GROWTH AND YIELD PERFORMANCE OF UPLAND RICE VARIETIES APPLIED WITH GUIMARAS BOKASHI AT DIFFERENT LEVELS

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ABSTRACT The study was conducted in Sitio Progreso, Barangay Constancia, San Lorenzo, Guimaras from June to October 2019. The split-plot design with two (2) factors replicated three (3) times was used, wherein Mainplot served as the main plot bearing the upland rice varieties such as V1-black rice and V2-red rice, and Subplot as the subplot contains the levels of bokashi as the treatments applied such as A–Positive Control (Commercial Organic Fertilizer), B–5 tons of bokashi/ha, C–10 tons of bokashi/ha, D–15 tons of bokashi/ha, and E–Negative Control (Synthetic Fertilizer). Representative plant samples per treatment were taken for the data gathering using the following parameters: in growth performance are plant height (cm), number of tillers per plant, number of leaves, and for the yield performance are the number of panicles per tiller, number of grains per panicle, yield per treatment (kg), 1000 seed weight (g), and biomass (kg). As to the growth performance of Variety 1, there were significant differences in the no. of tillers and leaves, while Variety 2 was on plant height. On the yield performance, a significant effect was observed in the weight of 1000 seeds (grams) of Variety. There is a significant difference in the number of tillers applied with treatment C (10 tons of Bokashi/ ha). On the yield performance, treatment B (5 tons of Bokashi/ha) has a significant effect on the no. of panicle per tiller. Rice varieties and bokashi application interacted only on the number of tillers on the 30th day after transplanting, as supported by a significant difference.

Keywords: Growth, yield, performance, upland rice, varieties, Guimaras, bokashi,

INTRODUCTION

Background of the Study

Rice is the staple food of more than half of the world's population – more than 3.5 billion people depend on rice for more than 20% of their daily calories. Asia accounts for 90% of global rice consumption, and total rice demand continues to rise. Global rice consumption remains strong, driven by both population and economic growth, especially in many Asian and African countries (CGIAR, 2018).

Traditional rice varieties, which include pigmented and aromatic rice, possess excellent eating qualities. They have export potential but the production and utilization of these varieties are limited because of their lower yield than modern rice varieties (Anies et.al., 2014).

Organic farming and organic products are gaining momentum in the agricultural sector as they are widely promoted by the Department of Agriculture nationwide (Taguiling, 2013). Efforts to increase crop productivity must be in synergy with the improvement of soil fertility through organic fertilizer.

Bokashi is a type of fermented organic fertilizer in which the organic materials are steamed, taking advantage of the heat generated by aerobic fermentation. It is also understood as a pre-digestion of organic matter through the heat generated by the decomposition process (Orihuela, 2017). It is a natural soil amendment that can be prepared using farm-based, locally derived materials. It focuses on the preparation of organic soil and plant amendments using microbiological processes as inspired by the Nature Farming approach, first advocated by the Japanese philosopher Mokichi Okada in 1935 (R.E.A.P. Canada, 2018).

Bokashi is ready for use after only two weeks of fermentation and preparation time and is composed of low-cost, locally available materials. The Bokashi organic soil amendment has proved extremely useful for reducing chemical fertilizer use, beginning the soil rehabilitation process on farms, and initiating the conversion to organic agriculture (Samson et.al., 2006).

Objectives of the Study

The aim of this study are the followings: (1) to determine the growth and yield performance of upland rice varieties in Guimaras; (2) to determine the growth and yield performance of upland rice varieties applied with the different levels of Guimaras bokashi; and (3) To determine the interaction between the rice varieties in Guimaras and the levels of bokashi application.

METHODOLOGY

This study was conducted in Sitio Progreso, Barangay Constancia, San Lorenzo, Guimaras. The study utilized the production area of the Egaran family and was facilitated by the fourth-year students of the Bachelor of Science in Agriculture, faculty, and staff. The study started in June 2019 after the approval of the proposal and procurement of the needed materials. The study was completed in four (4) months duration. Two (2) upland rice varieties (red rice and black rice) were utilized in this study. These were obtained from the farmers in the area.

Other materials used:

The following materials were also used during the conduct of the study: Bokashi fertilizer, sacks, record book, ballpen, meter stick, ribbons, camera, weighing scale, and thermometer.

Experimental Design and Layout

The experiment was laid out using a split-plot design with two (2) factors. The main plot served as the main plot, which consists of the two (2) upland rice varieties (black and red), and Subplot as the subplot, was the levels of bokashi. Each plot has a dimension of 4X5 meters. 1 meter was the distance between blocks, 0.5 meter between treatments and 1 meter is the dimension of the border canal with a total area of 896 square meters.

Table 1. Randomization of treatments.

V1			V2		
B1	B2	B3	B1	B2	B3
A	C	C	E	D	C
C	B	B	B	C	B
D	E	D	C	E	A
B	D	A	D	B	D
E	A	E	A	A	E

Legend:

Mainplot – Rice Varieties
V1 – Variety 1 (Black Rice)
V2 – Variety 2 (Red Rice)

Subplot –Levels of Bokashi
A – Positive Control (Commercial Organic Fertilizer)
B – 5 tons of bokashi/ha
C – 10 tons of bokashi/ha
D – 15 tons of bokashi/ha
E – Negative Control (Synthetic Fertilizer)

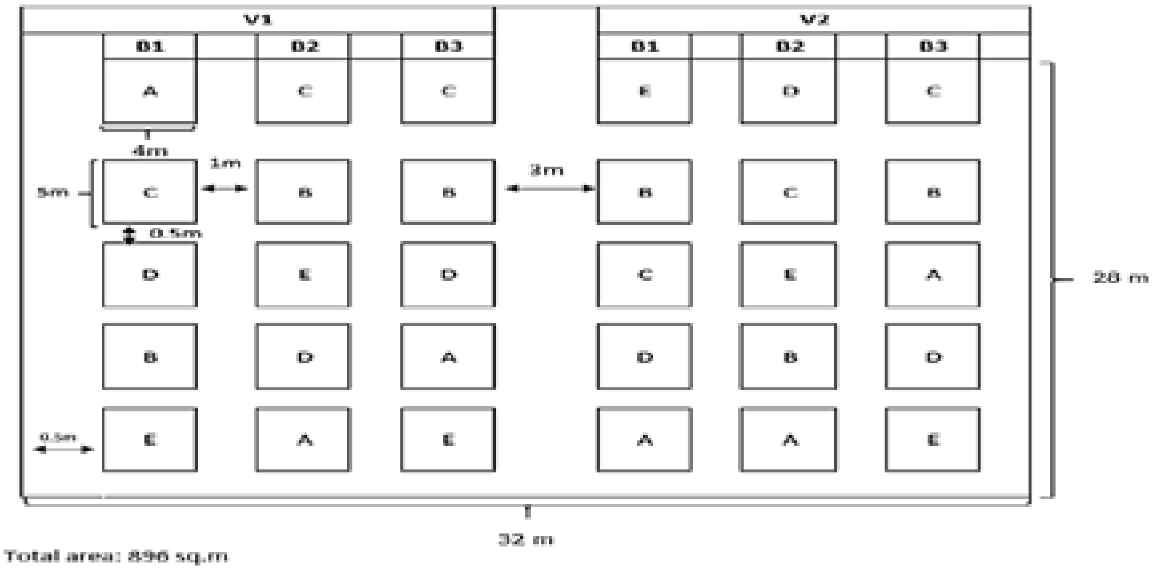

Figure 2.1 Experimental layout of the study arrange in a split-plot design.

Soil and Fertilizer Analysis. Soil samples were randomly taken in each area for testing soil content after land preparation. Ten (10) representative soil samples were collected and mixed to form one composite sample. This was air dried and 1 kg of it was packed and sent to the laboratory together with the Guimaras Bokashi.

Land Preparation and Plot Establishment. The land was plowed, harrowed, and leveled for a week. The field was made into thirty (30) plots, measuring 4x5 meters. Border canals are measured at 0.5 meter and drainage canals are 1 meter between blocks and 0.5 meter between treatments. Each plot was enclosed with a dike measuring 1 foot as a border to retain water, as well as the fertilizer.

Seed Preparation. Two (2) kilograms of each rice seed variety were soaked for 48 hours and were drained to allow seed germination. Separate plots were broadcasted with germinated seeds. Germinated seeds were grown for 20 days before transplanting to the main plots or the study area.

Transplanting. Seedlings were equally transplanted to the study area following the planting distance of 25x25 cm per plot.

Fertilization. The bokashi treatments were applied two weeks before transplanting. However, the negative control or the synthetic fertilizer was applied as basal fertilizer since it can easily be volatilized.

Pest and Disease Management. To prevent pests and disease infestation, the field was thoroughly prepared and sanitized by clearing and monitoring pests and diseases. Once there was a pest infestation, natural farming system concoctions, smoked vinegar, and other plant-based pesticides were used.

Harvesting. Rice was manually harvested within 100-120 days after transplanting using a scythe. It was manually threshed to determine the production level in each treatment as well as the overall production of the study.

There were representative plant samples per treatment that were taken within the net plot. This is located in the middle part of each plot and samples were marked using bamboo sticks. One (1) meter from both sides of the plot was used as the buffer zone. So, the net plot has an area of 3 sq.m. These sample plants served as experimental plants for the data gathering throughout the study.

The data were gathered using the following parameters:

Growth performance: There were ten (10) representative plant samples per replication that were taken within the net plot.

Plant height: The plant height was measured every 30, 45, and 60 days after transplanting using a meter stick. The plant was measured from its base to the tip of the tallest leaf.

Number of tillers per plant: The tillers were counted every 30, 45, and 60 days after transplanting.

Number of leaves: The leaves of each sample plant were counted every 30, 45, and 60 days after transplanting

Yield Performance: There were ten (10) representative plant samples per replication that were taken within the net plot.

Number of panicles per tiller: The number of panicle/tiller was counted and recorded.

Number of grains per panicle: The number of grains per panicle was counted and recorded.

Yield per treatment: The total harvested grains in each treatment were weighed in kilograms.

1000 seed weight: 1000 seed/grain was counted and weighed.

Biomass: Rice biomass per treatment was weighed after the study.

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1000 seed weight: 1000 seed/grain was counted and weighed.
Biomass: Rice biomass per treatment was weighed after the study.

The data gathered were sorted, tallied, tabulated, computed, and analyzed using two-way Analysis of Variance (ANOVA) of Split-Plot design at 1% and 5% levels to test its significance among treatments. If the data showed a significant effect, the means were compared using Duncan's Multiple Range Test (DMRT) to determine the most significant treatment.

RESULTS AND DISCUSSION

Plant Height

Table 2 shows the height of rice in Mainplot (rice varieties) on the 30th, 45th, and 60th day after transplanting (DAT) in centimeters. Column 2 presents the height of rice varieties on the 30th day after transplanting. Analysis of variance shows a significant difference in the height of rice. Variety 2 (Red rice) got the highest mean of 53.9 cm compared to variety 1 (Red rice) with a mean of 50.7 cm. This implies that black rice performs well on the 30th day after transplanting. The coefficient of variance is 6%.

Column 3 of Table 2 presents the height of rice in 45th days after transplanting. Analysis of variance shows a highly significant difference, wherein variety 2 (Red rice) got the highest mean of 76.8 cm, while variety 1 (Red rice) got a mean of 67.5 cm. This implies that black rice performs well on the 45th day after transplanting. The coefficient of variance is 5%.

Column 4 of Table 2 presents the height of rice varieties in 60th days after transplanting. Analysis of variance shows a highly significant difference wherein, variety 2 (Red rice) got the highest mean of 92.7 cm, while variety 1 (Red rice) got a mean of 85.1 cm. This implies that red rice performs well on the 60th day after transplanting. The coefficient of variance is 4%.

Table 2. Height of rice in Mainplot (Rice varieties) in 30, 45, and 60 days after transplanting (DAT) in centimeters.

Mainplot (Rice Varieties)	30DAT	45DAT	60DAT
V1 (Black rice)	50.7b	67.5b	85.1b
V2 (Red rice)	53.9a	76.8a	92.7a
f-test	*	**	**
cv%	6%	5%	4%

Table 3 shows the height of rice varieties in the Subplot (levels of bokashi) on the 30th, 45th, and 60th days after transplanting (DAT) in centimeters. Column 2 presents the height of rice varieties on the 30th day after transplanting. Analysis of variance shows no significant difference among treatment means. This implies that all treatments have the same performance in the height of rice varieties. The coefficient of variance is 7%.

Column 3 of shows the height of rice varieties on the 45th days after transplanting. Treatment E (Negative control-synthetic fertilizer) got the highest mean of 77.8 cm, followed by treatment D (15 tons of Bokashi/ha) with 90 72.9 cm, then treatment B (5 tons of Bokashi/ha) with 71.1 cm, treatment C (10 tons of Bokashi/ha) with 69.8 cm, and treatment A (Positive control-Commercial Organic Fertilizer) got the lowest mean of 69.2 cm.

Analysis of variance shows a highly significant difference among treatment means. This implies that synthetic fertilizer application brought the most significant effect compared to treatments treated with different levels of bokashi fertilizers and commercial organic fertilizers which have the same effects. The coefficient of variance is 4%. olumn 4 shows the height of rice varieties on the 60th days after transplanting. Treatment E (Negative control-synthetic fertilizer) got the highest mean of 95.4 cm, followed by treatment D (15 tons of Bokashi/ha) with a mean of 90 cm, then treatment B (5 tons of Bokashi/ha) with a mean of 86.9 cm, treatment C (10 tons of Bokashi/ha), and treatment A (Positive Control-Commercial Organic Fertilizer) got the lowest mean of 85.4 cm. Analysis of variance shows a highly significant effect among treatment means. The coefficient of variance is 5%.

Table 3. Height of rice varieties in Subplot (Levels of bokashi) in 30, 45, and 60 days after transplanting (DAT) in centimeters.

Subplot (Levels of Bokashi)	30DAT	45DAT	60DAT
A - Positive Control (Commercial Organic Fertilizer)	49.8	69.2b	85.4c
B - 5 tons of Bokashi/ha	51.5	71.1b	86.9c
C - 10 tons of Bokashi /ha	52.7	69.8b	86.7c
D - 15 tons of Bokashi/ha	52.8	72.9b	90.0b
E - Negative Control (Synthetic Fertilizer)	54.7	77.8a	95.4a
f-test	ns	**	**
cv%	7%	4%	5%

Table 4 shows the treatment interactions of Mainplot and 2 in 30, 45, and 60 days after transplanting (DAT) in terms of height in centimeters. Column 2 shows the height of rice varieties treated with different levels of bokashi 30 days after transplanting. Analysis of variance shows no significant difference among treatment means. This implies that levels of bokashi, commercial organic, and synthetic fetilizer has the same effect on the height of rice varieties 30 days after transplanting. The coefficient of variance is 7%.

Column 3 of Table 4 shows the height of rice varieties treated with different levels of bokashi 45 days after transplanting. Analysis of variance shows no significant difference among treatment means. This implies that levels of bokashi, commercial organic, and synthetic fertilizer have the same effect on the height of rice varieties 45 days after transplanting. The coefficient of variance is 4%.

Column 4 of Table 4 shows the height of rice varieties treated with different levels of bokashi 60 days after transplanting. Analysis of variance shows no significant difference among treatment means. This implies that levels of bokashi, commercial organic, and synthetic fertilizer have the same effect on the height of rice varieties 60 days after transplanting. The coefficient of variance is 5%.

Table 4. Treatment interactions in height of main plot and subplot in 30, 45, and 60 days after transplanting (DAT) in centimeters.

Mainplot * Subplot	30DAT	45DAT	60DAT
V1A1 – Black rice * Positive Control (Commercial Organic Fertilizer)	49.3	66.0	83.1
V1B1 - Black rice * 5 tons of Bokashi/ha	48.6	65.7	82.4
V1C1 - Black rice * 10 tons of Bokashi/ha	51.9	65.3	83.5
V1D1 - Black rice * 15 tons of Bokashi/ha	49.1	66.1	83.9
V1E1 - Black rice * Negative Control (Synthetic Fertilizer)	54.9	74.5	92.7
V2A2 – Red rice * Positive Control (Commercial Organic Fertilizer)	50.2	72.3	87.7
V2B2 – Red rice * 5 tons of Bokashi/ha	54.5	76.5	91.5
V2C2 – Red rice * 10 tons of Bokashi/ha	53.5	74.3	89.9
V2D2 – Red rice * 15 tons of Bokashi/ha	56.6	79.7	96.2

Mainplot * Subplot	30DAT	45DAT	60DAT
V2E2 – Red rice * Negative Control (Synthetic Fertilizer) f-test cv%	54.4 Ns 7%	81.1 Ns 4%	98.2 Ns 5%

Number of Tillers

Table 5 shows the number of rice tillers in Mainplot (rice varieties) in 30, 45, and 60 days after transplanting (DAT). Column 2 presents the no. of rice tillers 30 days after transplanting. Analysis of variance shows no significant difference among treatment means. This implies that all treatments have the same performance as to the no. of rice tillers 30 days after transplanting. The coefficient of variance is 9%.

Column 3 of Table 5 shows the number of rice tillers in Mainplot (rice varieties) 45 days after transplanting. Analysis of variance shows a highly significant difference in the number of tillers. Variety 1 (Black rice) has a better performance compared to variety 2 (Red rice) in terms of the no. of rice tillers 45 days after transplanting. The coefficient of variance is 20%.

Column 4 of Table 5 shows the number of rice tillers in Mainplot (rice varieties) 60 days after transplanting. Analysis of variance shows a highly significant difference in the number of rice tillers. Variety 1 (Black rice) performed well compared to variety 2 (Red rice) in terms of the no. of rice tillers 60 days after transplanting. The coefficient of variance is 17%.

Table 5. No. of rice tillers in Mainplot (Rice varieties) in 30, 45, and 60 days after transplanting (DAT).

Mainplot (Rice Varieties)	30DAT	45DAT	60DAT
V1 (Black rice)	5.5	10.6a	9.7a
V2 (Red rice)	5.8	8.4b	7.1b
f-test	ns	**	**
cv%	9%	20%	17%

Table 6 shows the number of rice tillers in the Subplot (levels of bokashi) in 30, 45, and 60 days after transplanting (DAT). Column 2 presents the no. of rice tillers 30 days after transplanting. Analysis of variance shows the significant difference among treatment means. Treatment C (10 tons of Bokashi/ha) got the highest mean of 6.3, followed by treatment D (15 tons of Bokashi/ha) with a mean of 5.7, then treatment E (Negative control-synthetic fertilizer) with a mean of 5.6, treatment A (Positive Control-Commercial Organic Fertilizer) with a mean of 5.5, and treatment B (5 tons of Bokashi/ha) got the lowest mean of 5.3. This implies that the application of treatment C (10 tons of Bokashi/ha) brought a significant effect on the number of tillers 30 days after transplanting. The coefficient of variance is 10%.

Column 3 of Table 6 shows the number of rice tillers in Subplot (levels of bokashi) 45 days after transplanting. Analysis of variance shows no significant difference in the number of tillers. The coefficient of variance is 16%.

Column 4 of Table 6 shows the number of rice tillers in Subplot (levels of bokashi) 60 days after transplanting. Analysis of variance shows no significant difference in the number of tillers. The coefficient of variance is 20%.

Table 6. No. of rice tillers in Subplot (Levels of bokashi) in 30, 45, and 60 days after transplanting (DAT).

Subplot (Levels of Bokashi)	30DAT	45DAT	60DAT
A - Positive Control (Commercial Organic Fertilizer)	5.5b	10.8	9.4
B - 5 tons of Bokashi/ha	5.3b	9.4	8.4
C - 10 tons of Bokashi /ha	6.3a	8.8	7.4
D - 15 tons of Bokashi/ha	5.7b	8.9	7.7
E - Negative Control (Synthetic Fertilizer)	5.6b	9.9	9.2
f-test	*	ns	ns
cv%	10%	16%	20%

Table 7 shows the treatment interactions of Mainplot and Subplot in 30, 45, and 60 days after transplanting (DAT) in terms of the number of tillers. Column 2 shows the tillers of rice varieties treated with different levels of bokashi 30 days after transplanting. Data shows that treatment V1C1 (Black rice * 10 tons of bokashi/ha) got the highest mean of 6.8, followed by treatment V2D2 (Red rice * 15 tons of bokashi/ha) with a mean of 6.3, treatment V2E2 (Red rice * Negative Control-Synthetic Fertilizer) got a mean of 6.1, then 5.8 was the mean of treatment V2C2 (Red rice * 10 tons of bokashi/ha), another is 5.5 which is the mean of treatment V2A2 (Red rice * Positive Control-Commercial Organic Fertilizer), both treatments V2B2 (Red rice * 5 tons of bokashi/ha) and V1A1 (Black rice * Positive Control-Commercial Organic Fertilizer) got a mean of 5.4, treatment V1B1 (Black rice * 5 tons of bokashi/ha) got a mean of 5.2, and both treatments V1C1 (Black rice * 10 tons of bokashi/ha) and V1E1 (Black rice * Negative Control-Synthetic Fertilizer) got the lowest mean of 5.1. Analysis of variance shows the significant difference among treatment means. This implies that black rice treated with 10 tons of bokashi/ha (V1C1), has the most significant performance among treatment means. The coefficient of variance is 10%.

Column 3 of Table 7 shows the tillers of rice varieties treated with different levels of bokashi 45 days after transplanting. Analysis of variance shows no significant difference among treatment means. This implies that levels of bokashi, commercial organic, and synthetic fertilizer have the same effect on the number of the tiller of rice varieties 45 days after transplanting. The coefficient of variance is 16%.

Column 4 of Table 7 shows the tillers of rice varieties treated with different levels of bokashi 60 days after transplanting. Analysis of variance shows no significant difference among treatment means. This implies that levels of bokashi, commercial organic, and synthetic fertilizer have the same effect on the tillers of rice varieties 60 days after transplanting. The coefficient of variance is 20%.

Table 7. Treatment interactions of Mainplot and Subplot as to the no. of tillers in 30, 45, and 60 days after transplanting (DAT) in centimeters.

Main plot*subplot	30DAT	45DAT	60DAT
V1A1–Black rice * Positive Control (Commercial Organic Fertilizer)	5.4c	11.2	11.2
V1B1 - Black rice * 5 tons of Bokashi/ha	5.2c	10.5	9.7
V1C1 - Black rice * 10 tons of Bokashi/ha	6.8a	10.5	8.2
V1D1 - Black rice * 15 tons of Bokashi/ha	5.1c	10.2	8.7
V1E1 - Black rice * Negative Control (Synthetic Fertilizer)	5.1c	10.7	10.9
V2A2 – Red rice * Positive Control (Commercial Organic Fertilizer)	5.5c	10.3	7.6
V2B2 – Red rice * 5 tons of Bokashi/ha	5.4c	8.3	7.2
V2C2 – Red rice * 10 tons of Bokashi/ha	5.8bc	7.0	6.6
V2D2 – Red rice * 15 tons of Bokashi/ha	6.3ab	7.5	6.6
V2E2 – Red rice * Negative Control (Synthetic Fertilizer)	6.1ab	9.0	7.6
f-test	*	ns	ns
cv%	10%	16%	20%

Number of Leaves

Table 8 shows the number of leaves in Mainplot (rice varieties) in 30, 45, and 60 days after transplanting (DAT). Column 2 presents the no. of leaves 30 days after transplanting. Analysis of variance shows no significant difference among treatment means. This implies that all treatments have the same performance as to the no. of leaves. The coefficient of variance is 19%.

Column 3 of Table 8 shows the number of leaves in Mainplot (rice varieties) 45 days after transplanting. Analysis of variance shows a significant difference in the number of leaves. V1 (black rice) has the highest mean of, 39 while V2 (red rice) has a mean of only 33.6. Variety 1 (Black rice) has a better performance compared to variety 2 (Red rice). The coefficient of variance is 11%.

Column 4 of Table 8 shows the number of leaves in Mainplot (rice varieties) 60 days after transplanting. Analysis of variance shows a highly significant difference in the number of leaves. Variety 1 (Black rice) performed well compared to variety 2 (Red rice). The coefficient of variance is 17%.

Table 8. No. of leaves in Mainplot (Rice varieties) in 30, 45, and 60 days after transplanting (DAT).

Mainplot (Rice Varieties)	30DAT	45DAT	60DAT
V1 (Black rice)	17.8	39.0a	39.1a
V2 (Red rice)	20.4	33.6b	27.9b
f-test	ns	*	**
cv%	19%	11%	17%

Table 9 shows the number of leaves in the Subplot (levels of bokashi) in 30, 45, and 60 days after transplanting (DAT). Column 2 presents the no. of leaves 30 days after transplanting. Analysis of variance shows no significant difference among treatment means. This implies that all treatments have the same performance as to the no. of leaves. The coefficient of variance is 20%.

Column 3 of Table 9 shows the number of leaves in Subplot (levels of bokashi) 45 days after transplanting. Analysis of variance shows no significant difference among treatment means. This implies that all treatments have the same performance as to the no. of leaves. The coefficient of variance is 16%.

Column 4 of Table 9 shows the number of leaves in Subplot (levels of bokashi) 60 days after transplanting. Analysis of variance shows no significant difference among treatment means. This implies that all treatments have the same performance as to the no. of leaves. The coefficient of variance is 22%.

Table 9. No. of leaves in Subplot (Levels of bokashi) in 30, 45, and 60 days after transplanting.

Subplot (Levels of Bokashi)	30DAT	45DAT	60DAT
A - Positive Control	17.3	38.5	37.3
(Commercial Organic Fertilizer)	19.1	36.7	32.4
B - 5 tons of Bokashi/ha	19.8	31.9	27.4
C - 10 tons of Bokashi /ha	21.4	36.6	31.3
D - 15 tons of Bokashi/ha	18.0	37.7	39.3
E - Negative Control (Synthetic Fertilizer)	ns	ns	ns
f-test	20%	16%	22%
cv%			

Table 10 shows the treatment interactions of Mainplot and 2 in 30, 45, and 60 days after transplanting (DAT) in terms of the number of leaves. Column 2 presents the no. of leaves 30 days after transplanting. Analysis of variance shows no significant difference among treatment means. This implies that all treatments have the same performance as to the no. of leaves. The coefficient of variance is 20%.

Column 3 of Table 10 shows the number of leaves of rice varieties treated with different levels of bokashi 45 days after transplanting. Analysis of variance shows no significant difference among treatment means. This implies that all treatments have the same performance as to the no. of leaves. The coefficient of variance is 16%.

Column 4 of Table 10 shows the number of leaves of rice varieties treated with different levels of bokashi 60 days after transplanting. Analysis of variance shows no significant difference among treatment means. This implies that all treatments have the same performance on the number of leaves. The coefficient of variance is 22%.

Table 10. Treatment interactions of Mainplot and 2 as to the no. of leaves in 30, 45, and 60 days after transplanting (DAT).

Main plot*subplot	30DAT	45DAT	60DAT
V1A1 – Black rice * Positive Control (Commercial Organic Fertilizer)	17.0	39.2	41.0
V1B1 - Black rice * 5 tons of Bokashi/ha	17.0	39.4	39.2
V1C1 - Black rice * 10 tons of Bokashi/ha	20.0	35.8	31.7
V1D1 - Black rice * 15 tons of Bokashi/ha	19.4	40.4	37.3
V1E1 - Black rice * Negative Control (Synthetic Fertilizer)	15.8	40.2	46.6
V2A2 – Red rice * Positive Control (Commercial Organic Fertilizer)	17.5	37.9	33.6
V2B2 – Red rice * 5 tons of Bokashi/ha	21.2	34.0	25.5
V2C2 – Red rice * 10 tons of Bokashi/ha	19.6	28.1	23.2

V2D2 – Red rice * 15 tons of Bokashi/ha	23.4	32.7	25.3
V2E2 – Red rice * Negative Control (Synthetic Fertilizer)	20.2	35.2	32.0
f-test	ns	ns	ns
cv%	20%	16%	22%

Yield Performance

Table 11 shows the yield performance of rice varieties in terms of the no. of panicle per tiller, no. of grains per panicle, yield per treatment (kgs), 1000 seed wt. (grams), and rice biomass (kg). Column 2 presents the no. of panicles per tiller of rice varieties. Analysis of variance shows no significant difference among treatment means. This implies that both varieties have the same performance on the number of panicles per tiller. The coefficient of variance is 15%.

Column 3 of Table 11 shows the no. of grains per panicle of rice varieties. Analysis of variance shows no significant difference among treatment means. This implies that both varieties have the same performance as to the number of grains per panicle. The coefficient of variance is 31%.

Column 4 of Table 3 shows the yield of rice varieties. Analysis of variance shows no significant difference among treatment means. This implies that both varieties have the same performance in terms of yield. The coefficient of variance is 8%.

Column 5 of Table 11 shows the weight of 1000 seeds of rice varieties. Analysis of variance shows a highly significant difference among treatment means. V2 (red rice) got the highest mean of 36.3 grams while V1 (black rice) has a mean of 33 grams. This implies that the red rice variety has a better performance as to the weight of 1000 seeds. The coefficient of variance is 14%.

Column 6 of Table 11 shows the weight of rice biomass (kg) of the rice varieties. Analysis of variance shows no significant difference among treatment means. This implies that both varieties have the same performance in terms of rice biomass (kg). The coefficient of variance is 13%.

Table 11. Yield performance of (Mainplot) rice varieties in terms of the no. of panicles per tiller, no. of grains per panicle, yield per treatment (kgs), 1000 seed wt. (grams), and rice biomass (kg).

Mainplot (Rice Varieties)	Panicle	Grains	Yield	1000 seeds	Biomass
V1 (Black rice)	49.1	571.4	2.9	33.0b	2.5
V2 (Red rice)	53.1	567.7	3.1	36.3a	2.8
f-test	Ns	ns	ns	**	ns
cv%	15%	31%	8%	14%	13%

Table 12 shows the yield performance of rice treated with levels of bokashi (Subplot) in terms of the no. of panicle per tiller, no. of grains per panicle, yield per treatment (kgs), 1000 seed wt. (grams), and rice biomass (kg). Column 2 presents the no. of panicles per tiller of rice. Treatment E (Negative Control-Synthetic Fertilizer) has the highest mean of 57.7, followed by treatment A (Positive Control-Commercial Organic Fertilizer), then treatment B (5 tons of Bokashi/ha) with a mean of 53, treatment D (15 tons of Bokashi/ha) with a mean of 47.4, and treatment C (10 tons of Bokashi/ha) got the lowest mean of 40.

Analysis of variance shows a highly significant difference among treatment means. This implies that treatments A (Positive Control-Commercial Organic Fertilizer), B (5 tons of Bokashi/ha), and E (Negative Control-Synthetic Fertilizer) have the same performance among other treatments. The coefficient of variance is 17%.

Column 3 of Table 12 shows the no. of grains per panicle of rice treated with levels of bokashi. Analysis of variance shows no significant difference among treatment means. This implies that all treatments have the same performance as to the no. of grains per panicle. The coefficient of variance is 25%.

Column 4 of Table 12 shows the yield of rice treated with levels of bokashi. Analysis of variance shows no significant difference among treatment means. This implies that all treatments have the same performance in terms of yield. The coefficient of variance is 14%.

Column 5 of Table 12 shows the weight of 1000 seeds of rice treated with levels of bokashi. Analysis of variance shows no significant difference among treatment means. This implies that all treatments have the same performance as to the weight of 1000 seeds. The coefficient of variance is 7%.

Column 6 of Table 12 shows the weight of rice biomass (kg) as treated with levels of bokashi. Analysis of variance shows no significant difference among treatment means. This implies that all treatments have the same performance in terms of rice biomass (kg). The coefficient of variance is 17%.

Table 12. Yield performance of rice in Subplot (levels of bokashi) in terms of the no. of panicles per tiller, no. of grains per panicle, yield per treatment (kgs), 1000 seed wt. (grams), and rice biomass (kg).

Subplot (Levels of Bokashi)	Panicle	Grains	Yield	1000 seeds	Biomass
A - Positive Control (Commercial Organic Fertilizer)	57.3a	655.3	2.7	33.0	2.5
B - 5 tons of Bokashi/ha	53.0a	515.2	2.8	35.2	2.6
C - 10 tons of Bokashi /ha	40.0c	454.8	2.9	35.2	2.7
D - 15 tons of Bokashi/ha	47.4b	558.0	3.1	34.2	2.8
E - Negative Control (Synthetic Fertilizer)	57.7a	664.4	3.3	35.7	2.9
f-test	**	ns	ns	ns	ns
cv%	17%	25%	14%	7%	17%

Table 13 shows the treatment interactions of Mainplot and 2 as to the yield performance of rice in terms of the no. of panicles per tiller, no. of grains per panicle, yield per treatment (kgs), 1000 seed wt. (grams), and rice biomass (kg).

Column 2 of Table 13 presents the interaction of treatments as to the no. of panicles. Analysis of variance shows no significant difference among treatment means. This implies that all treatments have the same performance. The coefficient of variance is 17%.

Column 3 of Table 13 shows the interaction of treatments as to the no. of grains per panicle. Analysis of variance shows no significant difference among treatment means. This implies that all treatments have the same performance as to the no. of grains per panicle. The coefficient of variance is 25%.

Column 4 of Table 13 shows the interaction of treatments as to yield. Analysis of variance shows no significant difference among treatment means. This implies that all treatments have the same performance in terms of yield. The coefficient of variance is 14%.

Column 5 of Table 3.12 shows the interaction of treatments as to the weight of 1000 seeds. Analysis of variance shows no significant difference among treatment means. This implies that all treatments have the same performance as to the weight of 1000 seeds. The coefficient of variance is 7%.

Column 6 of Table 13 shows the interaction of treatments as to the weight of rice biomass (kg. Analysis of variance shows no significant difference among treatment means. This implies that all treatments have the same performance in terms of rice biomass (kg). The coefficient of variance is 17%.

Table 13. Treatment interactions of Mainplot and Subplot as to the yield performance of rice in terms of the no. of panicles per tiller, no. of grains per panicle, yield per treatment (kgs), 1000 seed wt. (grams), and rice biomass (kg).

Main plot* subplot	Panicle	Grains	Yield	1000 Seeds	Biomass
1A1 – Black rice * Positive Control (Commercial Organic Fertilizer)	56.7	635.9	2.5	31.7	2.2
*V1B1 - Black rice * 5 tons of Bokashi/ha	49.0	517.8	2.7	32.7	2.6

V1C1 - Black rice * 10 tons of Bokashi/ha	39.0	496.8	2.9	33.3	2.6
V1D1 - Black rice * 15 tons of Bokashi/ha	43.7	544.2	3.0	33.0	2.5
V1E1 - Black rice * Negative Control (Synthetic Fertilizer)	57.0	662.2	3.4	34.3	2.8
V2A2 – Red rice * Positive Control (Commercial Organic Fertilizer)	57.9	674.7	2.9	34.3	2.7
V2B2 – Red rice * 5 tons of Bokashi/ha	57.0	512.6	3.0	37.7	2.6
V2C2 – Red rice * 10 tons of Bokashi/ha	41.0	412.8	3.0	37.0	2.8
V2D2 – Red rice * 15 tons of Bokashi/ha	51.1	571.8	3.2	35.3	3.1
V2E2 – Red rice * Negative Control (Synthetic Fertilizer)	58.4	666.6	3.2	37.0	2.9
f-test cv%	ns 17%	ns 25%	ns 14%	ns 7%	ns 17%

CONCLUSION

As to the growth performance of Variety 1, there were significant differences in the no. of tillers and leaves, while Variety 2 was on plant height. As to the yield performance, a significant effect was observed in the weight of 1000 seeds (grams) of Variety 2. There is a significant difference in the number of tillers applied with treatment C (10 tons of Bokashi/ha). On the yield performance, treatment B (5 tons of Bokashi/ha) has a significant effect on the no. of panicle per tiller. Rice varieties and bokashi application interacted only on the number of tillers on the 30th day after transplanting, as supported by a significant difference.

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