BEGINNER'S SERIES

Paphiopedilums — Part 1

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As A RECENT SUBSCRIBER, I used to scoff at the frequent appearance in the AMERICAN ORCHID SOCIETY BULLETIN of articles on paphiopedilums, accusing the editorial staff, in its northern location, of a bias towards the cooler-growing genera. Living in central Florida at the time, I saw no reason, as a beginner, to even consider trying to grow these orchids. It is with a sense of irony, then, that some years later I am about to begin an article intended to encourage beginners everywhere to grow suitable *Paphiopedilum* species and hybrids — of which there are many, whatever the location!

FIGURE 1: *Paphiopedilum charlesworthii*, a fine example of the genus, flowering in August.

But with all the excellent, colorful articles on paphiopedilums written by some of the best contemporary growers in recent issues of the BULLETIN, is this article really necessary? In a very real sense, much of what I am about to say will be redundant; this information can be found in previous volumes of the BULLETIN and other orchid periodicals. Yet editors and more inveterate subscribers tend to take a broader view of what is in print than do newer subscribers. To you who have become American Orchid Society members just this year, our coverage of the genus *Paphiopedilum* in this, the fifty-first volume of the BULLETIN, has been minimal. What has been printed in previous years is not likely to be in your possession. This could mean that you have yet to add a paphiopedilum to your beginning orchid collection — an unfortunate oversight, indeed!

Before beginning, though, an important point needs to be made regarding the color pictures and the bibliography accompanying this article. The *Paphiopedilum* species and hybrids pictured here by no

means thoroughly present the variety offered by paphiopedilums today. No one article could possibly accomplish that! As a group, however, the articles on paphiopedilums appearing in the AMERICAN ORCHID SOCIETY BULLETIN over the years do provide a very comprehensive view of the genus. To take advantage of what at least some of these articles have to offer, the reader needs to make use of the bibliography at the end of this article. Listed there are some of the best articles on paphiopedilums to be printed in the BULLETIN, though this bibliography encompasses only what has appeared in the past ten or so years, and many fine articles can be found in earlier BULLETIN issues, as well as in other orchid periodicals.

GENERAL CHARACTERISTICS OF THE GENUS

It has been said before, and it needs to be said again, that *Paphiopedilum* species and hybrids are eminently attractive orchids, in or out of flower. Not only that, they are, on the whole, exceedingly adaptable to contemporary growing conditions, be they under lights, on a windowsill, outdoors or in a greenhouse. By way of illustration, consider the *Paphiopedilum* species, *Paph. charlesworthii,* pictured on the first page of this article (FIGURE 1) flowering in a four-inch pot in August. The plant pictured has been grown, and has flowered equally well, under fluorescent lights, on the windowsill, as well as in a greenhouse. Though this plant is certainly no cultural specimen, and has no chance of winning a CCM/AOS, it does present a very attractive, overall appearance. Furthermore, with its low, densely clustered growths, the leaves of which measure about 6 inches (15 cm) long, the species certainly qualifies as a compact, miniature orchid. At the same time, *Paphiopedilum charlesworthii* does not have a miniature flower, the one pictured being 3 inches (7.5 cm) across.

Photography: Stephen R. Batchelor

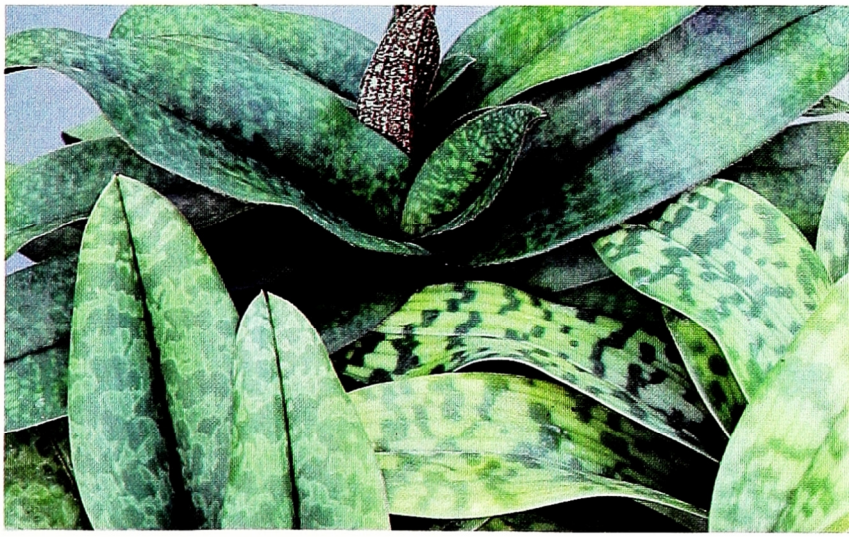
FIGURE 2 — Paphiopedilum Olivia (*tonsum* × *niveum*), beginning new growth and flower buds during August.

While *Paphiopedium* flowers vary considerably in shape, size and color, like *Paphiopedilum charlesworthii* they all have a "pouch", the cupped, lowermost portion of the flower called, in botanical nomenclature, the labellum. Just above the pouch, in the center of a

Paphiopedilum flower, is a shield-like structure called the staminode. *Paphiopedilum charlesworthii* has a glossy, pure-white staminode (in FIGURE 1 partially obscured, because of the angle of the camera lens, by the brown pouch below). The two lateral petals appear at either side of the pouch. Behind the pouch is the ventral or synsepal, actually the fusion of the two lateral sepals. Lastly, the most prominent flower part of a *Paphiopedilum* is frequently the dorsal sepal, uppermost on the flower. As seen in FIGURE 1, the lovely dorsal sepal *of Paphiopedilum charlesworthii* is broad and heavily patterned (tessellated) in pink.

FIGURE 3 — Mottled-leaf paphiopedilums, a random selection: *Paph.* Dellaina (*delenatii* × *chamberlainianum*), top, *Paph. venustum*, bottom left, and *Paph.* Maudiae (*callosum* × *lawrenceanum*), bottom right.

Photography: Stephen K. Batchelor



In terms of plant habit, paphiopedilums arc composed of one or more fan-like growths connected by a short rhizome, or horizontal stem (FIGURE 1). These growths continue to produce leaves from their central growing points until a sheath is formed, from which the flower spike emerges. By this stage in development, new growths usually have initiated at the base (FIGURE 2). *Paphiopedilum* leaves can be a solid green, as in the case of *Paphiopedilum charlesworthii* and many complex *Paphiopedilum* hybrids, or can exhibit varying degrees of patterning on both the topside and underside of the leaves, as illustrated in FIGURE 3. These "mottled-leaf paphiopedilums are among the most attractive of orchid plants.

PAPHIOPEDILUM SPECIES AND HYBRIDS

Over fifty species *of Paphiopedilum* have been discovered in the Far East, from the higher, cooler elevations of the Himalayas, across to China and Southeast Asia, and down to the warmer, sea-level regions of Malaysia, Indonesia and the Philippines (Hawkes, 1965). Most species, like *Paphiopedilum callosum,* are terrestrial in nature, growing under the shaded and moist conditions of the forest floor (Fitch, 1982a). Some species, such as *Paphiopedilum niveum,* are lithophytic, found in colonies on the coastal rock formations of the Malaysian islands (Fitch, 1982b). While a few of the larger, "strap-leaf" *Paphiopedilum* species, such as *Paph. lowii,* are usually epiphytic,

exposed to the higher light conditions found in their loftier habitats.

Paphiopedilum philippinense var. *roebelenii* (synonym *philippinense)* (FIGURE 4) and *Paphiopedilum lowii* (FIGURE 5) provide a strong contrast to the

Figure 4 Paphiopedilum philippinense var. roebelenii 'Ten Inch Tales', AM/AOS (80 pts) Awarded in 1998 with 4 flowers, nearly a foot long, and 2 buds on 1 inflorescence.

Paphiopedilum charlesworthii previously described, and serve to illustrate the extent of variation in both plant and flower habit within this genus. Unlike the single-flowered spikes *of Paphiopedilum charlesworthii,* which are usually around 6 inches (15 cm) tall, those of *Paph. philippinense* var. *roebelenii* and *Paph. lowii* can bear up to a half-dozen flowers, and can measure two feet (60 cm), or more, in length. Paphiopedilums with this kind of flowering habit are referred to as "multifloral" paphiopedilums in this article. The plants themselves can be quite large, particularly in the case of *Paphiopedilum lowii,* where individual leaves are often well over a foot (30 cm) long, though narrow. The flowers *of Paphiopedilum philippinense* var. *roebelenii* in FIGURE 4, with their pendent, highly twisted petals measuring 5 inches (13 cm) long (Day, 1974), also contrast strikingly with those of *Paphiopedilum charlesworthii.*

In the hybrid orchid registrations conducted by the Royal Horticultural Society of England, *Paphiopedilum philippinense* var. *roebelenii* is treated as a synonym for *Paphiopedilum philippinense. Paphiopedilum* Berenice *(lowii* X *philippinense),* registered in 1891, is a good example of a primary *Paphiopedilum* hybrid which combines desirable floral traits of both its parent species (FIGURE 6). Remade in contemporary times (Peterson, 1979a), this cross has received over twenty American Orchid Society flower-quality awards in recent years. Many other fine, multifloral *Paphiopedilum* hybrids are available to the orchid hobbyist today, typically produced by the remaking of crosses registered around the turn of the century. From *Paphiopedilum rothschildianum,* one of the most dramatic of

Paphiopedilum species, many highly desirable, primary hybrids have resulted (Peterson, 1979b). *Paphiopedilum* Julius *(rothschildianum* X *lowii,* registered in 1913), whose flowers are similar to those of *Paphiopedilum* Berenice, has toils credit nearly a dozen A.O.S. awards (appearing in this year's issues of the AWARDS QUARTERLY alone). Not all successful primary hybrids of multifloral *Paphiopedilum* species are remakes of old crosses, however. *Paphiopedilum* Bengal Lancers, a cross of *Paphiopedilum haynaldianum* and *Paphiopedilum parishii,* two worthy, strap-leaf species in their own right, was registered in 1974, and has received almost ten A.O.S. awards to date.

If the flowers of the multifloral *Paphiopedilum* species can be likened to "tropical birds in flight", then those of the *Brachypetalum* section *of Paphiopedilum* could be considered the brilliantly colored eggs such exotic birds would lay! *Paphiopedilum bellatulum* is an excellent example of this distinct group *of Paphiopedilum* species, its round, brilliantly speckled flowers kept low among the dwarfed, mottled foliage because of a short and lax inflorescence (FIGURE 7). This shorter spike habit tends carry over to the primary

Figure 6
Paphiopedilum Berenice 'Blumen Insel', FCC/AOS (92pts.)
(lowii x philippinense)

An average clone flowering during July and August can have four or five flowers , 5 inches (13cm) across, on one 1 ½ foot (46cm) inflorescence.

hybrids *of Paphiopedilum bellatulum,* even when the other parent has a fairly tall spike habit to contribute, as is the case with *Paphiopedilum fairrieanum* (FIGURE 8). The resulting primary hybrid, *Paphiopedilum* Iona *(bellatulum* X *fairrieanum,* 1913) has more than proven its desirability with clones produced from a contemporary remake of the cross, nearly forty of which have received A.O.S. awards in recent years. Obviously, the consistent flower quality of this primary paph more than compensates for the fact that, even when staked, its flowers are usually but inches above the foliage (FIGURE 9). To its credit, the small plant habit *of Paphiopedilum bellatulum* carries through as well in clones *of Paphiopedilum* Iona, and usually in those of other primary hybrids of the *Brachypetalum* section.

The list of *Paphiopedilum* hybrids of the *Brachypetalum* section only begins with *Paphiopedilum bellatulum;* countless other combinations with this and other, similar species exist (Heuer, 1977; Ratcliffe, 1977). Many of the flowers *of Paphiopedilum bellatulum, Paph, godefroyae* and *Paph. niveum* hybrids are whitish with differing degrees of pink patterning, but *Paphiopedilum concolor* (FIGURE 10) has introduced a warmer range of colors into contemporary hybrids. *Paphiopedilum* Colorkulii *(concolor* X *sukhakulii),* registered in 1973, is one of the many primary *Paphiopedilum* hybrids involving *Paphiopedilum concolor* recently hybridized (FIGURE 11).

Paphiopedilum bellatulum 'Suigen-Bin', SBM 79, exhibited by Okada Toshiharu Awarded in 2008 with two flowers.

Paphiopedilum sukhakulii (FIGURE 12) is classified in another section of the genus, characterized in part by tall, upright, usually single-flowered inflorescences. It was discovered less than twenty years ago (Bechtel, 1981). From this comparatively new species many new primary hybrids have been made, with many more surely to come (Nash, 1981). *Paphiopedilum* Supersuk (William Mathews *lawrenceanum* X *mastersianum,* 1899] X *sukhakulii),* registered in 1973, is perhaps the most highly regarded of *Paphiopedilum sukhakulii* hybrids, being very aptly named. In the most recent *Addendum* to the *Sander's List of Orchid Hybrids* (1976-1980), thirteen new hybrids were registered with *Paphiopedilum sukhakulii* as one parent; fifteen for *Paphiopedilum concolor.* It would seem that hybridizers are only just now fully exploring the possibilities!

Undoubtedly the paphiopedilum most frequently recommended for beginners is *Paphiopedilum* Maudiae — and small wonder! The plants of this primary paph are very attractive, having pleasing, mottled leaves (FIGURE 3). They are tolerant of a wide range of conditions. Flowering occurs during the warm months of the year, indicating that cool night temperatures are not necessary for flower initiation. The flowers themselves, around 5 inches (13 cm) wide, are borne singly on tall spikes over a foot (30 cm) long, and can last three months, possibly more.

Paphiopedilum fairrieanum 'Big Mama', CCM/AOS (80pts) Awarded in January 1978 with 13 flowers, 6.1cm (2 1/3 inches) across, on 13 inflorescences. Exhibited by Norman L. Berwick

The original *Paphiopedilum* Maudiae, registered in 1900, was a cross of albino cultivars (lacking red pigment) of *Paphiopedilum callosum* and *Paphiopedilum lawrenceanum.* The resulting flowers were white and green. Normally pigmented cultivars of *Paphiopedilum callosum* (FIGURE 13) and *Paphiopedilum lawrenceanum* were crossed soon thereafter, making the "coloratum" clones *of Paphiopedilum* Maudiae (FIGURE 14) (Peterson, 1977). For a slightly different flower form, *Paphiopedilum* Maudiae was crossed with *Paphiopedilum fairrieanum* (FIGURE 8) to create *Paphiopedilum* Faire-Maud, registered in 1909 (FIGURE 15). Yet modern-day hybridizers have resumed breeding with *Paphiopedilum* Maudiae (Nash, 1981). For instance, utilizing ever darker cultivars *of Paphiopedilum callosum* and *Paphiopedilum lawrenceanum,* as well as those of other species such as *Paphiopedilum curtisii,* they are creating flowers so heavily pigmented they appear virtually black in color.

Apart from the *Paphiopedilum* species and their immediate hybrids just discussed are the green-leaved, complex *Paphiopedilum* hybrids of today. These countless hybrids, brought about by over one-hundred years of continuous hybridizing beginning with such cooler-growing species as *Paphiopedilum insigne,* have genealogy charts which could rival the most intricate of spiders' webs (Moore, 1973). Complex *Paphiopedilum* hybrids

Figure 9
Paphiopedilum Iona 'Carrie K.', HCC/AOS (76pts.) (bellatulum x fairrieanum)

generally lack distinct patterning on their leaves, have growths with leaves usually under a foot (30 cm) long when flowering size, and generally grow and flower best under cooler night temperatures. Their glossy, thick flowers, usually 4 inches (10 cm) or more across, frequently have a round form, created by the overlapping of very broad flower parts. Every conceivable color pattern is represented, the flowers presented boldly, and usually singly, on sturdy stalks which require minimal staking *(see* the front cover of this issue, and FIGURES 16—19). Peak flowering of the complex *Paphiopedilum* hybrids is during the winter months of the year, but individual flowers can last over three months, particularly if cooler, lower light conditions prevail.

SELECTING PAPHIOPEDILUMS TO GROW

The following discussion is based on several assumptions. It assumes that the beginner does not own a greenhouse, because most do not. Whether the beginner grows orchids on the windowsill, under lights, or possibly outdoors, this discussion also assumes that the growing conditions involved — particularly in terms of light and temperature — are already determined. The goal in mind is to first choose the *Paphiopedilum* species and hybrids known to adapt well to these set conditions, rather than try to adjust prevailing conditions to whatever *Paphiopedilum* might be readily available at the time. The former is a far more successful – and economical – means of growing orchids than the latter!

Paphiopedilum concolor 'Shirley', CCM/AOS (85pts.) exhibited by Michael Roccaforte, awarded in August of 1973 with 11 flowers 6cm (2 ½ inches) across and seven buds on seven inflorescences.

Light is only rarely the determining factor in the selection of one *Paphiopedilum* over another. Most paphiopedilums, from the most complex of hybrids to the species, will grow and flower successfully with the light intensities found under conventional fluorescent tubes (Raynor, 1975), provided that four-tube fixtures are used, the plants are within a foot (30 cm) of the lights, and the lights are on at least 12 hours a day (Batchelor, 1981a). The usually epiphytic, strap-leaf species, such as *Paphiopedilum parishii* and *Paph. lowii,* might prove difficult to flower under lights, however. These species, by virtue of their sunnier origins, may require higher light levels to flower well (Hartman, 1976; Hewlett, 1972).

Such strap-leaf *Paphiopedilum* species might be more appropriate for a sunny windowsill. Here in the A.O.S. office in Cambridge, Massachusetts, a plant of *Paphiopedilum parishii* prospered in a south-facing window receiving four hours or more of direct sunlight a day. But beginners beware! Most paphiopedilums will require some degree of shading from direct, mid-day sunlight, even on a windowsill. As to the amount of shading, this very much depends on the location. In the wintertime this far north, paphs require little or no shading from the rays of the sun, so weak are they at that time of the year. In the southern "Sunbelt" of the United States, it is quite a different story. In this region *Paphiopedilum* growers always shade their plants (Gee, 1978), removing as much as 60% to 75% of their brilliant sunshine in the summertime (Grezaffi, 1982; Hewlett, 1972).

Paphiopedilum Colorkulii 'Shirley D', HCC/AOS (78pts)
(concolor x sukhakulii) exhibited in 1990 by Neal R. Amundson.

Temperature, rather than light, is more often the stumbling-block for successful *Paphiopedilum* culture. It is generally believed that many paphiopedilums, particularly the complex hybrids, require a "cool treatment" at some time during the year in order to flower properly (Wilcox, 1971). Walter Bertsch, in a very thorough series of three articles on growing paphiopedilums, recommends night temperatures in the fall of 55-60°F (13-16°C) for two to eight weeks to induce flowering, finding that, on the other hand, night temperatures of 65-68°F (18-20°C) are best for vegetative growth, while day temperatures above 80°F (27°C) can be inhibiting. At the same time he mentions, "Day temperatures of up to 90°F [32°C] may actually be beneficial for some tessellated paphs such as *Paph. callosum, Paph.* Clair de Lune and the warmer growing brachypetalums. This is also true for certain large, strap-leaf paphs, which may not have tessellations, such as *Paphiopedilum philippinense."* (Bertsch, 1979, pages 892-893). This would indicate that paphiopedilums offer some leeway in terms of temperature.

The invaluable *Encyclopaedia of Cultivated Orchids* by Alex D. Hawkes lists a surprising proportion of *Paphiopedilum* species with the designation "H", meaning "warm or tropical conditions (65-70°F [18-21°C] or more)" as the ideal night temperature range (Hawkes, 1965): *Paph. appletonianum, Paph. argus, Paph. barbatum,*

Paphiopedilum sukhakulii 'Bold Statement', AM/AOS (82pts) exhibited by Hilo Orchid Farm in 2010 (photograph copyright Glenn Barfield)

Paph. bellatulum, Paph. callosum, Paph. chamberlainianum, Paph. ciliolare, Paph. curtisii, Paph. glaucophyllum, Paph. godefroyae, Paph. haynaldianum, Paph. hirsutissimum, Paph. hookerae, Paph. lawrenceanum, Paph. lowii, Paph. niveum, Paph. parishii, Paph. philippinense, Paph. rothschildianum, Paph. stonei and *Paph. tonsum,* among others. These species all originate from the lower, warmer elevations of the Far East. Those *Paphiopedilum* species designated "C" in Hawkes', "average night temperatures of 45-50°F [7-10°C] during the cool months", or "I" only (55-65°F, 13-18°C), were definitely in the minority: *Paph. charlesworthii, Paph. concolor, Paph.fairrieanum, Paph. insigne, Paph. spicerianum, Paph. venustum* and *Paph. villosum.* Many of these cooler-growing species from the higher altitudes of the Far East figure prominently in the background of today's complex *Paphiopedilum* hybrids.

Further evidence that many *Paphiopedilum* species do indeed tolerate warmer climates can be found in the A.O.S. AWARDS QUARTERLY. While the great majority of American Orchid Society awards go to paphiopedilums grown in California and its moderate climate, a significant number of awards — including the Certificate of Cultural Merit — have gone to *Paphiopedilum* species grown in such warmer regions of the United States as Florida, the Deep South and the Southwest. The impressive specimen of *Paphiopedilum callosum* pictured in FIGURE 13, which received a

CCM/AOS of 85 points, was grown in St. Petersburg, Florida, for example. Other *Paphiopedilum* species grown in warmer climates and awarded C.C.M.'s over the past ten years include: *Paph. acmodontum, Paph. haynaldianum, Paph. hirsutissimum, Paph. niveum, Paph. parishii, Paph. philippinense* and *Paph. sukhakulii.* It is interesting to note, also, that while *Paphiopedilum concolor is* classified in Hawkes' *Encyclopaedia of Cultivated Orchids* as a cooler-growing species, a number of A.O.S. flower awards have been given to cultivars grown in Florida and other southern regions. Sometimes, the only way to determine a species' tolerances under individual conditions is to give it a try!

Many have, and successfully. Mrs. William A. (Ruth) Gee, in an article entitled, "Growing Paphiopedilums in the Southwest" (April 1978 BULLETIN), relates her experiences in growing paphiopedilums in windows facing south and west, as well as under greenhouse conditions, in Houston, Texas. She finds paphiopedilums to be "a truly compatible orchid" under her conditions, stating, "I am fond of species and primary hybrids. Both types seem to have an earlier, more dependable blooming cycle in our area than the complicated modern hybrids. Gradually, however, we are being charmed by certain colorful hybrids and more are being added to the collection." (Gee, 1978, page 300) She reports success in her area with such primary hybrids as *Paphiopedilum* Rodney Wilcox Jones *(haynaldianum X glaucophyllum), a* multifloral; *Paphiopedilum* Prelude *(glaucophyllum* X *charlesworthii),* offering successive flowers on a spike; *Paphiopedilum* Harrisianum *(barbatum* X *villosum),* the first *Paphiopedilum* hybrid registered (1869); *Paphiopedilum* Maudiae and *Paphiopedilum* Vanda M. Pearman, while finding *Paphiopedilum bellatulum* and *Paph. niveum* "more difficult to maintain in good cultural condition with consistency." (Gee, 1978, page 301) It would seem that primary hybrids of the warmer-growing *Paphiopedilum* species retain a certain degree of heat tolerance.

Paphiopedilum hybridizers do the beginner a great service in providing hybrids which are frequently easier to grow and flower than their species ancestors. Larry Heuer points this out in his excellent article, "The Culture of the Brachypetalum Section of Paphiopedilum" in the instance *of Paphiopedilum* Vanda M. Pearman *(bellatulum* X *delenatii,* 1939), one of the most awarded of primary *Paphiopedilum* hybrids: *"Paphiopedilum* Vanda M. Pearman can and does produce a plant and flower much larger than those of either parent. I have had plants with a leaf spread in excess of 12 inches with flowers up to 4 inches across. This is exceptional when you consider the sizes of both *P. bellatulum* and *P. delenatii.* In addition, *P.* Vanda M. Pearman is much less exacting in its cultural requirements than either parent." (Heuer,

Paphiopedilum callosum 'Mary', CCM/AOS (85pts) Awarded in June of 1976 with 18 flowers 9.7cm (3.75 inches) across on 18 inflorescences.

1977, page 147) The multifloral *Paphiopedilum* species and primary hybrids are also a good example of this phenomenon. If the under lights grower is having difficulty flowering *Paphiopedilum philippinense* or *Paph. lowii,* he or she need not despair; *Paphiopedilum* Berenice *(lowii* X *philippinense)* (FIGURE 6) both grows and flowers readily under lights – as do many other primary hybrids of the more recalcitrant species.

Figure 14
Paphiopedilum Maudiae 'Shueng Yuet Chin', AM/AOS (80pts) (callosum x lawrenceanum) coloratum type

Awarded in 1991

Figure 15
Paphiopedilum Faire-Maud 'Red Dot', HCC/AOS (76pts.) (fairrieanum x Maudiae)
Awarded in 1980 and exhibited by Seacoast Orchids.

Those considering growing paphiopedilums in warmer climates should not miss Leora Hewlett's very helpful article, "Growing the Cypripedilinae in the South" (July 1972 BULLETIN). Here she points out, "The constant factors for paphiopedilums in their native habitats are: good humidity, good drainage, constant air movement, constant moisture for the root system, little day-night-length variation, tempered light and clean growing media. Temperature is the variable factor in the natural habitat.

Figure 16
Paphiopedilum Apropo 'Winifred', HCC/AOS (78pts) (Diversion x Brownly)
Exhibited in March 1980 by Ralph Zuranski and awarded with two flowers 12cm (4.75 inches) across on two inflorescences

Considering the constant climate factors, there would seem to be little difference between establishing a good healthy habitat for paphiopedilums in any greenhouse — east, west, north or south." She goes on to say, "A good drop from day to night temperatures, winter or summer, is the definitive temperature factor for all paphiopedilums. (This is true for all orchids.) So if the night temperature can be dropped approximately 20°F [11°C] from

day temperature, good growth and bloom will ensue." (Hewlett, 1972, pages 622, 623, 626) Based on her experiences in growing paphiopedilums under greenhouse conditions in South Carolina, Mrs. Hewlett classifies the following as warm growing, recommended for culture in the southern United States: *Paphiopedilum appletonianum, Paph. argus, Paph. bellatulum, Paph. charlesworthii, Paph. ciliolare, Paph. concolor, Paph. godefroyae, Paph. haynaldianum, Paph. lowii, Paph. niveum, Paph. parishii, Paph. philippinense, Paph.*

Figure 17
Paphiopedilum Peachie 'Madeira', AM/AOS (85pts.)
(Hellas x Betty Bracey)
Exhibited by Val & Jack Tonkin and awarded in March of 1979 with a flower 10.9cm (4.25 inches) across.

sukhakulii, Paph. tonsum and *Paph. venustum.* She also recommends *Paphiopedilum spicerianum* and *Paphiopedilum fairrieanum,* plants of which are grown in the cooler areas of the Hewlett's intermediate greenhouse. In their "cool house", where both evaporative cooling and air-conditioning are provided, *Paphiopedilum hirsutissimum, Paph. insigne, Paph. villosum* and complex *Paphiopedilum* hybrids find a more suitable home. INDOOR/OUTDOOR CULTURE OF PAPHIOPEDILUMS

Figure 18
Paphiopedilum Bournette 'Basque', HCC/AOS (77pts.)
(Bourneva x Milionette)
Exhibited by Fred A. Stewart, Inc. in March of 1980. The flower was 10.3cm (4 inches) across.

hybrids have to offer. In answering this question for yourself, you need to examine your growing conditions in terms of temperature, winter and summer.

Indoors in the wintertime, achieving night temperatures in the ideal range of 55-60°F (13-16°C) is no great difficulty, particularly

if you live in a cooler climate and grow on the windowsill or under lights in the basement. If you grow orchids indoors in a sub-tropical climate, for instance in Florida, along the U.S. Gulf coast or in southern California, this is a greater challenge. Windows often need to be opened wide to take advantage of outdoor night temperatures which may, only inconsistently, drop into this range in these areas. If this is the case for you, outdoor culture even during the winter months might be advised. With a "roof of light-diffusing Fiberglas overhead to protect against excessive sun and rain, the plants would be more likely to receive the night temperatures they need for good flowering, whether they are cool- or warm-growing. Were it not for those occasional frosty nights (which tourist and state agencies are loath to allude to!), outdoor growers in such sub-tropical regions could leave their paphs out every night of the year without a worry. As it is, on those nights when temperatures are forecast to fall below the low 40's F (6°C), bringing the plants inside is a wise precaution.

Summer temperatures for the hobbyist are generally the decisive factor in *Paphiopedilum* culture. Few climates, even those more moderate, are entirely spared periods when day temperatures are in the 90's F (32-37°C). During these times especially, temperatures indoors may vary little daily from the warm or steaming, much of the solar heat of the day being retained indoors into the night hours. Likewise, while air-conditioning can bring temperatures

Figure 19
Paphiopedilum Spotglen 'Doodlebug', HCC/AOS (75pts.)
(Sharnden x Geraldine)
Exhibited by the Rod McLellan Company in January of 1981. It carried a 9.8cm (3.75 inch) flower

down into the more comfortable 70's F (22-24°C) it cannot provide the variation between night and day temperatures found to be beneficial to paphs. Under such unvaryingly warm conditions, paphiopedilums, both the modern hybrids and mottled-leaf species, may show symptoms of decline in the form of leaf-tip die-back, abnormal elongation of the rhizome between growths and, ultimately, a loss of flowers in sheath (Batchelor, 1981b). Should it come as a surprise, then, to hear that many indoor growers

of paphiopedilums place their plants outdoors during the warmer times of the year?

As an avid *Paphiopedilum* grower Editor Richard Peterson for many years grew his diverse collection under lights in a basement here in Massachusetts. Yet as soon as outdoor temperatures permitted, in the late spring of each year he would place his plants outdoors in a sheltered patio, with only a layer of fiberglass overhead to diffuse the sunlight slightly and to keep out the rain. Here the paphs stayed until mid-September when temperatures all too soon fall back into the 30's F (0—4°C). By this time, however, the paphs would have been exposed to a month or so of night temperatures frequently in the 40's and 50's (5-15°C), and sheaths would have seemingly "popped up" out of every new, firm growth of the complex hybrids. These would soon initiate buds after the plants were brought back under lights for the winter.

If you are considering growing paphiopedilums, and have your collection indoors, why not move the plants outdoors, if at all possible, with some protection, for as long as temperatures are favorable? In cooler climates this may mean that the plants will be outdoors only three or four months, while in tropical and sub-tropical climates it could mean nearly year around. Whatever the duration, this is the easiest way for the beginner to make certain that the paphiopedilums receive the daily variation in temperature, the cooler night temperatures, necessary for good flowering (Raynor, 1975; Batchelor, 1982c). The only exception to this would be if you live in a hot and arid desert climate, where conditions would be preferable indoors.

On this basis, you should feel confident in attempting to grow many of the primary *Paphiopedilum* hybrids now available, as well as some of their parent species, with the possible exception of the cool-growing species mentioned earlier, or those generally thought to be difficult to flower, such as *Paphiopedilum rothschildianum* or *Paphiopedilum delenatii* (Peterson, 1979b, 1978). As for the complex, green-leaf *Paphiopedilum* hybrids, some of the countless, inexpensive seedlings on the market today are well worth the try even if you live in a sub-tropical climate (Grezaffi, 1982).

Watering and fertilizing, potting medium and other cultural conditions also influence a hobbyist's success with growing and flowering paphiopedilums. The next article in this series will consider these additional factors, as well as some of the problems beginners might encounter in attempting to grow this attractive and versatile genus of orchids. — *84 Sherman Street, Cambridge, Massachusetts 02140.*

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