Field Assessment and Temporal Recovery of Polymer-Coated Urea-N by Kentucky Bluegrass

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Justification

Many turfgrass managers seek results of applied, replicated agronomic research conducted by Land-grant University personnel. Enhanced heritable color and shoot density traits of newer Kentucky bluegrass and perennial ryegrass cultivars limit the resolution of visual turfgrass color and/or quality ratings. Direct measurement of turfgrass growth rate (clipping yield) from treated and untreated plots, supports quantitative turfgrass fertilizer evaluation.

Objective

To systematically evaluate, under an array of field conditions, Kentucky bluegrass vigor/yield response following single applications of conventional or polymer-coated granular urea-N fertilizers. Resulting data, when complimented by ongoing chemical analysis, will support inference into temporal recovery of enhanced efficiency fertilizer N by the Kentucky bluegrass system, and support development of responsible application rate thresholds by regional agencies.

Table 1. Descriptions of urea-based nitrogen fertilizer products evaluated in the field study.

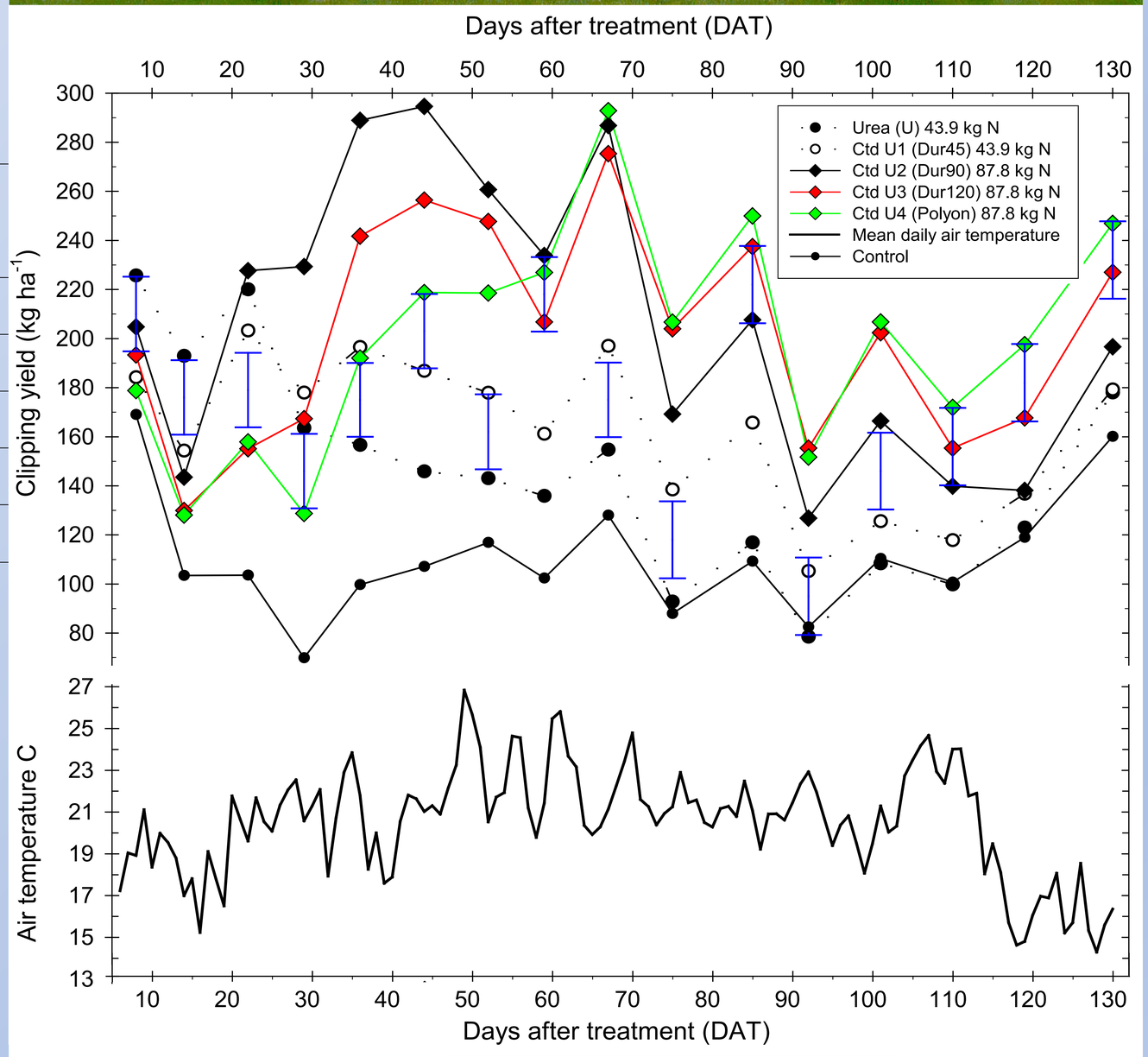
Nitrogen (N) fertilizer treatment		Rate	Component(s)
Name	Grade	ha^{-1}	Description, % inclusion
Urea	46–0–0	43.9 kg N	100% water soluble urea-N
Duration 45	44–0–0	43.9 kg N	100% polymer-coated controlled release urea-N
Duration 90	44–0–0	87.8 kg N	100% polymer-coated controlled release urea-N
Duration 120	43–0–0	87.8 kg N	100% polymer-coated controlled release urea-N
Polyon 43	43–0–0	87.8 kg N	100% polymer-coated controlled release urea-N

Methodology

In May of Year 1 & 2, granular urea-based N fertilizers (Table 1) were applied to randomly-selected plots at a N rate of 43.9 or 87.8 kg ha^{-1} (0.9 or 1.8 lbs N / 1000 ft^2). An unfertilized control plot (0 kg ha^{-1}) was maintained in each block. Following application of all fertilizer treatments, the experimental area was flagged to prevent inadvertent mowing by facility personnel. Later that day, the granular fertilizer applications were activated by an approximate 1-cm precipitation (Year 1) or irrigation (Year 2) event.

A fabricated chute and 'micro-bagger' was installed on the 56-cm rotary mower to collect weekly clipping yields from the centers of each plot. The micro-bagger was replaced with the 'stock' bagger following clipping yield collections, and all remaining turf mowed with clippings removed. Clippings were dried to constant mass in a forced-air oven (65 C) and transferred to desiccators for storage. The mass of dry clipping samples was determined at 1-mg resolution and recorded.

Turfgrass vigor/yield was modeled by main effects and interaction of fertilizer treatment and DAT using the mixed procedure (SAS Institute, v. 9.4). Component means of this significant interaction were parsed by traditional pairwise analysis using Fisher's Protected least significant difference (LSD, a=0.05).



Summary

Under the described conditions and application rates; and relative to traditional substrate-decay patterns demonstrated by conventional-urea fertilizers herein, the latest generation of coated urea-N fertilizers uniquely support turfgrass management and culture with dependable 3- to 4-month nitrogen-release patterns.

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