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AGRONOMIC AND FIBER YIELD OF JUTE MALLOW (CORCHORUS OLITORIOUS) AS INFLUENCED BY ORGANIC MANURE AND INORGANIC FERTILIZER PLANTED IN CLAY AND SANDY LOAM

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ABSTRACT

Jute mallow (Corchorus olitorius) is a leafy vegetable and fiber crop valued for its nutritional and economic benefits. This study was examined the performance of Jute mallow (Corchorus olitorious) applies with organic manure and inorganic fertilizer. Specifically, the objective of the study was to determine the best level of organic manure combined with inorganic fertilizer on the performance of jute mallow on clay loam and sandy loam soils. This was conducted at Laguilayan, Isulan Sultan Kudarat from October 2024-March 2025. The experimental design used was the Randomized Complete Block Design (RCBD). A total area of 180 m² was divided into three equals blocks representing the number of replications and each block was subdivide into 6 equal plots corresponding to the different treatment used in both clay loam and sandy loam soils. The parameters observed were on growth (plant height, number of leaves, number of branches, stem diameter, limb length, petiole length, plant yield and fiber yield of jute mallows. Results of the study revealed that the use of any fertilizer combinations, organic manure and inorganic fertilizer did not significantly affect the production of jute mallow in terms of growth and plant yield. Fiber yield was highest in Treatment 1 (100% inorganic fertilizer), indicating its effectiveness in enhancing fiber production across both soil types. However, in terms of cost and analysis, Treatment 1(100% inorganic fertilizer) both in clay loam and sandy loam obtained the highest net income and average production cost to both plant yield and fiber yield compared to those plants applied with lower rates of fertilizer combinations or even the application of 100% organic manure.

Keywords: *Agronomic, Fiber Yield, Jute Mallow, Organic Manure, Inorganic Fertilizer*

INTRODUCTION

Jute mallow (Corchorus olitorious), known as "ewedu" in West Africa and "saluyot" or "tugabang" in the Philippines, holds an important outlook in global agriculture due to its nutritional richness and adaptability to diverse climates. Despite its widespread consumption, there is a noticeable scarcity of research focusing on augmenting cultivation practices, particularly concerning soil amendments, both internationally and locally. Moreover, jute mallow (Corchorus olitorious) is recognized as a highly nutritious tropical leafy vegetable rich in essential nutrients such as β-carotene, vitamins B1, B2, C, and E, minerals, dietary fiber, and protein (Baiyeri et al. 2023; Adeyemi et al. 2012). Its traditional use in folk medicines and its significance as a textile stem fiber highlights its multifaceted importance. However, agricultural challenges in tropical regions, characterized by low soil nutrients and rapid nutrient depletion due to poor farming practices, necessitate effective solutions.

Studies from India and Bangladesh have illuminated the advantages of combining organic manure and inorganic fertilizers to boost jute mallow yield and understand nutrient requirements (Sharma et al. 2017; Haque et al. 2019). However, applying these findings to Philippine conditions remains uncertain due to the country's varying soil types and agricultural practices.

Local scientific investigations into jute mallows' response to soil amendments in the Philippines, where clay loam and sandy loam soils are prevalent and limited (Carating et al. 2017), have revealed that traditional farming methods persist, underscoring the necessity for evidence-based recommendations to enhance crop productivity and nutrient content. Addressing this gap is significant for heightening Jute mallow cultivation, ensuring food security, and fostering sustainable agriculture in the Philippines.

Previous studies have highlighted the benefits of organic manure and fertilizers in improving the growth and yield of various crops (Mkhabela & Warman, 2005; Agegnehu et al. 2014). However, there is a limited understanding of how these organic inputs affect Corchorus olitorious grown on different soil types. Most research has focused on inorganic fertilizers or single soil types, leaving a gap in knowledge about how organic inputs interact with varying soil conditions.

Therefore, farmers commonly turn to inorganic fertilizers to augment soil fertility and increase yields (Vanlauwe et al. 2010; Chivenge et al. 2011). While effective, these fertilizers pose challenges such as high costs, potential toxicity, and environmental harm. This study aims to evaluate the crop's reaction to organic manure and inorganic fertilizer on both soil types, aiming to develop tailored agricultural practices while potentially offering insights applicable to similar regions globally. Organic alternatives, especially poultry manure, offer a sustainable option, albeit with drawbacks like variability in composition and slower nutrient release (Adekiya et al. 2017). Research into their efficacy, particularly in tropical contexts, remains essential for promoting eco-friendly agricultural practices and ensuring long-term soil health (Bachir et al. 2019; Mupangwa et al. 2019).

Research Questions

The general objective of this study was to evaluate the response of jute mallow to different types of nutrient inputs, including organic manure and inorganic fertilizer, in both clay loam and sandy loam soils. The study aims to provide valuable awareness into cultivating this fundamental crop in various soil types while promoting efficient and sustainable agricultural practices. Specifically, this seeks to:

1. Determine the response of jute mallows to clay loam and sandy loam soils in terms of:
    a. plant height
    b. number of leaves per plant
    c. number of branches per plant
    d. stem diameter
    e. limb length
    f. petiole length
    g. plant yield of jute mallows
    h. fiber yield of jute mallows.
2. Determine the response of jute mallows to organic and inorganic fertilizer in terms of:
    a. plant height
    b. number of leaves per plant
    c. number of branches per plant
    d. stem diameter
    e. limb length
    f. petiole length
    g. plant yield of jute mallows
    h. fiber yield of jute mallows
3. Determine the interaction effect of organic and inorganic fertilizer and the type of soil (clay loam and sandy loam soils) on the growth response of jute mallow.

METHODOLOGY

The study utilized various materials such as jute mallow seeds, commercial fertilizer, organic manure, and essential farming tools to ensure accurate planting, management, and data gathering. A 2x3 factorial experiment in a Randomized Complete Block Design (RCBD) with three replications was employed, testing the effects of two types of soil (sandy loam and clay loam) and six fertilizer treatments (varying combinations of organic and inorganic fertilizers, including a control). Each seedling served as an experimental unit subjected to uniform cultural practices. Land preparation involved clearing, plowing, and harrowing the field, followed by fencing and detailed plot preparation. Soil analysis was conducted prior to planting to determine baseline soil conditions. Seeds were line-sown after a brief hot-water treatment, and regular watering, hand weeding, and hilling-up were done. Fertilizers were applied according to treatment specifications: organic manure was incorporated before planting, while inorganic fertilizer was applied after planting. Harvesting occurred 90 days after emergence, with plants measured for height, number of leaves, number of branches, stem diameter, limb length, and petiole length. Yield was assessed in terms of both edible parts and fiber content, following appropriate post-harvest processing techniques like retting and stripping for fiber extraction. Statistical analysis was performed using Analysis of Variance (ANOVA) and Least Significant Difference (LSD) tests to determine significant differences among treatments, ensuring reliable and valid interpretation of the results.

RESULTS

Table 1. Interaction Data on Plant Height (cm) of Jute Mallow to Organic Manure and Inorganic Fertilization on Clay Loam and Sandy Loam Soils

Factor A [1/] (Types of Soil)	Factor B (*Fertilizer Combination*) [2/]						Mean
	B1 (100% Inorganic Fertilizer)	B2 (75% Inorganic Fertilizer + 25% Organic Manure)	B3 (50% Inorganic Fertilizer + 50% Organic Manure)	B4 (25% Inorganic Fertilizer + 75% Organic Manure)	B5 (100 % Organic Manure)	B6 (Control)	
Sandy Loam A1	164.47	164.41	163.66	159.74	158.78	156.69	**161.29**
Clay Loam A2	164.28	164.06	163.66	159.28	158.89	157.33	**161.25**
Mean	**164.38**	**164.24**	**163.66**	**159.51**	**158.84**	**157.01**	**161.27**

CV = 0.16%
NS – Not Significant

The interaction data on the plant height of jute mallow (Corchorus olitorious) is presented in Table 1. Statistical analysis showed no significant differences in Factor A, with plant heights recording statistically similar results of 161.29 cm and 161.25 cm, respectively. Likewise, no significant differences were observed in plant height across different fertilizer combinations (organic manure and inorganic fertilizer) regardless of the recommended rates, with heights ranging from 157.01 cm to 164.38 cm. Furthermore, the interaction between soil types (clay loam and sandy loam) and fertilizer combinations also did not show significant differences, with plant heights ranging from 157.33 cm to 164.47 cm.

Table 2. Interaction Data on Number of Branches of Jute Mallow to Organic Manure and Inorganic Fertilization on Clay Loam and Sandy Loam Soils

Factor A (Types of Soil)	Factor B $(Fertilizer\ Combination)^{B^{\frac{2}{}}}$						Mean
	B1 (100% Inorganic Fertilizer)	B2 (75% Inorganic Fertilizer + 25% Organic Manure)	B3 (50% Inorganic Fertilizer + 50% Organic Manure)	B4 (25% Inorganic Fertilizer + 75% Organic Manure)	B5 (100 % Organic Manure)	B6 (100% Inorganic Fertilizer)	
Sandy Loam A1	30.60	30.60	30.60	30.48	30.48	30.60	**30.56**
Clay Loam A2	30.60	30.60	30.60	30.48	30.48	30.60	**30.56**
Mean	**30.60**	**30.60**	**30.60**	**30.48**	**30.48**	**30.60**	**30.56**

CV = 0.04%
NS – Not Significant

The interaction data on the number of branches of jute mallow (Corchorus olitorious) is presented in Table 2. Statistical analysis revealed no significant differences in Factor A, with the number of branches obtaining a statistically similar average of 30.56 branches. There is no significant differences that were observed in the number of branches of jute mallow plants applied with different fertilizer combinations (organic manure and inorganic fertilizer) regardless of the recommended rate, with branch numbers ranging from 30.48 to 30.60. The interaction between soil types (clay loam and sandy loam soils) and fertilizer combinations also did not show significant differences among treatments, as reflected in the nearly uniform mean values ranging from 30.48 to 30.60 branches.

Table 3. Interaction Data on Number of Leaves of Jute Mallow to Organic Manure and Inorganic Fertilization on Clay Loam and Sandy Loam Soils

Factor A (Types of Soil)	Factor B $(Fertilizer\ Combination)^{B^{\frac{2}{}}}$						Mean
	B1 (100% Inorganic Fertilizer)	B2 (75% Inorganic Fertilizer + 25% Organic Manure)	B3 (50% Inorganic Fertilizer + 50% Organic Manure)	B4 (25% Inorganic Fertilizer + 75% Organic Manure)	B5 (100 % Organic Manure)	B6 (Control)	
Sandy Loam A1	209.08	208.79	208.79	202.13	201.73	200.33	**205.14**
Clay Loam A2	209.08	208.79	208.79	202.13	201.73	200.33	**205.14**
Mean	**209.08**	**208.79**	**208.79**	**202.13**	**201.73**	**200.33**	**205.14**

CV = 0.03%
NS – Not Significant

The interaction data on the number of leaves of jute mallow (Corchorus olitorious) is presented in Table 3. Statistical analysis revealed no significant differences in Factor A, with the number of leaves obtaining a statistically similar average of 205.14 leaves. Likewise, no significant differences were observed in the number of leaves of jute mallow plants applied with different fertilizer combinations (organic manure and inorganic fertilizer) regardless of the recommended rate, with the number of leaves ranging from 200.33 to 209.08. Additionally, the interaction between soil types (clay loam and sandy loam soils) and fertilizer combinations also did not show significant differences among treatments, as reflected in the nearly uniform mean values ranging from 200.33 to 209.08 leaves.

Table 4. Interaction Data on Stem Diameter (mm) of Jute Mallow to Organic Manure and Inorganic Fertilization on Clay Loam and Sandy Loam Soils

Factor A	**Factor B** $(Fertilizer\ Combination)^{\frac{2}{B}}$						
(Types of Soil)	**B1** (100% Inorganic Fertilizer)	**B2** (75% Inorganic Fertilizer + 25% Organic Manure)	**B3** (50% Inorganic Fertilizer + 50% Organic Manure)	**B4** (25% Inorganic Fertilizer + 75% Organic Manure)	**B5** (100 % Organic Manure)	**B6** (Control)	**Mean**
Sandy Loam A1	10.48	10.50	10.50	10.50	10.50	10.50	**10.50**
Clay Loam A2	10.50	10.50	10.50	10.50	10.50	10.50	**10.50**
Mean	**10.49**	**10.50**	**10.50**	**10.50**	**10.50**	**10.50**	**10.50**

CV = 17.09%
NS – Not Significant

The interaction data on stem diameter of jute mallow (Corchorus olitorious) is shown in Table 4. Statistical analysis revealed no significant differences in Factor A, with the stem diameter obtaining statistically similar results, averaging 10.50 mm. Moreover, no significant differences were observed in the stem diameter of jute mallow plants applied with fertilizer combinations (organic manure and inorganic fertilizer) regardless of the recommended rate, with measurements ranging from 10.49 mm to 10.50 mm. Additionally, the interaction effect between soil types (clay loam and sandy loam soils) and fertilizer combinations did not show significant differences among treatments, with stem diameters ranging from 10.48 mm to 10.50 mm, as reflected in the nearly uniform mean values across all treatments.

Table 5. Interaction Data on Limb Length (cm) of Jute Mallow to Organic Manure and Inorganic Fertilization on Clay Loam and Sandy Loam Soils

Factor A (Types of Soil)	Factor B $(Fertilizer\ Combination)^{B^{\frac{2}{}}}$						Mean
	B1 (100% Inorganic Fertilizer)	B2 (75% Inorganic Fertilizer + 25% Organic Manure)	B3 (50% Inorganic Fertilizer + 50% Organic Manure)	B4 (25% Inorganic Fertilizer + 75% Organic Manure)	B5 (100 % Organic Manure)	B6 (Control)	
Sandy Loam A1	15.43	15.43	15.43	15.46	15.46	15.43	**15.44**
Clay Loam A2	15.43	15.43	15.43	15.46	15.46	15.43	**15.44**
Mean	**15.43**	**15.43**	**15.43**	**15.46**	**15.46**	**15.43**	**15.44**

CV = 00.00%
NS – Not Significant

The interaction data on limb length of jute mallow (Corchorus olitorious) is illustrated in Table 5. Statistical analysis revealed no significant differences in Factor A, with the limb length obtaining statistically similar results, averaging 15.44 cm. Moreover, no significant differences were observed in the limb length of jute mallow plants applied with fertilizer combinations (organic manure and inorganic fertilizer) regardless of the recommended rate per treatment, with measurements ranging from 15.43 cm to 15.46 cm. Additionally, the interaction effect between soil types (clay loam and sandy loam soils) and fertilizer combinations did not show significant differences among treatments, as reflected by the nearly uniform mean values across all treatments, ranging from 15.43 cm to 15.46 cm.

Table 6. Interaction Data on Petiole Length (cm) of Jute Mallow to Organic Manure and Inorganic Fertilization on Clay Loam and Sandy Loam Soils

Factor A (Types of Soil)	Factor B $(Fertilizer\ Combination)^{B^{\frac{2}{}}}$						Mean
	B1 (100% Inorganic Fertilizer)	B2 (75% Inorganic Fertilizer + 25% Organic Manure)	B3 (50% Inorganic Fertilizer + 50% Organic Manure)	B4 (25% Inorganic Fertilizer + 75% Organic Manure)	B5 (100 % Organic Manure)	B6 (Control)	
Sandy Loam A1	3.96	3.96	3.96	3.93	3.94	3.93	**3.95**
Clay Loam A2	3.96	3.96	3.96	3.94	3.94	3.96	**3.95**
Mean	**3.96**	**3.96**	**3.96**	**3.94**	**3.94**	**3.95**	**4.45**

CV = 00.00%
NS – Not Significant

The interaction data on petiole length of jute mallow (Corchorus olitorious) is shown in Table 6. Statistical analysis revealed no significant differences in Factor A, with the petiole length obtaining statistically similar results, averaging 3.95 cm. Moreover, no significant differences were observed in the petiole length of jute mallow plants applied with fertilizer combinations (organic manure and inorganic fertilizer) regardless of the recommended rate per treatment, with measurements ranging from 3.93 cm to 3.96 cm. Additionally, the interaction effect between soil types (clay loam and sandy loam soils) and fertilizer combinations did not show significant differences among treatments, as reflected by the nearly uniform mean values across all treatments.

Table 7. Interaction Data on Plant Yield (kg/10m²) of Jute Mallow to Organic Manure and Inorganic Fertilization on Clay Loam and Sandy Loam Soils

Factor A (Types of Soil)	Factor B $(Fertilizer\ Combination)^{B^{\frac{2}{}}}$						Mean
	B1 (100% Inorganic Fertilizer)	B2 (75% Inorganic Fertilizer + 25% Organic Manure)	B3 (50% Inorganic Fertilizer + 50% Organic Manure)	B4 (25% Inorganic Fertilizer + 75% Organic Manure)	B5 (100 % Organic Manure)	B6 (Control)	
Sandy Loam A1	5.05	4.90	4.92	4.87	4.13	3.17	**4.51**
Clay Loam A2	5.23	5.17	5.18	4.98	4.92	4.19	**4.95**
Mean	**5.14**	**5.11**	**5.04**	**4.95**	**4.90**	**3.68**	**4.73**

CV = 00.40%
NS – Not Significant

The interaction data on plant yield of jute mallow (Corchorus olitorious) is illustrated in Table 7. Statistical analysis revealed no significant differences in Factor A, with plant yield obtaining statistically similar results ranging from 4.51 kg/m² to 4.95 kg/m². Moreover, no significant differences were observed on the plant yield of jute mallow plants applied with fertilizer combinations (organic manure and inorganic fertilizer) regardless of the recommended rate per treatment, with yields ranging from 3.68 kg/m² to 5.14 kg/m². Additionally, the interaction effect between soil types (clay loam and sandy loam soils) and fertilizer combinations did not show significant differences among treatments, with plant yields ranging from 3.68 kg/m² to 5.23 kg/m² as reflected in the nearly uniform mean values across all treatments.

Table 8. Interaction Data on Fiber Yield (kg/10m²) of Jute Mallow to Organic Manure and Inorganic Fertilization on Clay Loam and Sandy Loam Soils

Factor A (Types of Soil)	Factor B $(Fertilizer\ Combination)^{B^{\frac{2}{}}}$						Mean
	B1 (100%)	B2 (75% if + 25% OF)	B3 (50% if + 50% OF)	B4 (25% if + 75% OF)	B5 100 cm	B6 (Control)	
Sandy Loam A1	3.53	3.50	3.47	3.40	3.37	3.23	**3.41**
Clay Loam A2	3.63	3.60	3.60	3.53	3.50	3.43	**3.54**
Mean	**3.58**	**3.55**	**3.53**	**3.46**	**3.43**	**3.33**	**3.47**

CV = 10.54 %
NS – Not Significant

The interaction data on fiber yield of jute mallow (Corchorus olitorious) is shown in Table 8. Statistical analysis revealed no significant differences in Factor A, with fiber yield obtaining statistically similar results ranging from 3.41 kg/m² to 3.54 kg/m². Moreover, no significant differences were observed on the fiber yield of jute mallow plants applied with fertilizer combinations (organic manure and inorganic fertilizer) regardless of the recommended rate per treatment, with yields ranging from 3.33 kg/m² to 3.58 kg/m². Additionally, the interaction effect between types of soil (clay loam and sandy loam soils) and fertilizer combinations did not show significant differences among treatments, with fiber yields ranging from 3.23 kg/m² to 3.63 kg/m² as reflected in the nearly uniform mean values across all treatments.

DISCUSSION

The findings presented in Table 1 align with those of Hossain et al. (2018), who stated that the use of organic manure and inorganic fertilizers can enhance crop growth and productivity. Similarly, Diacono et al. (2011) emphasized that while inorganic fertilizers may lead to immediate plant growth, organic amendments contribute to long-term soil health, ultimately resulting in higher yields over time.

As shown in Table 2, the results corroborate previous studies, such as that of Xu et al. (2003), who demonstrated that balanced applications of organic and inorganic fertilizers improved plant structure and branching in leafy vegetables by ensuring adequate nutrient availability. This suggests that either inorganic fertilizers alone or a combination of organic and inorganic inputs are effective strategies for optimizing branch development in crops like jute mallow.

The trends observed in Table 3 are supported by research on leafy vegetable production. Kundu et al. (2021) found that organic and inorganic fertilizer applications significantly enhanced leaf production in spinach, especially when inorganic inputs were dominant. Meanwhile, Elbashier et al. (2021) noted that organic amendments improve soil fertility over time but may initially yield fewer leaves compared to inorganic fertilizers. These findings affirm that mixed fertilizer treatments result in similar leaf counts to inorganic treatments, while purely organic applications yield slightly fewer leaves, highlighting the balance between immediate growth and soil sustainability.

Evidence in Table 4 corresponds with the findings of El-Mogy et al. (2022) and Xu et al. (2003), who reported that while combined organic and inorganic fertilization enhances general plant growth, it does not significantly impact stem diameter. Consistently, the data show that stem thickness in jute mallow remains uniform across different fertilizer treatments and soil types.

As illustrated in Table 5, Uddin et al. (2024) demonstrated that the use of organic and inorganic fertilizers similarly influences the vegetative growth of leafy vegetables, suggesting that limb elongation is largely unaffected by fertilizer type. Dincă et al. (2022) also showed that while organic amendments improve soil health over time, their immediate effects on morphological features such as limb length are comparable to inorganic fertilizers. This supports the observation that jute mallow maintains consistent limb growth across various fertilization treatments, reflecting its adaptability.

The results depicted in Table 6 are in agreement with the findings of Zhang et al. (2023), who indicated that organic amendments improve morphological characteristics in leafy vegetables by enhancing soil fertility and microbial activity. Khanam et al. (2022) also noted that organic fertilizers promote plant vigor and the elongation of vegetative structures through the gradual release of nutrients. These results validate the enhanced petiole growth observed in jute mallow, particularly in clay loam soils with superior nutrient-holding capacity compared to sandy loam soils.

Data presented in Table 7 support the conclusions of Otuaro et al. (2024), who reported that blending organic and inorganic fertilizers boosts vegetable yields by ensuring sufficient nutrient supply. Liu et al. (2024) further showed that clay loam soil promotes better plant growth than sandy soils, emphasizing the importance of selecting appropriate soil types and fertilizer strategies to enhance jute mallow production.

Finally, the findings summarized in Table 8 correspond to the work of Khan et al. (2024), who demonstrated that combining organic and inorganic fertilizers increases fiber yield in fiber crops through optimized nutrient availability. Paramesh et al. (2023) also emphasized the role of soil type, showing that clay loam soils facilitate better root development and nutrient absorption, thereby improving fiber output. This study reinforces the need for integrated soil and fertilizer management to optimize jute mallow fiber production within sustainable agricultural systems.

Conclusions

The following conclusions are drawn based on the findings of the study.

The jute mallow *(Corchorus oilitorious)* planted on clay loam and sandy loam soil responded well with the different organic manure and inorganic fertilizer combinations. However, jute mallow grows slightly better in clay loam soil than in sandy loam soil. Clay loam soil retained more nutrients and moisture, leading to higher yield and fiber production. However, plant height, stem diameter, limb length, and number of branches remained stable across both soil types, showing that jute mallow can adapt to different soil conditions.

Since jute mallow in clay loam soil yielded more than in sandy loam soil, the farmer realized a higher net income with a consequent higher ROI.

It was concluded that the right amount of fertilizer combinations (organic manure and inorganic fertilizer) is required for jute mallow production rather than leaving the plant unfertilized. Furthermore, among the fertilizer tested, 100% inorganic fertilizer showed a significant effect on the growth and yield of jute mallow on both clay loam and sandy loam soils with the net income of P198,765.00 kg/ha and P 203,315.00 kg/ha.

The interaction between soil type and fertilizer did not significantly impact plant growth, as reflected in the constant values across treatments. While inorganic fertilizers provided fast plant growth, organic manure improved soil fertility, which can benefit long-term productivity. The combination of organic and inorganic fertilizers is a sustainable approach that supports plant growth and soil health.

Recommendations

From the salient findings of this study and the conclusion reached, the following recommendations are presented.

1. The response of jute mallow to clay loam and sandy loam soils, jute mallow responded well on clay loam soil with the application of organic manure and inorganic fertilizer combinations, hence it is ideal for commercial production purposes to higher marketable and fiber yield.
2. The response of jute mallow to organic manure and inorganic fertilizer, using 100% inorganic fertilizer and 100% organic manure are statistically comparable on the computed yield of jute mallows on clay loam and sandy loam soils, farmers should use a combination of organic and inorganic fertilizers to maximize plant growth while maintaining soil health. For immediate high yields, inorganic fertilizer is effective, but for long-term soil fertility, organic manure should be combined.
3. The interaction effect of organic manure and inorganic fertilizer in the type of soil (clay loam and sandy loam soils) did not significantly affect the production in terms of growth and yield of jute mallow.
4. Future researchers, farmers, extension workers, and students who have an interest in conducting related studies may conduct similar studies to validate the effectiveness of various fertilizer combinations used in fertilizing jute mallow

plants to obtain a conducive result, considering that jute mallow production in the Philippines is not well studied.

Compliance with Ethical Standards

The author affirms that there are no conflicts of interest related to this study. Ethical approval was obtained before the commencement of the research, and informed consent was acquired from all respondents involved. No specific funding was received for this research from any public, commercial, or not-for-profit organizations. The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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