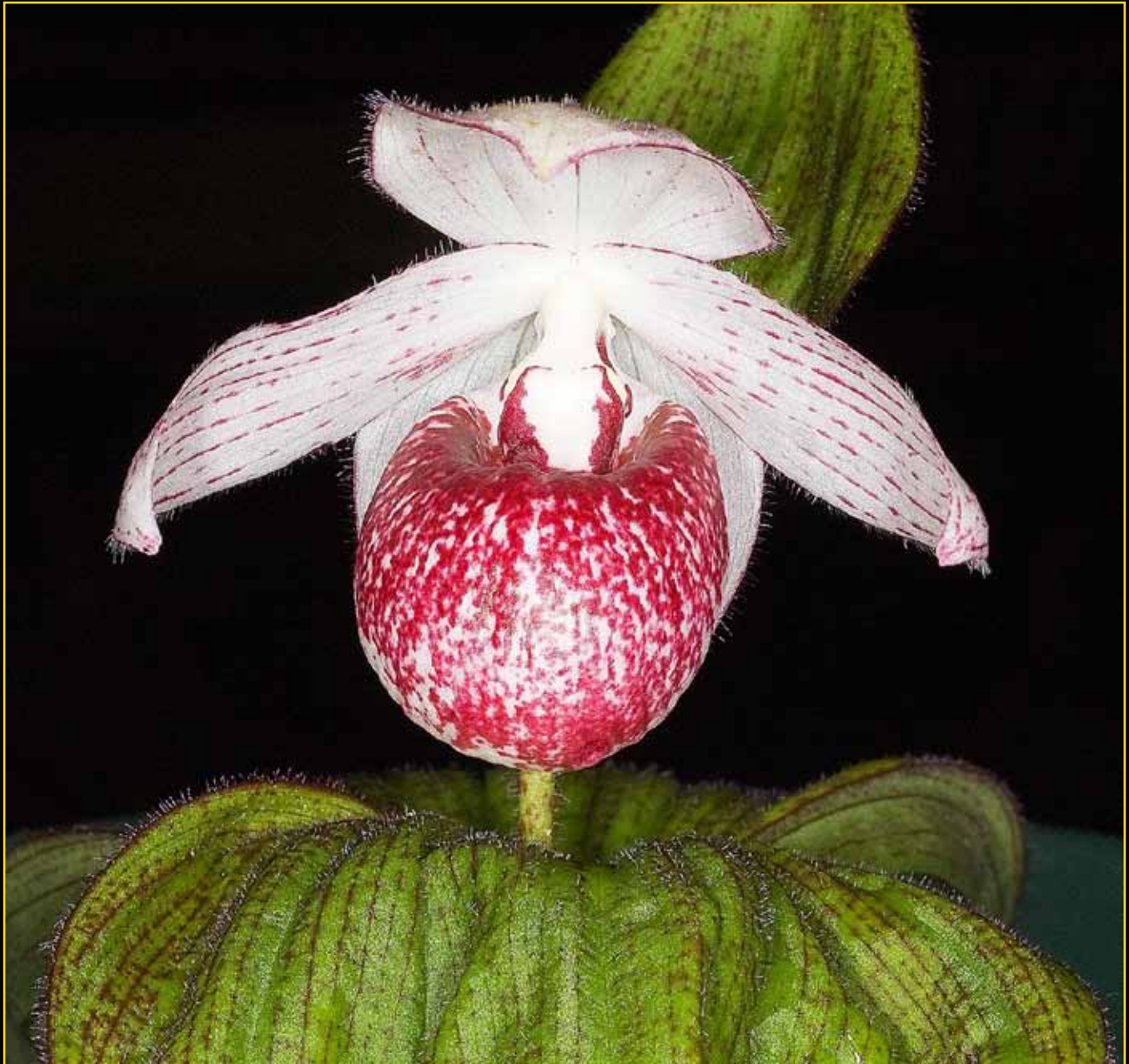


# Slipper Orchids

The Slipper Orchid Alliance Journal



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## CYPRIPEDIUM HYBRIDS - AMAZING COLORS

By Ronald M. Burch

*Cypripedium* is a genus of northern temperate terrestrial lady's slipper orchids that offer northern gardeners the opportunity to incorporate orchids with large, showy flowers into their gardens, and that all orchidists may enjoy in pots. *Cypripedium* (*C.*) is composed of nearly 50 species divided into 13 sections. In addition, for registration purposes, the RHS recognizes four named varieties of *C. parviflorum* and five varieties of *C. macranthos*. Of the 46 species in the genus, only about 20 are reasonably easy to obtain in Europe, and fewer in the United States. Some of these, when available, have proven difficult to maintain in cultivation.

Cypripediums have been reliably propagated from seed only since the mid-1980s when Werner Frosch reported his success in raising *Cypripedium reginae* from seed to bloom (Frosch, 1986). Since then, about 200 cypripedium hybrids have been registered with the RHS Orchid Registrar. During the early years, cypripedium hybridization was the province of a few masters, including Werner Frosch, Carson Whitlow and Svante Malmgren. Frosch has continued to be the most active cypripedium hybridizer to this day.

Cypripedium hybridization has been slow to progress, not only because the seed of some species still remains difficult to germinate, but because reliable methods for keeping many species alive in cultivation for extended periods of time have only recently become available, and for a few species are still elusive. Now, however, anyone can keep most cypripediums as readily as any other orchid genus, inside the home or greenhouse or outside in the garden.

This article updates our previous review in *Orchid Digest* (Burch, 2011). Given the rapid expansion in the number of cypripedium hybrids, it is important to review the progress that is being made and to discuss some of the goals going forward. Hybridization of cyps is exciting, since most species are able to be successfully crossed, especially if green pods are harvested to allow embryo rescue. Unlike many paphiopedilums, deformed flowers are only rarely observed when members of distant sections are crossed with one another. There does, however, seem to be poor fertility in some primary hybrids. This may be due to immaturity of plants, since we have found that several hybrids that seemed sterile for their first three or four years of flowering have, both as pollen parents and pod parents, produced many progeny in later seasons, resulting in many second and third generation hybrids in the past few years.

Since most cypripedium fanciers grow their plants in the garden, relatively few AOS awards have been received. Now that pot growing is becoming established, more plants should be presented for award judging.

### Hybrids by Section

For a review of the species of *Cypripedium*, see the previous issue of *Slipper Orchids* (Burch, 2014). To date no hybrids have been registered using species within Sections *Irapeana*, *Retinerva*, and *Sinopedilum*. This reflects the rarity in cultivation of species within these sections.

### Section Cypripedium

Section *Cypripedium* contains 19 species, many of which are widely cultivated. The section is further divided into two subsections: *Cypripedium* and *Macrantha*.

#### Subsection Cypripedium

Subsection *Cypripedium* contains 11 species: four occur in North America, six in Asia, and one in both Asia and Europe. All of the species have yellow or white pouches. Most are easy to keep in cultivation, with some specimens of *C. parviflorum* having been maintained in cultivation for 100 years or more.

#### Subsection Cypripedium Intrasubsectional Primary Hybrids

Members of subsection *Cypripedium* have been extensively hybridized among themselves, with 37 primary hybrids registered. *C. calceolus*, the only member of the genus that extends into Western Europe, has been extensively used in making hybrids with other members of the subsection. One natural hybrid occurs, *Xmicrosaccos* (*calceolus* x *shanxiense*, also registered as *C. Schoko*, Frosch 2011), and nine artificial hybrids have been registered. All of these hybrids have yellow pouches, often less brilliant yellow than *C. calceolus* itself. *C. calceolus* is somewhat more difficult to cultivate than its North American counterpart, *C. parviflorum*, but its hybrids tend to be quite hardy. Few of the intrasectional primary hybrids are an improvement over *C. calceolus* in appearance: examples are *C. Memoria Gerd Kohls* (*calceolus* x *henryi*, Lowland-Biotech 1995), *C. Carolin* (*calceolus* x *macranthos* var. *speciosum*, Frosch

1991), *C. Emil* (*calceolus* x *parviflorum* var. *parviflorum*, Frosch 1993) and *C. Erika* (*calceolus* x *candidum*, Frosch 2003). *C. Dietrich* (*calceolus* x *kentuckiense*, Frosch 2003) looks more like its *C. kentuckiense* parent, but with a brighter yellow pouch, closer to *C. calceolus*.

*C. candidum*, native to Midwestern North America, is an outstanding small plant. Its flowers have white pouches with sepals that range from green to dark brown and which may be short and nearly straight, or long and highly twisted. The plant rapidly forms large clumps. *C. candidum* usually imparts excellent hardiness to its hybrids. Within the subsection, one natural hybrid occurs, and seven artificial hybrids have been registered, among them *C. Mason's Birthday* (*candidum* x *kentuckiense*, Burch 2012). *C. Xandrewsii* (*candidum* x *parviflorum*) occurs in nature. Several natural backcrosses have also been formally recognized. (See discussion under *C.*



*Cypripedium Emil*  
(*calceolus* x *parviflorum* var. *parviflorum*)



*Cypripedium Memoria Gerd Kohls*  
(*calceolus* x *henryi*)



*Cypripedium Erika*  
(*calceolus* x *candidum*)



*Cypripedium Carolin*  
(*calceolus* x *macranthos* var. *speciosum*)



*Cypripedium Xandrewsii*  
(*candidum* x *parviflorum*)

*parviflorum*.) Because of its importance in hybridization among cyps, the artificial form of one natural hybrid, *C. Xandrewsii* nothovar. *favillianum* (*candidum* x *parviflorum* var. *pubescens*) was allowed to be registered as the artificial hybrid *C. Favillianum* (Whitlow 1994). *C. Favillianum* is a beautiful, extremely hardy hybrid that, when it opens, has a pastel yellow pouch that in most specimens becomes pure white after three or four days. We have found that *C. Favillianum* imparts tremendous vigor to later generation intrasectional and intersectional hybrids, including *C. GPH Barbara* (*Favillianum* x *fasciolatum*, Burch 2009) and *C. Carla* (*Favillianum* x *macranthos* var. *album*, Burch & Perakos 2009). We are using *C. Favillianum* extensively in attempts to make hardy garden cyps.

*C. cordigerum*, found in Asia, has delicate, lime green



*Cyripedium Favillianum* - yellow phase  
(*candidum* x *parviflorum* var. *pubescens*)



*Cyripedium GPH Barbara*  
(*Favillianum* x *fasciolatum*)



*Cyripedium Carla*  
(*Favillianum* x *macranthos* var. *album*)

coloration in its sepals and petals. Some specimens have some of the most beautiful flowers we have seen in cyps. The brightness of the white pouch is apparently sensitive to its environment, since it varies from year to year. *C. cordigerum* has recently become common in culture, so many hybrids will undoubtedly appear. Six primary intrasubsectional hybrids have been registered. *C. Hildegard* (*cordigerum* x *candidum*, Frosch 2005) introduces genes from the extremely hardy *C. candidum*. *C. Hildegard* is quite variable, but some specimens have flowers that bear remarkable resemblance to *C. cordigerum* and generate many compliments. *C. Ingrid* (*cordigerum* x *parviflorum*, Frosch 1990) has striking small flowers that may have white or cream-colored pouches. *C. Ivory* (*cordigerum* x *kentuckiense*, Koch 2008) has white flowers intermediate in size between the two parents. *C. GPH Petite Delight* (*cordigerum* x *segawai*, Burch 2014) is a small plant like its parents, with tiny yellow flowers.

*C. farreri*, another Asian species, is a small plant with attractive flowers that resemble small versions of the flowers of *C. fasciolatum*. *C. farreri* has not often been available, and as a result, only three intrasubsectional primary hybrids have been reported.

*C. fasciolatum* is a smaller Asian plant with very large flowers. It has only recently been rediscovered in the wild, but specimens that have entered cultivation have proven to be good garden subjects. Because of its large flower size, *C. fasciolatum* is being used extensively in hybridization efforts. To date, seven intrasubsectional primary hybrids have been registered; all have outstanding flowers. *C. Ursel* (*fasciolatum* x *henryi*, Frosch 2003) has very nice creamy yellow flowers. Because of their parents, *Gabriela* (*fasciolatum* x *kentuckiense*, Frosch 2003) and *Victoria*



*Cypripedium Hildegard*  
(*cordigerum* x *candidum*)



*Cypripedium Ingrid - white*  
(*cordigerum* x *parviflorum*)



*Cypripedium Victoria*  
(*fasciolatum* x *parviflorum* var. *pubescens*)

(*fasciolatum* x *parviflorum* var. *pubescens*, Corkhill 2005) have extremely large flowers. *C. Inge* (*fasciolatum* x *parviflorum* var. *parviflorum*, Frosch 2003) is the smaller flowered version of Victoria. *C. Jens* (*fasciolatum* x *shanxiense*, Frosch 2012) is another small-flowered hybrid. *C. Barry Phillips* (*fasciolatum* x *segawai*, RHS 2013) is a new favorite with very nice mid-sized flowers of uniform yellow.



*Cypripedium Inge*  
(*fasciolatum* x *parviflorum* var. *parviflorum*)



*Cypripedium Barry Phillips*  
(*fasciolatum* x *segawai*)

*C. henryi* is an Asian species with small green flowers and is one of a few cyps that have multiple flowers blooming up the stem. The species sometimes transmits this characteristic to its hybrids. Eight intrasubsectional primary hybrids have been registered. Of these, *C. Hank Small* (*henryi* x *parviflorum* var. *parviflorum*, Whitlow 1991), with flowers that are identical in appearance to *C. parviflorum* var. *parviflorum*, sometimes exhibits multiple flowers along a stem. *C. Kristi Lyn* (*henryi* x *parviflorum* var. *pubescens*,



*Cypripedium* Hank Small  
(*henryi* x *parviflorum* var. *parviflorum*)



*Cypripedium* Lothar Pinkepank  
(*kentuckiense* x *parviflorum* var. *pubescens*)



*Cypripedium* Kristi Lyn  
(*henryi* x *parviflorum* var. *pubescens*)



*Cypripedium* Rascal  
(*kentuckiense* x *parviflorum*)

Keisling 2003) is the larger-flowered version of Hank Small. *C. GPH Yellow Hank* (*henryi* x *segawai*, Burch 2014) also has small flowers, of a uniform yellow color.

*C. kentuckiense*, from the Southeastern United States, is a large plant, up to 30 inches in height. It has the largest flowers in the genus, and it always transmits large flower size to its hybrids. Eight intrasubsectional primary hybrids have been registered, among which *C. Lothar Pinkepank* (*kentuckiense* x *parviflorum* var. *pubescens*, Pinkepank 2005) has an elegant flower similar to *C. kentuckiense* with a slightly more intense yellow pouch. We find that *C. Lothar Pinkepank* clumps much more rapidly than its *C. kentuckiense* parent, commonly adding three to four new stems each year. *C. Gabriela* was described under *C. fasciolatum*. *C. Rascal* (*kentuckiense* x *parviflorum*,

Whitlow 1990) bears greater resemblance to *C. parviflorum* than to *C. kentuckiense*.

*C. montanum* is a small species with a tiny flower with white pouch and dark brown sepals. It occurs at high elevations in the Rocky Mountains and is difficult to maintain in the heat and humidity of the eastern United States. A natural hybrid with *C. parviflorum* var. *pubescens* is *Xcolumbianum*. Six artificial intrasubsectional primary hybrids have been registered. The flowers of *C. Sebastian* (*montanum* x *parviflorum*, Frosch 1998) look exactly like *C. montanum*, whereas *C. GPH Charles* (*montanum* x *candidum*, Burch 2009) is intermediate between the parents. Both *C. Sebastian* and *C. GPH Charles* retain much of the heat intolerance of *C. montanum*.



*Cypripedium* Sebastian  
(*montanum* x *parviflorum*)



*Cypripedium* GPH Charles  
(*montanum* x *candidum*)

Depending upon authority, several *C. parviflorum* varieties are recognized, occurring in various geographical areas of North America, with flowers ranging from tiny with brilliant yellow pouches and dark brown sepals to very large with bright yellow pouches and light green sepals. The RHS has recognized *C. parviflorum* var. *parviflorum*, *C. parviflorum* var. *pubescens*, *C. parviflorum* var. *makasin* and *C. parviflorum* var. *planipetalum* for registration. There are two natural intrasubsectional primary hybrids, *C. Xandrewsii* and *C. Xcolumbianum* (*parviflorum* var. *pubescens* x *montanum*). As mentioned under *C. candidum*, *C. Xandrewsii* is composed of any *parviflorum* variety with *candidum*: *Xandrewsii* nothovar. *andrewsii* is with *parviflorum* var. *makasin*; *Xandrewsii* nothovar. *favillianum* is with *parviflorum* var. *pubescens*. *C. Xandrewsii* nothovar. *landonii* is *parviflorum* var. *parviflorum* with *Xandrewsii* nothovar. *favillianum*.

*C. parviflorum* has been used extensively in hybridization and usually imparts excellent vigor to its hybrids. Fifteen intrasubsectional primary hybrids have been registered using *C. parviflorum* var. *parviflorum* or *C. parviflorum* var. *pubescens* as described under the descriptions of hybrids for the other parents.

The Asian species *C. segawai* and *C. shanxiense* have until recently been rarely seen in culture. Only one intrasubsectional primary hybrid of *segawai* has been registered. One natural hybrid of *C. shanxiense* has been reported. *C. Xmicrosaccos*, also registered as *C. Schoko* (Frosch 2011), and two artificial hybrids have been registered. *C. segawai* has outstanding brilliant yellow flowers. Now that it is becoming established in culture, many hybrids will appear within the next few years. Among the first in the new wave are *C. Barry Phillips*, *C. GPH Yellow Hank*, and *C. GPH Petite Delight*, mentioned previously.

## Subsection *Macrantha*

The eight species in subsection *Macrantha* all occur in Asia. All of the species have pouches in various shades of purple, magenta, red or pink; *album* forms also exist. Some specimens have quite spectacular flowers. Many of the species have flowers that are quite similar; some growers suspect that some species may be better considered local varieties. Here we include as species all of the forms recognized by RHS for registration.

### Subsection *Macrantha* Intrasubsectional Primary Hybrids

All *Macrantha* intrasubsectional hybrids strongly resemble one another, with pouches that tend to be white with purple venation. Particularly exceptional specimens have uniform, solid pouch coloration. Several species are rare in cultivation. There are no registered hybrids of *C. ludlowii*, which is considered by some authorities to be a species and by others a natural hybrid.

*C. calcicola*, *C. corrugatum* and *C. himilaicum* each have one natural intrasubsectional primary hybrid. *C. franchetti* has four intrasubsectional primary hybrids.

The status of *C. froschii* has been debated. It has been considered a natural hybrid (*tibeticum* x *yunnanense*) as well as a variety of *C. tibeticum*. Flower shape is distinctive and *C. froschii* has often been recognized as a species for registration. Two intrasubsectional primary hybrids have been registered.

*C. macranthos* is divided into *macranthos*, *macranthos*

var. *album*, *macranthos* var. *hotei-atsumorianum*, *macranthos* var. *rebutense*, *macranthos* var. *speciosum* and *macranthos* var. *taiwanianum* for registration purposes. Most of these have been used extensively in hybridization. Among intrasubsectional primary hybrids, four have been registered using *macranthos*: two with *macranthos* var. *hotei-atsumorianum* and two with var. *speciosum*. *C. Peter* (*macranthos* var. *speciosum* x *yunnanense*, Frosch 2009) has an attractive purple flower.

*C. tibeticum* has historically been divided into several varieties. For registration, however, only *C. tibeticum* has been used. There are four intrasubsectional primary hybrids, one occurring naturally.

*C. Peter*, mentioned earlier, is the only intrasubsectional primary hybrid of *C. yunnanense*.



*Cyripedium Peter*  
(*macranthos* var. *speciosum* x *yunnanense*)

## Section *Cyripedium* Intersubsectional Primary Hybrids

Many intersubsectional hybrids have been registered. *C. calceolus* has eight registered intersubsectional primary hybrids. *C. Xventricosum* (*calceolus* x *macranthos*) occurs in nature and is found in a wide variety of colors from solid purple, magenta and red, to solid yellow and many combinations of those colors. *C. Pixi* (*calceolus* x *tibeticum*, Corkhill 2003) has beautiful mahogany-colored flowers that have either a dark brown or yellow ring near the pouch opening. *C. Memoriam Shawna Austin* (*calceolus* x *macranthos* var. *hotei-atsumorianum*, Hach/Austin 2006) has flowers similar to *C. Pixi*, but on taller plants.

Only two intersubsectional primary hybrids of *C. candidum* have been registered. *C. Annette* (*candidum* x *macranthos*, Frosch 2002) has an almost equal number of cultivars



*Cyripedium Pixi* (*calceolus* x *tibeticum*)



*Cyripedium Xventricosum* - yellow  
(*calceolus* x *macranthos*)



*Cyripedium Xventricosum* - red  
(*calceolus* x *macranthos*)



with flowers nearly as tiny as those of *C. candidum* as cultivars with flowers closer to the size and habit of those of *C. macranthos*. The flowers are always of a nice purple coloration. One intersubsectional primary hybrid of *C. cordigerum*, three of *C. farreri* and two of *C. montanum* have been registered. There is also a natural hybrid of *C. farreri* with *C. tibeticum* – *C. Xwenqingiae*.

Ten intersubsectional primary hybrids of *C. fasciolatum* have been registered. Like its intrasubsectional primary hybrids, many have outstanding flowers. *C. Uta* (*fasciolatum* x *froschii* Frosch 2004), *C. Pluto* (*fasciolatum* x *franchetti*, Frosch 2005) and *C. Sabine* (*fasciolatum* x *macranthos*, Frosch 2002) have extremely large flowers and are available in light *albino*-like forms. *C. Sabine* ‘Monkey Bowls’ was awarded an AM/AOS in 2009. Frosch Exclusive Perennials markets several near-white forms under the trade name ‘Pastel’, including *C. Sabine Pastel*’.

Five intersubsectional primary hybrids of *C. henryi* have been registered and one natural hybrid, *C. Xludlowii* (*henryi* x *yunnanense*), has been reported. An outstanding hybrid is *C. GPH Anna Marie* (*henryi* x *flavum*, Burch 2009).

*C. kentuckiense* has been used extensively in intersubsectional hybridization. Ten primary hybrids have been registered. *C. Delphine* (*kentuckiense* x *franchetii*, Moors 2009) has large flowers. *C. Philipp* (*kentuckiense* x *macranthos*, Frosch 1996) has enormous flowers, sometimes larger even than its *kentuckiense* parent. Flowers occur in a variety of colors depending upon the color of the *C. macranthos* parent. *C. Francis* (*kentuckiense* x *macranthos* var. *speciosum*, Robinson 2001) is an analogous hybrid, but smaller flowered, like its *speciosum* parent. *C. Cleo Pinkepank* (*kentuckiense* x *C. macranthos* var. *hotei-atsumorianum*, Pinkepank 1998) is yet another analogous hybrid with the very-large-flowered *hotei-atsumorianum*.



*Cypripedium Uta*  
(*fasciolatum* x *froschii*)



*Cypripedium GPH Anna Marie*  
(*henryi* x *flavum*)



*Cypripedium Sabine*  
(*fasciolatum* x *macranthos*)



*Cypripedium Philipp*  
(*kentuckiense* x *macranthos*)



*Cyripedium* Francis  
(*kentuckiense* x *macranthos* var. *speciosum*)



*Cyripedium* Lucy Pinkepank  
(*kentuckiense* x *tibeticum*)

Despite this parent, I have never seen a *C. Cleo* Pinkepank with flowers as large as *C. Philipp*. *C. Lucy* Pinkepank (*kentuckiense* x *tibeticum*, Pinkepank 1998) also has extremely large flowers, sometimes bright red.

*C. parviflorum* has 23 registered intersubsectional primary hybrids. Many of these are outstanding. *C. Gisela* (*parviflorum* var. *parviflorum* x *macranthos*, Frosch 1992) is the most popular cyripedium hybrid to date, and has received a number of AOS awards. It grows well in a variety of conditions and clumps very rapidly. We have had plants increase from one blooming stem to more than 20 in three years. Flowers tend to have dark magenta sepals and whitish pouches with purple striations. Some specimens have nearly solid purple or red pouches, and in a few the *parviflorum* yellow is apparent. Analogous to *Gisela*, three hybrids of *C. parviflorum* var. *parviflorum* with *macranthos* varieties have been registered: *C. Maria* (Frosch 1991) was



*Cyripedium* Maria  
(*parviflorum* var. *parviflorum* x  
*macranthos* var. *speciosum*)



*Cyripedium* Gisela (purple and yellow)  
(*parviflorum* var. *parviflorum* x *macranthos*)



*Cyripedium* GPH Little Charlie  
(*parviflorum* var. *makasin* x  
*macranthos* var. *albiflorum*)

made with *macranthos* var. *speciosum*; *C. Johnny Petersen* (Hach/Malmgren 1999) was made with *macranthos* var. *rebunense*. The latest, *C. Anna* (Frosch 2012) was made with *macranthos* var. *hotei-atsumorianum*.

Two cultivars of *C. Aki* received HCC/AOS awards in 2010. *C. Aki* (Frosch 1996) is similar to *Gisela*, but with larger flowers on a larger plant due to its *parviflorum* var. *pubescens* parent. Very-light-colored flowers occur when *C. macranthos* var. *album* is used. The pastel versions of the *Gisela/Aki* pair are *C. GPH Little Charlie* (*parviflorum* var. *makasin* x *macranthos* var. *albiflorum*, Burch 2010) and *C. GPH Memoria Charles Frail Jr* (*parviflorum* var. *pubescens* x *macranthos* var. *album*, Burch & Perakos, 2009).

*C. Axel* (*parviflorum* x *tibeticum*, Malmgren/Petersen 1998) is a very small plant, eight inches in height with attractive small flowers from its *parviflorum* parent, rather than large *tibeticum* flowers. *C. Carol Ilene* (*parviflorum* var.



*Cypripedium* GPH Memoria Charles Frail Jr  
(*parviflorum* var. *pubescens* x *macranthos* var. *album*)



*Cypripedium* Anna  
(*parviflorum* var. *parviflorum* x  
*macranthos* var. *hotei-atsumorianum*)



*Cypripedium* Axel  
(*parviflorum* x *tibeticum*)



*Cypripedium* Aki  
(*parviflorum* var. *pubescens* x *macranthos*)



*Cypripedium* Carol Ilene  
(*parviflorum* var. *pubescens* x *macranthos*  
var. *hotei-atsumorianum*)

*pubescens* x *macranthos* var. *hotei-atsumorianum*, Keisling 2005) has flowers that resemble those of Axel, but are three times larger on a plant that is 14 to 16 inches tall.

*C. shanxiense* has two registered intersubsectional primary hybrids.

### Subsection Macrantha Intersubsectional Primary Hybrids

Fourteen intersubsectional primary hybrids of *C. macranthos* have been registered. In nearly all examples, the purple flower coloration of the *Macrantha* partner dominates over the yellow or white flower coloration of the *Cypripedium* partner. *C. Sabine* and *C. Uta*, described earlier, have particularly large, attractive flowers, as does *C. Achim* (*froschii* x *parviflorum* var. *pubescens*, Frosch 2003).



*Cypripedium Achim*  
(*froschii* x *parviflorum* var. *pubescens*)

### Section Obtusipetala

Section *Obtusipetala* contains three species. Two, *C. passerinum* and *C. reginae*, occur in North America and one, *C. flavum*, occurs in Asia.

#### Section Obtusipetala Intrasectional Primary Hybrids

Six intrasectional primary hybrids have been registered. *C. reginae* is one of the most attractive and common cyps occurring in the Eastern and Midwestern United States and Canada. Intrasectional primary hybrids with each of the other species have been registered. *C. Ulla Silkens* (*reginae* x *flavum*, Malmgren/Petersen 1996) is one of the most

popular cypripedium hybrids; most flowers bear a strong resemblance to their *reginae* parent, although some have attractive speckled patterns on their pouches. *C. Rheinsberg Sparrow Egg* (*reginae* x *passerinum*, Hach/Bergel 2007) is of interest, since unlike nearly all other *reginae* hybrids, whether intrasectional or intersectional, its flowers often resemble its *passerinum* parent.



*Cypripedium Ulla Silkens*  
(*reginae* x *flavum*)



*Cypripedium Rheinsberg Sparrow Egg*  
(*reginae* x *passerinum*)

#### Section Obtusipetala Intersectional Primary Hybrids

*Obtusipetala* species have been used extensively in making intersectional hybrids, with 25 having been registered. Four intersectional primary hybrids of *C. flavum* have been registered, all of them with species within subsection

*Cypripedium*. *C.* GPH Anna Marie (*flavum* x *henryi*, Burch 2009) is of interest, since all siblings have essentially identical flowers. The plant clumps rapidly, like *flavum*. Flowers open with a distinct *henryi* green coloration, which changes to a *flavum* pastel yellow over three days.

There are 18 intersectional primary hybrids with *C. reginae*. The most unusual is *C.* Princess, with *C. lichiangense*, a very distant relative from section *Trigonopedia*. As is observed with most *C. reginae* hybrids, most plants are large and the few that flower have flowers that look like *C. reginae*. However, some plants are small; ours is about eight inches in height, with flowers that resemble *C. reginae* in shape, but with many intense red spots. All plants in section *Trigonopedia* have unique leaves with red colored spots and blotches. The leaves of our *C.* Princess resemble *C. reginae* leaves, but with rows of tiny red spots.



*Cypripedium* GPH Anna Marie  
(*flavum* x *henryi*)



*Cypripedium* Princess  
(*reginae* x *lichiangense*)

## Section Flabellinervia

Section *Flabellinervia* is composed of two species, *C. formosanum* and *C. japonicum*, which are very closely related. The hybrid of the two species is *C.* Ge Pang (Pinkepank 2010).

## Section Flabellinervia Intersectional Hybrids

No intersectional hybrids of *C. japonicum* have been registered, whereas seven intersectional hybrids have been registered for *C. formosanum*. *C.* Lady Dorine (*formosanum* x *fasciolatum*, Opstaele 2008) is a hardy hybrid.

## Section Bifolia

Section *Bifolia* contains two far northern North American species. *C. guttatum* is not often seen in culture, since it does not tolerate climates warmer than zone 4 for long. *C. yatabeanum* also has a far northern distribution, but also extends southward along the Aleutian Island chain into northern Japan, so hardy specimens are available. The primary hybrid, *C. Xalaskanum* (*guttatum* x *yatabeanum*) occurs naturally. Both *C. guttatum* and *C. yatabeanum* have two intersectional primary hybrids.

## Section Acaulia

Section *Acaulia* contains only a single species, *C. acaule*, which has a very wide North American distribution from cold, dry pine forests in New England and Canada to wet,



*Cypripedium* GPH Low Percentage  
(*fasciolatum* x *acaule*)

acidic bogs in the Southeast. Because of the species' requirement for extremely acidic growth conditions, it rarely survives in culture for long. Three intersectional primary hybrids have been registered. Here we highlight one, *C. GPH Low Percentage* (*fasciolatum* x *acaule*, Burch 2014). We have crossed *C. acaule* with many other species and hybrids for the past eight years. While seedlings are produced, we slowly lose them over a few years. This is the first we have successfully flowered. Anthura has been distributing this hybrid into the commercial market.

### Section Californica

Section *Californica* contains a single species, *C. californicum*, which occurs along the California-Oregon border. Five intersectional hybrids of *C. californicum* have been registered.

### Section Trigonopedia

Section *Trigonopedia* contains six species. One intrasectional hybrid has been registered. Five intersectional primary hybrids have been registered. *C. Fantasy* was registered by Carson Whitlow as the hybrid of *margaritaceum* x *reginae* (1992). Later, it was realized that the *Trigonopedia* parent was misidentified, so Whitlow registered the actual cross as *C. Princess* (*lichiangense* x *reginae*, 1995). A very interesting, recently registered hybrid is *C. Neil Lancaster* (*lichiangense* x *fasciolatum*, RHS/Anthura 2013). Unlike *C. Princess*, which only rarely blooms, we have found that *C. Neil Lancaster* blooms well.



*Cypripedium* Neil Lancaster  
(*lichiangense* x *fasciolatum*)

### Section Arietinum

Section *Arietinum* contains two tiny species. *C. arietinum* occurs in North America, whereas *C. plectrochilum* occurs in Asia. A hybrid between the two species has not been reported. Only one intersectional primary hybrid has been registered.

### Section Subtropica

Section *Subtropica* contains two rare species, *C. subtropica* and *C. wardii*. *C. subtropica* is not in culture, and *C. wardii* is quite rare. A single hybrid of *C. wardii* has been registered. *C. Ayana* (Malmgren/Roegler 2012) is an intersectional hybrid with *C. flavum*.

### Second Generation and Later Hybrids

Breeding cyps toward specific goals is still in its infancy. During the past few years, secondary hybrids have become more prominent. About half of all hybrids registered were second generation hybrids. Hybridization programs have focused mostly on sections *Cypripedium* and *Obtusipedila*.

We have found that intersubsectional hybrids within section *Cypripedium* are often poorly fertile. We have attempted to use *C. Gisela* as pollen or pod parent in many crosses. Whereas a typical cypripedium pod produces hundreds to thousands of seedlings, we usually obtain only a few dozen seedlings from a *C. Gisela* cross, even when green pods are used. In spite of a poor yield of seedlings, a growing number of progeny are being registered. A particularly nice secondary hybrid is *C. Gisela* backcrossed to *macranthos*, *C. Spirit of Violet* (Vossler 2009).

*C. Gisela*, which has a rather small flower inherited from *parviflorum* var. *parviflorum*, when crossed with *C. candidum*, which has an even smaller flower, yielded *C. Geisha* (Burch & Perakos 2010). The plant resembles *C. candidum*, as does the tiny flower. However, the pouch becomes infused with purple from its *macranthos* ancestor to yield a very attractive compact plant with multiple attractive flowers. We have been breeding toward particularly garden-hardy cyps with intense red coloration. *C. Gisela* x *C. Maria* produced *C. GPH Crimson Promise* (Burch 2010) and *C. Gisela* x *C. franchetii* produced *C. GPH Crimson Challenger* (Burch 2012), both with red-colored flowers. *C. GPH Memoria Florence Frail* (*franchetti* x *Peter*, Burch 2013) has an intensely purple-colored flower.

*C. Xandrewsii* and *C. Favillianum* are highly fertile as



*Cypripedium* Spirit of Violet  
(Gisela x *macranthos*)



*Cypripedium* Geisha  
(Gisela x *candidum*)



*Cypripedium* Dieter  
(*Xandrewsii* x *candidum*)



*Cypripedium* GPH Crimson Promise  
(Gisela x Maria)



*Cypripedium* GPH Barbara's Smile  
(Lothar Pinkepank x Kristi Lyn)

pollen or pod parents. We have been using these hybrids to aid in clumping tendency and hardiness. *C. Xandrewsii* backcrossed to *C. candidum* yielded *C. Dieter* (Burch & Perakos 2010), which looks essentially identical to *C. Xandrewsii*. *C. Gisela* x *C. Xandrewsii* yielded *C. Sam Saulys* (Burch & Perakos 2009), and *C. Sabine* x *C. Xandrewsii* yielded *C. Donna* (Burch & Perakos 2012). We have used *C. Favillianum* to attempt to make a faster-clumping version of *C. fasciolatum*, and produced *C. GPH Barbara*, the flowers of which resemble a robust *C. Favillianum*. *C. Carla* (Burch & Perakos 2009) is *C. Favillianum* x *C. macranthos* var. *album*.

Because *C. Lothar Pinkepank* is such a fine, rapidly-clumping plant with outstanding flowers, we are using it as a parent in attempts to increase garden hardiness, clumping and flower size. To date we have registered *C. GPH Barbara's Smile* (Lothar Pinkepank x Kristi Lyn, Burch 2014) and *C. GPH Theresa* (Lothar Pinkepank x *macranthos* [var. *hotei-atsumorianum*]), Burch 2013).

*C. Aki* is the large-flowered var. *pubescens* version of *Gisela*. Like *Gisela*, we have found *Aki* to be a rather infertile parent. However, we achieved the attractive white-flowered *C. Marika* (Burch & Perakos 2009) from a cross of a light-colored *C. Aki* x *C. candidum*. Interestingly, we have attempted several crosses and have found that *C. Marika*, unlike its *C. Aki* parent, is a good pollen and pod parent. *C. Rena* (*kentuckiense* x *Marika*, Burch 2012) is *C. Marika*'s first registered offspring. In a further attempt to achieve large plants with excellent white flowers, we crossed *album* forms of *C. Sabine* x *C. Birgit* to achieve *C. Memoria Marika* Perakos (Burch 2014).

*C. Sabine* has a very large flower. *C. Sabine* x *macranthos* var. *album* produced *C. GPH Tom Velardi* (Burch 2010), with a pure white flower of the largest size (10 cm from sepal tip to sepal tip) we have observed in any *Cypripedium* species or hybrid, although on rather short stems, held within the leaves. We are attempting several crosses with the goal of maintaining flower size, but increasing the length of the flower stem. *C. GPH Yumi* (Burch 2013) is *C. Tom Velardi* backcrossed to *C. Sabine*, with an improved stem length.

What does the future of cyp hybridization hold? Certainly, continuing to improve garden hardiness is an important goal for many cyp fanciers. Ultimately we may achieve cyp hybrids that are nearly as hardy as other shade garden perennials. *C. Gisela* is an important step along the way. Color can be improved. Today there are outstanding colorful clones, but they are the minority. Another goal will be to select for plants with flowers that have consistently upright dorsal sepals. While many cyp flowers are large and showy, some of the new hybrids, such as *C. GPH Tom Velardi*, have larger flowers than occur in nature. Breeding for yet larger flowers will be an important activity.



*Cypripedium* GPH Yumi  
(Tom Velardi x Sabine)



*Cypripedium* Memoria Marika Perakos  
(Sabine x Birgit)



*Cypripedium* Marika  
(Aki x *candidum*)



*Cypripedium* GPH Tom Velardi  
(Sabine x *macranthos* var. *album*)



## Cultivation of *Cypripediums*

The availability of seed-grown plants and modern culture methods make the keeping of most cyps straightforward. In the past it was recommended that loam, shredded leaves and peat, among other organic materials, be used for cyps kept in outside beds and in pots. Cyps have typical orchid roots and do not tolerate such media for long. For long-term success, inorganic media are necessary. For pot culture a 50:50 mixture of coarse perlite and stalite (Espoma Soil Perfector®), an expanded shale, makes an excellent medium. Some growers find 100% coarse perlite is ideal. For outside beds, we use a 50:50 mixture of Soil Perfector and Turface, an expanded clay used for baseball fields. While perlite can be used, it is lighter than water so will eventually float away. Beds do not have to be deep since cyp roots grow horizontally in the medium, 1-2 cm below the surface. We make our beds six inches deep. Even small cyp species and hybrids are robust plants. A six-inch pot will be outgrown in two to three years unless the plant is divided. A typical small hybrid like *Gisela* must be planted in a 12 to 16 inch pot if the intent is to keep the plant in it for three years. Cyp roots can never be allowed to dry. In the summer we water pots daily. Established plants in beds need either rain or water weekly; water newly planted cyps every two to three days.

Cyps have to grow complete new sets of stems and leaves, flowers and seed pods within a few weeks every year. This means they are very heavy feeders. For potted plants, we include a complete fertilizer (with trace elements) with every watering. For Dyna-Gro Grow, we use 1 teaspoon per gallon. We find that we cannot over-fertilize; the more we add, the faster they grow. With higher fertilizer concentrations than that mentioned, the surface of the medium becomes covered with algae within a week or two. The plants do not seem to mind. They just continue to grow rapidly, but the algae becomes unsightly.

Beds are more easily maintained using time-release fertilizer. We use complete fertilizers with trace elements, such as some Miracle Grow and Vigoro fertilizers. Add amount indicated for flowering plants, a bit more for large plants. Hybrids that include *C. reginae* or *C. candidum* in their backgrounds should receive a handful of lime each fall.

In outside beds, most hybrids enjoy two hours of full sun in the morning and dappled shade the remainder of the day. In pots, 70% shade is ideal. Our shade houses are covered in 70% shade cloth. Plants younger than four years old do better with greater shade.

Once plants become dormant in late fall, we cover beds with an inch or two of leaves to assure adequate moistness without worrying about watering during dormancy – the medium cannot be allowed to become dry. Plants need four months of freezing temperatures over the winter to grow the next year. Pots can be placed in an unheated greenhouse or garage. To assure that plants do not become desiccated over the winter, we water the pots heavily, then, four hours later, double-bag each pot and place into storage. This way, we can ignore them all winter. Pots should be removed from bags in mid-April. Light freezes will not harm the newly growing plants after that date. We protect young seedlings (three seasons out of flask or less) by taking them out in late May (our USDA last freeze date is May 22).

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Ron Burch has been growing orchids for 50 years. He specializes in *Cypripedium*, 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.

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All photos are by Ron Burch.

## North American Orchid Conservation Center

As explained on the NAOCC website, "North America is home to over 200 orchid species, and more than half are endangered or threatened somewhere in their native range. The North American Orchid Conservation Center (NAOCC) was established by the Smithsonian Institution and the United States Botanic Garden to assure the survival of all native orchids in the U.S. and Canada. NAOCC activities will focus on establishing collections of seeds and orchid mycorrhizal fungi, developing protocols to propagate and restore all native orchid species and developing an