Phalaenopsis Orchids as Potential Pot Plants

Phalaenopsis are epiphytic orchids native to tropical Asia. The taxonomy of this genus is quite complex. For horticultural purposes, however, the species can be placed in one of 2 sections. One section contains those species (e.g., Phal. amabilis. Blume) which usually are spring blooming and produce inflorescences with 10 to 100 flowers. The flowers are quite large with a 5 to 10 cm natural spread and are pastel colored. The other section contains those species (e.g., Phal. laeddemanniata, Rchb.) which usually are summer blooming and produce inflorescences with 1 to 4 flowers. The flowers are quite small, only having a 3 to 5 cm natural spread, and are very brightly colored and patterned (1).

Hybrids can be created from any 2 Phalaenopsis species, even between species in the different taxonomic sections. In most instances, the interspecific hybrids are very fertile, allowing for a complex breeding program. Most of the initial breeding within this genus concentrated on the large flowered types. From these species, several economically important cut flower lines were developed. From Phal. schillerana Rchb. and Phal. sanderana Rchb., the pink flowered Phal. Zada was developed. Similarly, from Phal. aphrodite Rchb. and Phal. amabilis, the white flowered Phal. Doris was created. During the late 1950s and early 1960s, many of the Phalaenopsis species in the other section of the genus were starting to be used in breeding. Most of the crosses were between these species and the Zada and Doris lines. Breeding programs centered on the development of large cut flower lines with new colors and patterns.

The large plant size of these cut flower types appears to be the limiting factor in the expansion of phalaenopsis orchids into the mass, pot plant market. For example, many cultivars have a leaf spread over 18 cm and an inflorescence over 100 cm long, not exactly a 4-inch pot plant! New hybrids, however, currently are being developed for this mass market. These pot plant hybrids involve the use of 2 dwarf species-Phal. lindenii Loher and Phal. equestris Rchb. Phal. equestris is a common, widely distributed species native to the Philippines. This species grows from sea level to about 12,000 ft elevation. Its leaves are green and about 10 cm long. Flowers are produced on 12 cm long inflorescences. The flowers are either light pink or white and have a 1 cm natural spread. Phal. lindenii is not as common or as widely distributed as equestris. This species is native to the mountainous regions of Luzon in the Philippines. Its leaves are green with silver gray variegation. The plant size, inflorescence length, and flower color of Phal. lindenii is very similar to Phal. equestris.

At the USDA's Florist and Nursery Crops, a breeding program has developed a new dwarf phalaenopsis orchid which potentially could be used as a mass market pot plant. This orchid, which has been named Phal. Toyland and is pictured on the cover, has Phal. lindenii, Phal. aphrodite, and Phal. schillerana in its background. Phal. lindenii contributes genes for dwarf plant habit and variegated foliage; Phal. aphrodite contributes genes for a full round flower; and Phal. schillerana contributes genes for variegated foliage and a branched inflorescence. Phal. Toyland is uniformly from seed, easy to grow, free flowering and never outgrows a 4-inch pot. Plants of Phal. Toyland can be grown at temperatures ranging from 20° to 35°C with an optimum day/night temperature of 25°/20°. Survival at high temperatures depends on a relative humidity between 70% and 90%. At low temperatures, fungal and bacterial diseases become a problem if the relative humidity is greater than 50%. Under normal growing conditions, optimal relative humidity is about 60%. Plants will, however, grow at a relative humidity range between 30% and 70%. Temperatures lower than 18° induce flowering, as well as photoperiods of less than 8 hr.

Individual flowers can last up to 6 weeks. Furthermore, mature plants usually produce more than one inflorescence a year. After flowering, the inflorescence can be cut back to the last nonflowering bud. From this bud, a new inflorescence can be induced to develop under low temperatures. Thus, plants can remain in flower for several months at a time.

Plants will grow under a range of illumination between 150 and 400 μmol s^{-1}m^{-2}. Optimal intensity for mature plants is about 350 μmol s^{-1}m^{-2}, but young seedlings require a light level of about 200 μmol s^{-1}m^{-2}.

The most difficult aspect of growing phalaenopsis is watering. The plants require a well aerated, constantly moist, but not wet growing medium. When potted in a standard soil mix, the plants may be easily overwatered. Therefore, the medium should be quite coarse. A suitable growing medium composition is 9 medium fir bark (2-3 cm pieces): 1 coarse perlite (0.75-1 cm pieces) (by volume). Plants can even be grown in a standard soilless mix if watering is carefully controlled. Plants should not be watered until the medium is almost dry. Phalaenopsis grow very slowly, requiring little fertilizer. When potted in bark, however, supplemental N is needed, because the microorganisms in the medium compete for the available N. At every watering, 100 mg of N/liter from a 20–20–20 soluble fertilizer is suggested. Plants should be repotted annually.

There are no major insect problems, although scale, thrips, and mealy bugs occasionally attack the plants. Malathion and/or diazinon at 1 ml/liter will control these pests. The most serious disease is crown rot caused by Pseudomonas. A preventative spray program with either Physan at 0.5 ml/liter or Subdue at 0.1 ml/liter is very effective against this bacterium. In some instances, Botrytis also can become a problem on older flowers. Benlate powder at 1 ml/liter will control this fungal disease.

Vegetative propagation of phalaenopsis plants cannot be done rapidly. Seed propagation is very reliable and produces up to 100,000 seedlings from a capsule. The seed must be germinated under aseptic conditions on a culture medium. In nature, a mycorrhizal association with a fungus is required for germination. Seed capsules are harvested about 6 months after pollination. The capsules are sterilized by incubating in 30% chlorox for 30 min, followed by a 1 min dip in 70% ethanol and flaming. The capsules then are split open aseptically, and the ovules spread onto medium containing half-strength Murashige and Skoog salts and vitamins, 20 gm/liter sucrose, 2 gm/liter peptone, and 8 gm/liter agar at pH 5.5 (1). After 1 to 2 months, the seeds will germinate and develop into small plantlets called protocorms. These plantlets are grown under a low light of about 50 μmol s^{-1}m^{-2} and are transferred to fresh medium every 2 months until their leaf spread is 2 cm. To reach this stage requires 6 to 12 months. The seedlings then are planted into unmilled sphagnum moss, placed in the greenhouse at 100 μmol s^{-1}m^{-2} and misted for 10 sec once an hour during daylight. When the leaf spread is about 4–5 cm, the plants are potted in a 10 cm pot and treated as regular greenhouse plants. Flowering takes about 1.5–2 years from seed.

**Literature Cited**


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