



QUARTERLY RESEARCH PROGRESS REPORT

QUARTER: (4th)

**Research Title: PERFORMANCE OF THREE ONION VARIETIES
UNDER THREE AGRO-ECOSYSTEM**

I. Project Objectives:

- To evaluate the effect on the bulb formation and growth parameters of the three onion varieties under VSU condition.
- To determine which Bulb onion variety that grows well in VSU condition

II. Relevance to VSU & College's Thrust and Priorities:

III. Highlights of accomplishments within the quarter

- A. Targets for the quarter
 - a. Finalize data collection and analysis
 - b. Draft progress report for funding agency submission
 - c. Draft terminal report
- B. Highlights of accomplishments
 - a. Data on horticultural and yield attributes were collected and analyzed
 - b. Submitted soil samples for final analysis (still waiting for the results)
 - c. Submitted progress report to Jollibee Group Foundation

General Observation

Despite being planted under plastic roofing, transplanted onion seedlings (June 20, 2023), were adversely affected by frequent rains and high relative humidity (Fig. 1) during the first 5 weeks. This resulted in a pale-green appearance (Fig. 2) and sluggish, uneven growth due to the limited exposure to sunlight. Newly transplanted seedlings were applied with treatments in accordance to its assigned rates of in combination of synthetic fertilizers, bio-organic fertilizers and biopesticides. Blanket application of starter solution (1tbsp urea/gallon of water) were supplemented through drenching onto the all-treatment plots. It was also observed that application of herbicide 7th and 10th days after transplanting at 4 tbsp per 16 liters resulted to partial stunting of growth of bulb onions. Half strength of the indicated dosage is advisable.

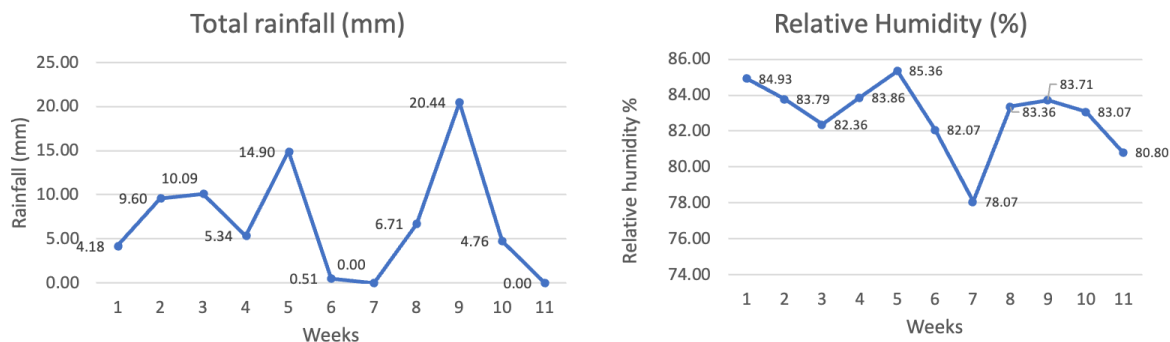


Fig 1. Total weekly rainfall (mm) and Relative humidity (%) from 1st to 11th week after transplanting



Figure 2. Two-week old onion var. Superex, Golden Pinoy, Pirate,

Plant Height

Table 1a shows the effect of different combinations of bio-organic fertilizers and biopesticides on the plant height of three onion varieties (Superex, Golden Pinoy, and Pirate) from 1st to 4th week after transplanting. It was observed that regardless of different fertilizer sources and biopesticides application, height of the three varieties were just statistically the same. However, onion plants regardless of varieties treated with T1 (control), T2 (inorganic fertilizer+ inorganic pesticides and T3 (inorganic fertilizer + biofertilizer + biopesticides) were comparably taller of 32.27 – 34.84 cm, than treated with T4 (half inorganic fertilizer + half biofertilizer + biopesticides) which is only 29.47 cm tall. The data suggests that the application of bio-organic fertilizers and biopesticides can enhance the growth of onion plants, but the effect may vary depending on the onion variety and the proportion of inorganic and organic inputs.

Variety x Treatments interaction

The data reveals distinct responses across treatments and varieties. In the control group (T1), Superex has the lowest height at 30.20 cm, while Golden Pinoy and Pirate exhibit intermediate heights of 38.62 cm and 35.72 cm, respectively, resulting in an overall treatment mean of 34.84 cm. Farmer's practice (T2) results in reduced heights for both Superex and Golden Pinoy, with an overall treatment mean of 32.27 cm. Notably, T3, involving inorganic fertilizer, biofertilizer, and biopesticides, leads to a significant increase in the height of Superex to 40.43 cm, while Golden Pinoy and Pirate show moderate heights, contributing to a treatment mean of 34.80 cm. T4, with a combination of half inorganic fertilizer and half biofertilizer with biopesticides, results in the shortest heights for all varieties, with an overall treatment mean of 29.47 cm. The variety mean indicates a subtle difference in height among Superex, Golden Pinoy, and Pirate. Overall, the data suggests that the interaction between onion varieties and the application of bio-organic fertilizers and biopesticides plays a crucial role in influencing the height of bulb onions, providing valuable insights for optimizing growth conditions in onion cultivation.

Table 1a. Plant height (cm) of different onion varieties at 1st to 4th weeks from transplanting as affected by different combinations of bio-organic fertilizers and biopesticide

Treatments	Plant Height (cm) weeks after transplanting (WAT)			
	1WAT	2WAT	3WAT	4WAT
Main plot- Onion Varieties				
Superex	17.11	24.03	27.69	32.622
Golden Pinoy	16.53	26.28	31.04	33.576
Pirate	17.11	27.12	29.60	32.342
Subplot- Biofertilizer and biopesticides treatments				
T1	16.41	24.83	28.64	34.84 ^a
T2	15.92	26.20	29.18	32.27 ^{ab}
T3	15.92	26.27	29.39	34.80 ^a
T4	14.91	25.93	30.55	29.47 ^b
CV- variety	21.62	12.17	13.29	5.15
CV- treatments	6.02	5.38	4.19	8.85

Means within a column in a block followed by a common letter and/ or no letter designation are not significantly different from each other at 5% level of significance using Least Significant Different (LSD)

T1- Control (no application)

T2- inorganic fertilizer+ inorganic pesticides (farmer's practice)

T3- inorganic fertilizer +biofertilizer+biopesticides

T4-1/2 inorganic fertilizer+1/2 biofertilizer+biopesticides

Tale 1b. Interaction effects of varieties and different combinations of bio-organic fertilizers and biopesticides on the height of Bulb onions at 4th week from transplanting

Treatments	Superex	Golden Pinoy	Pirate	Treatment Mean
T1	30.20 ^d	38.62 ^{ab}	35.72 ^{bc}	34.84
T2	31.33 ^c	28.77 ^d	36.70 ^{ab}	32.27
T3	40.43 ^a	37.05 ^{ab}	26.92 ^d	34.80
T4	28.5 ^d	29.87 ^d	30.03 ^d	29.47
Variety Mean	32.62	33.58	32.34	

Means within a column in a block followed by a common letter and/ or no letter designation are not significantly different from each other at 5% level of significance using Least Significant Different (LSD)

T1- Control (no application)

T2- inorganic fertilizer+ inorganic pesticides (farmer's practice)

T3- inorganic fertilizer +biofertilizer+biopesticides

T4-1/2 inorganic fertilizer+1/2 biofertilizer+biopesticides

Yield and Yield Components

The data presented in Table 2a explores the impact of different combinations of bio-organic fertilizers and biopesticides on the yield and yield components of various onion varieties. In the main plot focusing on onion varieties, Superex exhibited a bulb size (Fig. 3) of 38.83 mm (Polar) and 32.84 mm (Equatorial), with a weight per bulb of 23.35 g and a yield of 5.84 t/ha. Golden Pinoy, on the other hand, displayed a larger bulb size (42.07 mm Polar, 34.48 mm Equatorial), a weight per bulb of 27.33 g, and the highest yield of 6.83 t/ha. Pirate, with a smaller bulb size, yielded 5.26 t/ha. In the subplot analyzing biofertilizer and biopesticide treatments, T3 stood out with the highest yield of 6.57 t/ha, associated with a bulb size of 39.56 mm (Polar) and 34.49 mm (Equatorial). The control (T1) and the farmer's practice (T2) showed lower yields, indicating the positive impact of incorporating biofertilizer and biopesticides.

Variety x Treatments interaction

Table 2b examines the interaction effects of different onion varieties and combinations of bio-organic fertilizers and biopesticides on the weight of onion bulbs. In this analysis, three onion varieties-Superex, Golden Pinoy, and Pirate-are subjected to four distinct treatments. The control group (T1) shows that Superex, Golden Pinoy, and Pirate have weights of 39.13 g, 41.47 g, and 33.00 g, respectively, contributing to an overall treatment mean of 37.87 g. The farmer's practice (T2) exhibits slightly lower weights for all varieties, with a treatment mean of 35.93 g. Notably, T3, involving inorganic fertilizer, biofertilizer, and biopesticides, enhances the weights of Superex and Golden Pinoy to 41.27 g and 40.83 g, respectively, resulting in a higher treatment mean of 39.56 g. T4, with a combination of half inorganic fertilizer and half biofertilizer with biopesticides, yields the highest weights for all varieties, with a treatment mean of 40.62 g. The variety mean provides an overview of the overall performance, showing that Golden Pinoy tends to have the highest weight among the three varieties. Overall, the results suggest that the combined application of bio-organic fertilizers and biopesticides, especially in T4, has a positive impact on enhancing the weight of onion bulbs, with variations observed across different onion varieties.

Table 2a. Yield and yield components of onion varieties as affected by different combinations of bio-organic fertilizers and biopesticide

Treatments	Bulb size (mm)		Weight per blub (g)	Yield	
	Polar	Equatorial		Yield per plot (g/2m ²)	Yield (t/ha)
Main plot- Onion Varieties					
Superex	38.83a	32.84	23.35ab	1167.40ab	5.84ab
Golden Pinoy	42.07a	34.48	27.33a	1366.70a	6.83a
Pirate	34.58b	31.85	21.05b	1052.50b	5.26b
Subplot- Biofertilizer and biopesticides treatments					
T1	37.87ab	32.93ab	24.09ab	1204.80ab	6.02ab
T2	35.93b	30.26b	19.17b	958.30b	4.79b
T3	39.56a	34.49a	26.29a	1314.40a	6.57a
T4	40.62a	34.56a	26.09a	1304.40a	6.52a
CV- variety	7.32	10.88	20.16	20.16	20.16
CV- treatments	5.00	10.63	10.63	24.64	24.64

Means within a column in a block followed by a common letter and/ or no letter designation are not significantly different from each other at 5% level of significance using Least Significant Different (LSD)

T1- Control (no application)

T2- inorganic fertilizer+ inorganic pesticides (farmer's practice)

T3- inorganic fertilizer +biofertilizer+biopesticides

T4-1/2 inorganic fertilizer+1/2 biofertilizer+biopesticides

Tale 2b. Interaction effects of onion varieties and different combinations of bio-organic fertilizers and biopesticides on its weight per bulb (g).

Treatments	Superex	Golden Pinoy	Pirate	Treatment Mean
T1	39.133abc	41.47ab	33.00c	37.87
T2	33.80c	40.27ab	33.73c	35.93
T3	41.27ab	40.83b	36.6bc	39.56
T4	41.13ab	45.73a	35.00bc	40.62
Variety Mean	38.83	42.07	34.58	

Means within a column in a block followed by a common letter and/ or no letter designation are not significantly different from each other at 5% level of significance using Least Significant Different (LSD)

T1- Control (no application)

T2- inorganic fertilizer+ inorganic pesticides (farmer's practice)

T3- inorganic fertilizer +biofertilizer+biopesticides

T4-1/2 inorganic fertilizer+1/2 biofertilizer+biopesticides

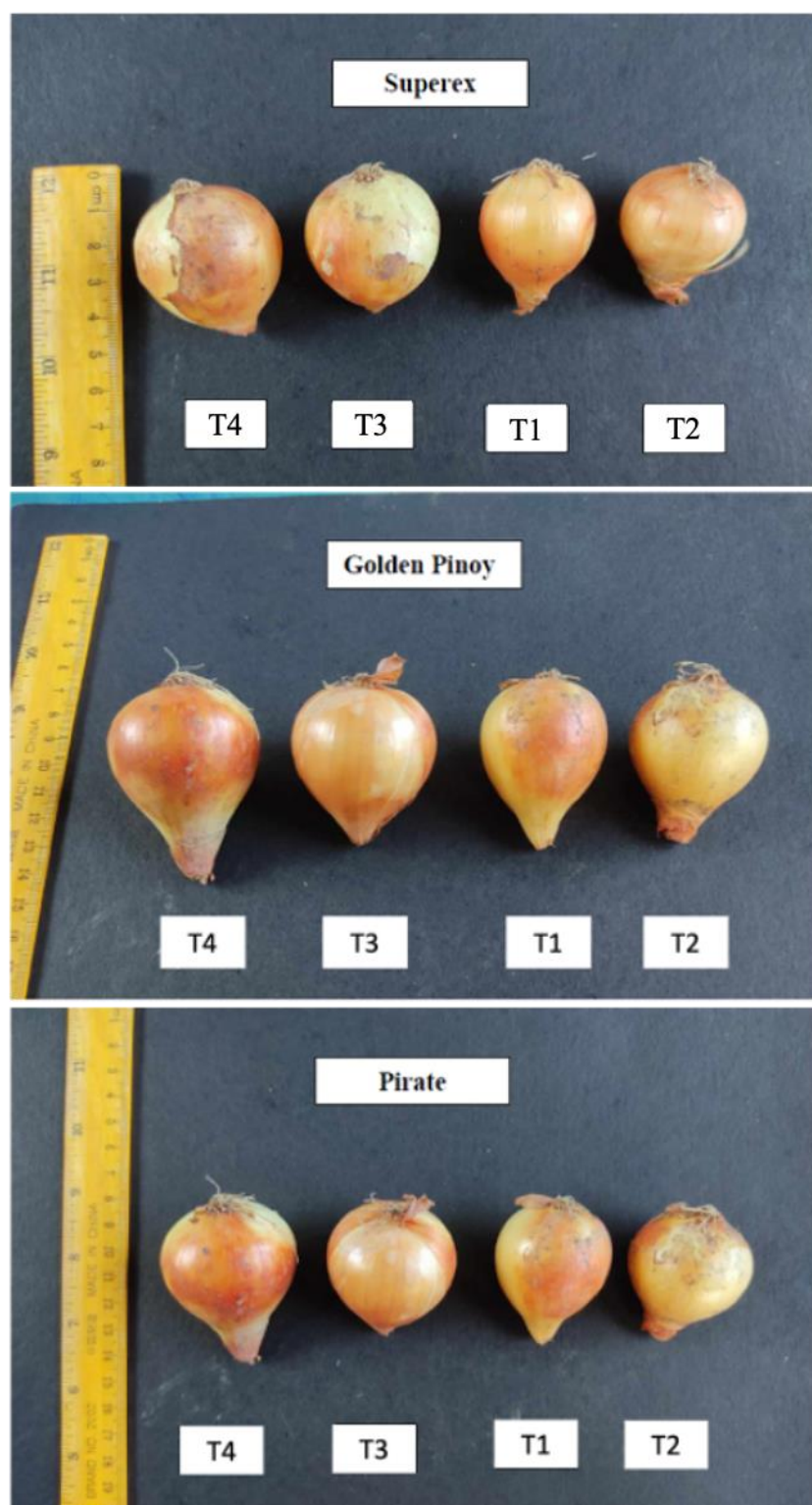


Fig 3. Bulb onion varieties Superex, Golden pinoy and Pirate showing bulb sizes from Largest to smallest (left to right)

SUMMARY AND CONCLUSIONS

In summary, the comprehensive analyses of the provided data shed light on the influence of different combinations of bio-organic fertilizers and biopesticides on plant height, yield, and bulb weight in three onion varieties (Superex, Golden Pinoy, and Pirate). In terms of plant height (Table 1a), the data suggests that, despite variations in fertilizer sources and biopesticide applications, the plant heights of the three varieties were statistically similar. However, treatments incorporating bio-organic fertilizers and biopesticides (T1, T2, and T3) resulted in taller onion plants compared to the treatment with a combination of half inorganic fertilizer and half biofertilizer with biopesticides (T4).

Golden Pinoy, with the largest bulb size, exhibited the highest yield, indicating the importance of variety-specific considerations in onion cultivation. The subplot analyzing biofertilizer and biopesticide treatments further underscores the positive impact of incorporating biofertilizer and biopesticides on yield. The combined application of bio-organic fertilizers and biopesticides, particularly in T4, led to the highest weights for onion bulbs. The variety mean suggests subtle differences in weight among Superex, Golden Pinoy, and Pirate, emphasizing the need for tailored agricultural practices considering both the specific onion variety and the composition of bio-organic inputs.

Overall, these findings provide valuable insights for optimizing growth conditions and enhancing yield in onion cultivation. The data highlights the complexity of the interactions between onion varieties and the application of bio-organic inputs, emphasizing the need for a customized approach to achieve optimal results in onion farming.

RECOMMENDATIONS

1. The same experiment should be conducted during dry season (February to May) to determine the yield at full maturity of bulb onions.
2. The application of inorganic fertilizers + biofertilizers + biopesticides is recommended for its positive growth and yield performance on onion plants

IV. Physical Report of Operation

A. Research Program

	Particulars/Name and Brief Description of Utilized/ Commercialized Technologies	Number
Outcome Indicator		
1. Number of research outputs utilized by the industry or by other beneficiaries	none	
Output Indicator		
1. Number of research outputs completed within the year	1	
2. Percentage of research outputs published in internationally-referred or CHED recognized journal within the year		

B. Technologies/Information patented and commercialized

Technology Invention(s) New Information	Invention Patent Number	Date of Issue	Utilization of Invention		Name of Commercial Product
			Development	Service	
A. Technology Invention(s)	None				
B. New Information	None				

C. Research papers published (*Identify if articles were for Research, Extension, Innovation or MSc/ PhD Studies*)

	Title	Author (s)	Date/Year/Publication/ Publisher	Remarks (if Research, Extension, Innovation, Thesis, MSc/PhD)
a. Refereed Journal				
Institutional	None			
National	None			
International	None			
b. Semi-popular publ'n (newsletter, etc.)	None			
c. Popularized publ'n (technoguides, etc.)	None			
d. Book Chapter/s	None			
e. Books	None			

D. Citation

Research Output as Cited by Other Researcher(s) in Journal Activities									
Title of Research Output/ Published Journal Articles/ Book	Title of Journal & Vol. Issue/ Year	Keywords	Researcher (s)	Citation Details					
				Author(s) Who Cited the Research Output	Title of Article Where the Research Output Was Cited	Title of Journal	Vol. / Issue / Page No.	City/ Year Published	Publisher

V. Issues, Problems, and Recommendations

1. The occurrence of rainfall almost the entire production period significantly impacts bulb onion cultivation.
2. Massive stealing of onion bulbs during of 2-3 weeks before the scheduled harvesting which affected data sampling and gathering.
3. Delayed results of final soil analysis

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