



by Brian E. Whipker¹
(bwhipker@ncsu.edu)

Poinsettia Fertilization: Calcium Deficiency

When a calcium deficiency develops early, it appears as a marginal chlorosis and leaf roll on the younger leaves. Late season deficiencies develop into bract edge burn.

Click to view YouTube summary: [Poinsettia Calcium](#)



2014 Sponsor



Calcium is the primary element used for building cell walls. When calcium is low, marginal leaf or bract necrosis can occur. This can occur because calcium is taken up by the plant along with the water supply, mainly through evapotranspiration. So any environmental condition which limits water uptake and water loss through the leaf can create deficiencies.

Symptoms

Calcium deficiency problems can appear on both the leaves and bracts. In the case of leaves, one



© Brian Whipker

Figure 1. Environmentally induced calcium deficiencies appear on the young leaves completing the final 50% of expansion. Symptoms appear as a marginal necrosis and leaf curling.

¹ Department of Horticultural Science, NC State University

e-GRO Alert

www.e-gro.org

CONTRIBUTORS

Dr. Nora Catlin
Floriculture Specialist
Cornell Cooperative Extension -
Suffolk County
nora.catlin@cornell.edu

Dr. Kristin Getter
Floriculture Outreach Specialist
Michigan State University
getterk@msu.edu

Dan Gilrein
Entomology Specialist
Cornell Cooperative Extension -
Suffolk County
dog1@cornell.edu

Dr. Brian Krug
Floriculture Ext. Specialist
Univ. New Hampshire
brian.krug@unh.edu

Dr. Joyce Latimer
Floriculture Extension & Research
Virginia Tech
jlatime@vt.edu

Dr. Roberto Lopez
Floriculture Extension Specialist &
Research
Purdue University
rglopez@purdue.edu

Dr. Paul Thomas
Floriculture Extension & Research
University of Georgia
pathomas@uga.edu

Dr. Brian Whipker
Floriculture Extension & Research
NC State University
bwhipker@ncsu.edu

Copyright © 2014

Where trade names, proprietary products, or specific equipment are listed, no discrimination is intended and no endorsement, guarantee or warranty is implied by the authors, universities or associations.

will observe symptoms on the younger leaves that are completing their final 50% of expansion (Fig. 1). This occurs because young leaves require a tremendous amount of calcium in order to grow and create new leaf cells. If calcium is limited, the cells along the leaf margin can die (Fig 2). Then as the cells within the leaf interior continue to expand to their normal size, leaf curling is observed.

This problem normally occurs in October when the shoots of pinch plants are rapidly growing and the plant has a high demand for calcium. If cloudy weather conditions coupled with high humidity occurs, such as what happens when back-to-back tropical storms hit the Eastern coast of the U.S., one can observe this problem. This situation is difficult to predict, therefore make sure the plants are fertilized with adequate levels of calcium from the irrigation water supply or fertilizer. If a week of cloudy weather is predicted, try to increase the airflow in the greenhouse to aid in evapo-transpiration by the

plants. Finally, calcium chloride sprays can be applied. Details are provided in the management section.

Later in the season, bract edge burn due to limited calcium can also occur on some poinsettia cultivars (Fig. 3). It is good to know that poinsettia breeding companies are actively screening for bract edge burn and susceptible cultivars are dropped. So problems with bract edge burn occur less frequently than 20 years ago. Symptoms of bract edge burn first appear along the leaf margin as necrotic spots. Under severe conditions, the entire leaf margin can turn brown.

In contrast, another problem that occurs with poinsettias is *Botrytis* bract edge burn. This disease problem is still frequently observed and can be confused with a bract edge burn. Symptoms of *Botrytis* bract edge burn appear as a discoloration along the leaf margins and rapidly move inward (Fig. 4).

Management

To prevent bract edge burn

Cooperating Universities



Cornell University
Cooperative Extension
of Suffolk County



**In cooperation with our
local and state greenhouse
organizations**



© Brian Whipker

Figure 2. Necrotic leaf margins caused by a calcium deficiency.



© Robert Eddy

Figure 3. Late season bract edge burn caused by a deficiency of calcium.

apply calcium chloride foliar sprays. Be sure to use top quality technical grade calcium chloride. Apply calcium chloride foliar sprays at the rate of 200 to 400 ppm Ca. Lower grades of calcium chloride or calcium nitrate can contain impurities that will burn the foliage and bracts.

So what can be done to prevent problems? If deficiencies occur, make sure you are supplying sufficient levels of calcium. Use either a dark weather feed or calcium nitrate. If problems occur, consider foliar applications of calcium chloride.

One should remember that 20-10-20 does not con-

tain sufficient levels of Ca to support poinsettia growth. One also needs to determine the amount of calcium supplied via the irrigation water, and if that level is low, then utilize a fertilizer that contains sufficient levels of calcium. In addition, try to maintain environmental conditions within the greenhouse that encourage good water uptake by the plant.

If conducting substrate test, the target SME values for calcium should be between 100 and 200 ppm. Also be aware that the ratio of Potassium to Calcium to Magnesium should be maintained at 4:2:1. If the level of one of those elements is too great, it can

have an antagonistic effect on the other two elements. To avoid problems, fertilizing poinsettias with a 4:2:1 such as 200 ppm potassium, 100 ppm calcium and 50 ppm magnesium to help avoid problems.

Summary

Calcium is the main building block of plant cells. Target Ca fertilization rates of around at 100 ppm and substrate levels between 100 and 200 ppm for an adequate supply. Also encourage good air circulation during periods of cloudy weather and use calcium chloride sprays if needed.

Table 1. Corrective procedures for overcoming calcium deficiency of poinsettias.	
Correction Steps – take these steps when problems occur	Notes
<p>a. Determine if the problem is a lack of Ca being supplied or a problem with the root system.</p> <p>b. Determine via substrate, fertilizer solution and tissue analysis if there is a problem of insufficient Ca being supplied. Confirm boron is adequately supplied.</p> <p>c. Provide 1 to 3 corrective application(s) of water soluble fertilizer containing 200 ppm Ca, such as calcium nitrate.</p> <p>d. After making the corrective application(s), retest the substrate to determine if the plant is now receiving sufficient Ca levels.</p> <p>e. Apply Calcium foliar sprays to bracts. See the guide: Foliar Feeding of Calcium - Ecke Ranch website: http://www.ecke.com/html/tibs/tib_foliar_feeding.html.</p>	<p>MISDIAGNOSED OR CONFUSED WITH:</p> <p>a. Pesticide phytotoxicity. (Review cultural records.)</p> <p>b. Boron deficiency. (Conduct leaf tissue analysis to determine levels.)</p>



© Brian Whipker

Figure 4. Bract edge burn caused by *Botrytis* has leaf spots which expand quickly towards the interior of the leaf.