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Plant Response Long Bean (*Vigna sinensis* L.) Shoots Pruning of Age Increase Production

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ABSTRACT

Long beans (Vigna sinensis L.) is a vegetable pod favored by the public culture forms chickpea cultivation has long been cultivated by the farming community as the principal livelihood mainly rural areas in Indonesia. The study aims to determine the response of bean plants to bud trimming age. This research was carried out by using a randomized block design consisting of four treatments: Plants are not pruned, the pruned plants 17 days after planting (DAP), pruned plant age 34 DAP and pruned plant age 51 DAP. This treatment was repeated three times. Observational parameters: the number of leaves, the number of branches, the amount of stalk, pods, pod length, pod weight, and the production ha-1. Results showed treatment without trimming gives better results on the number of leaves (60.89 strands), gives better results on fruit branches (9.66 fruits) and pod length (57.99 cm), pruned plant age 34 days after planting give better results in the number of pods (30.66 fruits), and the stalk pods (21.77 fruits). While production at 34 DAP pod weight (611.86 g), pruning at the age of 34 DAP gives better results than other treatments. With good bud trimming branches can increase production long bean.

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INTRODUCTION

Long beans (*Vigna sinensis* L.) is a vegetable polong favored by the public culture forms chickpea cultivation has long been cultivated by the farming community as the principal livelihood mainly rural areas in Indonesia. *Vigna sinensis* also known as long-podded cowpea or Chinese long bean (Family: Fabaceae) is most widely grown in Southeast Asia. They are a good source of protein, vitamin A, vitamin C, iron, phosphorus, and potassium [1].

Protein is one of the essential elements needed by the human body. In addition, as a source of nutrients, principally proteins play a role in supporting the existence of every cell in the body and plays an important role in the immune system. Generally people prefer to choose the source of animal protein (meat, chicken or fish) to meet protein needs. In addition to nutritious, vegetable protein safer and healthier than animal protein [2].

Plant beans are vegetables that can be processed into various foods. for example vegetable tamarind, lodeh, and a hodgepodge, but it can be consumed in its raw form, as fresh vegetables, it tastes good, crunchy and savory vegetables cause is favored by consumers both in the village or in the city. In addition, price can be reached by various circles of society. peas, bean leaf consumed for mothers who are breastfeeding. Protein content is high enough is 22.3% in dry seeds, 4.1% and 2.7% in the leaves on the young pods therefore, long beans is one of the inexpensive source of protein and plants are easily developed in a variety of areas besides, content and other nutritional composition and complete high enough [3].

The addition of organic matter to the soil to increase crop productivity because to the organic matter can improve soil fertility and able to improve the physical properties of the soil. The use of organic materials has been shown to greatly improve the growth and yield [4]. Fertilizing with organic fertilizer can repair physical as well as chemical and biological character. The research aims to find out the effect of concentration cow urine and manure fertilizer dose on growth and yield of long bean [5].

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Legumes also help to restore soil organic matter and reduce pest and disease problems when used in rotation with non-leguminous crop [6]. The purpose of this Research to determine the effect of fertilizer type and dose of bokashi of growth and yield bean Results of research: 1) bokashi fertilizer and chicken manure effect on plant length and number of leaves at the age of 24 days after the plant, 2) dose of fertilizer bokashi or chicken manure is best for the total fruit weight each plant is 20 t ha^{-1} [7]. The effect of cow urine and manure dosage effect on the growth and increased production in long bean plants [5]. While according to [8], when the pool of water was stopped after the completion of adaptation, post-stress retarded growth and reduced significantly the results.

In addition to fertilizing the growth of beans that can produce quality fruit to produce the trimming needs to be done. Pruning is a common action performed on horticultural crops with the aim to obtain a high quality and quantity. Trimming the bean plants are pruning shoots, branches. Type pruning branches bud will give different effects on the rate of plant growth and can increase the quality of production [3]. With pruning resulting in the formation of new stems that will produce fruit.

The purpose of the study how long bean plant responses to the age of pruning shoots and how plants respond to pruning shoots bean plant growth.

MATERIALS AND METHODS

Place and Time:

The research location is located in the Village Ramonglompoa, District Bontomarannu, Gowa, South Sulawesi Province. This study was conducted in July to September 2013.

The Study Design:

This research was carried out by using a randomized block design consisting of four treatments and three replications so that there are 12 research plots area: plants are not pruned, the pruned plants age 17 days after planting (DAP), pruned plants age 34 DAP, and pruned plants age 51 DAP. Observations were made on three clumps of plants in each plot were randomly selected. Data were analyzed using analysis of variance and LSD test analysis [9].

Implementation of the Study:

Soil Treatment:

Activities before tillage done is to clear the land of weeds, hoe/tractor plowed up the soil becomes loose. A raised bed with size 120 cm wide and 350 cm long beds, the distance between beds of 50 cm, height 30 cm. The pile formed two weeks before planting so that the soil becomes loose.

Cultivation:

Planting hole spacing is 80 cm x 50 cm. Good planting time is early dry season/beginning of the rainy season, but throughout the season can be the origin of adequate soil water, seeds incorporated into the planting hole as much as 2 seeds, cover with a thin soil mixed with compost. At the age of 1-2 weeks after planting the plants growing abandoned well.

Stitching:

Stitching is done when the bean seeds will grow 3-5 DAP. Seeds that do not grow immediately embroidered, so that optimum plant growth.

Installation of Trellis:

Installation of trellis made as early as possible about 1-2 weeks after planting (WAP). Trellis is usually made of bamboo parts with a height of ± 2 m. Trellis functions to tether bean plants to grow straight up and located prop hanging pod.

Weeding:

Weeding is done when the plants aged 2-3 WAP, depending on the growth of grass in the field planting. Weeding by way of pulling weeds/cleaning with tools kored.

Pruning:

Long beans are too dense leaves and trimming needs to be held end of the rod. Plants that are too dense to inhibit the growth of flowers. Pruning branches shoots done in the afternoon. Pruning is tailored to the treatment to be tested, ie at the age of 0, 17, 34 and 51 DAP.

Fertilization:

Fertilization is done is by using organic fertilizer from chicken manure were applied simultaneously during the formation of beds.

Irrigation:

In the initial phase of growth of the seed to young plants, watering is done regularly every day. The next irrigation adapted to climatic conditions.

Pest and Disease Control:

In this study, plant pest control is done with the Integrated Pest Management System. You do this by spraying with a pesticide plant extract and massaged directly or existing pest planting. Control use of pesticides considered less healthy if it is associated with the impact on the environment, an increase in pathogen resistance and reluctance of consumers. Effective control is the use of resistant or tolerant varieties. This study aims to obtain improved varieties tolerant to aphids and high yield [10].

Harvest:

The characteristics of the pods are ready to be harvested pods have a maximum size, easily broken and the seeds in the pods are not prominent. The best harvest time in the morning/afternoon. Age of plants ready to harvest 1.5 - 2.5 months.

Parameter Study:

1. Total leaf (blade), calculated the number of leaves when the plants were 2, 3, 4, 5, 6, 7, and 8 WAP. The calculation is performed in three clumps of plants randomly selected from each unit plot experiment.
2. Number of branches (fruits), calculated on the generative phase of the plant. Observations were made three clumps are randomly selected from each experimental unit.
3. The number of stalks (fruits), calculated on the generative phase plants. Observations were made three clumps are randomly selected from each experimental unit.
4. The number of pods (fruits), calculated on the generative phase plants. Observations were made three clumps are randomly selected from each experimental unit.
5. Pod length (cm), calculated on the generative phase of the plant. Observations were made three clumps are randomly selected from each experimental unit
6. Pod weight (g), obtained from the weighing at the time of harvest. Observations were made three clumps are randomly selected from each experimental unit.
7. Production ha^{-1}, yields obtained from the unit kg/experimental plots subsequently converted in t ha^{-1}.

RESULTS AND DISCUSSION

Number of Leaves:

The observation and recording, and analysis of variance bean plant leaf number aged pruning treatment 17, 34, 51 DAP, and no treatment aged 2-8 WAP and fingerprint analysis showed that treatment manifold gives results with the highest average average number of leaf blade than other treatments 60.89 strands. To determine the amount of leaf growth can be seen in Table 1.

Table 1: Growth in the number of leaves on the treatment and the untreated bean plants pruning age 2 up to age 8 WAP.

Treatments	Growth in the number of leaves long bean (strands)						
	2	3	4	5	6	7	8
Not pruned	2.67.a	4.33	9.22	15.66	31.22	50.1	60.89
Pruned 17 DAP	2.33.a	4.33	8.77	18.77	26.89	46.00	53.89
Pruned 34 DAP	3.33.b	5.66	10.66	16.33	32.59	49.66	53.33
Pruned 51 DAP	2.33.ab	5.11	10.66	14.88	26.22	42.77	48.22
F.Count	6.04	ns	ns	ns	ns	ns	ns
LSD 0.05	0.38	-	-	-	-	-	-
Coefficient of variability (%)	12.53	13.75	22.11	17.65	20.45	26.76	21.97

Description: The numbers in the same column followed by the same letter are not significantly different means at the level of LSD 0.05

Growth in the number of leaves in Table 1 above shows that the bean plants without pruning treatment to respond sufficiently high compared with the other (17, 34, and 51 DAP), this was due to the large number of leaves of bean plants are not done trimming shoots will lead to too high making. The result showed that in order to get good growth on long bean, the watering volume should be half of the capacity of plant media. On the

other hand, high content of chlorophyll is achieved when watering volume is equal to the capacity of plant media [11].

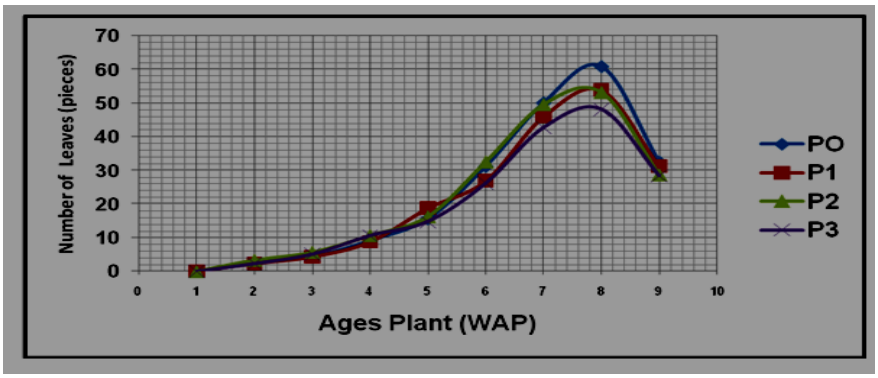

Fig. 1: The pattern of growth in the number of leaves in treatment pruning 2-8 WAP bean longevity.

Figure 1 above shows that the rate of growth of bean leaf number without treatment to the trimming treatment 17, 34, and 51 DAP showed a growth pattern that is a quadratic negative, meaning that the number of leaves quite a lot initially but decreased again due to the increasing age of the plant.

Number of Branches:

Growth charts the number of branches at the end of the experiment are presented in Figure 2 shows that, trimming the age of 17 DAP gives the highest results with an average 9.66 fruit than other treatments.

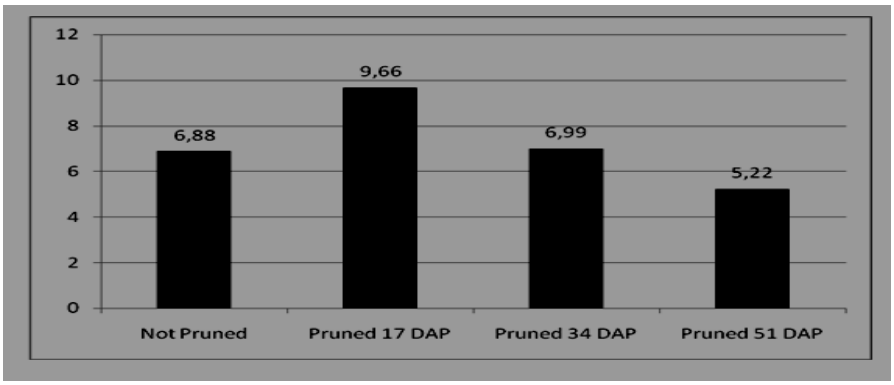

Fig. 2: Graph the number of branch pods of bean plants length of the various treatments.

Number of Pods:

Graph growth in the number of pods at the end of the experiment are presented in Figure 3 shows that, treatment trimming age 34 DAP gives the highest result with 30.66 average fruit than other treatments.

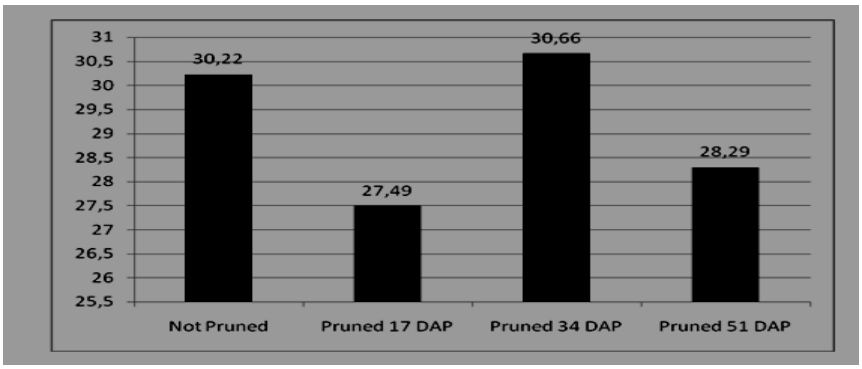

Fig. 3: Graph Number of pods of bean plants at various treatment long lifespan.

Stalk Pods:

Graph growth stalk pods at the end of the experiment are presented in Figure 4 shows that, trimming the age of 34 day after planting treatment gives the highest results with an average of 21.77 fruit than other treatments.

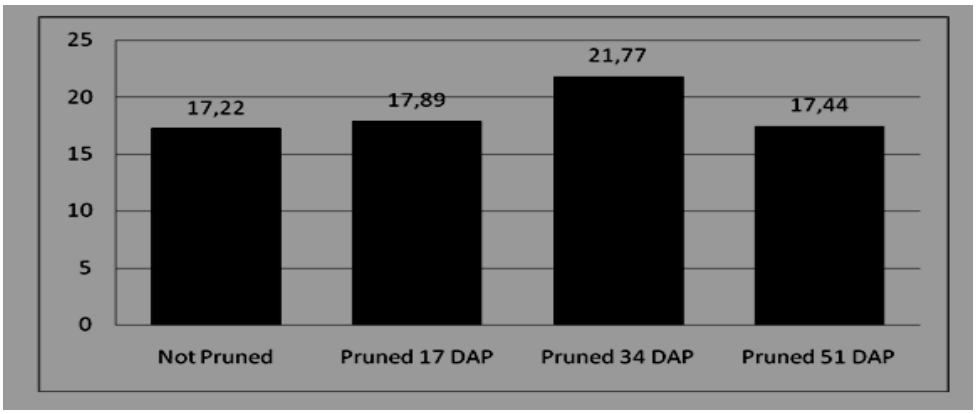

Fig. 4: Graph long stalk pods of bean plants at various ages treatment.

Long Pods:

Graph growth stalk pods at the end of the experiment are presented in Figure 5 shows that. Length growth charts bean pods of the plant showed that treatment cuts at 17 DAP (57.99 cm) exceeds that of the other treatments.

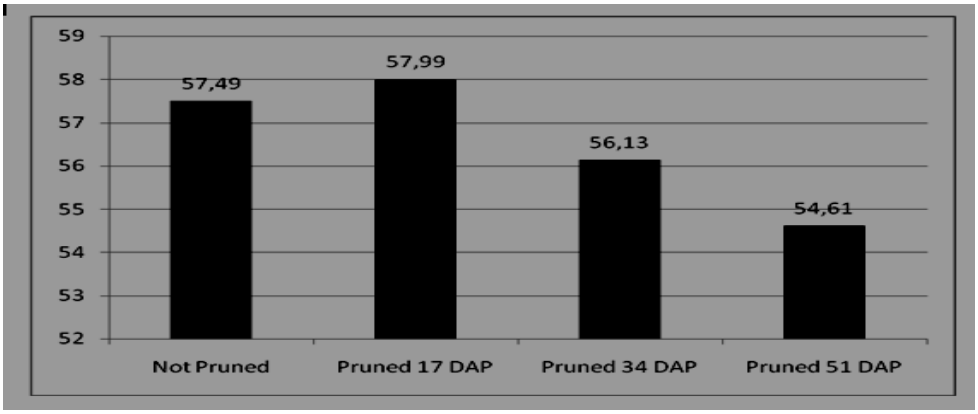

Fig. 5: Length growth charts pods of bean plants length of the various treatments

Weight Pods:

Weight growth charts bean pods of the plant showed that pruning treatment at the age of 34 DAP (611.86 g) exceeds that of the other treatments.

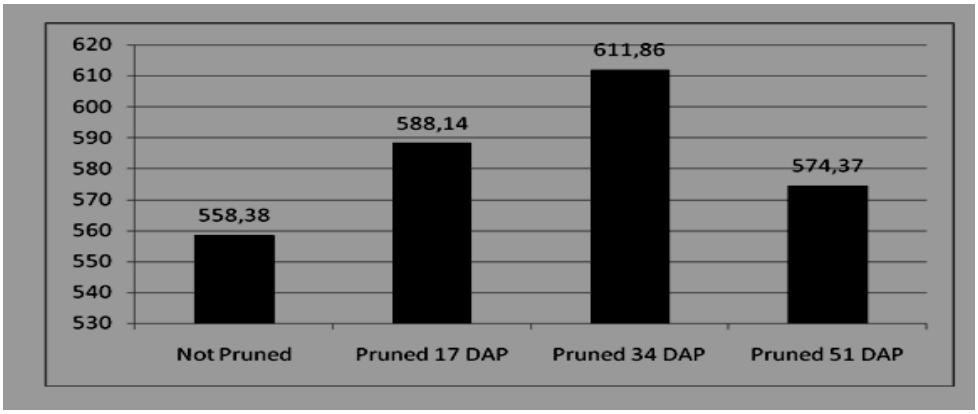

Fig. 6: Added weight chart pod bean plants in various treatments.

Effect of Age Pruning:

Based on the research results of the treatment of age trimming very significant effect on plant height 15, 25 and 35 DAP, 15 DAP branch number, number of pods each plant wet. Pruning at the age of 35 DAP , gave the highest yield different unreal with trimming 15 DAP based on variable number of branches 15 DAP, pod length and number of pods. While the wet weight of pods per plant pruning highest found in 25 and in contrast to 35 days after planting and 15 DAP. At 35 DAP pruning gave the best response, as shown by the number of productive branches are formed (Yufni, 2010)[12]. Is suggested that frequent pruning can be used to maintain plant growth and flower shoot initiation (Saifuddin *et al*., 2010) [13].

Treatment without pruning gives better results on the number of leaves (60.89 strands), Pruned 17 DAP gives better results in the branches of fruit (fruit 9.66) and pod length (57.99 cm), Pruned 34 DAP gives results more on the number of pods (30.66 fruits), stalk pods (21.77 fruits).

Pruning can Increase Production:

Based on the results of the study treatment 34 DAP gives the highest result is 611.86 g. Pruning should be done at that age, trimming is a common action performed on horticultural crops which aims to get the quality and quantity as well as high production. Trimming the bean plants are pruning a branch shoots. Type pruning branches bud will give different effects on the rate of plant growth and can increase the quality and production[3]. According to research [14] 1153.80 kg bean production. Significant cuts to increase production, so pruning is recommended in the cultivation of plants [15].

Conclusion:

Treatment without pruning gives better results on the number of leaves (60.89 strands), Pruned 17 DAP gives better results in the branches of fruit (fruits 9.66) and pod length (57.99 cm), Pruned 34 DAP gives results more on the number of pods (30.66 fruits), and the stalk pods (21.77 fruits). Results in the production of Pruned 34 DAP pod weight (611.86 g), and gives better results than other treatments. Further research needs to be conducted on bean plants on proper pruning time in order to know the difference is more noticeable. As well as the need for follow-up of the counseling or related agencies to speed up the production of information, especially the increase in bean plants by pruning shoots. With good bud trimming branches can increase production so long bean production increased.

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