

Working Smarter, Not Harder Or (Liquid Fertilizers are Effective In Fall Fertilizer Programs)

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Most, if not all of us, know how hard we can work but do we really know how to work smart. Questions concerning the way we do things usually are left unanswered and instead evoke the response "I've done it this way all along so it must be right (after all, I'm working hard)". Its working smarter when we challenge ourselves to analyze the 'hows', 'whats', and 'whys'.

I use this to introduce the subject of a recent conversation with golf course people during which the following question and comment were made.

"Why not use liquid fertilizers in the fall like we do in the summer? After all, if they perform so well under (summer's) stressful conditions, won't they give the same benefits in the fall."

That comment provokes thought and analysis. **LET'S BE SMARTER.**

First when we talk about fall fertilization programs, what do we want to accomplish? Usually it is to

- (1) Maintain top quality playing conditions throughout the remainder of the season;
- (2) Relieve plant stresses incurred over the summer; and,
- (3) Precondition the grass plants for winter survival, as well as provide early vigor the following year.

These are a greatly diverging set of conditions. From the plant's point of view one means "keep me going at a good pace"; another means "catch-me-up"; and a third means "slow me down". Obviously, the entire fall season exists in which to accomplish this. Fall seasons however, vary from year to year, so turfgrass managers need to have maximum control. Control which allows you to stage each of these conditions at the appropriate time. One good method to achieve this level of control is by using liquid fertilizers. Full formula liquid fertilizers offer the capability to best manage valuable turf.

Secondly, and more specifically, a fall fertilizer program must improve the turf through

- (1) plant propagation;
- (2) root proliferation; and,
- (3) plant hardiness.

With a decrease in temperature and moisture stress, fall provides an opportunity to revitalize turf vigor. Deep rooting, healing and general vigor need to be promoted. Cooler temperatures and abundant moisture only facilitate stress relief, whereas sound nutrition promotes health and vigor.

Plant propagation is simply thickening the stand. After the mowing, traffic, temperature and moisture stresses of summer, the plant is weakened. Consequently, so are tiller and rhizome development. Since Bentgrass tillers and rhizomes develop most during September and October, N, P and K are required to stimulate that development. N is required for foliar coverage. Growth responses also result from P and K applications. The 3:1:2 N-P-K ratio has been cited as a well-balanced feed for turfgrass. Applications of a balanced fertilizer at bi-weekly intervals promote rejuvenation by supplying nutrients without causing excessive growth.

Liquid fertilizers provide an easy and efficient means for

"limited feeding". With nutrients being more available and coverage more thorough, each plant is nourished at the desired rate and to the desired level. In Bentgrass, high soil levels of P and K favor *Poa annua* invasion. Frequent, low rate foliar applications can mitigate against raising soil levels for these elements. Where P and K levels are already high, liquid fertilizers can provide a means for feeding without exacerbating the soil problem. Also, University of Illinois research suggests that greater emphasis be given to late summer-fall fertilizer programs since high N rates applied in spring caused a higher incidence of disease (*Fusarium* and *Helminthosporium*) in susceptible varieties.

Rooting proliferation, as is the case with plant propagation, is retarded by stress during the summer. Fall then becomes the time to play catch-up as well as improving root growth. Even though rooting activity is at a maximum in the fall, research shows that N and K nutrition increase the rate of activity. The benefits resulting from improved rooting are obvious, yet the situation of supplying nutrients without over-stimulating top growth can be tricky. The means for accomplishing this follows the same rationale used in plant propagation. Caution must be used however, since excessive N can restrict rooting by shifting the plant's metabolism too much towards foliar production. Hence the need to control the balance between top growth and root growth.

Plant hardiness for winter survival requires preconditioning. Here too, turfgrass plants often must be brought from sub-optimal conditions to a high level of condition. In that conditioning phase, the plant's metabolism shifts towards increasing levels of protein and total non-structural carbohydrates in the tissue. Although temperature has an effect on these functions, proper nutrition enhances metabolism. Balanced N-P-K feeding improves winter hardiness. Studies have shown that raising the level of K enhances the effects of N on winter hardiness. However, high and unbalanced N rates will reduce hardiness through increased tissue hydration.

Micronutrients make the plant's utilization of the major nutrient even more efficient than the balancing of N, P and K. They increase enzymatic activity, and in many cases, the protein and carbohydrate metabolic functions necessary for winter survival.

The liquid fertilizer system gives good control and allows the fertilizer management system to meet the three objectives of **maintaining, relieving and preconditioning** the grass.

The keys to a fall fertilizer program should be 'balanced' and 'controlled' nutrition. **Balance** means providing nutrients in the proper ratios. Plant growth must continue throughout the latter part of the growing season and provisional nutrition must be made for it. However, feeding must not supercede the plant's endogenous rhythm that is taking it into the hardening process. That is, sufficient nutrition in the correct balance will promote plant vigor without delaying the winter hardiness process. Feeding limited quantities throughout the fall season allows the turf manager **control** over the amount and rate of feeding, according to the plant's needs and the type of season.

To review what your fertilizer program must do, it must be: adequate for plants' to recuperate from summer's stress; sufficient to maintain good growth necessary for a playable, well-conditioned course; and subsequently, allow the plant to harden

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for winter. These can only be achieved through good management. Don't rely totally on climate to control the release of nutrients. Remember, each year varies from the other end and you may end up with an undesired release of nutrients. Excessive top growth has an adverse effect on the plant. (In addition, it can have negative consequences for the manager when summer help is gone and additional mowing is required).

The question then is: How can liquid fertilizers meet this challenge? The very characteristics that make it desirable for a summer fertilizer program are the attributes you want for a fall program.

- Safe - low burn potential
- Controllable - low rates uniformly applied every 14 days supplies the plant's requirements of fertilizer nutrients without overstimulating growth. As the season winds down you can fertilize according to the plant's need.
- Effective - plants perk-up and maintain vigor and health. A 3-1-2 ratio amended with micronutrients provides efficient fertilizer utilization by the plant.
- Complimentary - tank mixes of fertilizer with fungicides or

herbicides (if necessary) can be made. This provides the basis for implementing an efficient, effective total **preventative** program.

- Easy to handle - totally water soluble which allows precise feeding. Sprayed uniformly over the entire area, each plant is fed, regardless of the rate of application.
- Cost effective - (1) high valued greens as well as tees are fertilized with the correct fertilizer formulation and treated independently from fairways. (2) Minimal amounts of fertilizer are lost when greens etc. are clipped since fertilizer on leaves is partially absorbed foliarly while the remainder runs down towards the crown and roots. (3) Fertilizer is applied at rates which allow it to be **consumed** 'to the max!', not left to the consequences of the environment.

The Final Analysis. Fertilizing at ¼ lb N every two weeks costs approximately 0.5 cents per square yard. Good nutrition is a primary factor in maintaining a healthy green. By comparison if weedy species, Poa annua for example, or disease encroach forcing replacement, that square yard will cost a minimum of \$4.00. NOW LET'S BE SMART.



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