Bioefficacy Evaluation of UltraBoost on the Growth and Yield of Pechay (*Brassica rapa* cv Black Behi*)*

PROPONENT   : AGRIGOPRO CROPS SERVICES
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DURATION   : July to September 2023
LOCATION / SITE : Barangay Cawongan, Padre Garcia, Batangas
RESEARCHER   : Dario M. Huelgas (PNT 145)

I. Introduction:

Pechay is an erect, biennial, cultivated as an annual about 15-30 cm tall in vegetative stage. Ovate leaves are arranged spirally and spreading. The petioles are enlarged and grow upright forming a subcylindrical bundle. Inflorescence is a raceme with pale yellow flowers. Seeds are one mm in diameter and are reddish to blackish brown in color. Pechay has many soft, thin, light green, broad to oblong ovate leaves. These are arrange spirally and spreading. Pechay are favorites by most Oriental people for it is always available in the market anytime of the year. It is also an important constituents of Filipino food such as "puchero" and "nilaga". It is a green leafy vegetable rich in calcium and other essential nutrients.

Pechay is used mainly at immature, but fully expanded tender leaves stage. The succulent petioles are often the preferred part. It is used as main ingredient for soup and stir-fried dishes. In Chinese cuisine, its green petioles and leaves are also used as garnish.

UltraBoost is a plant enhancer and is a unique proprietary technology formulated to biologically activate plants via direct application to the foliage. UltraBoost will improve the interactions between your plants and soils. Biological interactions that improve plant health, increase plant nutrient utilization efficiency and improve the plants ability to get more photosynthetic output to reproduction. UltraBoost 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.

II. Objectives:

The objectives of the study were:

1. To determine the efficacy of UltraBoost in the growth and yield of pechay, and
2. To generate data for the registration of the product to the Fertilizer and Pesticide Authority

III. Methodology

1. Experimental Site

The study was conducted in Barangay Cawongan, Padre Garcia, Batangas. The area is usually planted with rice and various vegetables. Irrigation is available throughout the year, from National Irrigation Authority and from a deep well located very near the area. The site is accessible for monitoring and data gathering.

2. Description of Products and Standards

UltraBoost is a plant enhancer and is a unique proprietary technology formulated to biologically activate plants via direct application to the foliage. UltraBoost will improve the interactions between your plants and soils. Biological interactions that improve plant health, increase plant nutrient utilization efficiency and improve the plants ability to get more photosynthetic output to reproduction. UltraBoost 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. The product contains 1% Urea, 0.03% Boric Acid, 0.002% Cobalt Chloride, 0.10 Manganese Sulfate, 0.015 Aluminum Molybdate, 0.05% Zinc Sulfate.

3. Reference Product

The reference product to this study is the recommended fertilizer rate based on soil analysis.

4. Selection of Crop Variety

The test crop is pechay (*Brassica rapa* cv Black Behi*)*

5. Soil sampling and analysis

A soil sample was collected prior to land preparation and planting. The composite soil sample was collected from 10 holes of a depth of 15 cm. After mixing the soil, a kilogram was analyzed for nutrient content. Results of the soil analysis were the basis for the amount and kind of fertilizers applied in pechay.

Based on the latest soil analysis done on the experimental field, the soil has heavy texture, pH of 6.9, low Nitrogen, low Phosphorus and medium Potassium. Based on the analysis, pechay crops need 150kg N - 60kg P – 0kg K or basal application of 7 bags 21-0-0 and 6 bags

0-20-0 prior to transplanting and top dressing of 7 bags 21-0-0 at two weeks after transplanting.

6. Application of Treatments

There were six treatments. The different treatments are as follows:
    T1 - control
    T2 – Recommended Rate of NPK based on soil analysis (RR)
    T3 – 1/2RR
    T4 – 1/2RR + rr (manufacturer's recommended rate)
    T5 – rr
    T6 – RR + rr

7. Experimental Design

The experiment was laid out in randomized complete block design with three replications. Each experimental unit has an area of 10sqm with a dimension of 2m x 5m. Refer to Figure 1 for the study lay out.

IV.   Agrometeorological Data

Major changes in the climate were observed during the conduct of the trial, recording also the dates of the rains or droughts and the stage of the plant. Rainfall and humidity data were obtained from the website accuweather.com and timeanddate.com.
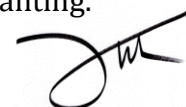
V.   Cultural Management

1. Land Preparation

The experimental field was plowed and harrowed using garden hoe and spade. Plots measuring 10 sqm were made manually using spade.

2. Sowing/Transplanting

Pechay seeds were sown in seedling box for uniform growth. Before sowing, the seeds were placed in refrigerator to break the dormancy. Two weeks after seed germination, the seedlings were transplanted to the plots at one seedling per hill at a planting distance of 25 cm x 25 cm. Replanting of missing hills was done up to a week after transplanting.

Figure 1. Study lay out

3. Fertilizer Management

Fertilizer management is shown in Table 1. The amount and kind of NPK fertilizers used in the trial were based on the result of soil analysis.

Table 1. Fertilizer Management

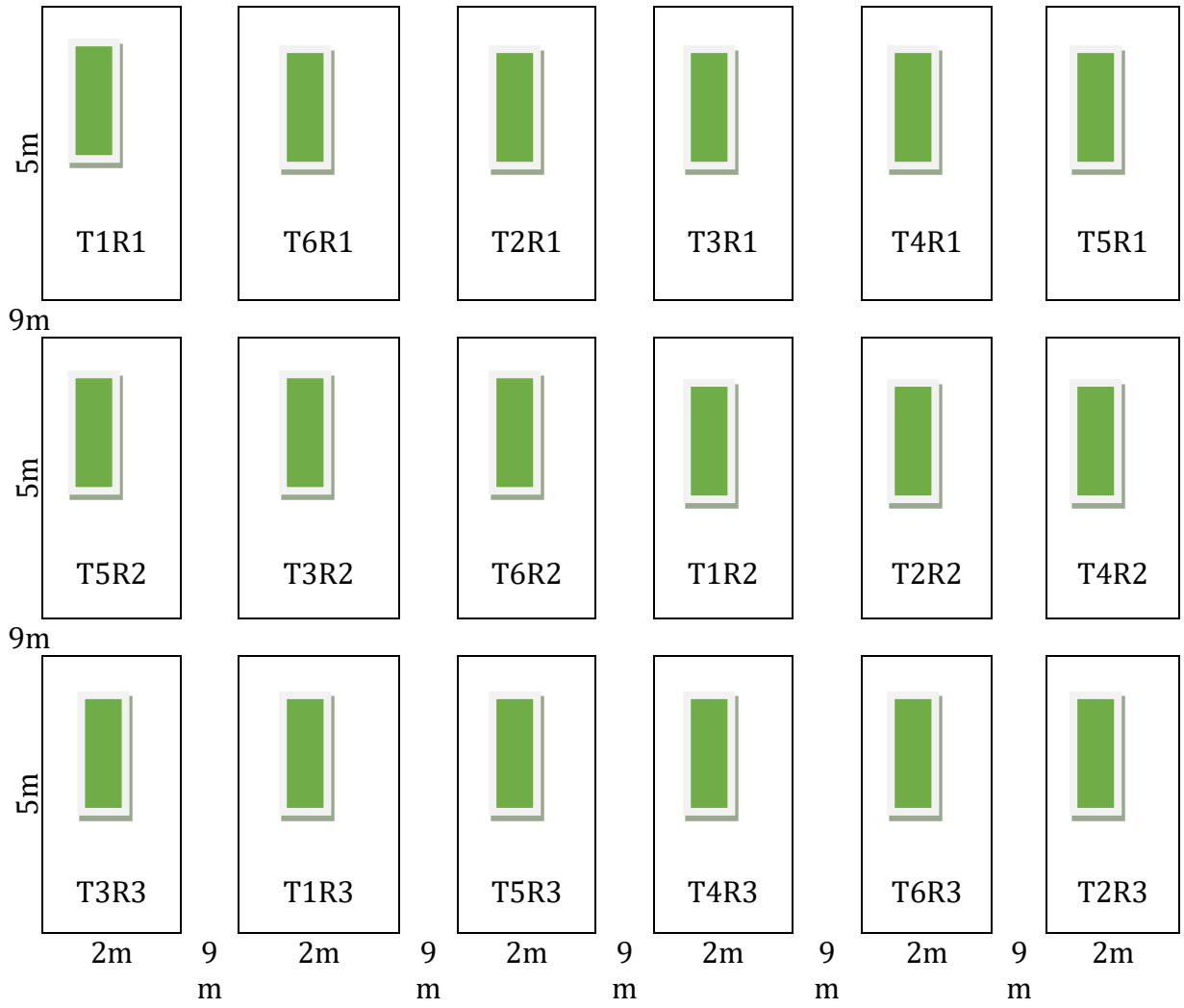| Treatment No.	Treatment Name	Fertilizer Application	Growth Stage	Description
T1	Control			Unfertilized
T2	RR	Amount, mode and frequency based on soil analysis		
T3	1/2RR	Amount, mode and frequency based on soil analysis		
T4	1/2RR + rr	Amount, mode and frequency based on soil analysis		
		apply on soil before planting, & at transplanting	Before planting At transplanting	2.3mL UltraBoost on soil 1.75mL on plant
T5	rr	apply on soil before planting, & at transplanting	Before planting At transplanting	2.3mL UltraBoost on soil 1.75mL on plant
T6	RR + rr	Amount, mode and frequency based on soil analysis		
		apply on soil before planting, & at transplanting	Before planting At transplanting	2.3mL UltraBoost on soil 1.75mL on plant

4. Crop management

Immediately after transplanting, the hills were watered to reduce transplanting shock. Irrigation during the entire duration of the trial was done whenever needed.

Weeds were removed manually every two weeks. Spot weeding was done whenever necessary especially to the areas very near the base of crops.

Regular monitoring of the plants was done to prevent disease outbreak. Infected plants showing unusual signs were immediately removed and burned.

Insect infestation was managed by applying appropriate insecticides.

5. Harvesting

The crops were harvested 30 DAT. Yield was evaluated from the crop cut of 1.5 meters x 4 meters. Pechay plants were cut at the base of the plant.

6. Data Gathered

The efficacy of the test product was evaluated with the following parameters:

a. Phytotoxicity - Crop phytotoxicity, conducted seven days after treatment application following the FPA rating scale as follows:

SCALE	% INJURY BASED ON THE UNTREATED CHECK
1	None
3	1-10%
5	11-20%
7	21-30%
9	> 30%

b. Growth Parameters, 10 plants from inner rows outside the crop cut (rows after the border plants). These plants were tagged for succeeding observations.

- o Number of Leaves per plant – taken by counting the number of leaves per plant at 14 DAT, 21 DAT and 30 DAT
- o Plant Height – taken by measuring the height one inch away from the base of the plant up to the tip of the highest leaf 14 DAT, 21 DAT and 30 DAT.

c. Yield Components, from a cut-crop of 2 meters x 5 meters from inner rows, converted to tons per hectare

- o Weight of marketable yield – undamaged leaves, greenish color
- o Weight of non-marketable yield – damaged leaves, yellowish to brownish color
- o Total weight of harvest – weight of marketable leaves and non-marketable leaves. This could explain the damaging effects (e.g. brittleness of the leaves during harvest of pechay), if any, of the test product to the leaves of the crops.

VI. Data analysis and interpretation

ANOVA was used to determine the significance of the treatments. LSD at 5% was used to compare means if differences among treatments are significant.

VII. Results and Discussion

Pechay seeds were sown in trays to promote homogeneity of seedlings. Two weeks after sowing, the seedlings were transplanted in prepared plots on August 19, 2023. Proper care and cultural management practices were followed. Pechay plants were harvested 33 days after transplanting, Sept 21, 2023.

1. Climatological Data

During the conduct of the trial, the lowest temperature was recorded was 24°C, while the highest was 35°C. The greatest relative humidity recorded was 95% while the least was 61%. Please refer to Figure 2 and Figure 3.

2. Phytotoxicity Analysis

The plants did not show any signs of damage from the application of test product.

3. Number of Leaves per plant, 14 DAT, 21 DAT and 30 DAT

The number of leaves was measured by counting the fully developed leaves per plant. At 14, 21 and 30 DAT, the greatest number of leaves came from the plants fertilized with both recommended rate of NPK (RR) and UltraBoost recommended rate (rr), with numbers of 4.72. 7/27 and 11.51, respectively. The least number of leaves, on the other hand, came from the unfertilized control (Treatment 1) and from those plants fertilized with UltraBoost alone (Treatment 5). Please refer to Table 2 for the summary table and Appendix Tables 1 to 3 for the number of leaves at 14, 21 and 30 DAT.

TEMPERATURE GRAPH   °C
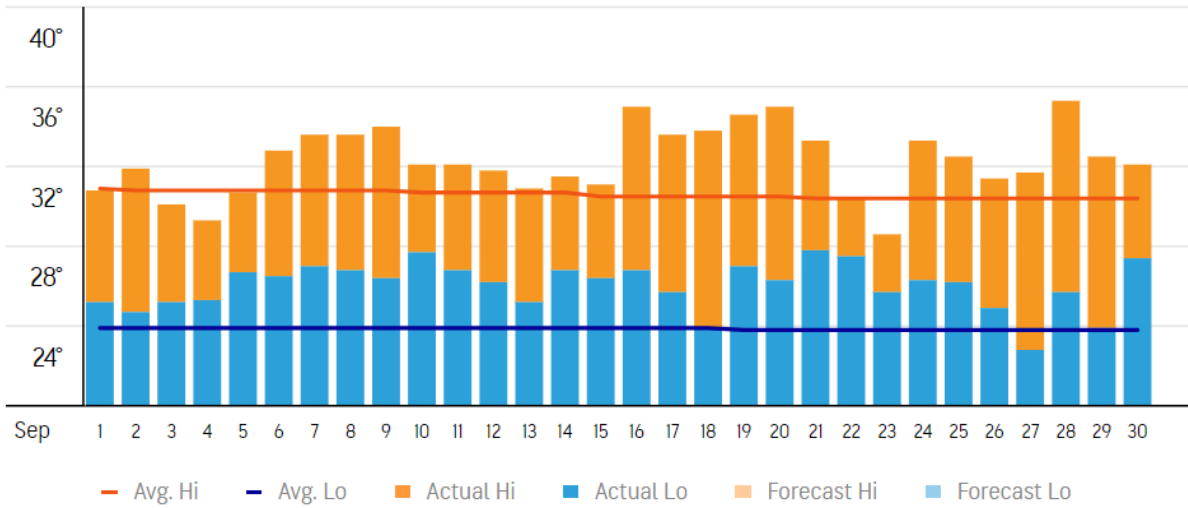
TEMPERATURE GRAPH   °C

Source: https://www.accuweather.com
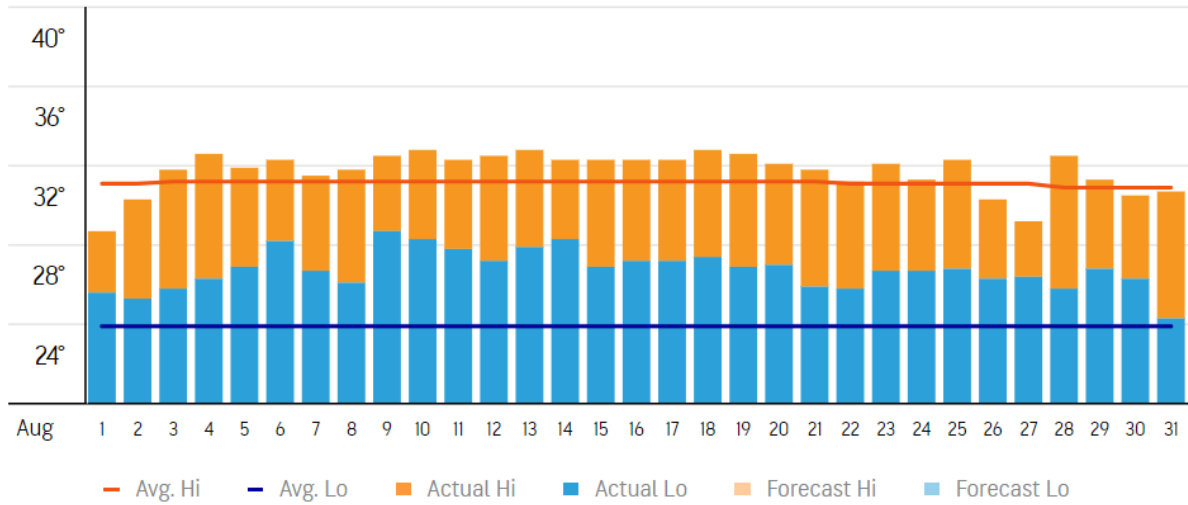
Figure 2. Temperature graph, August and September, 2023
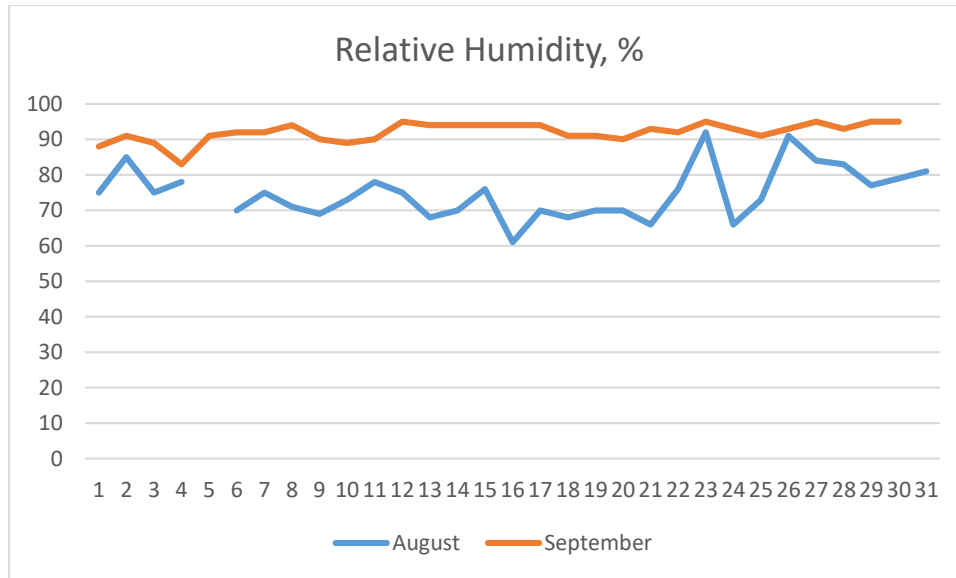
Source: www.timeanddate.com/weather

Figure 3. Relative Humidity, August to September, 2023

Table 2. Summary Table

TREATMENT	Number of Leaves			Plant Height, cm			Yield, t/ha		
	14DAT	21 DAT	30 DAT	14DAT	21 DAT	30 DAT	Marketable	Nonmarketable	Total
T1 - Control	4.40 d	6.53 f	9.46 c	9.24 d	13.72 d	20.81 f	6.72 d	2.99	9.81 d
T2 - RR*	4.67 ab	7.16 b	11.34 a	9.82 ab	14.86 b	22.27 c	12.37 b	5.62	17.99 ab
T3 - 1/2 RR	4.62 c	6.93 d	10.03 b	9.70 bc	14.54 c	22.06 d	10.45 bc	5.59	16.04 bc
T4 - 1/2 RR + rr**	4.63 bc	4.06 c	11.35 a	9.58 c	14.82 b	22.48 b	13.05 ab	6.03	19.08 ab
T5 - rr	4.44 d	6.60 e	9.55 c	9.33 d	13.86 d	21.02 e	8.92 cd	5.26	14.19 c
T6 - RR + rr	4.72 a	7.27 a	11.51 a	9.91 a	15.09 a	22.6 a	15.72 a	5.9	21.62 a

* Recommended Rate of NPK based on soil analysis (RR)

**UltraBoost recommended rate

4. Plant Height, 14 DAT, 21 DAT and 30 DAT

The plant height was evaluated using a meter stick and measured from the base of the plant to the highest part of the leaves. Based on statistical analysis done on the plant heights at 14, 21 and 30 DAT, the tallest pechay came from the plant applied with both recommended rate of NPK (RR) and UltraBoost recommended rate (rr), with heights of 9.91, 15.09 and 22.60 cm, respectively. The least plant height came from the unfertilized control (Treatment 1) and

from plants applied with UltraBoost alone (Treatment 5). See Table 2 for the summary table and Appendix Tables 4 to 6 for the plant heights at 14, 21 and 30 DAT.

5. Weight of marketable yield, tons/hectare

Based on the statistical analysis done on the marketable yield data, the greatest measurement came from the plants fertilized by both recommended rate of NPK (RR) and UltraBoost recommended rate (rr), with 15.72 tons per hectare and is statistically significantly similar with the marketable weight of plants applied with half of the recommended rate of NPK (RR) and UltraBoost recommended rate (rr) (Treatment 4) with 13.05 tons per hectare. The application of recommended rate of NPK (RR) alone (Treatment 2) yielded marketable harvest of 12.37 tons per hectare, while the unfertilized control with 6.72 tons per hectare, the least marketable yield. Refer to Table 2 for the summary table and Appendix Table 7 for the marketable yield.

6. Weight of nonmarketable yield, tons/hectare

Based on the data on nonmarketable yield, there is no significant differences among treatments. See Table 2 for the summary table and Appendix Table 7 for the nonmarketable yield data.

7. Total weight of harvest

The greatest total harvest came from the plants applied with both recommended rate of NPK (RR) and UltraBoost recommended rate (rr) with 21.62 tons per hectare. This is followed with yield from plants applied with half of the recommended rate of NPK (RR) and UltraBoost recommended rate (rr) (Treatment 4) with 19.08 tons per hectare. The application of the recommended rate of NPK (RR) alone (Treatment 2) was observed to have a total yield of 17.99 tons per hectare, while the unfertilized control with 9.81 tons per hectare. Please refer to Table 2 for the summary table and Appendix Table 9 for the total yield data.

VIII. Conclusion and Recommendation

Based on the results of the bioefficacy trial, the test product can increase pechay production, hence can be registered to the Fertilizer and Pesticide Authority.

For label expansion, it is recommended to test the product to the priority grain crops of the country, rice and corn, to help the grain industry to reduce reliance on imported rice and corn.

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Appendix Table 1. Number of leaves of pechay at 14 DAT, tested with UltraBoost, Cawongan, Padre Garcia, Batangas, September, 2023

TREATMENT	Number of leaves			TREATMENT TOTAL	TREATMENT MEAN
	REP I	REP II	REP III		
T1 - Control	4.50	4.30	4.40	13.20	4.40
T2 - Recommended Rate of NPK based on soil ana	4.82	4.52	4.69	14.02	4.67
T3 - 1/2 RR	4.73	4.52	4.62	13.86	4.62
T4 - 1/2 RR +UltraBoost recommended rate (rr)	4.77	4.47	4.64	13.88	4.63
T5 - rr	4.55	4.34	4.44	13.33	4.44
T6 - RR + rr	4.87	4.56	4.74	14.16	4.72
Rep Total	28.2236	26.7086	27.5297		
Grand total				82.46	
Grand mean					27.49

```
ANOVA TABLE
Response Variable: No.of.Leaves
------------------------------------------------------------
Source      DF  Sum of Square  Mean Square  F Value Pr(> F)
------------------------------------------------------------
Block        2       0.1917       0.0959    127.09  0.0000
Treatment    5       0.2507       0.0501     66.48  0.0000
Error       10       0.0075       0.0008
Total       17       0.4500
------------------------------------------------------------


Least Significant Difference (LSD) Test

Alpha                         0.05
Error Degrees of Freedom        10
Error Mean Square             0.0008
Critical Value                2.2281
Test Statistics               0.0500

Summary of the Result:
-------------------------------
Treatment    means     N group
-------------------------------
1            4.40       3    d
2            4.67       3 ab
3            4.62       3   c
4            4.63       3  bc
5            4.44       3    d
6            4.72       3 a
-------------------------------
Means with the same letter are not significantly different.
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Appendix Table 2.   Number of leaves of pechay at 21 DAT, tested with UltraBoost, Cawongan, Padre Garcia, Batangas, September, 2023

TREATMENT	Number of leaves			TREATMENT TOTAL	TREATMENT MEAN
	REP I	REP II	REP III		
T1 - Control	6.50	6.70	6.40	19.60	6.53
T2 - Recommended Rate of NPK based on soil ana	7.13	7.34	7.02	21.49	7.16
T3 - 1/2 RR	6.89	7.10	6.78	20.78	6.93
T4 - 1/2 RR +UltraBoost recommended rate (rr)	7.02	7.24	6.91	21.17	7.06
T5 - rr	6.57	6.77	6.46	19.80	6.60
T6 - RR + rr	7.23	7.45	7.12	21.81	7.27
Rep Total	41.3325	42.6042	40.6966		
Grand total				125	
Grand mean					41.54

```
ANOVA TABLE
Response Variable: No.of.Leaves
---------------------------------------------------------------
Source      DF  Sum of Square  Mean Square  F Value Pr(> F)
---------------------------------------------------------------
Block        2      0.3145       0.1572     3184.40  0.0000
Treatment    5      1.3550       0.2710     5488.00  0.0000
Error       10      0.0005       0.0000
Total       17      1.6700
---------------------------------------------------------------


Least Significant Difference (LSD) Test

Alpha                          0.05
Error Degrees of Freedom         10
Error Mean Square              0.0000
Critical Value                2.2281
Test Statistics               0.0128

Summary of the Result:
--------------------------------
Treatment    means    N group
--------------------------------
1            6.53      3       f
2            7.16      3  b
3            6.93      3    d
4            7.06      3   c
5            6.60      3     e
6            7.27      3 a
--------------------------------
Means with the same letter are not significantly different.
```

Appendix Table 3. Number of leaves of pechay at 30 DAT, tested with UltraBoost, Cawongan, Padre Garcia, Batangas, September, 2023

TREATMENT	Number of leaves			TREATMENT TOTAL	TREATMENT MEAN
	REP I	REP II	REP III		
T1 - Control	9.35	9.79	9.24	28.38	9.46
T2 - Recommended Rate of NPK based on soil ana	11.33	11.16	11.53	34.02	11.34
T3 - 1/2 RR	9.91	10.38	9.79	30.08	10.03
T4 - 1/2 RR +UltraBoost recommended rate (rr)	11.22	11.75	11.09	34.06	11.35
T5 - rr	9.44	9.89	9.33	28.66	9.55
T6 - RR + rr	11.50	11.33	11.70	34.53	11.51
Rep Total	62.7589	64.2919	62.6908		
Grand total				190	
Grand mean					63.25

```
ANOVA TABLE
Response Variable: No.of.Leaves
--------------------------------------------------------------
Source      DF  Sum of Square  Mean Square  F Value Pr(> F)
--------------------------------------------------------------
Block        2        0.2732       0.1366      2.12  0.1703
Treatment    5       13.9366       2.7873     43.34  0.0000
Error       10        0.6432       0.0643
Total       17       14.8530
--------------------------------------------------------------

Least Significant Difference (LSD) Test

Alpha                         0.05
Error Degrees of Freedom        10
Error Mean Square           0.0643
Critical Value              2.2281
Test Statistics             0.4614

Summary of the Result:
-------------------------------
Treatment    means    N group
-------------------------------
1             9.46     3   c
2            11.34     3 a
3            10.03     3  b
4            11.35     3 a
5             9.55     3   c
6            11.51     3 a
-------------------------------
Means with the same letter are not significantly different.
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Appendix Table 4. Plant height, cm, of pechay at 14 DAT, tested with UltraBoost, Cawongan, Padre Garcia, Batangas, September, 2023

TREATMENT	Plant Height			TREATMENT TOTAL	TREATMENT MEAN
	REP I	REP II	REP III		
T1 - Control	9.45	9.03	9.24	27.72	9.24
T2 - Recommended Rate of NPK based on soil ana	10.12	9.49	9.85	29.45	9.82
T3 - 1/2 RR	9.92	9.48	9.70	29.11	9.70
T4 - 1/2 RR +UltraBoost recommended rate (rr)	10.02	9.39	9.33	28.74	9.58
T5 - rr	9.54	9.12	9.33	28.00	9.33
T6 - RR + rr	10.22	9.58	9.94	29.74	9.91
Rep Total	59.2695	56.0881	57.3966		
Grand total				172.75	
Grand mean					57.58

```
ANOVA TABLE
Response Variable: Plant.Height
-------------------------------------------------------------
Source      DF  Sum of Square  Mean Square  F Value  Pr(> F)
-------------------------------------------------------------
Block        2     0.8523       0.4262       36.36   0.0000
Treatment    5     1.0719       0.2144       18.29   0.0001
Error       10     0.1172       0.0117
Total       17     2.0414
-------------------------------------------------------------


Least Significant Difference (LSD) Test

Alpha                          0.05
Error Degrees of Freedom         10
Error Mean Square            0.0117
Critical Value               2.2281
Test Statistics              0.1970

Summary of the Result:
-------------------------------
Treatment    means    N group
-------------------------------
1            9.24      3    d
2            9.82      3 ab
3            9.70      3  bc
4            9.58      3   c
5            9.33      3    d
6            9.91      3 a
-------------------------------
Means with the same letter are not significantly different.
```

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Appendix Table 5. Plant height, cm, of pechay at 21 DAT, tested with UltraBoost, Cawongan, Padre Garcia, Batangas, September, 2023

TREATMENT	Plant Height			TREATMENT TOTAL	TREATMENT MEAN
	REP I	REP II	REP III		
T1 - Control	13.65	14.07	13.44	41.16	13.72
T2 - Recommended Rate of NPK based on soil ana	14.74	15.34	14.52	44.59	14.86
T3 - 1/2 RR	14.47	14.91	14.25	43.63	14.54
T4 - 1/2 RR +UltraBoost recommended rate (rr)	14.88	15.20	14.38	44.45	14.82
T5 - rr	13.79	14.21	13.57	41.57	13.86
T6 - RR + rr	14.96	15.57	14.73	45.26	15.09
Rep Total	86.4891	89.2931	84.8897		
Grand total				261	
Grand mean					86.89

```
ANOVA TABLE
Response Variable: Plant.Height
----------------------------------------------------------------
Source      DF  Sum of Square  Mean Square  F Value  Pr(> F)
----------------------------------------------------------------
Block        2      1.6561        0.8281     142.03   0.0000
Treatment    5      4.8023        0.9605     164.73   0.0000
Error       10      0.0583        0.0058
Total       17      6.5167
----------------------------------------------------------------


Least Significant Difference (LSD) Test

Alpha                           0.05
Error Degrees of Freedom          10
Error Mean Square             0.0058
Critical Value                2.2281
Test Statistics               0.1389

Summary of the Result:
-------------------------------
Treatment     means     N group
-------------------------------
1             13.72      3    d
2             14.86      3  b
3             14.54      3    c
4             14.82      3  b
5             13.86      3    d
6             15.09      3 a
-------------------------------
Means with the same letter are not significantly different.
```

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Appendix Table 6. Plant height, cm, of pechay at 30 DAT, tested with UltraBoost, Cawongan, Padre Garcia, Batangas, September, 2023

TREATMENT	Plant Height			TREATMENT TOTAL	TREATMENT MEAN
	REP I	REP II	REP III		
T1 - Control	20.57	21.54	20.33	62.44	20.81
T2 - Recommended Rate of NPK based on soil ana	22.01	23.05	21.75	66.81	22.27
T3 - 1/2 RR	21.80	22.83	21.55	66.18	22.06
T4 - 1/2 RR +UltraBoost recommended rate (rr)	22.22	23.26	21.95	67.43	22.48
T5 - rr	20.78	21.75	20.53	63.06	21.02
T6 - RR + rr	22.34	23.39	22.08	67.81	22.60
Rep Total	129.715	135.82	128.189		
Grand total				394	
Grand mean					131.24

```
ANOVA TABLE
Response Variable: Plant.Height
------------------------------------------------------------
Source      DF  Sum of Square  Mean Square  F Value Pr(> F)
------------------------------------------------------------
Block        2       5.4340       2.7170    4877.98  0.0000
Treatment    5       8.8276       1.7655    3169.71  0.0000
Error       10       0.0056       0.0006
Total       17      14.2672
------------------------------------------------------------


Least Significant Difference (LSD) Test

Alpha                          0.05
Error Degrees of Freedom         10
Error Mean Square            0.0006
Critical Value              2.2281
Test Statistics             0.0429

Summary of the Result:
--------------------------------
Treatment     means     N group
--------------------------------
1             20.81     3       f
2             22.27     3   c
3             22.06     3    d
4             22.48     3  b
5             21.02     3     e
6             22.60     3 a
--------------------------------
Means with the same letter are not significantly different.
```

Appendix Table 7.   Marketable yield, t/ha, of pechay tested with UltraBoost, Cawongan, Padre Garcia, Batangas, September, 2023

TREATMENT	Yield			TREATMENT TOTAL	TREATMENT MEAN
	REP I	REP II	REP III		
T1 - Control	5.44	8.00	6.72	20.16	6.72
T2 - Recommended Rate of NPK based on soil ana	12.80	15.47	8.85	37.12	12.37
T3 - 1/2 RR	11.39	12.27	7.68	31.34	10.45
T4 - 1/2 RR +UltraBoost recommended rate (rr)	14.08	16.53	8.53	39.15	13.05
T5 - rr	8.96	10.88	6.93	26.77	8.92
T6 - RR + rr	18.24	17.71	11.20	47.15	15.72
Rep Total	70.912	80.8533	49.92		
Grand total				201.69	
Grand mean					67.23

```
ANOVA TABLE
Response Variable: Yield
-----------------------------------------------------------
Source       DF   Sum of Square   Mean Square   F Value  Pr(> F)
-----------------------------------------------------------
Block         2         83.1314      41.5657     15.83   0.0008
Treatment     5        153.0058      30.6012     11.65   0.0007
Error        10         26.2594       2.6259
Total        17        262.3966
-----------------------------------------------------------


Least Significant Difference (LSD) Test

Alpha                           0.05
Error Degrees of Freedom          10
Error Mean Square             2.6259
Critical Value                2.2281
Test Statistics               2.9481

Summary of the Result:
-------------------------------
Treatment      means     N group
-------------------------------
1               6.72      3    d
2              12.37      3  b
3              10.45      3  bc
4              13.05      3  ab
5               8.92      3   cd
6              15.72      3  a
-------------------------------
Means with the same letter are not significantly different.
```

Appendix Table 8.   Nonmarketable yield, t/ha, of pechay tested with UltraBoost, Cawongan, Padre Garcia, Batangas, September, 2023

TREATMENT	Yield			TREATMENT TOTAL	TREATMENT MEAN
	REP I	REP II	REP III		
T1 - Control	2.37	3.20	3.41	8.98	2.99
T2 - Recommended Rate of NPK based on soil ana	6.08	5.44	5.33	16.85	5.62
T3 - 1/2 RR	7.17	4.80	4.80	16.77	5.59
T4 - 1/2 RR +UltraBoost recommended rate (rr)	7.20	6.08	4.80	18.08	6.03
T5 - rr	7.68	3.84	4.27	15.79	5.26
T6 - RR + rr	4.80	5.12	7.79	17.71	5.90
Rep Total	35.296	28.48	30.4		
Grand total				94	
Grand mean					31.39

```
ANOVA TABLE
Response Variable: Yield
------------------------------------------------------------
Source      DF  Sum of Square  Mean Square  F Value Pr(> F)
------------------------------------------------------------
Block        2         4.1175       2.0588     1.16  0.3510
Treatment    5        19.1033       3.8207     2.16  0.1403
Error       10        17.6788       1.7679
Total       17        40.8995
------------------------------------------------------------

Table of Means
-------------------------
Treatment    Yield Means
-------------------------
1                   2.99
2                   5.62
3                   5.59
4                   6.03
5                   5.26
6                   5.90
-------------------------
```

Appendix Table 9. Total yield, t/ha, of pechay tested with UltraBoost, Cawongan, Padre Garcia, Batangas, September, 2023

TREATMENT	Yield			TREATMENT TOTAL	TREATMENT MEAN
	REP I	REP II	REP III		
T1 - Control	7.81	11.20	10.13	29.14	9.71
T2 - Recommended Rate of NPK based on soil ana	18.88	20.91	14.19	53.97	17.99
T3 - 1/2 RR	18.56	17.07	12.48	48.11	16.04
T4 - 1/2 RR +UltraBoost recommended rate (rr)	21.28	22.61	13.33	57.23	19.08
T5 - rr	16.64	14.72	11.20	42.56	14.19
T6 - RR + rr	23.04	22.83	18.99	64.85	21.62
Rep Total	106.208	109.333	80.32		
Grand total				296	
Grand mean					98.62

```
ANOVA TABLE
Response Variable: Yield
-----------------------------------------------------------
Source       DF  Sum of Square  Mean Square  F Value Pr(> F)
-----------------------------------------------------------
Block         2        84.5405      42.2703    10.24  0.0038
Treatment     5       259.9337      51.9867    12.59  0.0005
Error        10        41.2976       4.1298
Total        17       385.7719
-----------------------------------------------------------


Least Significant Difference (LSD) Test

Alpha                          0.05
Error Degrees of Freedom         10
Error Mean Square            4.1298
Critical Value               2.2281
Test Statistics              3.6971

Summary of the Result:
-------------------------------
Treatment      means      N group
-------------------------------
1               9.71      3     d
2              17.99      3  ab
3              16.04      3    bc
4              19.08      3  ab
5              14.19      3     c
6              21.62      3  a
-------------------------------
Means with the same letter are not significantly different.
```

Photodocuments

22

Galaxy A22

Galaxy A22

Galaxy A22

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Galaxy A22

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