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Vegetative Growth Response of Tobacco Plant Local Varieties of Payakumbuh the Age Moving to the Field

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Abstract.

Tobacco are an elite good. The individual consumer selection determines the quality standards. The cultivation elements around plants have a significant impact on the success of tobacco production, in addition to the potential of the plants themselves. One of the less expensive criteria for attaining the objective of improving productivity and quality is the adoption of superior varieties. Using seedlings of unknown age when transferring plants to fields is one of the issues with tobacco farming in the West Sumatra Province's fifty-city district. The purpose of this study is to determine the appropriate transplant age for tobacco plants of regional types found in the districts of fifty cities. This study used a random group scheme with a single factor different ages at which local tobacco crops were transplanted. At the 5% level, the ratio analysis (test F) was used to analyse the data. At level 5%, the findings of the real ratio test were followed up with the Minimum Real Difference test.The following metrics were noted: plant height (cm), leaf width (cm), leaf length (cm), upper wet leaves wet weight (g), lower dry leaves dry weight (gram), middle dry weight (gram), and upper dry weight(gram).

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Observations When comparing the parameters of crop height, leaf length, leaf width, fresh leaf weight, and dried leaf of a tobacco plant, the usage of 45 days post-sowing seedage age had the greatest influence, as opposed to 30 days old seeds(DOS), 35 DOS, 40 DOS, 55 DOS, and 60 DOS.

Keywords: Local variety; transplant age; tobacco plants.

1. Introduction

Tobacco is a fancy commodity. The quality standard depends on the individual buyer's taste. Tobacco plants are agricultural commodities that play a strategic role in the national economy, that is, are a source of national income through state currency, taxes, and taxation, as well as farmers' sources of income, and can create jobs. Given the huge and significant contribution of tobacco to national revenue, the management of cigarettes must be taken seriously [1]. In the years 2021, the area of tobacco plantation in Indonesia was 213,700 hectares, but years 2022, it had decreased to 202,500 hectares. The production of Indonesian tobacco crops in 2021 will be around 245,400 tonnes, and in 2022, it will be 5,700 tons. Indonesia will also import 164,659.6 tonnes of tobacco by 2021 [2].

The production of tobacco crops is affected by the development of crops in the field. Tobacco plants are site-specific plants. Depending on where tobacco is planted, it produces different yields and qualities. There are three areas of Indonesia that have location-specific outputs: besuki tobacco grown in Jember, vorstenlanden in Klaten, and delica in North Sumatra [1]. The success of tobacco production, in addition to determining the potential of plants, is also heavily influenced by the cultivation factors that exist around plants. The use of superior varieties is one of the cheap prerequisites for achieving the goal of increasing productivity and quality. The means of production, together with other elements of cultivation and the environment, have a strong influence on the level of production [3]. One of the problems with the cultivation of tobacco plants in the fifty-city district, West Sumatra Province, is the use of unknown-age seedlings when moving plants to fields. [4] using seedlings with a number of leaves as many as 3–4 leaves for planting in the field. In addition to that, the type of embroidery system is divided into three categories: traditionally (busted), polybag and pottray. The aim of this research is to find the right transplant age for tobacco plants of local varieties that exist in the districts of fifty cities.

2. Research Methodology

The study employs a randomized block design experimental design, with a single factor being the varying ages at which local tobacco crops are transplanted. This study comprises six parts of the treatment, which are outlined as follows:

A0 = age of transplantation is 30 days.

A1 = age of transplantation is 35 days.

A2 = age of transplantation is 40 days.

A3 = age of transplantation: 45 days.

A4 = age of transplantation: 50 days

A5 = age of transplantation: 55 days.

Observations were conducted at three different time points: when the plants were 30 days after sowing (HST), 45 HST, and 60 HST. These observations included measurements of growth and the weight of fresh and dried tobacco leaves. The data analysis was performed using a 5% significance level (F-test). The findings of the actual test were followed by a minimal real difference test with a significance level of 5%. The research implementation encompassed several key steps, including ground preparation, media preparation, zeolite application, basic fertilisation, seedling planting, maintenance activities such as watering, advanced fertilisation, propagation and planting, as well as pest and disease control. The measured variables are plant height (cm), leaf width (cm), leaf length (cm), lower leaf wet weight (g), middle leaf wet weight (g), upper leaf dry weight (g), bottom leaf dry weight (g), and middle dry weight (g).

3. Results and discussion

3.1. Plant height

According to the LSD analysis (Table 1), there is no significant difference in plant height observations at 30 days after planting (DAP). Plant height measurements were taken at 45 HST. The plant with the greatest seed utilisation reaches maturity in 45 days following germination. Age 60 HST higher plants are observed using a half-life of 45 HSS. Plant development is influenced by both genetic factors and the growth of the plant. Plant development is characterised by continuous progression, with the growth and development of plants steadily increasing on a daily basis. Furthermore, the growth of tobacco crops is also influenced by the element's availability during plant development. The findings of a study conducted by [5] revealed that augmenting the intensity and timing of fertilisation, along with the specific combination of fertilisers employed, can result in a substantial rise in the height of tobacco plants, up to a maximum of 168 cm. [6] discovered that, apart from external factors, the genetic makeup of tobacco plants also plays a role in determining their height. Specifically, certain varieties of tobacco plants have the potential to grow as tall as 277 cm. Tobacco plants assimilate nitrogen during a period of vigorous growth, specifically within 3–4 weeks after being planted. Only a fraction of the total nitrogen, specifically less than 80%, is taken up by the plant until it reaches an age of 4-6 weeks. The reference is from [7].

Table 1: average height of tobacco plants at various ages used when transplanting seedlings into the field

Treatment	**Tobacco Plant Plant Height**		
	30 DAP	**45** DAP	**60** DAP
Seed aged 30 days after sowing	11,60 a	41,40 a	79,20 a
Seed aged 35 days after sowing	12,53 a	47,27 a	100,93 b
Seed aged 40 days after sowing	9,27 a	45,47 a	109,20 b
Seed aged 45 days after sowing	12,27 a	51,47 b	133,20 b
Seed aged 50 days after sowing	10,93 a	31,60 a	97,40 b
Seed aged 55 days after sowing	10,93 a	33,04 a	100,73 b
KK (%)	27,33%	19,51%	8,97%

Explanation: The average values followed by the same letter do not significantly differ according to the Advanced LSD Test at a significance level of 0.05.

3.2. Length and width of tobacco plant leaves

The production component in the vegetative phase of tobacco plants is generally represented by the number of leaves and the length and width of the leaves [6] Based on the analysis of LSD with the use of 45 days old seeds, obtained the highest leaf width (table 2) among other seed life uses, both at observations of 30 DAP, 45 DAP and 60 DAP. The length of leaves of tobacco plants with the use of seed age 45 DAP obtains the maximum leaf length at the ages of 45 and 60 HST. The length and width of the leaf (table 2 and table 3) are parameters for determining the growth rate of photosynthesis per unit of dominant plant, determined by leaf size [8]. . The growth speed of the plant is influenced by the rate of net assimilation and leaf width [9].

Table 2: Average leaf width of tobacco plants and the age at which the seedlings were transferred to the field

Treatment	**Width of Tobacco Plant leaves**		
	30 DAP	**45** DAP	**60** DAP
Seed aged 30 days after sowing	10,00 a	15,93 a	23,13 a
Seed aged 35 days after sowing	13,83 b	21,00 b	27,93 b
Seed aged 40 days after sowing	13,63 b	21,93 b	28,33 b
Seed aged 45 days after sowing	16,90 b	24,13 b	32,40 b
Seed aged 50 days after sowing	11,07 a	17,13 a	24,60 a
Seed aged 55 days after sowing	15,54 b	21,27 b	24,60 a
KK	11,05%	12,77%	9,90%

Explanation: The average values followed by the same letter do not significantly differ according to the Advanced LSD Test at a significance level of 0.05.

Table 3: Average leaf length of tobacco plants and the age at which the seedlings were transferred to the field

Treatment	**Length of Tobacco Plant leaves**		
	30 DAP	**45** DAP	**60** DAP
Seed aged 30 days after sowing	16,60 a	28,73 a	39,27 a
Seed aged 35 days after sowing	22,27 a	34,13 b	41,47 a
Seed aged 40 days after sowing	22,73 a	33,53 b	43,40 a
Seed aged 45 days after sowing	21,30 a	34,00 b	45,87 b
Seed aged 50 days after sowing	18,23 a	27,13 a	35,87 a
Seed aged 55 days after sowing	19,60 a	28,20 a	37,13 a
KK	19,51%	10,81%	8,56%

Explanation: The average values followed by the same letter do not significantly differ according to the Advanced LSD Test at a significance level of 0.05.

3.3. Wet weight and dry weight of tobacco plant leaves

The wet weight refers to the complete weight of a plant. [9] asserted that moist weight is an indicator of the makeup of plant tissue, including the presence of water. The fresh weight is frequently utilised to measure the pace of growth in plants. The anticipated weight on the tobacco plant's leaves is mostly determined by the disparity between the weight of fresh leaves and that of dry leaves. The foliage is categorised into three distinct groups: bottom leaves, middle leaves, and top leaves. Based on the information presented in Table 4, The fresh weight of the lower leaves is implausible, however the fresh weights of the intermediate leaf and the upper section vary. The weight of the leaf when it is still moist and has not yet dried out. The wet weight of a plant refers to the total weight of a harvested portion of the plant before any water loss or flushing occurs [10]. As stated by [11], the weight of the plant is determined by the amount of water it contains, which in turn is impacted by the environmental conditions the plant is exposed to.

Table 4: average fresh weight of tobacco plants at various ages of transplanting seedlings

Treatment	Fresh Leaf Weight Tobacco Plant (gram)		
	Lower Leaves	**Middle Leaves**	**Upper Leaves**
Seed aged 30 days after sowing	121,67 a	212,67 a	64,67 a
Seed aged 35 days after sowing	123,33 a	218,67 a	74,33 a
Seed aged 40 days after sowing	127,47 a	256,00 a	92,53 b
Seed aged 45 days after sowing	155,67 a	263,67 b	98,00 b
Seed aged 50 days after sowing	129,33 a	161,33 b	69,67 a
Seed aged 55 days after sowing	129,33 a	161,33 b	69,67 a
KK	18,82%	17,16%	18,31%

Explanation: The average values followed by the same letter do not significantly differ according to the

Advanced LSD Test at a significance level of 0.05.

The dry weight of a plant is determined by the equilibrium between the uptake of CO2 via photosynthesis and the release of CO2 through respiration [9]. The source cited is [12]. The research findings by [13] revealed that the dry weight of tobacco plants varied between 54.59 grammes and -83.30 grammes. The reference is from the study conducted by [14]. The maximum dry weight of tobacco leaves was 83.04 grammes.

Table 5: average dry weight of tobacco plants at various ages of transplanting seedlings

Treatment	Weight Dry Leaf Tobacco Plant		
	Lower Leaves	**Middle Leaves**	**Upper Leaves**
Seed aged 30 days after sowing	16,00 a	26,20 a	12,93 a
Seed aged 35 days after sowing	18,20 a	34,53 a	12,73 a
Seed aged 40 days after sowing	21,73 b	45,47 a	14,60 a
Seed aged 45 days after sowing	23,40 b	35,53 a	22,00 b
Seed aged 50 days after sowing	23,27 b	42,40 a	14,33 a
Seed aged 55 days after sowing	25,53 b	43,13 a	14,33 a
KK	15,74%	26,59%	27,08%

Explanation: The average values followed by the same letter do not significantly differ according to the Advanced LSD Test at a significance level of 0.05.

4. Conclusion

The use of seedage age 45 days after sowing gives the best effect on the parameter of plant height, leaf length, sheet width, fresh leaf weight and dry weight of leaf of tobacco plant compared to the use of 30 years old seedlings, 35 years old, 40 HSS, 55 HSS and 60 HSS.

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