e-GRO Alert

Brian E. Whipker[1] Patrick Veazie[1]

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It's Complicated: Rosemary Boron Problems

Stubby, clubbed, and brittle new leaves are all typical symptoms of a boron deficiency. While the resulting symptomology suggests a boron deficiency is the problem, the actual culprit is a physiological issue with water uptake and a saturated substrate.

Figure 1. Pinched rosemary plant with stunted axillary shoots. (Photo: Brian Whipker)

Holdover plants from the spring make it easier for plant problem sleuths to locate great examples. On a recent extension trip, we were able to scout a crop of rosemary plants. Overall, >99% of the plants were fine, but we were able to find a few problem plants. The new leaves were small, distorted, and brittle (Figs. 1-4). These are typical symptoms of a boron deficiency.

These plants had been pinched to trim them back when they got too large. For some reason, these did not resume normal axillary shoot development like the remainder of the crop and stalled. As time progressed, the irrigations were based on the needs of the

[1]NC State University, Dept. of Hort. Science
bwhipker@ncsu.edu

plants with normal regrowth. This resulted in overly saturated substrate conditions for the stalled plant.

Boron (B), like calcium (Ca), is taken up and transported by plants via mass flow. The primary mechanism is water uptake via transpiration. Any plant injury or environmental conditions that limit water uptake can also limit the supply of B. In the case of these rosemary plants, this is more complicated due to the physiological limits of the plants to take up the B, even though B was being provided in the fertility program.

Figure 2. The typical symptomology of a boron deficiency is stunted, clubby growth. (Photo: Brian Whipker)

Leaf Tissue Analysis

Confirming your diagnosis with leaf tissue analysis can be challenging. First of all the leaf mass is usually limited and being able to obtain a sufficient number of leaves might not be possible. Also, the principle of analyzing results is based on dry weight. The stubby leaves did not expand adequately, thus not diluting the B over a larger leaf area. So B may be reported from the test as being adequate because it is more concentrated in the small leaves.

Figure 3. Axillary shoots failed to grow and can be seen as small buds. (Photo: Brian Whipker)

Figure 4. Affected leaves are brittle and can crunch into smaller pieces. (Photo: Brian Whipker)

[With both hydrogen (H) and oxygen (O) being essential plant elements, could one argue that it was a nutritional issue instead? Hydrogen and oxygen toxicity in the form of excess water (H_2O) in the saturated substrate, coupled with an oxygen deficiency (O_2) due to the lack of adequate air space.]

Corrective Procedures

There is no economical fix to turn the affected plants around. Discarding them is the only option.

Conclusion

Boron deficiency of rosemary and other plant species can occur when B is limited. Symptomology can develop due to a physiological hindrance to uptake such as over-irrigation or poor water transpiration or when the concentration of B is too low.

CEA HERB Controlled Environment Agriculture Herb Extension & Research Base

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CONTRIBUTORS

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

Dr. Chris Currey
Assistant Professor of Floriculture
Iowa State University
ccurrey@iastate.edu

Dr. Ryan Dickson
Greenhouse Horticulture and
Controlled-Environment Agriculture
University of Arkansas
ryand@uark.edu

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

Dr. Chieri Kubota
Controlled Environments Agriculture
The Ohio State University
kubota.10@osu.edu

Heidi Lindberg
Floriculture Extension Educator
Michigan State University
wolleage@anr.msu.edu

Dr. Roberto Lopez
Floriculture Extension & Research
Michigan State University
rglopez@msu.edu

Dr. Neil Mattson
Greenhouse Research & Extension
Cornell University
neil.mattson@cornell.edu

Dr. W. Garrett Owen
Sustainable Greenhouse & Nursery
Systems Extension & Research
The Ohio State University
owen.367@osu.edu

Dr. Rosa E. Raudales
Greenhouse Extension Specialist
University of Connecticut
rosa.raudales@uconn.edu

Dr. Alicia Rihn
Agricultural & Resource Economics
University of Tennessee-Knoxville
arihn@utk.edu

Dr. Debalina Saha
Horticulture Weed Science
Michigan State University
sahadeb2@msu.edu

Dr. Beth Scheckelhoff
Extension Educator - Greenhouse Systems
The Ohio State University
scheckelhoff.11@osu.edu

Dr. Ariana Torres-Bravo
Horticulture/ Ag. Economics
Purdue University
torres2@purdue.edu

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

Dr. Jean Williams-Woodward
Ornamental Extension Plant Pathologist
University of Georgia
jwoodwar@uga.edu

Cooperating Universities

Cornell CALS College of Agriculture and Life Sciences

Cornell Cooperative Extension Suffolk County

UTIA Institute of Agriculture The University of Tennessee

Iowa State University

College of Agricultural & Environmental Sciences University of Georgia

UConn

UofA Division of Agriculture Research & Extension University of Arkansas System

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