



The **Slipper Orchid Alliance Newsletter**

Volume 3, Number 1

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President's Message

It is with excitement and anticipation that I look forward to serving as your President. I thank the Nominating Committee for the confidence they have shown in me and the other elected officials. The Slipper Orchid Alliance is relatively new but is already making its presence known as the only international orchid organization devoted to the slipper group of orchids. Since our inception in late 1999, we have grown to almost 250 members, demonstrating the allure of these orchids and the quest for knowledge about them. The Slipper Orchid Alliance will be focused on being a resource center to enhance the understanding and growing of these captivating flowers and to provide information on events and happenings of interest to our members.

For those who are new members, I will repeat the slate which took office as of January 1, 2002. Vice President is Tom Larkin of Rogers, Arkansas; Secretary is Al Svoboda of Santa Barbara, California; and Treasurer is Steve Drozda of Pittsburgh, Pennsylvania. Directors are Jerry Fischer of Plymouth, Minnesota; Richard Grundy of Santa Rosa, California; and Kevin Porter of Santa Maria, California.

I am delighted to announce the appointment of the following individuals who have accepted the responsibilities of certain positions or committee chairmanships.

Membership Secretary is Barbara Noe of Richmond,

Virginia, who will be in charge of keeping the membership records, sending dues notices, and providing an annual membership roster. Working closely with her will be the Treasurer, Steve Drozda, who will collect the dues and forward the information to her. The other member of the membership team is Carolyn Butcher, of Birmingham, Michigan, who as Membership Chairman is responsible for recruiting new members. She will be gathering a committee which will represent different parts of the country to help us become better known. However, to grow as we need to, I hope that all of our members will consider themselves ambassadors for the SOA.

The Resource Committee, headed by Jerry Fischer, is composed of individuals greatly involved specifically with slipper orchids; many are recognized authorities. They reflect geographic diversity and various segments of the international slipper orchid community. In addition to serving as sources for articles and speakers themselves, they will identify potential authors and speakers and will keep us informed about happenings, meetings and other pertinent information within the worldwide slipper orchid community. Other members of the committee at present are Bill Goldner, Olaf Gruss, Norito Hasegawa, Tom Kalina, Harold Koopowitz, Glenn Lehr, Paul Phillips, Kevin Porter, Eric Sauer, Gordon Slaymaker, Albert Svoboda, and Bob Wellenstein.

We are fortunate that Janette Harris will continue as Newsletter Editor. She has done a remarkable job of starting our quarterly newsletter from scratch and obtaining a variety of articles, some of which contained color photos. The calendar of upcoming events is important, and we print reports from as many as we are able to obtain. We expect to add several new features, such as on-going columns, personal profiles and in-depth articles on species. This is another area in which we need your help; obviously, the more people who provide articles the larger our newsletter will be. What do you want to see in the newsletter? Please let us know.

Our web-site, www.slipperorchid.org, is another vital aspect of our mission to provide information and serve as a resource center. We will be adding pictures and expanding its scope, including a section for membership participation

Dues Notice

Please renew your membership to the Slipper Orchid Alliance by filling out the enclosed membership form and mailing to Steve Drozda by April 30, 2002. Membership for one year is US\$25 for members and US\$50 for commercial supporting members.

and posting of members' pictures. Again, what do you want us to include on our web-site? Do you have photos to contribute?

Sponsoring speakers in various venues is a service to the wider orchid community as well as our members. Gordon Slaymaker is Chairman of Speakers Forums. Another article in this newsletter details our participation in the April AOS Members Meeting in Chicago. Future meetings will be held in different parts of the country; we expect to be on the West Coast in 2003.

Recognizing outstanding slipper orchids will be the province of Tom Larkin, Awards Chairman. We have already sponsored a trophy at several shows and will continue to do so and to make the winners and their owners known. Our newsletter and web-site will be perfect places to display pictures of top flowers from the national and international scene, which otherwise most of us would never have the opportunity to see. Under discussion is the creation of annual awards in several categories. Another possibility is recognizing outstanding contributions by individuals for advancement of knowledge about slipper orchids or improvements in their hybridization.

Glenn Lehr has agreed to serve as Chairman of Fund-raising, which will include auctions and other means of increasing our treasury so that we can expand our services.

The Audit Committee will be chaired by Ken Wilson.

I have asked Norito Hasegawa, Tom Kalina, Harold Koopowitz, and Paul Phillips to serve as advisers to me and the organization. All have been involved with our development since the beginning. In fact, it was Paul Phillips who started the ball rolling by asking me why we didn't have a North American Paphiopedilum group as they had in Great Britain. It was obviously an idea whose time had come! I am sure we will benefit from their experience and wisdom.

As we are cognizant of the many problems revolving around collecting orchids, we will support conservation of orchids in their natural habitats and discourage collection of wild specimens by encouraging the artificial propagation of endangered species *ex situ*. A future goal as we grow and have funds available is to promote scientific and horticultural studies of slipper orchid species and hybrids.

We are poised for tremendous growth and possibilities, and we want to know what you, as a member of the SOA, want us to do for you and the orchid community. We need to hear from you. Please, contact me or any of the officers or chairmen with your requests, ideas, and suggestions, or if you would like to volunteer in some capacity. (See Directory in this newsletter.) **THIS IS YOUR ORGANIZATION.** We are all here for the same reason – our love of orchids and our desire to learn more about them. Working together we will forge an organization that will be an integral part of the orchid world.

Barbara Tisherman

SOA Meeting in Chicago

This year the SOA will be meeting in conjunction with the AOS Members Meeting near Chicago in Northbrook, Illinois, hosted by the Illinois Orchid Society, April 10-14, 2002.

Saturday morning, April 13, we will be sponsoring three speakers, starting at 9:00 with Sam Tsui describing "Recent Trends in Paphiopedilum Hybridizing." Sam was born in Hong Kong and came to the United States at age 22. He subsequently graduated from Illinois State University and received an MBA. He is currently an application software specialist with Country Companies Insurance and Investment Group, based in Bloomington-Normal, Illinois. After starting to grow orchids in 1983 and trying many types of orchids he became a serious Paphiopedilum grower in 1985. In 1991 he began hybridizing with Paphs and continues that work today, making over 200 crosses per year. He started the Orchid Inn in 1995 and fills orders from around the world. He attends approximately 15 orchid shows/conferences a year and gives several programs or lectures every year in the United States, Canada and overseas. Hybridizing is Sam's passion. He emphasizes the Parvisepalum, Brachypetalum and multifloral groups in his latest breeding work. Numerous AOS and CSA awards have been bestowed on his plants, including two FCC's and a CCE/AOS.

Glen Decker will be talking about "Phragmipediums and Their Culture" at 10:00. Glen has been growing orchids since he was 16. He became involved with Paphs and Phrags about 18 years ago, and his personal collection now numbers in the thousands along with the thousands of plants for Piping Rock Orchids, which he started four years ago. After 22 years of running his own graphic arts company, he recently sold it to go into orchids full-time. Piping Rock Orchids is in a new location in Charlton, New York (about 40 minutes from Albany). He has received over 100 AOS awards, as well as awards from the RHS and CSA. Most noteworthy, he won the Nax Trophy in 1995 for *Baptistonia echinata* 'Suzanne' CCM/AOS, the W. W. Wilson Award in 1999 for Phrag. Jason Fischer 'Suzanne' AM/AOS, and the Butterworth Prize in 2000 for *Paph. henryanum* 'Haley Suzanne' CCM/AOS. In addition, his plants were honored on the front cover of the *AOS Bulletin* (1983), *Orchids* (1999), *Awards Quarterly* (1999 and 2000) and the AOS calendar (1999). He was featured in an article about himself and the AOS in Martha Stewart's *Better Living Magazine* (2000) and filmed a PBS special called "Orchid Delirium" (2000).

At 11:00 John Doherty will explain "Biology and Culture of the Genus *Cypripedium*." Inspired by the orchid successes of his father, John began growing orchids at the age of 15. He holds a Bachelor of Science in Plant Biology, is an AOS judge and is a Director of the Orchid Digest. His articles on slipper orchids have appeared in the *North American Native*

Upcoming Events

April 10-14, 2002

Chicago, IL

AOS Members Meeting

Hosted by the Illinois Orchid Society, the SOA will have a half day forum on April 13 with three speakers and an auction. See accompanying article.

Orchid Journal, the *Orchid Digest*, the *AOS Awards Quarterly* and *Orchids*. Speaking engagements have taken him across the globe, with highlights being the 16th World Orchid Conference and Tokyo Dome Show. He currently runs Zephyrus Orchids in Windsor, Canada (across the river from Detroit), a wholesale pot plant nursery, with some room of course devoted to personal favorites *Cypripedium* and *Pahioepidilum* species and primary hybrids.

Although we had previously announced that H. P. Norton would be speaking about red Phrags, due to health concerns he will not be able to be with us. We will miss him and hearing about his breeding program.

To add to the excitement of the day we will be auctioning a few plants between the lectures. This is an opportunity for growers to add special plants to their collections while at the same time benefiting the SOA. If you have a plant you would like to donate, please contact Glenn Lehr, who will be in charge of the auction. (See SOA Directory in this newsletter.)

The SOA Board will meet Friday, April 12, at 4:00 p.m. This will be the first opportunity for the new officers, directors and chairmen to meet as a group to discuss plans and the future of the SOA.

This meeting will offer many other speakers and activities as well as a large show that will bring out many Paphs and Phrags for our enjoyment and edification. We hope to see you there!

Barbara Tisherman

Paph History

Paph. spicerianum

The year 1884 may be remembered for the story of *Cypripedium spicerianum*. Six years previously a lady resident in Wimbledon had asked Messrs. Veitch to send a representative to inspect a lovely and apparently unknown orchid which had flowered in her glasshouse. In due course he arrived, pronounced the flower to be a fine specimen of *Cypripedium spicerianum*, and offered her a cheque for seventy guineas on the spot. In due course as the plant prospered and was divided, each piece fetching rather more than its weight in gold. But where had it come from? All the lady would or could say was that it had appeared unexpectedly among a consignment of *Cypripedium insigne*, which would appear to indicate that it belonged to the Himalayan region, or possibly as far east as Assam, that wet mountainous country which lies in the bend of the Brahmaputra, between India and Burma. But the plant had not appeared for many years and no one could say precisely where it could be located.

Not unexpectedly all the main firms put their travellers on the trail, and contacted their agents in India, seeking information. Sander did so, too, but took the precaution of calling on the lady in Wimbledon to discover if further clues could be obtained from her. Chatting happily about orchids in general, he led the conversation to the subject of the Far East and casually enquired if the lady had any relatives or friends there? The reply was that she had; indeed her son owned a large tea plantation near the border of Bhutan, the mountainous State to the north of Assam and the east of Nepal. Further probing elicited the address, and happily Sander took the train back to St. Albans. Here he wrote Forsterman, telling him to make haste to Assam and call upon the tea-planter; he also indicated that direct questions would meet with a rebuff, and it would therefore be necessary to employ guile. In due course Forsterman arrived at the estate and informed the owner that he wished to obtain experience in the tea business, and asked for a job. As it happened, no job was available, but the manager courteously invited him to stay on a while as his guest. When the estate manager returned, he added, the latter would take Forsterman duck hunting.

Now orchids are *ferae naturae* and the landowner on whose territory they appear has no property in them. However, there is no onus upon him to give information concerning them; and if he has any idea of their value—as this owner obviously possessed—any such disclosure is most unlikely. So Forsterman had to bide his time and keep his eyes open. Several times as he drove about the estate he could see

Cypripedium insigne growing in large numbers, but of the *spicerianum* there was no sign.

Then he had some luck. A feud or *chelan* had broken out among the coolies on the estate, and the manager was spending a good deal of time trying to get to the bottom of it. Talk led to previous feuds and how he had travelled across the river to the territory of the Bhutanis to deal with their chief. It was a terrible journey, he told Forsterman; fever was rampant; tigers abounded in the jungles, and the Bhutias were hostile. However, he added casually, it had been on this trip that he had found the orchid which, so he gathered, later on, had caused such a sensation in London.

The following day Forsterman bade farewell to his host, relieved that the orchid was not on the tea estate, and headed across the river. From the manager's description he gathered that the plant grew in a valley through which a stream ran down to the river (probably the Torsof though Forsterman did not give it a name). The country was thick, and to cut a path through the streaming jungle would have taken months; the only hope was to wade up each stream as he came to it until he found the right one. The search, which went on for two days, was difficult and exhausting, and the water coming down from the Tibetan mountains was still freezing cold. The terrain rose steep, and rocky, closing in over the stream, and more than once Forsterman almost gave up the job as hopeless. But just before sunset he saw great sprays of orchids at the summit of the rock wall, and built himself a bamboo ladder to climb up to them. This was the plant he had come for and it was growing in huge quantities. Soon he had collected large numbers and was faced with getting them back to the Brahmaputra and then with transporting them to civilisation. The job in fact proved long and dangerous, and it was only after he had shot a tiger that was rampaging the village that the Bhutani porters would follow him. But after this all went well, and for once the plants did not die *en route* for England, or meet disaster aboard ship.

So on the 9th March, 1884, Sander was able to offer 40,000 plants of *Cypripedium spicerianum* at Stevens' Auction Rooms. They did not, of course, fetch seventy guineas each, but the haul was a considerable one, nevertheless. No doubt many of the dealers wondered how Sander had succeeded where every other firm had failed miserably; how his Intelligence system had led him to the precise spot where the orchid was to be found. It never occurred to them that the key to the mystery lay in Wimbledon. The coup added considerably to the Sander legend.

Frederick Sander: The Orchid King, Arthur Swinson, 1970.

Polyploidy in Phrags

Interest in and prevalence of tetraploid Phragmipediums has increased dramatically in today's marketplace. Why has this interest increased? There appear to be several reasons.

Phragmipediums initially gained popularity with hybridizers in 1870 with the first registered cross, *Dominianum* made from *Phragmipedium caudatum* and *caricinum*. Hybridizing continued for 36 years ending with *Phragmipedium Turconiense* (*caricinum* x *Lemoinierianum*) in 1906. During this time period, a total of 38 crosses were registered, 28 of which were complex hybrids. Also worth noting is that of the 37 crosses, 26 have *schlimii* in the progeny and 28 use one of the forms of *longifolium*. Most of the hybrids created were some form of pink flower, along with other notable crosses such as *Phragmipedium Grande* (*caudatum* x *longifolium*) and *Nitidissimum* (*warscewiczianum* x *Conchiferum*) which are still widely grown and seen at today's shows. From the pink hybridizing, hybrids such as *Schroderae* (*caudatum* x *Sedenii*), *Sedenii* (*schlimii* x *longifolium*) and *Cardinale* (*Sedenii* x *schlimii*) are still grown and shown as well.

Registration of new hybrids completely stopped for almost seventy years until 1975 when Stewarts registered *Praying Mantis* (*boissierianum* x *longifolium*). Looking back and understanding breeding today helps indicate why breeding stopped. Several factors probably played a part; however, there are most likely two primary causes. First, most of the hybrids in existence were starting to look similar. With so much *schlimii* and *longifolium* in the gene pool, most flowers were pink and similar in shape. It probably seemed pointless to continue making crosses that would just turn out looking like the parents. The second and main reason for the lack of new hybrids was that most hybrids would not breed. We still find today that most of the 'oldie but goodie' hybrids do not produce abundant seed, if they produce any seed at all. With better knowledge and techniques in the lab, we are able to produce some small amounts of plants from these old hybrids. However, most commercial greenhouses cannot afford to deal with such limited number of plants produced and the expense needed to produce them. These crosses, if they produce any viable seed at all, may only produce a single plant or at best, a single flask of plants.

A resurgence of interest in Phragmipedium breeding developed with the discovery of the brilliant red or orange *Phragmipedium besseae* discovered in Ecuador and Peru in the early eighties. Fuel was added to the breeding fire with the introduction of *Phragmipedium* Eric Young (*besseae* x *longifolium*), introduced by the Eric Young Orchid Foundation and *Ecu-Bess* (*ecuadorensis* x *besseae*) by the Orchid House in 1991. Both hybrids produced wonderful, easy to grow and flower red hybrids that are still widely

grown today. Additional hybrids were quickly added to the marketplace by combining *besseae* with the other known *Phragmipedium* species. *Phragmipedium*s hybridize well between species, but do not perform well as hybrids. Once the species had been used, the next obvious choice was to utilize the hybrids for new crosses. Today's breeders found similar problems that the breeders in the early twentieth century found—that the use of these hybrids would not yield great results in terms of plant production. Something needed to be done if the interest in and future breeding of *Phragmipedium*s was to continue successfully.

Other orchids, especially in the *Oncidium* group, were being genetically modified into polyploids. These plants were producing more vigorous plants with much larger flowers with very heavy substance. It was also discovered that the tetraploid forms of these plants were also very fertile in terms of seed production. The Eric Young Orchid Foundation took this same concept and applied it to *Phragmipedium*s.

In order to understand the entire polyploidy concept, a basic botany lesson is in order. Most naturally occurring plants are genetic diploids or in simpler terms have one complete set of chromosomes. One half of each complete set of chromosomes comes from each parent, or in other words each parent produces a haploid cell during meiosis. From this point it gets very complex and confusing. Once the new plant completes the various phases in meiosis, the half pairs of chromosomes have paired back together and the process of Mitosis begins. During this phase, cells divide and eventually begin to differentiate into things most of us recognize as roots and leaves. If during the mitosis phase of plant development the chromosomes do not split properly, and this segment can survive to produce reproductive structures, the plant will become a polyploid. A polyploid is defined by **Hortus Third** as the duplication of the individual chromosomes within the individual genome. In simpler terms, the plant develops multiple copies of the single set of chromosomes found in common diploids. A polyploid can develop with multiple combinations of chromosomes including triploids (three sets) to tetraploids (four sets) and on up in to more complex combinations. When this condition exists in a plant's cellular makeup, they are referred to as 3N or 4N, referring to the number of sets of chromosomes found within the plant.

Plants can become polyploid in one of two ways. First, on rare occasions, plants will become triploids or tetraploids naturally. These plants are very rare, either in nature or occurring as a genetic mutation in the lab. The second method is artificially produced polyploid plants. This process involves a chemical called colchicine. Colchicine is an alkaloid drug derived from the autumn crocus. If this chemical is applied to cells undergoing meiosis, colchicine will prohibit the chromosomes from splitting into haploid strings causing the chromosomes to double, resulting in

polyploid plants. This process sounds simple; however, colchicine is an extremely toxic chemical that tends to both kill the young plant cells and alter the cells on the hands of the person applying the chemical. With this in mind, only persons professionally trained in lab techniques should attempt the use of colchicine. Of the plants that do survive, only a small portion will become polyploids. The treated plants that do survive will be simply diploids or will result in triploids or tetraploids. As the plants mature, the polyploids will differ in appearance from the diploids; however, only genetic testing can confirm the differences between the triploids and tetraploids.



Phrag. Eric Young 'Larry Sanford' AM/AOS,
An excellent example of a diploid Eric Young



Phrag. Eric Young (4n),
An unawarded clone

Now we have triploid (3N) and tetraploid (4N) *Phragmipedium*s. What benefits do these plants offer? First, the plants themselves differ from their diploid counterparts in several ways. The plants are generally more vigorous and larger. This in itself can present some basic problems for the small windowsill grower or those growing under lights. When a standard *Phragmipedium longifolium* or Sorcerer's Apprentice plant can reach large sizes as standard plants, producing inflorescences reaching several feet, their polyploid counterparts will produce leaf spans reaching four feet with longer inflorescences to match. The flowers that these plants produce are also substantially larger as well. The overall flower is generally much larger with each individual segment being generally wider and of heavier substance. For example, one of the first tetraploids produced was *Phragmipedium* Eric Young. The standard form of the flower has slightly down-swept petals with awarded clones producing natural spreads around 10 centimeters. The tetraploid forms of *Phragmipedium* Eric Young generally have petals held much more horizontally with natural spreads reaching 15 centimeters. Both the triploid and tetraploid forms of these plants exhibit the large plant and flower size. However, the triploid forms of the plants are sterile, rendering them useless for future breeding. These plants are wonderful for growing into specimen plants to be enjoyed. The tetraploid forms of these plants, by contrast, are very fertile, making them valuable to breeders for making new crosses. Again, the original clones of *Phragmipedium* Eric Young, even the best awarded ones, were reluctant breeders, producing little or no seed in their crosses. However, once the tetraploid clones of Eric Young were introduced, crosses such as Don Wimber (Eric Young x *besseae*) have been produced reaching the market in large quantities. Don Wimber is beginning to be seen in the pot-plant market and seen in some mass retailers and florist shops. Initially, and continuing into the near future, tetraploid plants will continue to demand much higher prices than their diploid or triploid counterparts. This is due to the lack of tetraploid stock in the marketplace. Some of the first clones released from the Eric Young Foundation were sold for hundreds to thousands of dollars. Today, breeding plants can be purchased for \$75 to \$150 as large seedlings, with more plants on the way to help bring down prices.

To date, there are approximately fifteen to twenty *Phragmipedium*s that have been converted to or produced as tetraploids. There are numerous additional hybrids produced using diploids and tetraploids that will result in triploids. These crosses, although fantastic as individuals, will not produce offspring. There have been five species converted to tetraploids: *besseae*, *caudatum*, *longifolium*, *sargentianum* and *schlimii*. All of these plants have improved size of both plants and flowers except for *caudatum*. All of the species and hybrids that normally produce long petals actually produce shorter petals as a result of the conversion.

Although the petals are shortened, the segments themselves are much broader. Many of the hybrids beginning to show up in shows and especially the Awards Quarterly of the American Orchid Society are being recognized as superior plants by the number of awards given. Many of the tetraploid plants are even being awarded as first bloom seedlings that are guaranteed to improve with age and appropriate good culture. These plants generally produce flowers and inflorescences that are hard to resist by judges and the buying public alike. For example, River Valley Orchids recently had a *Phragmipedium* Les Dirouilles (Sorcerer's Apprentice x Grande) awarded at the fall Greater Cincinnati Orchid Show. The plant with the inflorescence was nearly as tall as my three-year old daughter!



Phrag. Les Dirouilles 'Sandy Engagement' HCC/AOS
with our daughter, Lexie

Upon review with various growers, the following hybrids have been converted or produced as tetraploids. This is by no means an official listing. First is *Phragmipedium* April Fool (Cardinale x *besseae*), which produces a much more rounded flower. Next is *Phrag.* Bel Royal (Mem. Dick Clements x Sorcerer's Apprentice). Beauport (*sargentianum*

x Hanne Popow) is producing some nice pinks and dark pink flowers. Bel Royal forms a nice large red flower.



Phrag. Bel Royal 'Envision Works' AM/AOS

Don Wimber (Eric Young x *besseae*) produces flowers that are larger and flatter, sometimes even without the pronounced midrib in the petals. Eric Young (*besseae* x *longifolium*) produces larger flowers, as discussed above, but does not tend to branch like some of the diploid counterparts. Fauvic (Mem. Dick Clements x Ecu-Bess) again produces even larger orange to red flowers. Grande (*longifolium* x *caudatum*) while producing a shorter flower than most diploid clones produces very wide segments including petals approaching 2 centimeters in width. Hanne Popow (*besseae* x *schlimii*) produces larger and more round flowers with the same color variations as found in earlier clones. Jason Fischer (Mem. Dick Clements x *besseae*) produces fantastic dark red flowers. This hybrid has already received numerous FCC's from the American Orchid Society. It is hard to believe that these can be improved upon, but better and larger tetraploid clones are on the way! Les Dirouilles (Sorcerer's Apprentice x Grande) produces large mahogany flowers that can be perfectly triangular in shape. My awarded clone has exactly the same horizontal and vertical size. Living Fire (Sorcerer's Apprentice x *besseae*) is another hybrid producing very large dark red flowers. Memoria Dick Clements (*sargentianum* x *besseae*) produces much larger flowers than its diploid counterparts. The clone 'Sandy's Gem' AM/AOS was raised by Hilltop Orchids. This clone reached a natural spread of almost 15 centimeters and was actually one of the rare naturally occurring tetraploids. Saint Ouen (Hanne Popow x *besseae*) produces a variety of color combinations from reds to pinks to pink blushes. The tetraploids are larger and more round. Sorcerer's Apprentice (*longifolium* x *sargentianum*) produces very large plants, tall inflorescences with huge flowers to match. Tropical Propagations in Madison Wisconsin is using Sorcerer's Apprentice to produce some wonderful large reds and other

interesting combinations that will also hopefully address the plant size issue.

The future of *Phragmipedium* breeding is healthy and bright! More new hybrids using these fantastic tetraploid clones are in the lab and on the way! Many more hybrids with large round pink flowers to large red flowers to plants similar to *Phragmipedium* Grande, only with bright red flowers are on the horizon. More and more hybrids with classifications of 4N are being seen on the market. *Phragmipedium* hybridizing will not end in 2006 like it did in 1906, but will continue well into the future.

Eric Sauer

Eric is the owner of River Valley Orchids in Lebanon, Ohio.

GROWING ORCHIDS UNDER HID LIGHTING

Tony Whitaker

Most indoor growers of orchids, when using supplemental lighting, zero in on fluorescents. But High Intensity Discharge (HID) lighting is an alternative that is gaining popularity where a spare room, a large closet or even an unused area of the basement is available.

HID lighting is revolutionizing the agricultural industry. Over the past few years the cost of these systems and the replacement bulbs has dropped significantly. The hydroponics industry relies heavily on these as either primary or supplemental lighting for a myriad of bedding and ornamental plants as well as some food crops such as tomatoes.

I first started using this type of lighting, specifically Metal Halides (MH) growing coral in a saltwater "reef" tank. That began the journey in learning about the theory of light spectrums and their role in the growth of corals. Now it has translated into my passion for orchids.

Measuring Light for Humans: Lumens and Lux

First, how do we measure light quantity for humans? The obvious way is based on how bright the source appears and how "well" the eye sees under the light. Since the human eye is particularly sensitive to yellow light, more weight is given to the yellow region of the spectrum and the contributions from blue and red light are largely discounted. This is the basis for rating the total amount of light emitted by a source in lumens.

The light emitted from the source is then distributed over the area to be illuminated. The illumination is measured in “lux”, a measurement of how many lumens fall on each square meter of surface. An illumination of 1000 lux implies that 1000 lumens are falling on each square meter of surface. Similarly, “foot-candles” is the term for the measure of how many lumens are falling on each square foot of surface. Clearly, both lumens and lux (or foot-candles) refer specifically to human vision and not to the way plants see light. “Lumens” is a meaningless term in the plant world.

How then should the rating for plant lighting be accomplished? There are two basic approaches to develop this rating: measuring energy or counting photons.

PAR and Plant Photosynthetic Response Curve

Just as humans need a balanced diet, all orchids need balanced, full-spectrum light for good health and optimum growth. The quality of light is as important as quantity. Plants are sensitive to a similar portion of the spectrum, as is the human eye. This portion of the light spectrum is referred to as Photosynthetically Active Radiation or PAR, namely about 400 to 700 nanometers in wavelength. Nevertheless, plant response within this region is very different from that of humans.

The human eye has peak sensitivity in the yellow-green region, around 550 nanometers. This is the “optic yellow” color used for highly visible signs and objects. Plants, on the other hand, respond more effectively to red light and to blue light, the peak being in the red region at around 630 nanometers. This is called the Plant Photosynthetic Response Curve.

In the same way fat provides the most efficient calories for humans, red light provides the most efficient food for plants. However, a plant illuminated only with red or orange light will fail to develop sufficient bulk. Leafy growth (vegetative growth) and bulk also require blue light. Many other complex processes are triggered by light required from different regions of the spectrum. The correct portion of the spectrum varies from species to species. However, the quantity of light needed for plant growth and health can be measured, assuming that all portions of the spectrum are adequately covered. Light for plants cannot, however, be measured with the same standards used to measure light for humans. Some basic definitions and distinctions follow that are useful in determining appropriate ways to measure the quantity of light for hydroponic plant growth.

PAR Watts for Plants

Watts is an objective measure of energy being used or emitted by a lamp each second. Energy itself is measured in joules, and 1 joule per second is called a watt. A 100-watt incandescent bulb uses up 100 joules of electrical energy every second. How much light energy is it generating? About

6 joules per second or 6 watts, but the efficiency of the lamp is only 6%, a rather dismal number. The rest of the energy is dissipated mainly as heat. Modern discharge lamps like high-pressure sodium (HPS) and metal halide convert (typically) 30% to 40% of the electrical energy into light. Therefore, they are significantly more efficient than incandescent bulbs. Since plants use energy between 400 and 700 nanometers and light in this region is called Photosynthetically Active Radiation or PAR, we could measure the total amount of energy emitted per second in this region and call it PAR Watts. This is an objective measure in contrast to lumens, which is a subjective measure since it is based on the response of the subjects (humans). PAR watts directly indicate how much light energy is available for plants to use in photosynthesis.

The output of a 400-watt incandescent bulb is about 25 watts of light; a 400-watt metal halide bulb emits about 140 watts of light. If PAR is considered to correspond more or less to the visible region, then a 400-watt metal halide lamp provides about 140 watts of PAR. A 400 watt HPS lamps has less PAR, typically 120 to 128 watts, but because the light is yellow it is rated at higher lumens (for the human eye).

“Illumination” for plants is measured in PAR watts per square meter. There is no specific name for this unit but it is referred to as “irradiance” and written, for example, as 25-watts/square meter or 25 w/m².

Photosynthesis and Photomorphogenesis

Generally speaking, orchids receiving insufficient light levels produce smaller, longer (as compared to wide) leaves and have lower overall weight. Plants receiving excessive amounts of light can dry up, develop extra growing points, become bleached through the destruction of chlorophyll, and display other symptoms of excessive stress. Excessive near (infrared) radiation or extreme ultraviolet (UV) radiation also damages plants.

Within the acceptable range, however, our orchids respond very well to light with their growth rate being proportional to irradiance levels. The relative quantum efficiency is a measure of how likely each photon is to stimulate a photosynthetic chemical reaction. The curve of relative quantum efficiency versus wavelength is, again, the Plant Photosynthetic Response Curve.

It is also possible to plot a curve showing the effectiveness of energy in different regions of the spectrum in producing photosynthesis. The fact that blue photons contain more energy than red photons would need to be taken into account, and the resulting curve could be programmed into photometry spheres to directly measure “plant lumens” of light sources instead of “human lumens.” This is likely to happen at some point in the future. In fact, manufacturers like Venture Lighting International now provide PAR watt ratings for their

Sunmaster line of lamps designed for the plant growth market.

The main ingredient in plants that is responsible for photosynthesis is chlorophyll. Some researchers extracted chlorophyll from plants and studied its response to different wavelengths of light, believing that this response would be identical to the photosynthetic response of plants. However, it is now known that other compounds (carotenoids and phycobilins) also result in photosynthesis. The plant response curve, therefore, is a complex summation of the responses of several pigments and is somewhat different for different plants. An average is generally used which represents most plants, although individual plants may vary by as much as 25% from this curve. While incandescent lamps are fixed in their spectral output, Metal Halide and HPS lamps are available in a broad range of color temperatures and spectral outputs. With this in mind, the discriminating grower can choose a lamp that provides the best spectral output for his specific needs.

Different types of Metal Halide bulbs emit light differently, in intensity and frequency, in the blue and red regions. The 'cool' Metal Halides are the typical Metal Halides you would buy at any home improvement store. Since plants reflect green light (therefore it is not utilized) the amount of reflected, therefore wasted, energy is in the green part of the spectrum in the 'cool' bulbs. The 'warm' Metal Halides are those with the red spectrum enhanced and have a better-balanced spectrum for overall plant growth.

Metal Halide – Warm Temperature

For HPS lighting the red spectrum is predominate. With the Hortilux high pressure sodium bulb, the blue spectrum is enhanced and better suited for our orchid growth, especially as greenhouse supplemental lighting where the blue spectrum is adequate from sunlight.

Summary

Plants "see" light differently than human beings do. As a result, lumens, lux or foot-candles should not be used to measure light for plant growth since they are measures used for human visibility. A more correct measure for plants is PAR watts, although it still does not tell the whole story. In addition to quantity of light, considerations of quality are important, since plants use energy in different parts of the spectrum for critical processes.

For Paphiopedilums I have learned they like a balance of red and blue lighting. However to initiate flowering the red spectrum must be adequate. If you use all Metal Halide lighting make sure to buy bulbs with the red spectrum

enhanced.

Typically, our paphs and phrags are native to the underbrush of tropical jungles or shady forests and do not require much light

My Personal Growing Tips for HID Lighting

1. DO NOT rely on typical light meters to determine the light levels for your orchids. For instance, with a typical light meter in a typical greenhouse a reading of between 1000 and 2000-foot candles is considered optimal for paphs. If you were to try to attain these readings with HID lighting you will literally "fry" your plants. The typical light reading in my greenhouse is between 200 and 700 (absolute maximum) foot-candles.
2. Keep paphs damp, damp, damp. I water my paphs once every week, but run a hose end sprayer over my plants every other day to keep the coconut chip mix I use damp at all times. For whatever reason, paphs like their roots damper under HID lighting, contrary to growing in typical greenhouse or windowsill conditions. A dry medium under HID lighting means a dead paph, phrag, or phal.
3. Because you are keeping the media damp, airflow cannot be over-emphasized. Please make sure there is a gentle breeze around your plants at all times. Stagnant air breeds plant pathogens at alarming rates.
4. Water phrags every other day or keep in a tray of water (remember to replace water at least weekly to keep the water, and the medium, fresh).
5. Feed phrags as you do paphs but at one half the strength! This is EXTREMELY important to prevent root tip burn.
6. Replace Metal Halide (MH) bulbs once per year. Replace High-Pressure Sodium (HPS) bulbs every 24 months. At that point the bulb is old and the light output may be less than half of a new bulb.

Paph seedlings should be kept on a high nitrogen fertilizer under this regimen. Once per month it is recommended to feed calcium nitrate. Once every two months I drench all my orchids and houseplants with an Epsom Salts (Magnesium Sulfate) solution at the rate of ½ teaspoon per gallon. This is a must.

Tony Whitaker lives in Kernersville, NC, and is the owner of Kingswood Orchids.

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Paph Guild Meeting

The 46th meeting of the Paphiopedilum Guild convened in January, bringing together members from Japan, Taiwan, Europe, Canada, and all parts of the US to share their flowers in the showroom, and to hear expert presentations on a range of topics.

Paul Phillips, of Ratcliffe Orchids, lead off the programs with a review of the benchmarks of Standard hybrid breeding, and reminded all that the level of quality achieved thirty or forty years ago would still be worthy today.

Dennis Olivas spoke on breeding Standard red hybrids, while Nick Tannaci, well known for his brachypetalum explorations, analyzed what Parvisepalum parents would make the best foundation plants for a new Complex direction. Butch Werkle-Thrun rounded out the floral discussions with a review of recent Cymbidium Society awards.

Conservation was particularly well explored, with Eric Christenson discussing concisely and simply the current problems in the application of CITES to Paphiopedilum importation, and the outlook for the hobby grower. As a complement to the topic, Dennis D'Alessandro spoke about the collection of Parvisepalum species in Viet Nam, and illustrated it with images of some spectacular selected species clones.

The overriding theme of the meeting, as with all Paphiopedilum Guild meetings, was friendship, and tradition. The casual tone, and the high caliber of the presentations, remains a tribute to the creator of the Guild, Norris Powell.

Kevin Porter

Biographies of SOA Officers

Barbara Tisherman, President

Barbara Tisherman has been growing orchids since 1971, the result of a gift, and became addicted immediately. One greenhouse grew to three sections with different temperatures so that she could grow a wide variety of orchids, but Paphs and Phrags captured her interest early on. In 1977 she became a student judge and became accredited in 1983. From January, 1991 through December, 1995 she was Chairman of the National Capital Judging Center. In October, 1985 she chaired an AOS Trustees Meeting and Eastern Orchid Congress in Pittsburgh, and was President of the Eastern Orchid Congress and chairman of its meeting again in Pittsburgh in the fall of 1999. She has been very active in her local society, the Orchid Society of Western Pennsylvania all along, including being Show Chairman and President, and creates a 50-square-foot exhibit every spring in its show; many of them have won the AOS Bronze Show Trophy. Her favorite topic to speak to other orchid societies about is exhibit judging and how to produce good exhibits. For several years she operated a small business, Barbara's Orchids. She has attended every Paphiopedilum Forum in Washington, D.C. Her many contacts from there and attendance at various AOS Trustees Meetings and three World Orchid Conferences have been helpful in enlisting volunteers and members in the new Slipper Orchid Alliance, which held its first meeting under her direction at the EOC in Pittsburgh in 1999. She served as the SOA Acting Chairman until her election as President as of January 1, 2002.

Tom Larkin, Vice President

Tom's passion for horticulture goes back to an extremely young age and an interest in orchids that started around the age of 12 and has flourished since. He developed an avid passion for hybridizing and has spent the last 15 years engrossed in the development of new and unusual orchid hybrids, having registered in excess of 100 grex with the Royal Horticulture Society in England, the International Registration Authority.

Whippoorwill Orchids, founded in 1991, is a natural extension of the hobby that started in 1950. The operation is small with greenhouses (2000 sq ft), office and laboratory operation (1000 sq ft) and the bulk of the business focused on replated flasks of their own hybrids which are shipped all over the world. The laboratory is limited to their own items and even most of their own lab work is accomplished by outside labs.

Tom and his wife Barbara are both heavily involved in the orchid world both as hobbyists and commercially. They are members of several National and International

organizations. Tom is an accredited American Orchid Society Judge, a Director of the Orchid Digest Corp and member of the ODC executive committee, a Director of the International Phalaenopsis Alliance, a member of the AOS Historical Committee and a Committee Chairman with the Mid-America Orchid Congress. Tom and Barbara were instrumental in founding the Orchid Society of the Ozarks, started in April of 1996 and now 110 members strong.

Al Svoboda, Secretary

I purchased my first orchid in 1967 after moving to Santa Barbara. Having two orchids, I had to try hybridizing and my first hybrids were in 1967 and 1971. Initially I tried to do my own flasking but obviously was not circumspect. My early love was cymbidiums, supplanted by the complex Paphs. By now I have registered about 70 Paphs. I reached the level of Cymbidium Society of America judge and was co-chairman of our local society, but family exigencies and career pressures eventually caused me to drop out. With my retirement and my wife's burgeoning interest in orchids, we resolved to again learn more about genera and species and enter the judging hierarchy. We have two greenhouses, mine more related to Paphs, Phrags, and Encyclias, and my wife's more eclectic. I am a retired physician addicted to travel, history, social anthropology, music, and art. We are lucky that Santa Barbara offers all.

Steve Drozda, Treasurer

Steve Drozda is a long-time resident of Pittsburgh, Pennsylvania. Steve is currently serving as the president of the Orchid Society of Western Pennsylvania. As an avid orchid hobbyist, his small greenhouse is filled with many different orchid genera, but it seems that the paphs and phrags predominate. In addition to growing orchids, he's become involved with the AOS judging program, and is enjoying his third year as a student for the National Capital Judging Center. Steve is employed as a loan officer for the Pittsburgh office of the Small Business Administration.

Jerry Fischer, Director

Jerry Lee Fischer was born and raised in Minneapolis, Minnesota. After attending The Minneapolis College of Art and Design in the early 70's, he was employed at Bachman's, one of the world's largest retail florists. One day while working in one of Bachman's many greenhouses, he saw an orchid that was brought in to be sold on consignment. He was 'hooked' and his passion lead to the business, Orchids Limited.

Orchids Limited was started in 1978 and has expanded over the years. The nursery is now located on 5½ acres in Plymouth, a western suburb of Minneapolis, and is comprised of 5 greenhouses and a support building. Orchids Limited specializes in Paphiopedilum and Phragmipedium species

and unique hybrids.

Jerry has traveled to Peru, Borneo, Malaysia and Venezuela to study orchids in their native habitat. He also does consultation on greenhouse construction for both hobbyists and professionals.

Kevin Porter, Director

I have been growing orchids for 26 years, and have operated Curved Air, a Paphiopedilum nursery, for 20 years. I also manage litigation for an insurance company, and partake of jazz, sushi, and difficult golf courses as often as possible.

SOA Membership Status

Support for the Slipper Orchid Alliance continues to grow. When the Alliance completed its 2000 inaugural year, founding member support exceeded 170 members from seven countries: Australia, Canada, Dominican Republic, England, Japan, Jersey of the Channel Islands, and the United States. At the Alliance's May 19th Speakers Forum, membership exceeded 200.

Supporting membership also grew in 2001 to include seventeen commercial members: Antec Laboratory, Candor, New York; Bloomfield Orchids, Pittsford, New York; Castle Rock Orchids, Ltd., Maple Plain, Minnesota; Curved Air Orchids, Santa Maria, California; Ellenberger's Orchid Eden, Victor, New York; Fox Valley Orchids, Villa Park, Illinois; Gypsy Glen Orchids, Beaver, Pennsylvania; Orchidaceae, Seattle, Washington; Orchid Inn, Downs, Illinois; Orchids Limited, Plymouth, Minnesota; Paphanatics, Ltd., Anaheim, California; Ratcliffe Orchids, LLC, Kissimmee, Florida; The Orchid House, Los Osos, California; The Paph House "Orchids", San Leandro, California; Whippoorwill Orchids, Rogers, Arkansas; Windy Hill Gardens, Labadie, Missouri; and Woodstream Orchids, Huntingtown, Maryland.

VA Paph Society Disbands, Joins SOA

It is always sad when an organization decides it cannot continue. Unfortunately that is the situation with the Virginia Paphiopedilum Society, which had been in existence since January 1998.

The group has donated its treasury to the SOA, and in return we are pleased to welcome its members as our members. Each will be considered a paid member of the SOA for the year 2002. We will grow stronger together and continue to look for new ways to serve all our members.

Mailing Address Errors?

Our Membership Secretary, Barbara Noe, has requested that every member check their mailing label. She wants a complete and accurate membership list, including your telephone number and e-mail address. Please contact her with any corrections, changes or additions: 1703 Grove Avenue, Richmond, VA 23220-4607; (804) 355-2270; e-mail Celorchids@aol.com.