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Coleus Physiological Disorder Guide

This e-GRO Alert provides a photographic guide to coleus physiological disorders.

Coleus are popular bedding plants because of their foliage which is available in a wide assortment of colors and leaf shapes. Successful production of coleus requires knowledge of the disorders that can affect plant growth. This e-GRO Alert focuses on coleus physiological disorders.

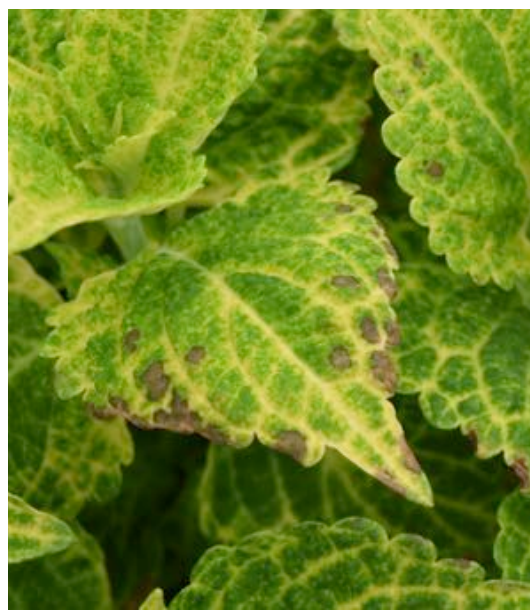


Figure 1. Water stress can result in necrotic leaf margins and spotting. (Photo: W. Garrett Owen)

Several physiological disorders are listed in production guides. These include: water stress, high substrate moisture (overwatering) induced plant stretch, high growing temperature-induced plant stretch, low growing temperatures which result in delayed growth, cold damage and freeze injury, sunscald from high light, diminished plant quality due to holding the plugs and plants too long, plant growth regulator overdose, chimeras, and herbicide drift.

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COVID-19 protocols caused uncertainty about our ability to conduct research. This research project provided an opportunity to enjoy exploring coleus production as a joint University of Kentucky and North Carolina State University endeavor.

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In addition, e-GRO authors have observed coleus fasciation (e-GRO Alert 10-29), chemical phytotoxicity, guttation water spotting, and growth distortion as the result of excessive rooting hormone.

Water Stress

Coleus can experience wilting and leaf necrosis when water stressed (Fig. 1). Damaged leaves typically occur on the upper foliage and marginal necrosis and interior leaf spotting symptoms are possible.

Excessive Moisture

Providing excessive moisture to coleus results in encouraging additional plant growth, as observed when overhead sprinklers are used (Fig. 2). The force of the water from the sprinkler can also result in leaf damage.

Guttation

Water droplets occur along the leaf margins when excessive moisture is forced up from the root system through the xylem and is pushed out of cells at the leaf tips called hydathodes (Fig. 3). This typically occurs at night when the stomata are closed and humidity is elevated in the greenhouse. The water droplets appear along the leaf margins and a white residue may be noticed after the water evaporates due to the nutrients that are contained in the solution. Angular water spotting formation can also be confused with a foliar nematode infestation (Fig. 3).

High Temperature Stress

High growing temperatures will result in excessive plant stretch (Fig. 4). Lower growing temperatures, scheduling the crop later, and/or plant growth regulators can all aid in controlling stretch.



Figure 2. Excessive moisture that occurs with overhead irrigation results in plant stretch and possible leaf damage. (Photo: Brian Whipker)

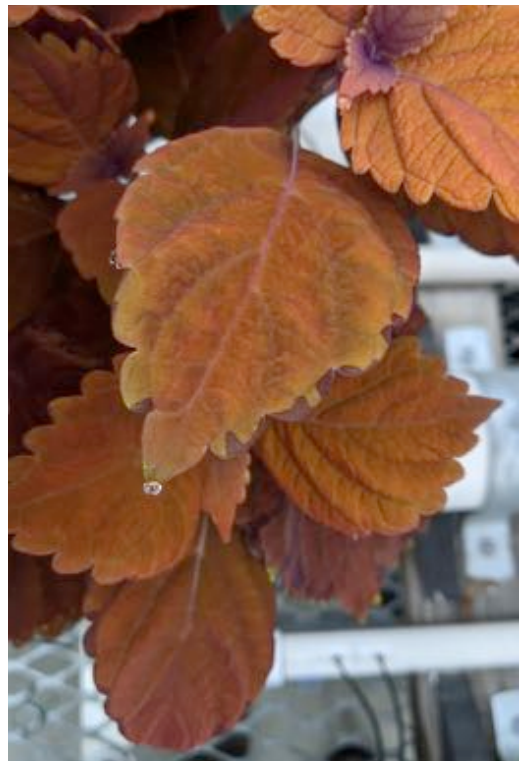


Figure 3. Water droplets can form overnight along the leaf margin due to excessive moisture and humidity and is referred to as guttation. Angular leaf discoloration can also occur and can be confused with foliar nematode infestation. (Photo: Brian Whipker)



Figure 4. Excessive temperatures will result in extended internodes resulting in undesirable stretched plants. (Photo: Brian Whipker)



Figure 5. Excessive stretch can occur if the plants are grown too long, especially with smaller, higher-density containers. (Photo: Brian Whipker)

Overscheduling

Most coleus cultivars are vigorous growers and can stretch due to being held too long or grown with too tight of spacing (Fig. 5). Growing multiple crops to have younger plants available or the use of a plant growth regulator will help avoid stretch.

Low Temperatures

Coleus prefers warm growing temperatures. If temperatures are too low, plants will be stunted and have shorter internodes (Fig. 6).



Growing Environment

Greenhouse

High Tunnel

Heated

Unheated

**Coleus
'Wall Street'**



Figure 6. Plant growth is less when coleus are grown at sub-optimal temperatures as seen on the right. (Photo: W. Garrett Owen)



Figure 7. Before (left) and after (right) photos of 'Main Street Chartres Street' coleus exposed to freezing temperatures (Photo: W. Garrett Owen)

Cold Damage / Freeze Injury

Coleus is a tropical evergreen native to Southeast Asia. It cannot withstand freezing temperatures which result in plant death (Fig. 7).

Sun Scald

Lighter leaf-colored coleus cultivars can develop sunscald symptoms if exposed to high light levels (Fig. 8). Leaves can develop a bleaching pattern or develop necrotic spotting.



Figure 8. Sunscald from high light levels resulted in bleached foliage. (Photo: W. Garrett Owen)

Fasciation

Abnormal growth in the form of wide stems can occur in coleus due to genetic abnormalities (Fig. 9) and is referred to as fasciation. Fasciation was covered in more depth in e-GRO Alert 10-29.

Chimera

Changes in leaf color or pattern are all typical occurrences with genetic drift and is referred to as a chimera (Fig. 10). If the change is desirable and stable, it may be developed into a new coleus cultivar.

Chemical Phytotoxicity

Necrotic leaf spotting (Fig. 11) can occur if the pesticide application rate is excessive, during excessively hot conditions, or if the pesticide is not suitable for applying to coleus.



Figure 9. Wide and thicker stems are typical symptoms of fasciated plant growth due to a genetic abnormality. (Photo: Brian Whipker)

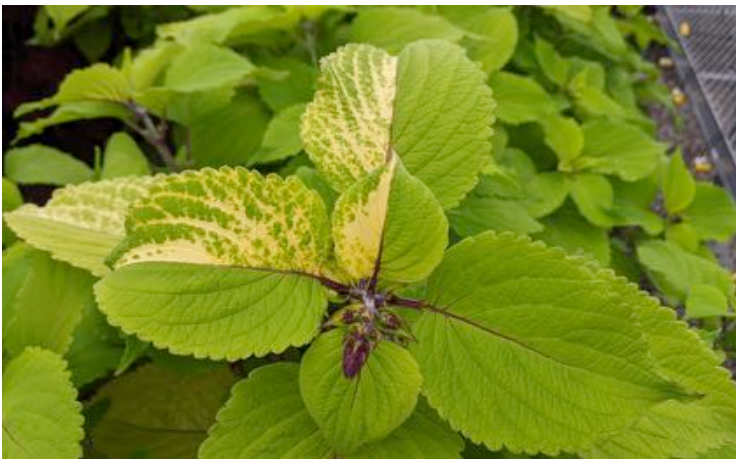


Figure 10. Leaf coloration abnormalities are referred to as chimeras due to a genetic change. (Photo: Brian Whipker)



Figure 11. Coleus are tolerant of most pesticides, but leaf spotting occurs if the pesticide is phytotoxic. (Photo: Brian Whipker)

PGR Overdose

Plant growth regulators (PGRs) are excellent tools to control excessive growth. If the rates used are too high, then stunted growth can occur (Fig. 12).



Figure 12. Excessive plant growth regulator rates can result in plant stunting (plant on the right). (Photo: Brian Whipker)

IBA Overdose

The hormone IBA promotes even root growth. If rates are excessive, stem roots can develop.

Herbicide Drift

Glyphosate-type herbicide drift can result in bleaching of the new growing point (Fig. 14). More severe exposures can result in necrotic leaves and plant death.



Figure 13. Excessive IBA rates of 800 ppm or higher can result in the development of stem roots. (Photo: Brian Whipker)



Figure 14. Bleaching of the new growth occurred when a glyphosate-type herbicide drifted in through the greenhouse vents. (Photo: Brian Whipker)

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