# COMPARATIVE TRIALS WITH METALOSATE COTTON BOOSTER IN GREECE

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## Introduction

Cotton has become a major crop in Greece since Greece was accepted as a full partner in the European community in 1985. Presently Greece has a total area of cotton production of about 400,000 Ha or 4,000,000 Strema (STR). It Is the most important cotton fiber producer in the EC followed by Spain, Portugal and Italy. Greek farmers' planting techniques have tremendously evolved in the last few years. Drip irrigation, fertigation as well as foliar application of minerals and other major nutrients in the cotton fields have become common practices. And many agricultural products from different companies have been introduced to this competitive market.

Albion Laboratories was the pioneer in the field of mineral foliar nutrients and through years of experience Albion has developed a custom product for cotton in Greece called Metalosate Cotton Yield Booster (CYB). It's composition is shown in Table 1.

**Table 1**
**Composition of Metalosate Cotton Yield Booster**

| | | | |
|---|---|---|---|
| Manganese | Mn | Manganese as chelated Manganese Metalosate | 2.0% |
| Magnesium | Mg | Magnesium as chelated Magnesium Metalosate | 1.0% |
| Zinc | Zn | Zinc as chelated Zinc Metalosate | 0.5% |
| Iron | Fe | Iron as chelated Iron Metalosate | 0.5% |
| Copper | Cu | Copper as chelated Copper Metalosate | 0.25% |
| Boron | B | Boron as Boric Acid | 0.025% |

## The Trial

During the 1994 cropping season, we decided to make a comparative trial to evaluate the efficiency of Metalosate compared to several products used in Greece. The trial was in collaboration with Hellafarm S.A. the distributor of Albion products in Greece. The trial director was a Hellafarm agronomist, Maria Antonakou, and the field investigator was Michaelis Koulizakis. The trial site was at Gianitsa Pella in the area of Immatia during the crop season of 1994. Immatia region is the largest area for cotton production in Greece.

## Products Tested

Four products were used in this comparative trial:

1. Metalosate Cotton Yield Booster.
2. Seamac - a seaweed extract with cytokinine constant.
3. Kik Foliar - a plant growth regulator.
4. Biofol - a combination of minerals produced locally.

These products are generally used in the area of Immatia, Greece.

## Trial Characteristics

The characteristics of the trial are as follows:

Cotton variety: Krema 132 (early variety).
Plot width: 6 crop rows, 95 cm (37.4 inches).
Plot length: 5 meters (16.4 feet).
Distance between plants within row 7 cm (2.75 inches).

## Fertilization

A single fertilization program was applied on all the plots as shown in Table 2 and 3.

**Table 2**
**Fertilization Program**

| Product | Guaranteed Analysis | Rate Applied | | |
|---|---|---|---|---|
| | | Kg/STR | Kg/Ha | Lb/Ac |
| Urea | 46-0-0 | 15 | 15 | 135 |
| Ammonium Nitrate | 33.5-0-0 | 15 | 150 | 135 |
| Treble Super Phosphate | 0-42-0 | 10 | 100 | 90 |

**Table 3**
**Pesticides Applied**

| Purpose | Product | Rate Applied | | |
|---|---|---|---|---|
| | | Per STR* | Per Ha | Per Ac |
| Soil Insect Control | Phorate 10% | 1kg | 10kg | 9lb |
| Weed Control | Trifluralin 48%<br>Prometrin 50% | 330cc<br>330cc | 3.3L<br>3.3L | 45 fl oz<br>45 fl oz |
| Pre-Harvest Defoliating Product | Dimethrin 60%<br>Trycol 56% | 50cc<br>100cc | 0.5cc<br>1.0L | 7 fl oz<br>14 fl oz |

*STR = Strema =0.10 Ha=0.25 Ac

Cotton was grown in the plots the two previous years: 1992 and 1993.

## Soil

The soil is a clay soil with a pH of 6.87 and an organic-matter content of 0.9%. The soil analysis results are shown on Table 4.

| Table 4<br>Soil Analysis | | | |
|---|---|---|---|
| EC | 1.36 MS/CM | Zn | 3.7 ppm |
| Ca | 13.05 ME/100g | P | 13.3 ppm |
| Mg | 4.3 ME/100g | $NO_3$-N | 48 ppm |
| K | 161 ppm | $Nh_4$-N | 15 ppm |
| Na | 4.5 ppm | B | 0.9 ppm |
| Fe | 3.1 ppm | Free $CaCO_3$ | 0.2% |

**Applications**

All products were applied with a knapsack sprayer with 3 T jet nozzles using 50 L of water spraying solution per strema (500 L/Ha, 53.5 gal/Ac) at 4 atm. pressure. Table 5 shows the application data.

Table 5
Application Data

| A/A | Product | Dose cc/STR* | Dose cc/HL | Application Dates | Cotton Development |
|---|---|---|---|---|---|
| 1 | Seamac | 50 | 95 | 6/14/94 | 6-8 Real leaves Forming on the half square |
| | Seamac | 200 | 397 | 7/13/94 | |
| 2 | Seamac | 100 | 200 | 7/4/94 | Start of square Forming in the middle of blooming |
| | Seamac | 150 | 297 | 7/4/94 | |
| 3 | Metalosate CYB | 150 | 297 | 7/13/94 | Appearance of the first flowers |
| 4 | Metalosate CYB | 100 | 198 | 7/13/94 | Appearance of the first flowers 20 days after 1st spray |
| | Metalosate CYB | 100 | 198 | 8/2/94 | |
| 5 | Kik Foliar | 15 | 28 | 6/14/94 | 6-8 real leaves Forming of the half squares |
| | Kik Foliar | 60 | 120 | 7/13/94 | |
| 6 | Biofol | 150 | 283 | 6/14/94 | 6-8 real leaves Forming of the half squares |
| | Super Biofol-3 | 200 | 397 | 7/13/94 | |
| 7 | Control | -- | -- | -- | -- |

*STR = Strema = 0.10 Ha = 0.25 Ac

**Weather**

The weather conditions in 1994 were optimum for cotton crop production. Table 6 shows the weather data at the time of application of the products.

**Table 6**
**Weather Data at Time of Application**

| A/A | Application Dates | Spray Time | Air Temperature | Relative Humidity |
|---|---|---|---|---|
| 1 | 6/14/94 | 11:30 | 25°C | 74% |
| 2 | 7/4/94 | 9:30 | 27°C | 67% |
| 3 | 7/13/94 | 11:05 | 27°C | 67% |
| 4 | 7/29/94 | 12:00 | 29°C | 58% |
| 5 | 8/2/94 | 10:15 | 24°C | 74% |

**Results**

Table 7 summarizes the average number of boils of cotton per plant plus the average weight of 100 bolls taken from each plot. Table 8 shows the yields from each plot. And, finally, Table 9 shows the characteristics of the cotton fiber from each plot.

Table 7
Boll Number Average and Average Weight of 100 Bolls Each Plot

| Treatment # | Product | Dose cc/STR | Boll Number per Plant | Average weight (g) of 100 bolls |
|---|---|---|---|---|
| 1 | Seamac<br>Seamac | 50<br>200 | 8.71 | 2,246 |
| 2 | Seamac<br>Seamac | 100<br>150 | 8.25 | 2,256 |
| 3 | Metalosate CYB | 150 | 8.86 | 2,183 |
| 4 | Metalosate CYB<br>Metalosate CYB | 100<br>100 | 8.43 | 2,158 |
| 5 | Kik Foliar<br>Kik Foliar | 15<br>60 | 8.66 | 2,246 |
| 6 | Biofol<br>Super Biofol-3 | 150<br>200 | 8.73 | 2,274 |
| 7 | Control | - | 8.07 | 2,250 |

Table 8
Yield Production/STR. and Percentage Increase

| Treatment # | Product | Dose (cc/STR) | First Collection (Kg/STR) | Second Collection (Kg/STR) | Total Production (Kg/STR) | Percent Increase |
|---|---|---|---|---|---|---|
| 1 | Seamac<br>Seamac | 50<br>200 | 482b | 40d | 522b | 8% |
| 2 | Seamac<br>Seamac | 100<br>150 | 502a | 51b | 553a | 14% |
| 3 | Metalosate CYB | 150 | 496a | 57a | 553a | 14% |
| 4 | Metalosate CYB<br>Metalosate CYB | 100<br>100 | 461c | 32ed | 493d | 2% |
| 5 | Kik Foliar<br>Kik Foliar | 15<br>60 | 471c | 29e | 500cd | 3% |
| 6 | Biofol<br>Super Biofol-3 | 150<br>200 | 433e | 45c | 478f | (1%) |
| 7 | Control | - | 460d | 24f | 484ef | - |

*STR = Strema = 0.10 Ha = 0.25 Ac

The average number in every column followed by the same letter are not statistically different (p0.05).

Table 9
Cotton Fiber Characteristics

| Treatment # | Product | Dose cc/STR* | Length 50% | Length 2.5% | Uniformity | Tolerance |
|---|---|---|---|---|---|---|
| 1 | Seamac<br>Seamac | 50<br>200 | 12.9 | 26.6 | 48.5 | 7.46 |
| 2 | Seamac<br>Seamac | 100<br>150 | 12.4 | 26.7 | 46.4 | 7.97 |
| 3 | Metalosate CYB | 150 | 13.5 | 27.8 | 48.6 | 7.89 |
| 4 | Metalosate CYB<br>Metalosate CYB | 100<br>100 | 13.1 | 27.4 | 47.8 | 7.25 |
| 5 | Kik Foliar<br>Kik Foliar | 15<br>60 | 12.4 | 26.8 | 46.3 | 7.92 |
| 6 | Biofol<br>Super Biofol-3 | 150<br>200 | 13.5 | 27.3 | 49.4 | 7.69 |
| 7 | Control | - | 11.5 | 26.2 | 43.9 | 7.69 |

*STR = Strema = 0.10 Ha = 0.25 Ac

Taking into account that the average cotton production in Greece is approximately 300 Kg/STR (3.0 MT/Ha, 2700 lb/Ac). It can be easily seen that the 1994 crop production was quite high even for the control. That gives even greater importance to the difference to the use of Metalosate in comparison with the control. It is generally known that the application of Metalosate gives higher results when the average production is low, as we have seen in other tests on others crops in Egypt where the increase of production reaches more than 50% with the control. However, Metalosate can even boost an already high production.

Qualitatively the length of the lint was greater with the Metalosate application than with either the control or the rest of the products being tested.

**Cost/Benefit Analysis**

Metalosate is sold in Greece at the price of US$ 9.75/L The cost per STR in plot 3 using 150 cc/SIR at the appearance of the first flower is US$ 1.46. The price of 1 Kg of unpitted cotton for the farmer is about US$ 1.25/Kg. The increase of production in this trial with the optimum condition is 69 Kg over the control which makes an increase in return of US$ 86.25/SIR for only US$ 1.46 invested in Metalosate. Adding the application cost per STR which is about US$1 .5/STR we have: 1.50+ 1.46 = US$2.96/STR. This brings us approximately US$30 (86.25/2.96) of gain for every dollar invested in Metalosate.

**Conclusion**

Applying Metalosate at the flowering stage brings full nutritional balance into the plant and increase the crop yield.

In this trial, one Metalosate application of 150cc/SIR (I.5LJHa, 21 ozlAc) at the flowering stage gave the best result. While two applications of IOOcc/STR (1.0 LFHa, 14 oz/Ac) each, the first at the flowering stage and the second 20 days from the first application, gave a lower yield.

This confirms what we always postulated. The earlier we bring nutritional balance in the plant, the better the result is, especially when the ideal conditions are present during the cropping season.

Dr. F. Legakis, the general manager, along with his wife, Mrs. Fotini Legakis, are the co-founders of Hellafarm S.A. We have enjoyed a long and excellent business relationship with the Legakis. We would like to take this opportunity to convey to them our best wishes and congratulations for the 30th anniversary of Hellafarm S.A.