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The Search For Controlled Nitrogen Release

If you can control nitrogen release, hopefully you can control:

A. Grass burn from high as well as low nitrogen rates.
B. Leaching which prevents nitrogen efficiency.
C. Labor costs in application and maintenance.
D. Rate of growth for more uniform results.
E. Flexibility in scheduling fertilizer application.
F. Wear on machinery.

Organic materials offer safety but result in mineral buildups that cause rapid release during hot periods and little or no release in cold periods. They are hard to handle and are not usually complete mixes.

The first major breakthrough came with the aldehydes and combinations of ion exchange resin fertilizer. Users experienced good steady release but little or no release in cool weather. Microorganisms played a role in the release of N. as well as temperature. Many aldehyde combinations were tried, e.g., urea formaldehyde. The urea-formaldehyde combination worked well but became very expensive. Over one-third of the Nitrogen was rendered insoluble and very slowly available over many years to the grass plant. Many combinations with so-called "hot" fertilizers were tried which resulted in too fast a release or too slow a release. Still they offered better results that had previously been obtained with other products.

To improve upon organics and urea aldehydes, slowly-soluble materials were developed. These products worked but had great variations. To eliminate the variation, coatings were developed. These coatings worked well until a hole developed. Then a rapid release resulted. The idea of mixing coated particles with small non-coated particles resulted in time capsule release. Unfortunately, the coatings broke down.

After the coatings and aldehydes came the idea of mixing slowly soluble compounds with urea. These then depended upon hydrolysis for rate of release. The material I.B.D.U. (Isobutylidene Diurea) became very popular. Its use was expanded from rice to tree crops to grass and then vegetables, etc. With this material the requirements for a slow controlled release nitrogen were found. Cost then became a factor. While cheaper than organics and urea-forms and several combinations, it still was more expensive than urea. With cheap and adequate labor, urea still was king.

In an effort to come close to the urea cost, sulphur coated urea was tried. Here urea was coated with sulphur in varying degrees. This worked well but could only be used in areas where the excessive sulphur could be tolerated. Cracks developed in the sulphur and urea leaches out which results in a loss of control.

At present the golf course superintendent uses several combinations of all the sources mentioned. Each through experimentation has settled upon the material that best fits his labor, finances and master plan. Each still searches for the best combination, e.g., organics, urea, urea formaldehydes, I.B.D.U., coated materials and many combinations of the above.

The search still goes on.