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Growth of Creeping Bentgrass on a New Medium for Turfgrass Growth: Clinoptilolite Zeolite-Amended Sand¹

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Abstract

Clinoptilolite zeolite (Z) is a natural silicate mineral with a three-dimensional lattice, a high degree of internal tunneling, and a large cation exchange capacity and water holding capacity even when particles are sand-sized (> 0.5 mm). The hypothesis of this study was that clinoptilolite had the facility to preferentially and internally sorb NH_4^+ where it would be physically protected from microbial nitrification resulting in increased plant fertilizer-N use efficiency. A field study relating growth and quality of creeping bentgrass (*Agrostis palustris* Huds.) to ranges of Z amendment of sand and N application rates of 25, 50, or 75 kg ha⁻¹, was initiated at the University of Arizona, Turfgrass Research Center in the spring of 1981. Germination and establishment were significantly increased by amendment of sand with 5 or 10% Z. Bentgrass quality in August 1981 was significantly increased by the 5% Z treatment. The 10% Z treatment initially did not increase turf quality due to the initial high Na content of the Z. However, by January 1982 both Z treatments gave significantly increased turf quality. At this time, excess N reduced turf quality due to high N-induced iron chlorosis. Clipping yields from seven harvests and N-use efficiency increased significantly with Z. Zeolite also increased both root growth as indicated by soil organic carbon and shoot-clipping P content. Excess N decreased root growth. Phosphorus uptake decreased with N during the hot summer months but increased when temperatures were cool. These data indicate that Z has potential as a new medium for the growth of turfgrass.

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