ISSN 2348-313X (Print)
International Journal of Life Sciences Research ISSN 2348-3148 (online)
Vol. 12, Issue 3, pp: (14-27), Month: July - September 2024, Available at: www.researchpublish.com

GROWTH AND NUTRIENT UP TAKE OF SENGON SEEDLINGS *(Paraserianthes falcataria (L.)* Nielsen*)* ON TAILING SOILS MEDIA WHICH ARE APPLIED WITH VARIOUS SPECIES OF MYCORRIZA AND COMPOST IN NURSERY

Dahliana[1], Yusran[2], Zulkaidha[3]

[1]Lecturer in Master of Agriculture Science, Postgraduate Tadulako University

[2]Lecturer in Master of Agriculture Science, Postgraduate Tadulako University, Palu, Indonesia

DOI: https://doi.org/10.5281/zenodo.12805401

Published Date: 24-July-2024

Abstract: **Damage to post-gold mining land spread across several places, resulting in open, barren land, the soil horizon changed due to excavation, and was very unproductive for plant growth. This can be seen because there are not many types of plants that can live on it. One type of Sengon legume plant is a type of commercial plant that is profitable and is a fast growing type so it is suitable for revegetation of ex-mining land. Efforts that can be made to improve the quality of soil on post-mining land include using mycorrhiza with the addition of compost which can increase the organic matter content. has balanced macro and micro pores so that the circulation produced is quite good and has high water absorption capacity in the soil. This research aims to study the growth and nutrient uptake of sengon seedlings in tailings soil media given various types of mycorrhiza and compost in the nursery. This research uses a variance analysis method with the research method used, namely Completely Randomized Design (CRD) Factorial Pattern which consists of 2 factors, namely the first factor, various types of mycorrhiza M1 (Mycorrhiza mosseae 25 gr) and M2 (Mycorrhiza deserticola 25 gr), the second factor K1 compost (250 gr quail compost) and K2 (swallow bird compost). There were 9 treatment combinations, each repeated 5 times so that there were 45 experimental units. The results of the research showed that the interaction of various types of mycorrhiza and compost had a significant effect on plant height, with the greatest growth obtained in the treatment of Mycorrhiza deserticola 25 gr + Swallow bird compost 250 gr (M2K2).**

Keywords: **Sengon, Mycorrhiza, Compost, Revegetation.**

I. INTRODUCTION

Poboya People's Mining is one of the mines that carries out traditional gold mining. The Poboya area is part of the Grand Forest Park (Tahura) area, namely a nature conservation area with the aim of collecting natural or artificial plants and animals, which are used for research, science, education, supporting cultivation, culture, tourism and recreation (Ministerial Decree No. .24/Kpts-II/1999).

According to Triadriani et al (2014). That the high mercury content in the soil can have an impact on organisms around People's Mining. Organisms in this area can die because they cannot survive in the presence of toxic mercury. Therefore, increasing heavy metal content in crop yields can also cause a decrease in soil quality and poisoning of plants which has an impact on environmental pollution. According to (Ahwal et al, 2014).

Leguminose cover crops are suitable for planting on reclaimed ex-mining land to protect the soil from erosion damage and this plant is able to grow and produce organic matter in large quantities, the roots of this Leguminose plant can improve the physical and chemical properties of the soil and are able to absorb metals that are poisoning in the soil as a result of mining (Syofiani And Oktabriana, 2017). One type of Sengon legume plant (*Paraserianthes falcataria* (L) Nielsen) is a profitable commercial plant type and is a fast growing species so it is suitable for revegetation of ex-mining land (Zulkifli 2013, Baskorowati 2014).

Efforts that can be made to improve soil quality on post-mining land include using Fungi Arbuscular Mycorrhiza (FMA). There is a contribution(FMA)as soil microorganisms have the potential to increase plant growth on post-mining land or marginal land that lacks water through symbiosishiswith plant roots thereby increasing the root absorption area in accessing nutrients in the soil (Ulfa et al, 2011).

The effectiveness of AMF in the soil is influenced by the organic material content, adding compost is an important part because it can increase the organic material content which has balanced macro and micro pores so that the resulting circulation is quite good and has high water absorption capacity in the soil.(Lubnan, 2013).Compost also contains nutrients such as nitrogen and phosphate in the form of complex compounds of organs, proteins and humates which are difficult for plants to absorb(Elpawati et al, 2015). Quail droppings contain quite high levels of N, P and K(Syahendra et al., 2016).Sources of N, P and K nutrients can come from weathering of soil minerals, organic matter, irrigation water and fertilization. Constraints in managing acidic dry land are the high exchangeable Al content, nutrients easily carried away by surface water, erosion and leaching and low levels of soil organic matter (Mulyaniet al,2001).

In this experiment, Sengon (*Paraserianthes falcataria* (L)Nielsen).pthere is Tailings soil media with additionsFArbuscular mycorrhizal plants and compost are expected to improve the physical, chemical and biological properties of soil as a plant growth medium in land revegetation efforts.

II. RESEARCH METHODS

2.1 Place and time of research

Study carried out duringthreemonth from month Meiup to Juli 2023 will take place at the permanent nursery of BP-DAS Palu-Poso, Tadulako University, Palu. Soil analysis of tailings originating from mining in the Poboya community was carried out in the laboratoryFaculty of Agriculture, Hasanuddin University.

2.2 Materials and tools

The materials used in this research are

1) SemailSengon from PT. Rayani Mandiri Utama,3 months old
2) Polybag as a place to grow seedlings
3) Arbuscular mycorrhizal fungiGlomus mosseae
4) Arbuscular mycorrhizal fungi*Glomus deserticola*,
5) Quail Compost (*Coturnix coturnix)*
6) Kswallow swallow (Collocalia vestita),
7) Qanah Tailingsas a growing media mixture

Tools usedin this research, namely

1) Scopeto taketailings land,
2) AYakan to sift the soil from dirt,

ISSN 2348-313X (Print)
International Journal of Life Sciences Research ISSN 2348-3148 (online)
Vol. 12, Issue 3, pp: (14-27), Month: July - September 2024, Available at: www.researchpublish.com

3) Lable to provide a mark for each treatment,

4) Scalesto weigh the sample

5) Ruler for measuring seedling height,

6) Calipers for measuring seedling diameter,

7) Camera for research documentation,

8) Laptopsto calculate the results

9) Stationery.

2.3 Research design

This research is experimental research (trial). This research was designed in a completely randomized design with a factorial pattern consisting of two factors that were tested, namely:

The first factor is various typesFMA(M)

M0 = No FMA

M1 = Glomus mosseae

M2 = Glomus deserticola

The second factor is varietytypeCompost (K) which consists of 2typetreatment, namely:

K0 = No Compost

K1 = Quail Compost

K2 = Swallow Bird compost

Thus there are 9 treatment combinationsthat iseach of which was repeated 5 times so that there were 45 experimental units in Figure3

M0K01	M0K22	M1K04	M2K03	M1K15
M1K11	M0K02	M1K23	M1K05	M2K02
M2K21	M0K11	M0K03	M0K12	M1K03
M2K04	M1K22	M0K24	M0K04	M2K11
M1K14	M.OK23	M0K13	M0K25	M0K05
M1K21	M2K05	M1K12	M1K02	M2K04
M2K12	M1K24	M1K01	M.OK14	M1K13
M2K13	M2K24	M1K25	M2K14	M2K23
M2K22	M2K25	M2K12	M0K15	M2K15

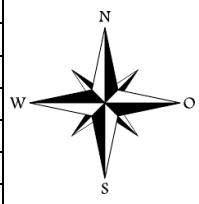


Figure 3. Layout of Research Design

2.4 Research procedure

2.4.1 Provision of research materials

1. Seedlingused in researchis3 month old seedlings come from the PT nursery. Rayani Mandiri Utama, Palu City, Central Sulawesi.

2. Arbuscular Mycorrhizal Fungi Inoculumobtained from the collectionLlaboratoryIscience-IForestry Science, Faculty of Forestry, Tadulako University.

3. Quail droppings (*Coturnix coturnix)*as a planting medium that will be processed (fermented into truly mature compost)originating from permanent seeding

4. Swallow droppings (Collocalia vestita) as a planting medium will be processed (fermented into truly mature compost)originating from permanent nurseries

5. The planting medium used in this research is ex-mining soil or tailings soil obtained from Poboya sub-district, Palu City, Central Sulawesi.

2.4.2 Research Implementation.

1. Making Quail Compost

a. Prepare the ingredients, namely 5 kg quail droppings, 3.3 kg husks, 160 g bran, 2 g granulated sugar, 3.3 ml EM4 and enough water

b. All ingredients are mixed and stirred evenly

c. Then store it in a burlap sack and close it tightly

d. Place the sack containing the mixture in a place that is not exposed to water and then wrap it using a tarpaulin or burlap sack.

e. The incubation period is 2 weeks before the bokashi is opened and ready to use(Kusuma, 2012).

2. Swallow bird composting.

According to Indriani (2005) the method for making swallow manure fertilizer is as follows:

a. Preparation of EM4 solution

Water is mixed with ¼ tablespoon of EM4 solution, and 1/3 tablespoon of granulated sugar then stir until the sugar solution dissolve evenly.

b. Swallow droppings were weighed as much as 5 kg, bran 1.5 kg, 3 kg of husk, then mixed together and then stirred until equally.

c. Slowly pour the EM4 solution into the mixture evenly until the water mixture reaches 30%.

d. Then cover the mixture with a sack, stir every day for 8 – 10 days.

e. After that the bokashi is aired for 2 days, after bokashi cold, blackish brown in color, does not smell of ammonia, and If there are white tissues, then the bokashi is ready used as fertilizer.

3. Planting and Application of AMF and Compost.

Soil (Tailings) that has been mixed with compost in a predetermined dose is put into a 15 x 15 cm polybag. Next, give mycorrhiza Glomous mosseae and Glomous desertico*Each of them is 25 g/poybag*This is done by making a planting hole 1 cm deep in the filled polybagwithMycorrhiza according to the dosagethe same oneeach is inserted into the planting hole followed by planting sengon seedlings and then the plants are coveredkback with tailings soil and composteach 250 g/polybagwhich has been mixed.

4. Maintenance of Sengon Seedlings.

Maintenance of Sengon seedlings is carried out during12 Sunday, watering the sengon seedlings is done twice a day, namely in the morning and evening, as well as cleaning the weeds on the plants.

2.5 Observation Parameters

1) IncreaseSeedling Height (cm)

Increase in seedling height, height measurement sowing (cm) was carried out by measuring the height of the seedling from the base of the stem to the shoot.

2) IncreaseSeedling Stem Diameter (cm)

Increasing the diameter of the seedlings is done by measuring the diameter of the stem 2 cm from the base of the roots.

3) Increase in Number of Leaves (sheet)

The increase in the number of leaves (strands) is determined by counting the number of fully formed leaves.

ISSN 2348-313X (Print)
International Journal of Life Sciences Research ISSN 2348-3148 (online)
Vol. 12, Issue 3, pp: (14-27), Month: July - September 2024, Available at: www.researchpublish.com

4) Seedling Wet Weight

Seedling wet weight was measured at the end of observation at age 12weeks after planting. The wet weight of the seedlings was measured by weighing the crown, leaves and roots. The weight is weighed using an analytical balance and expressed in grams.

5) Seedling dry weight

The dry weight of the seedlings will be observed at the end of the research, namely 12weeks after planting after being dried using an oven at 600C for 2 days (48 hours) then weighed using a digital scale and expressed in gr units.

6) Seed Quality Index

The seed quality index was calculated at the end of the observation using the formula according to Dickson et al. (1960)

$$IMB = \frac{BKT\ (gr) + BKA\ (gr)}{\frac{T(cm)}{D\ (cm)} + \frac{BKT\ (g)}{BKA\ (g)}}$$

Information :

IMB = Seed Quality Index

BKT = Head Dry Weight (g)

BKA = Root Dry Weight (g)

Q = Plant Height (cm)

D = Diameter (mm)

Seedlings are good and able to survive in the field if they have an IMB (Q) value > 0.09

7) N, P, K Nutrient Uptake Analysis

Analysis of nutrient content in seedlings in the study with all treatments representing 5 replications, using the analysis method as in table 1.

Table 1. Nutrient analysis methods in the canopy

Analysis Method Test Parameters
Nitrogen Kjeldah-titrimetry
Phospor Spectrophotometry
Potassium AAS

Source: Soil Science Laboratory, Faculty of Agriculture, Hasanuddin University

2.6 Analysis Method

The analysis of this research was analyzed using variance according to the research method used, namely Completely Randomized Design (CRD) Factorial Pattern with a mathematical model according to Gaspersz and Vincent (1991), as follows:

Yij = μ + αi + βj + (αβ)ij + €ijk

Where:

Yij = Observation value

μ = Common mean value

αi = Species factorFMAat level i

βj = FactorCompostjth

(αβ)ij = Interaction component of factors M and B

ISSN 2348-313X (Print)
International Journal of Life Sciences Research ISSN 2348-3148 (online)
Vol. 12, Issue 3, pp: (14-27), Month: July - September 2024, Available at: www.researchpublish.com

€ijk = Effect of unit error

kth trial that obtains treatment combination ij.

If the analysis of variance shows that the treatment has a real or very real effect, then it will be continued with the Honestly Significant Difference (BNT).

2.7 Operational Definition of Variables

1) Tailings are rock waste or fine soil left over from crushing and separating (extracting) valuable minerals (copper, gold, silver) from mining materials. According to Ansyari (2013) tailings are rock waste or fine soil left over from crushing and separating (extraction) valuable minerals (copper, gold, silver) from mining materials.

2) The role of mycorrhiza is to help absorb plant nutrients, increase growth and yield of plant products. On the other hand, fungi obtain assimilated energy from plants. Although the symbiosis of AMF with plants on fertile land does not have much positive effect, in extreme conditions it can increase the majority of plant growth (Smith and Read 2008).

3) Compost is the result of decomposition, weathering and decomposition of organic materials such as animal waste, leaves and other organic materials. Compost materials are available around us in various forms. Some examples of compost materials are stems, leaves, plant roots, and anything that can be destroyed(Soeryoko, 2011).

4) Nutrient uptake is the amount of nutrients that enter plant tissue. This was obtained based on the results of plant tissue analysis.

SHara's era= nutrient content (%) x dry weight (g)

The benefits of nutrient uptake rates include:

1. Knowing the efficiency of fertilization
2. Knowing the distribution of nutrients in the plant body
3. Understand the transport of nutrients in plants
4. Knowing the nutrient balance in a land.
5. Considerations in making fertilizer recommendations.

5) Seed Quality Index (IMB)

The seed quality index is an indicator of the level of readiness of seeds to be transferred from the nursery to the field (planting).Hendromono and Durahim (2004)stated that seeds that have an IMB value of at least 0.09 will have high survival when transferred to the field.

III. RESULTS AND DISCUSSION

3.1 Results

3.1.1 Increase in Height of Sengon Seedlings

Increase measurement resultsheight of sengon seedlings (Paraserianthes*fAlcataria*(L) Nielson).Umyrrh12 weeksafter planting is presented in Table 1. To determine the effect of various types of mycorrhiza and compost on the increase in height of sengon seedlings, an analysis of variance was carried out, as presented in Table2.

Table 2. Pe Variety Print AnalysisradditionTall(cm)Semai SengonAge 12 Week After Planting

Sk	Db	jk	kt	F count	F Table 5%
m	2	13,480	6,740	0.719 tn	3.26
K	2	116,375	58,188	6,205*	3.26*
MK	4	16,997	4,249	0.453 tn	2.63
Error	36	337,612	9,378		
Total	44	484,464			

Description: tn= not real, *= real kk:38.82 %

ISSN 2348-313X (Print)
International Journal of Life Sciences Research ISSN 2348-3148 (online)
Vol. 12, Issue 3, pp: (14-27), Month: July - September 2024, Available at: www.researchpublish.com

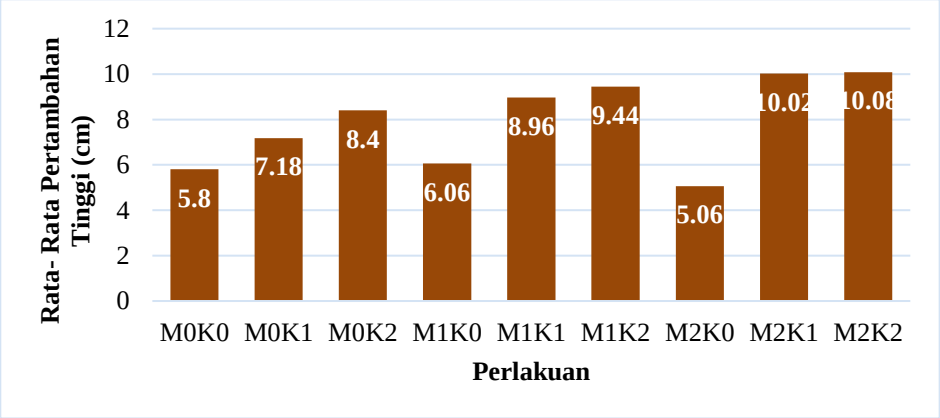
The results of the analysis of variance show that there are various types of treatmentmycorrhizaAndcompostprovide that influence real increase in heightSengon seedlings.SSo a Real Difference test was carried outHonest(BNJ) 5% level presented in Table 3 (a).

Table 3 (a). Advanced Test Average Honest Significant Difference (BNT) 5%PinfluenceIninteraction BvariousJenismichorizaDanKcompostQfacingQhigh(cm) SemailSengon.

Treatment	K0 No Compost	K1 Quail Compost	K2 Wallet Bird Compost	Average	BNT
M0 (No Mycorrhiza)	29	35.9	42	35.6 a	
M1 (Glomus Mosseae)	30.3	44.8	47.2	40.8 a	2.01
M2 (Glomus Deseticola)	25.3	50.1	50.4	41.9 b	
Average	28.2	43.6	46.5		
BNT			2.01		

Description: Numbers followed by different letters have a significant effect at 5% BNJ Test level

Table 2: shows that the averageheight of sengon seedlingsthe biggest treatmentMycorrhiza deserticola 25 (gr)+Swallow Bird Compost(M2K2) ie250(gr). As for averagetall Sengon seedlingscan be seen on himgrod ram, Fig4.



Picture 4. AverageHeight Increase (cm) Semail SengonUmyrrh12 Weeks SafterQplant.

3.1.2 Increase in Diameter of Sengon Seedlings.

Diameter increase measurement resultsSengon seedlings (Paraserianthes*fAlcataria*(L) Nielson). age12 weeksafter planting are presented in Table 3 (b). To determine the effect of various types of mycorrhiza and compost on growthdiameterSengon seedlings were subjected to analysis of variance, as presented in Table 3 (b).

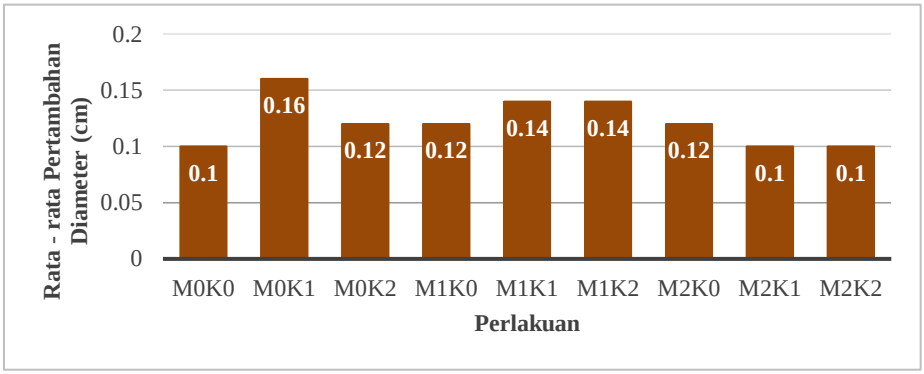
Table 3 (b). Pe Variety Print Analysisraddition Diameter (cm)Semai SengonAge 12 Weeks After Planting

Sk	Db	jk	kt	F. Count	F. Table 5%
m	2	0.006	0.003	1,300 tn	3.26
K	2	0.003	0.002	0.700 tn	3.26
MK	4	0.009	0.002	1,000 tn	2.63
Error	36	0.080	0.002		
Total	44	0.0978			

Description: tn= not real kk:1,348 %

The results of the analysis of variance show that there are various types of treatment mycorrhiza And compost exert influence No real about p addition diameter sengon seedlings, so there is no need to carry out further tests. For more details measurement diameter of sengon seedlings presented in Fig5.

ISSN 2348-313X (Print)
International Journal of Life Sciences Research ISSN 2348-3148 (online)
Vol. 12, Issue 3, pp: (14-27), Month: July - September 2024, Available at: www.researchpublish.com



Picture 5. AverageIncrease in Diameter (cm) Semai Sengon age12 Weeks SafterQplant.

Although Sidi's resultskvariety shows that the effect is not real, but based on the research results it shows that there is a tendency that the treatmentwithout mycorrhiza and quail compost 250 (gr) (m0K1)resulted in a better increase in the diameter of sengon seedlings compared to other treatments.

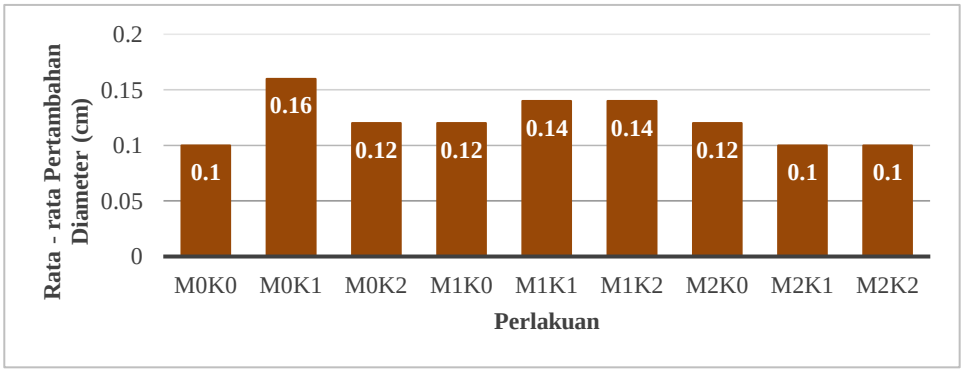
3.1.3 Increase in the Number of Sengon Seedling Leaves

Results of measuring the increase in the number of leavesSengon seedlings (Paraserianthes*fAlcataria*(L) Nielson). age12 weeksafter planting are presented in Table4. To determine the effect of various types of mycorrhiza and compost on growthnumber of leavesSengon seedlings were subjected to analysis of variance, as presented in Table4.

Table 4. Pert Variety Print Analysisaddition Number of Leaves (Sheet)Sengon seedlings (cm)Age 12 Weeks After Planting

Sk	Db	jk	kt	F. count	F. Table 5%
m	2	2,133	1,067	0.511Mr	3.26
K	2	8,133	4,067	1,947Mr	3.26
MK	4	5,733	1,433	0.686Mr	2.63
Error	36	75,200	2,089		
Total	44	91,200			

The results of the analysis of variance show that there are various types of treatment mycorrhiza And compost exert influence No real increase number of leaves sengon seedlings, so there is no need to carry out further tests. For further details, increase number of leaves of sengon seedlings presented in Fig6.



Picture 6. Average IncreaseNumber of S Leavesemail SengonUmyrrh12 Sunday Safter Qplant.

Although Sidi's resultskvariety shows that the effect is not real, but based on the research results it shows that there is a tendency that the treatmentwithout Mycorrhiza And quail compost 250 (gr) (m0K1)resulted in a better increase in the number of Sengon seedling leaves compared to other treatments.

ISSN 2348-313X (Print)
International Journal of Life Sciences Research ISSN 2348-3148 (online)
Vol. 12, Issue 3, pp: (14-27), Month: July - September 2024, Available at: www.researchpublish.com

3.1.4 Wet Weight

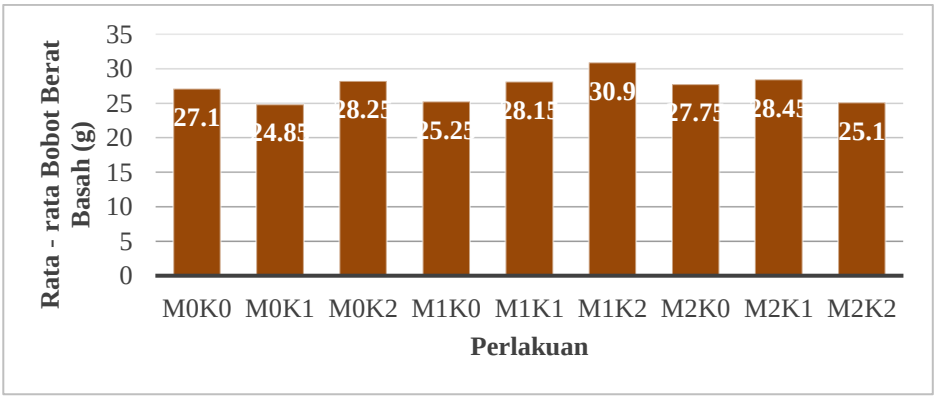
Results of measuring the increase in wet weightSengon seedlings (Paraserianthes*fAlcataria*(L) Nielson). age12 weeksafter planting are presented in Table5. To determine the effect of various types of mycorrhiza and compost on growthwet weightSengon seedlings were subjected to analysis of variance, as presented in Table5.

Table 5. Pert Variety Print Analysisaddition Wet Weight (g)Seedling SengonAge 12 Weeks After Planting

Sk	Db	jk	kt	F. count	F. Table 5%
m	2	2,402	1,201	0.005Mr	3.26
K	2	2,390	1,195	0.005Mr	3.26
MK	4	20,164	5,041	0.022Mr	2.63
Error	36	8267,228	229,645		
Total	44	8292,183			

Description: tn= not real. kk:28.99%

The results of the analysis of variance show that there are various types of treatment mycorrhiza And compost exert influence No real increase wet weight sengon seedlings, so there is no need to carry out further tests. For further details, increase wet weight of sengon seedlings presented in Fig 7.



Picture 7. Average IncreaseWet Weight Semai Sengon age 12 Sunday SafterQplant.

Although Sidi's resultskvariety shows that the effect is not real, but based on the research results it shows that there is a tendency that the treatment givenmycorrhiza mosseae 25 (gr)Andswallow bird compost 250 (gr) (M1K2)resulted in a better increase in wet weight of Sengon seedlings compared to other treatments.

3.1.5 Dry Weight

Results of measuring dry weight gainSengon seedlings (Paraserianthes*fAlcataria*(L) Nielson). age12 weeksafter planting are presented in Table6. To determine the effect of various types of mycorrhiza and compost on growthdry weightSengon seedlings were subjected to analysis of variance, as presented in Table 6.

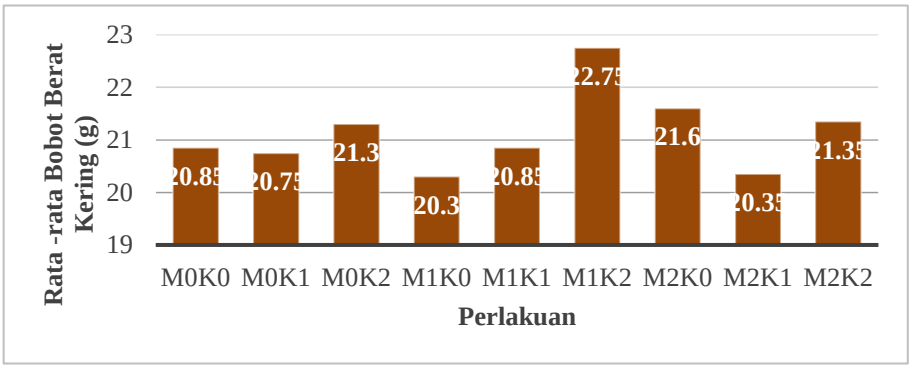
Table 6. Pert Variety Print Analysisaddition Dry Weight (g)Semai SengonAge 12 Weeks After Planting

Sk	Db	jk	kt	F count	F Table 5%
m	2	0.135	0.068	0.001Mr	3.26
K	2	1,739	0.870	0.006Mr	3.26
MK	4	1,742	0.436	0.003Mr	2.63
Error	36	4832,676	134,241		
Total	44	4836,292			

Description: tn= not real. kk: 25,21%

The results of the analysis of variance show that there are various types of treatment mycorrhiza And compost exert influence No real increase dry weight sengon seedlings, so there is no need to carry out further tests. For further details, increase dry weight of sengon seedlings presented in Fig8.

ISSN 2348-313X (Print)
International Journal of Life Sciences Research ISSN 2348-3148 (online)
Vol. 12, Issue 3, pp: (14-27), Month: July - September 2024, Available at: www.researchpublish.com



Picture 8. Average IncreaseDry Weight Semai Sengon age12 Sunday SafterQplant.

Although Sidi's resultskvariety shows that the effect is not real, but based on the research results it shows that there is a tendency that the treatment givenmycorrhiza mosseae 25(gr)Andswallow bird compost (M1K2) resulted in a better increase in dry weight of Sengon seedling seedlings compared to other treatments.

3.1.6 Seed Quality Index

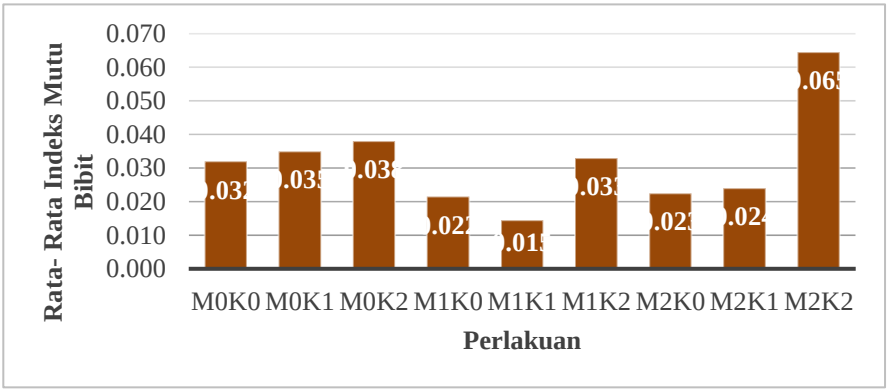
Results of measuring the seed quality indexsengon (Paraserianthes*fAlcataria*(L) Nielson). age12 weeksafter planting are presented in Table7. To determine the effect of various types of mycorrhiza and compost onseed quality indexsengon, analysis of variance was carried out, as presented in Table7.

Table 7. Variety Print AnalysisSeed Quality IndexSemai SengonAge 12 Weeks After Planting.

Sk	Db	jk	kt	F count	F Table 5%
m	2	0.0003	0.0001	0.3429 tn	3.26
K	2	0.0007	0.0003	0.8185 tn	3.26
MK	4	0.0004	0.0001	0.2526 tn	2.63
Error	36	0.0144	0.0004		
Total	44	0.0158			

Description: tn= not real. kk:0.494%

The results of the analysis of variance show that there are various types of treatment mycorrhiza And compost exert influence No real increase dry weight sengon seedlings, so there is no need to carry out further tests. For further details, increase dry weight of sengon seedlings presented in Fig9.



Picture 9. Average IncreaseSeed Quality Index Semai Sengon age 12 Sunday SafterQplant.

Although Sidi's resultskvariety shows that the effect is not real, but based on the research results it shows that there is a tendency that the treatment givenmycorrhiza deserticola 25 (gr) + swallow bird compost (m2K2)produceseed quality indexSengon seedlings were better compared to other treatments.

ISSN 2348-313X (Print)
International Journal of Life Sciences Research ISSN 2348-3148 (online)
Vol. 12, Issue 3, pp: (14-27), Month: July - September 2024, Available at: www.researchpublish.com

3.1.7 Nutrient UptakeN, P and KSemai Sengon.

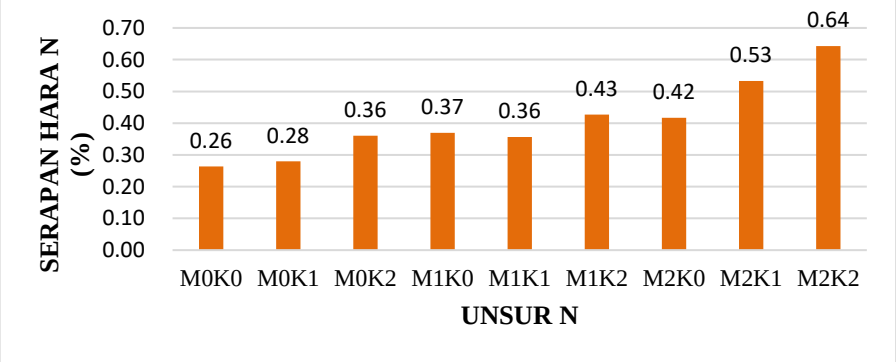
Results of N nutrient analysis in seedlingssengon (Paraserianthes*fAlcataria*(L) Nielson). age12 weeksafter planting are presented in Table8. To determine the effect of various types of mycorrhiza and compost onN nutrient uptake in seedlingssengon, analysis of variance was carried out, as presented in Table8.

Table 8. Rag Print Analysisam N Nutrient UptakeSemai SengonAge 12 Weeks After Planting.

Sk	Db	jk	kt	F. Count	F. Table 5%
m	2	0.146	0.073	1,337	3.26
K	2	0.045	0.023	0.413	3.26
MK	4	0.016	0.004	0.071	2.63
Error	36	1,972	0.055		
Total	44	0.0453			

Description: tn= not real Family: 12.249 %

The results of the analysis of variance show thatN nutrient uptake provides influence No real increase the nutrient N in sengon seedlings, so there is no need to carry out further tests. For further details, increase N nutrient uptake of sengon seedlings presented in Fig10.



Picture 10. AverageResults of Research on N Nutrient Uptake in Semail SengonUmyrrh12 Week SafterQplant.

Although Sidi's resultskvariety shows that the effect is not real, but based on the research results it shows that there is a tendency that the treatment givenmycorrhiza deserticola 25 (gr) + swallow bird compost (m2K22)produceN nutrient uptake inseedlingsengon is better than other treatments.

Nutrient P Uptake

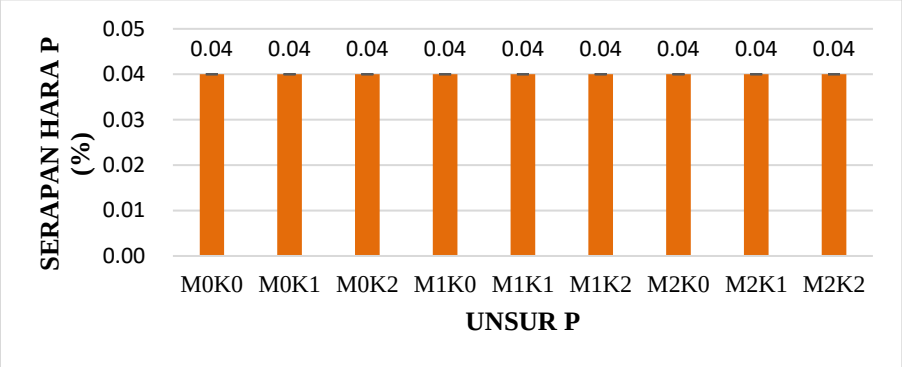
Results of seedling P nutrient analysissengon (Paraserianthes*fAlcataria*(L) Nielson). age12 weeksafter planting are presented in Table8. To determine the effect of various types of mycorrhiza and compost onN nutrient uptake in seedlingssengon, analysis of variance was carried out, as presented in Table 9.

Sk	Db	jk	kt	F. Count	F. Table 5%
m	2	0,000	0,000	0,000	3.26
K	2	0,000	0,000	0,000	3.26
MK	4	0,000	0,000	0,000	2.63
Error	36	0.017	0,000		
Total	44	0.0000			

Description: tn= not real Family: 3.561 %

The results of the analysis of variance show thatP nutrient uptake provides influence No real increase P nutrients in sengon seedlings, so there is no need to carry out further tests. For further details, increase P nutrient uptake of sengon seedlings presented in Fig11.

ISSN 2348-313X (Print)
International Journal of Life Sciences Research ISSN 2348-3148 (online)
Vol. 12, Issue 3, pp: (14-27), Month: July - September 2024, Available at: www.researchpublish.com



Picture 11. AverageResults of Research on P Nutrient Uptake in Semail SengonUmyrrh12 Week SafterQplant.

AlthoughhAsil Sidik variety shows that the effect is not real, but based on the research results it shows that there is a tendency that the treatment givenmycorrhiza and compostproduceP nutrient uptake was the same for all treatments seedling sengon.

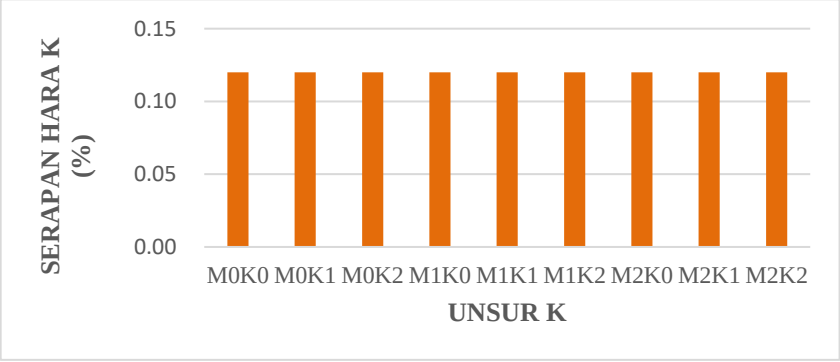
Hara K Uptake

Results of seedling K nutrient analysis sengon (Paraserianthes*fAlcataria*(L) Nielson). age12 weeksafter planting are presented in Table8. To determine the effect of various types of mycorrhiza and compost onN nutrient uptake in seedlings sengon, analysis of variance was carried out, as presented in Table9.

Sk	Db	jk	kt	F. Count	F. Table 5%
m	2	0,000	0,000	0,000	3.26
K	2	0,000	0,000	0,000	3.26
MK	4	0,000	0,000	0,000	2.63
Error	36	0.156	0.004		
Total	44	0.0000			

Description: tn= not real Kk: 6.325 %

The results of the analysis of variance show thatK nutrient uptake provides influence Noreal increase nutrient K in sengon seedlings, so there is no need to carry out further tests. For further details, increase K nutrient uptake of sengon seedlings presented in Fig12.



Picture 12. AverageResults of Research on K Nutrient Uptake in Semail SengonUmyrrh12 Week SafterQplant.

AlthoughhAsil Sidikvariety shows that the effect is not real, but based on the research results it shows that there is a tendency that the treatment givenmycorrhiza and compostproduceK nutrient uptake was the same for all treatments seedling sengon.

4. DISCUSSION

The results of the research show that the analysis of various types of treatment interactions variescompostreal influence onheight increase, but has no real effect onp, seedling stem diameter, number of leaves, weight heavy wet, weight heavy

dry, and seed quality index sengon age tribsmonths after planting. But there is a tendency for each The treatments gave slightly different growth responses.

Suharti (2008) explained that plant growth cannot be separated from the presence of factors that influence both internal and external factors. Internal factors are factors that come from the plant body itself, such as genetic factors and hormones. External factors are factors that come from outside the plant body, namely from the environment. External factors that influence growth include light, nutrient availability, water, humidity, temperature.

From the results of the sidiq variance analysis, it shows that the influence of the tailings soil treatment given various typesFMAand compost had a real influence on increasing the height of the best Sengon seedlings with treatment Glomus deserticola 25 (gr) +. compost wallet 250 (gr) (M2K2). The results of the lowest increase in height can be seen from the implementationn Glomusdeserticola and without compost (M2K0). This is thought to be a lack of nutrients in the tailings soil, resulting in a slow and non-optimal response.

The results of the sidiq analysis of variance show that diameter results have no significant effect on the treatment of various typesGlomusand compost. The best results from the diameter increase analysis are:withoutmycorrhiza + quail compost 250 (gr) (M0K1). The lowest diameter increase results can be seen in the treatment withoutFMA+ Swallow bird compost 250 (gr) (M0K2). The increase in seedling diameter is secondary growth which is much slower than the growth in seedling height. If something like this lasts long enough, it can cause the balance of the plant to be disturbed and can reduce plant growth including plant diameter (Sumiasri and Setyowati, 2006).

According to Chairuman (2008), adding compost to tailings as a planting medium can produce organic acids such as humic acid and fulphic acid, where these two acids are able to bind Al and Fe so that P becomes available as a nutrient source for plants. Compost as a source of nutrients is able to provide favorable conditions for mycorrhizae, thereby increasing available P (Khairuna et al., 2015). According to Sagala et al. (2013) that sufficient P elements are available in the soil will help the absorption of other nutrients which are very important for plant metabolic processes. Sufficient P availability, assisted by inoculation of mycorrhizal spores, can help the growth of sunflower plants more optimally.

Leaves are plant organs that synthesize food for the plant's needs as food reserves. So observations of leaves are very necessary as an indicator of plant growth and can also be used as supporting data in explaining the growth process. Leaves have chlorophyll which plays a role in photosynthesis. If there are more places to grow to carry out the photosynthesis process, the results will be more (Duaja, 2012).

The increase in the number of leaves in this study resulted in growth parameters for sengon seedlings that did not have a significant effect on all plants, but there was a tendency for the best results when given this type.*GlomusMosseae*25 (gr) + quail compost 250 (gr) produced the best number of leaves compared to other treatments and for the lowest treatment in the type of treatment givenGlomusdeserticola 25 (gr) + Without compost. According toPratiwi et al., 2017states that the high number of leaves on plants is caused by the high content of the nutrients nitrogen, phosphorus and potassium in the growth medium. The formation of leaves requires food reserves (carbohydrates and protein) in sufficient quantities. The more leaves there are, the photosynthesis process increases, so that the amount of food reserves that are stored and then used for growth increases. Gardner et al (1991) stated that the emergence and addition of leaves requires a number of nutrients in sufficient quantities which will be used in the formation of carbohydrates and proteins. Sufficient amounts of carbohydrates and protein will increase optimal growth of roots, stems and leaves

The wet weight of the crown and roots is weighed to determine how much water is contained in the crown and roots of the plant. The highest wet weight of shoots and roots was produced in the type treatmentGlomusmosseae 25 (gr) + compost wallet 250 (gr) (M1K2) produced the best wet weight compared to other treatments and for the lowest treatment in the Without treatmentFMA+ Quail compost 250 (gr) (M0K1). According to area (Nasrullah et al. 2015) An environment that supports the growth of mycorrhiza will be in good symbiosis with plant roots so that it will create external hyphae on plant roots to a large extent.

The higher the dry weight of the plant, the better the plant growth will be because the photosynthesis process runs smoothly and the plant also absorbs more nutrients and water (Valentine et al. 2018). In this study, dry weight had no significant effect on the increase in dry weight of sengon seedlings. Type assignment*Glomusdeserticola*25 (gr) + wallet bird compost (M1K2) gave the best results compared to other treatments, but for the lowest treatment in this type*Glomusdeserticola*25 (gr) + without compost produces low dry weight. Mycorrhizal plants have the ability to absorb the nutrient P and other

nutrients such as N, K and Mg. This is because mycorrhizae have root hyphae that will grow longer than plants without mycorrhizae so that plants with mycorrhizae have higher root weight (Hartoyo et al. 2011).

The seed quality index (IMB) is intended to determine the level of resistance of a seed to being transferred to the field. The addition of mycorrhiza and compost to sengon plants resulted in the highest IMB value in the M2K2 treatment, while the lowest IMB value was in the M2K1 treatment.

According to Setyamidjaja (1986), the elements N, P and K in the plant body play a role in stimulating the growth and division of new cells so that they directly influence the formation of leaves. The number of plant leaves is greatly influenced by the dose of nitrogen fertilizer, the supply of nitrogen is limited from the roots to the leaves and stems, so in the vegetative phase the nitrogen content in the lower leaves becomes a source of nitrogen which is mobilized to the upper leaves. According to Harjadi (1979), the vegetative growth phase indicates the use of carbohydrates for the development of plant roots, stems and leaves.

Element P is an important element for plants for conversion, storage, transportation and use of energy in plants (Sagala et al., 2013). P uptake increases with increasing P availability in the soil. The addition of mycorrhizal spores aims to help the plant absorb P. According to Chairuman (2008), mycorrhizae can increase nutrient uptake with the presence of external hyphae which have a wide reach and are able to meet the needs of plants for optimal growth.

REFERENCES

[1] Triadriani, L.N., Handayanto, E., and Utami, S.R. (2014). The Use of *Caladium Bicolor, Paspalum Conjugatum,* and *Comelina Nudiflora* for the Remediation Mercury Contaminated Soil of Gold Mine Waste and The Effect Growth and Production of Maize Plants. Malang. Brawijaya University.

[2] Ahwal K., Muin A., Reine. (2014). Resilience of Medang (*roxb*.) and Spruce (*Casuarina junghuniana*) Against Mercury Concentration in Tailings Media with Arbuscular Mycorrhizal Fungi (FMA) Inoculation. Journal of Sustainable Forest.Vol. 4 (3) : 322 – 334

[3] Syofiani, R. and Oktabriana, G. (2017). Application of Guano Fertilizer in Increasing Nutrients N, P, K, and Soybean Plant Growth On Gold Mine Taitling Planting Media. STIPER Sawahlunto Sijunjung. Sijunjung.

[4] Zulkifli A. (2013). Sustainable Mine Management. Jakarta. Graha Ilmu. ISBN: 978-602-262-216-1

[5] Baskorowati L. (2014). Superior Sengon (*Falcataria moluccana*) Cultivation for Community Forest Development. Community Forest Development. Bogor (ID): IPB Press

[6] Ulfa, M., Kurniawan, A., Sumardi, & Sitepu, I. (2011). Population of Mycorrhizal Fungi Arbuscular Fungi (FMA) Local in Post Coal Mine Land. Journal Forest Research and Nature Conservation, 8(3), 3.

[7] Lubnan (2013). Effect of Organic Planting Media on Growth and Rooting in the Early Phase of Tea Seeds in the Nursery. Journal of Research Tea and Quinine, Vol. 16 No. 1, 2013: 1-11

[8] Elpawati 2015. Optimizing the Use of Compost Fertilizer with the Addition of Effective Microorganism 10 (Em10) on Corn Plant Productivity (*Zea mays* L.)

[9] Decree of the Minister of Forestry and Plantations No. 24/Kpts-II/1999. Bureau Law and Organization of the Ministry of Forestry R.I

[10] Mulyani, N.S., M.E. Suryadi, S. Dwiningsih, and Haryanto. (2001). Dynamics of Nitrogen Nutrient Dynamics in Rice Field Soil. Journal of Soil and Climate (19):14-25.