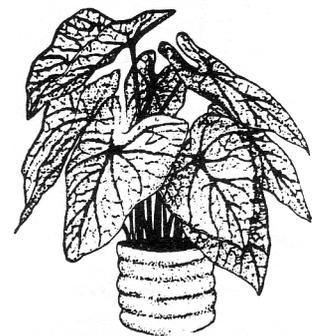


Caladium Production

by
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Scientific Name: Caladium bicolor (C. x hortulanum), Caladium picturatum

Family: Araceae

Origin and Sites of Production:

The caladium is native to Peru and the Amazon River District of Brazil. The majority of the world tuber supply is produced in south central Florida.

Anatomy: The underground storage structure of the caladium is classified as a tuber. A tuber is a modified stem structure which develops below ground which is used to store reserve carbohydrates. The Irish potato is a tuber. Shoots develop from vegetative buds (eyes) on the tuber. Caladium bicolor has nearly heart-shaped leaves while C. picturatum has lanceolate leaves. Leaf colors include green, white, red, and pink. Various leaf coloration patterns exist among different caladium cultivars.

Season of Production and

Markets: The caladium is sensitive to chilling which limits its use in the northern landscape. Caladium tubers are forced as either a pot crop for the spring market or planted out of doors as a specimen plant in the garden. In some cases, mass plantings of caladiums may be seen in more extensively landscaped settings.

Selected Species and

Cultivars: Caladium picturatum has lanceolate leaves, is shorter and tolerates full sun better than C. bicolor. Caladium picturatum cultivars are usually recommended for use in hanging baskets. Colors on all cultivars tend to be darker when plants are grown in the shade compared to in full sun.

Selected Species and Cultivars

Cultivar	Color	Description
Aaron	White	White heart-shaped leaf changing to light green and dark green at leaf margins. White midribs extend to the leaf borders.
Candidum	White	White heart-shaped leaves with green midrib.
Candidum Junior	White	White heart-shaped leaves with green midribs. Shorter than 'Candidum'.
Carolyn Whorton	Pink	Light pink with darker pink veins and irregular green border.
Crimson Wave	Red	Crimson with green border.
Dr. Grover	Pink	Transparent pink with dark green border and red veins.
Fannie Munson	Pink	Bright pink with darker veins. May turn green with maturity. Good in sun.
Fire Chief	Red	Crimson with green border and green spots.
Florida Cardinal	Red	Red with wide green margins.
Freida Hample	Red	Dark red with green border. Dwarf and good in sun.
Ithacapus	Red	Deep red with bright red spots.
June Bride	White	White to nearly translucent heart-shaped leaves. Narrow green margins.
Lord Derby	Pink	Nearly translucent pink with green midrib and border.
Miss Muffet	Mixed	White with slight light green border and spots.
Mrs. Arno Hehring	Pink	White with pink spots and dark red midrib.
Mrs. F.M. Joyner	White	White heart-shaped leaves with a pink hue. Red midrib.
Pink Beauty	Pink	Pink leaves with green border.
Poecile Anglais	Red	Centers of crimson with metallic green margin. Leaves are waxy and undulated.
Postman Joyner	Red	Deep red with bright red spots.
Red Flash	Mixed	Red with irregular green border and white spots.
Rose Bud	Pink	Dark pink with irregular green border. Pink midribs extend through green border to leaf margin.
Texas Beauty	Red	Dark rose with red midrib.
White Christmas	White	White heart-shaped leaf with prominent green midribs.
White Queen	Mixed	White with narrow green border and red midribs.

Environmental Requirements:

Light: Although each cultivar has its own optimum light level, most cultivars perform best at approximately 5,000 footcandles (1,000 micro mol s⁻¹ m⁻²) or in 60% shade in Florida (Conover and Poole, 1973). The 'Holland Bulb Forcer's Guide' recommends that caladiums should be grown at 3,000-4,000 footcandles.

Insufficient light results in smaller leaves, reduced plant height, and reduced plant quality. Excessive light results in reduced coloration due to increased chlorophyll (green pigment) production. Plants may also be stunted and have smaller leaves.

Temperature: Tubers should be stored after harvest (cured) to promote rapid sprouting after planting (see propagation). 'Curing' involves exposing tubers to 90°F for 3 days then storing tubers at 70-75°F for at least 6 weeks for early forced caladiums or storing tubers at 70-75°F constant temperatures for caladiums forced later in the season.

Most pot plant producers receive tubers that already have been cured by the tuber producer. If tubers are not to be planted immediately, they may be stored. Generally, temperatures of 70 - 80°F (21 - 27°C) are recommended for storage. Relative humidity should be maintained at approximately 75%. Good air circulation should be maintained to prevent build up of undesirable gases and to prevent fungal growth on tubers. A fungicide dust may also be applied to prevent fungal growth on the tubers. Tubers should never be stored below 70°F (21°C).

Optimal forcing temperature for caladium is 75-80°F (24-27°C). Temperatures can be raised to as high as 90°F (32°C) to increase the rate of leaf emergence. However, forcing at 90°F (32°C) or higher temperatures reduces root growth. Bottom heat is often beneficial to encourage sprouting. When caladium are in a greenhouse with plants which prefer a cooler temperature, cover pots with a clear plastic to increase the pot temperature and relative humidity under the plastic. After leaves have emerged, temperature can be lowered to 70°F (21°C) without any detrimental effects on plant growth.

When planting tubers out-of-doors, tubers should be planted when the soil temperature is 65°F (18°C) or above.

Water: Plants should be watered when medium begins to dry. Do not overwater as root and tuber rot will occur. However, plants should not be allowed to wilt as irreversible damage may occur. Tubers may become dormant if the medium becomes dry.

Fertilization: Many types of fertilizers are acceptable. Conover and Poole (1975) recommended 6 kg Osmocote (14-14-14) per cubic meter of medium (6 oz/cubic ft) or 1 tsp per inch (15 cm) pot diameter. A constant feed of 100 - 200 ppm nitrogen and potassium weekly has also been used to successfully grow caladium. Superphosphate may be added prior to potting. The pH should be maintained at 5.5 - 6.5. Dolomitic lime may be added to the mix prior to potting to raise the pH if necessary.

Excess nitrogen may cause undesirable green leaves (due to over production of chlorophyll).

Gases: - A high relative humidity (75%) is required during storage to reduce tuber weight loss. No information is available on the affect of CO₂ on caladium growth.

Propagation - Caladium propagation is accomplished by tuber multiplication, tissue culture or by seed. Tubers are the most common means of caladium propagation. Tuber propagation is usually conducted in the spring. Pieces of tuber (1 cubic inch) with at least 1 bud are planted in the field in spring. Before planting tuber pieces are soaked in hot water (122°F) for 30 minutes. Plants mature and tubers are harvested in August. The tubers are placed in open containers for drying and then placed in a forced air building for curing (70 - 80°F, 75% RH). Curing results in more rapid sprouting. After curing, tubers are dipped in or dusted with a fungicide.

Caladium tubers are graded by the circumference of the tuber. Tuber grades and the respective sizes are shown in Table 2.

Table 2. **Caladium tuber grades and their respective sizes.**

Grade	Size
Super Mammoth	4.5 inches 11.5 cm or greater
Mammoth	4.5 - 3.5 inches 11.5 - 9.0 cm
Jumbo	3.5 - 2.5 inches 9.0 - 6.5 cm
# 1	2.5-1.5 inches 6.5 - 4.0 cm
# 2	1.5 - 1.0 inches 4.0 - 2.0 cm

New crop tubers (harvested in August) are usually available in December. However, with proper storage, tubers can be available virtually year round.

Tubers should be inspected upon receipt for signs of chilling injury and/or physical damage upon delivery

Tubers should be firm. Tubers exposed to chilling temperatures are often rubbery to the touch. When cut, the tuber should be free of milky-white areas and brown streaks which may indicate the presence of fungal pathogens.

Shoot Development- Shoot number is increased in any one of 3 ways: pinching, cutting tubers into pieces, or planting tuber upside-down.

1) Pinching- As with other crops, pinching is used to increase the number of shoots on a plant. In the caladium, the main bud, or eye, is the dominant bud. If this bud is removed before tubers are planted (referred to as scooping) additional axillary shoots will develop.

2) Large tubers may be cut in pieces, allowed to suberize, placed back together, and planted.

3) Tubers may be planted upside down. Besides causing an increase in the number of shoots emerging, the shoots are shorter, and the finished plant is fuller.

However, production time is increased.

Growth Regulators: Soaking tubers in 2,000 ppm Ethephon for 2 hours improves uniformity and increases shoot number. Forcing time is unaffected by Ethephon soaks.

Planting tubers - Medium should be well drained and high in organic matter. The media pH should be maintained from 5.5-6.5. Tubers should be planted 2 -3 cm (1 inch) below the soil line. The number of tubers per pot is determined by the pot size and the desired final plant size. Usually 1 mammoth or jumbo tuber, 3 #1's , or 4 -5 #2's are planted per 6 inch pot. One #1 or 2 #2's are also be planted per 4 inch pot. Caladiums can also be started in flats and transplanted to pots to reduce the space requirement during production.

Spacing -Pots may initially be placed pot-to-pot. When plants become larger, pots should be spaced far enough apart to allow good air movement and little shading.

Support -Caladiums generally do not require support.

Production Problems:

1) **Insects** -Caladiums do not, in general, have serious insect pest problems. However, root aphids and mealy bugs may feed on tubers during storage. Mites, aphids, mealy bugs, white flies, red spider mites, and lepidopterous larvae may feed on the leaves.

2) **Diseases** - Tubers should always be inspected upon receipt. Tubers with discolored areas or chalky substances on the surfaces should be discarded.

Tubers may be attacked by many pathogens including Fusarium, Rhizoctonia, Schlerotium, and Erwinia. A warm fungicide dip (50°C or 122°F) for 10 - 30 minutes prior to potting helps to control fungal pathogens. In addition, a regular preventative fungicide drench is recommended on a monthly basis.

Dasheen Mosaic Virus (DMV) has been found in many 'Candidum' cultivars. A DMV infected plant may not show symptoms of

infection but plant size may be reduced by as much as 30-50%.

Many root knot nematodes have been found in association with caladiums in Florida. Symptoms include discolored, decayed, galled or deformed roots and stunted growth. Control has been achieved with hot water treatments and nematocides.

3) **pH**- Often in the upper midwest we can have difficulties maintaining a lower pH, i.e. 6.0. If pH should rise above 7.0 caladium growth can be reduced and foliage discoloration can occur. Therefore, it is essential to monitor your pH on a regular basis. In all probability the water pH may need to be modified with an acid to lower the water pH prior to watering a crop.

4) **Magnesium deficiency** - Magnesium deficiency can occur in caladium when the media pH rises above 7.0 and/or when plants do not receive magnesium through the fertilization regime. It is necessary to monitor pH regularly and apply magnesium to a crop on a regular basis. Apply 2 oz/100 gallons magnesium sulfate (epsom salts) in a constant liquid feed program or 8 oz/100 gallons as a single application once a month. Do not mix magnesium sulfate and calcium nitrate together, as they will react to form a precipitate.

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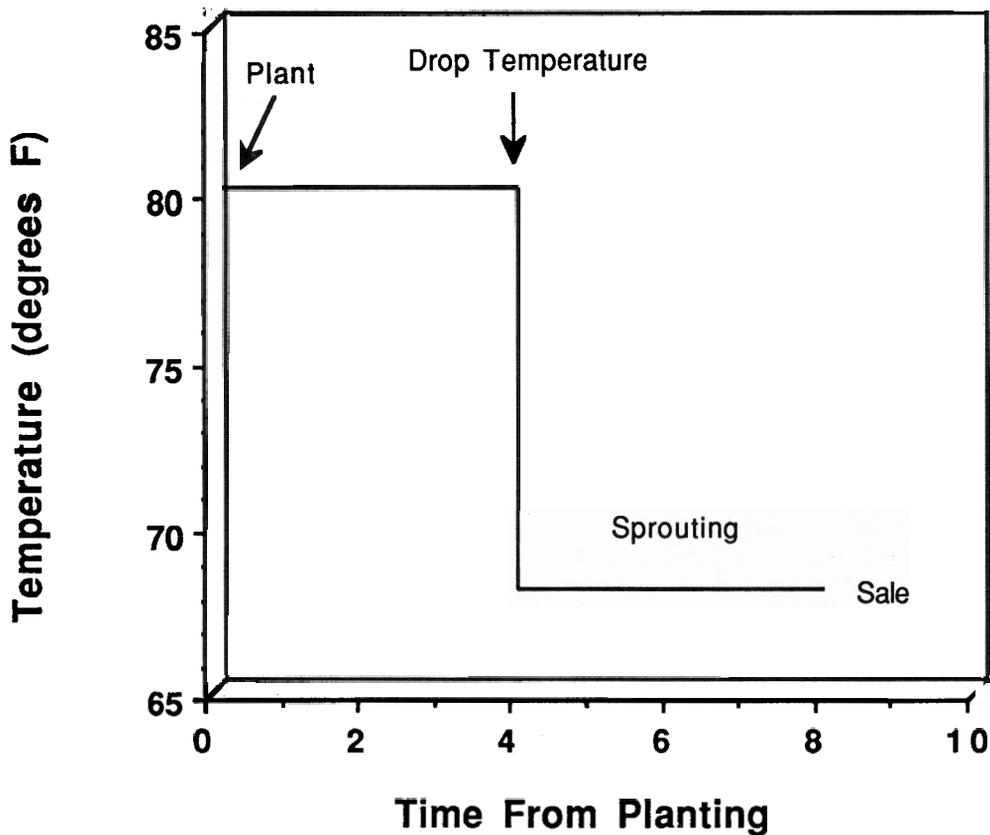
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Caladium Production Schedule



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