e-GRO Alert


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Petunia Purpling Problems

From rooting to finishing, there are a wide range of reasons why petunias may display purple discoloration. However, the location of occurrence and the stage can help diagnose why the discoloration is occurring.

Anthocyanins are secondary metabolites in plants that are responsible for the red and purple colors. However, anthocyanin concentrations can be impacted by many factors including light quality, temperature, nutrient deficiency, carbohydrate status, root rot, over watering, and drought. When an increase in anthocyanin concentration is observed growers must determine which of the following possibilities are the likely culprit for the change in leaf color.

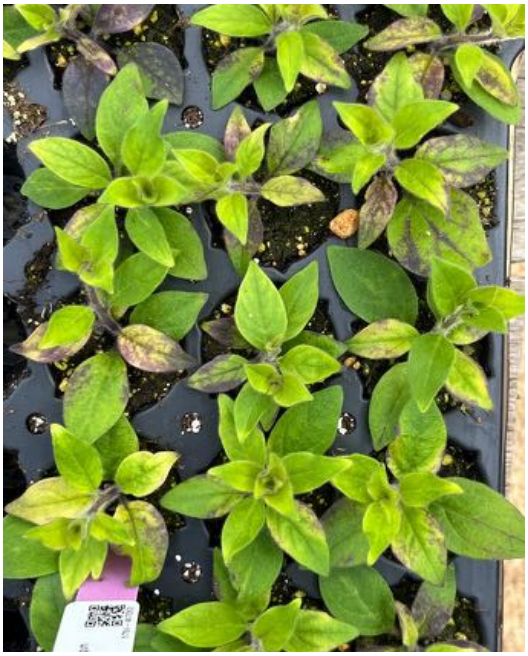

Figure 1: Petunia cuttings rooted under red and blue LEDs resulting in purple leaf discoloration. (Photo: Patrick Veazie)

LED Blue Radiation

Propagation for spring bedding plants occurs during the darkest days of the year from both a light quality and quantity perspective. As a result, many growers utilize supplemental lighting to promote plant growth. Growers have a wide range of lighting spectrum choices ranging from narrow bands (specific wavelengths of light) such as blue or red radiation or broadband (a wide range of wavelengths) which generally appear as white. When rooting under blue and red LED, growers may observe a purple discoloration of the foliage (Fig. 1). However, one

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may ask why cuttings rooted under traditional lights such as high-pressure sodium (HPS) lights generally exhibit less severe coloration. LEDs are generally more efficient in light production compared to HPS lamps. This results in less ambient heat being given off by the light fixtures. As a result, growers should increase their root zone temperatures when utilizing LEDs to prevent purple discoloration from occurring.

While the purple discoloration on rooted cuttings at the end of the propagation stage once the cutting is transplanted and warmer temperatures are received the plant will grow out of the discoloration. For additional information on LED's impacting anthocyanin accumulation please see Edible Alert 5.4 and a recent article by Charlie Smith et al. in the November issue of GrowerTalks magazine.

Figure 2: Lower purple leaf discoloration resulting from phosphorus deficiency and cold growing. (Photo: Brian Whipker)

Figure 3: Olive green and spotting on lower leaf discoloration is common in warmer climates when phosphorus deficiency occurs. (Photo: Brian Whipker)

Nutrient Deficiencies

Nutrient deficiencies can often impact foliage color; phosphorus (P) is the most commonly attributed deficiency to result in lower leaf purpling (Fig. 2). This is most commonly observed in combination with cold or wet growing conditions. In the southeast with warmer climate conditions P deficiency will often manifest as overall pale green lower foliage and olive spotting patterns (Fig. 3). However, magnesium (Mg) can also result in lower leaf purpling. While Mg, deficiency is commonly attributed as interveinal chlorosis of the lower foliage, in cold growing conditions lower leaf purple discoloration has been observed on petunia. We have observed this when growers utilize a fertilizer such as 20-10-20 (N-P_2O_5-K_2O), a fertilizer that does not supply calcium or Mg, and also rely on the Mg from the dolomitic limestone during spring bedding plant production. Changing to a 17-4-17 Cal Mag fertilizer at a similar rate will supply adequate Mg for optimal petunia growth or an application of Epsom salt of 2 pounds per 100 gallons will prevent the advancement of Mg deficiency. Both P and Mg are mobile elements within the plant and will be translocated from the lower foliage (sources) to the newly developing part of the plant (sinks) such as flowers or new expanding foliage. Growers should conduct foliar tissue analysis to confirm nutrient deficiencies.

Cold Temperatures

Petunias prefer daytime growing temperatures of 61-80 F and nighttime temperatures of 55-65 F, ensuring that nighttime temperatures do not drop below this range is critical to optimize quicker growth. Lower temperatures used to slow

the crop can increase the occurrence of purple discoloration of foliage. Growers should monitor their growing conditions to promote optimal plant growth utilizing a temperature data logger will create the

ability to monitor day and nighttime temperatures to ensure that heaters are turning on at the correct set points. Colder regions of a greenhouse may also exhibit purple discoloration while warmer sections may not.

Conclusions

There are a wide variety of causes for purple discoloration of petunias, however, determining when the symptoms are first observed, and the growing conditions can help diagnose the cause of the problem.

Figure 4: Lower leaf interveinal chlorosis is the result of a magnesium deficiency. (Photo: Brian Whipker)

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