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Effect of Transfer Age of Seedlings and Application of Photosynthetic Bacteria on Hydroponic Systems of Pakcoy Plants (Brassica *Rapa* L.)

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ABSTRACT

Research with the aim of knowing and analysing the interaction between the influence of planting moving age and the application of photosynthetic bacteria on the growth and yield of *pakcoy* plants (*Brassica rapa* L.). The research will be conducted at The Nogosari ARD Farm, Boyolali, Central Java Indonesia. In December 2023 – January 2024. Factorial experiment (4 x 3) with 3 repetitions in the study. The first factor is the treatment of transplanting age (S), namely: S0: age 10 days after seedling/DAS, S1: age 13 DAS, S2: age 16 DAS. The second factor is the treatment of applying 20ml/liter (F) photosynthetic bacterial folier, namely: F0: control application, F1: folier application 3 Days after Planting/DAP, F2: 7 DAP foliar application, F3: 10 DAP foterner application. Observational data were analysed statistically using fingerprint analysis (ANOVA), followed by a further test of Honest Real Difference (BNJ) at the level of 5%. The parameters observed include; plant height, number of leaves, biological weight, and harvest index. The best results of *pakcoy* growth research on transplanting age transfer treatment f 16 DAS with foliar application of 7 DAP. The results of the best *pakcoy* harvest research on transplanting age treatment16 DAS and foliar application 10 DAP.

Keywords: Transplanting Age, Application of Photosynthetic Bacteria, Hydroponics, *Pakcoy*

1. INTRODUCTION

Pakcoy (*Brassica rapa* L.) is a type of vegetable plant belonging to the Brassicaceae family. The history of *pakcoy* comes from China which has been cultivated after the 5th century widely almost all over China. This vegetable is a new introduction in Japan and is still in the same family as Chinese vegetable. Currently *pakcoy* is widely developed in the Philippines, Malaysia, Indonesia and Thailand (Yustian, 2016)

Currently, according to BPS data sourced from the Agriculture and Plantation Office of Central Java Province, from 2017 to 2020, mustard crop production is 751,113kg, 887,401kg, 983,246kg and 869,527kg. There was a decrease in production in 2020 along with a lot of demand and an increase in the amount of land converted. With this shrinking land area, it is necessary to develop plant cultivation system technology using narrow land but still producing production output to meet the needs of the community. One of the methods used is farming using the hydroponic method.

Hydroponics is a modern plant cultivation technique without the use of soil (*soilless*). According to Atika and Enceng (2019), hydroponics is a plant cultivation technique in a controlled environment, without soil, with controlled plant nutrients, and can be carried out using substrates or without substrates. One type of hydroponic method used for cultivation is the Nutrient Film Tehnique (NFT) system. According to Arianto et. al (2020) NFT system is a commonly used system compared to other hydroponic systems, plants grow in a thin solution stream that resembles a film layer (2-3 mm), the nutrient solution is circulated continuously with a water pump so that plants can get enough water, nutrients and oxygen.

Crop production can be increased by adding an element by giving the right dose and time interval. One that can be used is microorganisms such as photosynthetic bacteria that are applied to plants. According to Baba et. al (2022), this photosynthetic bacterium (*Synechococcus sp*) is one type of photosynthetic bacteria from the cyanobacteria bacteria group, has the ability to penetrate plant leaf tissue and carry out photosynthesis while being able to tether free nitrogen in the atmosphere. With the ability of these bacteria is expected to add nitrogen elements in plants so that yields can increase.
The objectives of this study are:

To determine the effect of transplanting age on the growth and yield of *pakcoy* plants, to determine the effect of photosynthetic bacteria application on the growth and yield of *pakcoy* plants and to determine the interaction between the effect of transplanting age and the application of photosynthetic bacteria on the growth and yield of *pakcoy* plants**.**

Application of *Synechococcus* sp. On the leaves will make bacteria live on the surface of the leaves. These bacteria are able to reduce N2 from the air to ammonium (known as N2 fixation) and provide simple nutrients needed by plants, namely air, water, few nutrients and light (Soedradjad and Avivi, 2005). *Synechococcus sp.* can live freely so that these bacteria do not need substrate from the host plant.
According to Muharam *et. Al.* (2020) in his research the treatment of the age of seedlings had a very real effect on the observation parameters, the age of seedlings of 15 days (B3) resulted in better growth and production than the age treatment of other seedlings.According to Febrianti *et. al.* (2019) in his research, the treatment of 1 week of floating raft hydroponic system and 4 weeks of NFT hydroponic system resulted in the highest R/C ratio values of 1.7 and 1.6, which resulted in higher profits and more efficient. According to Wahyuni *et. al.* (2022) in his research, the transfer age treatment of 10 DAS seedlings showed the highest average value of plant height, number of leaves and wet weight in mustard plants cultivated with the NFT hydroponic system. The moving age treatment of 16 DAS showed a lower growth rate compared to other treatments.
The application of photosynthetic bacteria differs markedly to the parameters of leaf count and leaf area as well as the fresh weight of the roots of kailan plants. Application of photosynthetic bacteria B2 (20 ml) gave a greater number of leaves, leaf area and fresh weight of roots than controls. According to Asmuni *et. al.* (2017) in his research mustard plants given *synechococcus sp* treatment showed a noticeable difference with no treatment of plant root length at all salinity concentrations. This is thought to be due to other factors that affect the number of roots in mustard plants.
It is estimated that the interaction between the effects of transplanting age at seedling age 13 DAS with the application of photosynthetic bacteria at the age of 7 DAP produces the best growth and yield of *pakcoy* plants.

2. METHODS

2.1 Time and Place of Research

This research was carried out from December 2023 to January 2024 at the Nogosari ARD Farm Garden, Boyolali, Central Java, Indonesia with an altitude of ± 152 meters above sea level.

2.2 Tools and Materials

1. Tools used in this study include; hydroponic installation table, *netpot*, pH meter. TDS meter, measuring cup, *sprayer*, label, seedling tool, measuring instruments (meter and scale), stationery*, mobile phone*,
2. The materials used in this study include: AB mix nutrients, *rockwool, pakcoy* seeds, water, and photosynthetic bacteria.

2.3 Research Plan

In this study, the experimental design used was a Complete Randomized Design (CRD) factorial pattern (3 x 4), with 3 repeats forming 36 experiments. The first factor is the age when transplanting and the second factor is the interval of foliar feeding using photosynthetic bacteria.
The first factor is age at the time of transplanting
S0 : planting transfer age 10 DAS
S1 : planting age 13 DAS

S2 : planting transfer age 16 DAS

The second factor at intervals of foliar foliar administration using photosynthetic bacterial products as much as 2ml/L

F0 : Control application
F1 : bacterial folier application photosynthesis 3 DAP
F2 : application of bacterial folier photosynthesis 7 DAP
F3 : application of bacterial folier photosynthesis 10 DAP

The treatment combination consists of 12 combinations and is repeated 3 times, so there are 36 experimental units. The number of combinations includes:

S0F0 : planting life 10 DAS and control application
S0F1 : planting age 10 DAS and foliar application 3 DAP
S0F2 : planting age 10 DAS and foliar application 7 DAP
S0F3 : planting transfer age 10 DAS and folier application 10 DAP
S1F0 : planting life 13 DAS and control application
S1F1 : planting age 13 DAS and foliar application 3 DAP
S1F2 : planting life 13 DAS and foliar application 7 DAP
S1F3 : transplanting age 13 DAS and foliar application 10 DAP
S2F0 : planting life 16 DAS and control application
S2F1 : transplanting age 16 DAS and foliar application 3 DAP
S2F2 : planting age 16 DAS and foliar application 7 DAP
S2F3 : planting age 16 DAS and foliar application 10 DAP

The mathematical model of Complete Random Design (CRD) factorial pattern can be written as follows (Steel and Torrie 1993):

$$Yijk = m + a_i + bj + (ab)_{jk} + e_{ijk}$$

$$i = 1,2,3,...,a$$
$$j = 1,2,3... b$$
$$k = 1,2,3... r$$

Information:

Yijk = The observation value of the influence of the A-to-I factor, the jth B factor, and the k-th repeat
M = General Average
α_i = Value addedinfluence of the i-th A factor
βj = Value added influence of factor B to-j
$(ab)_{ij}$ = Value added to the influence of the interaction of the Ith factor A with the B to-j factor
εijk = Trial gelat

The last observational data was statistically analysed using fingerprint analysis (ANOVA), nudity was followed by conducting a further test of Honest Real Difference (BNJ) at the level of 5%.

2.4 Research Procedure

The research procedures to be carried out in the research include:

1. Installation Preparation

This research uses cultivation techniques using an NFT hydroponic system. The installation table is 8 meters long by 1.5 meters wide and slopes of 3% down per meter. The installation table to be used is cleaned using water until clean so that it can be ready for planting. The installation table is labelled to know the blocks and samples of plants to be studied.

2. Sowing

Seeding is done manually, which is sown on trays containing rockwool that has been cut into 1.5cm x 1.5cm pieces moistened using enough water until all parts of the rockwool are moist. Rockwool that has been moistened can be placed *pakcoy* seeds in holes that have been made.

3. Planting

Planting or *transplanting* is carried out when *pakcoy* seedlings are 10, 13, 16 DAS old and transferred to the planting hole of the installation table.

4. Maintenance

Maintenance carried out in this study includes: provision and addition of nutrients, checking the condition of reservoirs using pH meters and tds meters, embroidery and *controlling* pests and plant diseases.

5. Foliar application

Foliar application on leaves using photosynthetic bacteria with a concentration of 2ml/L (photosynthetic bacteria 2ml then added water up to a volume of 1 liter) was carried out at planting age 3, 7, and 10 DAP using a *sprayer*. The dose during application is to spray photosynthetic bacteria that have been dissolved under the leaves until the leaves look wet enough. The process of applying photosynthetic bacteria, around the plant sample is closed using plastic as a curtain so as not to hit other plant samples.

6. Harvesting

Harvesting is carried out at the age of 21 DAP or plants aged 35 DAS by removing plants from the planting hole of the installation table.

2.5 Observation Parameters

The observation parameters to be observed in the study include:

1. Plant height (cm)

Measurement of plant height begins when transplanting. Plant height is measured from the root neck to the tip of the plant's highest leaf. Plant height measurement begins at the time of transplanting at intervals of once every 7 days until *pakcoy* plants can be harvested.

2. Leaf width (cm)

The width of the leaf is measured from the true leaf blade number 3 from the bottom that has opened perfectly. Measurements are carried out at the time of transplanting until harvest with observation intervals of 7 days until *pakcoy* plants can be harvested.

3. Number of leaves (strands)

The number of leaves is calculated from the young leaves that have opened completely to the oldest leaves. Observations are carried out at the time of transplanting until harvest with an observation time interval of 7 days until *pakcoy* plants can be harvested.

4. Biological weight (grams)

Fresh weight weighing of plants is carried out after harvest by weighing all plant parts (crown and roots) using electric scales.

5. Ecological weight (grams)

Fresh weight weighing of plants is carried out after harvest by cutting the roots so that the remaining productive parts are then weighed using electric scales.

6. Harvest Index

The harvest index is a comparison of ecological weight (header) with biological weight (root and header). The harvest index can be calculated using the formula

$$Indeks\ panen = \frac{berat\ ekologis\ (tajuk)}{berat\ biologis\ (akar+tajuk)}$$

3. RESULTS AND DISCUSSION

3.1 Plant Growth *Pakcoy* (*Brassica rapa* L.)

In this study, the effect of transplanting age and application of photosynthetic bacteria on *pakcoy* growth was determined through observations of plant height (cm), number of leaves (strands), and leaf width (cm) carried out after transplanting aged 1 day after planting (DAP) and measured once every 7 days until harvest. Results of observations for 4 weeks.

3.1.1 Plant Height (cm)

Observations made in this study measured plant height every 7 days after transplanting. Observation data on plant height of 21 DAP are listed in Appendix 3. And for fingerprint analysis in Appendix 4. The fingerprint results showed that the treatment of transplanting age (S) was very significantly different from plant height, and the treatment of foliar application of photosynthetic bacteria (F) was not significantly different from plant height. As for the interaction of transplant age treatment and folier application of photosynthetic bacteria (SF) did not differ markedly from plant height parameters. The next step to find out the results of further analysis is that the very real difference is carried out BNJ test with a level of 5% whose results are presented in Table 1. Next:

Table 1. Average height of *Pakcoy* in the transplanting age treatment

Treatment	Average
10 DAS (S0)	23.33 a
13 DAS (S1)	24.08 a
16 DAS (S2)	25.08 b
BNJ 5%= 3.53	

Description: Numbers followed by the same letter showed no real difference in the 5% BNJ test.

The BNJ Test Results with the above 5% rating show that S2 and S0 treatment showed real different results. On the S2 treatment with an average yield of 25,05 and the treatment of S0 with an average yield of 23,33 showed a decrease in yield of 6.9%.

The S0 and S1 treatments showed no real different results from each of these treatments and were very significantly different compared to the S2 treatment. In the S2 treatment with an average result of 25.05 when compared to the S1 treatment with an average result of 24.08 showed a decrease of 3.8%.

The effect of moving age treatment on the height growth of pakcoy plants is presented in figure 1:

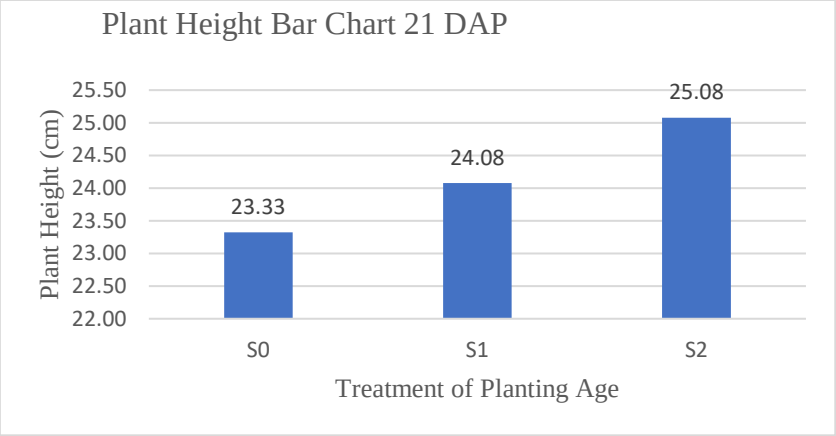

Figure 1. Bar diagram of height of Pakcoy aged 21 DAT, influence of transplanting age

Figure 1. Shows the average yield of pakcoy S2 plant height shows better results than other treatments. S1 treatment showed results after S2 treatment, while the average height of S0 pakcoy plants showed the lowest results compared to other treatments. According to Jalil et al., (2015), transfer to land using young seedlings is very high risk because it is still weak and roots are not strong, it is in accordance with the results of research on S0 transplanting age treatment showing the lowest results compared to other transplant age treatments.

The results of bacterial folier application treatment did not differ markedly from plant height growth. This is thought to be due to low light intensity, so it cannot help the photosynthesis process optimally for growing and tall plants. This is in accordance with the statement of Shamsunihar et. Al (2009) which states that photosynthetic bacteria experience stunted growth due to low light intensity and high air humidity resulting in bacteria only having a small population.

The results of the interaction treatment between the moving age of seedlings and the application of folier photosynthetic bacteria did not have a significant effect on plant height growth. It is suspected that the combination of these applications must be repeated to get real growth results. According to Mandie et al. (2015), fertilizer application through leaf folier provides a fast response and is temporary so that the application must be repeated. The main component of farming is the planting nutrient and medium, that must keep the area around the roots moist, provide adequate air, and be able to with stand nutrient availability (Dewi RN, 2023). Nutrient needs through foliar fertilization can increase the rate of photosynthesis, which can increase plant growth, especially tall plants.

3.1.2 Number of Leaves

Observations made in this study counted the number of plant leaves every 7 days after transplanting. Observation data on the number of leaves of plants aged 21 DAP are listed in Appendix 5. And for fingerprint analysis in Appendix 6. The results of the fingerprints showed that the treatment of planting age (S) was very significantly different from the number of leaves and the treatment of folier application of photosynthetic bacteria (F) was very different from the number of leaves. As for the interaction of transplant age treatment and foliar application of photosynthetic bacteria (SF) did not differ markedly from the parameter of the number of leaves. The next step to find out the results of further analysis is that the very real difference is carried out BNJ test with a level of 5% whose results are presented in Table 2 and Table 3 below:

Table 2. Average number of leaves of pakcoy in the transplanting age treatments

Treatment	Average
Planting transfer age10 DAS (S0)	22.83 a
Planting transfer age 13 DAS (S1)	25.08 b
Planting transfer age 16 DAS (S2)	25.58 b
BNJ 5%= 3.53	

Description: Numbers followed by the same letter showed no real difference in the 5% BNJ test

The BNJ Test Results with the above 5% rating show that S2 and S0 treatment showed real different results. On the S2 treatment with an average yield of 25,58 and S0 with an average yield of 22,83 showed a decrease in yield of 10,7%.

The S1 and S2 treatments showed very different results for each of these treatments compared to the S0 treatment. In the S1 treatment with an average result of 25.08 when compared to the S0 treatment with an average result of 22.83 showed a decrease of 8.9%.

The effect of moving age treatment on the number of leaves of pakcoy plants is presented in figure 2.

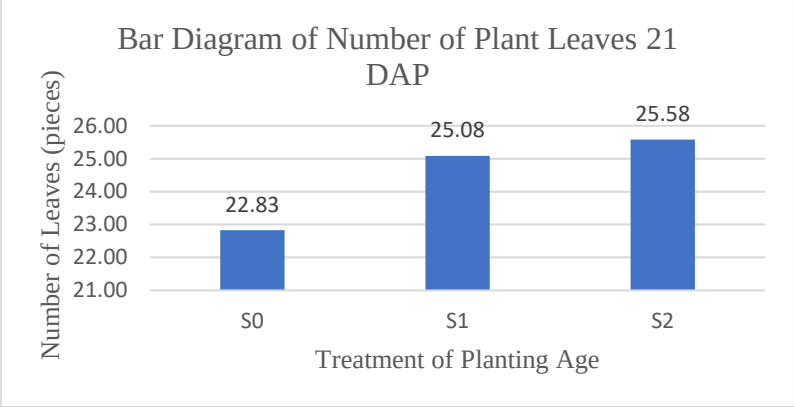

Figure 2. Bar diagram of number of leaves of *pakcoy* aged 21 DAT, influence of transplanting age

Figure 2. Shows the average result of the number of leaves of *pakcoy* S2 plants shows better results than other treatments. S1 treatment showed good results after S2 treatment, while the average number of leaves of S0 *pakcoy* plants showed the lowest results compared to other treatments. The increase in the number of *pakcoy* leaves occurs due to the appearance of leaf primordia on the apical meristem of the stem and will grow into whole plant leaves. The appearance of leaf primordia can affect the number of leaves formed on *pakcoy*. This can be influenced by the age of transplanting when in the field. This is corroborated by the fact of the opinion of Sutedjo and Kartasapoetra (1990) which states that to be transferred to the field, the right age of seedlings is when plants have perfect roots, stems, and leaves, are able to adapt to new environments, and produce photosynthesis well. When transplanted, the risk of death of seedlings is very small and disruption to the plant growth process can be minimized.

Table 3. Average number of leaves of *pakcoy* in the folier application treatment of photosynthetic bacteria

Treatment	Average and notation
Application control (F0)	17.08 a
PSB 3 DAP (F1) folier application	18.58 ab
PSB 7 DAP (F2) folier application	18.67 b
PSB 10 DAP (F3) folier application	19.17 b
BNJ 5%= 3.90	

Description: Numbers followed by the same letter showed no real difference in the 5% BNJ test

The BNJ Test Results with the above 5% rating show that F3 and F0 behaviour show real different results. On the F3 treatment with an average yield of 19, 17 and the F0 treatment with an average yield of 17,08 showed a decrease in yield of 10,4%.

The F2 and F1 treatments showed very different results and significantly different from each treatment compared to the F0 treatment. In F2 treatment with an average result of 18.67 when compared to F0 treatment with an average result of 17.08 showed a decrease of 8.5%. While the F1 treatment with an average result of 18.58 when compared to the F0 treatment with an average result of 17.08 showed a decrease of 8%.

The effect of bacterial photosynthetic folier application treatment on the number of leaves of *pakcoy* plants is presented in figure 3.

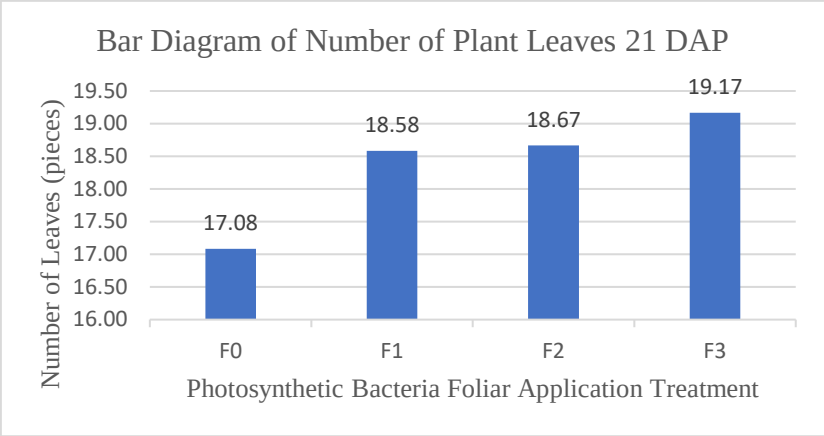

Figure 3. Bar diagram of the number of leaves of *pakcoy* aged 21 DAT, the influence of the application of photosynthetic bacterial foliers

Figure 3. Shows the average result of the number of leaves of *pakcoy* F3 plants shows better results than other treatments. F2 and F1 treatments showed good results after F3 treatment, while the average number of leaves of F0 *pakcoy* plants showed the lowest results compared to other treatments. The use of folier application of photosynthetic bacteria can stimulate growth because the culture is able to decompose organic substances in the air with the help of solar radiation. This is corroborated by Maulana's statement (2023) in his research which states that the use of photosynthetic bacteria can support nutrient needs for plants in growing such as the number of leaves and branches.

The results of the interaction between the transfer age treatment of seedlings and the application of foliar photosynthetic bacteria did not differ markedly from the number of leaves. It is suspected that the application of the combination is less than optimal. According to Syriac et. Al (2021), Foliers applied to leaves at the right time and with the right amount can prevent nutrient loss due to leaching and evaporation. As a result, plants can use nutrients to increase the number of leaves.

3.2 *Pakcoy* Plant (*Brassica rapa L.)*

In this study, the effect of planting transfer age and application of photosynthetic bacteria on *pakcoy* growth was determined through observations of biological weight (grams), economic weight (grams), and harvest index conducted after harvest. The results of observations on the table.

Biological Weight (grams)

In this study, biological weight of plants was observed after harvest. Observational data on plant biological weight are listed in Appendix 9 and for variegation analysis in Annex 10. The fingerprint results showed that the treatment of transplanting age (S) was very significantly different from the biological weight of plants, and the treatment of foliar application of photosynthetic bacteria (F) was not significantly different from the biological weight of plants. Meanwhile, the interaction of transplant age treatment and foliar application of photosynthetic bacteria (SF) is significantly different from biological weight parameters. The next step to find out the results of further analysis that are very real and real different, then the BNJ test with a level of 5% is carried out whose results are presented in Tables 4 and 5. Next:

Table 4. Average biological weight of *pakcoy* at transplanting age treatments)

Treatment	Average
Planting transfer age 10 DAS (S0)	247.63 a
Planting transfer age 13 DAS (S1)	283.42 AB
Planting transfer age 16 DAS (S2)	303.88 b
BNJ 5%= 3,53	

Description: Numbers followed by the same letter showed no real difference in the 5% BNJ test

The BNJ Test Results with the above 5% rating show that S2 and S0 treatment showed real different results. On the treatment of S2 with an average yield of 303,88 grams and the treatment of S0 with an average yield of 247,63 grams showed a decrease in yield of 18,5%.

The S1 and S2 treatments showed very different results for each of these treatments compared to the S0 treatment. In the S1 treatment with an average yield of 283.42 grams when compared to the S0 treatment with an average result of 247.63 grams, the results decreased by 12.6%.

The effect of moving age treatment on the biological weight of *pakcoy* plants is presented in figure 4.

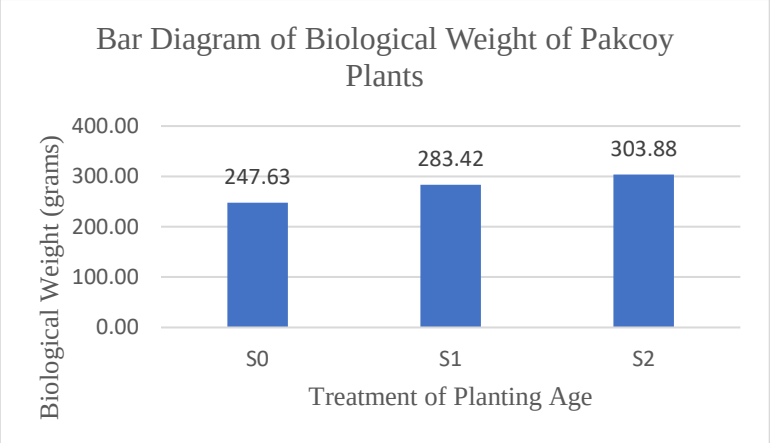

Figure 4. Bar diagram of the biological weight of *pakcoy*, the influence of transplanting age

Figure 4. Shows the average biological weight of *pakcoy* S2 plants shows better results than other treatments. S1 treatment showed good results after S2 treatment, while the average biological weight of S0 *pakcoy* plants showed the lowest results compared to other treatments. Proper seedling removal can promote vegetative phase growth and increase crop yields. Sitompul and Guritno (1995) stated that the condition of seedling transfer needs to be considered, especially the roots when transplanting seedlings so that the roots do not experience damage that can affect the absorption of water and nutrients.

Table 5. Average biological weight of *pakcoy* due to the influence of planting age treatment and application of photosynthetic bacterial foliers)

	Photosynthetic Bacteria Folier Application				Average S
Age of transplanting	F0	F1	F2	F3	
S0	192,33a	255,00from	243,67from	299,50b	247,63b
S1	283,00from	308,17b	264,33from	278,17from	283,42from
S2	305,00b	272,67from	322,50b	315,33b	303,88a
Average F	195,08a	208,96a	207,63a	223,25a	

Description: Numbers followed by the same letter showed no real difference in the 5% BNJ test

Based on the results of the 5% BNJ test in table 6 above, it shows that in the S0F0 treatment, the average biological weight of plants in the last observation of 192.33 grams was not significantly different when compared to the S0F1 treatment obtained an average of 255.00 grams, S0F2 obtained an average of 243.67 grams, S0F3 obtained an average of 299.50 grams.

The S1F0 treatment which produced an average biological weight of plants in the last observation of 283.00 grams was very significantly different when compared to the S1F1 treatment obtained an average of 308.17 grams, and significantly different from S1F2 obtained an average of 264.33 grams, S1F3 obtained an average of 283.42

grams. The S2F1 treatment average biological weight of plants in the last observation of 272.67 grams was very different when compared to the S2F0 treatment obtained an average of 305.00 grams, S2F3 obtained an average of 315.33 grams, S2F2 obtained an average of 322.50 grams.

The effect of the interaction of the combination of transplanting age and folier application of photosynthetic bacteria on the biological weight of *pakcoy* plants is presented in figure 5.

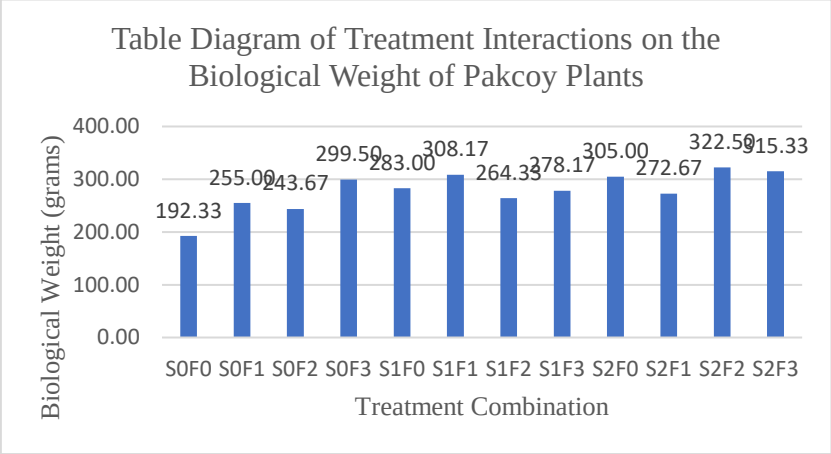

Figure 5. Bar diagram of the biological weight of *pakcoy*, the influence of the interaction between transplanting age and application of photosynthetic bacterial foliers

Figure 5 above shows that the highest average result of biological weight in S2F2 treatment with a value of 322.50 grams. While the lowest average biological weight result in S0F0 treatment with a value of 192.33 grams. This can be obtained by the interaction between the right transplant and the right time of application of the photosynthetic bacterial folier. This fact is in accordance with the opinion of Agrolestari (2009) states that plants can grow well and optimally if they have mutualism symbiosis with microorganisms so that it will increase plant productivity. In addition, interactions can also be influenced by supporting environmental factors. Environmental factors that affect plant growth and development include: light intensity, temperature, humidity and water availability, and nutrients.

The results of the application treatment of photosynthetic bacteria did not differ markedly from the biological weight of plants. This is thought to be due to environmental conditions of lack of sunlight which results in bacteria cannot help the process of capturing N in the free air. According to Sari et. Al (2016) states that if enough nitrogen is available, the leaves become greener and the photosynthesis process runs larger.

Harvest Index

In this study, an analysis of the crop harvest index after harvest was carried out. Plant index analysis data are listed in Appendix 13 and for variegation analysis in Appendix 14. The results of variety analysis found no significant difference between treatments of harvest index parameters. The results of variety analysis (ANOVA) with are presented in the following table:

Table 6. Analysis of variations in the harvest index of *pakcoy* due to the influence of transplanting age and application of photosynthetic bacterial foliers

SK	DB	JK	KT	F count	F 5%	Ket
Treatment	11	0.01	0.00	1.14	2.22	ns
S	2	0.00	0.00	2.06	3.40	ns
F	3	0.00	0.00	1.47	3.01	ns

SF	6	0.00	0.00	0.66	2.51	ns
Error	24	0.02	0.00			
Total	35	0.0				

Description: Analysis of the variety of *pakcoy* crop harvest index with a signification level of 5% shows no real difference (NS).

Based on the analysis of variance with a significance level of 5% in table 8, it shows a different effect is not evident on all treatments, the effect of planting moving age and foliar application of photosynthetic bacteria. This shows that the effect of transplant age and folier application of photosynthetic bacteria has a different effect between treatments.

The effect of treatment on the effect of planting transfer age and folier application of photosynthetic bacteria on the harvest index of *pakcoy* plants is presented in figure 6.

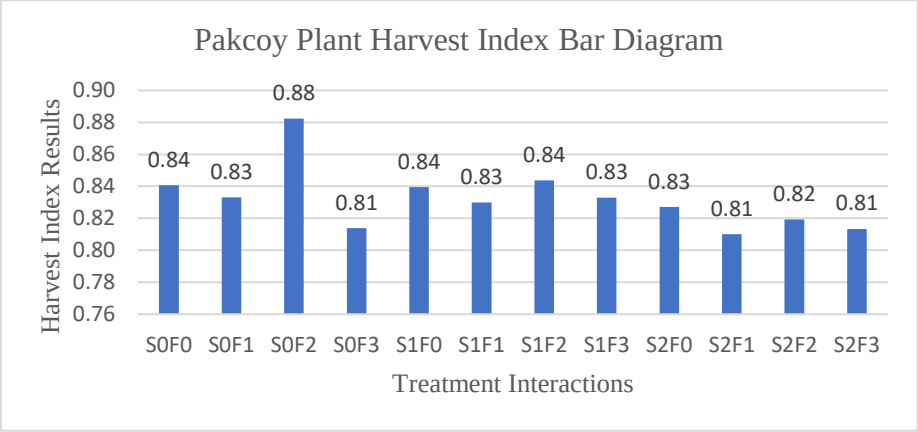

Figure 6. Bar diagram of the harvest index for *pakcoy*

Figure 6, shows that the yield of *pakcoy* crop index is not significantly different with a slight difference between treatment interactions. According to Marpaung et al. (2013) that the crop harvest index can be influenced by the interaction between plant genetic factors with environmental factors such as humidity, temperature, water, pH and sunlight. The combination of transplant age treatment and foliar application of photosynthetic bacteria did not have a positive effect on crop index yield. According to Simangunsong et al. (2018) that the combination of treatments can inhibit or help growth or even have no effect on growth.

CONCLUSION

Based on research and discussion on "The Effect of Moving Age of Seeds and Application of Photosynthetic Bacteria with a Hydroponic System on the Growth and Yield of *Pakcoy* (*Brassica rapa* L.) Plants" the following conclusions were drawn:

1. The age of transplanting has a significant effect on growth on the parameters of plant height, number of leaves, leaf width and yield of *pakcoy* plants on parameters of biological weight, ecological weight
2. Knowing the effect of the application of photosynthetic bacteria on growth on the parameters of the number of leaves
3. There was a significantly different interaction between the treatment of transplanting age and the application of folier of photosynthetic bacteria on biological weight parameters

SUGGESTION

Further research needs to be done to determine the treatment of transplanting age combined with the application of folier photosynthetic bacteria with other intensities to find out and get better growth and results on the growth and yield of *pakcoy* plants.

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