

Vegetative Propagation by Stem Cuttings

Supplies: Rose pots, trays, cotton glove liners, nitrile gloves, feather blades, small tub (1-ft in length) of water (to submerge cut end of stem in as you make the cuttings), large tub (1-m in length) of water for perlite trays, ¼ inch diameter stick, disposable pot labels, pencil, dust mask.

Soil media for cuttings: perlite, wet thoroughly with water.

Procedure:

1. Prepare perlite pots: Place 21 green, reusable rose pots into a tray, fill pots with perlite, place the tray of pots in a tub (approx. 1-m in length) containing about 1 inch (3cm) water, and water the pots from a sprinkler can.



2. Prepare stem cuttings:

- Put on a cotton liner, and over that, a nitrile glove. Snap a feather blade into two halves, each with one blade edge (consult with others if you do not know what this is). **Feather blades are SHARP - be extremely careful!**
- Cuttings (internodes ~ 1.5-2 in. long) are made from vigorously growing shoots (see [Tips](#) below). Use a pruner to cut off the top 30-40 internodes of the parent plant. **Immediately** submerge cut end into a 5-gal bucket filled 1/3 full with water, cut the submerged end **below** the water surface with the pruner and move **quickly** into the head house prep area.
- Remove the apical meristem and trim each leaf to ~1/4 of the original size. Internodes LPI-5 to LPI-20 (consult with experienced personnel) are usable for cuttings, as long as leaves are in good shape.
- Use a prepared feather blade, cut through each internode **just above** the tiny (non-emerged) bud while the end of the stem that you are excising the cuttings from is submerged in the smaller tub filled to the top with water. **Leave cuttings in tub until you are ready to stick them into the perlite. Do one plant at a time!**
- **Optional:** soak cuttings in 5% bleach for 10-15 min, rinse and place in a water tub until use.



Tip 1. Use parent plants that are 4-6 tall, and have vigorous growth at the shoot apex.

Tip 2. Carefully examine plants for evidence of mites and thrips about 1 week before you plan to make cuttings. If you see pests, let the greenhouse manager know that you will segregate those plants for spraying especially for making cuttings.

Tip 3. On your own, fertilize the plants (1-gal pots) with blue fertilizer (Miracle-Gro, one small teaspoon/liter of water) two days before you plan to make your cuttings.

Tip 4. Best time to make cuttings is early morning or late afternoon. Avoid working in the heat of a hot sunny day, but if this cannot be avoided, cut off the shoot tip, and trim the leaves on the parent plant, BEFORE using the pruner to cut the plant off. Mist the cuttings frequently.

3. Optional: Remove cuttings from water bath, lightly dip bottom of each cutting onto the very surface of root-inducing hormone powder (HORMEX Rooting Powder NO.1 [0.1% IBA], Hummert). The 717 clone roots easily. We have never adopted the practice of dipping for 717. If you ever try it out, you will have to optimize. The big danger is callusing instead of rooting, which leads to non-viable cuttings. So hormone-dip is not generally recommended for 717.

4. Planting: With a small stick, ¼ inch in diameter, make a hole diagonally through the perlite all the way to the bottom. Gently push cuttings into the perlite bed so that the remaining part of the leaf blade is pointing up. Press the perlite gently around the cuttings and make sure the cuttings are anchored. **Keep cuttings moist during the process by frequently misting (DON'T wait till the end).** Insert a plastic label with genotype and date, in pencil, into each and every pot. When the tray is full, place it onto the mist bench.



Clean up the cutting area thoroughly. Sweep away all perlite from bench and floor, rinse tubs and make sure there is no perlite sitting in the sink. Flush well with water. **Dispose of used blades in the sharps container which is near the bench.**



This is very important since blades can be easily missed and if one blade makes it to the garbage or into somebody's shoe or something, any resulting injury could result in serious consequences for everybody.

5. Mist bench: Roots usually develop within ~ 1 month. Ensure that the area of the bench you are using is receiving good misting. Avoid ends, and edges of the benches. Report to the greenhouse manager if it appears that misting is weak, or not functioning as expected. Check on your cuttings once a day to be sure they are sufficiently misted and the perlite soaked (randomly lift a few pots to feel the weight). Rooting can be gauged by peeking from the bottom of the tray/pot, or by gently pulling the cutting upward. Cuttings without roots can be pulled easily, while rooted ones will “resist” the motion. This can be tricky if the cuttings develop a callus. They will seem as though they are anchored, but will die once taken out of the chamber. Don't worry about those, just be aware that it can happen. Good to not count your chickens until they are hatched.

6. Acclimation: Once rooted, with new shoot growth of >4-5 cm in height, move the cuttings to a mist bench that has a reduced misting frequency and observe for a couple of days (consult with greenhouse manager for the misting setting of different benches). If plants are holding up, move the cuttings out of the mist, but keep partially shaded. Water manually with Miracle-Gro (1 tsp/liter) once per day and manage this way for one week to harden the plants (check with greenhouse manager to avoid duplicate fertilization). Plants that are fully acclimated to normal greenhouse conditions should be transplanted to soil pots as soon as possible (and no potting should be attempted before full acclimation). Rooted cuttings left in the mist chamber for long will begin to rot. Fully acclimated cuttings in perlite pots will dry out and die if potting is delayed. Placing rooted cuttings into tubs is NOT recommended, as it slows the acclimation.

Soil media for rooted cuttings: Fafard 3B + Osmocote (15-9-12 NPK, 8 gm/1 gal pot)

Cutting success depends greatly on personal care and attention to detail. There are tips for difficult/unusual circumstances - consult with experienced personnel for advice and guidance.

When to take cuttings



The plant to the left is ready for cuttings. Generally plants are about a meter tall when they reach the perfect stage of semi-woodiness. The stem should be $< \frac{1}{2}$ inch.

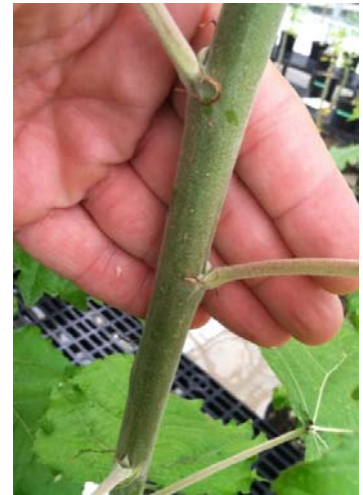
The plant on the right is no good for cuttings; it was allowed to grow to 3 meters tall with a stem diameter of $> \frac{1}{2}$ inch. The plant to the left has lush green petioles and buds. The plant to the right has pink petioles and buds.



The plant to the left has lush green stems and buds. The buds are soft and green. The stem is small and covered in waxy white material (probably trichomes).

The plant to the right has hard woody stems and pinkish petioles and buds. The buds are hard and small. No white material.

The plant on the left is probably cleaner with less fungal spores on it.



Old plants can make decent cuttings if they are cut back and fertilized and allowed to sprout.

These should be used when the plant reaches ~ 1 m tall.

However, these plants will have more insect and fungal pests due to their age.

Mites and thrips can reside in soil as larvae. Older plants will be more stressed as well.



When to start acclimation



Cuttings should be utilized at this stage. As soon as a cutting has a root and begins to grow, it should begin the transition to a low-mist bench for acclimation.

The misting frequency should be reduced when more than 50% of the cuttings have broken dormancy.



As cuttings grow at different rates, the best way is to separate the sprouting plants onto another table (NOT moving the whole tray).

Acclimation should take **no more than a week**. Cuttings fully acclimated to normal greenhouse conditions should be potted ASAP.

These plants to the right should have been removed from the mist days ago. The plant on the left is still OK while the plant on the right is beginning to rot. The fungus responsible is Botrytis Blight (the same gray fungus that rots strawberries in your refrigerator). It cannot be sprayed for because the mist will simply wash it off.

