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This report discusses some of the issues being dealt with in local fertilizer ordinances. This summarizes nitrate leaching findings from the UF-IFAS research project conducted in 3 locations statewide over an 8 year period. The research was completely and solely funded by the Florida Department of Environmental Protection.

1. A summer ban on fertilizing with nitrogen during the summer months (June 1 – September 30)

Results do not support the summer fertilizer ban; in fact, the data indicate that this is the time when the grass can best take up the applied nitrogen and will use it most fully (Figure 1).

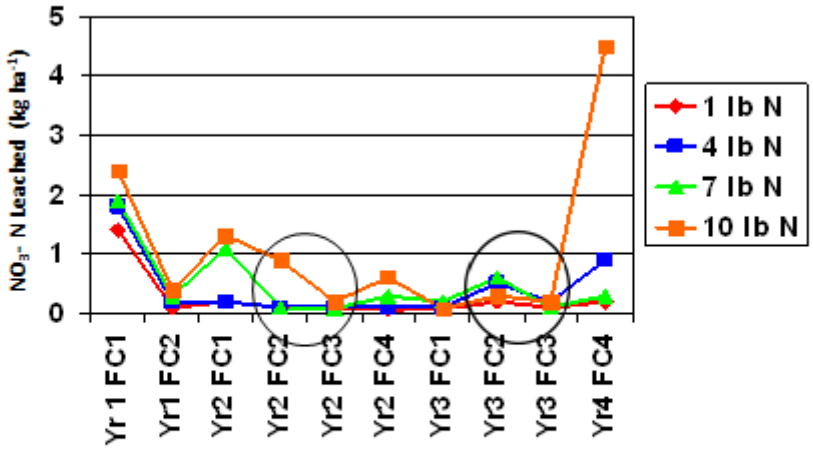

Figure 1. Nitrate-N loading from Floratam St. Augustinegrass from July 2005 through Nov 2008 in response to nitrogen rate treatments. Nitrogen was applied at 2-mo intervals during the growing season in Citra, FL as water soluble urea at annual rates of 1,4,7, or 10 lbs of N per 1,000 square feet. FC in the legend refers to "Fertilizer Cycle", defined as the 60-day interval between treatments and represents the total cumulative nitrate-N loading for that time period. In yr 1, FC1 = July-Aug and FC2 = Sept-Oct. In yrs 2 and 3, FC1 = April-May, FC2 = June-July, FC3 = Aug-Sept, FC4 = Oct-Nov. The circles in yrs 2 and 3 represent the time that a proposed fertilizer ban would be in effect.

For the Marion County area where this research was conducted, the recommended annual N rates for St. Augustinegrass range from 2-5 lbs. N per 1,000 square feet. In yr 2, FC2, there were no significant differences in cumulative nitrate-N loading regardless of the range of N rates applied. In yr 2, FC 3, nitrate-N loading differed between treatments, with the 10 lb rate greatest, followed by the 1 and 4 lb rates, which were statistically equal, and least loading from the 7 lb rate.

In yr 3, FC2, highest loading occurred from the 7 lb rate, followed by the 4, 10 and 1 lb rates. In yr 3, FC3, greater loading occurred from the 10 lb rate, with no differences between the other 3 rates. Nitrate-N loading rates were lowest in the summer months than in spring and fall.

When nitrogen was applied at the recommended UF rates during the growing season, nitrate-N concentrations were often well below the minimum detection limit of the analytical instrument. Minimum detection limits and all sample collection, handling, storage and measurements followed Environmental Protection Agency protocols. When the nitrate-N concentrations were below the detection limits of 0.15 ppm, which was often the case (they were often zero), Florida Department of Environmental Protection Quality Assurance protocols required that a value of 0.15 ppm nitrate-N be inserted as the concentration recorded for that sample.

These results demonstrate that *actively growing*, healthy turfgrass mitigates NO_3–N leaching from fertilization events and that the summertime is the time when nitrate-N loading is reduced in a healthy, well maintained grass. Figure 2 represents the typical annual growth habit of a warm-season turfgrass. Note the lack of both shoot and root growth during the non-growing season (fall- late winter) as compared to the ample shoot and root growth during the summer. It is this growth of both shoots and roots that provides the filtering ability of the warm-season grasses during the summer months.

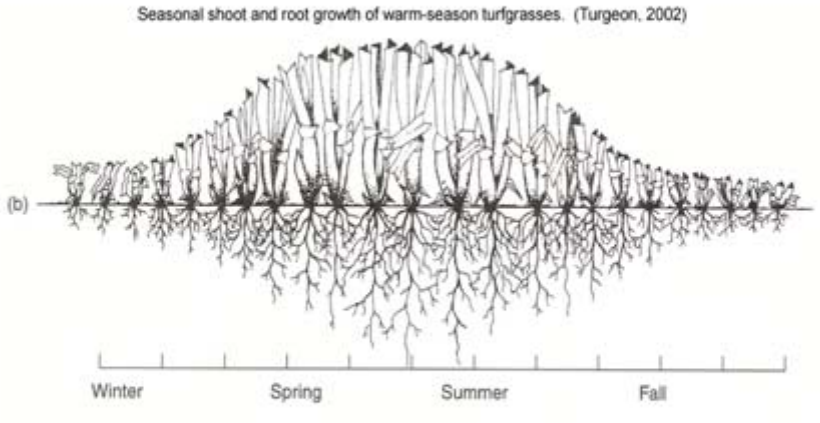

Figure 2. Warm-Season Grass Growth Curve

It should also be considered that a growing season fertilizer ban may result in application of fertilizer during the winter months in order for the lawn care provider to meet contractual obligations and provide the recommended rates of fertilizer. Another study conducted under the Florida Department of Environmental Protection research project looked at nitrate-N loading during the winter months in Citra and Jay, FL. In Citra, monthly applications of water soluble urea were made to Floratam St. Augustinegrass and UltimateFlora zoysiagrass at 0, 1/8, ¼, ½, 1 and 2 lbs N per 1,000 square feet monthly fropm Nov-Mar. In yr 1, the grass was not established when the study began but results were similar for yrs 2 and 3 (Figure 3 shows results from yr 2).

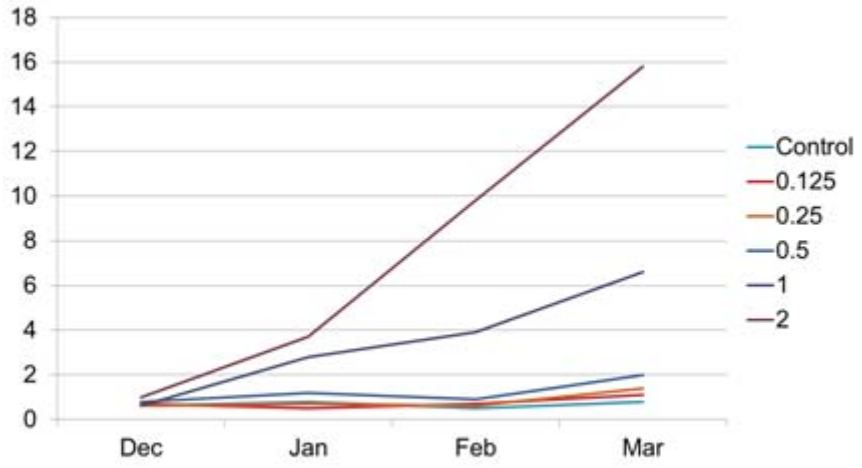

Figure 3. Cumulative monthly nitrate-N loading from St. Augustinegrass from application of various N rates monthly during the winter.

There were no differences in nitrate-N loading up to 0.50 lbs N per 1,000 square feet, but at the 1.0 lb N per 1,000 square feet rate , greater loading occurred in Jan., Feb. and Mar. At the 2 lb N per 1,000 square feet rate, greater loading occurred in Feb or Mar.

2. No phosphorus without a soil test

We support the Florida Department of Agriculture and Consumer Services Urban Turf Fertilizer Rule (RE-1.003(2) FAC), which recommends application of no more than 0.25 lbs P_2O_5 per 1,000 square feet for any single application and no more than 0.5 lbs P_2O_5 per 1,000 square feet applied annually without a soil test. While turf needs for phosphorus are lower than for the other primary macronutrients, it is still an important nutrient for plant cellular function and deficiencies could result without application of the nutrient.

3. Ten foot buffer around any body of water

We support the Florida Department of Environmental Protection/UF-IFAS Green Industries Beat Management Practices recommendation that professional applicators be allowed to fertilize up to 3' from a water body if using a deflector shield on rotary spreaders or 10' if not using the shield. Not fertilizing a 10' bank area could potentially result in increased soil erosion, with the soil sediment providing potentially major inputs of nonpoint source pollution into the water body.

4. At least 50% slow release nitrogen

There are advantages and disadvantages to both water soluble and slow release N sources, but our Florida Department of Environmental Protection research project showed that nitrate-N loading did not often differ significantly due to N source when fertilizer was applied to a healthy turf at the recommended rates. Because of the dense shoot and deep root system found in an actively growing turfgrass, either N source was taken up rather than lost when applied during the growing season. Figure 4 shows cumulative year-round data sampling for 2010 by treatment.

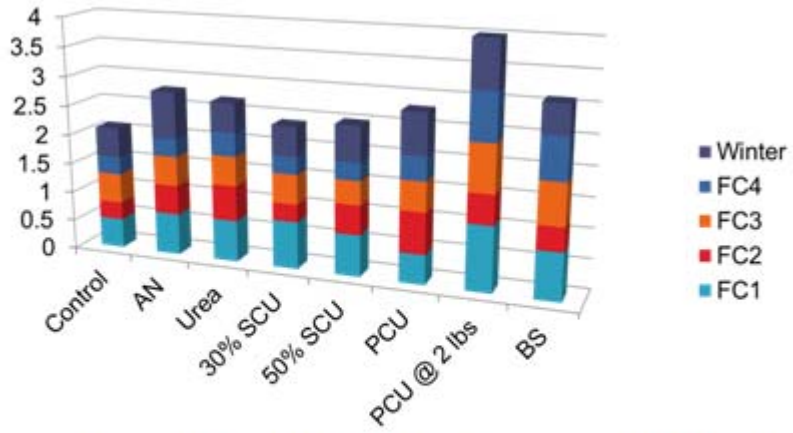

Figure 4. Cumulative annual nitrate-N loading due to N source. Treatments were applied every 60 days at 1 lb N per 1,000 square feet for a total of 4 lbs N per 1,000 square feet annually unless otherwise noted. Treatments from left to right: Control=no N, AN= ammonium nitrate (water soluble), Urea (water soluble), 30% Sulfur Coated Urea (slow release), 50% Sulfur Coated Urea (slow release), PCU= polymer coated urea (slow release), PCU@2 lbs = polymer coated urea (slow release) applied at 2 lbs N per 1,000 square feet every 120 days, BS=biosolid (slow release).

Data bars are delineated by cumulative sampling period throughout the year, including winter, when no treatments were applied, but plots were sampled for any residual nitrate-N loading. There were no significant differences in nitrate-N loading for any treatments in any of the cumulative sampling cycles. There were likewise no differences in 2008 and 2009. In 2011, there was an interaction of nitrogen source and grass (Figure 5 shows results for St. Augustinegrass).

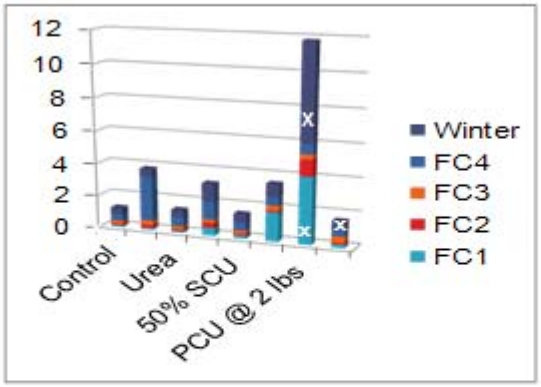

Figure 5. Cumulative annual nitrate-N loading due to N source. Treatments were applied every 60 days at 1 lb N per 1,000 square feet for a total of 4 lbs N per 1,000 square feet annually unless otherwise noted. Treatments from left to right: Control=no N, AN= ammonium nitrate (water soluble), Urea (water soluble), 30% Sulfur Coated Urea (slow release), 50% Sulfur Coated Urea (slow release), PCU= polymer coated urea (slow release), PCU@2 lbs = polymer coated urea (slow release) applied at 2 lbs N per 1,000 square feet every 120 days, BS=biosolid (slow release).

Significant differences are marked with an x on the treatment and FC that had greater nitrate-N loading. The PCU applied at 2 lbs every 120 days had greater loading in FC1 (April-May) and throughout the winter sampling period. The Biosolid treatment also had greater loading during the winter sampling period. It should be considered that some of the extended release products applied in October following the ban period may still release nitrogen during the dormant period, when the grass has less

ability to take up the nutrients and more leaching might occur during the winter. Use of a product with less slow release properties at this time, such as a lower percentage of slow release N would be more appropriate.

I hope that this is helpful for the Council members as they consider this important decision. Please do not hesitate to contact me if there are further questions.

Sincerely,

Laurie E. Trenholm
Professor, Environmental Horticulture