

# Sulphur Fertilization Improves Bahiagrass Pastures

By Jack E. Rechcigl

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*Recent field studies have shown that addition of sulphur (S) can increase yields and quality of bahiagrass grown in Florida.*

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**SULPHUR DEFICIENCIES** for plant growth have been reported in over 35 states, including Florida. Though it is usually termed a secondary plant nutrient, S should be considered one of the major nutrients essential for crop growth along with nitrogen (N), phosphorus (P), and potassium (K).

Sulphur is required by plants for the synthesis of essential amino acids required for protein production. Thus, if S is limiting, forage quality as well as quantity will be reduced. In fact, S deficiencies are often confused with N deficiencies because of the similarity of symptoms.

Symptoms of S deficiency consist of stunted plant growth and a yellowing of plant tissue, which are similar to N deficiency. In less severe cases of S deficiency, visual symptoms may not always show up, but crop yield and quality will still be affected.

Until recently, little attention has been focused on the need for S fertilization in Florida. In the past, low analysis fertilizers contained S. Therefore, growers did not need to be concerned with S fertilization. Modern, high analysis fertilizers such as triple superphosphate and diammonium phosphate contain very little S. Further, emission controls have decreased S deposition from the atmosphere. As a result, S deficiencies are becoming more pronounced and widespread. Coarse textured soils commonly found in Florida often exhibit S deficiencies because of low organic matter levels and leaching.

Sulphur fertilization will likely affect crop yield and quality only when S is deficient. Sulphur status of a crop is best determined by having plant tissue analyzed by a reputable laboratory. Tissue analysis is more reliable than a soil test for determining deficiencies. Sulphur levels in grasses should range from 0.2 to 0.5 percent. If the



**BAHIAGRASS** in plots at left and right both received 134 lb/A rate of N as ammonium nitrate. Note response in plot at right which also received S at a rate of 77 lb/A.

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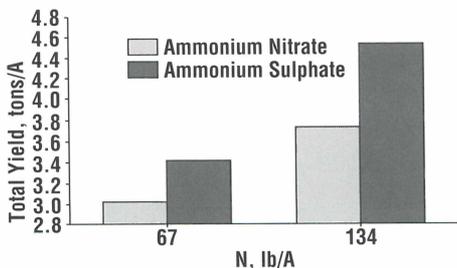


Figure 1. Effect of ammonium nitrate and ammonium sulphate rates on bahiagrass yields.

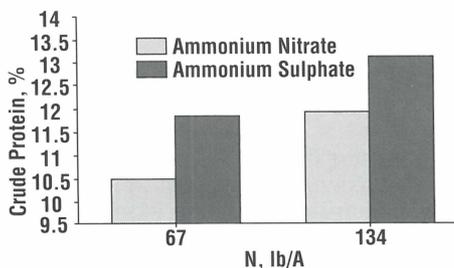


Figure 2. Effect of ammonium nitrate and ammonium sulphate on percent crude protein content of bahiagrass.

level of S is less than 0.2 percent, the grass should respond to S fertilization.

### Florida Studies

A 3-year study was conducted at Arcadia, Florida, to evaluate the influence of S and N on bahiagrass yield and quality. Treatments consisted of two forms of N (ammonium nitrate and ammonium sulphate), and three rates of S (0, 77, and 155 lb S/A/yr from potassium sulphate), applied to an established Pensacola bahiagrass field. In addition, all plots received an annual application of 50 lb/A  $P_2O_5$  and 100 lb/A  $K_2O$ . Fertilizer was applied in split applications, half in March and the remainder in September.

**Yields.** Bahiagrass yields increased with increasing rates of N. Highest yields were obtained with ammonium sulphate compared to ammonium nitrate (Figure 1). The higher yields were likely the result of the ammonium sulphate providing

needed S. The addition of S (77 lb S/A) increased bahiagrass yields by 25 percent. Plant numbers were also higher on areas fertilized with ammonium sulphate as compared to ammonium nitrate.

**Forage Quality.** This research demonstrated that the addition of 77 lb S/A increased crude protein 1.2 percent (Figure 2) and digestibility 3 to 4 percent 30 days after S was applied (Figure 3). The quality effects reflected the essential role of S in protein production. Improved digestibility with S applications reflects the more rapid, lush growth of the forage.

Plant tissue S was greater in bahiagrass treated with ammonium sulphate compared to ammonium nitrate (Figure 4). Sulphur application increased S concentration of plant tissue from around 0.10 percent up to 0.23 and 0.30 percent for S applications of 77 and 155 lb S/A, respectively. It is important to note that the

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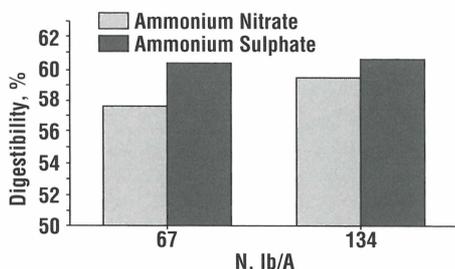


Figure 3. Effect of ammonium nitrate and ammonium sulphate on bahiagrass digestibility.

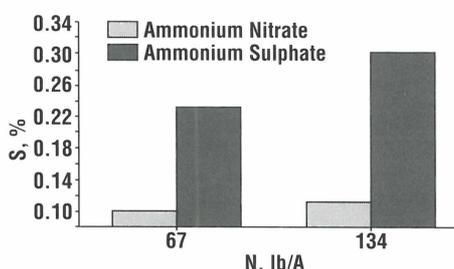


Figure 4. Effect of ammonium nitrate and ammonium sulphate on S concentrations in bahiagrass.

## Institute Announces New Book: *Sugarcane Nutrition*

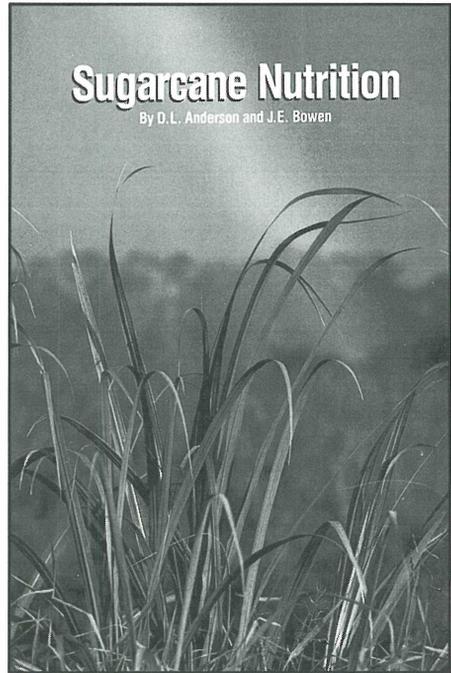
A NEW BOOK titled *Sugarcane Nutrition* is now available from the Potash & Phosphate Institute (PPI). The publication features more than 40 pages of information with 44 color photographs illustrating specific malnutrition conditions in sugarcane.

*Sugarcane Nutrition* was authored by Dr. David L. Anderson, Sugarcane Nutritionist at University of Florida, Everglades Research and Education Center, and by Dr. John E. Bowen, Plant Physiologist, University of Hawaii, Honolulu. The book was published jointly by PPI, the Potash & Phosphate Institute of Canada (PPIC), and the Foundation for Agronomic Research (FAR).

"*Sugarcane Nutrition* is international in scope and should appeal to sugarcane growers, research scientists, Extension specialists, consultants and others interested in nutritional deficiencies and toxicities affecting sugarcane plants," said Dr. David W. Dibb, PPI President.

The text includes descriptions of the metabolic functions of important nutrients, leaf nutrient concentrations, listing of fertilizer sources, and comments on management considerations.

Printed on special synthetic paper resistant to moisture, the book is durable and easy to use.



*Sugarcane Nutrition* is priced at \$15.00 per copy (plus shipping). Discounts are available on quantities.

See page 31 for more details. ■

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### Bahiagrass . . . from page 23

bahiagrass fertilized with ammonium nitrate contained about 0.1 percent S, which indicates S deficiency. Ideally, bahiagrass should contain between 0.2 to 0.5 percent S.

**Soil pH.** Application of both ammonium sulphate and ammonium nitrate resulted in a decrease in soil pH 3 years after application. Predictably, ammonium sulphate resulted in a greater decrease in soil pH than ammonium nitrate (pH 4.8 versus 5.2 at the highest N rate). However, the results of a 3-year liming study on bahiagrass show no significant differences

in dry matter production with soil pH values within the pH range observed in this study (4.8 to 5.7).

### Summary

Based on the results of this 3-year study and other research conducted in Florida, S application increases both yield and quality of bahiagrass pasture. Bahiagrass tissue should be tested for S to determine fertilization needs, with a level below 0.20 percent of the tissue dry matter indicating a S deficiency. Where S is limiting, forage yield and quality may be improved by using S-containing fertilizers. ■