INTRODUCTION

Sulfur (S) plays an important role in plant metabolism. It is required in photosynthesis and production of amino acids and proteins. The atmospheric S deposition has declined since the implementation of Clean Air Act in 1985 which partially contributes to increasing number of cases of S deficiencies in crop production in the US. Sugarcane (Saccharum officinarum) exhibits luxury consumption and removes a considerable quantity of S from the soil. So the manageable rates and in combination with other granular fertilizer can facilitate the adoption of this rather new agronomic practice in sugarcane production.

OBJECTIVE

Evaluate the effect of S fertilization using different sources in replicated field experiment on Louisiana sugarcane production system.

MATERIALS AND METHODS

Location: Sugar Research Station, Saint Gabriel and Donaldsonville, Louisiana

✦ Saint Gabriel Site:
  ▪ Site 1: Established on a Commerce silt loam soil (Plant Cane)
    - Variety: L01-299
    - Plot size: 40 ft x 3 rows
    - Experimental Design: RCBD with four replications
  ▪ Site 2: Established on a Sharkey clay soil (1st Ratoon)
    - Variety: L01-299
    - Plot size: 40 ft x 3 rows
    - Experimental Design: RCBD with six replications
  ▪ Site 3: Established on a Commerce silt loam soil (1st Ratoon)
    - Variety: L01-299
    - Plot size: 50 ft x 3 rows
    - Experimental Design: RCBD with three replications

Treatment Structure:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Check (No S, No K) Δ</td>
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<tr>
<td>2</td>
<td>Check (No S)</td>
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<tr>
<td>3</td>
<td>Phosphate MST (8-44-0-22S) Δ</td>
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<td>4</td>
<td>Microessentials (13-33-0-15S) Δ</td>
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<td>5</td>
<td>Potash MST (0-0-52-13S) Δ</td>
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<td>6</td>
<td>Potash + Ammonium Sulfate Δ</td>
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<tr>
<td>7</td>
<td>Liquid MST (8-0-0-45S) Δ</td>
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<td>8</td>
<td>Ammonium Thiosulfate (12-0-0-26S) Δ</td>
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</tbody>
</table>

ΔDensity 13.3 kg L⁻¹; ΔDensity 10.9 kg L⁻¹; Donaldsonville treatments.

✦ Donaldsonville Site: The experiment was established on a silt loam soil with a plot size of 550 ft x 3 rows. There were six treatments (Table 1) arranged in a randomized complete block design with two replications.

✦ Fertilization: The granular and liquid S containing fertilizer were applied using the Gandy applicator (Photo 1) and a four-wheeler mounted with fertilizer applicator (Photo 2), respectively for the producer’s field at Donaldsonville, LA. On the other hand, for Saint Gabriel site, granular S was applied by hand (Photo 4) and liquid S was applied using backpack sprayer (Photo 5).

RESULTS AND HIGHLIGHTS

Figure 1. Sulfur content in leaves one month after S fertilization, Saint Gabriel, LA.

Figure 2. Sulfur content in leaves (A) and soil (B) one month after S fertilization, Donaldsonville, LA.

- The application of S increased leaf S content by 0.03% (30 g kg⁻¹ leaf dry weight) across the four sites (Figures 1 and 2A).
- In Donaldsonville, the highest leaf S content of 0.21% (Figure 2A) was obtained from plots treated with a source containing both elemental S and sulfate form (Microessentials®).
- The S content of soil based on Mehlich-3 procedure was higher in plots which received S fertilizers (11 mg kg⁻¹) than in the control plot (8 mg kg⁻¹) with Microessentials and liquid MST-treated plots (13 mg kg⁻¹) having the highest soil S (Figure 2B).

Our initial results showed that S sources containing sulfate and MST were effective in raising leaf and soil S. A season-long availability of S is important for crops especially for sugarcane which has a long growing season in Louisiana.

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