

**Trial Design BG-CA-CN-03**  
**Genica and Nitrogen Efficiency in Cotton**

**Title:** Genica in Traditional & Improved Nitrogen fertilizer Program as a sidedress.

**Background:** Nitrogen is usually applied in low rates & using the cheapest source possible –aqua. However, in this case it was applied at a fairly high rate. There are roughly in any given year 1 million acres of cotton in California and another 7-10 million in the rest of the USA. Since it is a tap root crop cotton doesn't respond in the same way as fibrous root crops. And has therefore been neglected. This will demonstrate to both the grower and field men the use of Genica and that efficient use of N while at the same time how to collect valuable data.

**Objective:**

- 1) To measure the effectiveness of Genica to increase the efficiency of nitrogen fertilizer (NH<sub>4</sub>).
- 2) To evaluate the effectiveness of Genica when mixed with other additives.
- 3) To observe the disease suppression of Genica on cotton as compared to normal cultural practices.
- 4) To show the grower that yield increases can be achieved with minor changes to normal practices.

**Methods:** The application was at the 12-15" stage in a side-dress band. The nitrogen was applied at the traditional rate of 100 gal. per acre of NH<sub>3</sub> and also at both 110% & 80% of normal rate. Genica was to be applied at 2 gallons per acre in all treatments except the 2 controls but due to plugging it was substantially less.

- Treatment 1 was the traditional amount of N as aqua ammonia plus Genica;
- T-2 is the aqua ammonia with a special humic-fulvic acid, Premium 6;
- T-3 combined T-1 & T-2 with both Genica and humic acid;
- T-4 was 80% of traditional N with humic acid, Genica and Amino 21;
- T-5 was 110% N with Genica, humic and amino acids
- T-6 is traditional amount of Nitrogen as the Control

**Questions to be answered:**

- 1.) Does Genica increase nitrogen efficiency and uptake in cotton?
- 2.) Do amendments increase N efficiency & yields when used with Genica?
- 3.) Can the quantity of nitrogen be reduced when applied with Genica and not reduce yields?

Investigator: Bio-Gro, Inc.

Cooperator: Nachtigall Farms, Wasco, CA & Dave German, Wilbur Ellis, Shafter, CA

Crop: Cotton - Roundup Ready type

Application Equipment: Wilbur Ellis side-dress rigs.

Plot Size: 72 rows at 36 inch spacing by 1200 ft. long. Treatment Size: 12 rows (1 acre)

**Trial Design and Treatments**

| <b>Treat.</b> | <b>Material</b>                         | <b>Rate</b>                               |
|---------------|---|---|
| 1             | Aqua ammonia + Genica                   | *100 gal/acre + 2 gal Genica              |
| 2             | Aqua ammonia + Humic acids              | 100 gal + 3 gal Premium 6                 |
| 3             | Aqua ammonia + Genica + Humics          | 100 gal + .6 gal Genica+4 gal Premium6    |
| 4             | Lo Aqua ammonia +Genica + Humic + Amino | 80 gal+ ¾ gal Gen +3½gal Prem6 +2 Amino21 |
| 5             | Hi Aqua ammonia +Genica + Humic + Amino | 110 gal+2 gal Gen +5gal Prem6 +3 Amino21  |
| 6             | Control – Traditional program           | 100 gal                                   |

\* Units of N is based on traditional rate used where T-1 is traditional;

**Units of NPK and other nutrients are expressed as lbs. per acre N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O, Ca, Organic Matter dry, humic acid dry**

| Treat. | Early Season Sidedress Product                    | N   | P <sub>2</sub> O <sub>5</sub> | K <sub>2</sub> O | Ca  | OM  | Humic | Amino |
|--------|---|-----|-------------------------------|------------------|-----|-----|-------|-------|
| 1      | Aqua Ammonia + Genica                             | 148 | 0                             | 0                | .95 | 5.7 |       |       |
| 2      | Aqua Ammonia + humic acids                        | 148 | 0                             | 0                | .95 | 5.8 | 2.6   |       |
| 3      | Aqua + Genica + humic acids                       | 148 | 0                             | 0                | .3  | 2.4 | 3.2   |       |
| 4      | Less Aqua + Genica + humic acids + amino acids    | 118 | 0                             | 0                | .5  | 2.7 | 3.8   | 1.2   |
| 5      | More Aqua + Genica + humic acids + amino acids    | 163 | 0                             | 0                | .95 | 8.2 | 5.75  | 1.8   |
| 6      | Control – Normal fertilization 100 gal/ac Aqua Am | 150 | 0                             | 0                |     |     |       |       |

**Results in Bales per Acre**

| T # | Treatment   | Yield bales/ac | Lint Increase | Rank |
|-----|---|----------------|---------------|------|
| 1   | Aqua Ammonia + Genica                             | 3.15           | 112           | 5    |
| 2   | Aqua Ammonia + humic acids                        | 3.29           | 182           | 3    |
| 3   | Aqua + Genica + humic acids                       | 3.56           | 319           | 1    |
| 4   | Less Aqua + Genica + humic acids + amino acids    | 3.32           | 195           | 2    |
| 5   | More Aqua + Genica + humic acids + amino acids    | 3.19           | 132           | 4    |
| 6   | Control – Normal fertilization 100 gal/ac Aqua Am | 3.00           | 37            | 6    |
|     | Average of all non-trial area (19.4 acres)        | 2.93           | 0             |      |

**Comments and Observations:**

1. The proposed rates of the protocol were not accomplished in every case due to the plugging of the nozzles.
2. Cotton is a taproot crop and does not usually respond to a side dress as well as fibrous roots crops. You would not expect to see big changes so any visible difference is really good.
3. Cotton can be addicted to ammonia and especially in large consistent annual doses. This crop should have been balanced for all nutrients to really see a difference but would have required a dramatic change in timing and equipment available to us. We are limited to what the cooperating grower can and will do.
4. Cotton needs to be treated after soil analysis and before planting but a field was not secured in time because most all growers didn't decide to plant until several days before acquiring the seed from Wilbur Ellis the day they planted. Since no fertilizer is applied until mid season and nothing else is applied at planting time we had no opportunity to get the trial out early in the season. Therefore the field man suggested we would have to wait until the side dress application.
5. We should have had a treatment of 30% less N just by itself and also with Genica because the lower rate responded very well and but we still don't know if it wasn't still too high in nitrogen for the Genica to be able to make more efficient.
- 6.

**Results and Observations:**

1. The highest yield was with Genica along the humic acid in the ammonia.
2. The treatment (T-4) with lowest rate of ammonia and low level ( $\frac{3}{4}$  gal) of Genica fared very well especially when compared to the high levels (T-5) of NH<sub>3</sub> (and Genica (2gal) even though it had the additives (humic) which have proved to be so effective with Genica. It appears that the level of N and quite possibly the 2 gal of Genica were too high. This is also brought out because the high rate T-5 was less than the control. Since there were no high and low rates applied alone with no additives as a sort of control to be able to determine if

the low yield was due to a higher rate of ammonia or the higher rate of Genica. Because of how the field equipment is calibrated it is difficult at times to vary just one ingredient. In addition to the water added to cut the ammonia rate we should have added more Genica but since each 5 gallon bucket only yielded 3.5 gal. of usable Genica (sediment on bottom plugs the nozzles) we ran out of product the day of the trial.

3. Even though this trial should stand alone it must be compared to Trial #4 because there was an effect with less NH<sub>3</sub> but #4 doesn't show that less N is best. There is more to this than was feasible to show. Genica does have a positive effect on fertilization but it must go on in less quantities when banding or in pre-plant for a positive effect.
4. An improved version of Genica would be very promising (no plugging and better compatibility).