

Creeping Bentgrass Response to Phosphorus and Potassium on a Sand Medium

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Creeping bentgrass is widely used for turf on golf greens in the United States. To encourage drainage and minimize compaction, golf greens are typically constructed of soil mixtures containing 75 to 100 percent sand by volume. The use of soil media containing high percentages of sand greatly affects turf fertility programs, primarily due to increased leaching of nutrients and a lower soil cation exchange capacity. Nitrates and potassium are readily leached from coarse-textured soils; phosphorus tends to form complexes with other elements and is less prone to leaching.

Nitrogen has its greatest effect on turfgrass shoot growth and it encourages root development of creeping bentgrass when applied judiciously. Phosphorus increases turfgrass root growth and lateral stem development. Potassium encourages turfgrass root growth and increases resistance to environmental stresses.

Research at Colorado State University has been conducted over 8 years on a sand medium to determine creeping bentgrass quality response to phosphorus and potassium. Phosphorus was applied at rates of 0, 5 and 11 kilograms per hectare (0, 4.5 and 9.8 pounds per acre) and potassium at 0, 4 and 8 kilograms per hectare (0, 3.6 and 7.1 pounds per acre). Treatments were made monthly to creeping bentgrass receiving uniform nitrogen at 49 kilograms per hectare (43.8 pounds per acre) per month.

Creeping bentgrass quality improved with increasing levels of phosphorus each year of the study. Creeping bentgrass fertilized at 5 or 11 kilograms per hectare (4.5 or 9.8 pounds per acre) phosphorus per month was similar in quality.

Potassium had no effect on visual quality of creeping bentgrass. Inherent cool summer night temperatures associated with the local climate and minimal disease pressure may have prevented beneficial potassium effects from surfacing. Perhaps creeping bentgrass quality response following potassium application would be more readily observed in a climate having more adverse environmental conditions.

This study demonstrated the importance of phosphorus in maintaining creeping bentgrass quality on a sand-based medium.

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