

# Tips for Better Young Plants

What to consider when producing young plants from the perspectives of fertilization, pH and water management.

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When it comes to growing young plants (seedlings, plugs, liners) there are a lot of factors that need to come together in order to produce quality crops. From proper watering (timing, frequency and amount), fertilization (which to use, rates), pH control, temperature, lighting, pest control, etc.—and not to mention that each crop has slightly different requirements—where do you start?

**Water quality:** Your irrigation water should be tested to determine the alkalinity and individual nutrient levels. Water alkalinity is a measure of the bicarbonates and carbonates in the water. It's important because these elements are essentially limestone, and the higher they are, the faster they cause the pH of the growing medium to rise. Ideally, the alkalinity of the water to mist and irrigate plugs or cuttings is 40 to 80 ppm CaCO<sub>3</sub>. With alkalinities above 120 ppm CaCO<sub>3</sub>, there may be a continuous battle with high growing medium pH. If you choose a high nitrate fertilizer that's potentially basic, then having a lower water alkalinity is desirable.

Water can contain helpful nutrients such as calcium, magnesium and sulfate. If these are low, then they need to be added through potentially basic, cal-mag fertilizers. If acid injection is used to reduce alkalinity, consider using sulfuric acid to supply sulfate. The phosphorus in phosphoric acid can lead to stretching in young plants. Water also can provide high levels of sodium, chloride, fluoride, boron or other elements or overall high salts. Make sure the water quality is acceptable for growing young plants, as they're more susceptible to injury from high salts, nutrient deficiencies and nutrient toxicities than mature plants.

**Fertilizer/pH:** Picking the proper fertilizer starts with a water test. If the water is low in calcium and/or magnesium (minimum should be 50 and 25 ppm, respectively), often cal-mag fertilizers are needed to provide these missing elements. However, most cal-mag fertilizers are potentially basic and will cause the growing medium pH to rise over time. To compensate, further reduce the alkalinity of the water with acid or rotate the cal-mag fertilizer with a potentially acidic fertilizer, such as 21-5-20, or use a cal-mag fertilizer that has slight potential acidity, such as 17-5-17.

Various publications mention that potentially acidic fertilizers have higher ratios of ammonium to nitrate nitrogen that can cause stretching in new growth and slow root development. Although there's some truth to this, phosphorus often causes greater stretching than ammonium, so it's best to use a fertilizer with a lower ratio of phosphorus, such as 17-5-17, 13-2-13, 21-5-20, etc.

Due to the low fertilizer application rates, watch for micronutrient deficiencies that often occur because of low fertilizer application rates and leaching. If this occurs, consider applying a low rate of a complete micronutrient fertilizer.

**Fertilizer application rates:** Young plants require little fertilizer, as there's limited root and shoot growth to utilize fertilizer. It's best to apply fertilizer at a rate of 30 to 50 ppm nitrogen with a complete fertilizing after first true leaves emerge in seedlings or roots develop from cuttings. After a few weeks, increase the rate to 50 to 100 ppm nitrogen, as plugs and rooted cuttings have more roots to absorb and utilize fertilizer. Electrical conductivity (E.C.) should range from 0.4 to 0.8 mmhos/cm (Saturated Media Extract) early in the production cycle and then 0.7 to 1.2 mmhos/cm later. Lower rates are best for seedlings and higher rates are best for rooted cuttings. Some rooted cuttings, such as petunias or calibrachoa, may require higher fertilizer application rates to prevent nutrient deficiencies.

**Watering:** Although high moisture is needed to germinate seed and develop roots on cuttings, a continuously saturated growing media stresses plants due to a lack of oxygen. This reduces root and shoot development, roots are thin and translucent with few root hairs, and there are



Figure 1. Petunias with elevated growing medium pH. High water alkalinity can cause iron and manganese deficiencies in crops.



Figure 2. Keeping plugs and liners too wet can result in unwanted algae growth.

increases in root disease and rotting of cuttings. Media temperatures below 65F (18C) can slow germination and root development, increasing the likelihood of overwatering and root disease. Once seeds germinate and roots start forming on cuttings, reduce misting/watering after seedling emergence and root formation on cuttings. If root disease is a common occurrence, use a better draining, peat-perlite growing medium amended with a biofungicide to help reduce root disease, such as PRO-MIX FPX BIO-FUNGICIDE.

Once cotyledons are fully expanded and the roots of cuttings have extended to the outside of the root ball, dry the growing medium down between waterings. This means that the surface of a peat-based product should turn from a dark brown-black color (meaning it's wet) to light brown. Doing so also discourages shore flies, fungus gnats and algae growth on the growing medium surface. Also, drying the growing medium allows for more oxygen in the root zone, which favors better root development. However, don't dry out the growing medium too much, as certain crops—such as alyssum, lobelia, rosemary, vine crops, etc.—that dry out and wilt may not recover. Also, excessive drying can trigger premature flowering in plugs and liners.

**Humidity:** Young plants grown in excess humidity often have stretched growth, thin stems and leaves, reduced branching and poor root development. Since plants need little water when the air is very humid, plant nutrients in the growing medium solution, such as calcium and boron, aren't taken up, which creates nutrient deficiencies. Reducing humidity often requires opening greenhouse vents to let in dry air and encouraging air flow. If the outdoor air is too cold, then make sure horizontal air flow fans are running to move humid air from the plant canopy. If young plants have only been grown in high humidity conditions, they may not tolerate stress from handling, shipping, low humidity or cold temperatures.

There are many more factors when growing young plants, including temperature, light, specific plant requirements, pest control, growth regulators, etc. These are some helpful tips to consider when producing young plants. Keep good notes and record your cultural practices and any adjustments made to produce quality crops. 🌱

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