

EFFICACY EVALUATION OF HYFER PLUS (GREEN) AS FOLIAR FERTILIZER FOR TOMATO

ADORACION TORRES-GUY
University Researcher

Soils and Agro-Ecosystem Division
Agricultural Systems Cluster
College of Agriculture
U.P. Los Baños
College, Laguna

2010

**EFFICACY EVALUATION OF HYFER PLUS
GREEN AS FOLIAR FERTILIZER
FOR TOMATO**

ADORACION TORRES-GUY
University Researcher

**SOILS AND AGRO-ECOSYSTEM DIVISION
AGRICULTURAL SYSTEMS CLUSTER
COLLEGE OF AGRICULTURE
U.P. LOS BAÑOS
COLLEGE, LAGUNA**

EFFICACY EVALUATION OF HYFER PLUS GREEN FOLIAR FERTILIZER FOR TOMATO

ABSTRACT

A field trial designed to assess the efficacy of Hyfer Plus (HP) (green) foliar fertilizer for tomato was conducted at the University of the Philippines, Central Experiment Station (UPLB-CES) during the wet season (October – December) of 2010. Hyfer plus was found to be effective in promoting the yield of tomato. However, application of fertilizer whether Recommended Rate of Inorganic fertilizer (RRIF) or Recommended Rate of Hyfer Plus (RRHP) alone or as a supplement to RRIF fertilization will significantly increase the number of fruits per plant, total weight of marketable fruit per plant and weight per fruit. Irrespective of fertilizer used there was a consistent increase in yield as the level of nutrient is increased relative to the control. These results require further validation during dry season cropping period.

INTRODUCTION

Hyper Plus 22-11-9 is registered at Fertilizer and Pesticide Authority (FPA) as an effective foliar fertilizer for rice. Results of field trials in lowland rice showed improved effects on yield. Hyfer Plus represents a breakthrough for higher and profitable yields. Some of the benefits claimed to be derived from Hyfer Plus are as follows: a) It enhances vigorous growth and development for having a unique blend of essential macro and micro nutrients b) quality sticker that minimized washed off in case of heavy rains

and c) improves pollination and fruit set, lower incidence of flower and fruit drop, hasten maturity and development and reduced the undesirable effects of bad weather.

Due to favorable market acceptance and preference when tried in other crops by end-users, the manufacturer, Multi Lines Inc. (MLI) decided to expand its label to include registration in tomato. However, all these claims must be validated by conducting field trials at different locations and cropping seasons.

OBJECTIVES

1. To evaluate the effectiveness of Hyfer Plus Fertilizer (Green) on tomato
2. To generate field data needed by the Fertilizer and Pesticide Authority for label expansion purposes.

III. MATERIALS AND METHODS

1. Product Description

HYFER PLUS fertilizer contains the following ingredients of the major and minor elements for the standard product that Multi Lines Inc. (MLI) market locally.

Nitrogen (N)	- 22 %
Phosphorous (P ₂ O ₅)	- 11 %
Potassium as (K ₂ O)	- 9 %

It is a unique blend of properly balanced macro and micro nutrients, humic acid, vitamins, hormones and sticker. Hyfer Plus also contain traced amounts of boron, copper, calcium, iron, manganese, molybdenum, sodium, sulfur and zinc,

It is compatible with most agricultural insecticides and fungicides.

2. Experimental Requirement

- Site: Central Experiment Station, University of the Philippines at Los Baños, Laguna.
- Soil Analysis: Before Experiment
- Crop: Tomato
- Variety: Rosanna
- Treatments: Six (6)
- Replications: Three (3)
- Design: RCBD

3. Treatments as prescribed by FPA (Fertilizer and Pesticide Authority, Regulatory Division).

T1 – Control

T2 – Recommended Rate of Conventional Fertilizer based on soil analysis.

T3 – $\frac{1}{2}$ Recommended Rate of Conventional Fertilizer ($\frac{1}{2}$ CF).

T4 - Recommended Rate of Hyfer Plus Foliar (green) Fertilizer

T5 – $\frac{1}{2}$ Recommended Rate of CF + Full Recommended Rate of Hyfer Plus foliar fertilizer

T6 - Full Recommended Rate of CF + Full Recommended Rate of Hyfer Plus foliar fertilizer

4. Fertilizer Application

A. Hyfer Plus (Green) foliar fertilizer application

Hyfer Plus foliar was sprayed on the leaves at the rate of 1 L/ha every 10 days.

B. Inorganic fertilizer

Treatment 2 – Basal applications of 60.6 g of 46-0-0, 50 g of 16-20-0, and 25 g of 0-0-60 were applied. Another 85 g of 46-00 was side-dressed at 10 DAT.

Treatment 3 – Basal applications of 30.3 g of 46-0-0, 25 g of 16-20-0 and 12.5 g of 0-0-60, were applied. Another 42.5 g of 46-00 was side dressed at 10 DAT.

Treatment 4 – Hyfer Plus green foliar fertilizer alone at the rate of 1L/ha was sprayed on the leaves until the spray started to drip at 5,10, and 15 DAT.

Treatment 5 – Basal applications of 30.3 g of 46-0-0, 25 g of 16-20-0 and 12.5 g of 0-0-60, were applied. Another 42.5 g of 46-00 was side dressed at 10 DAT. Hyfer Plus green foliar fertilizer was sprayed on the leaves at the rate of 1 L/ha at 5, 10, and 15 DAT.

Treatment 6 - Basal applications of 60.6 g of 46-0-0, 50 g of 16-20-0, and 25 g of 0-0-60 were applied. Another 85 g of 46-00 was side-dressed at 10 DAT.

Hyfer Plus green foliar fertilizer was sprayed on the leaves at the rate of 1 L/ha at 5, 10, and 15 DAT.

5. Raising of Seedlings, Transplanting and Maintenance

Seeds were sown in seed boxes and the seedlings were transplanted three (3) weeks after seeds have germinated. One seedling was transplanted per hill with a distancing of 50 cm between hills and 75 cm between rows.

6. Cultural Requirement

Standard cultural requirements for tomato production was followed. Furthermore, extreme weather conditions which may influence the performance of the field trials were recorded to help in explaining the final results.

7. Harvesting and Data gathering

The tomato being a determinate type, a once-over harvest is possible. So when more than 90 % of the fruits of the plants have reached maturities between breaker and table ripe, the border rows were eliminated and among the remaining plants, 10 plants were picked at random then harvested. To maximize fruit recovery, however, sample test plants were harvested twice at weekly interval.

The total number of marketable fruits from each plant were recorded and the total fruit weight per plant and weight per fruit were determined.

The percent unmarketable fruits (rejects) were also weighed. Most of the rejects consisted of immature fruits, misshapen or with defects due to pest and postharvest mechanical injuries. The percent rejects ranged from 4 to 6

percent of the total harvest. But since no trend could be established as regard the effect of treatment, the data was not treated statistically.

IV. RESULTS AND DISCUSSION

The efficacy test for Hyfer Plus (green) Foliar fertilizer was conducted at the University of the Philippines Central Experiment Station Los Baños, Laguna from October to December 2010.

During the duration of the test, the rainfall in Los Baños was relatively heavy, so white polyethylene plastic and plastic mulch were used. There were also several days when the sunlight conditions were not so adequate for optimum growth.

Despite the unfavorable weather conditions, the yield obtained is still near or within the yield range expected of the variety for the wet season cropping which is from 10 to 15 tons per ha.

The results of the trial are shown graphically in Figures 1 to 3 and presented in Tables 1 to 3. Result showed the average number of fruits per plant, average weight per fruit and the total weight of fruits per plant respectively. Result showed that relative to the control plants fertilized with the inorganic fertilizer and Hyfer Plus (green) foliar fertilizer at the recommended rates significantly increased all the three parameters such as average number of fruits per plant, average weight per fruit and the total weight of fruits per plant.

If Hyfer Plus 22-11-9 is used as supplement to the recommended inorganic fertilizer (RIF), whether in combination with $\frac{1}{2}$ RIF or full RIF, number of fruits per plant was significantly increased.

The trend for the average fruit weight follows a similar trend as that shown for increase in fruit number. At $\frac{1}{2}$ RIF, however, the fruit weight was increased but not statistically significant, table 2.

The total fruit weight per plant relative to the control was significantly increased by both the RIF and Hyfer Plus (green) foliar fertilizer at the recommended rates. When Hyfer Plus (green) was used as supplement to the RIF, total fruit weight was increased significantly. When Hyfer Plus (green) is used as supplement to $\frac{1}{2}$ RIF, however, yield was also increased but not statistically significant when compared to Hyfer Plus alone, table3.

The summary of results shown in Table 4 shows the application of fertilizer whether the recommended inorganic fertilizer or Hyfer Plus (green) 22-11-9 either alone or as supplement to RIF fertilization will significantly increase the number of fruits per plant, mean fruit size and the total weight of marketable fruits per plant. Irrespective of fertilizer used there was a consistent increase in yield as the level of nutrient is increase relative to the control.

Translating the increased in yield per plant to yield per hectare 9 total yield per plant in kgm x 35,000 plants) shows that plants fertilized either with the recommended inorganic fertilizer could increase yield relative to the control by 3 to 3.5 tons. A yield increased may be maximized to about 5 tons if plants are fertilized with the recommended rate of inorganic fertilizer supplemented with the recommended rate of hyfer Plus (green) foliar fertilizer.

V. SUMMARY AND CONCLUSION

The data for the efficacy trial showed that the new product, HYFER PLUS (Green) foliar fertilizer was effective in increasing significantly the average number of fruits per plant, average weight per fruit and the total weight of fruits per plant over the control.

Hence, the new product, Hyfer Plus (green) foliar fertilizer may qualify for provisional registration by the Fertilizer and Pesticide Authority (FPA) as long as it is applied together with $\frac{1}{2}$ recommended rate of conventional fertilizer.

VI. RECOMMENDATION

On the basis of the results obtained from the efficacy testing on tomato, provisional Fertilizer and Pesticide Authority registration is recommended for HYFER PLUS (green) foliar fertilizer.

For purposes of full registration, there is a need to conduct another field trial during the dry season period.

Adnan I. Guy

Appendix 1. Tables and Figures

Table 1. Number of fruits per plant

Treatment	Average Yield (Tons/ha)			Total	Mean
	I	II	III		
T1	4.60	4.60	4.20	13.40	4.47 ^e
T2	5.70	5.70	5.70	17.10	5.70 ^{cd}
T3	5.00	5.20	5.10	15.30	5.10 ^d
T4	5.90	5.80	5.90	17.60	5.87 ^{bc}
T5	6.10	6.20	6.20	18.50	6.17 ^{ab}
T6	6.50	6.60	6.50	19.60	6.53 ^a
Block Total	33.80	34.10	33.60		
Grand total				101.50	
Grand mean					5.64

Treatment means followed by the same letter are not significantly different at 5% level

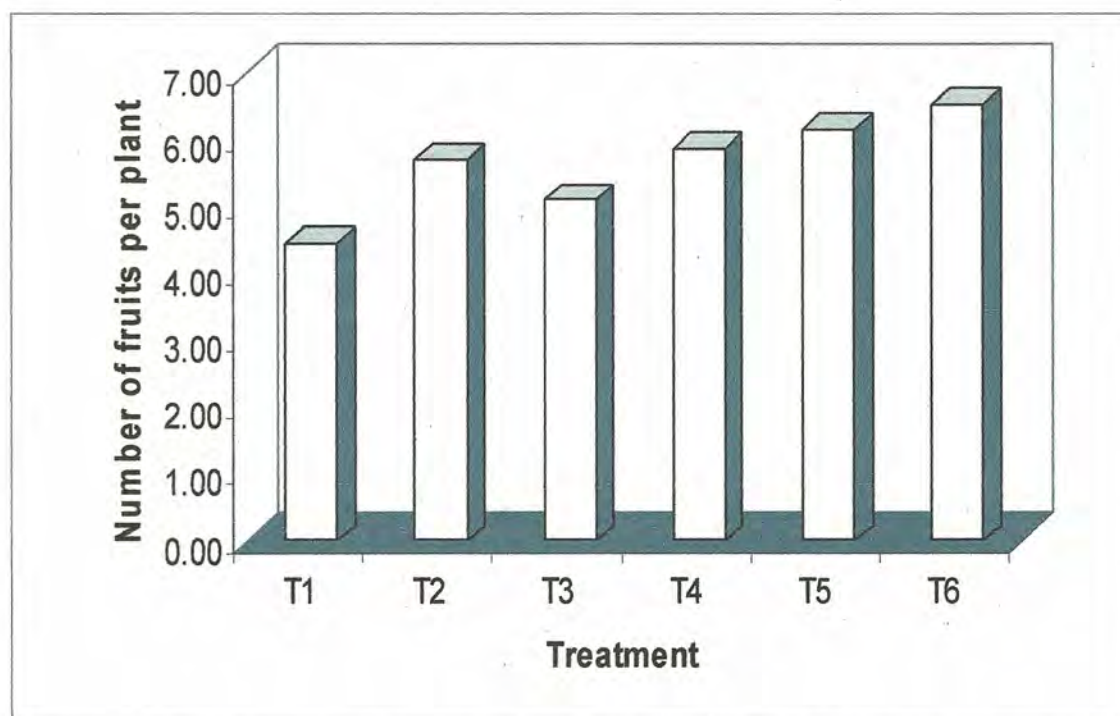


Figure 1. Average number of fruit per plant as affected by different treatments. (Legend: T1 –Control; T2 – Recommended Rate of Conventional Fertilizer; T3 – ½ Recommended Rate of Conventional Fertilizer ; T4 - Recommended Rate of Hyfer Plus (green) ; T5 – ½ recommended Rate of Conventional Fertilizer + Full Recommended Rate of Hyfer Plus Green; T6 - Full Recommended Rate of Conventional Fertilizer + Full Recommended Rate of Hyfer Plus).

Table2. Average weight per fruit

Treatment	Average weight per fruit (g)			Total	Mean
	I	II	III		
T1	46.55	45.95	49.50	142.00	47.33 ^c
T2	55.98	53.33	56.30	165.61	55.20 ^a
T3	46.61	48.40	50.43	145.44	48.48 ^c
T4	51.59	53.10	53.22	157.91	52.64 ^b
T5	52.13	52.77	54.88	159.78	53.26 ^b
T6	53.23	54.06	58.56	165.85	55.28 ^a
Block Total	306.09	307.61	322.89		
Grand total				936.59	
Grand Mean					52.03

Treatment means followed by the same letter are not significantly different at 5% level

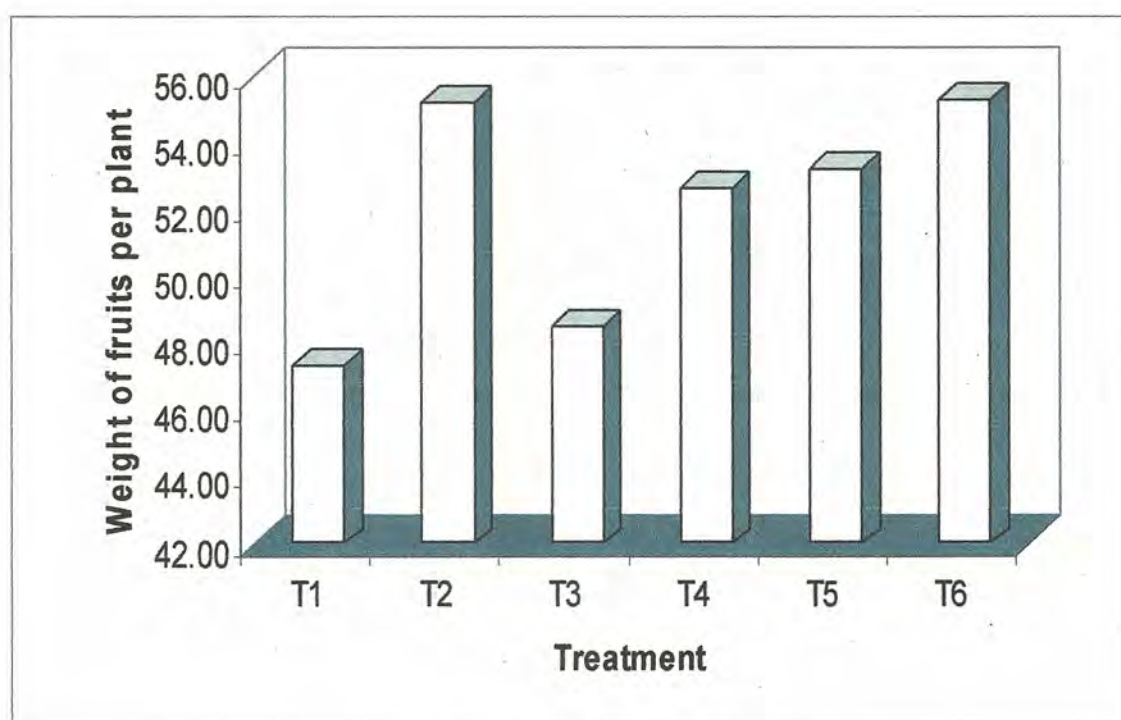


Figure 2. Average weight of fruit per plant as affected by different treatments. (Legend: T1 –Control; T2 – Recommended Rate of Conventional Fertilizer; T3 – ½ Recommended Rate of Conventional Fertilizer ; T4 - Recommended Rate of Hyfer Plus (green); T5 – ½ recommended Rate of Conventional Fertilizer + Full Recommended Rate of Hyfer Plus Green; T6 - Full Recommended Rate of Conventional Fertilizer + Full Recommended Rate of Hyfer Plus).

Table 3. Total weight of fruits per plant (g)

Treatment	Average Yield (Tons/ha)			Total	Mean
	I	II	III		
T1	218.80	216.00	199.00	633.80	211.27 ^a
T2	279.90	310.00	318.90	908.80	302.93 ^c
T3	208.40	252.70	267.30	728.40	242.80 ^d
T4	304.40	310.00	314.00	928.40	309.47 ^{bc}
T5	318.00	337.70	325.40	981.10	327.03 ^b
T6	388.60	345.00	351.10	1084.70	361.57 ^a
Block Total	1718.10	1771.40	1775.70		
Grand total				5265.20	
Grand Mean					292.51

Treatment means followed by the same letter are not significantly different at 5% level

Table 3. Total weight of fruits per plant

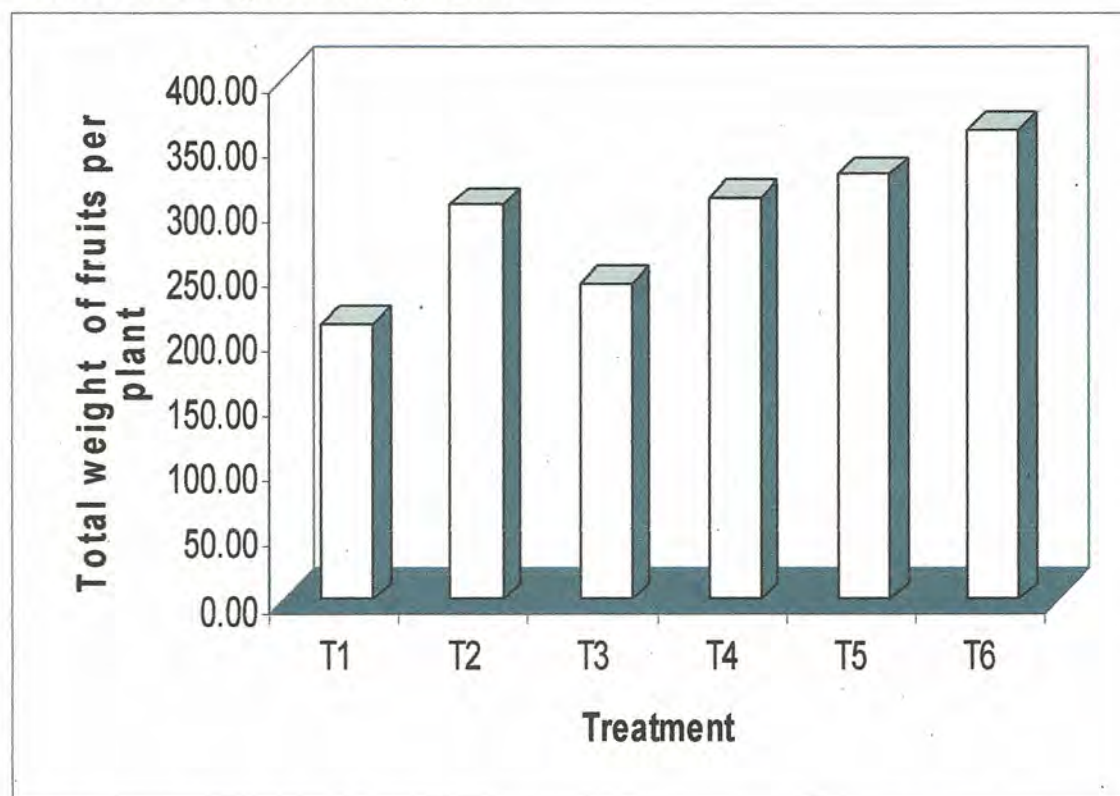


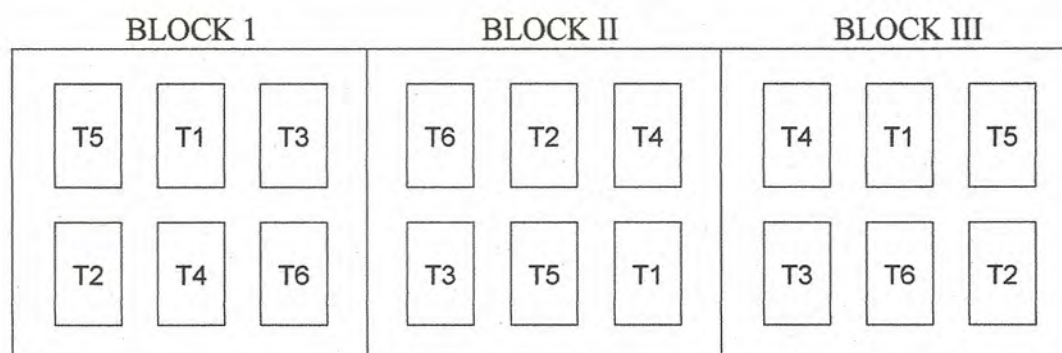
Figure 3. Average number of fruit perplant as affected by different treatments. (Legend: T1 –Control; T2 – Recommended Rate of Conventional Fertilizer; T3 – ½ Recommended Rate of Conventional Fertilizer ; T4 - Recommended Rate of Hyfer Plus (green) ; T5 – ½ recommended Rate of Conventional Fertilizer + Full Recommended Rate of Hyfer Plus Green; T6 - Full Recommended Rate of Conventional Fertilizer + Full Recommended Rate of Hyfer Plus).

Table 4. Summary data (means) on yield of tomato as affected by different treatments.

Treatment	No. of fruits per plant (g)	Weight per fruit (g)	Total Fruit weight per plant (g)	Yield per hectare (tons)
T1	4.47	47.33	211.27	7.40
T2	5.70	55.20	302.93	10.60
T3	5.10	48.48	242.80	8.50
T4	5.87	52.64	309.47	10.83
T5	6.17	53.26	327.03	11.45
T6	6.53	55.28	361.57	12.65

Appendix 2. Experimental Layout

EXPERIMENTAL LAYOUT (Randomized Complete Block Design)



Legend:

