

## Does Coring Increase Runoff?

There is increasing concern over the runoff of nutrients, especially phosphorus (P). Fertilizer regulations are being considered in spite of the lack of data to support the contribution of turf fertilizer to increasing P concentrations in surface water. In fact, a significant amount of data exists to support the role of turf in stabilizing soil and reducing the particulate movement of P.

Core cultivation (aeration) that removes a plug of soil from the ground is known to be an important practice for high quality turf. Studies have demonstrated the short term benefits of compaction relief, increased infiltration by reducing soil layering and bringing soil to the surface to enhance overseeding operations. However, there is concern over the potential increase in soil runoff of P following core cultivation.

Researchers at Penn State University conducted an experiment on perennial ryegrass and creeping bentgrass growing on a silt loam soil. One half-inch diameter tines were used to disrupt about 15 percent of the soil surface and cores were processed on the surface leaving soil accumulation on the surface. A simulated 50-year rainfall event (six inches per hour) was applied to the plot to generate runoff.

Results indicated that soluble P from a fertilizer application made 24 hrs prior to simulated rainfall did result in significant levels of P runoff from the core cultivated turf. This effect dissipated within a week of the application. In addition, there was significantly more runoff water collected from the perennial ryegrass turf as compared to the bentgrass.

There was no evidence to indicate that core cultivation alone increased the amount of soluble or particulate P, especially where soil tests indicate low soil P values. Disturbing the soil surface seemed to increase infiltration and reduce overland water flow thereby reducing the risk of runoff. However this was not absolute and anytime the turf surface is disturbed there is increased potential for soil P loss, especially when conducted in conjunction with a fertilizer application.

*From: Kauffman, G. L., III, and T. Watschke. 2007. Phosphorus and sediment in runoff after core cultivation of creeping bentgrass and perennial ryegrass turfs. Agron. J. 99(1):p. 141-147.*

## Source of N Effects Putting Surface Performance

The importance of a putting surface to the game of golf cannot be overstated. Although it comprises less than two percent of the entire maintained area of a golf course it consumes a disproportional amount of inputs, especially precise fertilization.

Professor Max Scholssberg at Penn State University investigated the effect of N rate and N source on the performance of a mixed stand of annual bluegrass and Penn A-4 creeping bentgrass. He applied from 1.4 to 8.2 lbs of actual N per 1000 square feet with various ratios of nitrate-N to ammoniacal-N in frequent applications of 0.1 to 0.2 lbs of N per 1000 square feet.

As one would expect there was a strong effect of N rate on color, growth and nutrient uptake. However, N source had little effect on overall turfgrass quality and uptake of most nutrients unless N rates exceeded five pounds of actual N per 1000 square feet.

Some key findings did indicate that ammonium sources of N enhanced uptake of P, Mg and Mn. The uptake of Mn could enhance bentgrass resistance to take-all patch often associated with restricted Mn uptake. This was thought to be related to the acidifying effect of the ammonium N sources that allows for increased solubility of these complex ions.

While no clear results emerged regarding source of N, the lack of response at more usual N rates, i.e., three pounds of N per 1000 square feet per year, was surprising. This was not consistent with previous studies that demonstrated a benefit of ammonium to nitrate ratios in the 50 percent range. This might be related to differential response of high shoot density bentgrass cultivars and more annual types of annual bluegrass. In the end, under neutral soil pH conditions the evidence supports the use of acidifying fertilizers for maximum putting green performance.

*From: Schlossberg, M. J., and J. P. Schmidt. 2007. Influence of nitrogen rate and form on quality of putting greens cohabitated by creeping bentgrass and annual bluegrass. Agron. J. 99(1):p. 99-106.*

CUTT

## Scanning the Journals

*Results indicated that soluble P from a fertilizer application made 24 hrs prior to simulated rainfall did result in significant levels of P runoff from the core cultivated turf. This effect dissipated within a week of the application.*

*There was no evidence to indicate that core cultivation alone increased the amount of soluble or particulate P, especially where soil tests indicate low soil P values*

