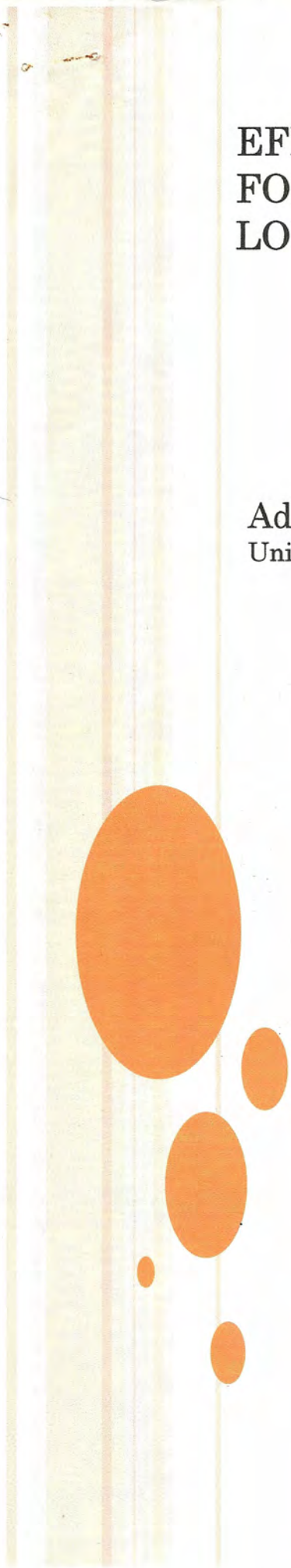


EFFICACY EVALUATION OF HYFER PLUS FOLIAR FERTILIZER FOR LOWLAND RICE

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ABSTRACT

The use of Hyfer Plus foliar fertilizer as a source of nutrient for lowland irrigated rice production was evaluated. Results showed that full application of Hyfer Plus foliar fertilizer significantly increased rice grain yield by 60.71 and 8.74 percent over the control and ½ SRR (45-30-30 kg NPK/ha), respectively. However, full application of Hyfer Plus foliar fertilizer is not comparable with full SRR (90-60-60 kg NPK/ha) using urea and 14-14-14 wherein full Hyfer Plus foliar fertilizer application produced significantly lower grain yield.

When Hyfer Plus was used as supplement to inorganic fertilizer, Hyfer Plus (4 kg/ha) can substitute for ½ of the rate of SRR (45-30-30 kg NPK/ha) as shown by the significant yield increase (15.12%) obtained from this treatment over the SRR (90-60-60 kg NPK/ha) using urea and 14-14-14. Likewise, a further increase of 14.04 in grain yield of rice was obtained when Hyfer Plus (4 kg/ha) was applied in combination with full SRR (90-60-60 kg NPK/ha).

I. INTRODUCTION

Inorganic fertilizers are known to increase harvestable yields in agricultural crops. However, continued use of inorganic fertilizer has a negative impact on the environment especially on the quality of ground water. Hyfer Plus organic foliar supplement is one of the

many liquid foliar fertilizers that can provide the plant with balanced macronutrient formulation fortified with hormones, enzymes, vitamins, and minerals.

The following benefits are claimed to be provided by Hyfer Plus: (a) provides resistance to pest and diseases and stress: (b) environment friendly can be sprayed directly on the above ground parts of the plant: and (c) increases yield of crops and reduce the dependence on fertilizer. However, these claims must be validated under prevailing conditions particularly this wet and dry seasons, to comply for the issuance for full registration of the product.

II. OBJECTIVES:

1. To evaluate the efficacy of Hyfer Plus organic fertilizer; and
2. To generate field data needed by FPA for full registration of the product.

III. MATERIALS AND METHODS

The trial was conducted at Dupho's Research Center, Calauan, Laguna. The soil is Lipa clay loam. Results of soil analysis using Soil Test Kit showed that soil is deficient in nitrogen but sufficient in phosphorus and potassium. Randomized Complete Block Design (RCBD) was used in the conduct of experiment with four replications. The recommended rate for lowland rice was 90-60-60 kg NPK/ha.

The following treatments were evaluated

T1 – Control

T2 – RR of CF (90-60-60)

T3 – ½ RR of CF (45-30-30)

T4 – RR of new product (HP)

T5 – ½ RR of CF + RR of new product (HF)

T6 – RR (IF) + RR (HF)

Seedlings of RC18 were raised following the conventional method of raising seedlings. Transplanting was done 27 days after emergence at a distance of 20cm x 20 cm between hills and rows respectively. Plot size was 10m x 10m replicated four times.

Rate of Application

Rate (kg/ha)	Time of Application
60-60-60/14-14-14	7 DAT
10-0-0 Urea	35 DAT
10-0-0 Urea	45 DAT
10-0-0 Urea	55 DAT

Comparing the effect of supplementation of inorganic and Hyfer Plus foliar fertilizer over the full Hyfer Plus application, the yield increase were 27.52 for $\frac{1}{2}$ SRR + full Hyfer Plus and 26.32 for SRR + full Hyfer Plus.

With respect to the effect of full Hyfer Plus over the SRR, a significant yield decrease of 9.7 percent was noted. However, the grain yield of plants treated with full Hyfer Plus was significantly higher over the $\frac{1}{2}$ SRR (45-30-30 kg NPK/ha) treated plants with means of 5.85 and 5.38 tons per hectare, respectively.

In terms of combined application of inorganic fertilizer and Hyfer Plus foliar fertilizer either at $\frac{1}{2}$ SRR or full SRR rates, comparable grain yields were obtained (Table 1).

Straw yield per hectare. The straw yield per hectare of lowland rice was likewise significantly affected by the treatments evaluated. Highest straw yield was obtained from the application of combined inorganic fertilizer and Hyfer Plus foliar fertilizer. Hyfer Plus applied in combination with $\frac{1}{2}$ SRR has comparable effect with Hyfer Plus + full SRR with means of 12.06 and 14.69 tons per hectare, respectively. Full Hyfer Plus + $\frac{1}{2}$ SRR was comparable with full Hyfer Plus alone, $\frac{1}{2}$ SRR alone and full SRR but significant over the untreated control plants. There was no significant increase in straw yield noted from the full SRR, $\frac{1}{2}$ SRR and full Hyfer Plus over the control.

Number of tillers at 30 days after transplanting, number of panicles and number of unproductive tillers per square meter. These parameters were not significantly affected by the treatments evaluated. These parameters are inherent attributes of the variety used which may or may not be affected by the different treatments used.

Rate of Hyfer Plus application was 4kg/ha. Dilution was 1kg per 100 L_i. Spray volume was 300 L_i water per hectare at early vegetative and peak of vegetative stages respectively.

Rate (kg/ha)	Time of Application
1	15 DAT
1	35 DAT
1	45 DAT
1	55 DAT

All cultural management practices were done throughout the duration of the experiment.

Data Gathered:

1. Plant height at 30 days after planting – a total of 16 hills taken from 4 corner hills measured from the base of the plant to the tip of flag leaf.
2. Tiller count at 30 days after transplanting – taken from tagged 16 hills and transformed to tiller count per square meter.
3. Plant height at harvest – taken from the tagged 16 hills measured a day before harvesting measured from the base of the plant to the tip of the flag leaf.
4. Number of panicle or productive tillers from the tagged – include the tillers with panicles taken from the tagged and was transformed to panicle count per square meter.

5. Number of unproductive tillers – the number tillers without panicle taken from the tagged 16 hills and was transformed to unproductive tillers per square meter.
6. Straw weight at harvest – the weight of straw measured just after threshing taken from a 4 square meter quadrat from the inner rows after disregarding the outer rows.
7. Grain yield per 4 sq. m – the weight of threshed grains from the 4 sq. meter quadrant and was converted to a hectare basis at 14% MC.

IV. RESULTS AND DISCUSSION

The results of the field trial are presented in Table 1.

Grain yield per hectare. The grain yield per hectare of lowland rice variety RC18 was significantly affected by Hyfer foliar fertilizer application. Application of Hyfer Plus fertilizer alone (4kg/ha) significantly outyielded the control and ½ SRR treatment (45-30-30 kg NPK/ha) with means of 5.85 tons and 3.64 and 5.38 tons per hectare, respectively. This correspond to significant yield increase of 60.71 and 8.74 percent over the control and ½ SRR, respectively. It is interesting to note that a further significant yield increase was observed when Hyfer Plus foliar fertilizer was applied as supplement to inorganic fertilizer application at the rates of 45-30-30 kg NPK/ha (1/2 SRR) and 90-60-60 kg NPK/ha (SRR) with means of 7.46 and 7.49 tons per hectare, respectively. The yield increase as a result of treatments ½ SRR + full Hyfer Plus (4kg/ha) and Full SRR + full Hyfer Plus over the reference rate (SRR, 90-60-60 kg NPK/ha using urea and 14-14-14) were 15.12 percent and 14.04 percent, respectively. With reference fertilizer over the control, the yield increase were 104.94 percent and 103.02 percent respectively.

AGRONOMIC CHARACTERS

Plant height. The height of plants at 30 days after transplanting was significantly affected by the different treatments evaluated. A significant height increase was noted as a result of full Hyfer Plus foliar fertilizer over the untreated control plants and $\frac{1}{2}$ SRR. However, with reference to full SRR, shorter plants were obtained as compared to full foliar fertilizer. In terms of height of plants measured at harvest, significant variations were also noted. Full application of Hyfer Plus foliar fertilizer significantly outgrew the untreated plants with means of 104.75cm and 98.80, respectively. The same treatment (Full Hyfer Plus, 4kg/ha) has comparable effect on plant height with $\frac{1}{2}$ SRR (45-30-30 kg NPK/ha).

With reference to full SRR, the application of full Hyfer Plus produced significantly shorter plants. Likewise, supplementing the inorganic fertilizer rate of $\frac{1}{2}$ and full SRR with full Hyfer Plus did not show any significant plant height increase over the full SRR (Table 1).

V. SUMMARY AND CONCLUSION

The result of the trial showed a promising result for the effectiveness of Hyfer Plus foliar fertilizer as nutrient source for lowland irrigated rice. When used as sole source of nutrient for lowland rice, higher rates (>4 kg/ha) should be evaluated to be competitive to full SRR (90-60-60 kg NPK/ha). As shown by the significant increase in yield of applying Hyfer Plus foliar fertilizer at 4 kg/ha in addition to $\frac{1}{2}$ SRR (45-30-30) and full SRR (90-60-60 kg NPK/ha) 50 percent inorganic fertilizer requirement of lowland rice can be substituted using 4 kg/ha Hyfer

Plus. Considering the low cost of Hyfer Plus, farmers can reduce their farm input particularly in terms of fertilizer cost when Hyfer Plus is used in addition to ½ SRR (45-30-30 kg NPK/ha).

VI. RECOMMENDATION

Based on the result of the efficacy trial on lowland rice during the wet season, Hyfer Plus can be considered for full registration.

Table 1. Summary Table on the performance of lowland rice RC18 as affected by the application of Hyfer Plus under lowland irrigated rice during the wet season of 2009-2010.

Treatments	Plant Height 30 DAT (cm)	Tiller count 30 DAT (per m ²)	Plant Height at harvest (cm)	No. of Panicles per m ²	No. of Unprod. tiller per m ²	Grain Yield t/ha (14% MC)	Straw Yield (t/ha)
T1	47.58 c	375	98.80 d	371	4	3.64 c	7.12 abc
T2	56.99 a	463	110.25 a	458	4	6.48 b	11.15 bc
T3	49.02 c	450	101.20 cd	449	1	5.38 d	8.64 bc
T4	52.06 b	406	104.75 bc	403	4	5.85 c	10.10 bc
T5	52.23 b	463	106.53 ab	460	3	7.46 a	12.06 ab
T6	55.91 a	425	110.31 a	424	4	7.39 a	14.69 a

Means within column followed by same letter(s) are not significantly different at 5% level by DMRT. (Note: T1 – Control; T2 – RR of CF; T3 – ½ RR of CF; T4 – RR of Hyfer Plus; T5 – ½ RR of CF + RR of Hyfer Plus; T6 – RR of CF + RR of Hyfer Plus)