TERMINAL REPORT

FIELD EVALUATION OF ULTRABOOST AS SEED TREATMENT AND FOLIAR FERTILIZER FOR RICE

Funding Agency:

Agri Go Pro Inc. Unit 1 Penthouse Legaspi Towers 200, 107 Paseo de Roxas, Makati City

Location:

Barangay Licaong Science City of Munoz, Nueva Ecija

December 2023 to April 2024

Field Evaluation of ULTRABOOST as Seed Treatment and Foliar Fertilizer in Rice

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ABSTRACT

ULTRABOOST applied as foliar spray and seed treatment was evaluated for its efficacy on the growth and yield of transplanted rice. It was conducted at Barangay Maragol, Science City of Muñoz, Nueva Ecija.

The effect of ULTRABOOST Foliar Fertilizer was evaluated using the following treatments: Treatment 1- Control (untreated), Treatment 2-Recommended Rate of Inorganic Fertilizer (RR of NPK), Treatment 3- $\frac{1}{2}$ Recommended Rate of Inorganic Fertilizer (1/2RR of NPK), Treatment 4- $\frac{1}{2}$ RR of NPK + Recommended Rate of ULTRABOOST, Treatment 5- RR of NPK + Recommended Rate of ULTRABOOST, and Treatment 6 - Recommended Rate of ULTRABOOST alone.

Treatments 4, 5, and 6 undergo the process of seed incubation at the rate of 11.25ml of ULTRABOOST in 140g of seeds. Findings revealed that application of recommended rate (RR) of ULTRABOOST by seed treatment and foliar spray in combination with the recommended rate of inorganic fertilizer (RRIF) at the recommended rate of 80-60-60 kg N $P_2O_5 K_2O$ produced the tallest plants with an average height of 42.24cm and 62.86cm at 15 and 30 days after transplanting (DAT), respectively, highest number of tillers (#) of 20 and 35 tillers, at 15 and 30 DAT. At 75 DAT, application of recommended rate (RR) of ULTRABOOST by seed treatment and foliar spray in combination with the recommended rate of so-60-60 kg N $P_2O_5 K_2O$ produced highest number of tillers (#) of 20 and 35 tillers, at 15 and 30 DAT. At 75 DAT, application of recommended rate (RR) of ULTRABOOST by seed treatment and foliar spray in combination with the recommended rate of inorganic fertilizer (RRIF) at the recommended rate of 80-60-60 kg N $P_2O_5 K_2O$ produced highest number of around 28 productive tillers.

Moreover, this above treatment obtained the heaviest 1000 seed weight (g) with an average weight of 27.54g at harvest, produced the highest yield per plot $(20m^2)$ of 22.94kg and heaviest computed yield of 11.47 t/ha.

The result of this best treatment was comparable with the application of RR of ULTRABOOST combined with $\frac{1}{2}$ RRIF that produced yield of 20.06kg per plot and computed yield of 10.03 t/ha. Also, this treatment produced 100% healthy plants on crop stand observed at 60 DAT comparable to the application of $\frac{1}{2}$ RRIF + recommended rate of ULTRABOOST.

All ULTRABOOST Foliar Fertilizer treatments applied alone or with applied RR of NPK produced higher grain yield per plot and higher computed yield in tons per hectare over the untreated control.

In addition, for economic point of view, application of RR of ULTRABOOST + ¹/₂ RRIF can be recommended for application to attain better yield because based on the result of the field trial, it can produced high yield comparable to that of using RR of ULTRABOOST in combination with full recommended rate of inorganic fertilizer.

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BIOEFFICACY TERMINAL REPORT

1. TITLE: Field Evaluation of ULTRABOOST as Seed Treatment and Foliar Fertilizer in Rice

2. INTRODUCTION:

Rice is considered one of the world's most important crops. It is a staple food for Filipinos where area of production reaches as high as 4.5 million hectares annually. An average of two cropping seasons (wet and dry) is practiced in most parts of the countries. It is a crop which can be found nationwide where farming varies in places and became an integral part of the Philippines' culture. Proper selection, use and application of fertilizer is needed to maintain the proper growth and development of rice crop.

Seed treatment improve plant stand and yield of rice crop and the starting point for achieving higher crop production due to the increase resistance to insect infestation and disease infection. Moreover, one of the most effective ways to supplement the nutrients needed by the plants for proper growth and development is through foliar feeding by applying liquid fertilizer directly to the leaves of the plants. Liquid foliar fertilizer boost nutrient density in crops and correct nutrient deficiencies. It becomes immediately available for plant use because it is water soluble and with this makes it perfect in correcting nutrient deficiencies. Liquid applied fertilizer is a great supplement to increase yield of crops, mixed specifically with water for foliar feeding and optimizing nutrient uptake through stomata or plant pores in the leaves. Greater efficiencies are obtained with foliar application because it stimulated entire 'pumping' system of the plants.

Ultraboost® is a concentrated liquid foliar fertilizer that is used for seed treatment and as foliar fertilizer for crop. This foliar fertilizer improve the interactions between plants and soils aside from providing additional nutrients for plant growth and development. Biological interactions that improve plant health, increase plant nutrient utilization efficiency and improve the plants ability to get more photosynthetic output to reproduction. Ultrboost® directly influences many critical plant functions that effect yield and quality like photosynthesis, respiration, fruit/grain fill and the plants natural ability to tolerate pathogens and stress.

- 3. PROPONENT: Agri Go Pro Inc.
- 4. **RESEARCHER:** Dr. Constancia C. Dacumos FPA Accredited Researcher No.E-103/PNT SPRT-65 P-240 Villa Isidra, Barangay Bantug Science City of Munoz, Nueva Ecija
- 5. **DATE AND LOCATION:** December 2023 to April 2024 (Dry Season Cropping) Barangay Maragol, Science City of Munoz, Nueva Ecija

6. TRIAL INFORMATION:

- 1. Rice variety: NSIC 222
- 2. Plot size: $5 \times 4 \text{ m} (20\text{m}^2)$
- 3. Planting distance: 20 cm between rows, 20 cm between hills
- 4. Experimental design: RCBD with three (3) replications
- The required amount of the product was mixed with the amount of seeds per sack of rice. The slurry was poured onto the seeds and mixed thoroughly to ensure that all seeds were treated.

7. **OBJECTIVES:**

- a. To determine the efficacy of Ultraboost as seed treatment and foliar fertilizer on the growth and yield of rice.
- b. To evaluate the cost effective rate of Ultraboost that will produce highest yield of rice.
- c. To determine cost and return analysis of the study.

8. TREATMENTS

The following treatments based on FPA recommendations including the rates, frequency and methods of application were evaluated.

Treatments	Rate kg NPK /ha ml product/140 g seeds L product/ha	Time of Application	Method of Application
1.Control (no fertilizer)	-	-	-
2.Recommended Rate of Inorganic Fertilizer (RRIF)	80-60-60	Basal,15DAT,30 DAT, 40 DAT	Broadcast
3. ½ RRIF	80-60-60	Basal,15DAT,30 DAT 40 DAT	Broadcast
4. ¹ / ₂ RRIF + Recommended Rate of		Basal,15DAT,30 DAT 40 DAT	Broadcast
Ultraboost	80-60-60	Seed incubation	Seed treatment
	11.25 ml/140 g seeds	When rice has 3 fully	Foliar spray
	3.4 ml	developed leaves at 30	Foliar spray
		DAT	1 2
		Top dress at 40 DAT	
5. RRIF +		Basal,15DAT,30 DAT	Broadcast
Pasammandad Pata of	80.60.60	40 DAT Seed incubation	Sood treatment
Liltraboost	$11.25 \text{ m}^{1/1/10} \text{ g seeds}$	When rice has 3 fully	Foliar spray
Chraboost	3/11.23 ml	developed leaves at 30	Foliar spray
	J. T III		ronai spray
		Top dress at 40 DAT	
6.Recommended Rate		Seed incubation	Seed treatment
of Ultraboost		When rice has 3 fully	Foliar sprav
	11.25 ml/140 g seeds	developed leaves at 30	Foliar sprav
	3.4 ml	DAT	1 5
		Top dress at 40 DAT	

9. METHODOLOGY:

- 1. Seeds were treated with Ultraboost as stated in the treatments except for the untreated control.
- 2. Treated seeds with Ultraboost and untreated seeds with water only were placed in sacks and incubated for 24 hours after which minimal watering was done.
- 3. Seed bed was prepared by three times plowing and harrowing to ensure uniform seed germination and good root development of rice seedlings.
- 4. Sowing of seeds was done after 24 hours incubation.

- 5. Seedling maintenance was strictly followed for better growth of seedlings.
- 6. Twenty five days old seedlings were ready for transplanting.
- 7. The experimental area was prepared following the recommended practices in growing rice with good land preparation by three times plowing and harrowing.
- 8. Experimental plots measuring 5 meters x 4 meters (20 sq. m) was constructed.
- 9. There were six treatments replicated three times.
- 10. Planting distance of 20 cm between rows and 20 cm between hills at 2 to 3 seedlings per hill were followed. The distance between treatment and block was nine (9) meters. Straight planting was done.
- 11. Rates and time of application of inorganic fertilizer based on soil analysis were applied into each plot as stated on the treatments.
- 12. Rates and time of application of Ultraboost were applied as stated on the treatments.
- 13. Fertilizer materials applied were 14-14-14 and urea.
- 14. Pre emergence herbicide was applied 3 days after transplanting.

10. DATA GATHERED:

- Days to 50% emergence and final emergence count- number of days were counted and recorded when 50 % of seedling emerge and final counting was done at 100% seedling emergence. This was done during the period of seedling maintenance
- 2. Plant height (cm) at 15 and 30 days after transplanting height of plants were measured two times, at 15 and 30 days after transplanting.
- 3. Number of tillers at 15 and 30 days after transplanting- tiller count was done at 15 days and 30 days after transplanting
- d. Crop stand at 60 days after transplanting- unhealthy and vigorous plants was rated from 0-100 percent.
- e. Number of productive tillers based on 16 sample hills per plot was counted at 75 days after transplanting.
- f. Weight of 1000 seeds collected from 16 sample hills per plot was gathered.
- g. Rice grain yield of 20 sq. m plot at 14 % MC was gathered and computed to tons/ha.
 All collected data were analyzed using Statistical Tool for Agricultural Research (STAR)

following the analysis of variance for Randomized Complete Block Design (RCBD) and treatment

means were compared using Tukey's Honest Significant Difference (HSD) Test at P=0.05 confidence level.



11. EXPERIMENTAL FIELD LAY OUT

Six treatments replicated three times Distance between treatment and block - 9 meters Size of plots - 20 sq. m Total size of experimental area-approximately 2250 sq. m

12. RESULTS AND DISCUSSION

Field evaluation of ULTRABOOST was conducted during dry season cropping (December 2023 to April 2024) for the purpose of determining its efficacy on transplanted lowland inbred rice. The field experiment was conducted at Brgy. Maragol, Science City of Muñoz, Nueva Ecija. A total of six (6) treatments and replicated three (3) times were evaluated.

Days to 50% emergence and final emergence count

Seeds of NSIC IR-222 was incubated for 24 hours. Seeds planted for Treatment 4, 5 and 6 were treated with ULTRABOOST during the seed incubation process. Seeds planted for Treatments 1, 2 and 3 were incubated using water only. The days to 50% emergence and final emergence count were gathered by counting and recording the number of days when 50% of seedlings emerge and final counting was done at 100% seedling emergence. This was done during the period of seedling maintenance. Treated seeds (Treatments 4, 5, and 6) emerged first, 1 day before the untreated one. The 50% emergence of treated seeds was 4 days while untreated one was 5 days.

Plant height (cm) at 15 and 30 days after transplanting (DAT)

Summary Table 1 shows the average plant height (cm) at 15 and 30 DAT measured from the base of the plant up to the height of the tallest leaf taken from 16 randomly selected plants that ranged from 34.57cm to 42.24cm, and from 51.38cm to 62.86cm at 15 and 30 DAT, respectively. Data were significantly affected by the different rates of fertilizer treatments over the control plants.

ULTRABOOST Foliar Fertilizer applied as foliar spray combined with the recommended rate of fertilizer obtained the highest average plant height (cm) of 42.24cm and 62.86cm, comparable with the application of ULTRABOOST combined with ½ RRIF with an average height (cm) of 41.27cm at 15 DAT and 61.31 at 30 DAT. The application of ½ recommended rate of inorganic fertilizer was comparable to recommended rate of ULTRABOOST alone and were significantly higher than the unfertilized treatment. The no fertilizer treatment produced the shortest plant with an average height of 34.57cm and 51.38cm at 15 and 30 DAT, respectively.

The results implies that the treatments which exhibited the tallest plants was due to wellbalanced nutrients applied coming from the ULTRABOOST Foliar Fertilizer applied as foliar spray directly to the leaves of transplanted rice plants. It was indicated that ULTRABOOST Foliar Fertilizer alone contributed to increase in plant height when compared to the control treatment. This shows the beneficial effects of ULTRABOOST Foliar Fertilizer application in increasing the growth of rice. Therefore, this product would be essential in providing the additional nutrient requirements of rice plants for better plant growth and development.

Treatmonts	Rate kg NPK /ha	Time	Plant height (cm)		
Treatments	ml product/280.5 ml water/20 sq. m	of Application	15 DAT	30 DAT	
1.Control (no fertilizer)	-	-	34.57d	51.38d	
2.Recommended Rate of Inorganic Fertilizer (RRIF)	80-60-60	Basal,15DAT,30 DAT 40 DAT	39.52b	59.56b	
3. ¹ / ₂ RRIF	40-30-30	Basal,15DAT,30 DAT 40 DAT	37.59c	56.81c	
4. ¹ / ₂ RRIF + Recommended Rate of ULTRABOOST	40-30-30 11.25 ml/140 g seeds 3.4 ml	Basal,15DAT,30 DAT 40 DAT Seed incubation When rice has 3 fully developed leaves	41.27a	61.31ab	
5. RRIF + Recommended Rate of ULTRABOOST	80-60-60 11.25 ml/140 g seeds 3.4 ml	Basal,15DAT,30 DAT 40 DAT Seed incubation When rice has 3 fully developed leaves	42.24a	62.86a	
6.Recommended Rate of ULTRABOOST	11.25 ml/140 g seeds 3.4 ml	Seed incubation When rice has 3 fully developed leaves	37.18c	55.67c	

Summary Table 1. Average plant height (cm) based on 16 randomly selected hills at 15 and 30 days after transplanting (DAT) as affected by different treatments

Number of tillers at 15 and 30 days after transplanting (DAT)

Summary Table 2 shows the average tiller count (#) based on 16 randomly selected hills at 15 and 30 days after transplanting (DAT). The data was significantly affected by different rates of fertilizers over the unfertilized treatments.

Data revealed that the application of ULTRABOOST Foliar Fertilizer applied as foliar spray combined with recommended rate of inorganic fertilizer produced the highest average number of tiller with an average of around 20 tillers (15DAT) and 35 tillers (30 DAT) comparable to the application of ULTRABOOST Foliar Fertilizer combined with ½ RRIF which produced an average tiller count of around 17 tillers (15 DAT) and 33 tillers (30 DAT). Moreover, tiller count sprayed with ULTRABOOST alone was comparable to plants applied with half of the recommended rate of inorganic fertilizer alone and both significantly produced better results compared from the untreated control.

Production of tiller at vegetative growth of the plant can be considered important as one of the agronomic traits associated with the grain yield of rice production. ULTRABOOST Foliar Fertilizer effectively increased the number of tillers during the vegetative stage of rice plant. The increased in number of tillers in response to the application of inorganic fertilizer plus the addition of ULTRABOOST Foliar Fertilizer enhances the nutrients to become available for plant use.

Results showed that the efficacy evaluation on treatments using ULTRABOOST Foliar Fertilizer significantly increased the number of tillers compared to the application of inorganic fertilizer alone.

Treatments	Rate kg NPK /ha	Time	Number of tillers (#)		
	ml product/280.5 ml water/20 sq. m	Application	15 DAT	30 DAT	
1.Control (no fertilizer)	-	-	7.84d	17.77d	
2.Recommended Rate of Inorganic Fertilizer (RRIF)	80-60-60	Basal,15DAT,30 DAT 40 DAT	14.42b	30.04b	
3. ½ RRIF	40-30-30	Basal,15DAT,30 DAT 40 DAT	12.63bc	24.50c	
4. ¹ / ₂ RRIF + Recommended Rate of ULTRABOOST	40-30-30 11.25 ml/140 g seeds 3.4 ml	Basal,15DAT,30 DAT 40 DAT Seed incubation When rice has 3 fully developed leaves	17.38a	33.19a	
5. RRIF + Recommended Rate of ULTRABOOST	80-60-60 11.25 ml/140 g seeds 3.4 ml	Basal,15DAT,30 DAT 40 DAT Seed incubation When rice has 3 fully developed leaves	19.75a	34.79a	
6.Recommended Rate of ULTRABOOST	11.25 ml/140 g seeds 3.4 ml	Seed incubation When rice has 3 fully developed leaves	11.90c	22.23c	

Summary Table 2. Average number of tillers (#) based on 16 randomly selected hills at 15 and 30 days after transplanting (DAT) as affected by different treatments

Crop stand (healthy and unhealthy crops) at 60 days after transplanting (DAT)

Presented in Summary Table 3 was the data collected on crop stand (healthy and unhealthy crops) based on 16 randomly selected sample hills at 60 DAT. The highest percentage of healthy crops was found in plots applied with RR of ULTRABOOST in combination of RRIF with highest percentage of 100% and none of unhealthy plants. This best treatment was comparable to the percentage of healthy crops obtained by plots treated with RR of ULTRABOOST + $\frac{1}{2}$ RRIF. Recommended rate of ULTRABOOST was comparable with $\frac{1}{2}$ RRIF. The untreated control produced the highest percentage of unhealthy crops (39.58%).

Treatments	Rate kg NPK /ha	Time	Crop stand at 60 DAT		
	ml product/280.5 ml water/20 sq. m	Application	Healthy (%)	Unhealthy (%)	
1.Control (no fertilizer)	-	-	60.42d	39.58a	
2.Recommended Rate of Inorganic Fertilizer (RRIF)	80-60-60	Basal,15DAT,30 DAT 40 DAT	93.75ab	6.25cd	
3. ½ RRIF	40-30-30	30-30 Basal,15DAT,30 DAT 40 DAT		18.75bc	
4. ¹ / ₂ RRIF + Recommended Rate of ULTRABOOST	40-30-30 11.25 ml/140 g seeds 3.4 ml	Basal,15DAT,30 DAT 40 DAT Seed incubation When rice has 3 fully developed leaves	97.92a	2.08d	
5. RRIF + Recommended Rate of ULTRABOOST	80-60-60 11.25 ml/140 g seeds 3.4 ml	Basal,15DAT,30 DAT 40 DAT Seed incubation When rice has 3 fully developed leaves	100.00a	0.00d	
6.Recommended Rate of ULTRABOOST	11.25 ml/140 g seeds 3.4 ml	Seed incubation When rice has 3 fully developed leaves	79.17c	20.83b	

Summary Table 3. Crop stand (healthy and unhealthy crops) based on 16 selected sample hills at 60 days after transplanting (60) as affected by different treatments

Average number of productive tillers at 75 days after transplanting (DAT)

Summary Table 4 presents the average number of productive tillers (#) based on 16 randomly selected hills at 75 days after transplanting (DAT). It can be seen that the control or the untreated plot produced the lowest average number of tillers at 75 DAT. On the other hand, plots treated with the application of ULTRABOOST combined with recommended rate of inorganic fertilizer obtained the highest average number of tillers (around 28 productive tillers) however, it was not significantly different to plots applied with ULTRABOOST and ¹/₂ recommended rate of inorganic fertilizer (around 26 productive tillers). Moreover, plots treated with ULTRABOOST alone (around 23 productive tillers) were comparable to plots applied with ¹/₂ recommended rate of inorganic fertilizer (around 23 productive tillers).

Treatments	Rate kg NPK /ha ml product/280.5 ml water/20 sq. m	Time of Application	Number of productive tillers (#)
1.Control (no fertilizer)	-	-	19.37e
2.Recommended Rate of Inorganic Fertilizer (RRIF)	80-60-60	Basal,15DAT,30 DAT 40 DAT	24.92bc
3. ½ RRIF	40-30-30	Basal,15DAT,30 DAT 40 DAT	23.54cd
4. ¹ / ₂ RRIF + Recommended Rate of	40-30-30	Basal,15DAT,30 DAT 40 DAT Seed incubation	26.23ab
ULTRABOOST	3.4 ml	When rice has 3 fully developed leaves	20.2540
5. RRIF +	80-60-60	Basal,15DAT,30 DAT 40 DAT	
Recommended Rate of ULTRABOOST	11.25 ml/140 g seeds	Seed incubation When rice has 3 fully	27.54a
	5.4 ml	developed leaves	
6.Kecommended Rate	11.25 ml/140 g seeds	Seed incubation	22.084
01 ULIKADUUSI	3.4 ml	developed leaves	22 . 980

Summary Table 4. Average number of productive tillers	s (#) based on 16 randomly selected hills
at 75 days after transplanting (DAT) as affected by different treatments

Average weight (g) of 1000 seeds at harvest

Presented in Summary Table 5 is the average weight (g) of 1000 seeds collected from 16 sample hills at harvest. Significantly highest weight of 1000 seeds was collected from plots applied with ULTRABOOST combined with RRIF with an average weight of 27.54g and was comparable to 1000 seeds collected from plots treated with ULTRABOOST combined with ¹/₂ RRIF having weight of 26.23g. Treatment with ULTRABOOST alone (22.98g) was not significantly different to ¹/₂ RRIF (23.54g). It can be noted that control or untreated produced significantly lowest in weight of 1000 seeds at harvest (19.37g).

Treatments	Rate kg NPK /ha ml product/280.5 ml water/20 sq. m	Time of Application	Weight (g) of 1000 seeds
1.Control (no fertilizer)	-	-	19.37e
2.Recommended Rate of Inorganic Fertilizer (RRIF)	80-60-60	Basal,15DAT,30 DAT 40 DAT	24.92bc
3. ½ RRIF	40-30-30	Basal,15DAT,30 DAT 40 DAT	23.54cd
4. ¹ / ₂ RRIF + Recommended Rate of ULTRABOOST	40-30-30 11.25 ml/140 g seeds 3.4 ml	Basal,15DAT,30 DAT 40 DAT Seed incubation When rice has 3 fully developed leaves	26.23ab
5. RRIF + Recommended Rate of ULTRABOOST	80-60-60 11.25 ml/140 g seeds 3.4 ml	Basal,15DAT,30 DAT 40 DAT Seed incubation When rice has 3 fully developed leaves	27.54a
6.Recommended Rate of ULTRABOOST	11.25 ml/140 g seeds 3.4 ml	Seed incubation When rice has 3 fully developed leaves	22.98d

Summary Table 5. Average weight (g) of 1000 seeds collected from 16 sample hills as affected by different treatments

Grain yield per plot (20m²) and computed in tons per ha (t/ha)

Summary Table 6 shows the grain yield data per plot (20m²) and converted in tons per ha (t/ha) at harvest as affected by different treatment applications. Spray application of ULTRABOOST combined with recommended rate of inorganic fertilizer produced the highest yield per plot (20m²) with an average weight of 22.94kg and was comparable to plots treated with ULTRABOOST combined with ½ RRIF of 20.06kg and heaviest computed yield in tons per hectare (t/ha) of 11.47 t/ha and 10.03 t/ha, respectively. Spray application of ULTRABOOST alone obtained 12.61kg/plot and computed yield of 6.31 t/ha was comparable to plots treated with ½ RRIF alone with 13.22kg/plot and computed yield of 6.61 t/ha. On the other hand, control or untreated plots produced the lowest grain yield per plot and computed yield in t/ha.

Significant differences on the effect of ULTRABOOST Foliar Fertilizer on grain yield per plot and computed yield in tons per hectare with combination of inorganic fertilizer were noted among treatments. All ULTRABOOST Foliar Fertilizer applied with RR of NPK produced higher grain yield per plot and higher computed yield in tons per hectare over the application of inorganic fertilizer alone. With the combination of either half or full of the inorganic fertilizer, there was an increase in yield rather than the use of inorganic fertilizer only.

Cost and return analysis

Summary Table 7 showed the net income of the different treatments. Computations of data showed that the highest net income (P 171, 769.52) was obtained from the application of recommended rate of ULTRABOOST applied as seed treatment and foliar spray supplemented by recommended rate of inorganic fertilizer. When compared to the application of recommended rate of inorganic fertilizer alone, an increase in yield of around 53% was obtained from the addition of ULTRABOOST+ inorganic fertilizer. There was an increase of 37 % obtained from the application of even ½ RRIF + RR ULTRABOOST when compared to the application of inorganic fertilizer alone. Both of these treatments obtained an increased in yield of 217.61 % over the control (RRIF + RR ULTRABOOST) and 185.27 % (½ RRIF + ULTRABOOST). Furthermore, the application of RR ULTRABOOST alone produced an increase in yield 66.71% over the untreated.

Treatmonte	Rate kg NPK /ha	Time	Yield data		
	ml product/280.5 ml water/20 sq. m	Application	20 sqm (kg)	t/ha	
1.Control (no fertilizer)	-	-	8.00d	4.00d	
2.Recommended Rate of Inorganic Fertilizer (RRIF)	80-60-60	Basal,15DAT,30 DAT 40 DAT	16.06b	8.03b	
3. ½ RRIF	40-30-30	Basal,15DAT,30 DAT 40 DAT	13.22bc	6.61bc	
4. ¹ / ₂ RRIF + Recommended Rate of ULTRABOOST	40-30-30 11.25 ml/140 g seeds 3.4 ml	Basal,15DAT,30 DAT 40 DAT Seed incubation When rice has 3 fully developed leaves	20.06a	10.03a	
5. RRIF + Recommended Rate of ULTRABOOST	80-60-60 11.25 ml/140 g seeds 3.4 ml	Basal,15DAT,30 DAT 40 DAT Seed incubation When rice has 3 fully developed leaves	22.94a	11.47a	
6.Recommended Rate of ULTRABOOST	11.25 ml/140 g seeds 3.4 ml	Seed incubation When rice has 3 fully developed leaves	12.61c	6.31c	

Summary Table 6. Yield data per plot (20m²) converted in tons per ha (t/ha) at harvest

Summary Table 7. Cost and return Analysis of One- Hectare Rice Production with and without Ultraboost

Expenses/Income	Values	Untreated	RRIF alone	½ RRIF	½ RRIF +	RRIF +	Ultraboost
•				alone	Ultraboost	Ultraboost	alone
I. EXPENSES							
A. LABOR INPUTS							
Land preparation							
Renovating	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00
Harrowing	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00
Dikes Construction	2,500.00	2,500.00	2,500.00	2,500.00	2,500.00	2,500.00	2,500.00
Seedling Maintenance	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00
Pulling of Seedlings and	9,000.00	9,000.00	9,000.00	9,000.00	9,000.00	9,000.00	9,000.00
Transplanting							
Fertilizer Application	1,500.00		1,500.00	750.00	750.00	1,500.00	
Insecticide Application	500.00	500.00	500.00	500.00			
Weeding/Herbicide	350.00	350.00	350.00	350.00	350.00	350.00	350.00
Application							
COST OF LABOR		23,350.00	24,850.00	24,100.00	23,600.00	24,350.00	22,850.00
B. MATERIAL INPUTS							
Seeds(2 packs at 40	2,400.00	2,400.00	2,400.00	2,400.00	2,400.00	2,400.00	2,400.00
kg/pack)							
NSIC RC 222							
Fertilizer							
8 bags 14-14-14(1,900/bag)	15,200.00		15,200.00	7,600.00	7,600.00	15,200.00	
4 bags Urea (1,800/bag)	7,200.00		7,200.00	3,600.00	3,600.00	7,200.00	
ULTRABOOST 6.614L/ha	17,385.37				17,385.37	17,385.37	17,385.37
@2,268.57							
Insecticide							
1 liter Brodan	560.00	560.00	560.00	560.00			
100g Padan	280.00	280.00	280.00	280.00			
Herbicide							
1 bottle Machete	580.00	580.00	580.00	580.00	580.00	580.00	580.00
Fungicides							
1 pack Dithane	540.00	540.00	540.00	540.00			

TOTAL COST OF	4,360.00	26,760.00	15,560.00	31,561.37	42,765.37	20,365.37
MATERIALS						
C. Harvester/Thresher (10%)	10,224.00	20,524.68	16,895.16	25,636.68	29,317.32	16,128.36
D. Porciento of Kasugpong (10%)	10,224.00	20,524.68	16,895.16	25,636.68	29,317.32	16,128.36
TOTAL EXPENSES	48,158.00	92,659.36	73,450.32	106,434.73	125,750.01	75,472.09
II. INCOME						
Yield per Hectare (cav)	80	160.6	132.2	200.6	229.4	126.2
Cost per Kilo at 24/kilo	2160	3,854.4	3,172.8	4,814.4	5,505.6	3,028.8
GROSS INCOME (Average Weight per Cavan 52 25 kilor)	102,240.00	205,246.8	168,951.6	256,366.8	293,173.2	161,283.6
NET INCOME	54,082.00	112,587.44	95,501.28	149,932.07	167,423.19	85,811.51

SUMMARY AND CONCLUSIONS

A field experimental trial of ULTRABOOST was conducted which has the following objectives: to determine the efficacy of ULTRABOOST as seed treatment and foliar fertilizer on the growth and yield of rice, to evaluate the cost effective rate of ULTRABOOST that will produce higher yield of rice and to determine the cost and return analysis of using the product.

There were six (6) treatments replicated three (3) times that were evaluated. The significant findings were the following:

- ULTRABOOST Foliar Fertilizer applied as seed treatment and foliar spray in combination with the recommended rate of inorganic fertilizer (80-60-60 kg N P₂O₅ K₂O) produced the tallest plant height comparable to RR of ULTRABOOST + $\frac{1}{2}$ of RRIF (40-30-30 kg N P₂O₅ K₂O).
- Data revealed that plots treated with ULTRABOOST combined with recommended rate of inorganic fertilizer (80-60-60 kg N P₂O₅ K₂O) obtained the highest number of tillers. No significant difference was noted on the application of RR of ULTRABOOST + ¹/₂ of RRIF (40-30-30 kg N P₂O₅ K₂O).
- Application of RR of ULTRABOOST combined with RRIF (80-60-60 kg N P₂O₅ K₂O) produced 100 percent of healthy crops comparable to the application of RR of ULTRABOOST + ½ of RRIF (40-30-30 kg N P₂O₅ K₂O).
- Spray application of RR of ULTRABOOST combined with RRIF (80-60-60 kg N P₂O₅ K₂O) produced the heaviest weight (g) of 1000 grains collected at harvest comparable with the application of RR of ULTRABOOST + ½ of RRIF (40-30-30 kg N P₂O₅ K₂O).
- Highest yield per plot (20m²) in kilogram and computed yield in tons per hectare were produced by plants grown on plots applied with RR of ULTRABOOST in combination with RRIF (80-60-60 kg N P₂O₅ K₂O) comparable with the application of RR of ULTRABOOST + ½ of RRIF (40-30-30 kg N P₂O₅ K₂O).
- Unfertilized plants obtained the lowest data of all growth and yield parameters due to lack of nutrients taken by the plants.
- Therefore, based from the results of the study spray application and seed treatment of RR of ULTRABOOST in combination with either half or full RRIF was recommended in enhancing the growth and yield performance of rice.

- Moreover, based on the data gathered ULTRABOOST in combination with ½ RRIF (40-30-30 kg N P₂O₅ K₂O) can be recommended to save the expenses of farmers in buying additional amount of inorganic fertilizer. Study showed that these treatments are recommended in producing better yield of rice.
- It can be stated further that looking into the effect on yield of using the recommended rate of ULTRABOOST alone was comparable with that of applying half of the recommended rate of inorganic fertilizer alone.
- Cost of inorganic fertilizer inputs as well as labor consumed in the application of inorganic fertilizer were some of the advantages incurred in using the product.
- Highest net income was obtained when the recommended rate of ULTRABOOST will be supplemented by either half or full of the recommended rate of inorganic fertilizer.
- Application of recommended rate of ULTRABOOST alone produced an increase in yield higher than the untreated.
- ULTRABOOST product is highly recommended for farmers' use in rice production to produce higher yield when combine with inorganic fertilizer than application of inorganic fertilizer alone.

APPENDIX TABLES

	Rate	RE	PLICATIC			
Treatments	ml product/280.5 ml water/20 sq. m	Ι	II	III	TOTAL	MEAN
1. Control (no fertilizer)	-	34.47	35.34	33.91	103.72	34.57d
2. Recommended Rate of Inorganic Fertilizer (RRIF) 80-60-60		39.88	39.38	39.31	118.56	39.52b
3. ½ RRIF	80-60-60	37.50	37.75	37.53	112.78	37.59c
4. ¹ / ₂ RRIF + Recommended Rate of ULTRABOOST	80-60-60 11.25 ml/140 g seeds 3.4 ml	41.53	41.03	41.25	123.81	41.27a
5. RRIF + Recommended Rate of ULTRABOOST	80-60-60 11.25 ml/140 g seeds 3.4 ml	42.91	41.69	42.13	126.72	42.24a
6. Recommended Rate of ULTRABOOST	11.25 ml/140 g seeds 3.4 ml	37.03	37.72	36.78	111.53	37.18c

Appendix Table 1.1a. Average plant height (cm) based on 16 randomly selected hills at 15 days after transplanting (DAT) as affected by different treatments

Appendix Table 1.1b. Analysis of variance on average plant height (cm) based on 16 randomly selected hills at 15 days after transplanting (DAT) as affected by different treatments

Source	DE	Sum of Squara	Maan of Sayana	E voluo	F-tab		
Source	DI Sull Of Squ	Sum of Square	Weall of Square	r value	F.05	F .01	
Replication	2	0.5542	0.2771	1.33	4.10	7.56	
Treatment	5	121.2217	24.2443	116.68**	3.33	5.64	
Error	10	2.0779	0.2078				
Total	17	123.8538					

**= highly significant cv= 1.18%

	Rate	RE	EPLICATIC	N		
Treatments	ml product/280.5 ml water/20 sq. m	Ι	II	III	TOTAL	MEAN
1. Control (no fertilizer)	-	51.50	52.19	50.44	154.13	51.38d
2. Recommended Rate of Inorganic Fertilizer (RRIF)	80-60-60	60.31	58.63	59.75	178.69	59.56b
3. ½ RRIF	80-60-60	55.44	57.31	57.69	170.44	56.81c
4. ½ RRIF + Recommended Rate of ULTRABOOST	80-60-60 11.25 ml/140 g seeds 3.4 ml	61.75	61.25	60.94	183.94	61.31ab
5. RRIF + Recommended Rate of ULTRABOOST	80-60-60 11.25 ml/140 g seeds 3.4 ml	62.88	62.50	63.19	188.57	62.86a
6. Recommended Rate of ULTRABOOST	11.25 ml/140 g seeds 3.4 ml	55.00	56.56	55.44	167.00	55.67c

Appendix Table 1.2a. Average plant height (cm) based on 16 randomly selected hills at 30 days after transplanting (DAT) as affected by different treatments

Appendix Table 1.2b. Analysis of variance on average plant height (cm) based on 16 randomly selected hills at 30 days after transplanting (DAT) as affected by different treatments

Sourco	DE	Sum of Squara	im of Square Mean of Square F value	E value	F-tab		
Source	DF	Sum of Square		r value	F.05	F .01	
Replication	2	0.2077	0.1039	0.14	4.10	7.56	
Treatment	5	263.1077	52.6215	69.44**	3.33	5.64	
Error	10	7.5779	0.7578				
Total	17	270.8933					

**= highly significant

cv=1.50%

	Rate	RE	PLICATIC	N		
Treatments	ml product/280.5 ml water/20 sq. m	Ι	II	III	TOTAL	MEAN
1.Control (no fertilizer)	-	8.19	7.94	7.38	23.51	7.84d
2. Recommended Rate of Inorganic Fertilizer (RRIF)	80-60-60	14.50	13.88	14.88	43.25	14.42b
3. ½ RRIF	80-60-60	12.50	13.63	11.75	37.88	12.63bc
4. ½ RRIF + Recommended Rate of ULTRABOOST	80-60-60 11.25 ml/140 g seeds 3.4 ml	16.75	17.50	17.88	52.13	17.38a
5. RRIF + Recommended Rate of ULTRABOOST	80-60-60 11.25 ml/140 g seeds 3.4 ml	18.00	21.50	19.75	59.25	19.75a
6. Recommended Rate of ULTRABOOST3.4 ml11.25 ml/140 g seeds 3.4 ml		11.50	11.81	12.38	35.69	11.90c

Appendix Table 2.1a. Average number of tillers (#) based on 16 randomly selected hills at 15 days after transplanting (DAT) as affected by different treatments

Appendix Table 2.1b. Analysis of variance on average number of tillers (#) based on 16 randomly selected hills at 15 days after transplanting (DAT) as affected by different treatments

Source	DE	Sum of Squara	e Mean of Square F value	E value	F-tab		
Source	Dr	Sum of Square		r value	F.05	F .01	
Replication	2	1.9392	0.9696	1.23	4.10	7.56	
Treatment	5	266.8082	53.3616	67.63**	3.33	5.64	
Error	10	7.8904	0.7890				
Total	17	276.6378					

cv= 6.35%

	Rate	RE	PLICATIC	N		
Treatments	ml product/280.5 ml water/20 sq. m	Ι	II	III	TOTAL	MEAN
1.Control (no fertilizer)	-	17.38	17.06	18.88	53.31	17.77d
2. Recommended Rate of Inorganic Fertilizer (RRIF)	80-60-60	31.06	29.31	29.75	90.13	30.04b
3. ½ RRIF	80-60-60	24.81	24.19	24.50	73.50	24.50c
4. ½ RRIF + Recommended Rate of ULTRABOOST	80-60-60 11.25 ml/140 g seeds 3.4 ml	33.19	32.38	34.00	99.56	33.19a
5. RRIF +80-60-60Recommended Rate of11.25 ml/140 g seedsULTRABOOST3.4 ml		35.00	33.88	35.50	104.38	34.79a
6. Recommended Rate of ULTRABOOST	6. Recommended Rate of ULTRABOOST 3.4 ml		23.44	22.00	66.69	22.23c

Appendix Table 2.2a. Average number of tillers (#) based on 16 randomly selected hills at 30 days after transplanting (DAT) as affected by different treatments

Appendix Table 2.2b. Analysis of variance on average number of tillers (#) based on 16 randomly selected hills at 30 days after transplanting (DAT) as affected by different treatments

Source	DE	Sum of Square	Mean of Square	E value	F-tab		
	Dr			r value	F.05	F .01	
Replication	2	1.5981	0.7990	1.09	4.10	7.56	
Treatment	5	667.1454	133.4291	182.64**	3.33	5.64	
Error	10	7.3057	0.7306				
Total	17	676.0491					

cv= 3.16%

	Rate	RE	EPLICATIC	DN		MEAN
Treatments	ml product/280.5 ml water/20 sq. m	Ι	II	III	TOTAL	MEAN
1.Control (no fertilizer)	-	62.5	56.25	62.5	181.25	60.42d
2.Recommended Rate of Inorganic Fertilizer (RRIF)	80-60-60	93.75	93.75	93.75	281.25	93.75ab
3. ½ RRIF	80-60-60	75	87.5	81.25	243.75	81.25bc
4. ½ RRIF + Recommended Rate of ULTRABOOST	80-60-60 11.25 ml/140 g seeds 3.4 ml	93.75	100	100	293.75	97.92a
5. RRIF + Recommended Rate of ULTRABOOST	80-60-60 11.25 ml/140 g seeds 3.4 ml	100	100	100	300	100.00a
6.Recommended Rate of ULTRABOOST	11.25 ml/140 g seeds 3.4 ml	87.5	75	75	237.5	79.17c

Appendix Table 3.1a. Crop stand (healthy crops) based on 16 selected sample hills at 60 days after transplanting (60) as affected by different treatments

Appendix Table 3.1b. Analysis of variance on crop stand (healthy crops) based on 16 selected sample hills at 60 days after transplanting (60) as affected by different treatments

Source	DE	Sum of Square	Mean of Square	E value	F-tab		
	Dr			г value	F.05	F .01	
Replication	2	0.0000	0.0000	0.00	4.10	7.56	
Treatment	5	3359.3750	671.8750	28.67**	3.33	5.64	
Error	10	234.3750	23.4375				
Total	17	3593.7500					

cv= 5.67%

	Rate	RE	EPLICATIC	DN		
Treatments	ml product/280.5 ml water/20 sq. m	Ι	II	III	TOTAL	MEAN
1.Control (no fertilizer)	-	37.5	43.75	37.5	118.75	39.58a
2.Recommended Rate of Inorganic Fertilizer (RRIF)	ed Rate ertilizer 80-60-60		6.25	6.25	18.75	6.25cd
3. ½ RRIF	80-60-60	25	12.5	18.75	56.25	18.75bc
4. ½ RRIF +	80-60-60					
Recommended Rate of ULTRABOOST	11.25 ml/140 g seeds 3.4 ml	6.25	0	0	6.25	2.08d
5. RRIF +	80-60-60					
Recommended Rate of	11.25 ml/140 g seeds	0	0	0	0.00	0.00d
ULTRABOOST	3.4 ml					
6.Recommended Rate of ULTRABOOST	11.25 ml/140 g seeds 3.4 ml	12.5	25	25	62.50	20.83b

Appendix Table 3.2a. Crop stand (unhealthy crops) based on 16 selected sample hills at 60 days after transplanting (60) as affected by different treatments

Appendix Table 3.2b. Analysis of variance on crop stand (unhealthy crops) based on 16 selected sample hills at 60 days after transplanting (60) as affected by different treatments

Source	DE	Sum of Squara	Moon of Squara	E value	F-tab		
Source	Dr Sun of Square Mean of Square P value	r value	F.05	F .01			
Replication	2	0.0000	0.0000	0.00	4.10	7.56	
Treatment	5	3359.3750	671.8750	28.67**	3.33	5.64	
Error	10	234.3750	23.4375				
Total	17	3593.7500					

**= highly significant

cv= 33.20%

	Rate	RE	PLICATIC	N		
Treatments	ml product/280.5 ml water/20 sq. m	Ι	II	III	TOTAL	MEAN
1.Control (no fertilizer)	Control (no fertilizer) -		18.31	19.75	58.13	19.37e
2.Recommended Rate of Inorganic Fertilizer (RRIF)	80-60-60	24.69	24.56	25.50	74.75	24.92bc
3. ½ RRIF	80-60-60	23.13	23.25	24.25	70.63	23.54cd
4. ½ RRIF +	80-60-60					
Recommended Rate of ULTRABOOST	11.25 ml/140 g seeds	25.63	26.19	26.88	78.69	26.23ab
5 RRIF +	80-60-60					
Recommended Rate of ULTRABOOST	11.25 ml/140 g seeds 3.4 ml	26.94	28.00	27.69	82.63	27.54a
6.Recommended Rate of ULTRABOOST	11.25 ml/140 g seeds 3.4 ml	22.69	23.06	23.19	68.94	22.98d

Appendix Table 4. Average number of productive tillers (#) based on 16 randomly selected hills at 75 days after transplanting (DAT) as affected by different treatments

Appendix Table 4. Analysis of variance on average number of productive tillers (#) based on 16 randomly selected hills at 75 days after transplanting (DAT) as affected by different treatments

Source		G 6G	Mean of Square	F value	F-tab		
	DF	Sum of Square			F.05	F .01	
Replication	2	1.7866	0.8933	3.25	4.10	7.56	
Treatment	5	122.9407	24.5881	89.56**	3.33	5.64	
Error	10	2.7453	0.2745				
Total	17	127.4726					

 $*\overline{*} = highly significant$

cv=2.17 %

	Rate	RE	EPLICATIO			
Treatments	ml product/280.5 ml water/20 sq. m	Ι	II	III	TOTAL	MEAN
1.Control (no fertilizer)	-	20.00	21.10	20.20	61.30	19.37e
2.Recommended Rate of Inorganic Fertilizer (RRIF)	80-60-60	25.90	26.00	26.10	78.00	24.92bc
3. ½ RRIF	RIF 80-60-60		24.20	25.00	74.30	23.54cd
4. ½ RRIF + Recommended Rate of ULTRABOOST	80-60-60 11.25 ml/140 g seeds 3.4 ml	26.20	25.90	26.50	78.60	26.23ab
5. RRIF + Recommended Rate of ULTRABOOST	80-60-60 11.25 ml/140 g seeds 3.4 ml	27.10	26.80	27.80	81.70	27.54a
6.Recommended Rate of ULTRABOOST	11.25 ml/140 g seeds 3.4 ml	24.00	23.90	24.20	72.10	22.98d

Appendix Table 5. Average weight (g) of 1000 seeds collected from 16 sample hills as affected by different treatments

Appendix Table 5. Analysis of variance on average weight (g) of 1000 seeds collected from 16 sample hills as affected by different treatments

Source	SourceDFSum of SquareMean of SquareF value	Moon of Sayona	Evolue	F-tab		
Source		F.05	F .01			
Replication	2	0.3344	0.1672	1.04	4.10	7.56
Treatment	5	86.9244	17.3849	107.83**	3.33	5.64
Error	10	1.6122	0.1612			
Total	17	88.8711				

**= highly significant

cv=1.62%

	Rate	RE	PLICATIC			
Treatments	ml product/280.5 ml water/20 sq. m	Ι	II	III	TOTAL	MEAN
1.Control (no fertilizer)	-	8.67	7.00	8.33	24.00	8.00d
2.Recommended Rate of Inorganic Fertilizer (RRIF)	80-60-60	15.67	16.33	16.17	48.17	16.06b
3. ½ RRIF	80-60-60	13.67	14.00	12.00	39.67	13.22bc
4. ½ RRIF + Recommended Rate of ULTRABOOST	80-60-60 11.25 ml/140 g seeds 3.4 ml	18.00	22.50	19.67	60.17	20.06a
5. RRIF + Recommended Rate of ULTRABOOST	80-60-60 11.25 ml/140 g seeds 3.4 ml	23.00	23.33	22.50	68.83	22.94a
6.Recommended Rate of ULTRABOOST	11.25 ml/140 g seeds 3.4 ml	12.00	13.33	12.50	37.83	12.61c

Appendix Table 6.1a. Yield data per plot (20m²) at harvest

Appendix Table 6.1b. Analysis of variance on yield data per plot (20m²) at harvest

Source	DE Sum of Squam	Moon of Sayona	Evalue	F-tab		
Source	DF	Dr Sum of Square Mean of Square r value	r value	F.05	F .01	
Replication	2	3.2421	1.6211	1.30	4.10	7.56
Treatment	5	438.7788	87.7558	70.47**	3.33	5.64
Error	10	12.4531	1.2453			
Total	17	454.4740				

cv=7.21%

	Rate	REPLICATION				
Treatments	ml product/280.5 ml water/20 sq. m	Ι	II	III	TOTAL	MEAN
1.Control (no fertilizer)	-	4.33	3.50	4.17	12.00	4.00d
2.Recommended Rate of Inorganic Fertilizer (RRIF)	80-60-60	7.83	8.17	8.08	24.08	8.03b
3. ½ RRIF 80-60-60		6.83	7.00	6.00	19.83	6.61bc
4. ½ RRIF + Recommended Rate of ULTRABOOST	80-60-60 11.25 ml/140 g seeds 3.4 ml	9.00	11.25	9.83	30.08	10.03a
5. RRIF + Recommended Rate of ULTRABOOST	80-60-60 11.25 ml/140 g seeds 3.4 ml	11.50	11.67	11.25	34.42	11.47a
6.Recommended Rate of ULTRABOOST	11.25 ml/140 g seeds 3.4 ml	6.00	6.67	6.25	18.92	6.31c

Appendix Table 6.2a. Yield data converted in tons per ha (t/ha) at harvest

Appendix Table 6.2b. Analysis of variance on yield data converted in tons per ha (t/ha) at harvest

Source	DE Sum of Squam	Moon of Sayona	Evalue	F-tab		
	DF	Sum of Square	Weatt of Square	r value	F.05	F .01
Replication	2	0.8257	0.4129	1.33	4.10	7.56
Treatment	5	109.7032	21.9406	70.67**	3.33	5.64
Error	10	3.1045	0.3105			
Total	17	113.6335				

cv= 7.20%

APPENDIX FIGURES

Appendix Figure 1. General view of the experimental area













Appendix Figure 2. Seed treatment













Appendix Figure 3.1. Field activities





Land preparation (plowing and harrowing)





Rice seeding



Field layout



Pulling of rice seedlings

Appendix Figure 3.2. Different field activities



Construct levee per plot



Transplanting of rice seedlings



Irrigating using water pump

Appendix Figure 4. Rice seedlings



Treated with Ultraboost



Untreated



Treated with Ultraboost



Untreated



Treated with ULTRABOOST



Untreated

Appendix Figure 5. Treatment application







Weighing of inorganic fertilizer

Appendix Figure 6. Fertilizer application at 10 DAT



T2 - RRIF alone



T3 - ½ RRIF



T4 - $\frac{1}{2}$ RRIF + RR of UltraBoost



T5 - RRIF + RR of UltraBoost

Appendix Figure 7.1. Treatment application at 20 DAT



T2 - RRIF alone



T3 - ½ RRIF





T4 - $\frac{1}{2}$ RRIF + RR of UltraBoost

Appendix Figure 7.2. Treatment application at 20 DAT



T5 - RRIF + RR of UltraBoost



T6 - RR of UltraBoost alone

Appendix Figure 8.1. Treatment application at 35 DAT



T2 - RRIF alone



T3 - ½ RRIF





T4 - $\frac{1}{2}$ RRIF + RR of UltraBoost

Appendix Figure 8.2. Treatment application at 35 DAT





T5 - RRIF + RR of UltraBoost



T6 - RR of UltraBoost alone

Appendix Figure 9. Representative treatment per plot at 10 DAT



T1 - Control (no fertilizer)



T2 - RRIF alone



T3 - ½ RRIF



T5 - RRIF + RR of UltraBoost



T4 - $\frac{1}{2}$ RRIF + RR of UltraBoost



T6 - RR of UltraBoost alone

Appendix Figure 10. Representative treatment per plot at 20 DAT



T1 - Control (no fertilizer)



T2 - RRIF alone



T3 - ½ RRIF



T5 - RRIF + RR of UltraBoost



T4 - $\frac{1}{2}$ RRIF + RR of UltraBoost



T6 - RR of UltraBoost alone

Appendix Figure 11. Representative treatment per plot at 35 DAT



T1 - Control (no fertilizer)



T2 - RRIF alone



T3 - ½ RRIF



T5 - RRIF + RR of UltraBoost



T4 - $\frac{1}{2}$ RRIF + RR of UltraBoost



T6 - RR of UltraBoost alone

Appendix Figure 12. Representative treatment per plot at 60 DAT



T1 - Control (no fertilizer)



T2 - RRIF alone



T3 - ½ RRIF



T4 - $\frac{1}{2}$ RRIF + RR of UltraBoost



T5 - RRIF + RR of UltraBoost



T6 - RR of UltraBoost alone

Appendix Figure 13. Representative treatment per plot at 75 DAT



T1 - Control (no fertilizer)



T2 - RRIF alone



T3 - ½ RRIF



T5 - RRIF + RR of UltraBoost



T4 - $\frac{1}{2}$ RRIF + RR of UltraBoost



T6 - RR of UltraBoost alone

Appendix Figure 14. Representative treatment per plot at 80 DAT



T1 - Control (no fertilizer)



T3 - ½ RRIF



T5 - RRIF + RR of UltraBoost



T2 - RRIF alone



T4 - ¹/₂ RRIF + RR of UltraBoost



T6 - RR of UltraBoost alone

Appendix Figure 15. Representative treatment per plot at harvest



T1 - Control (no fertilizer)



T3 - ½ RRIF



T5 - RRIF + RR of UltraBoost



T2 - RRIF alone



T4 - $\frac{1}{2}$ RRIF + RR of UltraBoost



T6 - RR of UltraBoost alone

Appendix Figure 16. Harvesting









Appendix Figure 17.2. Harvesting









Rice winnowing



Sun drying

Appendix Figure 18. Representative harvested sample from 6m² per plot



T1 - Control (no fertilizer)



T5 - RRIF + RR of UltraBoost



T2 - RRIF alone



T4 - $\frac{1}{2}$ RRIF + RR of UltraBoost



T6 - RR of UltraBoost alone

Appendix Figure 19. Representative harvested grain yield from 6m² per plot



T1 - Control (no fertilizer)



T2 - RRIF alone



T3 - ½ RRIF



T4 - ¹/₂ RRIF + RR of UltraBoost



T5 - RRIF + RR of UltraBoost



T6 - RR of UltraBoost alone

Appendix Figure 20. Representative panicle per treatment



T1 - Control (no fertilizer)



T2 - RRIF alone



T3 - ½ RRIF



T4 - ½ RRIF + RR of UltraBoost



T5 - RRIF + RR of UltraBoost



T6 - RR of UltraBoost alone

Appendix Figure 21.1. Representative panicle per treatment at harvest



T1 - Control (no fertilizer)



T2 - RRIF alone



T3 - ½ RRIF



T5 - RRIF + RR of UltraBoost



T4 - $\frac{1}{2}$ RRIF + RR of UltraBoost



T6 - RR of UltraBoost alone

Appendix Figure 21.2. Representative panicle per treatment at harvest



Appendix Figure 22. Representative weight of 1000 grains per treatment



T1 - Control (no fertilizer)



T2 - RRIF alone



T3 - ½ RRIF



T5 - RRIF + RR of UltraBoost



T4 - ½ RRIF + RR of UltraBoost



T6 - RR of UltraBoost alone

Appendix Figure 23. Data gathering



Plant height (cm) measuring



Weighing of harvested grains per plot



Tiller count (#) (16 hills per plot)



1000 grains counting





Weighing of 1000 grains