ONA REPORTS

published in

THE FLORIDA CATTLEMAN AND LIVESTOCK JOURNAL

February 2005

Nitrogen Fertilizer Sources for Warm Season Grass Pastures

Dr. Martin Adjei
University of Florida/IFAS
Range Cattle Research and Education Center

For questions or comments regarding this publication contact
Dr. Martin Adjei

Pasture fertilization is an expensive operating cost in cow-calf production and nitrogen (N) is usually the most limiting nutrient for pastures on spodic soils in Florida. In 2003 and 2004, three trials were conducted on private ranches and one at the Range Cattle REC to evaluate warm season grass forage production and quality following applications of various sources of N. The objective was to compare the response of grazed bahiagrass pastures to currently available N sources; ammonium nitrate, ammonium sulfate and calcium nitrate. A second objective was to study the response of N sources on limpograss (hemarthria) forage cut for hay.

Each year four fertilizer treatments: 1) ammonium nitrate, 2) ammonium nitrate + elemental S, 3) ammonium sulfate and 4) calcium nitrate; were applied once in May to supply 50 lb N/A/year to Argentine bahiagrass pasture on Stokes Ranch in Lake Wales and to similar pastures on Butler Oak Dairy in Okeechobee. A no-fertilizer control was used as a check on each site. Because pastures were grazed, metal cages were used to protect new forage regrowth and cages were moved to a new location on pasture after each of six annual harvests. The bahiagrass pasture on Stokes Ranch had a history of sludge application, and the pasture on Butler Oak Dairy was used to graze replacement dairy heifers fed concentrate supplement.

In the third and fourth experiments, fertilizer and control treatments were applied to non-grazed hemarthria pastures in May and September (50 lb N/A per application), one on Butler Oak Dairy and the other at the research center at Ona. In 2003, hemarthria was harvested five times at 35 day intervals and in 2004, three times at 45 day intervals due to hurricanes.

In 2003, bahiagrass forage yield on Stokes Ranch was 5 tons/A for the control and

ammonium nitrate fertilizer, but averaged 6 tons/A for the other treatments. In 2004, the only dry matter yield difference on Stokes Ranch occurred between ammonium sulfate (5.7 tons/A) and control treatments (5.0 tons/A). The remaining treatments averaged 5.4 tons/A. In 2003, bahiagrass forage yield on Butler Oak Dairy averaged 7 tons/A for all treatments including the control, but 9 tons/A for the ammonium nitrate + sulfur treatment. This was probably due to the high stocking rate of heavily supplemented dairy replacement heifers grazing these pastures.

In 2004, bahiagrass DM yield averaged 5.6 T/A regardless of N treatment on Butler Oak Dairy pasture. Bahiagrass forage digestibility and crude protein content were improved equally by all fertilizer treatments compared to the control (55% vs. 49% for TDN and 11% vs. 9% for CP).

The situation was quite different for hemarthria managed for hay production. In 2003, hemarthria DM yield was greater (4.5 T/A) when ammonium sulfate was applied at the Ona RCREC compared with 3.6 T/A for the other fertilizers and 2.2 T/A for the control. In 2004, due to disruption from hurricanes, hemarthria DM yield at Ona RCREC was only 1.1 T/A for the control, 2.3 T/A for ammonium nitrate, 2.8 T/A for calcium nitrate, 3.3 T/A for ammonium nitrate + sulfur, and 3.6 T/A for ammonium sulfate. In 2003, hemarthria yield without fertilizer was 3.0 T/A. at Butler Oak Dairy, but 5.8 T/A with ammonium sulfate compared with 5.0 T/A for the other fertilizers. In 2004, yield at Butler Oak Dairy was 3.0 T/A for the control, 5.0 T/A for ammonium nitrate and ammonium sulfate and 4.3 T/A for ammonium nitrate + sulfur and calcium nitrate.

Bahiagrass tissue S concentration at the beginning of trials was borderline to being deficient for plant growth (0.16%) at both sites. Bahiagrass tissue S concentration during the trial averaged 0.32% across treatments on Stokes Ranch, probably due to the history of sludge application. Bahiagrass tissue S averaged 0.24% on Butler Oak Dairy, regardless of N-source, but hemarthria tissue S concentration at this site increased from 0.16% to 0.23% in response to S inclusion in fertilizer.

We concluded from these results that the addition of S or Ca in N-fertilizer has little effect on grazed bahiagrass pasture, especially those with a history of sludge application or used to raise fed dairy replacement heifers. Purchasing N-fertilizer for bahiagrass should be based on relative cost per lb of actual N applied. However, S inclusion could significantly enhance hemarthria hay production without any deleterious increase in tissue S concentration relative to cattle nutrition.