

# ARNOLDIA



*the magazine of the arnold arboretum*

July/Aug.  
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*On the cover* A clump of *Bletilla striata* growing outdoors against the foundation of a house. Photograph by R. Weaver.

## Exotic Orchids in the Garden

by RICHARD E. WEAVER, JR.

“Exotic orchid” would to many people immediately evoke the image of a sumptuous lavender *Cattleya* or a multflowered spray of brightly colored cymbidiums. But a great number of the more than 20,000 species of exotic orchids are much more modest than these in their coloring and proportions. In fact many cultivated greenhouse species have flowers which are best appreciated with the aid of a magnifying glass. And, while the great majority of orchid species require cultivation in a home or a greenhouse in our climate, an appreciable number are closely related to our own native bog and woodland species, and many of these are hardy out of doors.

Growing orchids in the garden is to me one of the most rewarding of horticultural endeavors. While the number of hardy species is only a small percentage of the total number of known orchids, their diversity in form and size of plant and flower is still considerable. Most are plainly and simply beautiful. Some are of difficult culture, and every good gardener loves a challenge. Others are rare in cultivation and have not been tested for cold hardiness. All of these factors have contributed to the considerable mystique surrounding these plants.

Anyone who has read Paul Keisling's (1981) recent article, on the cultivation of hardy orchids would be amazed at the variety of orchids he grows in eastern Massachusetts. His is a specialty garden, how-

ever, and many of his plants require conditions that few gardeners would be able or willing to duplicate. The species reported on in this article, on the other hand, can be successfully cultivated by anyone with only a little more patience and effort than necessary for growing *Trillium grandiflorum*.

The purpose of this article is twofold: both to report on the successful cultivation of several species which generally have been presumed to be tender, and to stimulate interest in growing these truly exciting plants. Unfortunately very few of the species are readily available from commercial sources in this country so it is necessary to import them from abroad. Although importation requires obtaining a permit, this is a simple procedure, and I provide foreign nursery sources in the appendix to this article. Importation of all orchids is regulated by international agreement, but none of the species included here is rare or endangered in the wild, and the nurseries listed are prepared to provide certification to this effect.

There are a number of precautions to be taken with newly imported orchid plants. First, I have been careful to recommend nurseries that are completely reliable; their plants will be well packed and they should arrive in excellent condition. However, orchids are extremely susceptible to fungal infection and rot. The plants should be carefully unpacked and immediately submerged in a solution of a commercial fungicide for several hours (follow recommendations on the package). Next the plants should be carefully washed in lukewarm water and planted in the garden as soon as possible. Orchid roots are generally delicate and brittle so extreme care should be taken throughout this procedure to avoid damaging them. It is best for the plants to arrive in the late autumn when they are completely dormant; if they are shipped in the spring, they will often break dormancy in transit, and this new growth is particularly susceptible to rot. Plants which arrive in the fall should be overwintered in a coldframe or planted directly in the garden with a heavy mulch. Never try to overwinter them in pots kept indoors. These precautions are not complicated or time consuming, and the results will certainly be worth the effort.

One further word of caution. Seed germination requirements for hardy orchids are still, for the most part, poorly known. Therefore, plants offered for sale have been vegetatively propagated, or more likely collected from the wild. Since most of them increase slowly even in the wild, overcollecting has greatly reduced natural populations of several species. Even though none of the species described here is threatened in the wild, the cultivation of any hardy orchid should only be attempted by the serious and responsible gardener.

## **Bletilla**

*Bletilla striata* (Thunberg) Reichenbach *f.* (often incorrectly called *B. hyacinthina*) is a rather familiar plant to the American gardening public. In fact, it is sold as the “hardy Chinese orchid” by



*Left: Closeup of a flower of Bletilla striata, showing its Cattleya-like form and the frilled ridges on the upper surface of its lip. Below: Part of the clump of Bletilla striata growing against the foundation of the southeast side of my house. Photographs by R. Weaver.*



most of the major domestic dealers in daffodils, tulips, gladioli, and other bulbs, mostly from stock grown in and imported from Holland. And unlike many of the other species described later, it is immediately recognizable as an orchid even by the non-gardener since its flowers are entirely reminiscent of the familiar lavender corsage cattleyas in miniature. It is probably the only hardy orchid vigorous enough to be planted in an herbaceous border, although I have not yet quite dared to try it there.

The genus *Bletilla* includes a few rather similar species distributed widely in eastern Asia. *Bletilla striata* itself has long been cultivated in China as an ornamental, but more important, its tuberlike pseudobulbs are used medicinally in that country, and these, when crushed into a paste, are valuable in the manufacture of porcelain. It was introduced into cultivation in Britain in 1803. As is the case with many plants which have been long cultivated, its natural range is difficult to determine. But *Bletilla striata* still occurs as a wild plant in parts of Japan and China.

The following description is made from plants in my garden. The shoots, which are of annual duration, arise from colorless, tuberlike pseudobulbs usually several inches below the surface of the soil. The canelike stems are from ten to fifteen inches tall, each bearing four to five leaves. The foliage is bold but refined, and remains in good condition for the duration of the growing season. The spreading leaves are prominently ribbed and average eighteen inches long by two-and-a-half inches broad, but may reach to two feet long. The leaf tapers to a long, slender point, and the base forms a sheath around the stem. The inflorescence apparently arises from the apex of the stem and bears five to ten flowers which open in succession from the end of May to the end of June. The flowers are from one-and-a-half to two inches across and uniformly lavender or "orchid" colored, except for the forward half of the lip which is deep purple. The lower, inner surface of the lip is further ornamented with five white, frilled ridges.

Several forms of the species are in cultivation, the best known being the one with pure white flowers (*Bletilla striata* forma *gebina* (Lindley) Ohwi, or as it is usually but incorrectly known, *B. striata* 'Alba'). Although I have never seen a fresh flower, this must be a most beautiful plant. It has a reputation for being less vigorous than the typical plant, and my experience bears this out. Recently Bowden (1980) named three clones ('Anne Axworthy', 'Mrs. Janet Fielding', and 'Mrs. Ruth Verity') of the normal colored form in a rather exhaustive article on the cultivation of the species. No descriptions were provided, although vague mention was made of differences in leaf width and "subtle" differences in the width and color of the floral segments. Basically these clones have proved to be good garden plants, and they were named to differentiate them from recently imported stock which may not be so reliable.

Gardeners vary greatly in their experience with *Bletilla striata*, and a number of my colleagues insist that it is not reliably hardy in the

Boston area. There is undoubtedly considerable variation in hardiness in the stock offered for sale, but Bowden, cited above, has grown all of his named clones, unprotected, in his Simcoe, Ontario garden. I have grown my plants outdoors since 1975 and they were more vigorous than ever after this past winter, the worst in recent memory. Admittedly, they are growing against the foundation on the southeast side of a house — a rather protected location.

I suspect that failure with this plant is due largely to the inferior condition of readily available stock rather than to lack of hardiness. Most imported material is dessicated to some degree by the time it reaches its destination, and dessication of the pseudobulbs is deleterious. In addition, plants obtained in the spring have often begun growth, and this new growth is highly susceptible to fungal rot. All imported material should be soaked for several hours in a fungicide solution as described in the introduction. A better alternative would be to obtain domestically grown plants, and the few sources of these are listed in the appendix to this article.

My clump has done so well that I have been reluctant to disturb it, even though I am anxious to try the plant in an open garden. For the first several years after it became established the number of shoots doubled annually. The increase has been slower the last two years, and although there was nearly fifty flowering shoots this season, the clump would probably profit from division. The soil is unexceptional, being light and rather sterile, and the site receives the shade of a pear tree for most of the day. For the first several years the plants were mulched heavily with pine needles, but more recently a year-round, one to two inch cover of the same material has been used. I suspect this plant would succeed in most garden situations, except if the soil were constantly wet. I have found it to be one of the most satisfactory plants I grow — beautiful, whether in bloom or not, and completely maintenance free except for a biennial (more or less) application of manure water during active growth and an annual replenishment of the mulch.

## Calanthe

The genus *Calanthe* includes perhaps 200 species widely distributed throughout eastern and southern Asia into India, the Himalayas, and Australia. Curiously, a single species is also native to the American tropics. The great majority are tropical or subtropical, and various species and hybrids have long been popular subjects for greenhouse cultivation. In fact the first of the increasing number of artificial orchid hybrids was the Englishman Dominy's cross of *C. masuca* Lindley and *C. furcata* Bateman in 1854.

Calanthes are robust plants with plicate leaves two feet long or more. They are divided into two general groups, deciduous and evergreen, the former of which is more commonly encountered. The deciduous species, represented by *Calanthe vestita* Lindley and its hy-



The general habit of the hardy calanthes, illustrated here by *Calanthe tricarinata*. Photograph by R. Weaver.

brids, have well developed, conspicuous pseudobulbs; the flowering shoot arises separately from the base of the pseudobulb as the leaves begin to wither. The evergreen species, represented by *C. masuca*, have small pseudobulbs which are mostly obscured by the bases of the leaves; the flowering shoot arises from the apex of the pseudobulb, from the fascicle of developing or mature leaves. All of the hardy species belong to the second group.

The name "*Calanthe*" is derived from Greek words meaning "beautiful flower," and the species generally live up to their name. The flowers are variable in size, but seldom more than two inches broad. Generally, the sepals and petals are similar in shape, size and coloration, but sometimes the petals are somewhat narrower. The prominent lip is frequently of a contrasting color, three-lobed, and usually prolonged behind into a spur.

Six or seven species of *Calanthe* are native to the temperate areas of Japan, and several of these also occur in China and Korea. These species were the subject of a short note by Jisaburo Ohwi (the author of the wonderful modern study, *The Flora of Japan* [1965]) which appeared in Bailey (1954). In spite of Ohwi's suggestion that several of these should be hardy in the United States, they are very rarely cultivated out of doors.

In the fall of 1977 Dr. Stephen Spongberg and I travelled to Japan on a seed-collecting expedition for the Arnold Arboretum. On one of our first days in the field we explored the forests near Sapporo, in the

south of Hokkaido, the northernmost of Japan's major islands. This area, which is the meeting grounds for northern and southern elements in the Japanese flora, supports more species of trees than any other place in all of the North Temperature Zone in Japan. The forests are a plant hunter's dream. Trees include the castor aralia (*Kalopanax septemlobus*), katsura tree (*Cercidiphyllum japonicum*), magnolias (*Magnolia hypoleuca* and *M. kobus*), an elm (*Ulmus laciniata*), a hornbeam (*Carpinus japonica*), and various maples (*Acer* spp.). From a first glance at the herbaceous cover we might have been in the Great Smoky Mountains of our own country with the numerous ferns, *Trillium*, jack-in-the-pulpit (*Arisaema*), solomon's-seal (*Polygonatum*), lily-of-the-valley (*Convallaria*), mandarin (*Disporum*), wild ginger (*Asarum*), etc. But on closer inspection we found several plants completely unrepresented in the American flora: *Paris*, an odd relative of *Trillium*; the blue Japanese "poppy" (*Glaucidium palmatum*), and several terrestrial orchids with broad, plicate leaves. I collected one of the orchids and brought it home. When it flowered the following spring, it turned out, to my delight, to be the most beautiful of Japan's hardy calanthes, *Calanthe tricarinata*.

*Calanthe tricarinata* Lindley has an extensive and disjunct distribution from the Himalayas of Kashmir, Nepal and Sikkim, the western Chinese province of Yunnan, and again in Japan where it occurs virtually throughout the Archipelago. The Japanese plants have been considered to represent a separate species, *C. torifera* Schlechter by several authorities, primarily on the evergreen character of their leaves. The differences are very slight and the species are considered synonymous here.

The species was introduced into cultivation from Japan in 1897 by the important English firm of J. Veitch and Son. It has never been common in cultivation, and it was (and probably still is) cultivated primarily as a greenhouse plant. It is the parent, with *Calanthe masuca*, of at least one artificial hybrid, *C. × harryana*. *Calanthe tricarinata* is a very beautiful plant, certainly one of the finest orchids which can be cultivated outdoors in our climate.

It is also among the hardiest of calanthes. I saw it cultivated near Asahikawa, in the center of Hokkaido, where the temperatures have fallen to  $-40^{\circ}\text{F}$  ( $-40^{\circ}\text{C}$ ), although the cold is somewhat tempered there by a deep and reliable snow cover.

The two to four conspicuously ribbed (plicate) leaves are bold and attractive, attaining a length of ten inches or more. Unfortunately they are not reliably evergreen here; by winter's end they are limp and tattered. In the wild the seven to fifteen flowers are borne on a scape which can be nearly twenty inches tall. My plant, in its third season in cultivation, produced ten flowers on a scape about fifteen inches tall. But even a single flower would be enough to make the plant worth growing. The flowers themselves are beautifully formed and colored. They are about an inch-and-a-half broad. The sepals and upper petals are nearly alike in shape and color, widely spreading, and colored a



*The delicate, almost spidery flowers of Calanthe discolor var bicolor f sieboldii. Photograph by R Weaver*

soft yellow-green. The sharply contrasting deep red lip is broad and somewhat scoop-shaped with three longitudinal scalloped ridges (*tricarinata* means with three ridges or keels) on its upper surface. The spur is barely visible.

The flowers are produced with the new leaves in early to mid-May in my garden, about the same time that *Trillium grandiflorum* blooms. It has been vigorous in cultivation, although it has not increased after three seasons. I grow it in gravelly loam to which I have added a bit of peat moss. The site is on a gentle slope, insuring good drainage, shaded from the direct sun most of the day by the back of my garage. I feel that good drainage, especially during the winter, is one of the most important considerations for growing orchids outdoors (as well as indoors for that matter), as long as supplemental moisture can be supplied during periods of dry weather.

*Calanthe discolor* Lindley, the most easily available of the remaining hardy species, is a variable and widespread plant native to all four of the major Japanese islands as well as Korea and possibly also China. The two to three prominently plicate leaves, as much as ten inches long and three inches broad, are semi-evergreen as in the previous species. In the wild, the ten or so flowers are borne on a stalk which may reach twenty inches tall. Individually they are about an inch across with narrow greenish to purplish brown segments except for the prominent white to rose-colored lip.

Several natural color variations are perhaps more attractive than

variety *discolor*, the plant described above. Variety *bicolor* (Lindley) Makino (also known as *C. striata* R. Browne) has larger flowers with cinnamon-brown segments, while its forma *sieboldii* (Decaisne) Ohwi has uniformly clear yellow flowers. All of these intergrade in nature, producing an array of hybrids with pinkish, brownish, golden, and reportedly even red flowers. All bloom in the spring with the new growth.

I have not been as successful with this species as with *Calanthe tricarinata*. I have had a plant of (supposedly) variety *discolor* outside for five winters. It appears perfectly hardy and it has increased but never flowered. It is planted close by the plant of *C. tricarinata* described above, which should suit it since the two species grow in similar habitats in the wild.

Keisling (1981) reported success in growing *Calanthe discolor* var. *discolor*, *C. discolor* var. *bicolor*, and *C. discolor* var. *bicolor* f. *sieboldii*, as well as with *C. japonica* Blume. The last of these needs verification since the species is subtropical and is probably tender. However, at least two other Japanese calanthes should be hardy in New England. I have only recently acquired these, so their hardiness cannot be verified at this time, but short descriptions follow.

*Calanthe reflexa* Maximowicz would be a valuable addition to our garden flora if it indeed proves hardy and amenable to cultivation since it is one of the few showy orchid species which blooms in the late summer or early fall. The plant is similar in size and aspect to those species described previously, but the flowers are slightly smaller and more delicate. The segments are pale purple in color with the lip slightly darker. The specific name "*reflexa*" refers to the fact that the sepals are curved backward or reflexed and held together behind the lip; the very narrow lateral petals are more spreading.

The species is distributed through the southern three of the main Japanese islands as well as on the island of Cheju (Quelpaert) off the southern tip of the Korean Peninsula and in western China. Those plants from northern Honshu in Japan would probably be the best for cultivation in the northeastern United States.

*Calanthe nipponica* Makino is one of the rarer of the Japanese species. Since it is restricted to Hokkaido and central and northern Honshu, it should also be among the hardiest species in the genus. It is rather more delicate in appearance than the other calanthes discussed here. The leaves are relatively narrow, seldom more than an inch-and-a-half broad. The inflorescence may be nearly two feet tall, and the five to twelve flowers are widely spaced. The flowers are yellow, except for red markings on the lip, with narrow segments giving them a somewhat spidery appearance. They appear in the spring with the new growth.

All of the *Calanthe* species described above should respond well if cultivated in a semi-shaded position with well drained but never dry soil. Paschall, in Britain, recommends (1972) the addition of bone meal before active growth has begun. None of the species should be



*The inflorescence of Cremastra variabilis. Like many orchids, the flowers of this species do not open completely. Photograph by R. Weaver.*

crowded in the garden since all produce numerous, fleshy, brittle roots which may become six or more inches long. These should be allowed to spread unhampered. In the climate of Boston at least *C. discolor* and *C. tricarinata* appear to be hardy without protection, although in more severe climates a mulch of pine needles would probably be advantageous.

## **Cremastra**

Plants of the genus *Cremastra* are among the least well known of the hardy Asiatic orchids, even though most of the five or so species have relatively large showy flowers. The genus is restricted in its distribution to temperate and subtropical Asia, from Sakhalin to the Himalayas, but it has a relative in our native flora. One of the species is commonly classified in *Aplectrum*, whose sole member otherwise is the American *A. hyemale*, the puttyroot or Adam-and-Eve orchid.

I have successfully grown *Cremastra variabilis* (Blume) Nakai for several years. This native of rich forests in Japan and Korea resembles the puttyroot in a number of characteristics: it grows from a colorless, fleshy, corm-like pseudobulb; the solitary plicate leaf is wintergreen and it disappears just before the flowers open to reappear in midsummer; it is a sporadic bloomer, only a few plants in a colony producing flowers in a given season. But the differences between *Cremastra variabilis* and *Aplectrum hyemale* are much more significant hor-

ticulturally than their similarities. The leaf of the *Cremastra* may be as long as fifteen inches, at least twice as long as that of the puttyroot. And the flowers are much finer. Appearing in early June, they are an inch to an inch-and-a-half long, with ten to twenty borne on a stalk about ten inches tall. The slender sepals and lateral petals are similar in shape, size, and coloration, and they spread only slightly. They are pale pink, dusted with fine purple dots near their tips. The lip is whitish, suffused with yellow.

Most of my plants were collected near Sapporo, Japan, and they have been perfectly hardy without protection through three winters. Several have increased, but only one has flowered. They are grown with most of my other Asiatic orchids in a light, humusy, slightly acid soil in partial shade.

## Cymbidium

Several years ago (Weaver, 1977), I reported on the successful outdoor cultivation of *Cymbidium goeringii* (Reichenbach f.) Reichenbach f., but additional information is now available and an update is in order. During the Arnold Arboretum's collecting trip to Japan later that same year I visited the city of Sendai, north of Tokyo on the east coast of the main island of Honshu. Although the latitude of Sendai is approximately 38°N., the climate is mild and the forests are the warm-temperate, broadleaved evergreen types found over much of southern and western Japan. From Sendai we traveled to the mountains inland where the climate is considerably cooler and the broadleaved evergreen trees essentially disappear. On drier slopes, where the canopy of the forest is relatively open, I was delighted to find *Cymbidium goeringii* as an important component of the herbaceous ground cover, along with other such familiar plants as *Epimedium grandiflorum* and *Lilium auratum*. I collected two plants and was able to bring them home in good condition.

*Cymbidium goeringii* is native to China and Korea as well as to Japan. In the latter country, Sendai is near the northern limit of its natural range, and plants collected there should be among the hardiest of their species. The plant on which I reported earlier was purchased, and its provenance is not known. It survived the winter of 1976–1977 outdoors in my garden, but it died during the more open winter that followed, even with a heavy mulch. One Sendai plant (the other was kept indoors as a safeguard) however survived the winter of 1977–1978 in good condition, as it has every one since with only a minimum of mulch. After this past severe winter I feel that I can safely add *C. goeringii* to our hardy garden flora.

As cymbidiums go, *Cymbidium goeringii* (incorrect synonyms are *C. virescens* and *C. virens*) is not a spectacular plant, and it has never been popular in western horticulture, even as a greenhouse plant. In contrast, it has been for centuries part of the traditional horticulture of



*Cymbidium goeringii* has long been used as a decorative motif in Japan and China. It is seen here on a piece of modern Japanese china. Photograph by R. Weaver

both China and Japan. It is valued for the rhythmical form of its graceful foliage and delicate flowers, and it is understandably a favorite subject of painters. But mostly it is revered for its fragrance, which has been called according to Li (1959) “the scent of the kings.” Natural variants, which include plants with variegated leaves, red flowers (reportedly), and a two-flowered scape are particularly sought after and occasionally are sold for the equivalent of thousands of dollars.

Unlike most of its genus, *Cymbidium goeringii* grows terrestrially rather than epiphytically. The small, nearly buried pseudobulbs persist for several years and produce a mass of thick fleshy roots. The narrow, almost grasslike leaves vary from eight to twelve inches in length and are evergreen, although they may brown at the tips in severe winters. The solitary flower appears on a fleshy stalk from the base of the pseudobulbs in the spring. The two-inch flowers are basically green except for the lip which is white spotted variously with red.

My plant has annually produced vigorous shoots and has doubled in size, but it has not flowered. Perhaps our winters are too severe for the flower buds, but perhaps I have not given it quite the proper conditions for blooming. I grow it under conditions similar to those in its natural habitat — a well-drained but not dry slope with humusy soil and partial shade but with annual springtime fertilization — and I will continue to be patient. I hope eventually to be rewarded with flowers, but merely being able to grow a cymbidium outside is sufficient reason for keeping it.

## Cypripedium

The genus *Cypripedium*, the lady's-slippers, consist of about forty species almost continuously distributed across the North Temperate Zone, with one species, *C. irapeanum* Lexarza extending into the American tropics. Although the species vary greatly in their ease of culture, some, particularly the American varieties of *C. calceolus* Linnaeus, the yellow ladyslippers, are the most satisfactory orchids for the wildflower garden.

The majority of *Cypripedium* species are native to Asia, from Japan to the Himalayas. Although many have been in cultivation at some time or another, most have been lost subsequently; the only one at all commonly cultivated at present is the widespread Eurasian *C. macranthum* Swartz. The wonderful Chinese species are still unavailable, but several of the five or so Japanese lady's-slippers can be imported nearly as cheaply as our native ones can be purchased domestically. All lady's-slippers are particularly susceptible to rot; soaking the plants in a fungicide immediately upon receipt is imperative, even if they are completely dormant.

The two species discussed below are among the most distinctive in the genus, and both have reputations for being difficult to cultivate. I feel that this reputation is unfounded, as long as plants can be obtained in good condition in the first place. *Cypripedium debile* Reichenbach *f.* has no English common name. It is among the most diminutive of lady's-slippers, and to the uninitiated eye might not be recognized as a member of this generally showy group of plants. It is a plant of mountain forests throughout Japan except for the mostly subtropical island of Kyushu and it has been collected a few times in the western Chinese province of Szechuan.

The plants grow from slender creeping rhizomes by which they form small colonies in the wild. Except for that of a closely related but even rarer Himalayan species, the foliage is unique in the genus. There are always two leaves, borne opposite each other atop a stem which reportedly grows to six inches tall but which has never been taller than two inches in my plants. The leaves themselves are broadly ovate, from one to two inches across, completely hairless and lustrous. Three to five prominent veins run their length and converge at the tips. The flower stalk arises from between the leaves, but as the single buds mature, the stalk elongates and turns downward. When the flower opens in early to mid-June, it is borne upside down, below the leaves. In my plants it nearly touches the ground.

The flower itself is delicately beautiful, even though it is difficult to admire because of its hidden position. The dorsal sepal, the synsepal (the united ventral sepals) and the lateral petals are nearly alike in size and shape, and they are all pale green with darker lines or blotches at their bases. The lip, about the size of a large pea, is pale pink with a ring of purple lines around the mouth. The whole flower is



*Above. A plant of Cyripedium debile showing the inverted position of the fully open flower. Below: Closeup of the flower of Cyripedium debile, held above the leaves for a better view. Photographs by R. Weaver*



*The striking flower of Cypripedium japonicum. Note its resemblance to the flower of our native pink lady's-slipper (C. acaule) Photograph by R. Weaver.*

little more than a half inch across. What it lacks in size it certainly makes up in lasting power. An individual flower may remain in good condition for nearly a month, longer than that of any other hardy orchid.

My oldest plant has survived and flowered after three winters without protection except for a standard inch-thick mulch of pine needles. It is planted in deciduous shade in a light, humusy, slightly acid soil. The only special care I provide is to remove scrupulously any plant which might compete too closely with it.

While most visitors to my garden pass *Cypripedium debile* without notice, few miss *C. japonicum* even when it is not in flower. The pair of fan-shaped, corrugated leaves are texturally incomparable in a New England garden and would alone make the plant well worth growing. With its wonderful flowers in addition, the Japanese lady's-slipper is surely one of the aristocrats among hardy plants.

*Cypripedium japonicum* Thunberg is widely distributed in Japan, occurring on all of the major islands. It was also widespread in the upper Yangtze Valley in western China. A closely related species, *C. formosanum* Hayata, inhabits the island of Taiwan. I have not observed the plant in the wild, but it is apparently still quite common in forests and bamboo thickets at low elevations in Japan. According to Summerhayes (1938) it at least formerly occurred in countless thousands in certain districts of China, where its local name means "Devil's Umbrella."

Unlike most of our native lady's-slippers, which have a cluster of

thick roots spreading from a congested rhizome, *Cypripedium japonicum* grows from a slender, elongate rhizome with clusters of rather delicate roots from the nodes. The wonderful leaves are borne in a nearly opposite pair at the apex of a hairy, eight to fifteen inch stem. They open like two fans, densely crinkled at first, becoming six to ten inches broad and nearly flat at maturity but with numerous conspicuous veins radiating from the base toward their margin like spokes.

The solitary flower appears in mid- to late May, arising on a slender stalk from between the leaves. The dorsal sepal and the lateral petals are rather alike in size and appearance — untwisted, slender-pointed and yellowish green with red spots at their bases. The egg-shaped lip is whitish marbled with pink; it is variously spotted with red, particularly at the base and within the orifice. The flower evokes widely differing responses from different observers. Many would call it serene or beautiful. Elick (1975) describes it as “bloated and obscene.” At any rate it is certainly striking and unusual. Though less refined, it is somewhat reminiscent of that of our native pink lady’s-slipper (*Cypripedium acaule* Aiton) in size and configuration, with the orifice of its pendent lip directed outward and downward (in most other lady’s-slippers the lip is more nearly horizontal with the orifice directed upward).

Once *Cypripedium japonicum* is established, it appears to prosper in cultivation. I started with a small plant imported from England in 1974. It moved with me the following year, and it has increased ever since; there are four shoots this season. Unfortunately it seems to flower in alternate years. The present site is rather densely shaded — at the base of an azalea under an apple tree — with a light, humusy soil; a previous site, under hemlocks, proved to be too dry. It apparently does not resent root competition from other plants, either in the wild or in cultivation. Although I mulched it heavily the first few winters, it no longer receives special protection in my garden and appears to be perfectly hardy.

## Epipactis

Plants of the genus *Epipactis*, commonly known as helleborines, are widely distributed across the Northern Hemisphere. They are confused taxonomically, and the number of species recognized varies considerably from author to author. Most of them are European, and one of these, *E. helleborine* (Linnaeus) Crantz, has become naturalized in the eastern United States. The only native American species is *E. gigantea* Douglas ex Hooker, known as chatterbox because of the mobile lower portion of its lip, a familiar orchid along streams in the western mountains.

Only a few species of *Epipactis* are native to eastern Asia. One of these, a wide-ranging plant in Japan, Korea, and eastern China, has been considered a variety of our *E. gigantea*. It is really a quite



Although their color is different, the shape of the flowers of *Epipactis thunbergii* is reminiscent of those of *E. helleborine*, a European species which has become widely naturalized in the eastern United States. Photographed by R. Weaver.

different plant and is now generally recognized as a separate species *E. thunbergii* A. Gray. I have found this species to be an easy and satisfactory plant. It blooms in early to mid-July, a time when orchid flowers are scarce in the garden. The creeping rhizome gives rise to tall, erect stems which bear prominently veined, lanceolate leaves with clasping bases at regular intervals. The inflorescence is terminal on the stem, and the ten to twenty flowers, each subtended by a leafy bract, open in succession. As they open, they bend in such a way as to make the inflorescence appear one-sided. The flowers are about three-quarters of an inch across and are somewhat variable in color. On my plant the sepals and lateral petals are bright golden yellow, beautifully setting off the lip with its bright rose-purple mid-lobe. Although the plants may be as tall as thirty inches in flower, they are not coarse.

*Epipactis thunbergii* is a bog plant as are many of its relatives. Since the plants are so susceptible to rot, a general rule in growing orchids both indoors and in the garden is this: if in doubt, grow them on the dry side rather than on the wet side. Heeding this, I punched large holes in the plastic lining of my artificial bog, and my bog orchids started growing rather than rotting. Actually, *Epipactis thunbergii* would probably respond well if planted in a normal woodland type soil, as long as it is well watered. It also should have full sun for at least four hours a day.

## Liparis

*Liparis* is a moderate sized genus with representatives in the temperate and tropical zones of both hemispheres. The tropical species are diverse, and many grow epiphytically, but the temperate terrestrial species are mostly similar in general appearance. They have two equal, hairless, basal leaves with narrowed, sheathing bases from within which grows the slender-stalked, many-flowered inflorescence. They grow from pseudobulbs which are typically just below the surface of the soil. The temperate species are commonly known as twayblades, because of the two leaves.

Two species of *Liparis* are native to the northeastern United States, and both of them have very similar Asiatic relatives. The lily-leaved twayblade (*L. lilifolia* L. C. Richard), is a widespread and familiar, but seldom abundant, native orchid in deciduous woodlands throughout most of the northern quarter of our country. Its oriental counterpart, from Japan, Korea, and Soviet Eastern Asia was long considered to represent the same species, but is now generally recognized as the distinct *L. makinoana* Schlechter. The oriental species has flowers nearly twice the size of those of *L. lilifolia*, but they look much alike otherwise and they have similar cultural requirements.

Although its flowers are relatively large and attractively shaped, they are not brightly colored, and *Liparis makinoana* is not a conspicuous plant in the garden. Nevertheless it is probably the showiest of the hardy *Liparis* species and well worthy of cultivation. A vigorous specimen may stand a foot tall, with fifteen or more flowers loosely arranged on an erect inflorescence. The flat, translucent, purplish brown, conspicuously veined lip is by far the most conspicuous part of the flower, particularly since the lateral sepals and threadlike petals are nearly hidden behind it. It varies in length from a half- to three-quarters of an inch, and nearly so in width. The flowers open in late May in my garden and continue until mid-June.

*Liparis makinoana* is very rare in cultivation in the United States, but it is occasionally grown in the British Isles, primarily as a pot plant. My original plant was purchased, so I know nothing of its provenance. But plants from throughout its natural range should be hardy in much of the eastern United States. My plant has survived four winters outdoors without protection, and has increased nicely.

Loesel's twayblade, or the fen orchid (*Liparis loeselii* (Linnaeus) L. C. Richard), is a plant of bogs and seepages of the northern United States. A similar species, but a woodland plant instead, *L. kumokiri* F. Maekawa, is widespread in Japan and Korea. It is similar in stature to *L. makinoana*, but the flowers are smaller, more densely arranged, solid yellow-green in color including the lip and they appear about two weeks later. The lip is also smaller in relation to the flower overall, and it is abruptly bent downward at about the middle. My plants were collected on the Japanese island of Hokkaido in the fall of 1977, and



Left: A plant of *Liparis makinoana*, showing the two basal leaves which give the genus its common name of *twayblade*. The prominent, veined lip is the most conspicuous part of the flower. Right: The charming and delicate flowers of *Liparis kumokiri*. Photographs by R. Weaver.

they appear to be perfectly hardy without protection in the garden. The species is practically unknown in western gardens.

Although *Liparis* species are generally not showy, plant and flower form is delicate and refined, and all of the hardy species are worthy of cultivation. At least four other Japanese species, *L. nervosa* (Thunberg) Lindley, *L. auriculata* Blume, *L. krameri* Franchet & Savatier, and *L. japonica* (Miquel) Maximowicz, should be hardy in the north-eastern United States, and Keisling has reported success with the Taiwanese *L. sasakii*. The species I have tried are undemanding and vigorous in the garden; they appear to be among the easiest hardy orchids to cultivate. General wildflower garden conditions — deciduous shade, with a light but humusy, slightly acid soil — suit them well. They are extremely easy to transplant since the pseudobulbs are essentially rootless from October through May. Unfortunately their lack of roots, in addition to their shallowness in the soil, render the bare pseudobulbs extremely susceptible to frost-heaving in the winter as well as unearthing by squirrels or other rodents. Therefore they should be carefully protected with a good mulch as well as a small sheet of chicken wire.

## **Spiranthes**

The genus *Spiranthes* includes a number of native orchids commonly known as lady's-tresses because the spirally twisted inflores-



*The spirally twisted inflorescences of Spiranthes sinensis. The lower flowers have already gone by and the capsules are beginning to develop. Photograph by R. Weaver.*

cences bear resemblance to braided locks of hair. Of these *Spiranthes cernua* (Linnaeus) L. C. Richard, the nodding lady's-tresses, is one of the commonest and most familiar orchids of the northeastern United States. Another species, *Spiranthes sinensis* (Pers.) Ames is one of the commonest terrestrial orchids of eastern Asia, ranging widely from Sakhalin to Malaysia and Australia.

The hardy *Spiranthes* species generally are not showy plants, and *S. sinensis* is no exception. But it is distinctly charming and worthy of cultivation. The plants grow from a cluster of short, fleshy, tuberlike roots, and the narrow, wintergreen leaves are mostly clustered into a loose rosette at the base of the stem. These wither after flowering to reappear in the late summer. The habit is rather similar overall to that of the American *S. lacera* (Rafinesque) Rafinesque.

The spikes are evident by mid-June and they are fully open by late in that month or in early July. They are from two to six inches long, densely many-flowered, on a stalk which may reach fifteen inches in height. The pale rose flowers, in contrast to the white ones of most American species, are about a quarter of an inch long, and close inspection is necessary before their exquisite form can be fully appreciated.

In the wild *Spiranthes sinensis* normally grows on grassy slopes, roadside banks, or other sunny places and at times could almost be called weedy. It appears to be extremely amenable to cultivation,

increasing nicely in a well drained position with sun most of the afternoon. Because of its delicate stature and cultural requirements it is one of the few orchids perfectly well suited for growing in a rock garden. Wherever it is grown it must be carefully sited to avoid its getting lost, because when not in bloom the plant is extremely inconspicuous. And because of its wide natural range, plants for cultivation in the northeastern United States should be carefully selected to ensure a hardy stock. Most Japanese and Korean material, however, should be reasonably hardy.

This is only a small sampling of the exotic orchids which should be amenable to cultivation in the eastern United States. I will be trying more in the future. I hope that this article will stimulate readers to try several species themselves, and I would appreciate reports on any experience with these or other species, particularly as concerns their hardiness.

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*Appendix*

Following is the address for obtaining a plant importation permit:

Permit Unit  
 USDA, APHIS, PPQ  
 6505 Belcrest Road  
 Federal Building  
 Hyattsville, Maryland 20782

Following are nursery sources for the plants treated in this article:

Alpenglow Gardens  
 13328 King George Highway  
 Surrey, British Columbia

Santa Barbara Orchid Estate  
 1250 Orchid Drive  
 Santa Barbara, California  
 93111

Avon Bulbs  
 Bathford  
 Bath BA1 8ED  
 Great Britain

Siskiyou Rare Plant Nursery  
 522 Franquette Street  
 Medford, Oregon 97501

Chow Cheng Orchids  
 194 Lito Street  
 Taichung, Taiwan

Tatsuo Niizuma  
 6-10, Yamate-2-chome  
 Nakasuji, Takarazuka  
 Hyogo 665, Japan

Orchids, Ltd.  
 407 East Carson Avenue  
 Carson, California 90745

## The Ginkgo in America

by PETER DEL TREDICI

During the eighteenth and nineteenth centuries, private estates played a central role in the development of American horticulture. Wealthy landowners enthusiastically planted everything they could get a hold of in a spirit of experimentation. Most of these gardens are now either badly overgrown or totally destroyed. The few that remain are fully mature and give little indication of the reckless abandon with which they were originally planted.

Wodenethe, Henry Winthrop Sargent's estate in Beacon, New York, is a good example of this horticultural experimentation. Between 1840 and 1882, Sargent planted hundreds of exotic species, many of which had never been grown in this country (Sargent, 1897b). When I visited Wodenethe in the spring of 1981, very little trace of Mr. Sargent's work could be found. The main building had been razed and a housing development built on the estate. But here and there a few relics of the glorious past remained. In all, I found about twenty trees that could be traced back to Sargent's day. A beautiful old ginkgo in particular caught my eye. I felt, somehow, that I had seen this tree before. And indeed, I had, in other nineteenth century estates I had visited, where old ginkgoes had similarly survived the twin test of time and neglect.

No one appreciated the powers of endurance of *Ginkgo biloba* better than Professor C. S. Sargent, Henry Winthrop's cousin, who, writ-



Figure 1. *The ginkgo planted by Henry W. Sargent at his estate, Wodenethe, at Beacon, New York. Photograph by P. Del Tredeci.*

ing about Wodenethe in 1897, made a prediction: "A ginkgo just beginning to emerge from its juvenile form promises to become a long lived and large tree." Not only has Sargent's prophesy come true, as can be seen from Figure 1, but the ginkgo he planted on his own estate in Brookline, Massachusetts, has also grown into a large and beautiful tree.

The survival power of the ginkgo is legendary in China, Japan and Korea, where there are many trees that are close to 1000 years old (Figure 2). One tree in Korea, reputed to be the largest in Asia, is said to be 1100 years old (Figure 3; Spongberg, 1978). It is remarkable enough for a wild tree to live this long, to say nothing of a cultivated tree. Whether the ginkgo still exists in the wild is a matter of controversy. E. H. Wilson always denied the existence of any wild ginkgoes (1916, 1919), but Li (1956) presents convincing evidence that wild trees were extant in eastern China as late as 1933. Whether these trees still exist is not known.

The ginkgo is remarkable not only for its survival through historic time, but also for its persistence through geologic time. The order to which the tree belongs, the *Ginkgoales*, can be traced back to the Permian era, almost 250 million years ago (Tralau, 1968). This is sufficiently long ago to make the *Ginkgoales* the most ancient living order of the class Gymnospermae. The genus *Ginkgo* made its first appearance in the lower Jurassic period, 180 million years ago. According to Hans Tralau, the foremost authority on fossil ginkgoes, at least four different species of *Ginkgo* coexisted with the dinosaurs during the Lower Cretaceous. One of these, *G. adiantoides*, possessed leaves which are considered identical to those of *G. biloba*, the species that exists today. Showing the caution characteristic of a good scientist, Tralau concludes ". . . that it might be reasonable to expect the direct predecessors of Tertiary and Recent *Ginkgo* in this part of the Lower Cretaceous population of *Ginkgo*." This direct link with ancient fossil plants gives the modern *Ginkgo biloba* a pedigree unmatched by any living tree, and is the basis of the oft repeated claim that the ginkgo has existed on earth longer than any other tree (Major, 1967).

More than one researcher has suggested that part of the explanation for the ginkgo's longevity is due to the tree's near immunity to insect damage and fungal diseases (Major, 1967). While there may be no correlation between immunity to modern pests and immunity to Cretaceous pests, the fact that pathologists consider the ginkgo ". . . less susceptible to disease, in general, than any tree grown in the United States" (Hepting, 1971), suggests that disease resistance may partly explain the ginkgo's remarkable tenacity.

*Ginkgo biloba* was introduced into Europe from Japan at the Botanic Garden in Utrecht, Holland about 1730, where, according to Dallimore and Jackson, ". . . a tree which may be one of the original introductions is still in very good condition (1964)." The ginkgo did not officially reach North America until 1784. According to Andrew



*Figure 2 The ginkgo at Zanpukuji Temple, Tokyo, Japan. In 1914, the diameter of the tree was 9 feet and 6 inches and its height was 50 feet. The tree was approximately 700 years old. Arrow indicates the stalactite-like burls, known as "chichi" (nipples) by the Japanese. These are leafless, positively geotropic spur shoots that take root when they reach the ground and form new shoots (Fuji, 1895). Photograph by E. H. Wilson.*



Figure 3. *The ginkgo on the temple ground at Yongmun-san, Korea. The tree is about 200 feet high and about 15 feet in diameter. It is reputed to be 1100 years old. The utility pole near the base of the tree offers some scale. Photograph by R. E. Weaver, Jr.*



**Figure 4 (left).** *The male ginkgo tree in Woodlands Cemetery, Philadelphia planted in 1784 by William Hamilton. This tree, and the female shown in Figure 5, are the oldest ginkgoes in the United States. This is the same tree illustrated by Wilson (1919) and Rehder (1936). Today the tree is 68 feet tall and 30 inches in diameter. Figure 5 (right). The female tree at Woodlands Cemetery, Philadelphia, planted in 1784 by William Hamilton. It is 60 feet tall and 32 inches in diameter. The main axis has suffered considerable damage. Photographs by C. Hipple*

Jackson Downing, writing in 1841, the first trees in America were planted in Philadelphia by William Hamilton on his estate "The Woodlands." Two of these original plants, a male and a female<sup>1</sup> still survive (Figures 4, 5). These trees, while not the most beautiful specimen ginkgoes, are the oldest plants in the country (Wilson, 1919; Rehder, 1936). Another ginkgo tree in John Bartram's garden in Philadelphia, thought to be the same age as Hamilton's trees (Wilson, 1919), is bigger than both of them and in better condition.

Downing mentions another ginkgo, ". . . standing on the north side of that fine public square, the Boston Common. It originally grew in the grounds of Gardiner Green, Esq., of Boston, but though of fine size, it was, about three years since, carefully removed to its present site, which proves its capability for bearing transplanting. Its measurement is forty feet in elevation and three in circumference." If the tree was that large three years after it was moved, it must have been nearly that large at the time of moving (Figure 6). Although this tree was standing in 1951 (Ley, 1951), it is no longer there. Unfortunately, I have not been able to learn why or when it was removed.

<sup>1</sup> The terms male and female are commonly used in reference to ginkgoes and other plants. While this usage is widely accepted, it is, unfortunately, botanically incorrect. To be accurate, ginkgoes should be called either microsporangiate or ovulate.



Figure 6 *The ginkgo on the Boston Common, photographed in 1919 by A. A. Greenlaw. The tree was moved to the Common in 1838 when it was 40 feet tall and one foot in diameter. In 1925 it was 55 feet tall.*

On the site of the old Harvard Botanical Garden in Cambridge, Massachusetts (now graduate student housing), a beautiful female tree, dating back at least to the days of Asa Gray, still flourishes (Figure 7). As in the other gardens I visited, it is one of the few original trees left. Large ginkgos, of comparable size, are scattered up and down the east coast between Washington and Boston. Philadelphia seems to be particularly rich in old ginkgos (Moore, 1943).

An isolated group of old ginkgos once existed in Kentucky. Claxton (1940) maintains that these ginkgos arrived at Washington, D.C. as seedlings from Japan and were subsequently sent to Kentucky by Henry Clay. As far as I have been able to determine at least two of

Figure 7. A female ginkgo in the old Harvard Botanical Garden, Cambridge, Mass. While its exact age is unknown, a photo from 1888 shows the tree to be almost as tall and to have the same branching pattern that it does now. Today the tree is 63 feet tall and 38 inches in diameter. Note the buttressed base of the tree. Photograph by P. Del Tredici



these trees, a fertile male and female pair, still exist in Frankfort, on the grounds of the former Kentucky Military Institute.<sup>2</sup> Both trees are in rather poor condition, with the larger one measuring 27 inches in diameter. The fact that the Institute was started in the 1850's suggests that the trees were probably planted around that time. Dr. John Stewart, whose family has owned the Institute since the time of its closing in the 1890's, repeated Claxton's story that the trees came from Henry Clay and added the note that they were the first ginkgos to be planted in Kentucky. The historical significance of these trees does not stop here, however, for Ward, writing in 1885,<sup>3</sup> and Sargent, in 1890, both indicate that the female of this pair was the first ginkgo in the United States reported to bear seeds. In 1890, Mr. W. R. Smith, the curator of the U. S. Botanical Gardens in Washington (Falconer, 1890) had this to say about the tree: "The female produces a large quantity of seed every year, and has been up to date our chief source of supply." Although none of these authors say when this "fruiting" first occurred, a minimum date can be established by the fact that the Arnold Arboretum received an accession of ginkgo seeds from the "Military Institute, Kentucky" on January 7, 1878. Unfortunately,

<sup>2</sup> The Institute is now the Stewart Home School.

<sup>3</sup> The statement by Ward that the first tree in the country to bear seeds was on ". . . the grounds adjacent to the University of Kentucky at Frankfort . . ." is clearly in error, given that there never was a branch of the University of Kentucky in Frankfort. Undoubtedly he was referring to the Military Institute tree.



*Figure 8 A young ginkgo tree showing the whorled, conifer-like branching habit. The angularity of the young trees harmonizes well with the sharp, straight lines of the city. Photograph by P Del Tredici.*

none of the trees from this seed collection, if there were any, have survived.

Stunning as mature specimen ginkgoes are, they contrast strikingly with young trees, which have an awkward appearance (Figure 8). C. S. Sargent, writing in 1897, summed up the contrast between young and old trees.

“Stiff and almost grotesque in its early years, with slender, remote, wide-spreading branches and sparse foliage, the Ginkgo does not assume its real character until it is more than a century old. There are few trees whose youth gives so little indication of future splendor; and so little picturesque is the Ginkgo in early life, and so badly does it blend with American surroundings that a great landscape gardener, knowing only young trees, declared that it could have no place in our landscape planting. If, on a bright November day, he had seen the great trees in Kamakura, or in the gardens of Asakura, in Tōkyō, he would certainly have recognized the great possibilities of the Ginkgo for picturesque planting. In the United States the Ginkgo is perfectly hardy as far north as Massachusetts, and thrives as well in the south as it does in the north. There are not, however, any very large or fine specimens in this country, although the tree planted nearly a century ago in the gar-

den at Hyde Park, on the Hudson River, has begun to assume mature habit and shows that later generations may hope to see eastern America rival eastern Asia in its Ginkgo trees."

Once again, C. S. Sargent has proved himself to be a great prophet. This Hyde Park tree, planted by Dr. David Hosack, the founder of the Elgin Botanic Garden<sup>4</sup> is still standing, an inspiration to a new generation of tree planters and a tribute to the foresight of a past generation of experimenters. This is certainly the most beautiful ginkgo in North America, and also the largest I could locate (Figure 9).

The lesson in all of this is, of course, that C. S. Sargent was right. The ginkgo does grow as well in North America as it does in Asia. When planted as a specimen, unshaded by other trees, it can be counted on to live at least a hundred years and probably two hundred. It is truly remarkable that the ginkgoes which were impressive when Downing and Sargent were writing are still alive today. In eastern North America, there is no other exotic tree except perhaps the European beech, that can endure as long as the ginkgo. To quote C. S. Sargent once again, ". . . if a man wants to plant for posterity, for it must not be forgotten that it has taken from five hundred to one thousand years to build up the great ginkgoes of Japanese and Chinese temple gardens, he is reasonably safe in selecting this tree for his purpose." Indeed, William Hamilton and David Hosack will not soon be forgotten, thanks to the trees they left behind.

#### *Acknowledgements*

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#### *Addendum:*

After this article was in page proofs, the author discovered the following quotation from 1877 by C.S. Sargent (*Gardner's Monthly* 19:358): "One of the *Salisburias*, planted some twenty years ago in the grounds of the Kentucky Military Institute at Farmdale, Ky., and now thirty feet high, proves to be a female, and has fruited this year for the first time. I am not aware that this interesting tree has fruited before in the United States, while in Europe specimens known to be female are still very rare. Through the kindness of Prof. R.H. Wildberger,

<sup>4</sup> This garden, once part of Columbia University School of Medicine in New York City, is considered to be the first "actual" Botanic Garden in the United States (Rehder, 1936).



*Figure 9. Dr. Hosack's ginkgo at Hyde Park, New York, now part of the Roosevelt-Vanderbilt National Historic Sites. Just below the lowest branch, the diameter of the tree is 5 feet 5 inches. The tree is about 85 feet tall. This is the largest ginkgo that I was able to locate in North America. Note the abrupt taper of the main axis, suggestive of both *Metasequoia* and *Pseudolarix*. Photograph courtesy of the National Park Service.*

specimens of the ripe fruit are before me. Its fleshy outer covering exhales an extremely disagreeable smell of rancid butter, but the kernel is excellent with the flavor of Filberts, although more delicate. In Japan the kernels have reputed digestive qualities, and are very generally served at dessert. The cultivation of the 'Ginjko' for its fruit is one of the possibilities of American Horticulture, and is, perhaps, worth consideration."

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## OUTSTANDING PLANTS OF THE ARNOLD ARBORETUM

### *Prunus* × *yedoensis* ‘Daybreak’

There are many different varieties and cultivars of flowering cherry trees available for use in today’s landscape plantings. One of the more spectacular but little used cherries is a cultivar of *Prunus* × *yedoensis* known as ‘Daybreak’. The Japanese name ‘Akebono’ refers to two different cultivars one with single flowers, and the other with double ones. This article will concern the single-flowered cultivar and will use the name ‘Daybreak’. *Prunus* ‘Daybreak’ is distinguished from other flowering cherries by abundant pink flowers that appear early in April, by its spreading habit, and by its glossy, lenticelled bark.

As a cultivar of *Prunus* × *yedoensis*, ‘Daybreak’ shares in a fascinating history. In *The Cherries of Japan* (1916), the famous plant explorer E. H. Wilson stated that the oldest known specimens of *Prunus* × *yedoensis* were growing in the Imperial Botanic Garden at Koishikawa, Japan; at that time the trees were approximately 40 years old. It was from this group of trees that the Japanese botanist Matsumura (1901) had first named and described *Prunus* × *yedoensis*, now thought to be a hybrid between the double white-flowered *P. speciosa* and the single pink-flowered *P. subhirtella* ‘Rosea’. The common name, Yoshino cherry, comes from the name of the Japanese region known for its wild cherries.

In 1902 seeds were sent from Tokyo to the Arnold Arboretum, constituting the first known introduction of *Prunus* × *yedoensis* into the United States. Wilson commented that in 1916 there were over 50,000 Yoshino cherry trees growing in Tokyo alone. In the United States, perhaps the most famous collection of flowering cherry trees is



in the Tidal Basin area in Washington, D.C., where each spring a cherry blossom festival is held. These trees were a gift from the Mayor of Tokyo in 1912. Originally, there were 4,000 trees planted, 800 of which were Yoshino cherries. Today, many of them are dying of old age and less than 25 percent of the original trees remain standing.

The 'Daybreak' cultivar of the Yoshino cherry originated in 1920 from a tree in the collection of W. B. Clarke in San José, California. This tree, which had masses of flowers pinker than those of the species, was named and introduced into cultivation in 1925. The Arnold Arboretum has a single specimen of *Prunus* 'Daybreak' on its Jamaica Plain grounds; a plant was received from Mr. Clarke in 1949 and given the accession number 212-49. It can be found on the left side of the road leading to the top of Bussey Hill, where it appears to survive Boston's winters quite well. It is a wide-spreading tree with four main branches and has reached a height of 25 feet with an equivalent spread. A strong grower, it has many open spaces between its branches, giving it an "airy" silhouette. A graceful touch is added by the slightly pendulous nature of its outermost branchlets.

*Prunus* 'Daybreak' is one of the earliest of the flowering cherries to bloom. In Jamaica Plain the peak bloom period occurs in early to mid-April and lasts for two weeks. The pleasingly almond-scented blossoms are usually borne on leafless branches in clusters of two to six. Each flower consists of five sepals, five or six petals, numerous stamens, and one pistil. The petals are half an inch in diameter, and each has a slight notch on its outer edge. The 'Daybreak' cultivar is best known for the color of the petals, light pink, with the outline of each petal tinged slightly darker. The calyx and upper side of the flower pedicel are rose colored. It is interesting to note that when the petals drop in late April, the appearance of the tree turns from light pink to dark rose due to the conspicuous calyces.

The leaves of *Prunus* 'Daybreak' are ovate, four to five inches long, and two inches wide. The leaf margins are doubly serrate, with the very tips of the teeth pointing upward. The newly unfolded leaves are bright green, but by summer the upper surfaces are a leathery dark green and the lower surfaces light green. The leaf petioles are red above and green below; they have two or three characteristic reddish glands just below the base of the blade and are grooved from this point to the stem. In the fall the leaf color ranges from reddish bronze, to bright yellow, to bright red.

New stem growth is red above and green below, with the tiny lenticels appearing as red dots widely spread around the entire stem. In one year's time the stems become glaucous chestnut-brown above and light tan below. After two years, the bark becomes glossy brownish red, with the prominent horizontal lenticels exposing the rust-colored inner bark. This mature bark provides for year-round interest; it is especially striking when seen against the white of the winter landscape.

Because *Prunus* 'Daybreak' is a hybrid, and also because it depends on insects and weather for pollination, fruit-set is not entirely predictable. There was no fruit formed this past spring on the Arnold



*The graceful, spreading habit and spectacular floral display of the 'Daybreak' cherry are evident in this specimen, located on Bussey Hill*

Arboretum specimen, but when fruit-set does occur it results in many small ( $\frac{1}{2}$ " diameter) drupes that ripen to a black color in late summer. These fruits are visually attractive both to man and to the many birds that seem to like their bitter taste.

Asexual propagation, by either budding or stem cuttings, is the best way to retain the desirable characteristics of this cultivar. Budding is best done in mid-summer and involves inserting several buds of *Prunus*  $\times$  *yedoensis* 'Daybreak' into an appropriate rootstock such as *P. avium*. If stem cuttings are used, they should be taken from the spring softwood, dipped in a liquid hormone solution containing 8,000 ppm. IBA(indolebutyric acid) for five seconds, and then placed in a medium of equal parts peat and perlite. If the cuttings are kept in a high-humidity atmosphere (using mist or by enclosing them within a large plastic bag), rooting should occur within eight to ten weeks.

As of September 1980, *Prunus* 'Daybreak' was commercially unavailable in North America. Interested individuals and nursery businesses wanting to try this cherry tree may be able to obtain budwood from the Arnold Arboretum during the month of July, 1982. Requests concerning availability and service charges should be sent to the Arnold Arboretum well in advance and rootstock of *Prunus avium* should be prepared for budding.

In the cultivation of *Prunus* 'Daybreak' for home landscapes, there are very few problems that can not be solved. Care should be taken to select a suitable site where the soil is well drained, where the pH is in the range of 5.5 to 7.0, and where there is full sun for optimum flowering. During the spring of 1980, the specimen at the Arnold Arboretum sustained a moderate amount of leaf damage known as "shot-holing." As the name implies, the disease causes the leaves to look as if they have had shot fired through them, and may be caused

either by insects or a fungus. When no insects were found in a careful examination of the Arnold Arboretum specimen, it was hypothesized that a fungus was the cause. In a home landscape this damage would be discovered quite early, and the tree could be sprayed; in a larger area, such as an arboretum, the damage might not be discovered quite as early, and it might not be feasible to spray a single tree. However, the extra effort perhaps necessary to keep the tree vigorous, well pruned, and pest-free is worthwhile in the long run.

*Prunus* 'Daybreak' would be best used in landscaping as a specimen plant, in a location where the full splendor of the tree could be viewed from several different angles. The delightful pink floral display, the graceful spreading habit, and the glossy, lenticelled bark give this cultivar a potential to be used a great deal more in today's landscape.

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*Back cover* Closeup of the flowers of *Calanthe tricarinata*, showing the beautiful form of the flowers and their prominently ridged lips in different views. Photograph by M. Dirr.

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