CONTROLLED-RELEASE NITROGEN ON AZALEAS

J. R. Breece, R. H. Sciaroni, R. F. Hasek and T. Furuta[1/]

The use of controlled-release nitrogen in conjunction with regular liquid or dry fertilization programs has resulted in increased growth of many ornamentals. Greatest plant growth response from this combination is achieved when the reserve nutrient in the mix is initially low, or the regular fertilization program is less than adequate, or the nitrogen requirements are high, or the mix is not able to maintain a moderate reserve of nitrogen, or a combination of these factors exist. While these qualitative determinations are valid, quantitative relationships and guidelines have not been established.

During 1967, field experiments were conducted in two commercial nurseries to test controlled-release nitrogen sources on azalea plants.

Southern California

At the Ruline Nursery, Fallbrook, California, azalea plants of the variety, "Chimes", were grown in six-inch clay pots in a medium of coarse German peat moss. Other than the test nitrogen, no fertilizer was added to the peat before potting the plants. During the growing season, the fertilizer program consisted of regular liquid fertilization (constant) with nitrogen (108 ppm), potassium (54 ppm), and phosphorus (78 ppm), derived from diammonium phosphate, ammonium nitrate and potassium nitrate. All plants in the study received this fertilization.

Two sources of controlled-release nitrogen --- urea-formaldehyde at one-half, one and two pounds of nitrogen per cubic yard, and sulfur-coated urea at one-fourth, one-half and one pound of nitrogen per cubic yard were studied and compared with no nitrogen incorporation. The plants were potted in the spring and final growth observations made in October.

Plant growth data recorded in October are reported in Table 1, page 6. While some differences were measured, these were not large enough to be significant statistically. The type of growth exhibited by azaleas apparently masks beneficial effects when only plant size is considered. Thus, the use of controlled-release nitrogen under the conditions of this study did not result in increased plant growth. Just as significantly, the rates of incorporation did not result in injury or reduced plant growth. It should be noted that this study was completed before the beginning of natural rainfall when the frequency of irrigations are drastically reduced.

Apparently the azaleas in this test did not suffer from any of the conditions where controlled-release nitrogen incorporation exerts a beneficial effect. A comparison with no nitrogen incorporation in a mix initially low in N was not possible--the peat used in the Ruline Nursery test had some nitrogen as a reserve.

Northern California

At the Half Moon Bay Nursery, Half Moon Bay, three varieties of azalea - "Snow", "Buccaneer", and "Hexe" - were grown in a medium of 1 part coarse sand, 9 parts fir bark. Experiments were started in mid-June of 1967. Initial fertilizer incorporation consisted of (for each cubic yard of mix) 5 pounds single superphosphate, 7 pounds dolomite, 2 pounds iron sulfate and 2 pounds potassium sulfate. Nitrogen incorporation comparisons were: 0.6, 1.3, and 2.6 pounds of N per cubic yard from urea-formaldehyde, and 1.7 pounds of N per cubic yard from hoof and horn and potassium nitrate. The regular fertilization program consisted of constant feeding with nitrogen (210 ppm), phosphorus (37 ppm) and potassium (41 ppm) from diammonium phosphate, ammonium nitrate and potassium nitrate.

Incorporation of controlled-release nitrogen

Symptoms of overfertilization were evident

1/ The authors are Farm Advisor, San Diego County; Farm Advisor, San Mateo County; Extension Floriculturist; and Extension Ornamental Horticulturist, Agricultural Extension Service, University of California.

Table 1 - Size of Plants of azalea treated with two sources of controlled-release nitrogen (Ruline Nursery).

Treatment[1]	Ave. Plant Height Inches	Ave. Plant Diameter Inches
Control	14.0	15.0
Urea-Formaldehyde		
1/2 lb. N per cubic yard	14.7	13.8
1 lb N per cubic yard	13.8	14.7
2 lb. N per cubic yard	15.0	15.0
Sulfur-coated urea		
1/4 lb. N per cubic yard	14.5	14.3
1/2 lb. N per cubic yard	14.7	15.2
1 lb. N per cubic yard	15.0	14.7
LSD .05	ns	ns

1 Incorporated before plants placed in soil mix of peat moss.

at the 2.6 pound rate of incorporation. Some differences due to variety were noted. Often the symptoms of overdose were the same as too little--poor plant growth. Observations on plant growth during the experiment revealed that the controlled-release nitrogen source of urea-formaldehyde was not superior to the hoof and horn-potassium nitrate source of nitrogen incorporated before planting. This experiment did not permit comparison with no nitrogen incorporation.

Top dressing with controlled-release nitrogen.

By October 1967 it was evident that most of the influence of the controlled-release nitrogen incorporated in mid-June was gone. Additional studies were established on the original plants to gain information on the use of controlled-release nitrogen as a fall top-dress treatment. Sulfur-coated urea was applied on part of the plants that did not originally receive controlled-release nitrogen. The material used had a dissolution rate of 1 per cent in 24 hours and a total nitrogen content of 26.2 per cent. At the same time, half of the plants that had received controlled-release nitrogen were topdressed with urea-formaldehyde nitrogen.

Observations made six weeks after topdressing in October disclosed no response to the urea-formaldehyde topdress and a striking response to the sulfur-coated urea top-dress. Plants of the variety "Snow" showed new growth when treated with sulfur-coated urea, the amount of growth being proportional to the amount used. Plants of the variety "Buccaneer" showed less growth than the plants of the variety "Snow". Very little vegetative growth was noted on plants of the variety "Hexe". However, the foliage color of all of the varieties treated with sulfur-coated urea was improved.

The lack of response to urea-formaldehyde may be attributed to temperature. Rate of mineralization of the urea-formaldehyde into soluble nitrogen is dependent on temperature. Apparently the soil temperature was too low for rapid mineralization. This factor may limit the usefulness of this form of nitrogen as a fall topdress to container plants.

Varietal differences in response to sulfur-coated urea is partially explained by the stage of growth. Plants of the variety "Hexe"

were initiating flower buds during the test period, thus less vegetative response. Flower bud initiation was intermediate with "Buccaneer". During the same time, plants of the variety "Snow" were highly vegetative.

Azalea plants grow vegetatively only for a short period of time before flower buds are set at the end of each shoot. Therefore, the timing of surface applications of materials such as sulfur-coated urea is of the utmost importance in producing maximum vegetative growth.