

## BULBOUS IRIS FORCING -- FERTILIZER REQUIREMENTS

It is generally assumed that the bulbs store a sizeable portion of the nutrients required for forcing; however, A. A. DeHertogh and coworkers have shown that tulips forced in a medium, such as pea gravel, that lacks nutrients require nitrogen, phosphorus, potassium and calcium. J. L. Paul, of the Department of Environmental Horticulture at the University of California at Davis, forced bulbous iris in liquid media while on a sabbatical at the Puyallup Laboratory of the Ornamental Plants Research Unit. He found that the only nutrients required for bulbous iris forcing were nitrogen, calcium and boron. J. K. Christian and I have elaborated on Paul's findings, and have estimated the tissue concentrations of these nutrients that are required for forcing.

### Nitrogen Deficiency

Severe nitrogen deficiency results in extreme stunting, leaf yellowing, and flower abortion. Some stunting, with few other symptoms, occurs with mild nitrogen deficiency. Plants with leaves containing at least 1.6% nitrogen, on a dry weight basis, can be assumed to be growing in a medium with adequate nitrogen supply. (Figure 1).



Figure 1. Bulbous iris (cultivar Ideal) grown in liquid medium lacking nitrogen (left), in medium without a sufficient amount of nitrogen (center) and in medium with adequate nitrogen (right)

### Calcium Deficiency

Extreme calcium deficiency, like nitrogen deficiency, causes stunting, flower abortion, and leaf yellowing. The leaf yellowing caused by calcium deficiency is most apparent on the youngest leaves; whereas, with nitrogen deficiency, the older leaves are the first to show yellowing. (Figure 2).



Figure 2. 'Ideal' iris plant grown with no calcium (left) and with adequate calcium (right).

A very slight calcium deficiency results in a malady called topple. With this disorder plants appear normal except for a weakness in the upper part of the flower stalk that causes the unopened flower bud to flop over. With leaf calcium levels of 0.36% or higher, no problems due to calcium deficiency should occur.

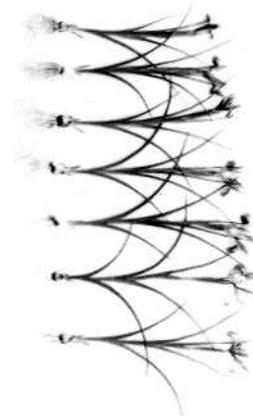
Figure 3. 'Ideal' iris plant grown exhibiting topple disorder resulting from slight calcium deficiency.



### Boron Deficiency

We have always seen deficiency symptoms when we have forced iris in liquid medium lacking boron. The most deficient plants show some stunting, and their flowers fail to open fully (Figure 4).

Figure 4. 'Ideal' iris plants grown in medium containing increasing amounts of boron ( top - bottom: ). Plant on extreme top was grown in medium lacking boron.



Perianth (the petal-like flower parts) segments on slightly deficient plants have curled edges (Figure 5). This symptom, while very typical, is quite subtle and could be mistaken for the early stages of flower wilting. With tissue concentrations of 25 pp, or greater no symptoms of boron deficiency will be visible.

Figure 5. Flowers of an 'Ideal' iris plant forced with an inadequate boron supply. Note curled edges on flower parts.

Of what practical value is this information? If iris are forced in a fertile soil or a well-formulated synthetic medium, the required nutrients should be available. However, if growers force bulbs in sand, pea gravel or other very infertile medium, it is essential that adequate nitrogen, calcium and boron be added.

**For additional information:**

Boodley, J.W. 1962. Nutrient content of Croft lily from juvenile to mature stages during forcing in three fertilizer regimes. Proc. Amer. Soc. Hort. Sci. 81:521-529.

De Hertogh, A.A., N. Blakely, and J. Barrett. 1978. Fertilization of special precooled (5°C) tulips for cut-flower forcing. Sci. Hort. 9:167-174.

Doss, R. P., J.K. Christian, and J.M. Langager. 1979. Calcium deficiency and the occurrence of topple disorder in bulbous iris. Can. J. Plant. Sci. 59:185-190.

Doss, R.P., J.K. Christian, and J.L. Paul. 1980. Nutrient requirements for bulbous iris forcing. Acta Hort. 109:133-139.

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