

Potted, Blooming Dendrobium Orchids

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Cultivation of potted, blooming dendrobium orchids (*Dendrobium* Swartz.) is a rapidly growing, multimillion dollar activity in the United States. The University of Hawaii has assisted this industry in Hawaii with research on culture and management, and the introduction of a variety of cultivars.

Environmental conditions favored by dendrobium cultivars to be used for pot plants include bright sunlight, warm temperatures, good air movement, and clean water. Plants grow and flower best when night temperatures do not drop below 18 °C (64 °F) and day temperatures are between 24 and 30 °C (75 and 86 °F). In Hawaii, dendrobiums are grown mostly in shadecloth-covered structures. Shadecloth densities vary depending on the solar radiation intensity of the area. In areas where rainfall exceeds 10 cm (3.9 inches) monthly, best results are obtained in structures with a solid roof covering, as plants and flowers are subject to fungal and bacterial diseases. Natural or artificial air movement helps keep plants and flowers dry and less subject to pathogens.

Cultivated dendrobium orchids, whether seedlings or clones, are started in aseptic flasks. Plantlets thrive in flasks, but should be deflasked before depletion of nutrients in the agar medium. Proper care of plants from flasks through the community pot or plug tray stage is critical to optimum growth, development, and productivity. Deflasked plants are placed in a pathogen free medium having good moisture holding capacity, drainage, and aeration. Several materials are commercially available, some requiring pasteurization. Young plants should be placed on highly sanitized benches.

Transplanting is normally done to 6- to 10-cm (2.4- to 3.9-inch) pots in a relatively coarse medium that promotes rapid root activity, drainage, and aeration. Nutrients in solid and/or liquid form are adequately provided. The full paper provides a table of recommended ranges of nutrients in leaf tissue. Irrigation is provided early to midday. Foliage and flowers should be dry during nighttime. Certain plant growth regulators may be effective in controlling plant height and in stimulating flowering.

The University of Hawaii has introduced over 15 dendrobium cultivars for potted plant production. They are products of a breeding system known as genome breeding. Most are triploids or tetraploids, usually with one amphidiploid parent. Amphidiploids are tetraploids with a complete diploid genome complement from each species parent. This condition causes the amphidiploid to breed as if it were a spe-

cies, with the resulting narrow genetic diversity normally associated with a species population. When an amphidiploid is crossed with a species or another amphidiploid, the hybrid progeny is relatively uniform from seed.

Genomes, or chromosome sets, are symbolized by letters that indicate the taxonomic section to which the species belong. *Dendrobium phalaenopsis* Fitzgerald and *D. bigibbum* F. Mueller are from section *Phalaenanthe*, represented by "P." These have large, fully shaped flat flowers on medium-length sprays. *Dendrobium antennatum* Lindley and *D. stratiotes* Rchb. f. are from section *Spatulata*, represented by "C" (retained for the former section name, *Ceratobium*). These are vigorous plants that produce abundant sprays with many small flowers having two twisted upper petals (antelope-type). *Dendrobium macrophyllum* A. Richard and *D. spectabile* (Blume) Miquel, with uniquely shaped, long lasting, heavy textured flowers, are in the *Latourea* section ("L" genome), while *D. canaliculatum* R. Brown and *D. carronii* Lavarack and Cribb of the section *Eleutheroglossum* ("E" genome) are floriferous, small, compact plants with small twisted flowers.

The various genomes have been combined in many ways to produce a wide assortment of cultivars with distinctive characteristics. The University of Hawaii released potted plant cultivars by registered name, color, and genome combination, i.e., PC, CC, PPC, PPL, PPE, PCL, PCE, PPCC, PPPC, PCCC, PPPE, etc., will be presented. The numerous University of Hawaii dendrobium cutflower cultivars (most are PPCC) are also widely grown as flowering potted plants, although they are larger, less compact plants. Seed-propagated dendrobiums have the advantages over mericlone cultivars in that they are easier, faster, and cheaper to produce, and are free of viruses. All University of Hawaii dendrobium cultivars were created by Professor Emeritus H. Kamemoto. Many other cultivars developed by commercial and hobbyist breeders are cloned for commercial production as potted plant cultivars.