# Tifton 85 bermudagrass yield and N use-efficiency as affected by N sources and application levels

Bernardo M. M. N. Borges*(1), Fernanda R. Peixoto(1), Saulo S. Cardoso(1), Ederlon F. V. Moline(1), Maria L. A. Silveira(2), Takashi Muraoka(3) and Edson L. M. Coutinho(1)

(1)Department of Soil Science, São Paulo State University Jaboticabal – SP – Brazil
(2)Range Cattle Research and Education Center, University of Florida Ona – FL – USA
(3)Center for Nuclear Energy in Agriculture, University of São Paulo Piracicaba – SP – Brazil
*Presenting author – bernardonog@hotmail.com

## Introduction

Nitrogen (N) fertilizer source and application level can have major impacts on crop performance and N utilization. The objective of this study was to evaluate the impacts of two N sources [urea and ammonium nitrate (AN)] on Tifton 85 (*Cynodon spp.*) dry matter (DM) yield and N use-efficiency in hay production systems.

## Material and Methods

The experiment was conducted in São Paulo State, Brazil and treatments consisted of either urea of AN surface applied at 0, 60, 120, 180, and 240 kg N $ha^{-1}$ after each harvest. Forage was harvested at 30-day intervals (December to March) for two years. Response variables included DM forage yield, N use-efficiency, soil- and root-rhizome- (0-40 cm) and litter-N concentrations, photosynthetically active radiation (PAR), and leaf area index (LAI).

## Results and Discussion

- Results indicated that **both fertilizer sources increased annual DM yield** at N levels up to 180 kg N $ha^{-1}$ (FIG. 1). There was a trend for AN to produce slightly greater yields than Urea (26.3 Mg $ha^{-1}$ for AN vs 25.2 Mg $ha^{-1}$ for urea). The interaction between "N Source x application level" was not significant ($P > 0.05$).
- **Ammonium nitrate** resulted in **greater DM yield** (2.2 Mg $ha^{-1}$ for AN vs. 1.6 Mg $ha^{-1}$ for urea) and **PAR** (AN – 65.6%; Urea – 55.1%) during the **dry month** (February of 2014). Treatments receiving **urea** showed **smaller LAI** (2.0) than AN (2.9) when rainfall was limited.
- **No effect** of N source on **DM yield** was observed when **rainfall was adequate**. Despite the lack of response on cumulative annual DM yield, **AN** resulted in **greater N use-efficiency** (average of 36%) than urea (average of 20%) ($P < 0.001$) (FIG. 2).
- Results demonstrated that **N recovery** by the plant-litter-root-soil system was **greater when utilized AN**, particularly when rainfall was scarce resulting in higher DM yield and N use–efficiency (FIG. 3).

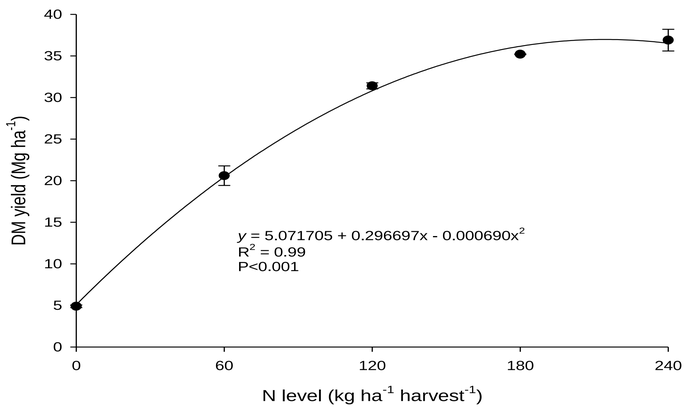


**Fig. 1.** Bermudagrass cumulative DM yield as affected by N application levels. Data are means of 8 harvests and 2 years (n= 16).

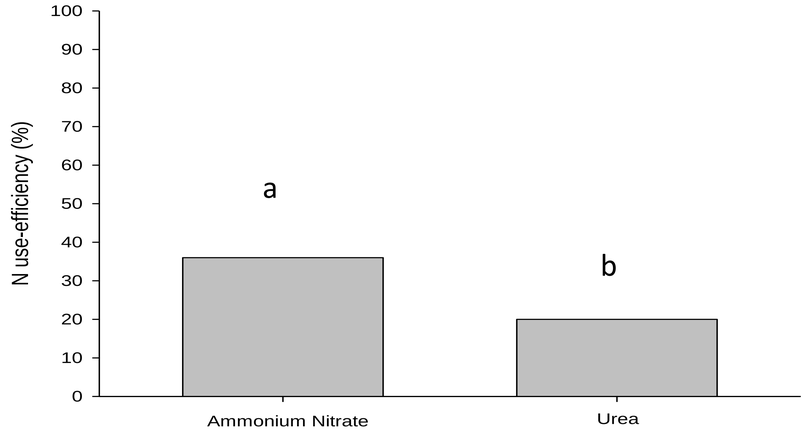


**Fig. 2.** Bermudagrass N use-efficiency as affected by N sources ($P < 0.001$). Data are means of 4 levels and 4 harvests (n= 16).

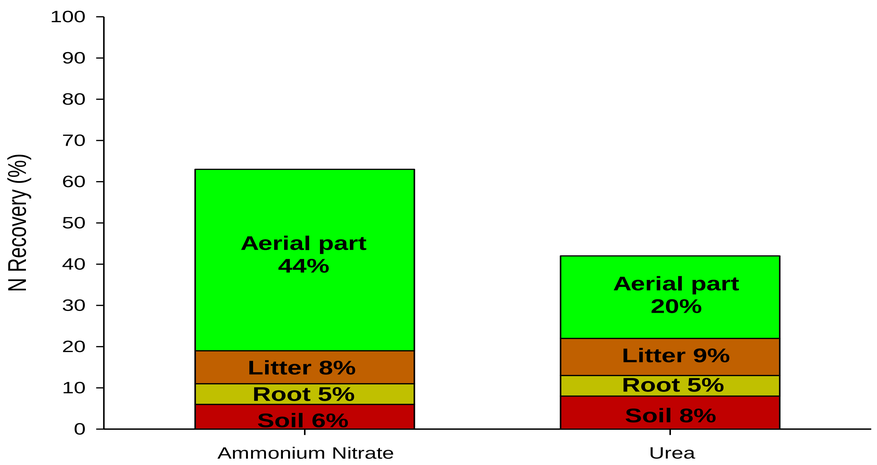


**Fig. 3.** Nitrogen distribution in Bermudagrass Plant-Litter-Root-Soil system. Data are average across 4 N levels and 4 harvests (n=16).