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Avoiding Caladium Conundrums

This e-GRO Alert includes environmental and cultural production information for successful greenhouse caladium forcing. Additionally, we will discuss shoot emergence issues that can occur.

On our recent grower visits several growers indicated that their caladium crops produced from tubers were either slow to emerge, emerging unevenly, or not emerging at all. There are several factors that contribute to these emergence issues and we will discuss those in this alert.

Caladiums originate in the tropical regions of Central and South America and therefore require warm temperatures. Most caladium tubers for commercial production are field-grown in Central Florida and are dried “cured” between digging and shipping for 6 to 8 weeks. Growers receive the cured tubers from January to June for forcing in the

greenhouse. Once you receive your tubers inspect them; they should feel firm, rubbery and somewhat sweaty (Figure 1). If they feel spongy or soft, they were more than likely

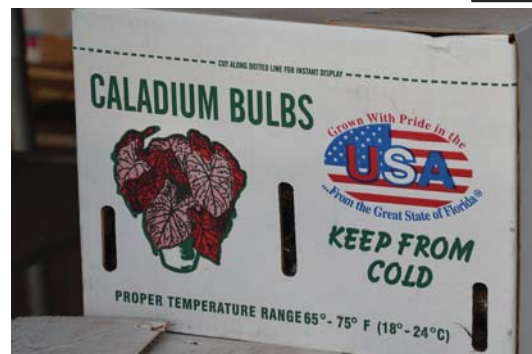


Figure 2. Caladium tubers being stored in a create prior to planting.



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Figure 1. Caladium tubers upon arrival at a commercial greenhouse.

e-GRO Alert

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exposed to cold temperatures and should not be planted. If the tubers must be stored until you are ready to plant them, place them at 70 °F (21 °C) on a screened rack with adequate circulation (Figure 2).

The tuber is a modified underground stem that contains nodes and axillary vegetative buds or “eyes” that will develop into shoots. There are three types of tubers, depending on the cultivar. Solid tubers have one main bud and is shaped like a flatten ball. Semi-solid tubers have two or three flattened segments connected together. Multi-tubers have four or more segments joined loosely together.

The apical or terminal bud may exhibit apical dominance over the basal buds and produce an unbalanced plant with one shoot that has large leaves and other shoots that are much smaller. In order to increase the number of axillary buds that emerge, growers will remove the apical, terminal or dominant bud in a process referred to as “de-eyeing” or “scooping” with a small knife (Figure 3). Make sure to disinfect your knife periodically between tubers to avoid spreading diseases. De-eyeing should break apical dominance and cause the plant to be fuller, uniform, and have smaller leaves. Cultivars with solid and semi-solid tubers need



Figure 3. The terminal bud of these tubers is being removed (de-eyed) with a small scooping knife to encourage fuller and more uniform plants.

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to be de-eyed, but many of the multi-tuber cultivars do not need de-eyeing. Additionally, only de-eye if you are growing caladium in 6 inch or smaller containers.

Once the tubers have been inspected, de-eyed, and dipped in a fungicide solution (Figure 4), they are ready to be planted. The tubers should be planted at least 1.5 inches deep (4 cm) in a moist, but not saturated substrate; 2 to 3 inches (5 to 9 cm) is generally recommended for larger containers. Place the containers in a greenhouse with high humidity (90%) and air temperatures of 80 to 90 °F (27 to 32 °C) and a minimum of 70 °F (21 °C).

The goal is to maintain the substrate temperature at 73 to 75 °F (23 to 24 °C) with bottom heating (Figure 5). Faster emergence can occur at warmer substrate temperatures up to 85 °F (29 °C). Previous research has shown that irreversible tuber chilling injury can occur at 41 °F (5 °C). Up to three days of 50 °F (10 °C) was not detrimental; however up to 10 days at 50 to 61 °F (10 to 16 °C) delayed leaf emergence and reduced leaf number. Longer durations at temperatures below 63 °F (17 °C) can damage tubers and result in slow or no emergence (Figure 6), uneven and stunted growth (Figure 7), tuber rot, and greening of leaves upon



Figure 4 (left). Tubers are soaked in a fungicide prior to planting.



Figure 5 (right). These caladiums are being forced with root-zone heating to maintain a substrate temperature of 73 to 75 °F (23 to 24 °C).

emergence. Therefore, if you do not have a location that has the required environmental conditions for caladium forcing, you can place the potted tubers pot-to-pot and cover them with plastic to increase the temperatures and humidity (Figure 8 and 9). As light is not required until shoots emerge, using clear, white or black plastic will not be detrimental. Remember to remove the plastic at least three times a week for ventilation. Additionally, you will want to check the substrate moisture and emerging shoots. Problems can arise from using plastic such as overheating the tubers, a physiological disorder called greening (excessive greening of the foliage in white leafed cultivars), stretching or tuber rot. The plastic should be permanently removed when the

Figure 6. Shoots have not emerged after being in the greenhouse for 45 days.

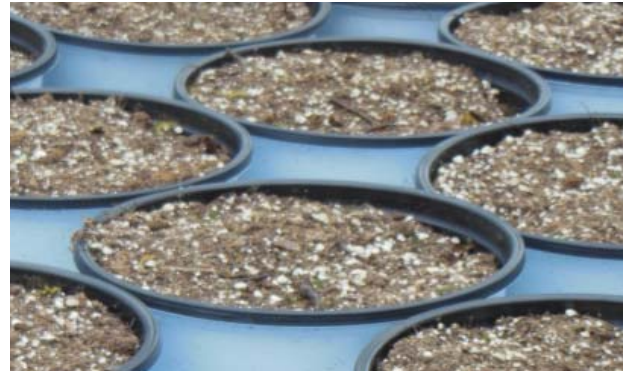


Figure 7. Uneven and slow emergence caused by suboptimal forcing temperatures.

Figure 8 (right and bottom). Use of plastic (clear, white and black) to increase temperatures and humidity to force caladium tubers in a greenhouse filled with other spring annuals.



first leaf sheaths are visible in 10 to 20 days (Figure 10).

Once the shoots begin to emerge, the day air temperatures should be maintained between 70 to 90 °F (21 to 31 °C) and the night temperatures should be at least 65 °F (18 °C) with an average daily temperature of 75 °F (24 °C). Poor quality plants can result from insufficient or excessive light levels. Maintain light levels between 2,500 to 5000 foot-candles (500 to 1000 $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$) for most red and pink foliage cultivars. Remember that color patterns of foliage is influenced by light levels and white foliage cultivars should be grown at lower light intensities to prevent bleached leaf color or necrotic leaf margins. It is recommended that you experiment with different light levels to find the most appropriate for the cultivars you are growing.

If the above mentioned environmental and cultural conditions are maintained, caladiums can be forced in 4 to 8 weeks (Figure 11). If lower temperatures [not less than 65 °F (18 °C)] are maintained, forcing can take from 8 to 12 weeks.

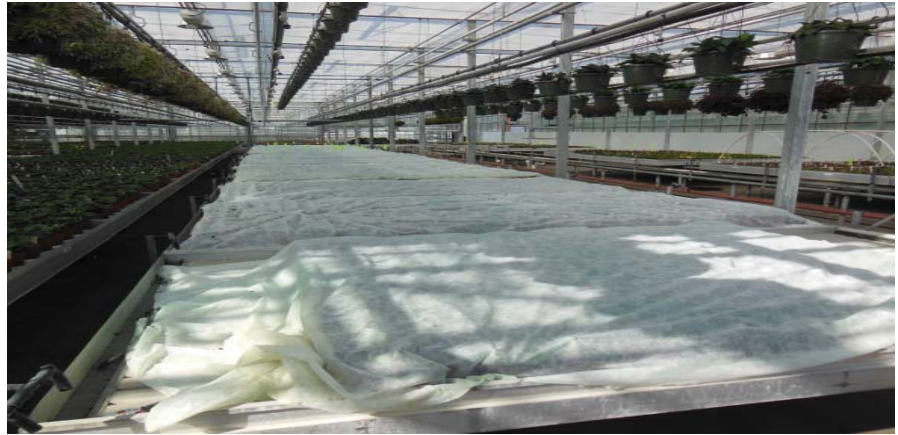


Figure 9. White plastic over potted caladium tubers.



Figure 10. Plastic has been removed and shoots are emerging.



Figure 11. Beautiful caladium crop that was initially forced under plastic. Photo was taken after 8 weeks of forcing.