BUKTI KORESPONDENSI

ARTIKEL JURNAL INTERNASIONAL BEREPUTASI

Judul Artikel : Effects of Biosullary Application on Soil Fertility Status and Corn (Zea mays) Production after Two Planting Periods

Jurnal : AGRIVITA Journal of Agricultural Science, 2024. 46(2): 404-412

Penulis : Abdul Haris, Annas Boceng, Saida Saida, Abdul Akbar

No	Perihal	Tanggal
1	Bukti konfirmasi submit artikel dan artikel yang disbumit	4 April 2024
2	Bukti konfirmasi review dan hasil review pertama	6 April 2024
3	Bukti konfirmasi submit revisi pertama, respon kepada reviewer, dan artikel yang diresubmit	9 April 2024
4	Bukti konfirmasi review dan hasil review kedua	3 Mei 2024
5	Bukti konfirmasi submit revisi kedua, respon kepada reviewer, dan artikel yang diresubmit	8 Mei 2024
6	Bukti konfirmasi artikel accepted	23 Mei 2024
7	Bukti konfirmasi artikel published online	20 Juni 2024

1. Bukti Konfirmasi Submit Artikel
Dan Artikel yang disubmit
(4 April 2024)

mail-UMI
e-mail Kampus UMI

Abdul Haris <abdul.haris@umi.ac.id>

[AGRIVITA] Submission Acknowledgement

1 message

AGRIVITA <agrivita@ub.ac.id> Thu, Apr 4, 2024 at 9:38 AM
To: Abdul Haris <abdul.haris@umi.ac.id>

Abdul Haris:

Thank you for submitting the manuscript, "Evaluation of Soil Fertility Status due to the Application of Biosullary on Maize (Zea mays) with Two Planting Periods" to AGRIVITA Journal of Agricultural Science. With the online journal management system that we are using, you will be able to track its progress through the editorial process by logging in to the journal web site:

Manuscript URL: https://agrivita.ub.ac.id/index.php/agrivita/author/submission/4530
Username: abdul_haris

If you have any questions, please contact me. Thank you for considering this journal as a venue for your work.

AGRIVITA
AGRIVITA Journal of Agricultural Science

Agrivita Editorial Team
Faculty of Agriculture University of Brawijaya
Jl. Veteran Malang 65145 East Java Indonesia
E-mail :
agrivita@ub.ac.id
agrivitafaperta@yahoo.com
website http://www.agrivita.ub.ac.id

COVER PAGE

Evaluation of Soil Fertility Status due to the Application of Biosullary on Maize (Zea mays) with Two Planting Periods

Abdul Haris [1*], Annas Boceng [2], Saida [3] and Abdul Akbar [4]

I. First author:

1. Name : Abdul Haris
2. Afiliation : Department of Agronomy. Faculty of Agriculture. Universitas Muslim Indonesia. Makassar. South Sulawesi. Indonesia
3. E-mail : abdul.haris@umi.ac.id
4. Orcid ID :
5. Contribution to this Manuscrip: Draft Writer. Data Analysis

III. Second author:

1. Name : Annas Boceng
2. Afiliation : Department of Agronomy. Faculty of Agriculture. Universitas Muslim Indonesia. Makassar. South Sulawesi. Indonesia
3. E-mail : annas.boceng@umi.ac.id
4. Orcid ID :
5. Contribution to this Manuscrip: Draft Writer, Data Analysis

IV. Third author:

1. Name : Saida
2. Afiliation : Department of Agronomy. Faculty of Agriculture. Universitas Muslim Indonesia. Makassar. South Sulawesi. Indonesia
3. E-mail : saida.saida@umi.ac.id
4. Orcid ID : http://orcid.org/0000-0002-5611-8935
5. Contribution to this Manuscrip: Draft Writer, Data Analysis

V. Third author:

1. Name : Abdul Akbar
2. Afiliation : Department of Agronomy. Faculty of Agriculture. Universitas Muslim Indonesia. Makassar. South Sulawesi. Indonesia
3. E-mail : aabdatp@gmail.com
4. Orcid ID : http://orcid.org/0000-0002-0722-2701
5. Contribution to this Manuscrip: Draft Writer

Evaluation of Soil Fertility Status due to the Application of Biosullary on Maize (Zea mays) with Two Planting Periods

ABSTRACT

Maize production in Indonesia faces challenges such as climate change affecting planting seasons and productivity, resulting in unstable production levels. The research aims to evaluate the impact of biosullary application on the growth and yield of maize in two different planting periods. The study was conducted over two planting periods using a Randomized Complete Block Design (RCBD) method. Each treatment was replicated three times, resulting in 21 experimental units. Each experimental unit consisted of 12 plants, with a total of 252 plants and 63 sample plants. Based on the research findings, the tallest plants were observed in treatment P6, reaching 199.67 cm in the first period and the same in the second period. The best leaf count was recorded in treatment P6 during the first period with 13.33 leaves and 12.00 leaves in the second period. The fastest flowering period was obtained in treatment P6 in both the first and second periods, with flowering durations of 39.00 and 45.00 days, respectively. Regarding cob length, the best performance was observed in treatment P6 with 11.67 cm in the first period and treatment P5 with 13.00 cm in the second period. For the 100-seed weight parameter, the highest values were recorded in treatment P5 with weights of 26.33 grams in the first period and 22.67 grams in the second period. Consequently, it is recommended to increase fertilizer dosage in the second period to maintain maize productivity. Furthermore, the use of biosullary contributes to improving soil physical properties, microbial vitality, and pH stability.

Keywords: fertilization, maize productivity, biosullary, soil physical properties, soil microbes

INTRODUCTION

Corn (Zea mays) is a cereal crop widely cultivated and plays a crucial role in global agriculture and food production. It belongs to the grass family Poaceae and is characterized by tall stalks bearing large ears containing grains. Corn serves as a staple food in many parts of the world and is used for various purposes such as human consumption, animal feed, and industrial applications. Maize production in Indonesia faces challenges such as climate change affecting planting seasons and productivity, resulting in unstable production levels (Herlina & Prasetyorini, 2020). Despite efforts to improve maize farming efficiency, Indonesia still encounters low production rates insufficient to meet consumer demand (Kholid et al., 2023).

The demand for maize is projected to increase in the coming years, necessitating continuous improvements in production and land availability (Tobing et al., 2022). Optimal maize production requires sufficient nutrient availability in the soil. However, excessive use of chemical fertilizers to meet plant nutrient requirements can lead to environmental damage and human health issues. Therefore, more environmentally friendly and sustainable alternatives for providing nutrients to plants need to be explored. According to the Central Bureau of Agricultural Statistics in 2022, maize production data showed 16.53 million tons, while in 2023, it decreased to 14.77 million tons. Based on this, it can be concluded that there was a decrease in production by 1.75 million tons (BPS, 2024).

One promising alternative is the use of biosullary. Biosullary is a product derived from the composting process of organic materials such as agricultural waste and other organic residues. Biosullary contains beneficial microorganisms that enhance soil health and nutrient availability for plants (Zone et al., 2020). Studies have shown that fertilization with phosphorus and potassium marginally increases leaf tissue concentrations in various plants, underscoring the importance of nutrient management strategies (Dossou-Yovo et al., 2020). It has also been observed that early plant growth does not always accurately predict plant performance, emphasizing the complexity of plant responses to nutrient application.

Although there have been some studies on the use of biosullary in agriculture, information on its effects on soil fertility status, particularly in maize plants, is still limited. Moreover, previous research tends to focus only on one planting period. Therefore, this study aims to fill this gap by examining the effects of biosullary application on maize plants in two different planting periods. West et al. (2020) emphasize the

potential of sustainable intensification through double cropping systems to increase biomass production and reduce nitrogen losses, which is relevant when assessing biosolid impacts on soil fertility dynamics. On the other hand, (Sharma et al. 2020) demonstrate the influence of zinc levels on maize crop yield, nutrient uptake, and soil fertility status, highlighting the interconnected relationship between plant growth and soil health.

The research objective is to evaluate the impact of biosullary application on the growth and yield of maize in two different planting periods to determine if the effects of biosullary differ between the first and second planting periods.

MATERIALS AND METHODS

This research was conducted from May to December 2023 in a dry land area located in Marang Subdistrict, Pangkep Regency, South Sulawesi. The materials used in this study included Hybrid F1 Exsotic Pertiwi maize seeds, gamal leaves (Gliricidia sepium), and krinyu leaves (Chromolaena odorata L). The equipment used in this research comprised a shovel, hand sprayer, meter, watering can, bucket, analytical balance, labels, and office stationery.

The research was carried out over two planting periods using a Randomized Complete Block Design (RCBD) method as follows:

P0 = Control
P1 = Gamal leaf fertilizer at a dose of 50 kg/plot and krinyu leaf fertilizer at a dose of 50 kg/plot
P2 = Gamal leaf fertilizer at a dose of 75 kg/plot and krinyu leaf fertilizer at a dose of 75 kg/plot
P3 = Gamal leaf fertilizer at a dose of 100 kg/plot and krinyu leaf fertilizer at a dose of 100 kg/plot
P4 = Gamal leaf fertilizer at a dose of 125 kg/plot and krinyu leaf fertilizer at a dose of 125 kg/plot
P5 = Gamal leaf fertilizer at a dose of 150 kg/plot and krinyu leaf fertilizer at a dose of 150 kg/plot
P6 = Gamal leaf fertilizer at a dose of 175 kg/plot and krinyu leaf fertilizer at a dose of 175 kg/plot

Each treatment was replicated three times, resulting in 21 experimental units. Each experimental unit consisted of 12 plants, and there were 3 sample plants per experimental unit, totaling 252 plants and 63 sample plants overall. The data obtained were analyzed using analysis of variance (ANOVA). If there were significant effects, post hoc tests were conducted using Least Significant Difference (LSD) test at a significance level of 5%.

RESULTS AND DISCUSSION

1. Corn Plant Height

The height of maize plants was observed in two planting periods with the application of Gamal and Krinyu leaf fertilizers. The observation results are represented in Table 1. It can be seen that the height of maize plants varies within each treatment and planting period.

Table 1. Maize Plant Height (cm) in Two Planting Periods with the Application of Gamal Leaf and Krinyu Leaf Fertilizers

Treatment	Plant Height (cm)	
	Period 1	Period 2
P0	154.33a	144.33a
P1	172.33b	160.67c
P2	175.33c	168.67d
P3	170.00b	155.00b
P4	182.67d	171.00d
P5	191.33e	172.33d
P6	199.67f	176.67e

Note: Numbers followed by the same letter are not significantly different at the 5% BNT test level

In the first planting period, the height of maize plants significantly increased from treatment P0 to P6. The tallest plants were recorded in treatment P6 with 199.67 cm, while the shortest plants were observed in treatment P0 with 154.33 cm. The analysis results indicate that these differences are statistically significant (LSD 0.05) between each treatment.

Meanwhile, in the second planting period, a similar increase in maize plant height was observed from treatment P0 to P6. The tallest plants were recorded in treatment P6 with 176.67 cm, while the shortest plants were observed in treatment P0 with 144.33 cm. These differences were also statistically significant (LSD 0.05) between each treatment.

Comparison between the first and second planting periods shows a decrease in plant height in some treatments in the second planting period compared to the first planting period. However, overall, plant height tends to be higher in the first planting period. Exploring the growth response of maize plants to different fertilizers indicates significant differences in plant height based on the type of fertilizer used (Harini & Sasli, 2021), signifying the potential impact of fertilizer choice on plant height. Specifically focusing on the use of Gamal leaf organic fertilizer positively affects plant height (Illah, 2022).

Overall, the application of Gamal and Krinyu leaf fertilizers positively influences the growth of maize plants, with better results observed in treatment P6 in both planting periods. This indicates the potential of using these leaf fertilizers to increase maize production. Furthermore, fertilizer dosage on plant growth emphasizes that specific cultivation methods result in taller plants, indicating the importance of cultivation practices on plant height influence (Suwarti & Suwardi, 2020). Additionally, the impact of various concentrations of liquid organic fertilizers on plant growth, including plant height as a measured parameter (Fatima et al., 2021).

2. Number of Leaves (Strands)

The data in Figure 1 show the average number of leaves from various treatments in two different planting periods. The number of leaves in maize plants is an important indicator in evaluating plant growth and health because an adequate number of leaves significantly influences the photosynthesis process and ultimately the crop yield.

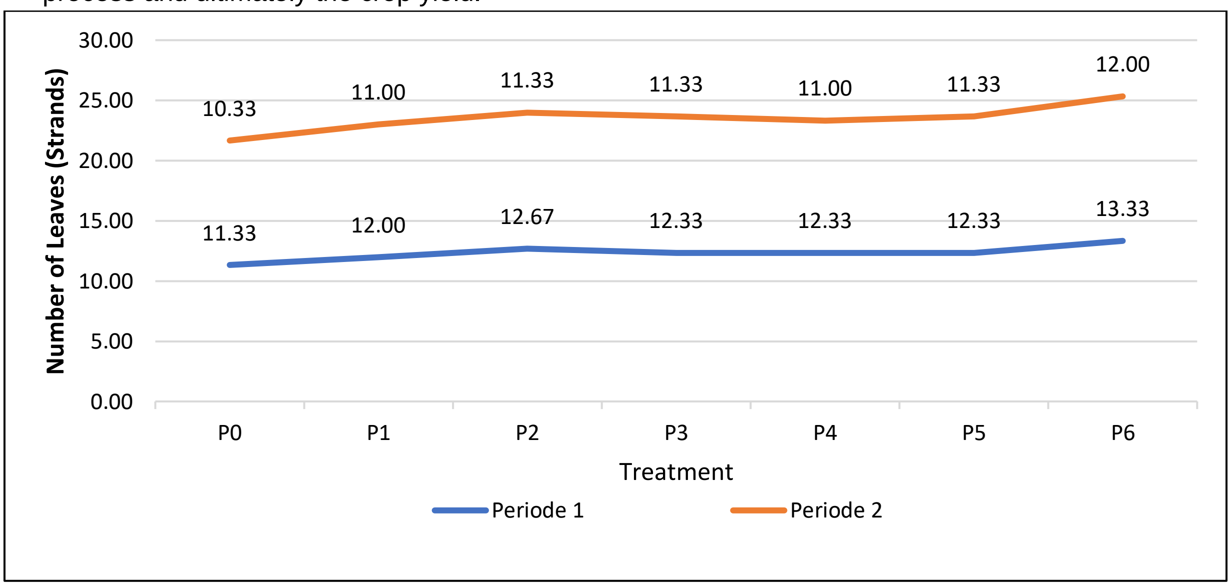


Figure 1. Average Number of Leaves in Two Planting Periods with the Application of Gamal Leaf and Krinyu Leaf Fertilizers

In period 1, there was variation in the average number of leaves among different treatments, with Treatment P6 showing the highest average number of leaves at 13.33 leaves, while Treatment P0 had the lowest average number of leaves at 11.33 leaves. This indicates the potential of certain treatments to stimulate leaf growth in maize plants. Furthermore, in period 2, there was a decrease in the average number of leaves for each treatment. However, this pattern was not consistently observed in every treatment. Treatment P6 showed the highest average number of leaves at 12.00 leaves in period 2, while Treatment P0 still had the lowest average number of leaves at 10.33 leaves. The effect of leaf fertilizers, such as Gamal leaf and Krinyu leaf fertilizers, in influencing the average number of leaves in maize plants across different planting periods has been documented (Pratiwi, 2017). The comparison of organic fertilizers in maize growth can result in different impacts on maize plant growth (Jjagwe et al., 2020).

The change in the number of leaves from period 1 to period 2 also varied among treatments. The decrease in the number of leaves in period 2 was attributed to various factors, including changes in environmental conditions, seasonal changes, and other experimental treatments. The potential of organic fertilizers on maize plants has positive effects on soil and plants (Buzo et al., 2022). The supplementation of vermicompost with liquid organic fertilizers and organic fertilizers in plant growth and yield has shown positive impacts (Muktamar et al., 2017).

The application of Gamal leaf and Krinyu leaf fertilizers on the average number of leaves in maize plants impacts the growth of maize plant leaf numbers but does not significantly affect them (Kefi et al., 2022). Furthermore, the application of Gamal leaf liquid organic fertilizer resulted in a positive influence on leaf development (Hasan et al., 2021), suggesting that maize growth with the influence of manure, NPK fertilizers, and soil types provides insights into the role of different fertilizers in enhancing plant growth, the effects of organic leaf fertilizers on growth, nutrient absorption, and maize plant performance (Sebetha & Mashele, 2019).

3. Age of Flowering Male 50% Days after planting (DAP)

The average age of 50% male flowering Days after Planting (DAP) in two planting periods with the application of Gamal and Krinyu leaf fertilizers is represented in Table 2. The data indicate variations in the age of 50% male flowering (DAP) among different treatments and planting periods.

Table 2. Average Age of 50% Male Flowering (DAP) in Two Planting Periods with the Application of Gamal Leaf and Krinyu Leaf Fertilizers

Treatment	**Age of Flowering Male 50% (DAP)**	
	Period1	Period2
P0	42.00d	49.00a
P1	41.00c	47.33b
P2	41.33c	47.00b
P3	40.67b	47.33b
P4	40.33b	46.33c
P5	40.00b	45.67c
P6	39.00a	45.00d

Note: Numbers followed by the same letter are not significantly different at the 5% BNT test level

In the first planting period, there were significant differences in the age of 50% male flowering (DAP) among treatments, with the highest age recorded in Treatment P0 at 42.00 days and the lowest age recorded in Treatment P6 at 39.00 days. The analysis results indicate that these differences are statistically significant (LSD 0.05) between each treatment.

In the second planting period, there was an increase in the age of 50% male flowering (DAP) in almost all treatments compared to the first planting period. The highest age of 50% male flowering (DAP) was recorded in Treatment P0 at 49.00 days, while the lowest age was recorded in Treatment P6 at 45.00 days. These differences were also statistically significant (LSD 0.05) between each treatment. Furthermore, the comparison between the first and second planting periods shows changes or delays in

50% male flowering (DAP) in general in all treatments.

Based on observations, the highest nutrient content in gamal and krinyu leaves is nitrogen, thus, the phosphorus concentration in leaves at the time of flowering in maize plants is influenced by nitrogen fertilization, which impacts proper nutrient management for optimal plant development (Galindo et al., 2016). Additionally, the application of green manure enriched with EM4 can increase leaf surface area and maize plant dry weight, potentially affecting flowering time (Karimuna et al., 2023).

Overall, the application of Gamal and Krinyu leaf fertilizers has varying effects on the age of 50% male flowering (DAP) in maize plants. Treatment P6 tends to exhibit faster 50% male flowering (DAP), indicating the potential use of these leaf fertilizers to accelerate the flowering process in maize. Various types of treatments and dosages have significant impacts on the average flowering age of plants (Triadiawarman et al., 2020). Flowering age in maize plants is primarily determined by genetic and environmental factors, as well as the interaction between these factors (Purba & Hadiatry, 2022). Observations have shown that some maize plants exhibit 1 or 2 ears (prolific). Specific genotypes have been identified to have shorter flowering times in various environments (Syafi'i & Ruswandi, 2019).

4. Cob Length (cm)

The data listed in the table indicate the average length of maize cobs from various treatments in two different planting periods. Cob length is one of the important indicators in evaluating harvest yield and maize plant productivity because longer cobs tend to produce more maize kernels.

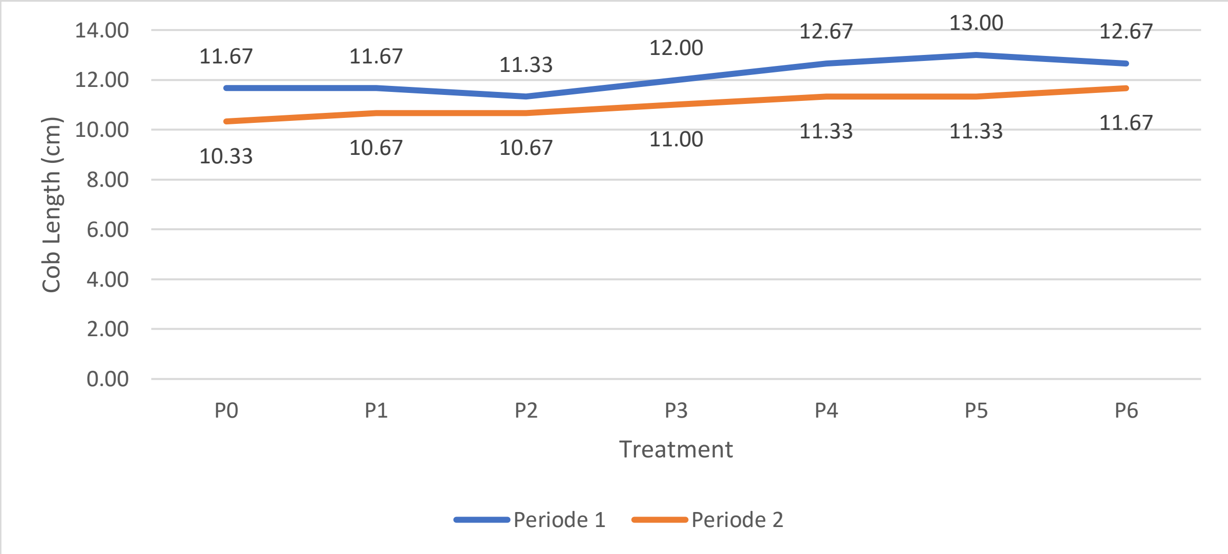


Figure 2. Average Cob Length in Two Planting Periods with the Application of Gamal Leaf and Krinyu Leaf Fertilizers

In period 1, there was variation in the average cob length among different treatments. Treatment P5 exhibited the highest average cob length at 13.00 cm, while Treatment P0 had the lowest average cob length at 11.67 cm. This indicates the potential of certain treatments to increase cob length in maize plants.

Furthermore, in period 2, there was a general decrease in the average cob length for each treatment. However, this pattern was not consistently observed in every treatment. Treatment P5 still showed the highest average cob length in period 2, while Treatment P0 remained with the lowest average cob length. The use of organic fertilizers significantly affects various parameters of maize plants, including cob length (Raksun et al., 2019). Similarly, significant effects on variables such as leaf number, cob length, cob diameter, and yield were observed when reducing inorganic fertilizer doses and adding liquid organic fertilizers to maize plants (Nurnawati et al., 2022).

Changes in cob length from period 1 to period 2 also varied among treatments. The decrease in cob length in period 2 may be attributed to various factors, such as changes in environmental conditions, seasonal changes, or interactions with other experimental treatments. The impact of organic fertilization on maize plant production as a source of nutrition influences the characteristics of maize cobs, including their length (Dewanto et al., 2017). The effect of various bioameliorant doses on nutrient concentrations and maize cob yield. Data analysis involves analysis of variance followed by Honestly Significant Difference test, which can reveal the specific impact of bioameliorant doses on maize cob length (Malayani et al., 2023).

5. Weight of 100 Seeds (g)

The information depicted in the figure indicates the average weight of 100 maize kernels tested under different treatments in two distinct planting seasons. Kernel weight is a crucial factor in assessing harvest yield and maize plant productivity, as larger kernel weights tend to result in higher maize kernel weights overall.

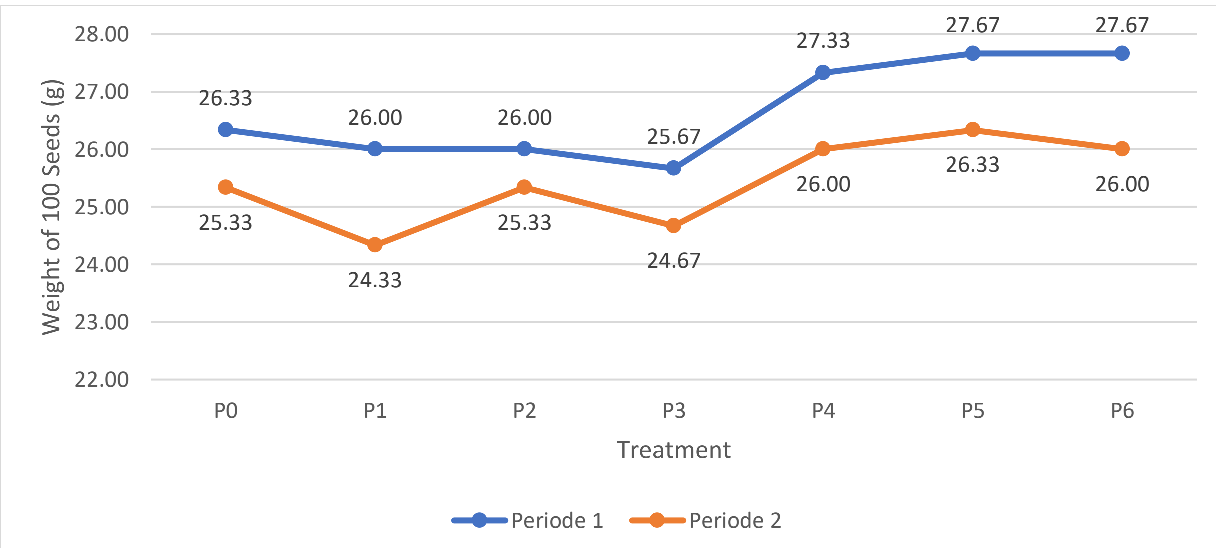


Figure 3. Average Weight of 100 Kernels (g) in Two Planting Periods with the Application of Gamal Leaf and Krinyu Leaf Fertilizers

The average weight of 100 maize kernels in two planting periods shows variation among different treatments. Generally, Treatments P5 and P6 exhibit higher average weights compared to other treatments in both periods, while Treatments P3 and P1 demonstrate lower average weights. The importance of proper fertilization management with suitable doses to enhance maize production is emphasized (Maintang et al., 2023).

There is a decrease in the average weight from period 1 to period 2 in most treatments, but this pattern is not consistent across all treatments. Treatments P5 and P6 show an increase in average weight from period 1 to period 2. Organic fertilizer application can influence soil pH, phosphorus availability, phosphorus uptake, and maize harvest yield (Yuniarti et al., 2020). The use of foliar fertilizers can also have a positive impact on maize growth and yield. Application of liquid organic foliar fertilizers can enhance the length, diameter, and weight of maize cobs (Hasan et al., 2021). Furthermore, the use of animal-based organic fertilizers, such as cuscus feces, can affect plant biomass (Sawen et al., 2022).

CONCLUSIONS

Based on the research findings, although the effect of biosullary on maize plant production in the first period is higher than in the second period, the decrease in production in the second period is not statistically significant. Therefore, it is recommended to increase the fertilization dosage in the second period to maintain maize plant productivity. The impact of using biosullary includes improving soil physical properties, enhancing soil microbial activity, and maintaining soil pH stability consistently.

REFERENCES

Amin, M., Tondok, A., & Dewi, M. (2023). Pertumbuhan dan hasil tanaman jagung pada berbagai dosis pemupukan organik dan anorganik di lahan sawah tadah hujan. Jurnal Agrisistem, 18(2), 76-85. https://doi.org/10.52625/j-agr.v18i2.246

BPS. (2024). https://www.bps.go.id/id/infographic?id=909

Buzo, F., Garcia, N., Garé, L., Gato, I., Martins, J., Martins, J., & Arf, O. (2022). Phosphate fertilization and mycorrhizal inoculation increase corn leaf and grain nutrient contents. Agronomy, 12(7), 1597. https://doi.org/10.3390/agronomy12071597

Dewanto, F., Londok, J., Tuturoong, R., & Kaunang, W. (2017). Pengaruh pemupukan anorganik dan organik terhadap produksi tanaman jagung sebagai sumber pakan.. Zootec, 32(5). https://doi.org/10.35792/zot.32.5.2013.982

Dossou-Yovo. W.. Ziadi. N.. Leblanc. M.. Tremblay. G.. Pellerin. A.. & Parent. L. (2020). Corn response to banded phosphorus fertilizers with or without manure application in eastern canada. Agronomy Journal. 112(3). 2176-2187. https://doi.org/10.1002/agj2.20115

Galindo, F., Filho, M., Buzetti, S., Santini, J., Alves, C., Nogueira, L., & Bellotte, J. (2016). Corn yield and foliar diagnosis affected by nitrogen fertilization and inoculation with azospirillum brasilense. Revista Brasileira De Ciência Do Solo, 40(0). https://doi.org/10.1590/18069657rbcs20150364

Harini, D. and Sasli, I. (2021). Tanggap pertumbuhan dan perkembangan jagung ketan terhadap pemberian amelioran dan pupuk npk pada tanah ultisol. Indonesian Journal of Agronomy, 49(1), 29-36. https://doi.org/10.24831/jai.v49i1.34284

Hasan, F., Nur, M., & Nayo, F. (2021). Aplikasi pupuk organik cair daun lamtoro (leucaena leucophala (lam. de wit) on growth and yield of sweet corn (zea mays saccharata sturt l.). Jurnal Agercolere, 3(2), 38-45. https://doi.org/10.37195/jac.v3i2.129

Hasan, F., Nur, M., & Nayo, F. (2021). Aplikasi pupuk organik cair daun lamtoro (leucaena leucophala (lam. de wit) on growth and yield of sweet corn (zea mays saccharata sturt l.). Jurnal Agercolere, 3(2), 38-45. https://doi.org/10.37195/jac.v3i2.129

Herlina. N.. & Prasetyorini. A. (2020). Effect of climate change on planting season and productivity of maize (zea mays l.) in malang regency. Jurnal Ilmu Pertanian Indonesia. 25(1). 118-128. https://doi.org/10.18343/jipi.25.1.118

Illah, M. (2022). Pemberian pupuk organik cair daun gamal terhadap pertumbuhan rumput gajah mini. Jurnal Sosial Sains, 2(9), 1003-1014. https://doi.org/10.36418/jurnalsosains.v2i9.485

Jjagwe, J., Chelimo, K., Karungi, J., Komakech, A., & Lederer, J. (2020). Comparative performance of organic fertilizers in maize (zea mays l.) growth, yield, and economic results. Agronomy, 10(1), 69. https://doi.org/10.3390/agronomy10010069

Karimuna, L., Kilowasid, L., Wijayanto, T., & Anti, W. (2023). Growth performances of maize (zea mays l.) intercropping with soybean (glycine max (l.) merrill.) in the legowo row system applied with bokashi plus fertilizer on marginal soils. Iop Conference Series Earth and Environmental Science, 1208(1), 012040. https://doi.org/10.1088/1755-1315/1208/1/012040

Kefi, A., Guntoro, D., & Santosa, E. (2022). Pertumbuhan dan hasil tanaman jagung manis pada berbagai populasi gulma chloris barbata (poaceae). Indonesian Journal of Agronomy, 50(1), 80-88. https://doi.org/10.24831/jai.v50i1.39708

Kholid. M.. Wangiyana. W.. & Sudantha. I. (2023). Pengaruh berbagai jarak tanam dan penyisipan kedelai terhadap pertumbuhan dan hasil tanaman jagung manis (zea mays l.). Jurnal Ilmiah Mahasiswa Agrokomplek. 2(1). 81-90. https://doi.org/10.29303/jima.v2i1.2138

Muktamar, Z., Sudjatmiko, S., Chozin, M., & Setyowati, N. (2017). Sweet corn performance and its major nutrient uptake following application of vermicompost supplemented with liquid organic fertilizer. International Journal on Advanced Science Engineering and Information Technology, 7(2), 602. https://doi.org/10.18517/ijaseit.7.2.1112

Nurnawati, A., Syarifuddin, R., & A.Samsu, A. (2022). Mengurangi dosis pupuk anorganik pada tanaman jagung ungu dengan aplikasi pupuk organik cair. Agro Bali Agricultural Journal, 5(1), 137-143. https://doi.org/10.37637/ab.v5i1.863

Pratiwi, A. (2017). Effect of nitrogen fertilizer to the flavonoid content of red amaranth (amaranthus gangeticus l.). Pharmaciana, 7(1), 87. https://doi.org/10.12928/pharmaciana.v7i1.4213

Pudjiwati, M. and Jenar, D. (2021). Pengaruh tetua betina pada beberapa karakter tanaman jagung (zea mays l). J-Pen Borneo Jurnal Ilmu Pertanian, 4(1). https://doi.org/10.35334/jpen.v4i1.1923

Purba, R. and Hadiatry, M. (2022). Yield performance and farmers' responses to corn composite varieties in pandeglang regency, banten province. E3s Web of Conferences, 361, 04013. https://doi.org/10.1051/e3sconf/202236104013

Raksun, A., Japa, L., & Mertha, I. (2019). Aplikasi pupuk organik dan npk untuk meningkatkan pertumbuhan vegetatif melon (cucumis melo l.). Jurnal Biologi Tropis, 19(1), 19-24. https://doi.org/10.29303/jbt.v19i1.1003

Sawen, D., Nuhuyanan, L., Nauw, S., Junaidi, M., & Hariadi, B. (2022). Pemberian pupuk organik feses kuskus berbasis konsumsi buah terhadap biomassa rumput setaria (setaria sphacelata) pada defoliasi kedua. Pastura, 11(2), 81. https://doi.org/10.24843/pastura.2022.v11.i02.p02

Sebetha, E. and Mashele, L. (2019). The growth performance of sweet corn under the influence of animal manure, npk and soil type. Indian Journal of Agricultural Research, (of). https://doi.org/10.18805/ijare.a-425

Sharma. A.. Singh. M.. Kumar. S.. & Shambhavi. S. (2020). Response of plant geometry. graded fertility and zinc level on yield and nutrients uptake by baby corn (zea mays l.) and nutrients status of soil. International Journal of Chemical Studies. 8(3). 812-815. https://doi.org/10.22271/chemi.2020.v8.i3j.9303

Suwarti, F. and Suwardi, F. (2020). Kombinasi jarak tanam dan dosis pupuk (za dan kcl) terhadap pertumbuhan dan hasil benih f1 varietas bima 20. Agriprima Journal of Applied Agricultural Sciences, 4(2), 178-189. https://doi.org/10.25047/agriprima.v4i2.369

Syafi'i, M. and Ruswandi, D. (2019). Model gge biplot untuk visualisasi interaksi genotip (g) x naungan (e) pada jagung toleran naungan pada sistem agroforestri. Kultivasi, 18(1). https://doi.org/10.24198/kultivasi.v18i1.20938

Tobing C. F. L., Lubis. S. N., & Rahmanta. R. (2022). Analisis faktor-faktor yang mempengaruhi permintaan dan produksi jagung di provinsi sumatera utara. indonesia. Agro Bali Agricultural Journal. 5(3). 576-583. https://doi.org/10.37637/ab.v5i3.1030

Triadiawarman, D., Rudi, R., & Sarido, L. (2020). Pengaruh berbagai jenis poc dan dosis pgpr terhadap pertumbuhan dan hasil tanaman okra (abelmoschus esculenthus). Jurnal Pertanian Terpadu, 8(2), 226-235. https://doi.org/10.36084/jpt..v8i2.274

West. J.. Ruark. M.. & Shelley. K. (2020). Sustainable intensification of corn silage cropping systems with winter rye. Agronomy for Sustainable Development. 40(2). https://doi.org/10.1007/s13593-020-00615-6

Yuniarti, A., Solihin, E., & Putri, A. (2020). Aplikasi pupuk organik dan n, p, k terhadap ph tanah, p-tersedia, serapan p, dan hasil padi hitam (oryza sativa l.) pada inceptisol. Kultivasi, 19(1), 1040. https://doi.org/10.24198/kultivasi.v19i1.24563

Zone. P.. Culman. S.. Haden. V.. Lindsey. L.. Fulford. A.. & Zhao. K. (2020). Do soil test levels and fertilization with phosphorus and potassium impact field crop tissue concentrations. Agronomy Journal. 112(4). 3024-3036. https://doi.org/10.1002/agj2.20243

2. Bukti Konfirmasi Review dan Hasil Review Pertama (6 April 2024)

mail-UMI
e-mail Kampus UMI

Abdul Haris <abdul.haris@umi.ac.id>

[AGRIVITA] Editor Decision

1 message

AGRIVITA <agrivita@ub.ac.id> Sat, Apr 6, 2024 at 6:00 PM
Reply-To: "Hagus Tarno, Prof.Dr.Agr.Sc." <h_gustarno@ub.ac.id>
To: Abdul Haris <abdul.haris@umi.ac.id>
Cc: Annas Boceng <annas.boceng@umi.ac.id>, Saida Saida <saida.saida@umi.ac.id>, Abdul Akbar <aabdatp@gmail.com>

Abdul Haris:

We have reached a decision regarding your submission to AGRIVITA Journal of Agricultural Science, "Evaluation of Soil Fertility Status due to the Application of Biosullary on Maize (Zea mays) with Two Planting Periods".

Our decision is to: Revision Required

Hagus Tarno, Prof.Dr.Agr.Sc.
Department of Plant Protection, University of Brawijaya (Scopus ID: 36163526900)
h_gustarno@ub.ac.id

Environmental Entomology and Nematology
Department of Plant Protection
Agricultural Faculty
University of Brawijaya
Jl. Veteran Malang
Jawa Timur INDONESIA 65145

Agrivita Editorial Team
Faculty of Agriculture University of Brawijaya
Jl. Veteran Malang 65145 East Java Indonesia
E-mail :
agrivita@ub.ac.id
agrivitafaperta@yahoo.com
website http://www.agrivita.ub.ac.id

4530-reviewed.docx
63K

3. Bukti Konfirmasi Submit Revisi Pertama,
Respon kepada Reviewer,
dan Artikel yang Diresubmit
(9 April 2024)

mail-UMI
e-mail Kampus UMI

Abdul Haris <abdul.haris@umi.ac.id>

Re: [AGRIVITA] Editor Decision

1 message

Hagus Tarno <h_gustarno@ub.ac.id> Tue, May 21, 2024 at 11:50 AM
To: abd akbar <aabdatp@gmail.com>, abdul.haris@umi.ac.id

Dear Authors,

Please check the comments and follow the suggestions to make your manuscript suitable to be published.
Several suggestions should be considered.

In example:
1. Value should be checked both in the text and the graph.
2. The Latin name should be italicized and checked in detail.
3. Rearrange the graph or charts based on Figure 3 (Edited by the reviewer).
4. References should be written by the reference manager to make it consistent.
5. Check it additional items if necessary.

Thanks a lot,

Hagus Tarno, Dr. Agr. Sc.

- **Professor**
  Environmental Entomology and Nematology
  Department of Plant Pest and Disease
  Faculty of Agriculture
  Universitas Brawijaya
  Jl. Veteran Malang Jawa Timur INDONESIA 65145
  Email: h_gustarno@ub.ac.id

- **Head of Double Degree Program and Foreign Student**
  Universitas Brawijaya
  Jl. Veteran Malang 65145
  website: https://ub.ac.id/id/

On Wed, May 8, 2024 at 1:57 PM abd akbar <aabdatp@gmail.com> wrote:

> Below we attach the results of the revision, thank you
>
> Pada Jum, 3 Mei 2024 pukul 02.07 AGRIVITA <agrivita@ub.ac.id> menulis:
>
>> Abdul Haris:
>>
>> We have reached a decision regarding your submission to AGRIVITA Journal of Agricultural Science, "Evaluation of Soil Fertility Status due to the Application of Biosullary on Maize (Zea mays) with Two Planting Periods".
>>
>> Our decision is to: Revision Required
>>
>> Hagus Tarno, Prof.Dr.Agr.Sc.
>> Department of Plant Protection, University of Brawijaya (Scopus ID: 36163526900)
>> h_gustarno@ub.ac.id

Environmental Entomology and Nematology
Department of Plant Protection
Agricultural Faculty
University of Brawijaya
Jl. Veteran Malang
Jawa Timur INDONESIA 65145

Agrivita Editorial Team
Faculty of Agriculture University of Brawijaya
Jl. Veteran Malang 65145 East Java Indonesia
E-mail :
agrivita@ub.ac.id
agrivitafaperta@yahoo.com
website http://www.agrivita.ub.ac.id

4530-20945-2-ED-HTN.docx
78K

Evaluation of Soil Fertility Status due to the Application of Biosullary on Maize (Zea mays) with Two Planting Periods

ABSTRACT

Maize production in Indonesia faces challenges such as climate change affecting planting seasons and productivity, resulting in unstable production levels. The research aims to evaluate the impact of biosullary application on the growth and yield of maize in two different planting periods. The study was conducted over two planting periods using a Randomized Complete Block Design (RCBD) method. Each treatment was replicated three times, resulting in 21 experimental units. Each experimental unit consisted of 12 plants, with a total of 252 plants and 63 sample plants. Based on the research findings, the tallest plants were observed in treatment P6, reaching 199.67 cm in the first period and the same in the second period. The best leaf count was recorded in treatment P6 during the first period with 13.33 leaves and 12.00 leaves in the second period. The fastest flowering period was obtained in treatment P6 in both the first and second periods, with flowering durations of 39.00 and 45.00 days, respectively. Regarding cob length, the best performance was observed in treatment P6 with 11.67 cm in the first period and treatment P5 with 13.00 cm in the second period. For the 100-seed weight parameter, the highest values were recorded in treatment P5 with weights of 26.33 grams in the first period and 22.67 grams in the second period. Consequently, it is recommended to increase fertilizer dosage in the second period to maintain maize productivity. Furthermore, the use of biosullary contributes to improving soil physical properties, microbial vitality, and pH stability.
Keywords: fertilization, maize productivity, biosullary, soil physical properties, soil microbes

INTRODUCTION

Corn (Zea mays) is a cereal crop widely cultivated and plays a crucial role in global agriculture and food production. It belongs to the grass family Poaceae and is characterized by tall stalks bearing large ears containing grains. Corn serves as a staple food in many parts of the world and is used for various purposes such as human consumption, animal feed, and industrial applications. Maize production in Indonesia faces challenges such as climate change affecting planting seasons and productivity, resulting in unstable production levels (Herlina & Prasetyorini, 2020). Despite efforts to improve maize farming efficiency, Indonesia still encounters low production rates insufficient to meet consumer demand (Kholid et al., 2023).

The demand for maize is projected to increase in the coming years, necessitating continuous improvements in production and land availability (Tobing et al., 2022). Optimal maize production requires sufficient nutrient availability in the soil. However, excessive use of chemical fertilizers to meet plant nutrient requirements can lead to environmental damage and human health issues. Therefore, more environmentally friendly and sustainable alternatives for providing nutrients to plants need to be explored. According to the Central Bureau of Agricultural Statistics in 2022, maize production data showed 16.53 million tons, while in 2023, it decreased to 14.77 million tons. Based on this, it can be concluded that there was a decrease in production by 1.75 million tons (BPS, 2024).

One promising alternative is the use of biosullary. Biosullary is a product derived from the composting process of organic materials such as agricultural waste and other organic residues. Biosullary contains beneficial microorganisms that enhance soil health and nutrient availability for plants (Zone et al., 2020). Studies have shown that fertilization with phosphorus and potassium marginally increases leaf tissue concentrations in various plants, underscoring the importance of nutrient management strategies (Dossou-Yovo et al., 2020). It has also been observed that early plant growth does not always accurately predict plant performance, emphasizing the complexity of plant responses to nutrient application.

Although there have been some studies on the use of biosullary in agriculture, information on its effects on soil fertility status, particularly in maize plants, is still limited. Moreover, previous research tends to focus only on one planting period. Therefore, this study aims to fill this gap by examining the effects of biosullary application on maize plants in two different planting periods. West et al. (2020) emphasize the

potential of sustainable intensification through double cropping systems to increase biomass production and reduce nitrogen losses, which is relevant when assessing biosolid impacts on soil fertility dynamics. On the other hand, (Sharma et al. 2020) demonstrate the influence of zinc levels on maize crop yield, nutrient uptake, and soil fertility status, highlighting the interconnected relationship between plant growth and soil health.

The research objective is to evaluate the impact of biosullary application on the growth and yield of maize in two different planting periods to determine if the effects of biosullary differ between the first and second planting periods.

MATERIALS AND METHODS

This research was conducted from May to December 2023 in a dry land area located in Marang Subdistrict, Pangkep Regency, South Sulawesi. The materials used in this study included Hybrid F1 Exsotic Pertiwi maize seeds, Gliricidia sepium, and Chromolaena odorata L. The equipment used in this research comprised a shovel, hand sprayer, meter, watering can, bucket, analytical balance, labels, and office stationery.

The research was carried out over two planting periods using a Randomized Complete Block Design (RCBD) method as follows:

P0 = Control

P1 = Gliricidia sepium fertilizer at a dose of 50 kg/plot and Chromolaena odorata L fertilizer at a dose of 50 kg/plot

P2 = Gliricidia sepium fertilizer at a dose of 75 kg/plot and Chromolaena odorata L fertilizer at a dose of 75 kg/plot

P3 = Gliricidia sepium fertilizer at a dose of 100 kg/plot and Chromolaena odorata L fertilizer at a dose of 100 kg/plot

P4 = Gliricidia sepium fertilizer at a dose of 125 kg/plot and Chromolaena odorata L fertilizer at a dose of 125 kg/plot

P5 = Gliricidia sepium fertilizer at a dose of 150 kg/plot and Chromolaena odorata L fertilizer at a dose of 150 kg/plot

P6 = Gliricidia sepium fertilizer at a dose of 175 kg/plot and Chromolaena odorata L fertilizer at a dose of 175 kg/plot

Each treatment was replicated three times, resulting in 21 experimental units. Each experimental unit consisted of 12 plants, and there were 3 sample plants per experimental unit, totaling 252 plants and 63 sample plants overall. The data obtained were analyzed using analysis of variance (ANOVA). If there were significant effects, post hoc tests were conducted using Least Significant Difference (LSD) test at a significance level of 5%.

RESULTS AND DISCUSSION

1. Corn Plant Height

The height of maize plants was observed in two planting periods with the application of Gliricidia sepium and Chromolaena odorata L fertilizers. The observation results are represented in Table 1. It can be seen that the height of maize plants varies within each treatment and planting period.

Table 1. Maize Plant Height (cm) in Two Planting Periods with the Application of Gliricidia sepium and Chromolaena odorata L Fertilizers

Treatment	Plant Height (cm)	
	Period 1	Period 2
P0	154.33a	144.33a
P1	172.33b	160.67c
P2	175.33c	168.67d

P3	170.00b	155.00b
P4	182.67d	171.00d
P5	191.33e	172.33d
P6	199.67f	176.67e

Note: Numbers followed by the same letter in the same column indicate that they are not significantly different at the 5% level according to the LSD test.

In the first planting period, the height of maize plants significantly increased from treatment P0 to P6. The tallest plants were recorded in treatment P6 with 199.67 cm, while the shortest plants were observed in treatment P0 with 154.33 cm. The analysis results indicate that these differences are statistically significant (LSD 0.05) between each treatment.

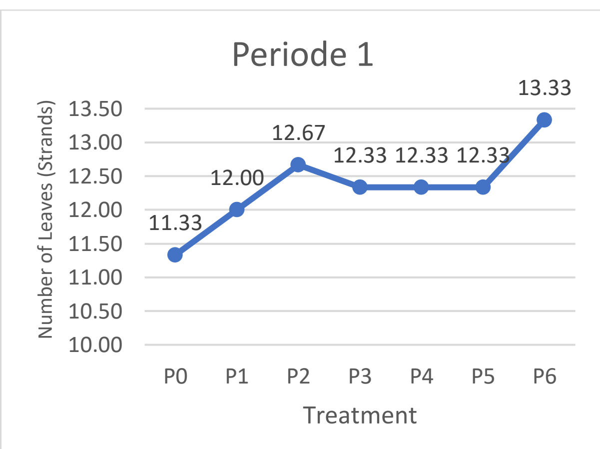
Meanwhile, in the second planting period, a similar increase in maize plant height was observed from treatment P0 to P6. The tallest plants were recorded in treatment P6 with 176.67 cm, while the shortest plants were observed in treatment P0 with 144.33 cm. These differences were also statistically significant (LSD 0.05) between each treatment.

Comparison between the first and second planting periods shows a decrease in plant height in some treatments in the second planting period compared to the first planting period. However, overall, plant height tends to be higher in the first planting period. Exploring the growth response of maize plants to different fertilizers indicates significant differences in plant height based on the type of fertilizer used (Harini & Sasli, 2021), signifying the potential impact of fertilizer choice on plant height. Specifically focusing on the use of Gliricidia sepiumorganic fertilizer positively affects plant height (Illah, 2022).

Overall, the application of Gliricidia sepium and Chromolaena odorata L fertilizers positively influences the growth of maize plants, with better results observed in treatment P6 in both planting periods. This indicates the potential of using these leaf fertilizers to increase maize production. Furthermore, fertilizer dosage on plant growth emphasizes that specific cultivation methods result in taller plants, indicating the importance of cultivation practices on plant height influence (Suwarti & Suwardi, 2020). Additionally, the impact of various concentrations of liquid organic fertilizers on plant growth, including plant height as a measured parameter (Fatima et al., 2021).

2. Number of Leaves (Strands)

The data in Figure 1 show the average number of leaves from various treatments in two different planting periods. The number of leaves in maize plants is an important indicator in evaluating plant growth and health because an adequate number of leaves significantly influences the photosynthesis process and ultimately the crop yield.



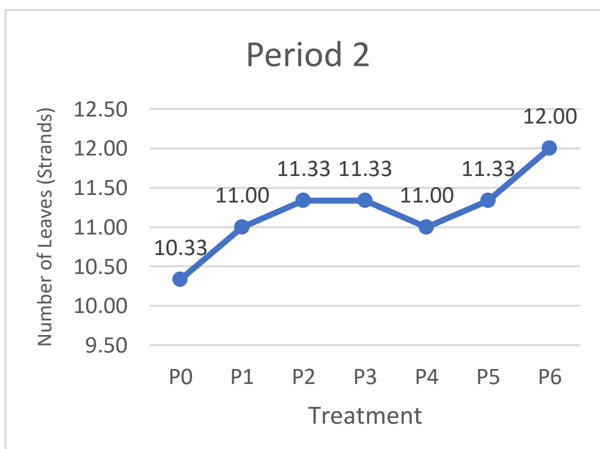


Figure 1. Average Number of Leaves in Two Planting Periods with the Application of Gliricidia sepium and

Chromolaena odorata L Fertilizers

In period 1, there was variation in the average number of leaves among different treatments, with Treatment P6 showing the highest average number of leaves at 13.33 leaves, while Treatment P0 had the lowest average number of leaves at 11.33 leaves. This indicates the potential of certain treatments to stimulate leaf growth in maize plants. Furthermore, in period 2, there was a decrease in the average number of leaves for each treatment. However, this pattern was not consistently observed in every treatment. Treatment P6 showed the highest average number of leaves at 12.00 leaves in period 2, while Treatment P0 still had the lowest average number of leaves at 10.33 leaves. The effect of leaf fertilizers, such as Gliricidia sepium and Chromolaena odorata L fertilizers, in influencing the average number of leaves in maize plants across different planting periods has been documented (Pratiwi, 2017). The comparison of organic fertilizers in maize growth can result in different impacts on maize plant growth (Jjagwe et al., 2020).

The change in the number of leaves from period 1 to period 2 also varied among treatments. The decrease in the number of leaves in period 2 was attributed to various factors, including changes in environmental conditions, seasonal changes, and other experimental treatments. The potential of organic fertilizers on maize plants has positive effects on soil and plants (Buzo et al., 2022). The supplementation of vermicompost with liquid organic fertilizers and organic fertilizers in plant growth and yield has shown positive impacts (Muktamar et al., 2017).

The application of Gliricidia sepium and Chromolaena odorata L fertilizers on the average number of leaves in maize plants impacts the growth of maize plant leaf numbers but does not significantly affect them (Kefi et al., 2022). Furthermore, the application of Gliricidia sepiumliquid organic fertilizer resulted in a positive influence on leaf development (Hasan et al., 2021), suggesting that maize growth with the influence of manure, NPK fertilizers, and soil types provides insights into the role of different fertilizers in enhancing plant growth, the effects of organic leaf fertilizers on growth, nutrient absorption, and maize plant performance (Sebetha & Mashele, 2019).

3. Age of Flowering Male 50% Days after planting (DAP)

The average age of 50% male flowering Days after Planting (DAP) in two planting periods with the application of Gliricidia sepium and Chromolaena odorata L fertilizers is represented in Table 2. The data indicate variations in the age of 50% male flowering (DAP) among different treatments and planting periods.

Table 2. Average Age of 50% Male Flowering (DAP) in Two Planting Periods with the Application of Gliricidia sepium and Chromolaena odorata L Fertilizers

Treatment	Age of Flowering Male 50% (DAP)	
	Period1	Period2
P0	42.00d	49.00a
P1	41.00c	47.33b
P2	41.33c	47.00b
P3	40.67b	47.33b
P4	40.33b	46.33c
P5	40.00b	45.67c
P6	39.00a	45.00d

Note: Numbers followed by the same letter in the same column indicate that they are not significantly different at the 5% level according to the LSD test.

In the first planting period, there were significant differences in the age of 50% male flowering (DAP) among treatments, with the highest age recorded in Treatment P0 at 42.00 days and the lowest age recorded in Treatment P6 at 39.00 days. The analysis results indicate that these differences are statistically significant (LSD 0.05) between each treatment.

In the second planting period, there was an increase in the age of 50% male flowering (DAP) in almost all treatments compared to the first planting period. The highest age of 50% male flowering (DAP) was recorded in Treatment P0 at 49.00 days, while the lowest age was recorded in Treatment P6 at 45.00 days. These differences were also statistically significant (LSD 0.05) between each treatment. Furthermore, the comparison between the first and second planting periods shows changes or delays in 50% male flowering (DAP) in general in all treatments.

Based on observations, the highest nutrient content in Gliricidia sepium and Chromolaena odorata leaves is nitrogen, thus, the phosphorus concentration in leaves at the time of flowering in maize plants is influenced by nitrogen fertilization, which impacts proper nutrient management for optimal plant development (Galindo et al., 2016). Additionally, the application of green manure enriched with EM4 can increase leaf surface area and maize plant dry weight, potentially affecting flowering time (Karimuna et al., 2023).

Overall, the application of Gamal and Chromolaena odorata L fertilizers has varying effects on the age of 50% male flowering (DAP) in maize plants. Treatment P6 tends to exhibit faster 50% male flowering (DAP), indicating the potential use of these leaf fertilizers to accelerate the flowering process in maize. Various types of treatments and dosages have significant impacts on the average flowering age of plants (Triadiawarman et al., 2020). Flowering age in maize plants is primarily determined by genetic and environmental factors, as well as the interaction between these factors (Purba & Hadiatry, 2022). Observations have shown that some maize plants exhibit 1 or 2 ears (prolific). Specific genotypes have been identified to have shorter flowering times in various environments (Syafi'i & Ruswandi, 2019).

4. Cob Length (cm)

The data listed in the table indicate the average length of maize cobs from various treatments in two different planting periods. Cob length is one of the important indicators in evaluating harvest yield and maize plant productivity because longer cobs tend to produce more maize kernels.

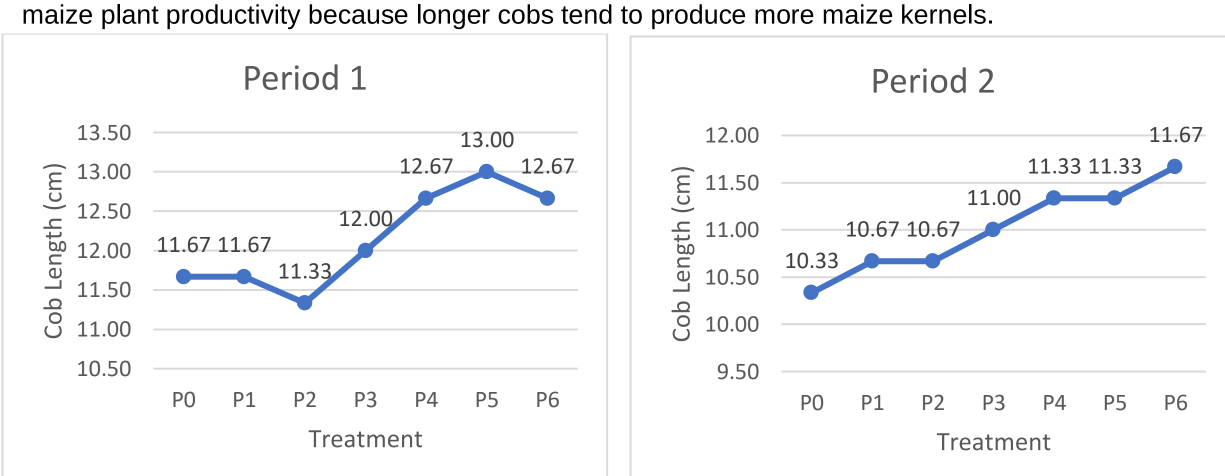


Figure 2. Average Cob Length in Two Planting Periods with the Application of Gliricidia sepiumand Chromolaena odorata L Fertilizers

In period 1, there was variation in the average cob length among different treatments. Treatment P5 exhibited the highest average cob length at 13.00 cm, while Treatment P0 had the lowest average cob length at 11.67 cm. This indicates the potential of certain treatments to increase cob length in maize plants.

Furthermore, in period 2, there was a general decrease in the average cob length for each treatment. However, this pattern was not consistently observed in every treatment. Treatment P5 still showed the highest average cob length in period 2, while Treatment P0 remained with the lowest average cob length. The use of organic fertilizers significantly affects various parameters of maize plants, including cob length (Raksun et al., 2019). Similarly, significant effects on variables such as leaf number, cob length, cob diameter, and yield were observed when reducing inorganic fertilizer doses and adding liquid organic fertilizers to maize plants (Nurnawati et al., 2022).

Changes in cob length from period 1 to period 2 also varied among treatments. The decrease in cob length in period 2 may be attributed to various factors, such as changes in environmental conditions, seasonal changes, or interactions with other experimental treatments. The impact of organic fertilization on maize plant production as a source of nutrition influences the characteristics of maize cobs, including their length (Dewanto et al., 2017). The effect of various bioameliorant doses on nutrient concentrations and maize cob yield. Data analysis involves analysis of variance followed by Honestly Significant Difference test, which can reveal the specific impact of bioameliorant doses on maize cob length (Malayani et al., 2023).

5. Weight of 100 Seeds (g)

The information depicted in the figure indicates the average weight of 100 maize kernels tested under different treatments in two distinct planting seasons. Kernel weight is a crucial factor in assessing harvest yield and maize plant productivity, as larger kernel weights tend to result in higher maize kernel weights overall.

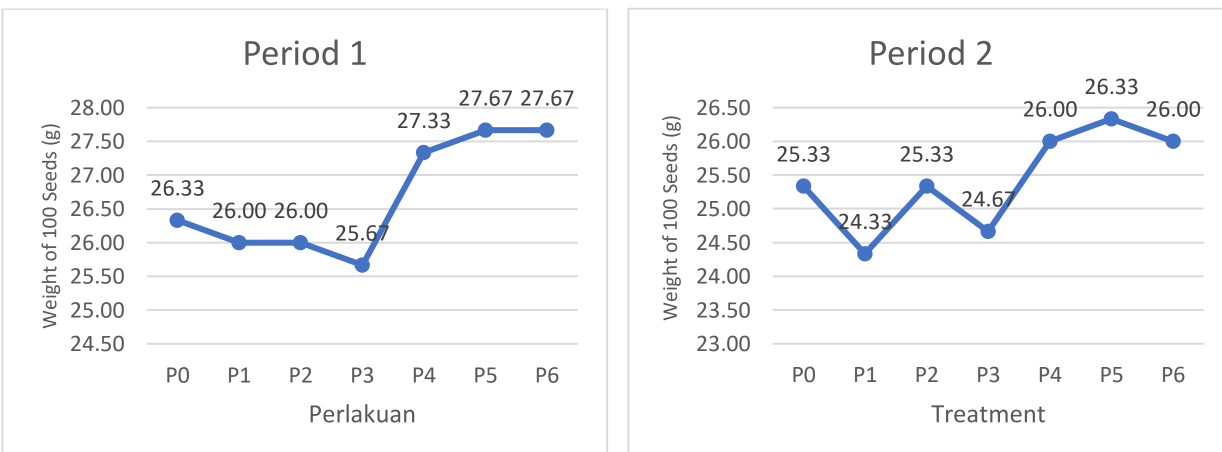


Figure 3. Average Weight of 100 Kernels (g) in Two Planting Periods with the Application of Gliricidia sepiumand Chromolaena odorata L Fertilizers

The average weight of 100 maize kernels in two planting periods shows variation among different treatments. Generally, Treatments P5 and P6 exhibit higher average weights compared to other treatments in both periods, while Treatments P3 and P1 demonstrate lower average weights. The importance of proper fertilization management with suitable doses to enhance maize production is emphasized (Maintang et al., 2023).

There is a decrease in the average weight from period 1 to period 2 in most treatments, but this pattern is not consistent across all treatments. Treatments P5 and P6 show an increase in average weight from period 1 to period 2. Organic fertilizer application can influence soil pH, phosphorus availability, phosphorus uptake, and maize harvest yield (Yuniarti et al., 2020). The use of foliar fertilizers can also have a positive impact on maize growth and yield. Application of liquid organic foliar fertilizers can enhance the length, diameter, and weight of maize cobs (Hasan et al., 2021). Furthermore, the use of animal-based organic fertilizers, such as cuscus feces, can affect plant biomass (Sawen et al., 2022).

CONCLUSIONS

Based on the research findings, although the effect of biosullary on maize plant production in the first period is higher than in the second period, the decrease in production in the second period is not statistically significant. Therefore, it is recommended to increase the fertilization dosage in the second period to maintain maize plant productivity. The impact of using biosullary includes improving soil physical properties, enhancing soil microbial activity, and maintaining soil pH stability consistently.

REFERENCES

Amin, M., Tondok, A., & Dewi, M. (2023). Growth and yield of corn plants at various doses of organic and inorganic fertilization in rainfed lowland. Jurnal Agrisistem, 18(2), 76-85. https://doi.org/10.52625/j-agr.v18i2.246

BPS. (2024). https://www.bps.go.id/id/infographic?id=909

Buzo, F., Garcia, N., Garé, L., Gato, I., Martins, J., Martins, J., & Arf, O. (2022). Phosphate fertilization and mycorrhizal inoculation increase corn leaf and grain nutrient contents. Agronomy, 12(7), 1597. https://doi.org/10.3390/agronomy12071597

Dewanto, F., Londok, J., Tuturoong, R., & Kaunang, W. (2017). The effect of inorganic and organic fertilization on corn production as a feed source. Zootec, 32(5). https://doi.org/10.35792/zot.32.5.2013.982

Dossou-Yovo. W.. Ziadi. N.. Leblanc. M.. Tremblay. G.. Pellerin. A.. & Parent. L. (2020). Corn response to banded phosphorus fertilizers with or without manure application in eastern Canada. Agronomy Journal. 112(3). 2176-2187. https://doi.org/10.1002/agj2.20115

Galindo, F., Filho, M., Buzetti, S., Santini, J., Alves, C., Nogueira, L., & Bellotte, J. (2016). Corn yield and foliar diagnosis affected by nitrogen fertilization and inoculation with Azospirillum brasilense. Revista Brasileira De Ciência Do Solo, 40(0). https://doi.org/10.1590/18069657rbcs20150364

Harini, D. and Sasli, I. (2021). Growth response and development of sticky corn to the application of ameliorant and NPK fertilizer on ultisol soil. Indonesian Journal of Agronomy, 49(1), 29-36. https://doi.org/10.24831/jai.v49i1.34284

Hasan, F., Nur, M., & Nayo, F. (2021). Application of lamtoro leaf liquid organic fertilizer on the growth and yield of sweet corn (Zea mays saccharata Sturt L.). Jurnal Agercolere, 3(2), 38-45. https://doi.org/10.37195/jac.v3i2.129

Herlina. N.. & Prasetyorini. A. (2020). Effect of climate change on planting season and productivity of maize (Zea mays L.) in Malang Regency. Jurnal Ilmu Pertanian Indonesia. 25(1). 118-128. https://doi.org/10.18343/jipi.25.1.118

Illah, M. (2022). The effect of gamal leaf liquid organic fertilizer on the growth of miniature elephant grass. Jurnal Sosial Sains, 2(9), 1003-1014. https://doi.org/10.36418/jurnalsosains.v2i9.485

Jjagwe, J., Chelimo, K., Karungi, J., Komakech, A., & Lederer, J. (2020). Comparative performance of organic fertilizers in maize (Zea mays L.) growth, yield, and economic results. Agronomy, 10(1), 69. https://doi.org/10.3390/agronomy10010069

Karimuna, L., Kilowasid, L., Wijayanto, T., & Anti, W. (2023). Growth performances of maize (Zea mays L.) intercropping with soybean (Glycine max (L.) Merrill.) in the legowo row system applied with bokashi plus fertilizer on marginal soils. IOP Conference Series Earth and Environmental Science, 1208(1), 012040. https://doi.org/10.1088/1755-1315/1208/1/012040

Kefi, A., Guntoro, D., & Santosa, E. (2022). Growth and yield of sweet corn at various populations of Chloris barbata (Poaceae) weeds. Indonesian Journal of Agronomy, 50(1), 80-88.

https://doi.org/10.24831/jai.v50i1.39708

Kholid. M.. Wangiyana. W.. & Sudantha. I. (2023). The effect of various planting distances and soybean insertion on the growth and yield of sweet corn (Zea mays L.). Jurnal Ilmiah Mahasiswa Agrokomplek. 2(1). 81-90. https://doi.org/10.29303/jima.v2i1.2138

Muktamar, Z., Sudjatmiko, S., Chozin, M., & Setyowati, N. (2017). Sweet corn performance and its major nutrient uptake following application of vermicompost supplemented with liquid organic fertilizer. International Journal on Advanced Science Engineering and Information Technology, 7(2), 602. https://doi.org/10.18517/ijaseit.7.2.1112

Nurnawati, A., Syarifuddin, R., & A. Samsu, A. (2022). Reducing the dose of inorganic fertilizer on purple corn plants with liquid organic fertilizer application. Agro Bali Agricultural Journal, 5(1), 137-143. https://doi.org/10.37637/ab.v5i1.863

Pratiwi, A. (2017). Effect of nitrogen fertilizer on the flavonoid content of red amaranth (Amaranthus gangeticus L.). Pharmaciana, 7(1), 87. https://doi.org/10.12928/pharmaciana.v7i1.4213

Pudjiwati, M. and Jenar, D. (2021). The effect of female parent on several maize (Zea mays L.) plant characters. J-Pen Borneo Jurnal Ilmu Pertanian, 4(1). https://doi.org/10.35334/jpen.v4i1.1923

Purba, R. and Hadiatry, M. (2022). Yield performance and farmers' responses to corn composite varieties in Pandeglang Regency, Banten Province. E3s Web of Conferences, 361, 04013. https://doi.org/10.1051/e3sconf/202236104013

Raksun, A., Japa, L., & Mertha, I. (2019). Application of organic and NPK

fertilizers to improve the vegetative growth of melons (Cucumis melo L.). Jurnal Biologi Tropis, 19(1), 19-24. https://doi.org/10.29303/jbt.v19i1.1003

Sawen, D., Nuhuyanan, L., Nauw, S., Junaidi, M., & Hariadi, B. (2022). Application of cuscus feces organic fertilizer based on fruit consumption to Setaria grass biomass (Setaria sphacelata) in the second defoliation. Pastura, 11(2), 81. https://doi.org/10.24843/pastura.2022.v11.i02.p02

Sebetha, E. and Mashele, L. (2019). The growth performance of sweet corn under the influence of animal manure, NPK, and soil type. Indian Journal of Agricultural Research, (of). https://doi.org/10.18805/ijare.a-425

Sharma. A.. Singh. M.. Kumar. S.. & Shambhavi. S. (2020). Response of plant geometry, graded fertility, and zinc level on yield and nutrients uptake by baby corn (Zea mays L.) and nutrient status of soil. International Journal of Chemical Studies. 8(3). 812-815. https://doi.org/10.22271/chemi.2020.v8.i3j.9303

Suwarti, F. and Suwardi, F. (2020). Combination of planting distance and fertilizer doses (ZA and KCl) on the growth and yield of F1 seed of Bima 20 variety. Agriprima Journal of Applied Agricultural Sciences, 4(2), 178-189. https://doi.org/10.25047/agriprima.v4i2.369

Syafi'i, M. and Ruswandi, D. (2019). GGE biplot model for visualization of genotype (G) x shade (E) interaction on shade-tolerant maize in agroforestry systems. Kultivasi, 18(1). https://doi.org/10.24198/kultivasi.v18i1.20938

Tobing C. F. L., Lubis. S. N., & Rahmanta. R. (2022). Analysis of factors affecting demand and production of corn in North Sumatra province, Indonesia. Agro Bali Agricultural Journal. 5(3). 576-583. https://doi.org/10.37637/ab.v5i3.1030

Triadiawarman, D., Rudi, R., & Sarido, L. (2020). The effect of various types of POC and doses of

PGPR on the growth and yield of okra plants (Abelmoschus esculenthus). Jurnal Pertanian Terpadu, 8(2), 226-235. https://doi.org/10.36084/jpt..v8i2.274

West. J.. Ruark. M.. & Shelley. K. (2020). Sustainable intensification of corn silage cropping systems with winter rye. Agronomy for Sustainable Development. 40(2). https://doi.org/10.1007/s13593-020-00615-6

Yuniarti, A., Solihin, E., & Putri, A. (2020). Application of organic and N, P, K fertilizers to soil pH, available P, P uptake, and yield of black rice (Oryza sativa L.) on inceptisol. Kultivasi, 19(1), 1040. https://doi.org/10.24198/kultivasi.v19i1.24563

Zone. P.. Culman. S.. Haden. V.. Lindsey. L.. Fulford. A.. & Zhao. K. (2020). Do soil test levels and fertilization with phosphorus and potassium impact field crop tissue concentrations. Agronomy Journal. 112(4). 3024-3036. https://doi.org/10.1002/agj2.20243

4. Bukti Konfirmasi Review dan Hasil Review Kedua (3 Mei 2024)

mail-UMI
e-mail Kampus UMI

Abdul Haris <abdul.haris@umi.ac.id>

Re: [AGRIVITA] Editor Decision

1 message

Hagus Tarno <h_gustarno@ub.ac.id> Tue, May 21, 2024 at 11:50 AM
To: abd akbar <aabdatp@gmail.com>, abdul.haris@umi.ac.id

Dear Authors,

Please check the comments and follow the suggestions to make your manuscript suitable to be published.
Several suggestions should be considered.

In example:
1. Value should be checked both in the text and the graph.
2. The Latin name should be italicized and checked in detail.
3. Rearrange the graph or charts based on Figure 3 (Edited by the reviewer).
4. References should be written by the reference manager to make it consistent.
5. Check it additional items if necessary.

Thanks a lot,

Hagus Tarno, Dr. Agr. Sc.

- **Professor**
  Environmental Entomology and Nematology
  Department of Plant Pest and Disease
  Faculty of Agriculture
  Universitas Brawijaya
  Jl. Veteran Malang Jawa Timur INDONESIA 65145
  Email: h_gustarno@ub.ac.id

- **Head of Double Degree Program and Foreign Student**
  Universitas Brawijaya
  Jl. Veteran Malang 65145
  website: https://ub.ac.id/id/

On Wed, May 8, 2024 at 1:57 PM abd akbar <aabdatp@gmail.com> wrote:

> Below we attach the results of the revision, thank you
>
> Pada Jum, 3 Mei 2024 pukul 02.07 AGRIVITA <agrivita@ub.ac.id> menulis:
>
>> Abdul Haris:
>>
>> We have reached a decision regarding your submission to AGRIVITA Journal of Agricultural Science, "Evaluation of Soil Fertility Status due to the Application of Biosullary on Maize (Zea mays) with Two Planting Periods".
>>
>> Our decision is to: Revision Required
>>
>> Hagus Tarno, Prof.Dr.Agr.Sc.
>> Department of Plant Protection, University of Brawijaya (Scopus ID: 36163526900)
>> h_gustarno@ub.ac.id

Environmental Entomology and Nematology
Department of Plant Protection
Agricultural Faculty
University of Brawijaya
Jl. Veteran Malang
Jawa Timur INDONESIA 65145

Agrivita Editorial Team
Faculty of Agriculture University of Brawijaya
Jl. Veteran Malang 65145 East Java Indonesia
E-mail :
agrivita@ub.ac.id
agrivitafaperta@yahoo.com
website http://www.agrivita.ub.ac.id

4530-20945-2-ED-HTN.docx
78K

5. **Bukti Konfirmasi Submit Revisi Kedua, Respon kepada Reviewer, dan Artikel yang Diresubmit (8 Mei 2024)**

mail-UMI
e-mail Kampus UMI

Abdul Haris <abdul.haris@umi.ac.id>

Re: [AGRIVITA] Editor Decision

1 message

Hagus Tarno <h_gustarno@ub.ac.id> Tue, May 21, 2024 at 11:50 AM
To: abd akbar <aabdatp@gmail.com>, abdul.haris@umi.ac.id

Dear Authors,

Please check the comments and follow the suggestions to make your manuscript suitable to be published.
Several suggestions should be considered.

In example:
1. Value should be checked both in the text and the graph.
2. The Latin name should be italicized and checked in detail.
3. Rearrange the graph or charts based on Figure 3 (Edited by the reviewer).
4. References should be written by the reference manager to make it consistent.
5. Check it additional items if necessary.

Thanks a lot,

Hagus Tarno, Dr. Agr. Sc.

- **Professor**
  Environmental Entomology and Nematology
  Department of Plant Pest and Disease
  Faculty of Agriculture
  Universitas Brawijaya
  Jl. Veteran Malang Jawa Timur INDONESIA 65145
  Email: h_gustarno@ub.ac.id

- **Head of Double Degree Program and Foreign Student**
  Universitas Brawijaya
  Jl. Veteran Malang 65145
  website: https://ub.ac.id/id/

On Wed, May 8, 2024 at 1:57 PM abd akbar <aabdatp@gmail.com> wrote:

> Below we attach the results of the revision, thank you
>
> Pada Jum, 3 Mei 2024 pukul 02.07 AGRIVITA <agrivita@ub.ac.id> menulis:
>
>> Abdul Haris:
>>
>> We have reached a decision regarding your submission to AGRIVITA Journal of Agricultural Science, "Evaluation of Soil Fertility Status due to the Application of Biosullary on Maize (Zea mays) with Two Planting Periods".
>>
>> Our decision is to: Revision Required
>>
>> Hagus Tarno, Prof.Dr.Agr.Sc.
>> Department of Plant Protection, University of Brawijaya (Scopus ID: 36163526900)
>> h_gustarno@ub.ac.id

Evaluation of Soil Fertility Status due to the Application of Biosullary on Maize (Zea mays) with Two Planting Periods

ABSTRACT

Maize production in Indonesia faces challenges such as climate change affecting planting seasons and productivity, resulting in unstable production levels. The research aims to evaluate the impact of biosullary application on the growth and yield of maize in two different planting periods. The study was conducted over two planting periods using a Randomized Complete Block Design (RCBD) method. Each treatment was replicated three times, resulting in 21 experimental units. Each experimental unit consisted of 12 plants, with a total of 252 plants and 63 sample plants. Based on the research findings, the tallest plants were observed in treatment P6, reaching 199.67 cm in the first period and the same in the second period. The best leaf count was recorded in treatment P6 during the first period with 13.33 leaves and 12.00 leaves in the second period. The fastest flowering period was obtained in treatment P6 in both the first and second periods, with flowering durations of 39.00 and 45.00 days, respectively. Regarding cob length, the best performance was observed in treatment P6 with 11.67 cm in the first period and treatment P5 with 13.00 cm in the second period. For the 100-seed weight parameter, the highest values were recorded in treatment P5 with weights of 26.33 grams in the first period and 22.67 grams in the second period. Consequently, it is recommended to increase fertilizer dosage in the second period to maintain maize productivity. Furthermore, the use of biosullary contributes to improving soil physical properties, microbial vitality, and pH stability.
Keywords: fertilization, maize productivity, biosullary, soil physical properties, soil microbes

INTRODUCTION

Corn (Zea mays) is a cereal crop widely cultivated and plays a crucial role in global agriculture and food production. It belongs to the grass family Poaceae and is characterized by tall stalks bearing large ears containing grains. Corn serves as a staple food in many parts of the world and is used for various purposes such as human consumption, animal feed, and industrial applications. Maize production in Indonesia faces challenges such as climate change affecting planting seasons and productivity, resulting in unstable production levels (Herlina & Prasetyorini, 2020). Despite efforts to improve maize farming efficiency, Indonesia still encounters low production rates insufficient to meet consumer demand (Kholid et al., 2023).

The demand for maize is projected to increase in the coming years, necessitating continuous improvements in production and land availability (Tobing et al., 2022). Optimal maize production requires sufficient nutrient availability in the soil. However, excessive use of chemical fertilizers to meet plant nutrient requirements can lead to environmental damage and human health issues. Therefore, more environmentally friendly and sustainable alternatives for providing nutrients to plants need to be explored. According to the Central Bureau of Agricultural Statistics in 2022, maize production data showed 16.53 million tons, while in 2023, it decreased to 14.77 million tons. Based on this, it can be concluded that there was a decrease in production by 1.75 million tons (BPS, 2024).

One promising alternative is the use of biosullary. Biosullary is a product derived from the composting process of organic materials such as agricultural waste and other organic residues. Biosullary contains beneficial microorganisms that enhance soil health and nutrient availability for plants (Zone et al., 2020). Studies have shown that fertilization with phosphorus and potassium marginally increases leaf tissue concentrations in various plants, underscoring the importance of nutrient management strategies (Dossou-Yovo et al., 2020). It has also been observed that early plant growth does not always accurately predict plant performance, emphasizing the complexity of plant responses to nutrient application.

Although there have been some studies on the use of biosullary in agriculture, information on its effects on soil fertility status, particularly in maize plants, is still limited. Moreover, previous research tends to focus only on one planting period. Therefore, this study aims to fill this gap by examining the effects of biosullary application on maize plants in two different planting periods. West et al. (2020) emphasize the

potential of sustainable intensification through double cropping systems to increase biomass production and reduce nitrogen losses, which is relevant when assessing biosolid impacts on soil fertility dynamics. On the other hand, (Sharma et al. 2020) demonstrate the influence of zinc levels on maize crop yield, nutrient uptake, and soil fertility status, highlighting the interconnected relationship between plant growth and soil health.

The research objective is to evaluate the impact of biosullary application on the growth and yield of maize in two different planting periods to determine if the effects of biosullary differ between the first and second planting periods.

MATERIALS AND METHODS

This research was conducted from May to December 2023 in a dry land area located in Marang Subdistrict, Pangkep Regency, South Sulawesi. The materials used in this study included Hybrid F1 Exsotic Pertiwi maize seeds, Gliricidia sepium, and Chromolaena odorata L. The equipment used in this research comprised a shovel, hand sprayer, meter, watering can, bucket, analytical balance, labels, and office stationery.

The research was carried out over two planting periods using a Randomized Complete Block Design (RCBD) method as follows:

P0 = Control
P1 = Gliricidia sepium fertilizer at a dose of 50 kg/plot and Chromolaena odorata L fertilizer at a dose of 50 kg/plot
P2 = Gliricidia sepium fertilizer at a dose of 75 kg/plot and Chromolaena odorata L fertilizer at a dose of 75 kg/plot
P3 = Gliricidia sepium fertilizer at a dose of 100 kg/plot and Chromolaena odorata L fertilizer at a dose of 100 kg/plot
P4 = Gliricidia sepium fertilizer at a dose of 125 kg/plot and Chromolaena odorata L fertilizer at a dose of 125 kg/plot
P5 = Gliricidia sepium fertilizer at a dose of 150 kg/plot and Chromolaena odorata L fertilizer at a dose of 150 kg/plot
P6 = Gliricidia sepium fertilizer at a dose of 175 kg/plot and Chromolaena odorata L fertilizer at a dose of 175 kg/plot

Each treatment was replicated three times, resulting in 21 experimental units. Each experimental unit consisted of 12 plants, and there were 3 sample plants per experimental unit, totaling 252 plants and 63 sample plants overall. The data obtained were analyzed using analysis of variance (ANOVA). If there were significant effects, post hoc tests were conducted using Least Significant Difference (LSD) test at a significance level of 5%.

RESULTS AND DISCUSSION

1. Corn Plant Height

The height of maize plants was observed in two planting periods with the application of Gliricidia sepium and Chromolaena odorata L fertilizers. The observation results are represented in Table 1. It can be seen that the height of maize plants varies within each treatment and planting period.

Table 1. Maize Plant Height (cm) in Two Planting Periods with the Application of Gliricidia sepium and Chromolaena odorata L Fertilizers

Treatment	Plant Height (cm)	
	Periode 1	Period 2
P0	154.33±0.54a	144.33±2.42a
P1	172.33±0.98b	160.67±2.36c
P2	175.33±0.72c	168.67±0.54d

P3	170.00±0.47b	155.00±0.27b
P4	182.67±1.19d	171.00±0.94d
P5	191.33±1.52e	172.33±0.98d
P6	199.67±0.72f	176.67±0.72e

Note: Numbers followed by the same letter in the same column indicate that they are not significantly different at the 5% level according to the LSD test.

In the first planting period, the height of maize plants significantly increased from treatment P0 to P6. The tallest plants were recorded in treatment P6 with 199.67 cm, while the shortest plants were observed in treatment P0 with 154.33 cm. The analysis results indicate that these differences are statistically significant (LSD 0.05) between each treatment.

Meanwhile, in the second planting period, a similar increase in maize plant height was observed from treatment P0 to P6. The tallest plants were recorded in treatment P6 with 176.67 cm, while the shortest plants were observed in treatment P0 with 144.33 cm. These differences were also statistically significant (LSD 0.05) between each treatment.

Comparison between the first and second planting periods shows a decrease in plant height in some treatments in the second planting period compared to the first planting period. However, overall, plant height tends to be higher in the first planting period. Exploring the growth response of maize plants to different fertilizers indicates significant differences in plant height based on the type of fertilizer used (Harini & Sasli, 2021), signifying the potential impact of fertilizer choice on plant height. Specifically focusing on the use of Gliricidia sepiumorganic fertilizer positively affects plant height (Illah, 2022).

Overall, the application of Gliricidia sepium and Chromolaena odorata L fertilizers positively influences the growth of maize plants, with better results observed in treatment P6 in both planting periods. This indicates the potential of using these leaf fertilizers to increase maize production. Furthermore, fertilizer dosage on plant growth emphasizes that specific cultivation methods result in taller plants, indicating the importance of cultivation practices on plant height influence (Suwarti & Suwardi, 2020). Additionally, the impact of various concentrations of liquid organic fertilizers on plant growth, including plant height as a measured parameter (Fatima et al., 2021).

2. Number of Leaves (Strands)

The data in Figure 1 show the average number of leaves from various treatments in two different planting periods. The number of leaves in maize plants is an important indicator in evaluating plant growth and health because an adequate number of leaves significantly influences the photosynthesis process and ultimately the crop yield.

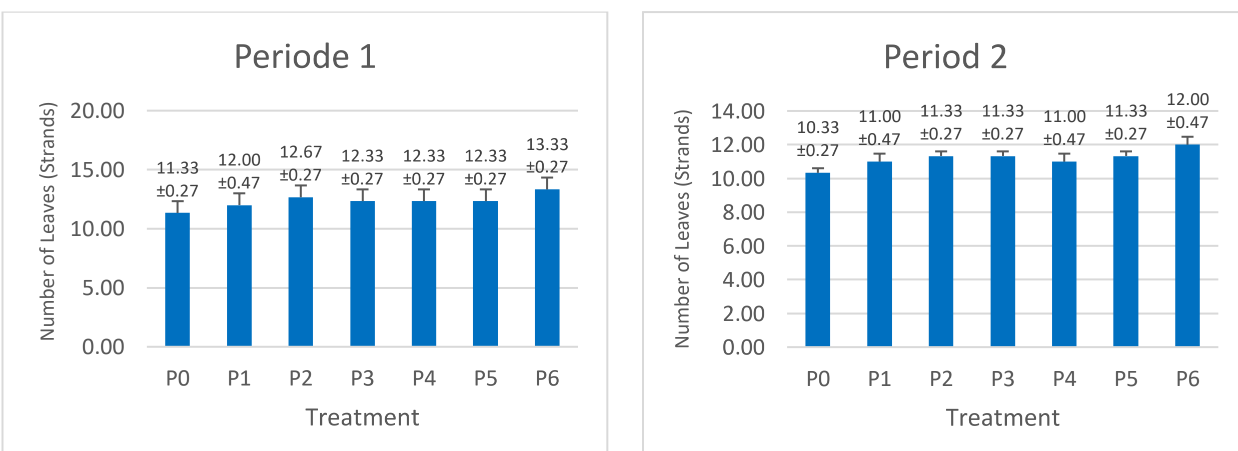


Figure 1. Average Number of Leaves in Two Planting Periods with the Application of Gliricidia sepium and

Chromolaena odorata L Fertilizers

In period 1, there was variation in the average number of leaves among different treatments, with Treatment P6 showing the highest average number of leaves at 13.33 leaves, while Treatment P0 had the lowest average number of leaves at 11.33 leaves. This indicates the potential of certain treatments to stimulate leaf growth in maize plants. Furthermore, in period 2, there was a decrease in the average number of leaves for each treatment. However, this pattern was not consistently observed in every treatment. Treatment P6 showed the highest average number of leaves at 12.00 leaves in period 2, while Treatment P0 still had the lowest average number of leaves at 10.33 leaves. The effect of leaf fertilizers, such as Gliricidia sepium and Chromolaena odorata L fertilizers, in influencing the average number of leaves in maize plants across different planting periods has been documented (Pratiwi, 2017). The comparison of organic fertilizers in maize growth can result in different impacts on maize plant growth (Jjagwe et al., 2020).

The change in the number of leaves from period 1 to period 2 also varied among treatments. The decrease in the number of leaves in period 2 was attributed to various factors, including changes in environmental conditions, seasonal changes, and other experimental treatments. The potential of organic fertilizers on maize plants has positive effects on soil and plants (Buzo et al., 2022). The supplementation of vermicompost with liquid organic fertilizers and organic fertilizers in plant growth and yield has shown positive impacts (Muktamar et al., 2017).

The application of Gliricidia sepium and Chromolaena odorata L fertilizers on the average number of leaves in maize plants impacts the growth of maize plant leaf numbers but does not significantly affect them (Kefi et al., 2022). Furthermore, the application of Gliricidia sepiumliquid organic fertilizer resulted in a positive influence on leaf development (Hasan et al., 2021), suggesting that maize growth with the influence of manure, NPK fertilizers, and soil types provides insights into the role of different fertilizers in enhancing plant growth, the effects of organic leaf fertilizers on growth, nutrient absorption, and maize plant performance (Sebetha & Mashele, 2019).

3. Age of Flowering Male 50% Days after planting (DAP)

The average age of 50% male flowering Days after Planting (DAP) in two planting periods with the application of Gliricidia sepium and Chromolaena odorata L fertilizers is represented in Table 2. The data indicate variations in the age of 50% male flowering (DAP) among different treatments and planting periods.

Table 2. Average Age of 50% Male Flowering (DAP) in Two Planting Periods with the Application of Gliricidia sepium and Chromolaena odorata L Fertilizers

Treatment	**Age of Flowering Male 50% (DAP)**	
	Period1	Period2
P0	42.00±0.00d	49.00±0.00a
P1	41.00±0.47c	47.33±0.27b
P2	41.33±0.27c	47.00±0.00b
P3	40.67±0.27b	47.33±0.27b
P4	40.33±0.27b	46.33±0.27c
P5	40.00±0.00b	45.67±0.27c
P6	39.00±0.00a	45.00±0.00d

Note: Numbers followed by the same letter in the same column indicate that they are not significantly different at the 5% level according to the LSD test.

In the first planting period, there were significant differences in the age of 50% male flowering (DAP) among treatments, with the highest age recorded in Treatment P0 at 42.00 days and the lowest age recorded in Treatment P6 at 39.00 days. The analysis results indicate that these differences are statistically significant (LSD 0.05) between each treatment.

In the second planting period, there was an increase in the age of 50% male flowering (DAP) in almost all treatments compared to the first planting period. The highest age of 50% male flowering (DAP) was recorded in Treatment P0 at 49.00 days, while the lowest age was recorded in Treatment P6 at 45.00 days. These differences were also statistically significant (LSD 0.05) between each treatment. Furthermore, the comparison between the first and second planting periods shows changes or delays in 50% male flowering (DAP) in general in all treatments.

Based on observations, the highest nutrient content in Gliricidia sepium and Chromolaena odorata leaves is nitrogen, thus, the phosphorus concentration in leaves at the time of flowering in maize plants is influenced by nitrogen fertilization, which impacts proper nutrient management for optimal plant development (Galindo et al., 2016). Additionally, the application of green manure enriched with EM4 can increase leaf surface area and maize plant dry weight, potentially affecting flowering time (Karimuna et al., 2023).

Overall, the application of Gamal and Chromolaena odorata L fertilizers has varying effects on the age of 50% male flowering (DAP) in maize plants. Treatment P6 tends to exhibit faster 50% male flowering (DAP), indicating the potential use of these leaf fertilizers to accelerate the flowering process in maize. Various types of treatments and dosages have significant impacts on the average flowering age of plants (Triadiawarman et al., 2020). Flowering age in maize plants is primarily determined by genetic and environmental factors, as well as the interaction between these factors (Purba & Hadiatry, 2022). Observations have shown that some maize plants exhibit 1 or 2 ears (prolific). Specific genotypes have been identified to have shorter flowering times in various environments (Syafi'i & Ruswandi, 2019).

4. Cob Length (cm)

The data listed in the table indicate the average length of maize cobs from various treatments in two different planting periods. Cob length is one of the important indicators in evaluating harvest yield and maize plant productivity because longer cobs tend to produce more maize kernels.

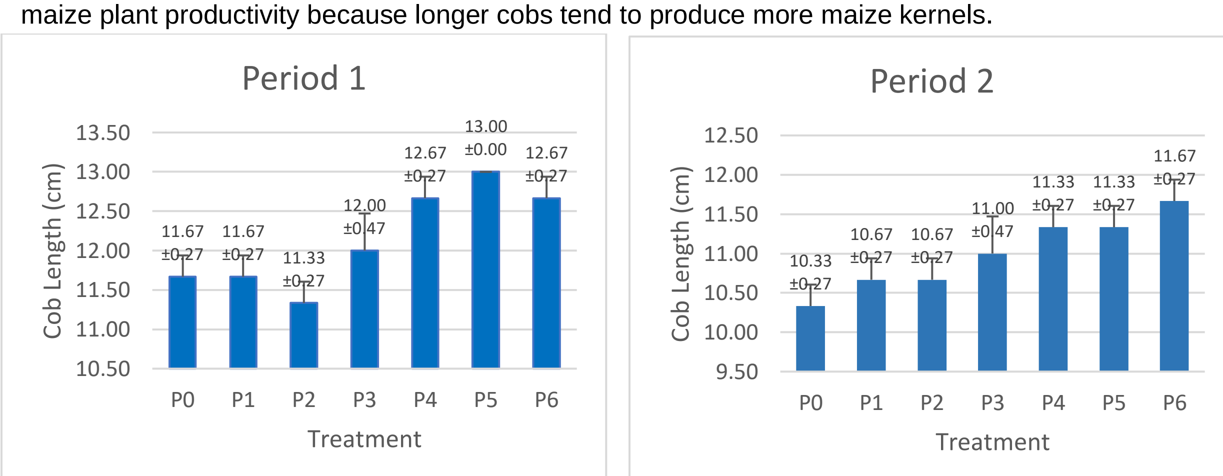


Figure 2. Average Cob Length in Two Planting Periods with the Application of Gliricidia sepiumand Chromolaena odorata L Fertilizers

In period 1, there was variation in the average cob length among different treatments. Treatment P5 exhibited the highest average cob length at 13.00 cm, while Treatment P0 had the lowest average cob length at 11.67 cm. This indicates the potential of certain treatments to increase cob length in maize plants.

Furthermore, in period 2, there was a general decrease in the average cob length for each treatment. However, this pattern was not consistently observed in every treatment. Treatment P5 still showed the highest average cob length in period 2, while Treatment P0 remained with the lowest average cob length. The use of organic fertilizers significantly affects various parameters of maize plants, including cob length (Raksun et al., 2019). Similarly, significant effects on variables such as leaf number, cob length, cob diameter, and yield were observed when reducing inorganic fertilizer doses and adding liquid organic fertilizers to maize plants (Nurnawati et al., 2022).

Changes in cob length from period 1 to period 2 also varied among treatments. The decrease in cob length in period 2 may be attributed to various factors, such as changes in environmental conditions, seasonal changes, or interactions with other experimental treatments. The impact of organic fertilization on maize plant production as a source of nutrition influences the characteristics of maize cobs, including their length (Dewanto et al., 2017). The effect of various bioameliorant doses on nutrient concentrations and maize cob yield. Data analysis involves analysis of variance followed by Honestly Significant Difference test, which can reveal the specific impact of bioameliorant doses on maize cob length (Malayani et al., 2023).

5. Weight of 100 Seeds (g)

The information depicted in the figure indicates the average weight of 100 maize kernels tested under different treatments in two distinct planting seasons. Kernel weight is a crucial factor in assessing harvest yield and maize plant productivity, as larger kernel weights tend to result in higher maize kernel weights overall.

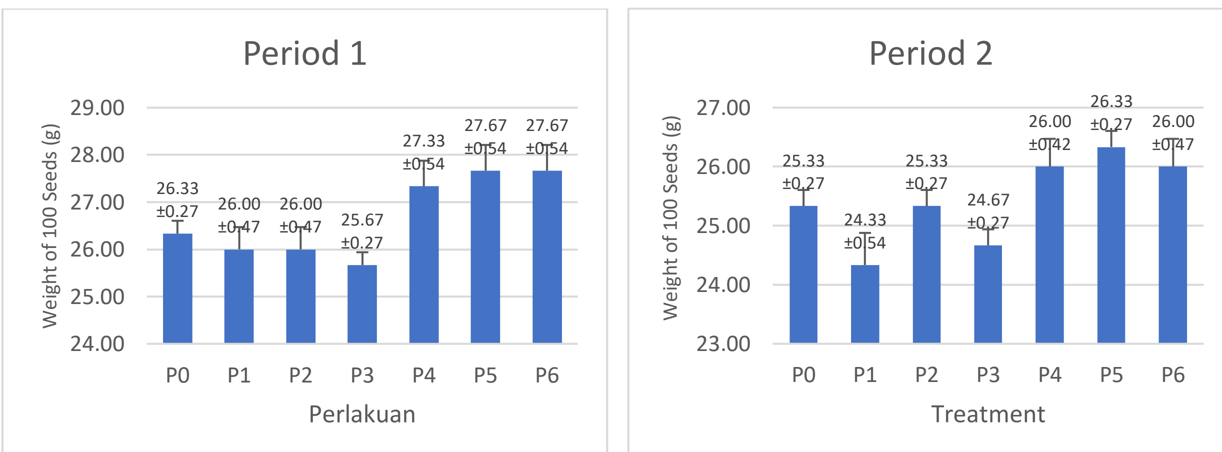


Figure 3. Average Weight of 100 Kernels (g) in Two Planting Periods with the Application of *Gliricidia sepium* and *Chromolaena odorata* L Fertilizers

The average weight of 100 maize kernels in two planting periods shows variation among different treatments. Generally, Treatments P5 and P6 exhibit higher average weights compared to other treatments in both periods, while Treatments P3 and P1 demonstrate lower average weights. The importance of proper fertilization management with suitable doses to enhance maize production is emphasized (Maintang et al., 2023).

There is a decrease in the average weight from period 1 to period 2 in most treatments, but this pattern is not consistent across all treatments. Treatments P5 and P6 show an increase in average weight from period 1 to period 2. Organic fertilizer application can influence soil pH, phosphorus availability, phosphorus uptake, and maize harvest yield (Yuniarti et al., 2020). The use of foliar fertilizers can also have a positive impact on maize growth and yield. Application of liquid organic foliar fertilizers can enhance the length, diameter, and weight of maize cobs (Hasan et al., 2021). Furthermore, the use of animal-based organic fertilizers, such as cuscus feces, can affect plant biomass (Sawen et al., 2022).

CONCLUSIONS

Based on the research findings, although the effect of biosullary on maize plant production in the first period is higher than in the second period, the decrease in production in the second period is not statistically significant. Therefore, it is recommended to increase the fertilization dosage in the second period to maintain maize plant productivity. The impact of using biosullary includes improving soil physical properties, enhancing soil microbial activity, and maintaining soil pH stability consistently.

REFERENCES

Amin, M., Tondok, A., & Dewi, M. (2023). Growth and yield of corn plants at various doses of organic and inorganic fertilization in rainfed lowland. Jurnal Agrisistem, 18(2), 76-85. https://doi.org/10.52625/j-agr.v18i2.246

BPS. (2024). https://www.bps.go.id/id/infographic?id=909

Buzo, F., Garcia, N., Garé, L., Gato, I., Martins, J., Martins, J., & Arf, O. (2022). Phosphate fertilization and mycorrhizal inoculation increase corn leaf and grain nutrient contents. Agronomy, 12(7), 1597. https://doi.org/10.3390/agronomy12071597

Dewanto, F., Londok, J., Tuturoong, R., & Kaunang, W. (2017). The effect of inorganic and organic fertilization on corn production as a feed source. Zootec, 32(5). https://doi.org/10.35792/zot.32.5.2013.982

Dossou-Yovo. W.. Ziadi. N.. Leblanc. M.. Tremblay. G.. Pellerin. A.. & Parent. L. (2020). Corn response to banded phosphorus fertilizers with or without manure application in eastern Canada. Agronomy Journal. 112(3). 2176-2187. https://doi.org/10.1002/agj2.20115

Galindo, F., Filho, M., Buzetti, S., Santini, J., Alves, C., Nogueira, L., & Bellotte, J. (2016). Corn yield and foliar diagnosis affected by nitrogen fertilization and inoculation with Azospirillum brasilense. Revista Brasileira De Ciência Do Solo, 40(0). https://doi.org/10.1590/18069657rbcs20150364

Harini, D. and Sasli, I. (2021). Growth response and development of sticky corn to the application of ameliorant and NPK fertilizer on ultisol soil. Indonesian Journal of Agronomy, 49(1), 29-36. https://doi.org/10.24831/jai.v49i1.34284

Hasan, F., Nur, M., & Nayo, F. (2021). Application of lamtoro leaf liquid organic fertilizer on the growth and yield of sweet corn (Zea mays saccharata Sturt L.). Jurnal Agercolere, 3(2), 38-45. https://doi.org/10.37195/jac.v3i2.129

Herlina. N.. & Prasetyorini. A. (2020). Effect of climate change on planting season and productivity of maize (Zea mays L.) in Malang Regency. Jurnal Ilmu Pertanian Indonesia. 25(1). 118-128. https://doi.org/10.18343/jipi.25.1.118

Illah, M. (2022). The effect of gamal leaf liquid organic fertilizer on the growth of miniature elephant grass. Jurnal Sosial Sains, 2(9), 1003-1014. https://doi.org/10.36418/jurnalsosains.v2i9.485

Jjagwe, J., Chelimo, K., Karungi, J., Komakech, A., & Lederer, J. (2020). Comparative performance of organic fertilizers in maize (Zea mays L.) growth, yield, and economic results. Agronomy, 10(1), 69. https://doi.org/10.3390/agronomy10010069

Karimuna, L., Kilowasid, L., Wijayanto, T., & Anti, W. (2023). Growth performances of maize (Zea mays L.) intercropping with soybean (Glycine max (L.) Merrill.) in the legowo row system applied with bokashi plus fertilizer on marginal soils. IOP Conference Series Earth and Environmental Science, 1208(1), 012040. https://doi.org/10.1088/1755-1315/1208/1/012040

Kefi, A., Guntoro, D., & Santosa, E. (2022). Growth and yield of sweet corn at various populations of Chloris barbata (Poaceae) weeds. Indonesian Journal of Agronomy, 50(1), 80-88.

https://doi.org/10.24831/jai.v50i1.39708

Kholid. M.. Wangiyana. W.. & Sudantha. I. (2023). The effect of various planting distances and soybean insertion on the growth and yield of sweet corn (Zea mays L.). Jurnal Ilmiah Mahasiswa Agrokomplek. 2(1). 81-90. https://doi.org/10.29303/jima.v2i1.2138

Muktamar, Z., Sudjatmiko, S., Chozin, M., & Setyowati, N. (2017). Sweet corn performance and its major nutrient uptake following application of vermicompost supplemented with liquid organic fertilizer. International Journal on Advanced Science Engineering and Information Technology, 7(2), 602. https://doi.org/10.18517/ijaseit.7.2.1112

Nurnawati, A., Syarifuddin, R., & A. Samsu, A. (2022). Reducing the dose of inorganic fertilizer on purple corn plants with liquid organic fertilizer application. Agro Bali Agricultural Journal, 5(1), 137-143. https://doi.org/10.37637/ab.v5i1.863

Pratiwi, A. (2017). Effect of nitrogen fertilizer on the flavonoid content of red amaranth (Amaranthus gangeticus L.). Pharmaciana, 7(1), 87. https://doi.org/10.12928/pharmaciana.v7i1.4213

Pudjiwati, M. and Jenar, D. (2021). The effect of female parent on several maize (Zea mays L.) plant characters. J-Pen Borneo Jurnal Ilmu Pertanian, 4(1). https://doi.org/10.35334/jpen.v4i1.1923

Purba, R. and Hadiatry, M. (2022). Yield performance and farmers' responses to corn composite varieties in Pandeglang Regency, Banten Province. E3s Web of Conferences, 361, 04013. https://doi.org/10.1051/e3sconf/202236104013

Raksun, A., Japa, L., & Mertha, I. (2019). Application of organic and NPK

fertilizers to improve the vegetative growth of melons (Cucumis melo L.). Jurnal Biologi Tropis, 19(1), 19-24. https://doi.org/10.29303/jbt.v19i1.1003

Sawen, D., Nuhuyanan, L., Nauw, S., Junaidi, M., & Hariadi, B. (2022). Application of cuscus feces organic fertilizer based on fruit consumption to Setaria grass biomass (Setaria sphacelata) in the second defoliation. Pastura, 11(2), 81. https://doi.org/10.24843/pastura.2022.v11.i02.p02

Sebetha, E. and Mashele, L. (2019). The growth performance of sweet corn under the influence of animal manure, NPK, and soil type. Indian Journal of Agricultural Research, (of). https://doi.org/10.18805/ijare.a-425

Sharma. A.. Singh. M.. Kumar. S.. & Shambhavi. S. (2020). Response of plant geometry, graded fertility, and zinc level on yield and nutrients uptake by baby corn (Zea mays L.) and nutrient status of soil. International Journal of Chemical Studies. 8(3). 812-815. https://doi.org/10.22271/chemi.2020.v8.i3j.9303

Suwarti, F. and Suwardi, F. (2020). Combination of planting distance and fertilizer doses (ZA and KCl) on the growth and yield of F1 seed of Bima 20 variety. Agriprima Journal of Applied Agricultural Sciences, 4(2), 178-189. https://doi.org/10.25047/agriprima.v4i2.369

Syafi'i, M. and Ruswandi, D. (2019). GGE biplot model for visualization of genotype (G) x shade (E) interaction on shade-tolerant maize in agroforestry systems. Kultivasi, 18(1). https://doi.org/10.24198/kultivasi.v18i1.20938

Tobing C. F. L., Lubis. S. N., & Rahmanta. R. (2022). Analysis of factors affecting demand and production of corn in North Sumatra province, Indonesia. Agro Bali Agricultural Journal. 5(3). 576-583. https://doi.org/10.37637/ab.v5i3.1030

Triadiawarman, D., Rudi, R., & Sarido, L. (2020). The effect of various types of POC and doses of PGPR on the growth and yield of okra plants (Abelmoschus esculenthus). Jurnal Pertanian Terpadu, 8(2), 226-235. https://doi.org/10.36084/jpt..v8i2.274

West. J.. Ruark. M.. & Shelley. K. (2020). Sustainable intensification of corn silage cropping systems with winter rye. Agronomy for Sustainable Development. 40(2). https://doi.org/10.1007/s13593-020-00615-6

Yuniarti, A., Solihin, E., & Putri, A. (2020). Application of organic and N, P, K fertilizers to soil pH, available P, P uptake, and yield of black rice (Oryza sativa L.) on inceptisol. Kultivasi, 19(1), 1040. https://doi.org/10.24198/kultivasi.v19i1.24563

Zone. P.. Culman. S.. Haden. V.. Lindsey. L.. Fulford. A.. & Zhao. K. (2020). Do soil test levels and fertilization with phosphorus and potassium impact field crop tissue concentrations. Agronomy Journal. 112(4). 3024-3036. https://doi.org/10.1002/agj2.20243

6. Bukti Konfirmasi Artikel Accepted
(23 mei 2024)

mail-UMI
e-mail Kampus UMI

Abdul Haris <abdul.haris@umi.ac.id>

[AGRIVITA] Editor Decision

1 message

AGRIVITA <agrivita@ub.ac.id> Thu, May 23, 2024 at 11:21 AM
Reply-To: "Hagus Tarno, Prof.Dr.Agr.Sc." <h_gustarno@ub.ac.id>
To: Abdul Haris <abdul.haris@umi.ac.id>
Cc: Annas Boceng <annas.boceng@umi.ac.id>, Saida Saida <saida.saida@umi.ac.id>, Abdul Akbar <aabdatp@gmail.com>

Abdul Haris:

We have reached a decision regarding your submission to AGRIVITA Journal of Agricultural Science, "Evaluation of Soil Fertility Status due to the Application of Biosullary on Maize (Zea mays) with Two Planting Periods".

Our decision is to: Accepted submission

Hagus Tarno, Prof.Dr.Agr.Sc.
Department of Plant Protection, University of Brawijaya (Scopus ID: 36163526900)
h_gustarno@ub.ac.id

Environmental Entomology and Nematology
Department of Plant Protection
Agricultural Faculty
University of Brawijaya
Jl. Veteran Malang
Jawa Timur INDONESIA 65145

Agrivita Editorial Team
Faculty of Agriculture University of Brawijaya
Jl. Veteran Malang 65145 East Java Indonesia
E-mail :
agrivita@ub.ac.id
agrivitafaperta@yahoo.com
website http://www.agrivita.ub.ac.id

4530-20945-3-ED-HTN.docx
351K

7. Bukti Konfirmasi Artikel Published Online
(20 Juni 2024)

UB Official Site Gapura Prasetya

HOME | ABOUT | USER HOME | SEARCH | CURRENT | ARCHIVES | ARTICLE IN PRESS | ANNOUNCEMENTS

Home > User > Author > Submissions > #4530 > Summary

#4530 Summary

- Summary
- Review
- Editing

Submission

Authors	Abdul Haris, Annas Boceng, Saida Saida, Abdul Akbar
Title	Effects of Biosullary Application on Soil Fertility Status and Corn (Zea mays) Production after Two Planting Periods
Original file	4530-20920-1-SM.docx 2024-04-04
Supp. files	4530-21256-1-SP.pdf 2024-06-21 4530-21257-1-SP.pdf 2024-06-21
Submitter	Abdul Haris
Date submitted	April 4, 2024 - 08:38 AM
Section	Articles
Editor	Hagus Tarno
Abstract Views	531

Author Fees

Article Submission	0.00 USD	Pay Now
Article Publication	Paid June 20, 2024 - 03:45 PM	

Status

Status	Published Vol 46, No 2 (2024)
Initiated	2024-06-20
Last modified	2024-07-08

Submission Metadata

Authors

Name	Abdul Haris
Affiliation	Department of Agronomy, Faculty of Agriculture, Universitas Muslim Indonesia, Makassar, South Sulawesi, Indonesia
Country	Indonesia
Competing interests CI Policy	—
Bio Statement	—

Principal contact for editorial correspondence.

Editorial Board

- Editorial Team

About Agrivita

- Aim and Scope
- Editorial Team
- Publication Ethics
- Visitor Statistics
- Reviewer Acknowledgment

Issues

- Current Issue
- Back Issues
- Article in Press
- Accepted Papers

Information For Author

- Author Guidelines
- Template (docx)
- Template (pdf)

Indexed By

ELSEVIER Scopus

S1 sinta Science and Technology Index

Clarivate Analytics