e-GRO Alert


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# Mind the Mist: Petunias

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*During propagation, mist management is the key to quick rooting. Excessive moisture will result in slower rooting and the onset of shoot tip discoloration and necrosis.*

Optimizing rooting is the goal of petunia propagation. Cutting suppliers have developed guidelines to follow to help ensure success. Wilting of cuttings on sunny days slow rooting and can lead to losses. Consequently, many operations will hedge their bets by over-applying mist to the new cuttings. In addition, if a large assortment of cutting types or multiple weeks of sticking are on the same mist zone, it can be difficult to optimize the mist for every plug flat.

Figure 1. Excessive irrigation during misting and plug grow out stage can result in uneven root growth (right plant). (Photo: Brian Whipker)

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The goal of mist during propagation is to quickly rehydrate the cutting and then avoid wilting. After only a few days, the water balance in the cutting is typically reestablished, and then the amount of mist applied needs to be decreased. If the mist is over applied at this stage, one result is the leaching of nutrients from the leaves which slows rooting. This lowers the nutrient reserves that the plant needs to establish good roots.

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Another result of over application of mist is an over saturation of the rooting substrate. Excess water will lower the amount of oxygen available (air space) in the root substrate. Unfortunately, the oxygen is not available to help maintain the air space. Excess moisture interestingly enough results in too much water ($H_20$) in the substrate, so you are dealing with a hydrogen and oxygen toxicity.

Symptoms of Too Much Mist

When the substrate is super saturated, the rooting process is slowed or stalled. This cascades into several secondary problems.

First of all, rooting is slowed. It may take longer than the typical 3 to 4 weeks to root petunias when the substrate is kept too wet.

With slow rooting also comes uneven rooting (Fig. 1). This situation becomes even more difficult to manage once the cuttings are rooted. Do you irrigate to the needs of the rooted cuttings and risk further oversaturating the substrate of the poor rooters, or does one water stress the well rooted cutting to salvage the poor rooters?

Induction of nutrient problems also occurs with an oversaturated substrate. With petunias, this results in discoloration and necrosis of the growing tip as a result of a deficiency of calcium, iron, and manganese (Figs. 2 and 3). Upon inspection of the root system, one will also notice that the plants with necrotic growing tips also have poor roots. At this point, it is very difficult to salvage these cuttings and growing the plugs out results in continual distortion (Fig. 4).

Figure 2. Uneven growth, leaf discoloration, and necrotic growing tips can result with excessive misting. (Photo: Brian Whipker)

Figure 3. Close up of distorted growing tip. (Photo: Brian Whipker)

Figure 4. Affected plugs rarely resume normal growth once transplanted. It is better to discard severely affected plugs to avoid further losses. (Photo: Brian Whipker)

Iron deficiency can also occur with excessive, prolonged mist (Fig. 5). This problem occurs more frequently after the cuttings are rooted and the plants are over irrigated. Dialing back the amount of water applied to the plants will help avoid this situation. The application of a complete fertilizer containing chelated iron will also help correct this situation.

Due to the leaching of nutrients from the leaves during rooting, the application of fertilizer in the mist (50 to 75 ppm N) and after rooting (100 to 150 ppm N) will help ensure quicker rooting and avoid nutrient deficiencies (Fig. 6).

Even though the three largest cutting suppliers do not recommend the use of IBA during petunia rooting, NC State University trials found that between 100 to 200 ppm IBA improved rooting (Fig. 7). IBA should be thought of as an insurance policy to help ensure more rapid and even rooting, even though petunias tend to root well on their own.

Dialing in mist can be a challenge when the same rooting zone on the propagation mist contains multiple species and ages of plants. Optimizing growing conditions will aid in avoiding tip necrosis of petunias (see table).

Additional information is available from e-GRO Alert 2.10 Improving rooting success of challenging petunia cultivars by Lopez et al.

Figure 5. Iron chlorosis can result if the plugs are irrigated too much or the substrate is kept too wet. (Photo: Brian Whipker)

Figure 6. Inadequate fertilization applications during propagation can result in nutrient deficiencies due to low electrical conductivity. (Photo: Brian Whipker)

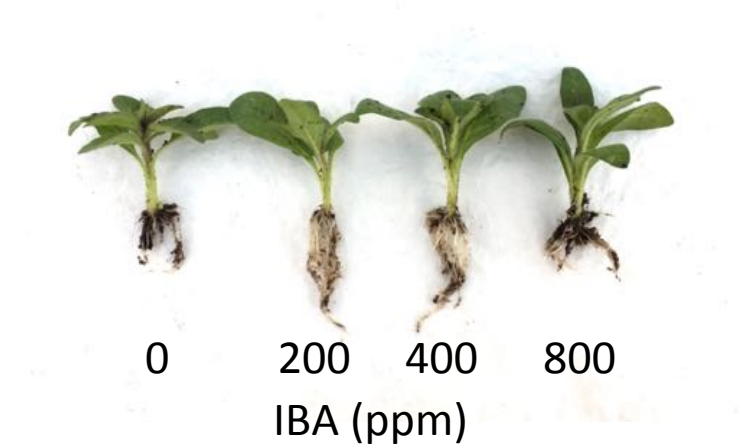


Figure 7. More rapid and improved rooting occurred with the use of IBA foliar sprays of 100 to 200 ppm, applied within 24 hours of sticking, based on NC State University trials. (Photo: Brian Whipker)

# Petunia Rooting Tips

The following tips are a summary of the technical cultural sheets of the major cutting suppliers.

| Parameter | Details | Tips |
|---|---|---|
| Tray size | 50, 72, 84, 105 | Customize to your growing needs. One to two weeks longer rooting time for larger plugs. |
| Substrate | 80% Peat / 20% Perlite or other “rubberized dirt” material or peat plug material. | Suitable substrate with both water holding capacity and drainage. |
| Rooting hormone | No. Propagator fact sheets do not list the need for a rooting hormone. | Trials at NC State University found quicker rooting when IBA foliar sprays were applied within 24 hours of sticking. Rooting hormone provides additional benefit of even rooting. |
| Plants per cell | 1 | - |
| Bottom heat temperature | 72-74 F (22-23 C) until the roots are well developed. | Lower temperatures during the final 1 to 2 weeks of rooting to tone the plant. |
| Mist | Amounts vary with stage of rooting. Rehydrate cuttings immediately after sticking (initial 24 hours). Gradually decrease mist over the initial 7 to 10 days, with significant lowering of misting after 4 days. Switch to providing water by irrigation after roots appear. | Spray adjuvant (Capsil) can be applied at 0.6 ml to 1.2 ml per 1 gallon (2 to 4 oz/100 gallons) of water within 1-2 days after sticking to help rehydrate cuttings. |
| Irrigation | Once rooted, keep the substrate moderately moist with mild drying cycles (Level 3) | |
| Fertilization | Mist: 50 to 75 ppm N<br>Growing: 100 to 150 ppm N | Use of fertilizer in the mist will help avoid excessive nutrient leaching from the cutting. Use Cal-Mag type fertilizers to avoid excessive ammoniacal-nitrogen and phosphorus (P), and at the same time providing calcium and magnesium. Avoid high P containing fertilizers. Applying fertilizer during the second half of rooting will aid in hasten rooting. |
| Growing air temperature | Days: 70 to 75 F (21 to 24 C)<br>Nights: 68 to 72 F (20 to 22 C) | |

| Parameter | Details | Tips |
|---|---|---|
| Lighting | Provide a Daily Light Integral (DLI) of 4 to 6 mols/day for the initial 2 weeks. Increase the DLI to 12 mols/day once rooting has occurred. | Petunias are a facultative long day plant. |
| Substrate pH | 5.6 to 6.0 | |
| Substrate electrical conductivity (EC) | SME: 0.9 to 1.3 mS/cm<br>PourThru: 1.4 to 2.0 mS/cm | Target concentrations based on rooted cuttings |
| Root emergence | 6 to 10 days | Curtail mist at this point. |
| Propagation pinch | Not recommended | |
| Plant growth regulators<br><br>Applied to avoid plug stretch during the second half of propagation<br><br>*(turn off mist for at least an hour to allow absorption)* | Daminozide (B-Nine/Dazide) at 1,000 to 2,500 ppm | Adjust rate to match the vigor of the cultivar. |
| | Ancymidol (Abide/A-Rest) at 10 to 25 ppm | Adjust rate to match the vigor of the cultivar. Ancymidol provides longer term effect than daminozide. |
| | Ethephon (Collate/Florel) at 250 ppm | Can be used to increase branching. Do not apply ethephon to stressed cuttings. |
| | Tank mix of daminozide (B-Nine/ Dazide) at 1,000 to 2,500 ppm and ethephon (Collate/Florel) at 250 ppm | Encourages branching and controls stretch. |
| Potential diseases | Botrytis | Gray mold on leaves and stems. Apply a fungicide a few days after sticking and a week later if needed. |
| | Pythium | Discolored root system. Apply a fungicide if needed. |
| | Rhizoctonia | Web-like mycelium strands visible at the soil line. Apply a fungicide if needed. |
| Potential pests | Fungus gnats | Inspect the base of the plant and root system |
| | Aphids, Western flower thrips, Whitefly | Infestations observed on the foliage |
| Potential abiotic disorders | Growing tip necrosis caused by a hindered calcium uptake situation. | Avoid cultural practices that hinder good water transpiration. Use a calcium containing fertilizer. |
| | Iron deficiency as a result of excessive irrigation. | Apply an iron chelate containing fertilizer or provide a supplemental application. |
| | Slow growing and lower leaf pale green to yellow coloration due to inadequate fertility. | Apply fertility to the cutting under mist and increase the rate once roots have appeared. |

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