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The Influence of Leaf Harvesting Methods on Tobacco Seed Production and Quality

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Abstract: To produce high-quality seeds, the harvest must be carried out on time so that the seed maturity is almost uniform. Like wise to produce seeds of high physiological quality. The study was conducted at the Karangploso Experimental Garden, Balittas Malang, in January-October 2017. The varieties used were Prancak-N1, with 6 treatments namely: (1) Leaves harvested and shredded, (2) Leaves harvested and shredded are not discarded, (3) Leaves not harvested and suckers not removed (4) Leaves not harvested and shredded (5 koseran leaves not harvested shingles disposed and (6) Koseran leaves harvested and shredded discarded.The treatment was planted as many as 10 polybags with a size of 20 kg of soil, one plant per polybag, population of each treatment as many as 10 plants with 3 replications. The fertilizer used was NPK fertilizer with a dose of 15 grams per plant. Analysis used Randomized Group Design repeated 3 times, to calculate the variance using the Duncan Distance Test (DMRT) with a level of 5%. The purpose of the study was to determine the effect of the treatment of harvesting leaves and tobacco flowers on the production and quality of the seeds produced. The results showed that the highest seed production from the six treatments was treated with leaves not harvested and shredded, the highest production of seeds reached 17.4 grams, but not significantly different from the treatment of koseran leaves not the harvested sirung was disposed of (16.10 grams) and the coseran leaves were harvested, the flush was disposed of (15.70 grams). For the highest seed vigor test, the leaves were not harvested and the flush was disposed (17.40%), while the highest germination test for the flush treatment was reached (93.33%), but not significantly different from the treatment of the leaf leaves not harvested by sirung discarded (91.33%) and the treatment of koseran leaves was harvested, flush was disposed (84.68%). Observation of abnormal sprouts from the six treatments was not significantly different between 1.33%-2.33%.

Keywords: How to harvest; Leaves; Sirung; Tobacco seeds

Introduction

Madura tobacco as a raw material for cigarettes is a commodity that has a competitive advantage in Madura as a development area. In Madura, one of the regions as a provider of local tobacco which is able to contribute 40-80% of farmers' income. 80% of the need for tobacco comes from within the country. Quality tobacco is needed to meet the demand for tobacco and benefit farmers. In the successful management of high-quality and productive tobacco, many factors must be met, one of which is the use of quality seeds (Rachman, 2021). Quality seeds must have at least two criteria, namely clear origin (true to type) and high viability (Nugroho, 1987; Sari et al., 2017). To support the statement above, seed technology is a method for studying aspects related to seeds. Understanding of the constraints faced in the seed system needs to be identified. Therefore, the factors that need to be considered in the implementation of quality seed production activities are the observation of seed quality (quality safeguarding). This research aims to increase the productivity and efficiency of quality seed production.

One way of cultivating Madura tobacco is to do pruning or pruning of plant shoots as candidates for flower production, this is done to get thick tobacco

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leaves so that the quality of the tobacco leaves is good. If the tobacco plants are not pruned, the nicotine levels in the leaves will be very low. Pruning is usually accompanied by removal of shoots (wiwil/sulang). Early pruning, leaving only a few leaves, results in thick, broad, high nicotine tobacco leaves; whereas pruning slowly (until the plant releases flowers) produces thin, narrow, low-nicotine leaves. Harvesting young tobacco leaves will make it difficult for chlorophyll to be broken down and produce tobacco that tastes bitter, smells musty and has a dull color (Chouteau et al., 1988; Rachman, 2003; Suwarso et al., 1992; Tso, 1972).

To get quality production, farmers override the quality of plant materials, namely in the form of seeds produced. Madura tobacco farmers to produce seeds are taken from plants that have been pruned and harvested leavesUnfortunately, the seeds are taken from the cloves of plants that produce flowers, so the quality of the seeds produced is very low, because the plants lack nutrients.

Handayani et al. (2018) stated that seeds are a vital need for farmers, this is because seeds are one of the means to be able to produce plants that produce maximum. Besides that, the seed as an important organism that carries all the genetic characteristics of plants. Morris (1988), suggested that the genetic nature of these plants determines the yield potential and greatly influences the effectiveness of photosynthesis, this occurs because of the plant's ability to convert energy from sunlight, water, air, and nutrients into biomass. Andrini et al. (2013) states that the highest quality seeds are obtained when the seeds reach physiological maturity because at that time the seeds have the maximum dry weight, viability and vigor.

To support the statement above, seed technology is a method for studying aspects related to seeds, identifying the constraints faced in seed systems. Understanding in aspects of seed technology usually aims to increase the productivity and efficiency of quality seed production. One of the main variables observed is the quality of the seeds produced, in addition to other variables such as yield and its components. Therefore, the factors that need to be considered in the implementation of quality seed production activities are the observation of seed quality (quality safeguarding).

By taking the right actions from the selection of main seeds to the post-harvest process, it is hoped that high quality seeds can be obtained including genetic quality, physical quality and physiological quality. Seeds of a variety that have a high value for these three qualities will produce good, uniform plantings and can express the genetic potential of the variety used so as to provide satisfactory results.

Seeds that have been cleaned and packed always require storage from several months to several years, before finally the seeds reach the entrepreneurs or farmers. Problems in seed storage are often the main obstacle that hinders the supply of quality seeds (Herwati et al., 2005; Sari et al., 2017).

The aim of this research was to obtain information on the productivity and physiological quality of tobacco seeds. Tobacco seeds with good physical and physiological quality will affect the growth and storage capacity of the seeds. Based on the background above, it is necessary to do research onthe effect of leaf harvesting on the production and quality of tobacco seeds.

Method

The research was conducted at the Karangploso Experimental Garden, Balittas Malang, with an altitude of 515 m DPL, climate type D (moderate) inJanuary-October 2017. The genetic material used was the Prancak Tobacco Variety – N1.

The study used a randomized block design (RBD) repeated 3 times. Treatment in research includes:(1) Leaves harvested and side shoots removed, (2) Leaves harvested and side shoots not removed, (3) Leaves harvested along with side shoots and koseran leaves not removed (4) Leaves not harvested and side shoots and koseran leaves removed (5) Leaves not harvested and side shoots removed (6) Leaves not harvested and side shoots and koseran leaves removed. SetEach treatment consisted of 10 polybags with 1 plant per polybag in a planting medium of 20 kg of soil.

The fertilizer used was NPK fertilizer with a dose of 15g per plant which was given 3 times, namely 1 week before planting, 5g when the plants were 14 days old, and 5g given when the plants were 30-40 days after planting. Pesticides used include insecticides and fungicides whose use is adjusted to the conditions of the plants during growth until fruit harvest. The flowers are eroded, when the capsule is dry it reaches ± 25%. Observations included seed production for each plant, vigor, germination, and abnormal sprouts. The germination test was carried out at the Balittas Seed Laboratory, Malang. Data analysis used a variance with Duncan's Range Test (DMRT) with a level of 5%.

Result and Discussion

The results of the research in Table 1 show that in treatment (4) the leaves were not harvested and the side shoots and kosheran leaves removed gave the highest results in: seed/tree production which reached 17.40 kg, seed vigor 65.67%, and seed germination rate (93.33%). Seed production was not significantly different from treatment (5), namely: leaves were not harvested and side shoots removed, seed production/tree 16.10 kg, seed vigor 52.33%, and seed germination rate (91.33%) and treatment (6) namely: leaves were not harvested and side shoots and cosserole leaves removed resulting in seed/tree production 15.70 kg, seed vigor 50%, and seed germination rate (84.68%).

Table 1. Seed Production, Seed Vigor, Seed Germination, and Abnormal Germination

Treatment	Production of seeds/plants	Vigor seed	Germination Seed	Abnormal sprouts
	Grams		……….. %	…………..
The leaves are harvested and the side shoots are removed	13.40c	34.33c	60,67b	1.33 ab
Leaves are harvested and side shoots are not removed	12.30 c	27.33c	62.33 b	2.33 a
The leaves are harvested and the side shoots and leaves are not removed	12.77c	23.33c	65.00b	1.00b
The leaves are not harvested and the side shoots and leaves are removed	17.40a	65,67 a	93.33a	1.67 ab
The leaves are not harvested and the side shoots are removed	16.10 ab	52.33 b	91.33a	1.00b
The leaves are not harvested and the side shoots and leaves are removed	15.70 ab	50.00b	84.68 a	1.67 ab
households (%)	10.55	14.93	10.92	0.45

Note: Numbers accompanied by the same letters in one column are not significantly different in the 5% BNT test.

In treatment 1 (leaves harvested and side shoots removed), treatment 2 (leaves harvested and side shoots not removed) and treatment 3 (leaves harvested and side shoots and side shoots removed), seed/tree production (12.30 gram to 13.40 gram), seed vigor 23.33% to 34.33%), and germination rate (60.67% to 65.00%), the three treatments yielded low results when compared to the treatment 4, treatment 5 and treatment 6.

In treatments 4, 5 and 6 the available nutrients for plant growth were sufficient and would further support fruit formation and seed filling quite well, so that seed production and quality were high. Macgregor et al. (2015), argued that the environment in which plants grow and develop affects the production and quality of the seeds produced. Mayun (2016) and Hasanah et al. (2021) stated that to produce seeds with physical and physiological quality, environmental conditions that support plant growth are needed.

Environmental factors such as temperature, water, oxygen, light, rainfall, soil moisture, mineral nutrients in the soil and types of microorganisms are elements that determine the physiological quality of seeds. Maximum seed maturity will increase the physiological maturity of the seed (Andrini et al., 2013). According to Hasanah et al. (2021), in the period of seed formation, namely from the time of anthesis to physiological maturity, environmental factors grow greatly affect the process of seed formation and the quality of the seeds produced.

The factors of water and soil nutrition are more dominant in influencing seed quality. To produce seeds of high physical quality, harvesting must be carried out on time so that the maturity of the seeds is almost uniform. Likewise, to produce seeds of high physiological quality. Delouche (1985) states that during physiological ripening conditions the seeds achieve germination, vigor, maximum dry weight and seed size as well as optimum moisture content. Mayun (2016), Ningsih (2018), and Hasanah et al. (2021) also argued that the seed is said to be of high quality if the physical and physiological quality is good, because the physical quality of the seed is the interaction between genetic factors and the growing environment where the seed is produced.

Kolo et al. (2016) states that seeds are categorized as high quality if their viability and vigor are high. Seed viability as an indicator to measure the ability of seeds to germinate into normal or abnormal seeds. Muis et al. (2021) and Zhang et al. (2019) stated that seeds with high vigor were characterized by their ability to last a long time in storage, resistance to pests and diseases, fast and uniform growth, and normal growth with good production results even though they were planted in a sub-optimal environment (Hapsari et al., 2017; Muis et al., 2021; Sari et al., 2017).

Furthermore, it is said that the harvest is done before it is physiologically ripe, even though the seeds are able to germinate, their vigor has not reached the maximum. In general, maximum vigor is achieved when the dry weight is maximum. Conversely, if the harvest is delayed until it is past physiological maturity, it means that seed storage has occurred. High quality seeds can be obtained if the planting environment for seed production is optimal, so that plants can produce seeds with high vigor.

Seed is the beginning of planting and determines the success of planting. High-quality seeds will produce good planting, and then provide optimal results (Hasanah et al., 2021; Mayun, 2016; Ningsih, 2018). Seed quality includes genetic quality, physical quality and physiological quality. Seeds with high physical quality must be clean from a mixture of physical impurities such as sand, soil, dry stalks or leaves, but also clean from a mixture of dead seeds or physically abnormal seeds. Physiological quality reflects the ability of seeds to be able to live normally in a wide range of natural conditions, able to grow quickly and evenly, while high genetic quality is reflected in its genotypic and phenotypic uniformity. The period of seed formation, namely from the time of anthesis to physiological maturity, environmental factors grow greatly affect the process of seed formation and the quality of the seeds produced. The factors of water and soil nutrition are more dominant in influencing seed quality. Ningsih et al. (2018), Mayun (2016), and Muis (2021), said that to produce seeds of high physical quality, harvesting must be carried out on time so that the seed maturity is almost uniform. Likewise, to produce seeds of high physiological quality. Rolletschek et al. (2021), stated that during physiological ripening the condition of the seeds reached germination, vigor, maximum dry weight and seed size as well as optimum moisture content. Furthermore, it is said that the harvest is done before physiological maturity, even though the seeds are able to germinate, their vigor has not reached the maximum. In general, maximum vigor will be achieved at maximum dry weight. Conversely, if the harvest is delayed until it is past physiological maturity, it means that seed storage has occurred. The use of high-quality tobacco seeds from superior varieties will have a broad socio-economic impact on farmers. By using high quality seeds, plant productivity is guaranteed.

Conclusion

The results showed that to produce quality seeds, the leaves were not harvested, the koseran leaves were removed and the side shoots were removed. This treatment resulted in 17.4 grams/tree of good quality seeds, 65.67% vigor and 93.33% germination.

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Author Contributions
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Conflicts of Interests
The authors declare no conflict of interest.

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