

SYMPTOMS OF NUTRITIONAL DISORDERS OF CHRYSANTHEMUMS AND GLADIOLUS

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Deficiencies of calcium, boron, copper, manganese and iron were established by omitting single elements from cultures. Growing media included aerated solutions, cypress sawdust and virgin flatwood soil. Varieties of chrysanthemums used were Bluechip, Iceberg and Portrait, and the white Excelsior variety of gladiolus.

Table 1. Symptoms of Nutrient Deficiencies in Chrysanthemums and Gladiolus

Element Deficient	Symptoms	
	<u>Chrysanthemums</u>	<u>Gladiolus</u>
Calcium	<ol style="list-style-type: none">1. Death of growing point, rosetting of leaves.2. Small, curled thickened leaves around growing point.	<ol style="list-style-type: none">1. Physiological bud (flore) rot.2. Breaking over of spikes in vase.3. Crooked spikes.4. Brown roots.

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Table 1 cont.
Element
Deficient

Symptoms

Chrysanthemums

Gladiolus

Calcium

- 3. Peduncles break over about time flower color shows, most commonly in Delmar but also in Iceberg and others.
- 4. Poor keeping quality of flowers.
- 5. Brown roots.

Boron

- 1. Anthocyanin in veins, interveinal chlorosis.
- 2. Corky veins and sides of petioles, first in recently matured leaves (epidermis breaks open).
- 3. Brittle, downward-cupped leaves.
- 4. Secondary flower buds die showing cambial browning.
- 5. Flowers do not open fully, more incurved than normal.
- 6. Rough and slightly browned petal surface.
- 7. Roots brown and stubby as in stubby-root nematode infestation. Roots affected before leaves.

- 1. Notched margins of leaves.
- 2. Translucent streaks along veins.
- 3. Break down of petal margins with rolling.
- 4. Colorless blotches in petals (flecking).
- 5. Brown roots.

Copper

- 1. Dull green leaves, chlorotic veins. Veinal chlorosis produces an inverse "netting". Margins of leaves are last to become chlorotic.
- 2. Affected leaves wilt during the day, outer margins turning upward.
- 3. Flowers are small, reflex and soft.

- 1. Drooping leaves and soft spikes usually seen first in Valeria variety. Pronounced drooping of leaves appears visually as a wilting.

Iron

- 1. Interveinal chlorosis of younger leaves becoming a general chlorosis in leaves severely affected. Deficiency not uncommon.

- 1. Yellowing of young leaves between veins. Chlorosis of entire leaves in more severe cases.
- 2. Pale green to yellow spikes.

Manganese

- 1. Generally pale green plants.
- 2. Mild interveinal chlorosis of young leaves veins are not as distinctly outlined as in iron deficiency.
- 3. Small necrotic spots occur first in middle leaves, affecting up to $\frac{1}{4}$ of the surface. First white or gray, then tan. Spots occur interveinally.

- 1. Generally pale green leaves; interveinal chlorosis not pronounced.

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