A molybdenum deficiency test

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Molybdenum is an essential micronutrient for plants. It is the metal constitutent of nitrate reductase, the enzyme which enables plants to reduce nitrate nitrogen and eventually form the amines which are necessary for the formation of proteins and chlorophyll (Nicholas and Nason, 1954).

There is a simple test for molybdenum deficiency. Since the nitrates cannot be utilized by the plant, they accumulate in the leaves. A chlorotic leaf that is high in nitrates is most likely molybdenum deficient. A chlorotic leaf devoid of nitrates is probably nitrogen deficient.

A nitrate reagent is all you need for a simple test. It is made by dissolving 0.2 grams diphenylamine in 100 ml concentrated sulfuric acid. It may be necessary to crush the diphenylamine granules against the side of the beaker in which it is being dissolved. Transfer to a glass bottle with a glass dropper top. If a bottle with a rubber dropping pipette is used, the rubber may degrade and drop particles into the reagent, ruining it. THIS IS A DANGEROUS MIXTURE and will burn fingers and dissolve clothing so HANDLE WITH CARE.

Molybdenum deficiency is frequently encountered in poinsettias. To test, remove a chlorotic top leaf from the plant and place a few thin slices of the petiole in a spot plate (almost any ceramic container will do). Cover with reagent and jiggle it a bit. If a blue color develops, molybdenum deficiency is probable. If no color develops, the plant is low in nitrate nitrogen. If a tissue test is made in the conventional manner by analysing dried and ground tissue a level of more than 3000 ppm nitrogen will also indicate molybdenum deficiency.

Molybdenum deficiency is more likely to occur in soilless root media than in those containing some soil. It is also more common in acid soils since ferric or aluminum molybdate may form, which is relatively unavailable to plants.

An extremely small amount of molybdenum is required for healthy plant growth. In some field crops, 2 oz. per acre provides a remarkable response. For poinsettias, an

application at 0.5 ppm in the irrigation water is recommended. This may be increased to 1 ppm if deficiency is evident. Ammonium or sodium molybdate may be used. These contain roughly half molybdenum. To provide 1 ppm molybdenum, dissolve 1 oz. molybdate (sodium or ammonium) in a gallon of water to make a stock solution. Each ounce of this stock will provide about 0.35 ppm molybdenum when diluted in 100 gallons.

Molybdate stock solution = 1 oz./gal.

For: Hozon, use 2 fl. oz. stock/5 gal.
1:100, use 3 fl. oz. stock/gal.
1:200, use 6 fl. oz. stock/gal.

Use when deficiency occurs (about 1 ppm). One application may be sufficient.

For routine fertilization use half the above amounts.

For continual fertilization use 0.1 ppm (1 oz./5 gals. for stock) and use half of the above amounts.

An excess of molybdenum is not a serious concern. Plants apparently tolerate an excess better than an excess of other micronutrients (Purvis, 1955). It is required in smaller amounts than any other essential element. Make certain it is present but don't overdo it. Many commercial soluble fertilizers contain micronutrients including molybdenum. Check the product label.

Molybdenum deficiency is not common but may occur more frequently as soilless root media become more widely used. Poinsettias are more prone to deficiency than most other crops but perhaps the deficiency exists more frequently than we suspect since the symptoms may not be as evident in other plants.

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