

Slipper Orchids

The Slipper Orchid Alliance Journal



IN THIS ISSUE:

COVER - An Assortment of Cypripedium species

Original Cyp photos by Ron Burch and Tom Velardi - Photo Collage by Rod Knowles, SOA Photo Editor

CYPRIPEDIUM SPECIES - WONDERFUL AND UNUSUAL by Ronald M. Burch ... pg 2

New Officers and Directors ... pg 13 ~ Upcoming Events ... pg 13

21st WORLD ORCHID CONFERENCE IN JOHANNESBURG, SOUTH AFRICA

By Olaf Gruss ~ Translated by Judith Rapacz-Hasler ... pg 14

CYPRIPEDIUM SPECIES - WONDERFUL AND UNUSUAL

By Ronald M. Burch

Slipper orchids of the genus *Cypripedium* (*C.*) are found throughout the temperate northern hemisphere. Until the mid-19th century, all slipper orchids were included in *Cypripedium*, but *Paphiopedilum*, *Phragmipedium*, *Mexipedium* and *Selenipedium* were separated as distinct genera. The current genus *Cypripedium* is divided into 13 sections containing nearly 50 species. In this review, we will discuss each section, with emphasis on the most commonly grown species. The sequence of the sections is based on the usual taxonomic treatment that lists them in order of close relationships. The majority of species cultivated today are contained within section *Cypripedium*. Species within sections *Obtusipetala* and *Flabellinervia* are also commonly cultivated. The remaining sections contain species which have small flowers and so are not often grown, or which are extremely difficult to maintain in cultivation for more than a year or two. We use the classification of Li and colleagues (2011), based on DNA analysis of many taxa. This varies somewhat from the classification used by Cribb (1997) in his long-standard treatise on the genus.

Section *Irapeana*

The species in this section, *C. irapeanum*, *C. dickinsonianum* and *C. molle*, have the southernmost distribution of all Cyps. They are found in Mexico and Central America. These species are closely related, with showy, bright yellow flowers. None of these species has been successfully cultivated outside of its native habitat. While rumors of successful propagation in Europe come and go, no specimens have ever been photographically proven.

Section *Subtropica*

C. subtropicum was, for many years, known only from a herbarium specimen. When the species was rediscovered, it was found far away from the location noted in the herbarium specimen. It has been found in Xizang and Yunnan provinces in China, and in North Vietnam. Following disclosure of the locations, the populations were quickly stripped. The only other species in this section is *C. wardii*, a tiny plant with exquisite small white flowers with purple polka dots. This species was imported into Europe several times, but has not survived in cultivation more than a few years. Similar to *C. subtropicum*, *C. wardii* was lost in the wild until recently. *C. wardii* has apparently not been successfully propagated. We were able to obtain pods one time and were able to germinate seed, which developed

into protocorms and a few small plants. The plants did not develop past the first year.



Cypripedium wardii

Section *Obtusipetala*

This section contains *C. flavum*, *C. passerinum* and *C. reginae*. Of these, *C. reginae*, the Showy Lady's Slipper, is a robust plant that reaches heights of 36 inches with as many as 80–100 stems. Its root mass spreads up to three or four feet. *C. reginae* is perhaps the most easily cultivated Cyp, surviving in moist to rather dry medium, and tolerating as little as one hour of sun per day to as much as four or even six hours. In nature, *C. reginae* occurs in limestone-containing soil. We try to remember to add lime to their medium every fall as they go dormant, but we often forget and the plants do well. Several *C. reginae* colonies have been found with *album* flowers.

The other two species, *C. flavum* and *C. passerinum*, are also easily cultivated if one lives far enough north to avoid hot summer temperatures that will quickly kill them. Here in Connecticut, *C. passerinum* does not survive even one year. We can sometimes keep mature *C. flavum* alive for two to three years, but eventually they succumb to summer heat. One study reported that metabolism decreases once air temperature exceeds 68 °F, essentially stopping by 78 °F (Zhang *et al.*, 2005). *C. flavum* is easy to propagate from seed. We have produced thousands of seedlings in hopes of finding specimens that will tolerate our summers, in order to use them as breeding stock. We have had seedlings last as long as four years, but exceptionally hot summers have always eventually killed them.

*Cypripedium flavum**Cypripedium californicum**Cypripedium flavum* - spotted

Section Californica

C. californicum is the sole species in this section, found in coastal Oregon and northern California, in wet areas with carnivorous bog plants. Plants of this unusual species generally have many stems, each with many tiny flowers. A mature plant may have nearly 1000 flowers. This species is readily cultivated from seed and is quite hardy in cultivation in typical Cyp medium, but unlike most other species, *C. californicum* is not hardy in gardens in zone 5 or warmer.

Section Cypripedium

The majority of Cyp species are placed in this section, which is divided into two subsections: Cypripedium, with members in North America, Europe and Asia, and

Macrantha, which contains Asian species. Nearly all the species within subsection Cypripedium grow well in cultivation, whereas many species in subsection Macrantha are far more difficult outside their native geographic area, unless their special needs can be addressed. Interestingly, hybrids of a subsection Macrantha species with another section or with subsection Cypripedium species generally grow quite well in cultivation. Indeed, several such hybrids are the most commonly cultivated Cyps, since they grow well in a variety of conditions.

Subsection Cypripedium

The eleven species in this subsection are the most adaptable and widely cultivated Cyps. Only *C. reginae* in section Obtusipetala is as adaptable and hardy. Species from this subsection, when used as parents in crosses with species from subsection Macrantha, result in hybrids that resemble their Macrantha parents, but are as adaptable in cultivation as their subsection Cypripedium parent.

C. calceolus is the only European Cyp, its range extending all the way across Asia into Japan. It has been cultivated longer than any other Cyp, with cultivation records from as early as 1568. Unfortunately, the last wild plant in England was dug up from its fenced enclosure a few years ago. *C. calceolus* is quite common in the mountains of Austria and Switzerland. In cultivation, it is somewhat more fussy than its look-alike North American sister species, *C. parviflorum*, but we have found adding lime to its medium will make it reasonably happy here in the United States.

C. candidum is a tiny plant with tiny white flowers. It grows naturally in North American prairie settings along with *C. parviflorum* var. *parviflorum* and *C. parviflorum*

*Cypripedium calceolus**Cypripedium candidum**Cypripedium candidum* - green

var. *pubescens*. Most “*C. candidum*” in cultivation have some *C. parviflorum* genes. This is proven when a pod of *C. candidum* yields yellow-flowered offspring after four or five years of growth. This is not a disaster, as the hybrids are quite attractive and extremely adaptable. *C. candidum* occurs naturally in alkaline soil, but, unlike *C. reginae*, which appreciates liming each fall, *C. candidum* requires lime. We find that adding a bit of lime every month during the growing season, and more once the plants have become dormant in the fall, makes *C. candidum* happy. We have grown them for years. *C. candidum* very quickly grows into large clumps when happy.

C. cordigerum, from China, is a medium-height species, 12–15 inches, with exquisite tiny flowers with white pouch and green sepals and petals. *C. cordigerum* has only recently become well-established in cultivation, due to the efforts of Anthura in the Netherlands. We find that *C. cordigerum* does well in the garden under typical Cyp conditions.

*Cypripedium cordigerum*

C. fasciolatum has a small distribution in China. In spite of this, *C. fasciolatum*, which has large white flowers, does well in our Connecticut garden. Surprisingly, we find it very difficult to germinate seed from intraspecies crosses, yet *C. fasciolatum* makes a very good hybrid parent, either as pod or pollen. We have registered several hybrids with excellent flowers.

C. farreri flowers look like a miniature *C. fasciolatum*. It has rarely been available in cultivation. We obtained a few specimens from Holger Perner’s company, Hengduan Mountains Biotechnology in China. Thus far they are doing well for us, but we do not have long-term data.

C. henryi is a small plant with tiny flowers, hailing from a small area in central China. It is distinguished from other

*Cypripedium fasciolatum**Cypripedium farreri**Cypripedium henryi*

Cyps in that older plants sport three or even four flowers along each stem. In most clones the flowers are a muddy, dark green, but in one clone we obtained from Vermont Ladyslipper Company, the flowers are an iridescent yellowish green. In older Cyp literature, *C. henryi* was described as very easy to grow. We find it instead to be rather slow to grow in cultivation, and have lost many specimens. In speaking to European growers who have much longer experience, we hear that they also consider *C. henryi* not to be an easy species.

C. kentuckiense is the most elegant and, at the same time, spectacular Cyp because of its flowers. These are light cream-colored, larger than any other Cyp, and are held in such a manner that breezes make them nod up and down in a mesmerizing fashion. Plants commonly reach approximately 30 inches in height, so an older plant with many stems and flowers is a sight not readily forgotten. Some plants have white flowers; very few have green flowers. Older literature considers *C. kentuckiense* to be among the hardiest Cyps. Often the older literature is really referring to *C. parviflorum* var. *pubescens*. (*C. kentuckiense* was relatively recently separated, in 1984, from this species.) If one sees both species together, there is no mistaking the differences. In typical Cyp growing medium, *C. kentuckiense* is often lost after a few years. Speaking to people who have seen *C. kentuckiense* in situ, we consistently hear that the species grows in pure fine sand along riverbanks that overflow in early spring but are rather dry the remainder of the year, and which often receive several hours of light each day.

We attempted an experiment. In a 2 x 8 foot raised bed filled with five inches of fine silica sand (the off-white Kwikcrete

*Cypripedium kentuckiense*
Copyright Stig Dalstrom

play sand, *not* the white sand which can be alkaline), in a shade house with 70% shade cloth and sun all day (our *C. reginae* and *C. candidum* seedling house), we planted 50 second-year *C. kentuckiense* seedlings. Four years later, 48 of them bloomed. The two stragglers bloomed the next year. We watered this bed every day while the seedlings were small, but as the plants matured they were watered every two or three days. After all, they do get a lot of solar radiation. Now that we use sand beds, our *C. kentuckiense* grow very large and clump nicely.

C. montanum has tiny, exquisite, white-pouched flowers with green or dark brown sepals and petals. *C. montanum* usually grows above 3000 feet in the Rocky Mountains and disdains hot summer temperatures. In Connecticut, where we usually reach 100 °F at times in the summer, we



Cyripedium montanum



Cyripedium montanum - green
Copyright Ross Kouzes

lose *C. montanum* quickly. We have grown thousands of seedlings, trying to find heat-tolerant clones. We are making progress. Michael Weinert, of Frosch Exclusive Perennials in Germany, grew many *C. Sebastian* (*C. montanum* x *C. parviflorum*), trying to find heat-tolerant clones. He found one and cloned it, producing *C. Sebastian* 'Frosch's Mountain King.' As with *C. montanum*, we have had little long-term success with *C. Sebastian*, but the 12 plants of this clone that we kept have graced us with beautiful *C. montanum* look-alike flowers for the past three years. We have not lost any of the plants, and all the plants are now putting up multiple stems. Weinert has proven that one can find heat-tolerant clones if one is persistent.

C. parviflorum is widespread across most of temperate North America. Plants range from under 10 inches in height (*C. parviflorum* var. *makasin*) to 30 inches in height (some clones of *C. parviflorum* var. *parviflorum* and *C. parviflorum* var. *pubescens*). Various authorities recognize different varieties. Several varieties commonly appear in the horticultural literature. *C. parviflorum* var. *pubescens* tends to have large flowers with green sepals. These are often highly impressive large plants with many stems. Mature plants commonly have two flowers per stem. *C. parviflorum* var. *parviflorum* tends to have flowers with dark brown sepals and petals, but they may be lighter. Flower size is quite variable. Several cultivated clones here in Connecticut have flowers of approximately the same size as *C. parviflorum* var. *pubescens*. Other *C. parviflorum* var. *parviflorum* keep to the specific epithet and have very small flowers. Sheviak recognizes *C. parviflorum* var. *makasin* as distinct; it is a tiny plant with tiny flowers. It is distinguished in that the flowers have a very sweet fragrance at dawn into the early morning. Some sources have recognized a far northern variety, *C. parviflorum* var. *planipetalum*, but most consider this not to be a valid variety. When these plants are transplanted to more southern climates, their sepals and petals tend to change to the typical highly-twisted form of the other varieties.

C. parviflorum is extremely adaptable in cultivation. The species is not fussy about pH and can tolerate a large fraction of organic material in its growing medium (which we do not recommend!). Most *C. parviflorum* do not fare well under conditions of too much sunlight, although a variety occurs in sunny prairies in the Midwestern United States. We keep direct sunlight to two hours per day or less.

C. segawai is a small plant that occurs only in Taiwan, similar in habit to *C. cordigerum*, and like *C. cordigerum* has tiny flowers, but bright yellow in *C. segawai*. *C. segawai* has been rare in cultivation until recently. Anthura introduced large numbers of plants three years ago. We



Cypripedium parviflorum var. *makasin*
Copyright Scott Weber



Cypripedium parviflorum var. *parviflorum*



Cypripedium parviflorum var. *pubescens*

have had good success with this species, but most of our specimens are potted and have been refrigerated over the winter. We have heard reports from European growers that *C. segawai* is not hardy outside in cold climates. Anthura cultivates its plants in greenhouses. It will be interesting to see if over time *C. segawai* acclimates to growing outside in colder climates.

C. shanxiense is a small species that occurs in northern China, far eastern Russia and northern Japan. *C. shanxiense* has flowers similar to *C. parviflorum*, but rather than bright yellow, the pouches are a light reddish brown.

Subsection Macrantha

All of the species in subsection Macrantha occur in Asia, many on the northern slopes of the Himalayas in China, where they experience cold, dry winters. This is a major difference from North America and Europe, where winters experience periodic thaws and much moisture. Under these conditions the rhizomes of Macrantha species quickly rot. The key to successful cultivation is to keep moisture to a minimum during the winter, either by using porous medium in raised beds, or keeping the plants in pots in refrigerators, unheated garages, or other protected areas. It is important to keep the pots in plastic bags to assure the rhizomes do not become desiccated while in storage.

C. calcicola is sometimes offered for sale as *C. smithii*, a junior synonym. *C. calcicola* flowers have a striking dark brown to plum coloration. This species must be protected from too much moisture during winter.



Cypripedium calcicola

C. franchetii has beautiful purple flowers. It is offered for sale intermittently and can be kept for many years in pots, or with strict avoidance of moisture during winter.

*Cypripedium franchetii**Cypripedium franchetii**Cypripedium franchetii* (in a pot)

C. froschii was described as a species. Many authorities have suggested that it is really a hybrid of *C. tibeticum* with another species. Holger Perner, the original describer of the species, currently believes that *C. froschii* is a variant of *C. tibeticum*. We place it here as a species, since the Royal Horticultural Society has allowed *C. froschii* to be considered a species for purposes of naming hybrids. *C. froschii* is a more difficult species to cultivate over long periods, like other *C. tibeticum*. However, we have had somewhat better success with *C. froschii* than other *C. tibeticum*.

C. himalaicum, as its name suggests, lives in remote locations with cold, dry winters. To our knowledge, this species has never been in cultivation.

C. ludlowii is only known from herbarium specimens.

C. macranthos has an enormous distribution across Asia, including Japan, Siberia, and China. While *C. macranthos* flowers are often purple in color, there are many color varieties that occur in different geographic areas. There are several named varieties that are accepted by various authorities. We will discuss those that have been recognized by the Royal Horticultural Society when naming hybrids. *C. macranthos* var. *hotei-atsumorianum* occurs in Japan. The name translates roughly as "Buddha with a fat belly." This epithet always refers to plants with large flowers, more than 10 cm in horizontal dimension, with broad petals. *C. macranthos* var. *rebunense* occurs on Rebus Island and has flowers with delicate cream-yellow coloration. This variety is revered in Japan, and the Rebus Island population is protected by the military. *C. macranthos* var. *speciosum* is also only from Japan, and has smaller flowers than most other *C. macranthos* of a lighter pinkish coloration. *C. macranthos* var. *taiwanianum* occurs on Taiwan, and is a

*Cypripedium macranthos* f. *album*



Cypripedium macranthos var. *hotei-atsumorianum* - purple



Cypripedium yunnanense



Cypripedium macranthos var. *hotei-atsumorianum* - red

small plant with small flowers. *C. macranthos* f. *album* refers to album forms not from Rebutia.

C. tibeticum has large flowers that are most commonly purple, but can be dark brown. The species occurs in central China. Some *C. tibeticum* with dark flowers were referred to as *C. corrugatum* in the horticultural literature. *C. tibeticum* can be maintained for years in cultivation if strict attention is paid to winter moisture. We have had reasonable success in pots, but poor success in the garden, even in raised beds.

C. yunnanense is sometimes available for cultivation. It requires strict cold, dry winter storage conditions. We have found this species quite difficult to maintain over long periods of time.

Section Enantiopedilum

There is one North American species, *C. fasciculatum*, and one Asian species, *C. palangshanense*, in this section. Both have tiny flowers, and neither is often found in cultivation.



Cypripedium fasciculatum
Copyright Ross Kouzes

Section Arietinum

This section also contains one North American species, *C. arietinum*, and one Asian species, *C. plectrochilum*. These are small plants with tiny flowers. Neither is often found in cultivation, probably due to their small size and flowers, although we have successfully cultivated both species for many years.

*Cypripedium arietinum**Cypripedium japonicum*

Section Flabellinerva

The two species in this section are very similar Asian species, which for many years were considered two varieties of the same species. *C. formosanum* is often cultivated in Japan, and has been popular in Europe and the United States. This species can be troublesome in climates with mid-winter, wet thaws. When the temperatures rise, the plants may break dormancy, only to be killed when very cold winter temperatures return. In milder climates this is not so much of an issue, since the new stems do tolerate mild freezing. *C. japonicum* is often more problematic. However, several clones that are easy to maintain have entered cultivation. We have one such clone that entered the United States about 15 years ago. While we do not keep other Cypris in medium with organic material, we cultivate *C. formosanum* and *C.*



Cypripedium japonicum
Copyright Tom Velardi

japonicum in medium containing 50% well-rotted orchid bark or pine chip mulch.

*Cypripedium formosanum*

Section Acaulia

C. acaule, the Moccasin Flower, is the only species in this section. It has a very wide distribution in North America, being found in dry pine forests in New England, and wet, boggy areas into Georgia. Most clones are pink, but flower color extends into dark vinicolors. A number of *album* clones are found throughout the range, being uncommon in the South but more common in New England. An especially attractive clone, with crystalline white flowers, is found on Cape Cod. Given its large distribution in apparently diverse habitats, it would seem that *C. acaule* would be an ideal

plant for cultivation. Instead, *C. acaule* is very difficult in cultivation. It grows in highly acidic conditions, with groundwater pH of 4 or even lower. We find that if we flask seed, the protocorms and seedlings do well in typical Cyp medium (which tends to have low pH of 4.5–5), but that once planted out, the seedlings decline and are lost after a few years. Attempts have been made to cultivate seedlings in pine duff, watering with deionized water with two ounces of vinegar per gallon. Sometimes plants may be maintained to flowering age using this method. We have found that if we plant out seedlings around well-established white pines, they tend to do very well. We have exported seedlings to Germany, where they were planted around pines, and have heard that these also did very well. A “foolproof” method that we have used is to collect a mature pod in late September or October and spread seed around white pines. Two years later, dozens to hundreds of seedlings will be found in the

area. Some of the resulting plants have bloomed in their third year after sowing the seed.

Section Bifolia

The two species in this section are *C. guttatum*, which occurs in far northern areas of North America and across the Aleutian peninsula through Asia to near Europe, and *C. yatabeanum*, which occurs in Alaska, down the Aleutian peninsula, and into Japan. These species are easy to grow from seed but, for most would-be cultivators, the northern distribution of these species makes them difficult or impossible to maintain for long. Bill Steele at Spangle Creek Labs refuses to sell seedlings to anyone living south of USDA horticultural zone 4.

C. yatabeanum clones from Japan are far easier in cultivation in more “southern” climates. We have kept it for many years in New England (USDA zone 5), and we know of orchidists who have success in USDA zone 6.

Section Retinerva

Two tiny Asian species, *C. debile* and *C. elegans*, compose this section. The tiny flowers are recurved toward the ground, making them even more difficult to observe. Each can be maintained in cultivation if care is taken to assure their tiny root systems do not become desiccated. In North America, *C. debile* is popular with rock gardeners who maintain shady, moist sections in their gardens.



Cypripedium acaule



Cypripedium acaule f. *album*



Cypripedium debile
compared to the size of *Paphiopedilum malipoense*
Copyright Tom Velardi

Section Sinopedilum

The three species in this section, *C. bardolphianum*, *C. forrestii* and *C. micranthum*, are small plants with tiny flowers. *C. micranthum* is sometimes available in North America.

Section Trigonopedia

This section of six Asian species, *C. fargesii*, *C. lentiginosum*, *C. lichiangense*, *C. margaritaceum*, *C. sichuanense*, and *C. wumenense*, is quite unusual in habit compared to other Cyps. They have broad leaves with red spots that lie upon the ground, and small, spotted flowers. All of the species in this section are difficult to maintain in cultivation. Lore suggests that watering from below keeps the leaves from rotting.



Cyripedium lichiangense

CULTIVATION

Cyripediums' roots do not grow deeply into soil. The roots generally grow horizontally in the litter on the soil, extending perhaps an inch or two into the soil, in spite of a spread of one foot or more. North American species will tolerate a large amount of organic material in their medium, but we recommend that no organic medium be used. Over time it will compact and smother the root system. Instead, we use a mixture of expanded shale called stalite, which is porous but heavier than water, and expanded clay, turface, which is somewhat smaller than stalite and is also highly porous. Stalite is often available at garden centers as Soil Perfector®, whereas turface is typically called turface. Turface is often used to surface baseball fields. A thin layer of pine needles makes an excellent mulch that allows air movement.

Cyp root masses must never be allowed to become dry. Once the roots are desiccated the plant will quickly die. Equally important is never to allow standing water, which will cause rhizomes to quickly succumb to rot. In our seedling beds we have automatic watering systems that provide water for 10 minutes each day or so. Once plants are

well-established, routine watering is not necessary except in drought conditions. In our display garden, we generally water four or five times in a season, generally if there has not been rain for more than a week. A good rule of thumb to follow, for plants that have not been in place for five or more years, is to water if you have any doubt.

Cyps like fertilizer and respond well to it. Since we use inorganic medium, we use fertilizers that contain minor elements. We use liquid hydroponic fertilizers, as well as controlled release forms. We begin to fertilize in April and stop in August, since the plants will soon go dormant.

Some Cyps have special cultural needs, which were mentioned during the discussion of each species. With good care, individual plants can live many years. Several botanical gardens have Cyps that are near or more than a century in age. Cyp species rarely have to be divided, although reproduction by pulling apart the rhizomes into portions with three or more growth buds on each can promote growth. This is best done soon after plants have gone dormant in the fall.

REFERENCES

Cribb, P. *The Genus Cyripedium*. Botanical Magazine Monograph. Timber Press, 1997, 358 pp.

Li, J.H., Liu, Z.H., Salazar, G.A. et al. "Molecular phylogeny of *Cyripedium* (Orchidaceae: Cyripedioideae) inferred from multiple nuclear and chloroplast regions." *Mol. Phylogenet. Evol.* 61: 308-320, 2011.

Zhang, S.-B., Hu, H., Zhou, Z.-K. et al. "Photosynthetic performances of transplanted *Cyripedium flavum* plants". *Bot. Bull. Acad. Sin.* 46: 307-313, 2005.

ABOUT THE AUTHOR

Ron Burch has been growing orchids for 50 years. He specializes in *Cyripedium* with interest in *Phragmipedium* as well as other terrestrial orchids, in particular *Platanthera*. Gardens at Post Hill LLC was established in 2006 to promote cultivation of Cyps in the United States.

All photos by Ron Burch except where noted.

Ronald M Burch
Gardens at Post Hill LLC
433 West Morris Road
Morris, CT 06763
Email: ron@gardensatposthill.com
www.gardensatposthill.com