

PHOSPHORUS FERTILIZATION OF USGA AND NATIVE SOIL PUTTING GREENS: PLACEMENT, RATES AND LEACHING

Elizabeth Guertal
Auburn University
Agronomy & Soils
334-844-3999
eguertal@acesag.auburn.edu

EXECUTIVE SUMMARY

This study evaluates phosphorus (P) fertilization and movement in USGA-type and native soil (loamy sand) putting greens. The experiment was conducted at two sites in Auburn, AL: the Auburn University Club (USGA-type green) and the Auburn University Turfgrass Research Unit (native soil). Both sites were planted with hybrid bermudagrass (cv 'Tifdwarf') overseeded with *Poa trivialis* in the winter. At both locations P fertilizer was applied in April, 2000 (AU Club) or July, 2000 (TGRU) at rates to supply 1/2x, 2, 1 & 1/2x and 2x the recommended rate of P fertilizer (which was 130 lbs P_2O_5/A). Fertilizer was applied by one of two methods: broadcast over the surface or banded via incorporation into core aerification holes. All plots were uniformly core-aerified and filled either with P fertilizer (band treatments) or sand (broadcast treatments). Collected data includes monthly soil-P using the Mehlich III soil-test extract (0-3 inch depth), monthly color and quality, twice yearly P movement (via incremental sampling) and twice-yearly rooting data. Clipping yield is also collected each time a soil sample is taken, and a subsample of dried clippings will be analyzed for tissue P content. Calibration of additional soil extractants will also be explored, including resin extracts, Bray-1 extracts and water-soluble phosphorus. To date six monthly samplings have been completed at the AU Club site, and three monthly samplings have been completed at the Turfgrass Research Unit site. In the sand-based green at the AU Club soil-test P levels have dropped dramatically, and all plots (including the 2x rate) require additional P fertilizer. This was applied in September, 2000, immediately after the first P movement data was collected. At this time neither the P movement data nor the exploration of various extractants has been completed.

PHOSPHORUS FERTILIZATION OF USGA AND NATIVE SOIL PUTTING GREENS: PLACEMENT, RATES AND LEACHING

Elizabeth Guertal
Auburn University
Agronomy & Soils
334-844-3999
eguertal@acesag.auburn.edu

OBJECTIVES

1. Evaluate common soil-test P extractants for their ability to predict bermudagrass response to P fertilization and turfgrass quality in a native soil and USGA-type putting green.
2. Evaluate P sufficiency levels in bermudagrass putting greens via tissue testing.
3. Examine P fertilizer rates and its implications for downward movement of P in USGA-type and native soil bermudagrass putting greens.
4. Examine P uptake and turf health in USGA and native soil bermudagrass putting greens as a function of P placement.

METHODS AND MATERIALS

The experiment has been installed at two sites near Auburn, AL. In both cases the experiments are conducted on bermudagrass (cv. 'Tifdwarf') putting greens overseeded with *Poa trivialis* in the winter. The USGA-type site is a two-year old putting green located at the Auburn University Club. Treatments were first applied on that site in April, 2000. The native soil (loamy sand) site is a newly constructed putting green located at the AU Turfgrass Research Unit. Treatments were first applied to that site in June, 2000.

Treatments were P rate (1/2x, x, 1 and 1/2 x or 2 x the recommended rate of 130 lb P/A) and P placement (band or broadcast). Band treatments were applied by core aerification followed by sweeping the P fertilizer into the aerification holes, followed by a topdressing. Band treatments were applied by core aerification followed by sand topdressing to fill the holes, with P fertilizer applied on top.

Monthly data collection included 0-3 inch soil samples, collected using a wide (4 inch) soil sampler so that core holes and uncured soil was collected. Clipping yield and a subsample for clipping analysis was also collected at each monthly soil sampling. Additional data included monthly color and quality, and twice-yearly incremental (0-12 inches, every 2 inches) soil samples. Collected soil samples will be extracted with water, Bray-1, Mehlich-3, resin and saturated paste to better evaluate which soil-test extractant best predicts turfgrass P uptake.

RESULTS AND DISCUSSION

Since these projects are so new relatively little data has been analyzed at this point. Figure 1 (below) illustrates how quickly fertilizer P levels drop in the upper 3 inches of the soil profile within a few months of fertilization in a sand-based green. At six months every P rate treatment required

additional P fertilizer, and P fertilizer was applied to the plots at the AU Club in September of 2000, immediately after the first incremental sampling was completed.

From Figure 1, after 2 months of sampling even the 2x P fertilization rate had fallen into the 'High' soil-test range. The line between 'Medium' and 'High' represents the point at which additional fertilizer P would be recommended. Because a wide-profile soil sampler was used to collect these soil samples there was no significant difference between P placement method (band or broadcast). Those differences may become apparent in the turf rooting and incremental depth sampling data.

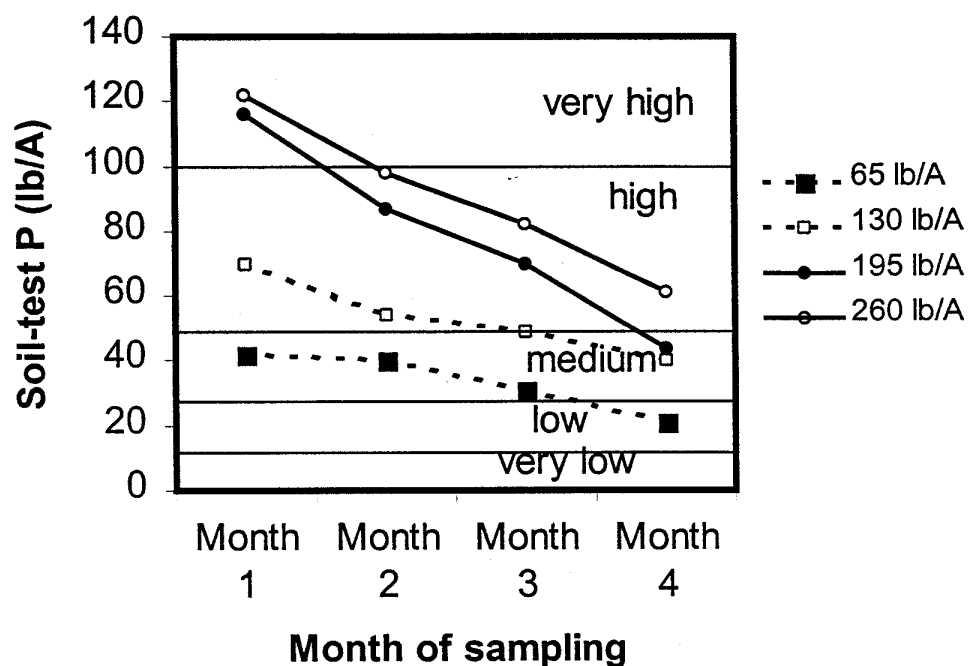


Figure 1. Mehlich-extractable soil-test P (0-3 inch depth) as affected by P fertilization rate, May, 2000 through August, 2000, Auburn University Club, Auburn, AL. Sand-based bermudagrass putting green.