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Bio-Gro, Inc.
11794 Sunburst Ave. Yuma, AZ
520-726-0385
PO Box 1004, Sunnyside, WA
509-840-2422

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Field Research Division Mexico- Research Report



*A Look at New Alternatives to Boosting
Yields and Biological Disease Suppression*
**PART TWO: IBR Liquid with a Complete Nutrition
System**



14 February 2001

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Field Research Division Mexico- Research Report

A Look at New Alternatives to Boosting Yields and Biological Disease Suppression

PART TWO: IBR Liquid with a Complete Nutrition System

Introductions and Objectives of Project

As is the case most often “Seeing is Believing”. Rancho Los Pinos has tried many new technologies over the years without being able to really determine which methods or products will assist them in obtaining their desired yields and corrected problems such as severe disease pressure. Even though the head agronomist and Director of Technical Services wanted to make some major changes the rest did not want to without first being assured that such changes would in fact make improvements. At stake are tens of millions of dollars of tomatoes and cucumbers.

The cost of controlling diseases has risen dramatically while the success in doing so has fallen short allowing the loss of millions of dollars. While it is common knowledge that Verticillium wilt always exists that was never really clear how much economic damage it has caused. This is PART TWO of demonstration trials that shows although yield loss due to verticillium can be significant, bio-fertilizers can have an impact on yield and quality.

Second was to demonstrate **a total fertility program with biological control products** to evaluate increase yields and the effect of the above biological disease control methods when included in a total package.

Report Summary

The full nutritional program did significantly increase the yields by 41% over the weighted control. This treated 6 acres had 88% verticillium wilt suppression while the control had 0% suppression (100% diseased).

Methods

Evaluation of a Full Nutritional Program on Yield and Quality (Camp 8)

At a different location and with different variety (Tequila—roma type) a nutritional program was outlined based on soil and water analysis. The program was followed generally 30 days late. Even though the ranch was using NPK, it was determined that the quantities were low. Both conventional and alternative products were used.

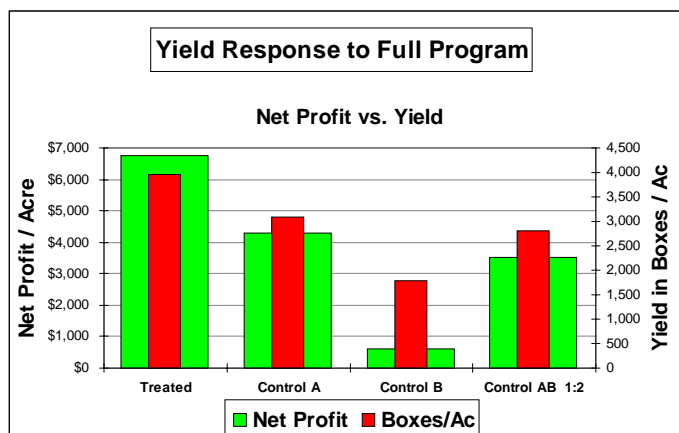
Genica and Soil Amigo were applied twice at 20 Lt per hectare. Activate III was applied at the rate of 1.75 oz. per acre plus 1 lb. per acre of Activate microbial food. This Activate III is 5 species of bacteria in equal proportion with total 100 Billion cfu / gm (colony forming units per gram).

Results and Data

The Results of the Full Nutritional Program on Yield and Quality

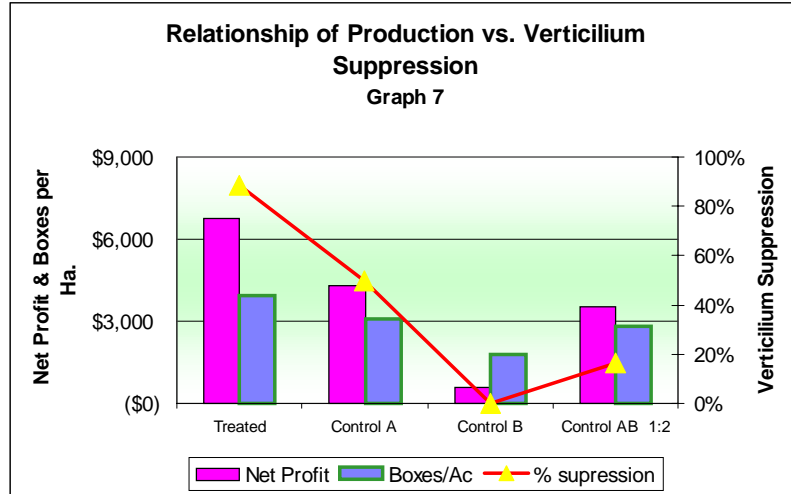
Since the objective was to combine all beneficial products necessary to obtain higher quality of both plant and fruit, individual products and techniques were not evaluated separately only collectively. There was only one treatment of 2.4 hectares (5.9 acres). Control A was used when profiling each of 25 consecutive plants for their production per hand and per plant. The treated was also profiled. In the last 1/3 of season the corner selected as Control A was a corner unlike the rest of the field. Control B was then selected because it is representative of the rest of the 50-acre field that lies immediately adjacent to and north of treated field with the identical conditions as the treated. Control AB 1:2 is a weighted average of 33% A and 67% B to better represent the field.

Graph 6 shows the data from **Table 2**. The treated had 41% better yield and 93% better net profit. In high dollar crops like tomatoes this is very significant. This field has not had a history of being very infested with disease; however, the response was really almost unbelievable. The average of the 3 random 10 consecutive samplings in Control B and full program showed the Control B to 0% suppression. That is say 30 out of 30 had advance stages of verticillium wilt present. While only 3 with advance stages and one in medium stages for 3.5 out of 30 or 88% suppression.



The tomato plants in Control A and treated were profiled to find both productive capacity and estimate yield. Each hand on each 25 consecutive plants plant were counted and sized. This area was marked and was checked during harvest and again near the end of harvest to quantify sizing, harvested fruit and culls. This information was used to model the yield data. Even though there were little differences in weight per fruit and number per plant when calculated to the 10,900 plants per acre the difference is great. The treated produced 41% more harvested fruit than control AB and 93% more net profit.

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A concern was to maintain adequate NPK in the soil even though it is standard operating procedures (sop) these values were low. However the main objective was to look at all the other nutrients needed by tomatoes along with amendments while putting the focus on calcium, zinc, potassium, soil organic matter, soil microbial health, and plant vigor and health. Humic acid was injected into the drip system at 20 Lts per hectare for rooting and soil stimulation. Soil organic matter was hoped to be helped by Genica and to stimulate microbial populations both native and those added by Activate III. Activate III is 5 bacteria species of equal proportions of which there decomposers, phosphorous utilizes, PGR producers and disease suppressants.

All materials were injected into the main manifold leading to the block with the backpack 3 hp-powered sprayer. Only 2/3 of the intended products were actually applied due to scheduling problems or lack of the product. Even so the results were very positive.

Conclusions

1. The economic damage verticillium is doing is devastating but can be controlled using alternative and biological methods. This proved to be very profitable.
2. Combination biological products proved to be better than any one alone.
3. Full nutritional program appears to be more effective in disease suppression than separate products alone.
4. Timing is important in biological controls for early infestation problems. That is to say prevention is better than trying to cure once infested especially with nematodes.
5. These treatments definitely have a future for both the grower and the service provider.

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Appendix A – Data Table

TABLE 2

Treatment	Box Yield / Acre	Sale Value / Box	Field Production Costs	Total Cost	Net Profit	Biological Cost / Acre	Increase Income / Acre	Yield % above control AB	Profit Increase above control AB
		\$5.50	\$4,453						
Treated	3,960	\$21,778	\$4,453	\$15,006	\$6,772	\$364	\$2,892	41%	93%
Control A	3,091	\$17,001	\$4,453	\$12,691	\$4,310	\$10	\$784	10%	23%
Control B	1,780	\$9,793	\$4,453	\$9,198	\$594	\$10	(\$2,931)	-37%	-83%
Control AB 1:2	2,811	\$15,460	\$4,453	\$11,944	\$3,515	\$10	-	-	-

Appendix B

1. The Traditional agri-chemical products used—fungicides and nematocides.
 - a. Rugby at rate of 8-10 Lts per ha.
 - b. Vidate 8-10 Lts. per ha.
 - c. Nema-cur 8 Lts per ha.
 - d. Tecto 60 (ai- tiabendazol) 1 kg per ha.
 - e. Carbendazim 2 Lts.
 - f. Basan 30 W 2-3 Lts
2. Full Program Treatment
 - a. Gypsum 200 kg / ha.
 - b. 6-21-2 20 Lts / ha.
 - c. Genica 20 Lts / ha.
 - d. Soil Amigo 20 Lts / ha.
 - e. CHB-12 HA 10 Lts X 2
 - f. Foliar 6-21-2 2 Lts.
 - g. Foliar Fastart + Cobalt 2 Lts
 - h. deStress 5 Lts X 2
 - i. Foliar deStress 2 Lts
 - j. Activate III 125 gm / ha.
 - k. Activate food source 1 KG / HA.
 - l. Calcium Nitrate 100 kg
 - m. Potassium Nitrate 100 kg.
 - n. Detour 2 Lts
 - o. Subdue 2 Lts.
 - p. Ziff Min trace minerals 3 Lts / ha.

Complete Nutrition System



Control





This demonstrates how the products were injected into the drip lines.

This system works well for treating a row, through a drip system, without causing problems.