

Nutrient Disorder Symptomology and Foliar Concentrations of *Clerodendrum thomsoniae*

Clerodendrum thomsoniae is a vine grown primarily for hanging baskets. Although grown commercially for years, limited information on mineral nutrition for *C. thomsoniae* is available. Plants were grown in silica sand culture under induced deficiency and toxicity symptoms to characterize nutrient disorders and determine foliar analysis standards. Tissue concentrations at time of initial symptom development are presented in Table 1.

Nitrogen (N): Initially, the young and youngest leaves were lighter green than the control, with mature leaves equal in color to the young leaves. Leaf variegation was less pronounced. Advanced symptoms progressed to stunted growth, lime-green new growth, and delayed flowering.

Phosphorus (P): At first sign of P deficiency, older leaves were slightly chlorotic and had rolled-up leaf margins. In intermediate P deficiency, leaves were dull green in color and had less variegation, advancing to yellowing with necrotic centers, defoliation, and pronounced curling symptoms. Plants were more compact than controls.

Potassium (K): Initial symptoms began with chlorotic older leaves with necrotic edges and slight interveinal necrosis. In later stages of K deficiency, plants were more compact than controls with an overall dull green color. Flowers also began to abort.

Calcium (Ca): Initially, Ca deficiency began with flower abortion and curled younger leaves, progressing to flowers becoming star-shaped.

Magnesium (Mg): Initially, leaf edges rolled upward, with smaller new growth. The oldest leaves were slightly chlorotic, advancing to interveinal chlorosis.

Sulfur (S): Leaves initially were a lighter green color in the top half of the plant. Flowers developed with narrow petals that curled under, giving a star-shaped appearance.

Copper (Cu): Symptoms began with strap-like youngest leaves on a compact plant. Flowering was delayed.

Iron (Fe): Plants were an overall yellowish-lime green color and some tip burn developed. As symptoms advanced, the variegation faded and the veins were green with interveinal chlorosis on youngest leaves.

Manganese (Mn): Plants were more compact with more pronounced variegation than controls. The most recently matured leaves were narrower and a strap-like appearance developed on youngest leaves.

Zinc (Zn): Initially, new growth curled and lower leaves became chlorotic. As symptoms advanced, flowers became star-shaped, with petals becoming narrower. Flowering occurred earlier than controls.

Boron (B): Deficiency symptoms began as flowers aborted and leaves curled and thickened. As B deficiency progressed, flowers opened to a star-shape and plants were generally shorter than controls. Toxicity of B showed marginal chlorosis on mature leaves, which over time became necrotic. Flowers developed with narrow petals that were slightly-curved under. Plants were generally more compact than controls.



For more information, contact: Muchha Reddy, muchha@ncat.edu, Department of Natural Resources and Environmental Design, North Carolina Agricultural and Technical State University, 1601 E. Market St., Greensboro, NC, 27411

Table 1. Tissue nutrient concentrations and dry weight as percentage of control at the initial stages of nutrient disorders in recently matured leaves from variegated-leaf clerodendrum plants grown hydroponically.

Treatment											
-N	-P	-K	-Ca	-Mg	-S	-Cu	-Fe	-Mn	-Zn	-B	+B
Elemental tissue concentration											
N	P	K	Ca	Mg	S	Cu	Fe	Mn	Zn	B	B
%						mg·kg ⁻¹					
Control plants—Initial											
3.53	0.93	3.68	2.32	0.52	0.44	7.9	114.2	219.5	9.1	21.6	23.6
Disorder plants—Initial											
1.54	0.08	1.29	0.39	0.13	0.14	1.5	49.0	21.2	5.4	4.9	73.0
Significance ² —Initial											
***	***	***	**	***	***	**	***	***	*	***	**
Disorder plants—Dry weight											
% of Control											
54	32	66	57	74	70	37	47	40	57	56	89
Significance ² —Dry weight											
*	*	NS	NS	NS	NS	**	*	**	NS	NS	*

² *, **, *** Significant at $P \leq 0.05$, 0.01 , or 0.001 , respectively, for each control and deficiency pair during the initial stage of deficiency development.