Turfgrass Nutrition Strategies

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Turf and lawngrass nutrition can be complicated. In order to adequately meet plant needs, a combination of different strategies may be employed. Dr. Jim Beard has devoted considerable time and effort to research in this area. Here he presents the following for your consideration.

- There are 9 major effects of **nitrogen** on turfgrasses:
  1 - shoot growth;
  2 - root growth;
  3 - shoot density;
  4 - color of foliage;
  5 - disease proneness;
  6 - heat, cold and drought hardiness;
  7 - wear tolerance;
  8 - recuperative potential and rate;
  9 - composition of the turfgrass community.
- Nitrogen rate of application should be limited to no more than one pound of nitrogen per 1000 square feet of water soluble types.
- The first response of nitrogen is on color of foliage. There are many gradations of green. The darkest green turf is not necessarily the most healthy.
- Nitrogen has an effect on disease. The application rate, the nitrogen carrier and application timing can either increase or decrease disease incidence.
- Under low nitrogen turf management, grasses are more prone to dollar spot, red thread and rust, for example.
- Use of nitrogen carrier Oxamid has resulted in no brown patch on St. Augustin grass.
- Timing of nitrogen applications in the late fall have produced more snow mold.
- Look for nitrogen deficiency first by checking the tips of older leaves (the lower and outer leaves). When they are pale green, this is the first indication. The yellow of these leaves will progress toward the base as deficiency intensifies.
- Nitrogen deficiency is encouraged by removal of clippings. As much as 2 pounds of nitrogen per 1000 square feet may be lost in a year.
- Coarse textured soils that are low in organic matter are prone to production of nitrogen deficient turf.
- Where there is intensive rainfall, nitrogen leaches away and the turf becomes nitrogen deficient.
- **Phosphorus** is not readily leached from the soil. At soil pH levels from 6 to 7, it is most available. In addition, turfgrass requirements for phosphorus are low.
- Phosphorus has 4 major effects on turfgrasses:
  1 - aids in establishment;
  2 - promotes rooting;
  3 - causes maturation of plants;
  4 - enhances seed production.
- When phosphorus is deficient, the foliage becomes darker green — a dull bluegreen. Older leaves exhibit this coloration first. Only a little phosphorus is required to correct this.
- **Potassium** is a good turf restorer. It affects rooting, drought, heat and cold hardiness, wear tolerance and disease proneness.
- With adequate potassium, there may be ⅓ more roots. More roots are observed under conditions of moisture stress.

(cont'd. page 14)

(Turfgrass Nutrition cont'd.)

- Hardiness is related to soil temperature (both hot and cold) and only indirectly to air temperature. Nitrogen to potassium balances are important in the promotion of turf hardiness - 2 to 1 or 3 to 2 (nitrogen to potassium). This balance is needed year around.
- With more potassium, there is less wear damage on turf. Up to 3.6 pounds of potassium per 1,000 square feet per year have been found beneficial.
- Addition of potassium has led to increased resistance of turf to brown patch, dollar spot and fusarium.
- Potassium is subject to luxury consumption by turfgrasses. High levels are not needed but grasses accumulate it anyway. After growth rates no longer increase with added potassium, these other hardiness benefits may continue to be noted. Natural concentrations of potassium in the soil are seldom adequate. These need to be increased for maintenance of healthy turf.
- **Sulfur** was thought for years not to be a limiting factor in the growth of turfgrass.
- Sulfur availability is reduced at pH levels below 6. At that point the foliage looks like there is a nitrogen deficiency.
- **Iron** is the most likely micro-nutrient to become deficient. Zinc and copper are heavy metals that do not move much in the soil. Higher than normal concentrations can lead to toxicity. Iron is required in very small amounts. At pH above 7, there is reduced availability.
- Iron is important for root and shoot growth for drought hardiness and for dark green foliage.
- Intervenal yellowing of the youngest leaves developes as iron becomes deficient.
- A foliar application of iron can produce a response in just 30 minutes.
- In turfgrass nutrition, nitrogen and potassium are the key.
- Nitrogen requirements of the turf are based on need indicators — pounds of nitrogen per growing month per 1000 square feet. Zero nitrogen is the lowest and the highest amount of nitrogen ranges from 0.5 to 1.5 pounds per 1000 square feet.
- The objective of turfgrass management is to grow grass and maintain the existing quality of turf.
- There are timing guidelines for use of nitrogen:
  not during heat stress;
  not during drought stress;
  30 to 40 days prior to winter where turf is subject to snow mold and winter kill, nitrogen should not be used;
  watch for disease proneness;
  watch for weed infestations.
- Use potassium in mid-summer where traffic is a problem.
- Use nitrogen after slicing and aerification.
- Use nitrogen after disease has run its course.
- Use phosphorus based on soil test results. Also, base potassium application on soil test results.
- Sixty five to eighty percent of the nitrogen applied may be matched 1 to 1 with potassium.
- Iron can function as a part of the nitrogen requirement by substituting it for nitrogen. Use iron at 2 ounces per 1000 square feet.
- From day 1 to day 5 following mowing, there is a 40 percent increase in the water use rate as leaves regrow.
- Eighty to ninety percent of the water lost by turf is through stomata. Most stomata close at mid-day and stay closed for a couple of hours. There is not as much foliar absorption of iron during this period.