

GROWERTALKS

Culture Notes

7/15/2008

Back to Basics on Vegetative Propagation

Jim Kennedy

Creating the optimal environmental conditions for each stage of root development is the most fundamental aspect of successful propagation. Seed propagators use germination chambers to crack the seed and then move the plug flats to a new environment. Throughout germination, they monitor water, humidity, light, temperature and fertilizer. The same commitment to detail is required when rooting cuttings. However, you must adjust the concepts throughout the four stages of development to meet the needs of unrooted cuttings. The four stages of development are: 1) arrival and sticking; 2) callus formation; 3) root development; and 4) toning, or hardening-off.

Stage 1

The first stage is from the time of sticking until callus formation. This is the “minimize moisture stress” stage. In this stage, high relative humidity and mist are needed. The commitment to using water properly begins as soon as cuttings arrive. To encourage callus formation, avoid over-saturating the media. Misting frequency, not duration, is essential. Increasing the relative humidity in the air will reduce the need to apply mist directly to the foliage and soil surface.

Fertilizer generally isn't recommended at this stage. Maintaining optimal soil temperatures of 68 to 74F (20 to 23C) and air temps of 62 to 80F (17 to 27C) are critical to uniform callus and root formation. Light levels should be low enough to reduce stress. Generally 600 to 1,000 f.c. is optimal. A preventative fungicide application (such as Daconil) should be made soon after sticking.

Stage 2

The second stage is from callus formation until the first roots appear. Callus formation is favored by high relative humidity at and around the cut end of the cutting. The tissue at the base swells and/or whitens as the plant transfers energy to promote early root formation.

Maintain optimal soil temps of 70 to 74F (21 to 23C) and air temps of 62 to 75F (17 to 24C) as well as relative humidity levels greater than or equal to 80% to achieve uniform root initiation. Light levels should be in the 1,200 to 1,800 f.c. range. You should reduce mist frequency as the cuttings move further along in Stage 2.

Misting just enough to maintain turgidity and avoid wilting, while providing some airflow and maintaining adequate plant spacing, are non-chemical ways to reduce disease pressure in this stage. Generally, no fertilizer is needed

until Stage 3.

Stage 3

Root development is the third stage. Warm bottoms and cool tops is a general rule for this stage. Begin feeding and increase light levels as roots emerge. Stage 3 continues until the roots have reached all sides and the bottom of the rooting media. Applying appropriate water stress at this stage has a significant impact on reducing unwanted stretch and minimizing plant growth regulator applications. If needed, plants should be pinched in this stage.

Stage 4

Toning and hardening off is the final stage of rooting. Increased feed levels, plant growth regulator applications and cooler temperatures combine with moderate water stress to finalize the rooting process. This stage prepares the plant for shipping and transplant.

These four stages are universal; they are variable in length and appearance. Understanding and applying the concepts of water management are the keys to successful root development. Excessive moisture delays rooting, increases disease pressure and increases the amount of growth regulator needed in production. By actively managing environmental conditions, particularly water in all stages, strong roots and a well-toned rooted cutting can be achieved.

Jim Kennedy is product representative manager, Ball Horticultural Co., West Chicago, Illinois. Tel: (630) 231-3600; e-mail: jkennedy@ballhort.com.