational resource for students and interested visitors alike, with orchid species from around the world. It all began in 1971, when Bill and Goldie Wheeler of Indianapolis, Indiana, donated their extensive orchid collection to Ball State University, Muncie, Indiana. In 1975, the collection was designated a "Species Bank," allowing growers to donate orchid species not currently in the collection and, in exchange, become eligible to receive an equivalent number of divisions from the collection, when available.

The collection expanded in the 1980s to become the Wheeler-Thanhauser Orchid Collection and Species Bank (WOCSB) and has since developed into a diverse educational and conservation collection, used for nature education, botany, and lessons in tropical ecology. In the early 1980s the WOCSB also became a "rescue center" for imported orchids confiscated by the U.S. Fish and Wildlife Service under the recently instituted CITES (Convention on International Trade of Endangered Species) rules. The CITES orchids are housed at WOCSB in perpetuity; the plants cannot be shared, but may be propagated for conservation purposes. In 2008, Dr. Charles Bracker of Lafayette, Indiana, donated 1,000 orchids to WOCSB; Dr. Bracker also donated the photo collection of his orchids to the Ball State University Library. In 2014, the Dr. Joe and Alice Rinard Orchid Greenhouse became the new home for the Wheeler-Thanhauser Orchid Collection.

The 3.400 square foot, state-of-the-art computer- controlled facility was made possible by Dr. Joe Rinard, a retired dentist and BSU alumnus from Farmland, Indiana. The facility was created to honor Dr. Rinard's late wife, Alice (Pursley) Rinard, also a BSU alumna from Farmland, Indiana, who loved nature and all things beautiful. The Rinard Orchid Greenhouse contains three separate growing rooms: a Display Conservatory for nature interpretation, a Warm House and a Cool House for *pleurothallidae* and other cool-growing plants.

This new facility provides a wide variety of interpretive information about orchids, their habitat, conservation, pollination biology and distribution. Information and examples of tropical ecology abound in the Display Conservatory. The WOCSB collection is utilized by BSU students and faculty from many disciplines, including art, English, photography, architecture, landscape architecture, biology, natural resources, science education and more.

Visitors regularly include community members, K-12 school groups, and out-of-town guests from as far away as Japan and Australia. Visitor use has increased to over 4,000 per year and currently averages about 300 per month. Many visitors also follow the Rinard Orchid Greenhouse on Facebook and Instagram.

In 2016, a large collective gift by over 60 people honored a local centenarian by establishing the Betty Kendall Ladyslipper Species Collection; this idea seemed a perfect pairing to recognize this special lady. The short version of the story is that Betty's friends wanted to do something unique for her 100th birthday. Betty wears high heels to this day, loves Ball State University, flowers and the Muncie community.

Another local resident, John D. Elwood, Sr., enjoyed growing orchids in his retirement. He was a member of the Ft. Wayne Orchid Society and traveled to orchid shows in the Midwest. He was passionate about orchids, especially slipper orchids, and grew many in his own small greenhouse. He donated over 60 plants to our slipper collection before he passed away in 2017.


Ball State University Photographic Services

The slipper species collection now contains 80 of the approximately 156 slipper species orchids worldwide. It is used for education and conservation, and we are working with other slipper experts and botanical gardens to propagate these species for conservation. In 2018, remaining funds donated for this slipper collection were used to commission a one-of-a kind glass sculpture that displays the main features of the five major slipper groups. The challenge to select appropriate representative slipper species was great, especially when they are all so amazing! We intentionally wished to highlight each of the autonomous groups within the subfamily *Cypripedioideae* (Braem and Chiron, 2003). In the end, we selected *Cypripedium parviflorum* (North America), *Mexipedium xerophyticum* (Mexico), *Paphiopedilum lowii* (Malesia, a phytogeographical region comprising Malaysia, Indonesia, New Guinea, the Philippines, and Brunei), *Phragmipedium kovachii* (Peru) and the rare and notoriously difficult to grow *Selenipedium aequinoctiale* (Ecuador). It is these species that will be discussed in this article.

Photo: Cheryl LeBlanc

*Cypripedium parviflorum* was selected as the representative of the genus *Cypripedium;* it is common in undisturbed or protected natural habitats of Indiana and across North America. The genus *Cypripedium* currently contains about 48 species (Koopowitz, 2008) of hardy terrestrial orchids found throughout the northern hemisphere. *Cypripedium parviflorum* is a complex species, and its taxonomy has been in flux. It is now treated as a single species (Rankou, H., 2014, International Union for Conservation of Nature Redlist) with many regional forms. The range of the species extends from Alaska to Nova Scotia, south to Nebraska and Georgia. The species can be found up to 2,900 m (9,514 ft) elevation.

In the wild, *Cypripedium parviflorum* occurs in a wide variety of habitats, including high meadows, mesic places (containing a moderate amount of moisture) in conifer and hardwood forests, wetlands and wet prairies, rocky wooded hillsides and mixed woodlands. The species grows in moderately moist to dry habitats on predominantly calcareous rocky soils, rich in humus, with a pH range of 5.0 to 7.5. It prefers shaded, cool, north-facing and well-drained slopes (Rankou, H., 2014, IUCN Redlist). In Indiana, it is found in rich moist woodlands, in light shade (Homoya, 1993). In cultivation, we grow it indoors with moderate difficulty, in a humus-rich soil with some added sphagnum, under cool conditions and in light shade. We keep this plant moist throughout the growing season and are careful not to overwater. To simulate the natural winter conditions, when the plant dies back in the fall, we overwinter it in a pot in our refrigerator. A cold winter dormancy is an essential part of its life cycle. Our most successful cultivation method is growing *Cypripedium parviflorum* in a naturalized outdoor bed which has been amended with a blend of sphagnum and native soils.

Photo: Rod Knowles

*Mexipedium xerophyticum* represents this genus from Mexico. It is the only species in the genus, so the selection was simple. It is a very rare and localized species, endemic to a small region in the state of Oaxaca in western Mexico (Rankou, H., 2016, IUCN Redlist), and it is the smallest flower in our sculpture. The wild population is decreasing, with the number of known mature individuals at fewer than 50; the population is very low due to deforestation, human disturbance, fires and habitat degradation. It is believed that this species will become extinct if its location is revealed, because collectors will decimate the entire population. *Mexipedium xerophyticum* is therefore listed as Critically Endangered.

In the wild, *Mexipedium xerophyticum* is a small species that grows on north-facing limestone rocks and karst cliffs in lowland areas of seasonally dry scrub in a tropical rainforest (annual rainfall is 2,500 mm or 98.4 inches) (Rankou, H., 2016, IUCN Redlist). It flowers in August and September, and until November in cultivation in Mexico (Albert and Chase, 1992; LeDoux, 1996; Aoyama and Karasawa, 1997; Cox *et al.,* 1997; McCook, 1998).

To help ensure conservation of this species, we worked with staff at Windy Hill Gardens, owned by Marilyn and Brian LeDoux, to obtain a lab-propagated plant of *Mexipedium xerophyticum*. In cultivation we grow this tiny slipper in shallow pots, with a medium-fine mix, in cattleya light conditions, warm 24 – 29° C (76 – 84° F) temperatures, and water one to two times a week, depending on season and local conditions. The tiny white flowers are borne on a single stem, but bloom in slow succession. Flowering takes place in July, August and September.

*Paphiopedilum lowii* was selected to represent *Paphiopedilum*, a genus of about 80 species that is found in Asia and the Pacific Islands (Koopowitz, 2008). This genus, like so many others in the *Orchidaceae* family, is undergoing reclassification as a result of new science, training, new DNA options for determining taxonomy, and examination of type specimens. *Paphiopedilum lowii* holds an unquestioned place in a small group of multifloral species and is classified as part of the Pardalopetalum Alliance (Koopowitz, 2008). The alliance name is derived from the leopard-like spots at the base of the petals of many species in this group. *Paphiopedilum lowii* is wide-ranging, including the Malay Peninsula, Sumatra, Java, Sulawesi and Borneo (Cash, 1991). There is much variation in flower morphology, and this species has some of the most intense coloration of any species in this group. It grows as an epiphyte in lowland forests, on branches and in the forks of trees in thick moss and pockets of leaf litter, and occasionally is found on rocks or cliff faces with the roots growing in moss or humus pockets, at altitudes of 250 to 1,600 meters (860–5,500 ft) (Cash, 1991; Braem and Chiron, 2003). Plants are usually found in areas with heavy rainfall, in full to partial sun, in bright locations.

The wide natural spread and numerous flowers of this plant, combined with its intense petal color, make it a very good choice as a selection for our glass sculpture. In addition, the specimens in the Rinard Orchid Greenhouse are sizable and bloom reliably each year. We grow *Paphiopetalum lowii* in our warm house, with bright light and average temperatures of 25– 27° C (77–81° F) throughout the year, with overnight fluctuations of 3–5° C (10–15° F). Our range of humidity is 65–75% throughout the year. We maintain consistently moist conditions in a well-drained bark mix, with an annual addition of oyster shell for calcium. Strong air movement is provided at all times.

Photo: Rod Knowles

The largest flower in the sculpture is of *Phragmipedium kovachii,* which was selected to represent the genus *Phragmipedium,* from the tropical regions of Central and South America. The genus contains 21 species (Koopowitz, 2008). Discovered only in 2001, this species has very large, pink to purple flowers that can reach more than 20 cm (8 in) across. The flower stems usually bear only a single flower at a time, with up to two buds per stem. The plants are quite large, reaching 1 m (3 ft) across.

Photo: Eric Young Orchid Foundation

*Phragmipedium kovachii* is one of the newest slippers to be discovered and has made quite a splash in the orchid world, due to its vibrant color and size. As reported by Decker (*Orchids*, Nov. 2007), plants in the wild receive cloud-filtered sunlight from noon until sunset. Average summer temperature is 26° C (79° F) and winter temperature is 18° C (64° F). This region receives an average annual rainfall of 1,000–1,500 mm (40 to 60 inches), with persistent but moderate afternoon showers nearly every day. Since these plants grow where winds can be high (60 mph), good air movement is critical in cultivation. We follow the recommendations of Decker (2007), growing *Phragmipedium kovachii* in very moist to wet conditions, in seedling bark with oyster shell, moderate light, limited fertilizer and RO water only.

*Selenipedium aequinoctiale* was selected to represent the genus *Selenipedium*, also from the neotropics. The genus contains only six species (Koopowitz, 2008). Selection of this representative species was fairly simple, as commercial availability of this genus is extremely limited. The growth form is so unlike any other slippers that they don't come to mind immediately as slippers. They are also very poorly known, except that they are very large plants with comparatively tiny flowers. As a result, their commercial appeal is minimal (Cash, 1991). This fact, and the limited range of the genus, made this species an especially interesting and sought-after one for the orchid species collection at Ball State University.

Photo: Lourens Grobler

The genus *Selenipedium* is limited to Central and South America, including Panama, northern Brazil, Guyana, Trinidad, Venezuela, Colombia and Ecuador (Cash, 1991). The branched, cane-like growth form is characteristic for the genus, with some species reaching 4 – 5 m (14 – 17ft) in height. The species are terrestrial in habitat, with several primitive morphological characteristics, such as the three-locular ovary and the sequentially flowering inflorescence with one flower opening at a time (Dressler, 1993). These and other very specific anatomical features are the reasons why this genus is considered to be a modern relative of a phylogenetic ancestor called *Protoselenipedium* (Atwood, 1984).

*Selenipedium aequinoctiale* is reported from the lower slopes of the mountains of Ecuador (Cash, 1991), and Colombia (Rankou, H., 2016, IUCN Redlist). It is a very rare species endemic to northwest Ecuador and the Choco region of Colombia, and it is listed as endangered *in situ* (Rankou, H., 2016, IUCN Redlist). It is found at elevations between 690 – 700 m (2263 – 2297 ft) (Rankou, H., 2016, IUCN Redlist). The extent of occurrence (EOO) is estimated at 9,000 km$^2$ (3474 mi$^2$), and the area of occu-

pancy (AOO) is estimated at 12 $km^2$ (4.6 $mi^2$) (Rankou, H., 2016, IUCN Redlist). Unfortunately, its numbers have been decreasing to a low of possibly fewer than 100 plants. The reasons for this decline are deforestation, human disturbance, habitat degradation and competition from other plants. Although *Selenipedium aequinoctiale* has extremely limited availability, we were able to acquire one plant from Ecuagenera, an orchid company in Ecuador.

Due to the limited information about this species, culture is a daunting exercise. We researched as much as possible about the native habitat and with references from other growers, we decided to grow this species in red clay. This soil ingredient is not readily available in East-Central Indiana, so we reached out to a family member in southern North Carolina, who kindly sent a whole box of reddish-yellow clay. We grow this plant in warm, lightly-shaded conditions, in a clay-charcoal-perlite mix. Apparently, our culture decision was correct, as the plant is currently thriving, with four growths and several tiny flower buds!

The focus of the WOCSB collection is on orchid diversity to support our educational and conservation mission. Within the Rinard Orchid Greenhouse, the collection contains representatives of over 300 orchid genera and over 2,000 individual plants, of which 75% are species orchids. Our Betty Kendall Ladyslipper Orchid Species Collection makes up a small portion of the collection, and we encourage visitors to enjoy the entire collection in person anytime.

The Rinard Orchid Greenhouse and WOCSB are free and open throughout the year to BSU students, staff, and faculty, as well as to orchid enthusiasts and the general public. Donations and volunteers allow the programs to remain free. It is with great pride that Ball State University supports this significant orchid collection within the Dr. Joe and Alice Rinard Orchid Greenhouse and makes it available to these diverse groups. We invite you to visit soon!

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## ABOUT THE AUTHOR

Cheryl LeBlanc has always been interested in plants and nature---she "met" her first orchid, *Cypripedium acaule,* in her backyard in southeastern Massachusetts, at the age of 9. She was delighted to discover this same species in abundance during her family's frequent travels to southwestern Maine during her youth. She received her BS (1985) and MS (1988) in Plant Ecology from SUNY College of Environmental Science and Forestry, in Syracuse, New York. Her thesis is titled "Vegetation Dynamics in a Central New York Shrub-Carr, 94 Years After Fire." [A Shrub-Carr is a wetland community dominated by tall shrubs.] Cheryl was employed with the Indiana Department of Natural Resources, Division of Nature Preserves, from 1987 - 1991 as a plant ecologist. Since 1993, she has been employed at Ball State University as the Curator/Ecologist of the Wheeler-Thanhauser Orchid Collection and Species Bank, Department of Biology, in Muncie, Indiana. Her focus is nature education and plant ecology, including plant-insect interactions, for which she uses the orchids as prime examples. She is also an artist and biological illustrator. Her work celebrates nature and nature education.

## AMERICAN ORCHID SOCIETY MEMBERS MEETING AND INTERNATIONAL SLIPPER SYMPOSIUM

The American Orchid Society held its 2018 Fall Members Meeting in conjunction with the annual International Slipper Symposium on October 31 to November 4 in Apopka, Florida. The charming Highland Manor was the venue for meetings, lectures, benched AOS award judging and social events.

There were six excellent slipper speakers. The first, on Friday morning, was Thanh Nguyen of Springwater Orchids in Melbourne, Florida. In his talk on "Line Breeding Paphiopedilum Species" he explained that inbreeding involves very closely related plants (usually siblings and parents), whereas line breeding is a type of inbreeding that utilizes individual plants that are not as closely related, such as grandparents, within a particular line of descent to perpetuate desirable characteristics. Usually after three or so generations, this breeding stops being as worthwhile. Outcrossing introduces new genes that can lead to greater vigor and other desirable characteristics. Large commercial nurseries concentrate on breeding pot plants with qualities such as vigor, attractive flowers, high flower count, fast growth and reliable blooming, so that buyers receive good value. Enthusiasts with small collections may have different objectives and may aim for uncommon species, better shapes and colors, and good presentation; they are not as concerned about low yields as commercial growers. He emphasized the importance of protecting plants in the wild and of smaller collectors continuing to breed species that are endangered.

After this lecture, the AOS held a Town Hall Meeting for organization reports and the opportunity for questions from members.

The lectures continued on Saturday. David Sorokowsky, of Paph Paradise in California, spoke about "Novelty Paphiopedilum Breeding." He is especially interested in unusual pairings such as multiflorals with brachypetalums and parvisepalums, and smaller plants with complex/standard hybrids to bring down size; he also likes to breed back to species. Often continuing in a certain line fizzles out after three or so generations. He is concerned that in the future fewer growers will be making hybrids and that there will be less experimentation. He hopes that hobby growers will continue hybridizing.

Mr. Chen-Chung Chen of Mainshow Orchids, in Taiwan, reported on "Multifloral Paphiopedilums," beginning with pictures of many clones of outstanding *Paphiopedilum rothschildianum*. He continued with gorgeous pic-

tures of newer breeding lines with that species and also different directions, such as using albinistic forms of multiflorals. Taiwan growers are also working with selected species.

Alexej Popow grew up in his father's nursery and the flower shop of his mother and eventually took over the family business, Popow-Orchids in Germany. He discussed "Contemporary German Complex Paphiopedilum Breeding." His nursery is building on some of the breeding from the Tokyo Orchid Nursery, especially with *Paphiopedilum rothschildianum* and brachypetalums. Their roths are now in their third generation and are showing darker colors, larger flower size, more flowers and more compact plant size. The paph species *bellatulum* and *godefroyae* are being produced with bigger and darker spots, and in some cases almost solid, very dark color. He is also making crosses with rare Vietnamese species, such as *hangianum*, *emersonii, vietnamense* and *trantuanii*, and many other species. Their standard/complex hybrids with excellent form and exciting colors are also part of the huge pot plant orchid production in Germany.

Jason Fischer presented "New Phragmipedium Hybrids and Culture." The introduction of phrag species such as *besseae* and *fischeri* has made possible many gorgeous and colorful new hybrids in shades of red, orange and pink. His photos demonstrated what a great impact these plants have had for new directions in phragmipedium breeding. His photos also included other newer hybrids, especially among the long-petal types.

Going to culture, Jason said that phragmipediums need low to medium light (300-1000 foot candles), although in nature they tolerate higher light, and they do well under artificial light. For a potting mix, he has used rock wool (Grow Cubes); if more drainage is desired, add perlite (sponge rock)/growstone/charcoal. For bark mixes in small pots, he likes small Orchiata with a perlite/charcoal/peat moss mix. For larger pots and all long-petaled phrags, he suggests medium Orchiata with added perlite/growstone/charcoal. He strongly recommends Rand's Air Cone pots. Phrags must be kept moist at all times with clean water. A pH of 5.5 to 7 is best, and an occasional buffering of powdered limestone may be helpful. Fertilizer should always include calcium and magnesium. He recommends timed release fertilizers, such as Nutricote and Jobe's spikes, as a boost. If you prefer foliar feeding, do it early in the day. It is easily absorbed by the leaves and prolongs the life of the potting medium. It is best applied as a fine mist when the temperature is below 75 degrees.

Dr. Harold Koopowitz completed the lectures with "Perfecting the Miniature Complex Paphiopedilums," a field he has been pursuing for about 25 years, to produce window-sill plants, sometimes called "pygmy" or "teacup" paphs. The main species he has been using to reduce plant size are *barbigerum, henryanum, charlesworthii* and its forma *albinum, spicerianum, fairrieanum* and *helenae.* The first three generations often suffered from less than ideal shape. One of the most important early crosses was Doll's Kobold (*charlesworthii* x *henryanum*), made by H. Doll. Some of the later more successful crosses he and Paphanatics (his partnership with Norito Hasegawa) registered were Tyke (*barbigerum* x *charlesworthii*), Small Wonder (Little Candy x Whimsical), Little King (King Charles x Little Stevie), and Little by Little (Doll's Kobold x Little Tyke).

The meeting was capped by two events held at the Krull-Smith nursery. On Saturday night, attendees enjoyed a barbecue dinner in a newly constructed and still empty large greenhouse, followed by the AOS auction. The next morning they returned for a light breakfast and open house in the greenhouses.

The next AOS Members Meeting will be held in San Diego, California, March 20-24, 2019, in conjunction with the San Diego County Orchid Society Annual Show. Meetings and events will be held in the Hilton Mission Valley, while the show will be in the Scottish Rite Event Center.

Barbara Tisherman

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