Synthetic Fertilizer Tested

new odorless nitrogen source of low solubility shows promise in investigations with ornamentals

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Uramite—a combination of urea and formaldehyde—is a type of recently developed plastic with many of the favorable characteristics of organic nitrogen.

Because the fertilizer is a synthetic product, there should be little variation in its properties such as occurs in many organic fertilizers which may vary greatly in different lots. This new product offers the advantages of nitrogen release over a long period of time; safety, because of low solubility; it is odorless, so it does not attract flies, nor does it seem to encourage algae growth on the surface of the soil after top dressings are made.

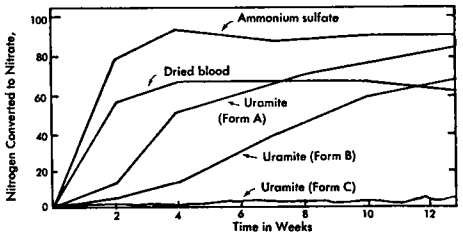
Most nitrogen sources—except some organic types—are readily soluble in water and are easily leached from the soil. Consequently, nitrogen is the most difficult of the plant nutrients to manage in a fertilizer program.

Nitrogen usually occurs in the soil solution either as nitrate or ammonium. Nitrate is not absorbed by soils and can easily be leached with normal irrigation practices. Ammonium is absorbed to some extent by the soil, but it too is rather easily leached in well-drained soils by average irrigation waters containing 500 to 1,000 ppm—parts per million—soluble salts. Even when an ammonia source of nitrogen is applied to a soil, about 80% to 95% of it is converted to nitrate in two to three weeks under average growing conditions. Therefore, in ornamental plantings where prepared soil mixes—which drain readily—are usually used, nitrogen levels are especially difficult to maintain.

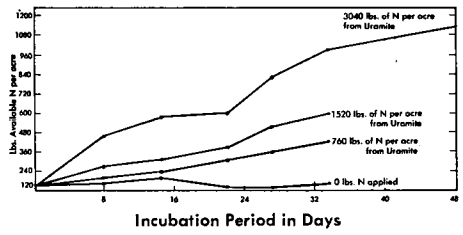
With organic sources of nitrogen—hoof and horn meal, dried blood, cottonseed meal, and others—only a portion of the nitrogen is immediately soluble. The remainder must be mineralized over a period of time before it is available to the plant or susceptible to leaching.

In general, organic nitrogen sources have had two principal advantages: *1.* Initial solubility is usually low, thus minimizing the dangers of over-fertilization, with resulting salt damage. *2.* Nitrogen is mineralized to the available forms over a period of time, thus helping to maintain a more uniform supply.

Conversion to Nitrate of Various Sources of Nitrogen During Periods Indicated.*



** The graph is based on an article by K. G. Clark, Bureau of Plant Industry, U.S.D.A., in the June–July 1952 issue of* Crops and Soils.



Conversion of Insoluble Nitrogen in Uramite to Water-soluble Forms.
(Moist soil was incubated at 76° F ± 2°)

Mineralization of organic nitrogen takes place over a shorter period of time than is rather widely believed. Other research workers have shown that under favorable soil conditions about 80% to 85% of the organic nitrogen—which was eventually mineralized during a growing season—became available during the first three weeks after application. This was true whether the recovery of nitrogen was low—20% of total—or high—50% of total.

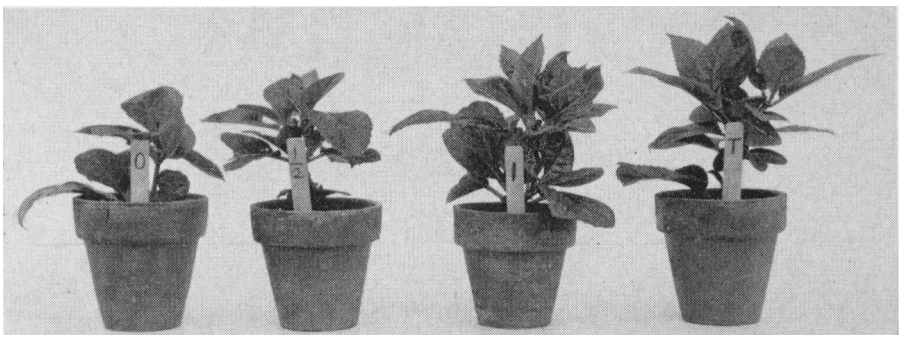
Laboratory and field tests with Uramite containing about 38% nitrogen showed that the material was mineralized to the available nitrogen forms over a considerable period. In most cases, as indicated in the upper graph on this page, the rate of mineralization reached a peak during the third to fifth week after application, but two months after treatment it was still high. No marked difference in rate of mineralization occurred in soils with relative acidity-alkalinity—pH—values between five and eight. A pH value of seven is considered to be neutral.

The tests also indicated that the rate at which additional nitrogen is made available from Uramite drops to low values within 3½ to four months after heavy applications are made. Therefore, even with a material such as Uramite, fertilization may be necessary about three times a year to maintain nitrogen in good supply in well-drained soils under greenhouse conditions.

Data obtained in the laboratory indicate that about 10 pounds of Uramite per 100 square feet may be safely applied in a single application.

Field tests on greenhouse azaleas, carnations, roses, and snapdragons in both ground beds and raised benches have shown that five to six pounds of Uramite per 100 square feet broadcast as a top dressing produced no injury. In some cases, the treatments were repeated every three months, with no harmful effects. With potted plants—poinsettia, Croft lily, chrysanthemum, cyclamen, hydrangea—top dressings of 1½ to two teaspoonfuls per 6″ pot produced no damage. The quality of the plant growth on the Uramite nitrogen program was excellent in all cases. With carnations, chrysanthemums, and hydrangeas, the quality of the plants was the best in the growers' experience.

Hydrangeas, variety Rosabella, 43 days after application of Uramite. *Left to right:* O, no treatment; ½ teaspoon Uramite; 1 teaspoon; and 1 tablespoon.



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