Greenhouse Tests with Urea-Formaldehyde Nitrogen

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Introduction

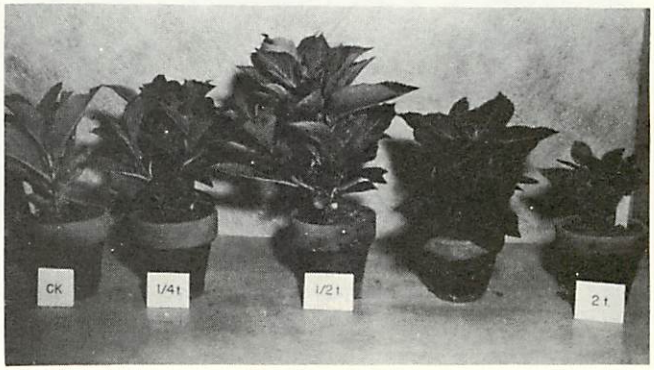
For some time, growers have been looking for a synthetic nitrogen fertilizer which would act similarly to the slowly available animal organic nitrogens.

Certain Urea - Formaldehyde combinations have produced a formulation which gives slowly available nitrogen. This product has been tested for several years on turfgrass with encouraging results. Also, this nitrogen source has been used experimentally on greenhouse crops by research workers in California. Results there also appeared encouraging. With this previous experience, it was decided to try this material in greenhouse ranges on Long Island. The material used was a DuPont product called Uramite which contains 38.5 percent nitrogen, three quarters of which is cold water insoluble. Because of its slow and uniform nitrogen release, it can be expected to replace two to five applications of the more soluble forms of nitrogen that growers use today.

Winter Tests

The first series of greenhouse experiments were made on hydrangeas, lilies, carnations, philodendrons, cyclamen, geraniums, tuberous begonias, and African violets during the months of January to April. These tests were made at the following Long Island greenhouse ranges: Charles Beckman, North Bellmore; A. M. Dauernheim, Wantagh; Eric Gedalius, Valley Stream; Oscar Maier, North Bellmore; Otto Muller, East Meadow; Wheatley Gardens, Greenvale. Two methods of application were used: (a) the material was mixed thoroughly with potting soil; and (b) surface applications were made to established plants in pots, flats, and on benches.

Where the nitrogen fertilizer was mixed with the soil prior to potting, it was used at rates of 0, 1/4, 1/2, 1, and 2 teaspoonfuls per 4-inch pot of prepared soil.



Hydrangeas (left to right) zero, 1/4 tsp., 1/2 tsp., 1 tsp., and 2 tsp. Urea-Formaldehyde nitrogen per 4-inch pot.

Where the material was used as a top dressing on established plants, it was used at rates of 0, 1 teaspoonful, 2 teaspoonfuls, 1 tablespoonful, and 2 tablespoonfuls per 7-inch pot. On an established bench crop of carnations, the material was tried at 0, 3, 5, and 7 pounds per hundred square feet. In the tests where it was deemed advisable to add P and K, these materials were added at recommended rates of application by using superphosphate and muriate of potash.

Results

In treatments where the fertilizer was mixed in the soil, the best results were obtained at the 1/2 teaspoonful per 4-inch pot rate. In almost all cases, the 2 teaspoonfuls per 4-inch pot rate caused considerable root injury seriously affecting the tops. The 1/4 teaspoonful rate did not supply enough nitrogen for optimum growth over a prolonged period.

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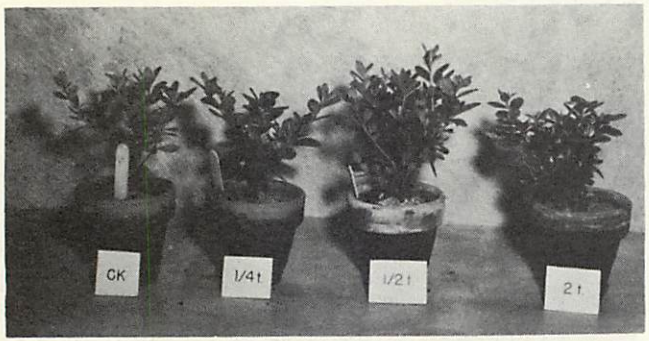
On the carnation bench that was treated at the rates of 0, 3, 5, and 7 pounds per hundred square feet, no production records were taken; however, there was no injury observed at any of these rates of application. In some tests, there was severe injury to Croft lilies even when used at the lower rates of application.

Hydrangeas in 7-inch pots top dressed with the Urea-Formaldehyde nitrogen were not injured by any of the rates of application used in this test series. The growers reported outstanding quality, with compactness and large leaves very evident on plants treated at the rates of 1 teaspoonful and 1 tablespoonful per 7-inch pot. It would appear that the optimum rate of application for hydrangeas would lie somewhere between these two rates--2 teaspoonfuls per 7-inch pot.

Summer Tests

These tests were carried on in the greenhouses of the Ornamentals Research Laboratory in Farmingdale. Young plants of geraniums, azaleas, hydrangeas, Sweet Alyssum, and marigolds were potted in soil which had been previously prepared with Uramite at rates of 0, 1/4, 1/2, 1, and 2 teaspoonfuls per 4-inch pot. Superphosphate was mixed with the soil at the rate of a 3-inch pot per 3 bushels of soil and muriate of potash at a rate of 3-inch pot per 12 bushels of soil. These two latter materials plus the Uramite insured a complete fertilizer in the soil mixture.



Azalea "Hinodegeri" (left to right) zero, 1/4 tsp., 1/2 tsp., 1 tsp., and 2 tsp. Urea-Formaldehyde nitrogen per 4-inch pot.

At these rates of application, the best plants were grown where the Uramite was mixed with the soil at the 1/2 teaspoonful rate. With all plants tested except the Sweet Alyssum, there was considerable injury at the 2 teaspoonful rate.

The photographs shown represent a fairly typical response to the concentrations of Uramite used. The 1/2 and 1 teaspoonful rates also produced the best foliage color.

Conclusions

The Urea-Formaldehyde nitrogen is released over a long period of time, and therefore its use may fit into a pot plant program. With all the plants tested, there appeared to have been an optimum rate of application. An overdose can cause severe injury. When mixed with the soil, a rate of 1/2 teaspoonful per 4-inch pot of soil (1 level 4-inch pot of Uramite per 3 bushels of soil, 2/10 lb. per bushel, 4 1/2 lbs. per cu. yd., 7 lbs. per 100 sq. ft. of bench soil) was best for the plants tested and would be a good strength to try with other plants. For established plants in 7-inch pots, the 2 teaspoonful surface application rate looked the most promising for hydrangeas; lower rates may be safe for Croft lilies.

Where plants are grown for periods over 3 months it may be necessary to supplement the nitrogen from the Urea-Formaldehyde with soluble nitrogen. This is largely because of the plants increased nitrogen requirement. This is due to the greater plant growth because of the plentiful nitrogen supply.

Urea-Formaldehyde is a more expensive form of nitrogen, but its increased cost may easily be balanced by reducing the labor required for the more numerous applications of a more soluble form of nitrogen. Growers are urged to give this new fertilizer a trial, but are cautioned against extensive use until it is amply tested on their crops and under their growing conditions.

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