# *Zantedeschia*: From Test Tube to Pot©

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## INTRODUCTION

Refining the micropropagation, hardening off, and growing-on of the New Zealand bred hybrid *Zantedeschia* has been a continuous process at Frontier Labs for the last 10 years. And refinement continues!

## MICROPROPAGATION

In early spring sprouting "eyes" from dry-stored tubers are excised and initiated onto basic Murashige and Skoog (MS) basal medium in vitro. Basil-shoot multiplication is stimulated from aseptic culture lines through the addition of 6-benzylaminopurine (BA) at final concentration of 0.5 $mg \cdot L^{-1}$. At this stage the original mother shoots are isolated and sent for virus indexing (see disease management paragraph). Mass propagation proceeds with the culture lines that show no virus infection. Rooting is carried out using standard MS medium (Murashige and Skoog, 1962) without the addition of growth regulators. Rooting results in 5–14 days and plants are removed from the glass containers ready for hardening off.

## HARDENING OFF

Plantlets are transferred to a peat and coir (1 : 3, v/v) growing medium (pH 5.6–6.0) in crates. Between 160–180 plants are planted in each crate, and the crates covered with a plastic bag to produce a 100% humid environment for the next 10–21 days. Crates should be left out of direct sunlight for this period. Once the plastic bags are ready to be removed, the crates are transferred to a 50%–60% shaded growing-on environment with evaporative cooling to reduce heat stress during the hot summer days. Crop guard (acryl cloth or spun-bond cloth) replaces the plastic bags for the next 7–10 days. Watering is limited to only when necessary, and plants are fertilized with a low nitrogen, high potassium, and calcium feed (10N–11P–18K) at pH5.8–6.5, and EC 1.8–2.2.

Summer-rainfall-hybrid zantedeschias are deciduous, and begin senescence as the temperature drops in the late autumn. Irrigation should be carried out sparingly in the autumn until the medium in the crates is completely dry. Crates can be stored under cover at room temperature until tubers are removed from the medium and stored dry at 17 °C for 2–3 days and then at 12–13 °C for 6–12 weeks prior to planting in the spring. All cold storage facilities should be well ventilated.

## POT PRODUCTION

Cool stored tubers (13 °C) are removed from the cold room and placed at room temperature or at 19–22 °C for a few days to stimulate the breaking of dormancy and emergence of the "eyes." Tubers should be planted when the largest eye is protruding no more than 1–3 cm. Dry, ready to plant, tubers are pre-treated by dipping for 15 min in a mix of 3 $g \cdot L^{-1}$ copper oxychloride 50WP and 100 ppm Promalin® (gibberillic acid) or one 10-g Berelex tablet (9.6% $GA_3$) in 8 L of water. Tubers are re-

moved from the dip and allowed to air dry under cover before planting. Two to three 3-cm-diameter tubers or one 5- to 6-cm-diameter tuber can be planted per 15-cm pots using a well draining medium with about 20% air porosity. Quality tubers will produce quality plants so be sure to check tubers for soft rot patches or "chalkiness" before dipping. These tubers should be removed and discarded!!

Tubers should be planted eyes facing up, and 5–8 cm below the surface. Water in sparingly and drench after 3 days with good fungicide against root rot associated pathogens such as *Pythium, Rhizoctonia,* and *Phytophthora.* This drench routine should be maintained on a 4-week cycle throughout the growing period.

When sprouts are 3–5 cm high (18–21 days post planting) the plant growth regulator paclobutrazole (Bonzi or Cultar) can be applied to aid in dwarfing and general plant conditioning. This improves the quality of the saleable product. Apply 120–170 ml of an 8–10 ppm paclobutrazole solution during the cooler early morning hours. Pot medium should be moist and the addition of the Bonzi should not produce excess run off. Multiple treatments are dependent on the size of the tubers and the size of pots. It is important also to remember that pine bark ties up Bonzi, so take this into consideration when doing your trials.

## DISEASES AND DISEASE MANAGEMENT

Watch for over watering and the associated guttation (water droplet formation) on the leaf margins and leaf tips. This can cause botrytis, and subsequent necrosis.

An infection by the soil bacterium *Erwinia carotovora,* is associated with primary fungus-infected roots or stressed roots, and results in the well know secondary tuber rot. Tuber rot is not reversible or containable through treatment and infected tubers should be isolated or removed and destroyed. Prevention is therefore better than cure and water management cannot be stressed enough. Fungicide drenches or the addition of biologicals will help to prevent or contain primary fungal infections.

Thrips and aphids can cause feeding damage but are more likely to spread viral diseases, resulting in mosaic leaves, "bootstrapping" (long narrow distorted leaves) and or abnormal flowers. A number of potyviruses and other viruses have been found in *Zantedeschia*, the most important being tomato spotted wilt virus, dasheen mosaic virus, and cucumber mosaic virus.

## CONCLUSION

Although the management of this crop is time consuming and labour intensive the input has its rewards, not only in the elegant beauty of the flowers but also in the prices obtained on the market. A "bitter sweet" crop to grow!!

## LITERATURE CITED

**Murashige, T.,** and **F. Skoog.** 1962. A revised medium for rapid growth and bioassay with tobacco tissue cultures. Physiol. Plant. 15:473–497.