WHATS NEW IN TURF FERTILIZERS

D. K. Mosdell
O. M. Scott, Marysville, OH

Although 16 mineral elements have been shown to be essential for growth and development of turfgrasses, we tend to focus our attention on the nitrogen (N) requirements. There are a number of reasons for this: (1) nitrogen concentration in plant tissue is greater than any other element; (2) turfgrass growth is more responsive to N applications than other elements (as long as adequate levels of other elements are present); and (3) there are numerous sinks for N that reduce availability to turf.

Realizing the large nutritional requirements for N, much of the fertilizer research has focused on maximizing plant uptake of applied N. A portion of this research involves using controlled release technology to prevent N losses as a result of excess growth (clipping removal) and to reduce amount of N available for avenues of N loss such as volatilization, leaching and denitrification. In addition, excess growth can also be detrimental to the health of the plant since stored carbohydrates (sugars) are utilized to support shoot growth. Less sugars would be available for other processes such as root growth and turf recovery after periods of stress. Also, controlled release N sources enable a turf manager to extend time between applications and improve turf safety over soluble -N sources.

I will confine my discussion to new controlled release N fertilizers since most of the new developments have occurred in this area. Agronomic research has demonstrated need and potential of improved controlled release technologies but manufacturing process feasibility or economics have slowed some technologies while others have capitalized on process improvements. The ureaformaldehyde technology is one example of the latter. Research has shown that the short-chain methylene ureas are more biologically active, meaning more N available to the plant within a reasonable time frame.

The HWIN fractions (hot water insoluble N) are extremely slow to release N and may extend beyond one or two growing seasons. Advances in the process area have allowed Scotts to maximize desired chain lengths which offer greater flexibility and predictable product performance.

On the liquid side, a number of companies including Acadian (N-Sure), Coron, Georgia Pacific have introduced water soluble, controlled release N sources. They offer higher N analysis and greater stability than the UF suspension-type slow release liquids. Test results with N-Sure (Triazone) have shown excellent turf safety, less surge growth and greater residual than soluble -N sources. N-Sure is a urea-triazone solution. Triazone has a ring configuration containing 41% N and require microbial degradation for release of N.

Other advances in controlled relase technology have come in the area of encapsulation. Sulfur-coating is an effective, economical means of controlling the dissolution rate of urea. However, as more sulfur is applied to urea to extend the N release rate we find more sulfur coated particles will not release within a growing season. This reduced the efficiency of the

applied N. In 1987 Scotts received a patent for the addition of a modifier or plasticizer to sulfur for coating fertilizers. This plasticizer modifies the structure of sulfur when coating fertilizers. The end result is at higher sulfur coating levels we find a near linear N release rate that approaches 100% release of applied N. Coating level changes the amount of initial and rate of N release.

Inert or plastic coated fertilizers are popular in the container ornamental and greenhouse industries. Osmocote was first patented in the early 60's but has had limited success in turf markets. New advances in applications of polymers to fertilizers and new coating polymers which are effective at low coating weights have reduced the costs of these materials to a point where they may be competitive in turf markets. There are a number of companies working on polymer (inert) encapsulated fertilizer. Rate of N release is dependent on thickness of watering (in most cases), temperature and, to a limited extent, moisture.

Organic fertilizers are certainly not new but some advances have been made in manufacturing to make them easier to handle and even smell more pleasant. Plants take up N in the inorganic forms so organic fertilizer must be mineralized to plant available inorganic N by microorganisms. Nitrogen release rates of organic fertilizers will vary with the organic N source. Some organic fertilizers contain soluble N and others have been processed (hydrolyzed) to make the N more available. Milorganite has been available over many years while Restore and Rejuvinate are more recent introductions.

I have outlined some new fertilizer technologies that have been introduced or will be shortly. In evaluating turf fertilizers there are some points I consider important. I feel it is important to understand the factors effecting the N release rate. Get as much information from the manufacturer or tech rep as possible. This information may influence when and how you use the product such as temperature effects on late fall N applications. Also, determine amount of N you want to apply to achieve the desired response. Some of the slow release materials may need to be applied at 1.5 to 2.0 lbs N per 1000 sq. ft. to produce adequate turf quality. You may be willing to use lighter rates and more frequent applications so a shorter residual fertilizer would be a better selection. Finally, attend state turf conferences and field days to learn about available products and how they perform in trials and if possible, do some testing yourself to see if a product produces the results you desire.