

Study Of Pruning On Growth Recovery Of Oil Palm (*Elaeis guineensis* Jacq.) Seeds Affected By Leaf Spots In Main – Nursery.

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Abstract. Fulfilling the need for quality seeds can be done by doing the right pruning and according to the growth phase. This study aimed to obtain the appropriate frequency and amount of midrib pruning to optimize the growth of oil palm seedlings affected by leaf spot in the main nursery. This research was carried out at the Oil Palm Nursery Business Unit of the Lampung State Polytechnic from April to September 2022. The research was carried out using a 2 x 3 factorial randomized design with 6 replications. The first factor is the frequency of pruning which is done every 3 weeks (P1) and every 6 weeks (P2). Factor two consisted of the number of leaves that were pruned, namely 0 leaves (D1), 1 strand (D2), and 2 strands (D3). Observations will be made on the variables of plant height, seedling stem diameter, number of leaves, and the level of greenness of the leaves. Observational data will be analyzed by F test at level = 5%. If the results of the analysis of variance are significant, it will be continued with the further test of the smallest significant difference (BNT) at the level of = 5%. The results showed that the application of pruning once every 3 weeks with 1 pruned leaf showed optimal growth in each observed variable.

1. Introduction

Oil palm (*Elaeis guineensis* Jacq.) is a plantation commodity that has a very high potential. The potential for palm oil that is currently being and continues to be promoted is the result of palm oil being used as a bio-diesel material for renewable energy B80. This resulted in an increase in the area of oil palm plantations from year to year. The development of the area of oil palm in the 2018 - 2020 range is 200,000 - 300,000 ha per year [1]. The increase in area requires the availability of good oil palm seeds that are free from pests and diseases.

Healthy and quality seeds can be available if during the nursery phase good maintenance is carried out. Provision of these seeds can be realized if good maintenance is carried out, namely by technical culture methods. The application of technical culture methods that can be applied, one of which is by trimming the leaves or midribs. [2] states that pruning can be done by reducing branches, leaves and twigs or midribs that are parasitic and unproductive. In addition, pruning aims to stimulate the growth of new shoots and roots so that by itself it will increase the number of tillers and the number of plant leaves [3].

Pruning can be good or bad for plant growth. Pruning time will increase or decrease the rate of photosynthesis and plant metabolism [4]. [5] added that the time or frequency and interval of pruning, type and conditions will affect plant growth and yield. Another purpose of pruning is to stimulate the emergence of shoots [6], in which shoot production increases with increasing frequency of pruning [7]. The more branches a plant has, the more leaves there are. Therefore, it is necessary to test the frequency and amount of midrib pruning in optimizing the growth of oil palm seedlings.

2. Methods

The research will be carried out from April to September 2022. The research location is in the Oil Palm Seedling Business Unit of the Lampung State Polytechnic, Rajabasa, Bandar Lampung. The tools that will be used in the research include: Pruning shears, meter, calipers, SPAD-502 Plus (Konica Minolta, Japan), CID Bioscience portable laser leaf area meter, scales, buckets, and measuring cups. The materials to be used in the research include: DxP Simalungun (PPKS, Medan) oil palm seedlings aged 1 month in the main nursery, bamboo, sheet plastic, NPK fertilizer and potassium nitrate fertilizer.

The experimental design applied was a 2 x 3 factorial pattern which was repeated 6 repetition. The first factor is the frequency of pruning which consists of once every 3 weeks (P1) and every 6 weeks (P2). The second factor is the number of pruned leaves as much as 0 strands (D1), 1 strand (D2), and 2 strands (D3). Each experimental unit (36 Experimental Units) consisted of 3 seeds as observation samples.

Research implementation includes preparation, application of treatment and maintenance of plants. Treatment preparation included preparing the planting medium by filling in the main-nursery polybags, and transplanting the seedlings from the initial nursery to the main nursery. Treatment was applied to seedlings that were 1 month old in the main nursery and were attacked by leaf spot disease. Maintenance carried out is loosening the soil, controlling pests and diseases, weeding and watering. Observations were made after 6 months from the first treatment application. Growth parameters observed were plant height, seedling stem diameter, leaf greenness level.

3. Results and Discussion

The results showed that the frequency of pruning and the number of pruned leaves had a significant effect on the growth recovery of oil palm seedlings that were attacked by leaf spot disease in the main nursery. This can be seen from the recapitulation of calculations for each observation variable showing significantly different results. Recapitulation of the calculation of each observation variable is presented in Table 1.

Table 1. Results of the Effect of KNO₃ and Kieserite Analysis of Variance on the Growth of Oil Palm Seedlings Affected by Leaf Spot in the Main Nursery.

| Observation Variable | Signification (F-Count Treatment Value) | | |
|-----------------------------|---|--------------------------|-------------|
| | Pruning Frequency | Number of Trimmed Leaves | Interaction |
| Seedling Height | 47,18* | 344,13* | 6,61* |
| Seedling Stem Diameter | 25,80* | 30,97* | 6,54* |
| The Greenness of the Leaves | 37,46 | 106,02* | 14,59* |

* = significant effect at the level $\alpha = 5\%$

The results of this study indicate that the application of pruning which is related to the frequency of pruning and the number of leaves pruned shows significantly different results for all observational variables in Table 1. The interaction shows that the frequency of pruning is once every three weeks and the number of leaves pruned is 1 leaf. the best growth recovery in all observed variables (Table 2). The results of this study are in line with [8], that high pruning by administering BAP cytokines was able to increase the number of shoots, fresh weight, and dry weight of tea plants. [9] added that adjusting the amount of palm fronds (time and amount of pruning) is able to optimize palm oil production. In addition, [10] also stated that pruning was able to increase the number of leaves, branches, and stem diameter in Moringa seedlings from seeds. In addition, the pruning aims to stimulate the growth of new shoots and roots so that by itself it will increase the number of tillers and the number of leaves of the plant [3].

The results of pruning when done with too many leaves trimmed with an inappropriate time frequency will result in disturbed plant growth. Pruning can be good or bad for plant growth. Pruning time will increase or decrease the rate of photosynthesis and plant metabolism [4]. [5] added that the time or frequency and interval of pruning, type and conditions will affect plant growth and yield.

Effective pruning will lead to the stimulation of continued growth of shoots and branches and can reduce the rate of disease spread when exposed to late blight and leaf spot. Destifa (2016) stated that pruning can stimulate the emergence of shoots in which shoot production increases with more intensive pruning frequency [6]. Therefore, with the results obtained, it can be used as a reference in the application of technical culture to optimize growth after leaf spot disease attacks in oil palm main nurseries.

Table 2. LSD test results on average seedling height, seedling stem diameter, and leaf greenness of oil palm seedlings affected by leaf spot disease in the main nursery.

| Observation Variable | Pruning Frequency | Number of Trimmed Leaves (leaf blade) | | | | | |
|---------------------------------|----------------------|---------------------------------------|---|-------------|---|-------------|---|
| | | 0 | | 1 | | 2 | |
| Seedling Height (cm) | Once in 3 Weeks (P1) | 94,40 A | c | 106,20 A | a | 100,04 A | b |
| | Every 6 Weeks (P2) | 93,15 A | c | 102,29 B | a | 98,48 B | b |
| BNT | | | | 1,26 | | | |
| Seedling Stem Diameter (cm) | Once in 3 Weeks (P1) | 4,87 A | c | 5,24 A | a | 4,91 A | b |
| | Every 6 Weeks (P2) | 4,84 A | c | 4,95 B | a | 4,79 B | b |
| BNT | | | | 0,11 | | | |
| The Greenness of the Leaves (%) | Once in 3 Weeks (P1) | 50,24 A | c | 58,29 A | a | 52,61 A | b |
| | Every 6 Weeks (P2) | 49,88 A | c | 53,68 B | a | 51,36 B | b |
| BNT | | | | 0,97 | | | |

Description: Numbers followed by the same letter show results that are not significantly different in the BNT test with an α level of 5%, Uppercase letters are read downwards and lowercase letters are read horizontally

4. Conclusions

Based on the results of the study, it can be seen that the frequency of pruning every three weeks and the number of leaves that are pruned as much as 1 strand resulted in the best growth recovery of oil palm seedlings in the main nursery.

5. References

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