

Greenhouse Production of Caladiums

Introduction

Caladiums are a colorful foliage crop often forced in the greenhouse, mainly for the spring market. Peak sales occur for Easter and Mother's Day. They may be used as pot crops or as outdoor bedding plants. They are a profitable crop in terms of production costs, because they are easy to grow and maintain and have few pest or disease problems. Florists also harvest the colorful leaves as cut greens for arrangements. Properly cared for, they will keep for 2 to 3 weeks, but should not be stored below 60 degrees F. The following guidelines should be helpful in growing top quality caladiums for the commercial greenhouse grower.

Cultivars

Caladium (*Caladium* × *hor-tulanum* Birdsey) is a genus of seven species found in the Araceae family. They are tropical species that originate in the Amazon Basin in areas such as Argentina, Bolivia, Brazil, Columbia, Costa Rica, Ecuador, French Guiana, Guyana, Lesser Antilles, Panama, Peru, Puerto Rico, Surinam, and Venezuela. They have been field-grown commercially in Florida since the 1930s. Ninety-five percent of all caladium tuber production is on the muck soils of Highlands County, Florida. There are currently 14 family-owned



Figure 1. Caladiums in the landscape.

and operated caladium farms that produce on a total of 1,200 acres in this area.

There are around 100 different cultivars available in the commercial market with only about 20 cultivars making up the bulk of production. Most caladium cultivars prefer to grow in light shade or morning sun with afternoon shade. However, recent cultivars can be grown in full sun (Table 1). Caladium cultivars can be grouped into three basic types:

Fancy-leaf—Large, heart-shaped leaves. Plant height is 18 to 22 inches. Most prefer filtered shade or afternoon shade with morning sun in the landscape.

Dwarf—Leaves are heart-shaped like fancy-leaf types, but

plants and leaves are smaller. Plant height is 15 to 17 inches. The light requirements are similar to fancy-leaf types.

Strap-leaf—Elongated, heart-shaped leaves and narrower shaped leaves. Plant height is 12 to 14 inches. Used in hanging baskets, borders, or plantings in front of fancy-leaf types.

Strap-leaf and dwarf cultivars are more expensive and generally less available because the tubers multiply more slowly than the fancy-leaf cultivars in field production. They also perform better in hanging baskets, tolerate more sun, and are shorter than the fancy-leaf cultivars. However, the fancy-leaf cultivars are more common.

Table 1. Caladium Cultivars That Perform Well in Full Sun in the Landscape

Fancy-leaf	Strap-leaf
Grey Ghost	Sweetheart
Florida Fantasy	White Wing
Red Flash	White Ruffles
Carolyn Whorton	White Water
White Queen	Red Frill
Elise	Pink Gem
	Red Ruffles
	Rosalie
	Florida Sweetheart
	Jackie Suthers

Propagation

Caladiums can be propagated by seed, tissue culture, or tubers. Seed production of caladiums requires a long production time and results in seedling variability, therefore it is only used in breeding. Tissue culture is not often used because it is costly. Nearly all caladium production is done from tubers. In field production, tubers are planted by suppliers in April and harvested from November through February. Tubers must go through 6 to 8 weeks (preferably 8 weeks) of curing between digging and shipping. Curing speeds shoot emergence dramatically. Suppliers store the tubers at a temperature range of 65 to 90 degrees F with a target temperature of 70 degrees F. The relative humidity during storage is kept at about 75 percent.

The shipping season from suppliers extends from January 1 to June 1. It is important for growers to understand that caladium tubers are only available during this time. Beautiful containers of caladiums can be grown for the summer and

fall market, but it is imperative to place orders early and store the tubers until needed. Many popular cultivars sell out by March.

Upon arrival, inspect the tubers carefully. Feel the tubers for firmness. They should be rubbery and firm. If they feel spongy, they have been exposed to cold temperatures and should not be used. Early in the year, suppliers watch the weather for the target shipping area and only ship if a period of warm weather is predicted. If the tubers cannot be potted as soon as they are received, store them at 70 degrees F with ample air circulation.

Caladium tubers are divided into 4 size grades based on tuber diameter: number 2s measure 1 to 1½ inches, number 1s measure 1½ to 2½ inches, Jumbos measure 2½ to 3½ inches, and Mammoths measure 3½ inches and larger. Caladium tubers may be planted in 4-inch pots, 6-inch pots, or 10-inch hanging baskets. It is recommended that 2 to 3 number 1 tubers or 1 Jumbo tuber be planted in a 6-inch pot; 2 number

2 tubers or 1 number 1 tuber be planted in a 4-inch pot; or 5 to 6 number 1 tubers be planted in a 10-inch hanging basket. Caladium product sold for bedding plant application may be started in small pots or large-celled flats. Grade number 2 tubers are planted in 3- or 4-inch pots and sold when they have 2 or 3 leaves unfolded. Mammoth-grade tubers are used for exhibition plants in large containers or planted outdoors in the landscape.

De-eyeing

Caladium tubers produce new shoots from vegetative buds called eyes much like the potato. The tuber is a modified, underground stem complete with nodes and axillary buds (eyes). The terminal bud is at the apical end (shoot end) of the tuber and may exhibit apical dominance over other basal buds. Tubers may have 1 to 5 large, prominent eyes and numerous small eyes. When forced, the large eyes grow and emerge first, producing large leaves and the

small eyes emerge later producing peripheral leaves. This results in an unbalanced product. De-eyeing increases leaf counts and result in shorter, more compact plants. Therefore, most growers prefer to de-eye caladium tubers before planting. Cultivars that should not be de-eyed are in Table 2.

De-eyeing involves scooping out the larger, main eyes with a small knife. Care must be taken not to remove the smaller eyes around the main eyes. De-eyeing can be done when it's convenient, months ahead of time, or just before planting. A dusting of fungicide on damaged areas is recommended. De-eyeing should not be practiced on tubers going into pots larger than 6 inches. One drawback to de-eyeing is that it increases forcing time by 10 days to 2 weeks. Despite this, it is still recommended for many cultivars. De-eyeing of caladiums used in the landscape may be undesirable because the larger plant and leaves are desirable.

Culture

Caladiums should be planted in a potting media that is high in peat or organic matter with a high water-holding capacity. Many growers use pure peat moss amended to correct

pH and fertility. However, many commercial peat-lite media also work well. Other growers plant the tubers in Jiffy pots to be transplanted later. Tubers should be planted 2 to 3 inches deep because roots will emerge from the upper side of the tuber. The media used should have a pH of 5.5 to 6.5 and an electrical conductivity level of 1.2 to 1.5 (2:1 extraction method). Water the tubers well soon after potting.

Some growers stack the newly potted tubers in pyramid formation and cover them with a plastic tarpaulin until shoots emerge. Others set the newly potted tubers pot-to-pot on a greenhouse bench and cover them with clear plastic. Emergence occurs much faster if the potting media temperature is 80 to 85 degrees F and the relative humidity is 90 to 100 percent. This may be accomplished by placing the newly potted tubers in a propagation greenhouse where temperatures are normally warm or by providing under bench heating.

Once shoots emerge, daytime temperatures should be kept in a range of 70 to 90 degrees F (75 to 78 degrees F is best) and a nighttime temperature of at least 65 degrees F. The average daily temperature should be in the mid-70s. Never expose caladiums to lower

temperatures. Temperatures below 60 degrees F can cause damage to plants and temperatures below 35 degrees F can kill the plants. Symptoms of low-temperature injury include slow emergence, stunted growth, small leaves, rot, and greening of the leaves on white cultivars. Many growers in northern climates use steam pipes or heated benches to give caladiums bottom heat.

Caladiums should be kept moist until near finish. Close to finish, the potting media should be allowed to dry slightly to harden off the plants. Remember to never let caladiums wilt.

Light is not required until the shoots of caladiums begin to emerge. Best growth and leaf color occurs between 2,500 to 5,000 footcandles. Lower light intensities cause stretched petioles, large leaves, and weak plants. Light intensities that are too high cause bleached leaf color or necrotic leaf margins. One mistake that growers make is to grow all their caladiums under the same light level. Cultivars vary in their optimum light requirement. Therefore, growers should experiment with different light levels to find which produces the best leaf color pattern for a specific cultivar.

Table 2. Caladium Cultivars That Do Not Require De-eyeing Regardless of Container Size

Fancy-leaf	Dwarf	Strap-leaf
Florida Fantasy	Candidum Jr.	Red Frill
Tom Tom		Florida Sweetheart
Freida Hemple		Jackie Suthers
Rosebud		White Water
Lord Derby		Red Ruffles
		Pink Gem

More compact caladiums can be produced by applying Bonzi plant growth retardant as a potting media drench at 0.5 to 1.0 milligrams active ingredient per 6-inch pot. Make one application 21 days after potting the tubers. In most cases, this will be before shoots emerge. Alternatively, Bonzi can be applied as a preplant soak of the tubers. Soak the tubers for 10 minutes in a 15 to 20 parts per million solution before planting.

Different cultivars emerge at different times. Whites are generally the first to emerge followed by pinks and then reds. The cultivars 'Candidum Jr.,' 'Florida Sweetheart,' and 'Fredia Hemple' tend to emerge 4 to 6 days earlier than others. Plants should be spaced on the greenhouse bench at 11 to 12 inches on center for 6-inch pots and 8 inches on center for 4-inch pots. Caladiums generally finish in 5 to 8 weeks. However, plants forced in January or February may require up to 10 weeks, while plants forced starting in May often require only 4 to 6 weeks. As a general rule, strap-leaf and pink-leaf cultivars are the slowest, followed by reds, then whites.

One of the biggest problems in caladium production is overfertilization. Caladiums should not be put on a constant liquid fertilizer program. They are nitrogen sensitive and a high nitrogen fertilizer is discouraged. Symptoms of overfertilization include stretching of petioles, poor leaf color, and greening and brown spots on white-leaf cultivars. Growers who choose to fertilize at the time of potting media mixing should apply a slow-release fertilizer at a rate of 5 pound per cubic yard using a 14-14-14. Growers who choose not to fertilize at planting should use 200 parts per million N once after shoots emerge and again 2 weeks before shipping. Caladiums prefer a 2-2-3 or 1-1-1 ratio of N-P-K.

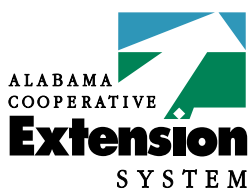
Pest and Disease

Caladium problems in production are usually related to letting the plants get too dry, too much light, too low temperature, or too high fertility. Caladiums are generally pest and disease free, but problems can occur. Aphids, thrips, mealy bugs, two-spotted spider

mites, and white flies can be problems. Emulsifiable concentrates should be avoided on caladiums.

Root-knot nematodes on the tubers can be treated with a hot water dip at 120 degrees F for 30 minutes. Southern blight can be a problem in hot weather. Several fungi (*Sclerotium rolfsii*, *Rhizoctonia solani*, and *Pythium* spp.), either together or separately, have been associated with root and tuber rot of caladium.

Synopsis: This publication describes the uses, marketing, and greenhouse culture of caladiums. Topics included are cultivar selection, de-eyeing, and environmental requirements for forcing.



Your Experts for Life

ANR-1256

J. Raymond Kessler Jr., *Extension Horticulturist*, Professor, Horticulture, Auburn University

For more information, call your county Extension office. Look in your telephone directory under your county's name to find the number. View more information on specific chemicals (product labels, MSDSs) at <http://www.cdms.net>.

Issued in furtherance of Cooperative Extension work in agriculture and home economics, Acts of May 8 and June 30, 1914, and other related acts, in cooperation with the U.S. Department of Agriculture. The Alabama Cooperative Extension System (Alabama A&M University and Auburn University) offers educational programs, materials, and equal opportunity employment to all people without regard to race, color, national origin, religion, sex, age, veteran status, or disability.

2.1M, New Sept 2004, ANR-1256

2004 by the Alabama Cooperative Extension System. All rights reserved.