The Water's Edge

Many turfgrass areas border water features, whether they are golf course fairways or lakeside home lawns. This often raises concern over the potential influence of turfgrass on water quality and the runoff of fertilizers and pesticides. Therefore, it behooves the turfgrass manager to be mindful of management practices implemented on these critical buffer areas that border surface water bodies to minimize runoff.

Research has been underway at Oklahoma State University for the last ten years on Bermudagrass buffer strip size and management. Recently the research has focused on the effect of consistent versus graduated mowing heights within a buffer strip. This study evaluated a buffer strip mowed consistently at 2" versus mowing the strip at 1", 1.5" and 2" within the same strip creating a mowing gradient within the plot.

Runoff amounts and fertilizer runoff were evaluated under natural rainfall and irrigation events. The graduated mowing regime reduced overall runoff water volume over 15 percent and nitrogen and phosphorus losses by as much as 20 percent compared to the single mowing height of 2". Furthermore the time when runoff occurred was extended by 4 hours on the graduated mowing plots compared to the single mowing height.

In general, 2 percent of the applied nitrogen and 6 percent of the applied phosphorus were lost to irrigation just four hours after fertilization regardless of management. This was determined to be sufficient to cause unacceptable nutrient loading of surface water bodies. Therefore, any effort that reduces runoff amount, even by a small percentage can have a dramatic effect on the nutrient movement from turf adjacent to water features.

While this work was conducted on Bermudagrass there are clear lessons for cool season turf. The ability of various turf heights to slow runoff from occurring and reducing overall volume is worthy of implementation rather than mowing the buffer strip at a single mowing height right to the water's edge.

From: *Moss, J.Q., G.E. Bell, M.A. Kizer, M.E. Payton, H. Zhang, and D.L. Martin. 2006. Reducing nutrient runoff from golf course fairways using grass buffers of multiple heights. Crop Sci. 46:72-80.*

K and Soil Testing

Potassium is an important macronutrient that is typically applied in the greatest amount after nitrogen. While the recommended method for determining potassium need is by soil testing, many turfgrass managers simply assume it is needed and will apply it in similar amounts to nitrogen. Clearly we need to more fully understand if potassium is in fact required to be applied at these rates and it seems getting better soil testing methods for potassium would be a logical first step.

Research at Cornell University has been investigating the use of potassium, especially striving to improve the efficiency of potassium use. The first of several experiments focused on assessing the ability of soil testing methods for detecting differences in potassium levels and if soil potassium levels provide evidence of changes in tissue potassium levels in case of deficiency.

A mixed stand of creeping bentgrass and annual bluegrass putting green turf was grown on a calcareous sand, pH 8.2 and treated with 0, 5, 10 and 20 pounds of potassium per 1000 square feet for three years. The plots all received about 3.5 pounds of nitrogen per 1000 square feet. We evaluated five soil extraction methods and found each method was able to detect differences in soil potassium levels albeit to different degrees. In addition, we found that maximum tissue potassium levels were reached at soil test values well below what would be considered adequate to maintain healthy turf. This suggests that soil test interpretation may be overestimating need and that soil tests do not correlate with tissue levels in a way that would help identify deficiencies.

Our research has consistently shown that there is much to learn (or relearn) about potassium management. Having precise soil testing methods would be a good first step but it appears that while we can detect differences, there is much work to do regarding whether an application of potassium fertilizer is needed. We believe that the published N:K ratios of 1:0.5 or 1:0.25 is likely adequate to maintain high quality turf.

From: *Woods, M.S., Q.M. Ketterings, and F.S. Rossi. 2004. Effectiveness of standard soil tests for assessing potassium availability in sand rootzones. Soil Science 170:110-119.*

Scanning the Journals

A buffer strip mowed consistently at 2" versus mowing at 1", 1.5" and 2" within the same strip created a mowing gradient within the plot. The graduated regime reduced runoff water volume over 15% and nitrogen and phosphorus losses by 20% compared to single mowing height of 2".

Soil test interpretation may overestimate need; soil tests do not correlate with tissue levels in a way that would help identify deficiencies.