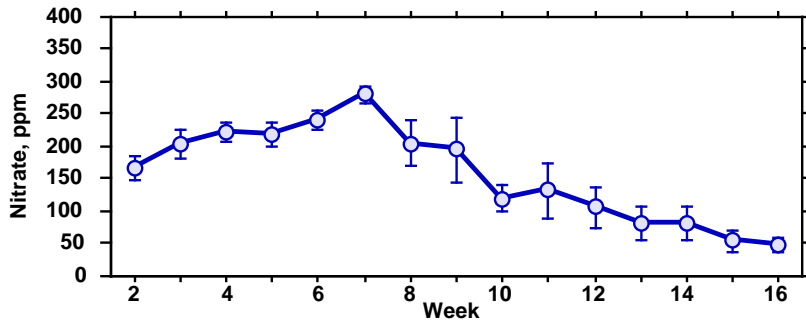
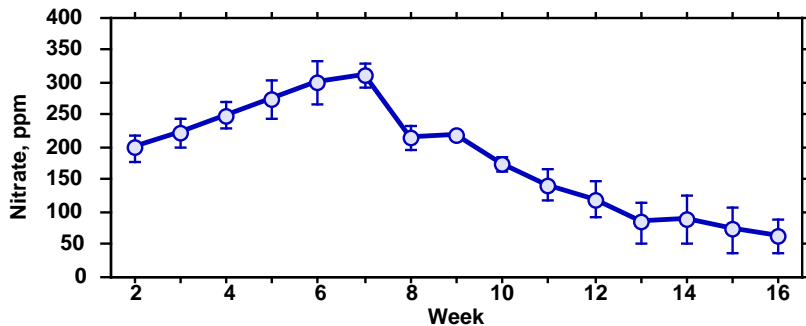


## Controlled Release Fertilizers



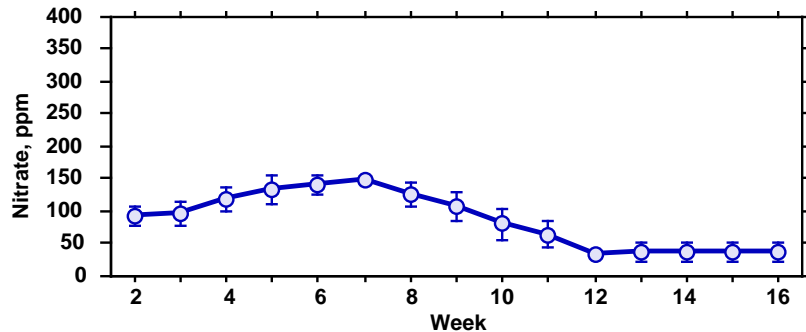
### Sulfur Coated Urea (SCU):

Thickness of the resin coating determines the release rate of this fertilizer. Release increases with higher temperature and higher moisture. Release rate is also affected by micro-organisms. 37% N with 4% water soluble and 33% slow release urea.



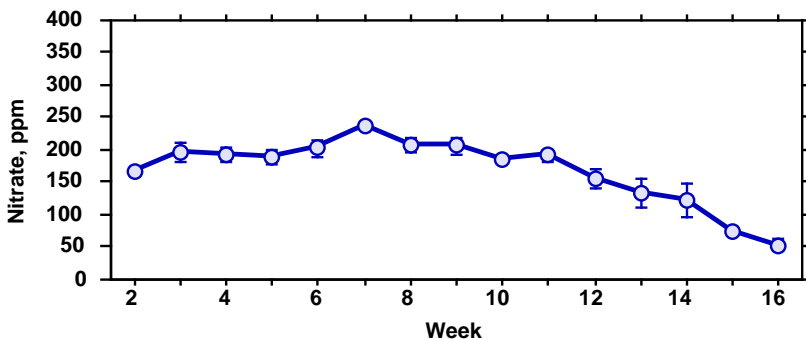
### Nutralene:

A methyl-urea polymer. Contains both water insoluble and slowly available N. Exposure to moisture and soil micro-organisms releases N. Release increases slightly with increased temperature. At lower temperatures this fertilizer releases N for 12-16 months. 40% N with 5% urea, 20.5% slowly available water soluble and 14.5% water soluble N.



### Nitroform:

Polymerization of urea with formaldehyde. N release occurs by soil micro-organisms and temperature. Three forms of N mixed together: cold-water soluble, cold-water insoluble, and hot-water soluble. Release is faster under warm, moist conditions. 38% N with 27% water insoluble and 11% water soluble.



### Iso-butylidene-diurea (IBDU):

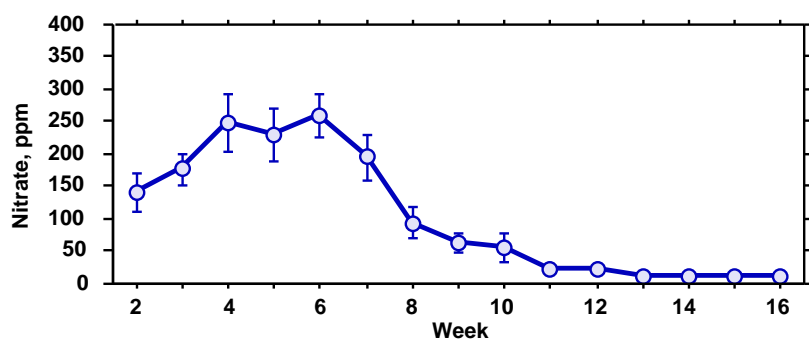
Composed of two urea molecules linked by a carbon group. Not affected by soil micro-organisms. Comes in a range of sizes, release of nitrate is faster with smaller granules. Slowly soluble. This fertilizer had the longest release of N of all fertilizers tested. Low pH and high temperatures increase solubility. 30% N.

The results of this study indicate that IBDU performed the best as a controlled release fertilizer maintaining a steady release over a 12 week period. By using IBDU, a constant supply of N can be made available for an extended period of time. In contrast, the other fertilizers showed peaks meaning that the N was released too quickly and over a shortened period of time. It should be noted that fertilizer behavior varies with soil type and environmental conditions.

## Fertilizer Behavior on Ija Soil.

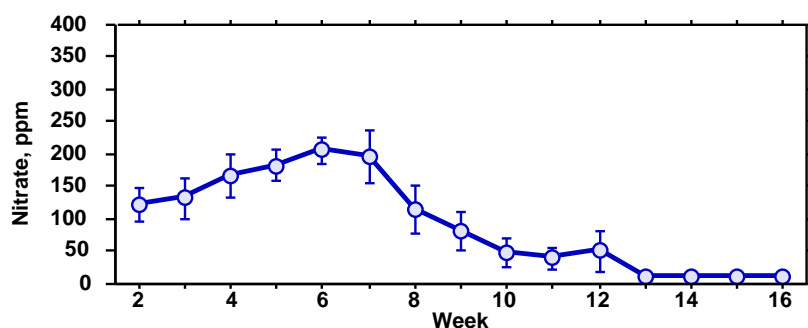
The use of N fertilizers is a common and necessary part of successful turfgrass culture. There are two main types of fertilizers, those which release N immediately upon exposure to water, and those that release N over a longer range of time. In an effort to get the most efficient use of N fertilizers, various fertilizers were compared for their leaching behavior on three soils common on Guam. Controlled release fertilizers did not differ from water soluble fertilizers on porous, high pH soils but differences did occur on Ija soil from southern Guam (See AG FAXTS 94-4). The following is a summary of the relative leaching behavior of 6 fertilizers on Ija soil, a slow draining soil with a pH of 5.0.

### Water Soluble Fertilizers



#### Ammonium Nitrate ( $\text{NH}_4\text{NO}_3$ ):

Nitrate highly soluble and available immediately to the plants. Ammonium is adsorbed to negatively charged clay particles and is also immediately available to plant roots. Ammonium is converted to nitrate by micro-organisms. Relatively expensive. 35%N.



#### Urea ( $\text{CO}(\text{NH}_2)_2$ ):

Contains highest amount of N by weight of any granular source. Cheapest cost per pound of granular N sources. Is mineralized to ammonium carbonate, then nitrified to  $\text{NO}_3$  by micro-organisms. 45% N.

M. Hamilton, F. J. Cruz, and J. McConnell—GCE Publication # 94-5. 1994.

The Guam Cooperative Extension. Issued in furtherance of Cooperative Extension Work, Acts of May 8, and June 30, 1914, in cooperation with the United States Department of Agriculture. C.T. Lee, Dean/Director, College of Agriculture and Life Sciences, Cooperative Extension System, University of Guam, UOG Station, Mangilao, Guam 96923. "The programs of the University of Guam Cooperative Extension are open to all regardless of age, race, color, national origin, religion, sex, or disability." This project was funded by USDA Special Grants Program for tropical and Subtropical Agriculture Research Project # 91-34135-6136 and by a grant from the Smith-Lever Act Section 3(d), for the Water Quality Initiative. Project #91-EWQL-1-9311.