THE USE OF UREA-FORMALDEHYDE NITROGEN ON GREENHOUSE CROPS

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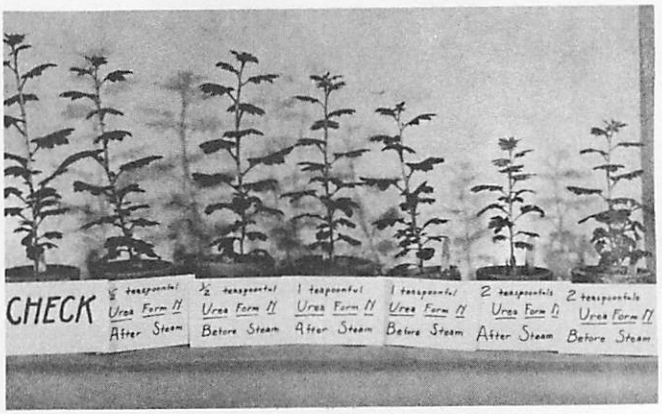
Review

There has been considerable discussion as to the place of Urea-Formaldehyde nitrogen in a greenhouse fertilization program. The grower is interested in what it can and cannot do and how much it will cost. In a previous article (1), it was shown that Uramite (DuPont's Urea-Formaldehyde formulation), at a rate of 1/2 teaspoonful per 4-inch pot mixed with steamed soil to which phosphate and potash had been added, stimulated plant growth over a period of time. Rates of 2 teaspoonfuls and sometimes 1 teaspoonful per 4-inch pot were harmful. Plants tested included Azalea, Cyclamen, Geranium, Hydrangea, Marigold, Philodendron, Sweet Alyssum, and Saintpaulia. Top dressings were successfully used on Hydrangeas but caused some injury on one lot of Croft lilies. The nitrogen supply from the Uramite usually appeared to be inadequate after 3-4 months.

Poinsettias

This winter a test was made on the effect of Urea-Formaldehyde on Poinsettias. Rooted cuttings of the variety Albert Ecke were potted in mid-October in 4-inch pots containing 0, 1/4, 1/2, 1, and 2 teaspoonfuls of Uramite mixed with steamed soil. Considering the effect of the treatments on bract size, number of leaves and height, the 1/2 teaspoonful rate was the most favorable. A few larger plants survived the 2 teaspoonful rate showing that plant vigor may influence how high a dosage of nitrogen they can tolerate. The plants treated at the 1/2 teaspoonful rate were of very good quality. This growing procedure should be tried by some commercial growers, as all that was done was to plant the rooted cuttings in the prepared soil, place the pots on a constant water level bench in a 60°F house and wait for Christmas.

Cream Mefo



Shasta

Mixing with soil before or after steaming

Several growers have asked if Urea-Formaldehyde fertilizers can be mixed with the soil before steaming as this is the usual time to mix in peat, lime, and phosphate. Although advertisements indicated that the material could be added at any time, it was decided to see if steaming accelerated the breakdown of the fertilizer. In one commercial range, chrysanthemums were found to be sensitive to Urea-Formaldehyde so this was chosen as the test plant. Borden's 38 was added to the soil before and after steaming at rates of 0, 1/2, 1, and 2 teaspoonfuls per 4-inch pot of soil. No other fertilizer materials were applied. Before treatment the potting soil had a pH of 5.2.

Varieties Cream Mefo, Encore and Shasta were planted in freshly prepared soil (within 24 hours of treatment) on December 22. Yellow Marketeer was planted in freshly prepared soil on January 3. The plants were photographed and records of plant heights taken on February 10. The varieties varied considerably in their reaction to the fertilizer. As seen from Table I and photographs, Cream Mefo and Encore were severely injured by Borden's 38 at the 2 teaspoonful rate when applied before steaming, while Shasta was not greatly affected. Steaming the fertilizer in the soil at the 1 teaspoonful rate also had quite an adverse effect on Cream Mefo and Encore. The main point to consider is that with Cream Mefo and Encore, 3 out of 5 plants were dead in the soil treated before steaming with 2 teaspoonfuls of Urea-Formaldehyde per 4-inch pot.

This test indicates that the 2-teaspoonful rate is excessive for chrysanthemums and also that for some crops on some soils putting the material in the soil before steaming can be dangerous both at the 2 teaspoonful and 1 teaspoonful rate. Therefore, it is probably best never to put Urea-Formaldehyde fertilizers in soil before steaming.

Con't on page 3.

Urea-Formaldehyde--Con't from page 2.

TABLE I

Effect of Concentration and Steaming of
Urea-Formaldehyde Fertilizer on Growth of Chrysanthemums

Variety	Height of Plants in Inches						
	Check	1/2 tsp.[a] after steaming	1/2 tsp.[b] before steaming	1 tsp. after steaming	1 tsp. before steaming	2 tsp. after steaming	2 tsp. before steaming
Cream Mefo	13[c]	14	11	11	5(1)[d]	8	6(3)
Golden Herald	9	9	8	8(1)	7	7	5(1)
Shasta	14	12	12	11	10	8(1)	8
Encore	13	14	12	11	7(1)	10	4(3)

(a) Fertilizer added after soil was steamed

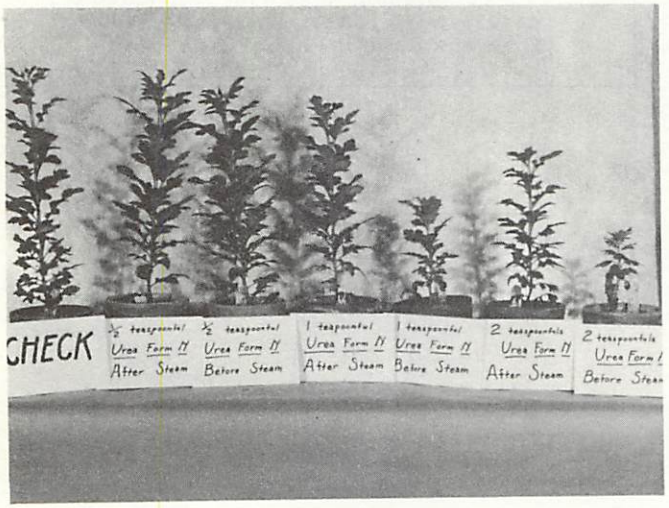
(b) Fertilizer added and steamed with the soil

(c) Averages of 5 plants

(d) Number in ( ) refers to number of dead plants

Cost

How does nitrogen from Urea-Formaldehyde compare in cost with nitrogen from other sources? Cotton seed meal, a 3% nitrogen fertilizer, costs about $5.75 per 100 pounds or $5.75 for 3 pounds of nitrogen. Therefore, each pound of nitrogen costs $1.92. Organic Green, similar to Milorganite, an organic fertilizer, costs about $4.70 per 100 pounds. It contains 5 pounds of nitrogen and 4 pounds of phosphate. If 4 pounds of phosphate is worth about $.50 based on the cost of super phosphate, the cost of 5 pounds of nitrogen would be $4.20 or $.84 per pound. The cost of a 50-pound bag of Urea-Formaldehyde fertilizer is about $13. This is $26 for 100 pounds of 38% nitrogen or $.68 per pound of nitrogen. The cost of nitrogen in Urea-Formaldehyde is slightly cheaper than in Organic Green fertilizer and much cheaper than from Cotton seed meal. They are similar in effect. Urea, a 42% nitrogen fertilizer, costs about $8 for 80 pounds or $8 for 33.6 pounds of nitrogen, which comes to $.24 per pound for nitrogen. Ammonium sulfate costs about $3.50 per 100 pounds of 16% nitrogen or $3.50 for 16 pounds of nitrogen. This reduces to $.22 the cost per pound of nitrogen. Both these forms of nitrogen are considerably cheaper than the slowly available organic forms.



Encore

Yellow Marketeer

Where a more long lasting supply of nitrogen is desired under conditions of heavy watering or leaching such as with roses and pot plants, it can well be worth the difference in price to use organic nitrogen. Nitrogen from Cotton seed meal is considerably more expensive than from Urea-Formaldehyde--$1.92 versus $.68 per pound. The difference in cost between nitrogen from Organic Green and Urea-Formaldehyde types depends to some extent on the value of the organic matter: in Organic Green, if the organic matter is of no direct or indirect value, the cost of nitrogen would be $.84 per pound. If the value of the organic matter were $1, the nitrogen would cost $.64 per pound, which is slightly lower than that of Urea-Formaldehyde nitrogen which is $.68 per pound.

Conclusions

Urea-Formaldehyde fertilizers are not complete but only nitrogen fertilizers. They supply nitrogen over a period of about 3 months and are not readily affected by leaching. Other fertilizer materials should be used at the same time to furnish the other nutrients or incorporated into the soil earlier. Table II gives favorable rates of application when mixed with the soil after steaming. Too much Urea-Formaldehyde fertilizer causes burning. It may not be advisable to mix Urea-Formaldehyde fertilizer with the soil before

Con't on page 4.

steaming. The nitrogen from Urea-Formaldehyde sources is comparable with nitrogen from other organic sources but is three times as costly as inorganic nitrogen. It may be worth the difference where its long lasting properties are desirable like with heavily watered crops such as roses and pot plants.

TABLE II

Optimum Rates of Application for Mixing with Soil

Urea-Formaldehyde	Soil
1/2 teaspoonful	4" pot *
2/10 pound	1 bushel
3-inch pot	2 bushel
4 1/2 pounds	1 cubic yard
2 level 6-inch pots	1 cubic yard
7 pounds	100 square feet
3 level 6-inch pots	100 square feet

* 28.3 cubic inches in a 4-inch pot

(1) New York State Flower Growers Bulletin 122

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