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# EFFECT OF FOLIAR CALCIUM APPLICATIONS ON COTTON LINT YIELDS

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## Abstract

Calcium nutrition is usually supplied to cotton via a good liming program. Recently however, there have been a number of foliar calcium materials made available to the Georgia farmer. The objective of this study was to evaluate the effectiveness of foliar feeding different calcium fertilizers for increasing cotton lint yield. The study was conducted in 2000 and 2001 at the Sunbelt Expo site in Moultrie, GA on a Dothan loamy sand. Six different calcium fertilizers designed for foliar feeding were tested. In 2000, the materials were applied one time (first bloom) at the upper end of the recommended rate. In 2001, multiple applications (three) of each material were made starting at first bloom then at two week intervals. In 2000, there was no statistical significant lint yield response although numerically there was a trend toward increasing yields with all of the materials compared to an untreated check. In 2001, there was no statistical significant yield response to any of the calcium fertilizers when multiple applications were used. In conclusion, there does not appear to be any benefit of using foliar calcium sprays on cotton when adequate soil test calcium levels are maintained through a proper liming program. This study could be repeated where soil test calcium levels are deficient and the cotton crop also shows signs of calcium deficiency. However, these conditions are rarely seen in Georgia.

## Introduction

Calcium is usually supplied to a cotton crop through use of liming materials that contain calcium. In addition, calcium is not considered by physiologist to translocate well in most crops therefore making it an unlikely candidate for foliar feeding. Calcium deficiencies in cotton are also rarely seen in Georgia and have only been demonstrated in greenhouse sand culture work. Despite these facts, there are currently at least six calcium fertilizer materials designed and marketed for foliar feeding cotton in Georgia. The objective of this study was to evaluate the effectiveness of these materials for increasing cotton yields.

## Materials and Methods

This field study was conducted in 2000 and 2001 at the Sunbelt Expo site in Moultrie, GA. Soil type is a Dothan loamy sand. DPL 458 B/RR cotton was grown in both years using standard agronomic practices. The site was irrigated using a center pivot. In 2000, four foliar calcium fertilizer materials were tested against an untreated check. The materials included 1) "Folical" derived from calcium acetate (10 % Ca), 2) "Traco Liquid Calcium" derived from calcium mannitol (10 % Ca), 3) "N-Cal 212" derived from calcium chloride (12 % Ca) and 4) "Threshold 88" derived from calcium nitrate (8 % Ca). All materials were applied to 2 row by 50 foot long plots using a backpack CO2 sprayer at a 20 gal/a spray volume. All materials were applied one time at first bloom at a 2 gal/a rate which is the upper end of the recommended rate. This supplied approximately 1.5 lb Ca/a. In 2001, these same four materials were tested again plus two more materials, 1) "Cabby" derived from calcium sucrose (10 % Ca) and 2) "PhosCal" derived from calcium phosphate ( 3 % Ca). In 2001, three applications of each material were made starting at first bloom then at two week intervals. Each application contained 0.5 lb Ca/a for a total of 1.5 lb Ca/a (the same amount that was applied in 2000 in a single application. All plots were harvested mechanically for yield.

## Results and Discussion

In 2000, there was no statistical significant yield response to any of the foliar calcium materials compared to the untreated check (Table 1). There was a numerical trend of increasing yields in the range of 30 to 60 lb lint/a. Lack of yield response was likely due to adequate soil test calcium levels in the range of 800 lb/a (soil pH = 6.5). The University of Georgia sufficiency range for soil test calcium for cotton is 250 lb/a (target soil pH = 6.0). Tissue samples were also taken 10 days after the calcium materials were applied and levels were in the sufficiency range. There was some foliar burn observed from some of the treatments particularly the calcium chloride and calcium mannitol derived materials. However, this burn was temporary and did not appear to affect final yield.

In 2001, there was no statistical significant yield difference for any of the six calcium materials compared to the untreated check (Table 2). Again, soil test calcium levels were considered adequate.

## Conclusions

Georgia cotton growers are encouraged to maintain soil pH at or above the target of 6.0 through a good liming program. This practice also should supply sufficient calcium for most crops including cotton. The addition of foliar calcium sprays does not appear to have any benefit in terms of increased cotton yield under these conditions. Therefore, the use of foliar calcium fertilizers on cotton is not recommended by the University of Georgia at this time.

Table 1. Cotton lint yield response to foliar calcium fertilizers in 2000.

| Treatment | Cotton lint Yield (lb/a) |
|---|---|
| Folical | 770 |
| Traco Liquid Cal | 804 |
| NCal 212 | 782 |
| Threshold 88 | 773 |
| Untreated Check | 741 |
| | |
| Statistical Significance | 0.28 |
| Coefficient of Variation (%) | 7 |

Table 2. Cotton lint yield response to foliar calcium fertilizers in 2001.

| Treatment | Cotton lint Yield (lb/a) |
|---|---|
| Folical | 1056 |
| Traco Liquid Cal | 1063 |
| NCal 212 | 1195 |
| Threshold 88 | 1087 |
| Cabby | 1098 |
| PhosCal | 1081 |
| Untreated Check | 1095 |
| | |
| Statistical Significance | NS |
| Coefficient of Variation (%) | 8 |