

TANGGAPAN KACCANG HIJAU PADA BERBAGAI TINGAT NAUNGAN[1)]

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ABSTRACT

Production of mungbean plants less food sufficiency in the land, mungbean technology was developed in order to obtain optimal results. Mungbeans do not require a lot of sunlight so it can use the technology planting shade. This research aims to study the response of mungbeans at different levels of shade on growth and yield. This research aims to study the response of mungbeans at different levels of shade on growth and yield. The research was conducted in October through December 2015 in Jumantono, Karanganyar, Central Java using a Randomized Completely Block Design (RCBD) consists of a single factor shade treatment with 5 levels ie 0, 20, 31 and 50%. Data were analyzed using analysis of variance and if there is a significant difference continued with Duncan Multiple (Duncan Multiple Range Test) level of 5%. The results showed with 50% shade can increase plant height, leaf number, leaf area index, biomass weight, weight of pods and seed weight

Keyword : Mungbean, Drought Stress, Growth, Yield

INTRODUCTION

Mungbean is a potential commodity has advantages both in terms of agronomist nor economical. It has easy way, can be planted in soil that is less lush, more resistant to drought, can be harvested aged 60 days, and the selling price is relatively high and stable. Indonesia is the largest producer of green beans to four in the world after India, Thailand, and China, with a vast harvest of about 300,000 ha/year. Mungbean in Indonesia ranks third the most important food crop after soybeans, legumes and peanuts. Because of its great importance, the need for mungbean green peas ever on the rise. With increasing needs for mungbeans in Indonesia, of course, increase in quantity is very expected.

Benefits of the mungbean are needed, especially in the food industry. The need for mungbean in Indonesia itself has not fulfilled so that Indonesia needs to import mungbean from several countries including Myanmar, Ethiopia, Thailand, Australia, and Brazil. Throughout January to March 2014, imports into Indonesia reached 18.64 thousand tons. Indonesia to import mungbean from several countries increased quite dramatically in March 2014 compared to the previous month. In February, imports of mungbeans totaled 6.27 thousand tons. The rapid increase became 13.96 thousand tons in March. Total imports of mungbean during the first 3 months of 2014 recorded 23.45 thousand tons. The high level of imports of mungbean illustrates the low production of green beans that exist in Indonesia. Green bean production management or planting low because less than optimal

Problems encountered in the development of mung bean is still low production reached farmers. The low yield is caused by poor farming (without fertilizing and weeding), water supply is not enough,

the disease mainly as Cercospora leaf spot, leaf rust, powdery mildew, scab (scab) and viruses. Production of mung bean that are less meet these needs, the green bean planting technology was developed in order to obtain optimal results. Plant mung bean do not require a lot of sunlight and therefore planting mung bean can use shade. Use of shade can keep the intensity of sunlight. This research was conducted to find the optimal percentage of shade for the growth and yield of mung bean.

RESEARCH METHODS

The research was conducted in October until December 2015 at the Center for Research and Development of the University Dryland March Surakarta in Sukosari Village, District Jumantono, Karanganyar Surakarta. Laboratory research conducted at the Laboratory of Chemical Ecology Laboratory of Soil and Crop Management and Production. The materials used in this study is a mungbean seed varieties VIMA-1, Alfisol soil, organic fertilizers and NPK fertilizer. The tools used in this study is a knife or razor blade, polybag, cameras, stationery, analytical balance, wire, shears, hoes, Lux meter and oven, paper hvs, oven, stationery and ruler

Research using Random Group Complete (RAKL) with a single factor such as shade, consisting of four levels (0, 20, 31 and 50%). Each stage is repeated four times in order to obtain 16 experimental plant. Experiment yamng maing each repeated four times, thus there are 64 plants (16 plants until harvest, 48 plants for the preparation destructive) .Variabel observed were plant height, leaf number, weight stover, biomass, root length, number of pods, pod weight and the weight of seeds. Data were analyzed using analysis of variance and if there is a significant difference continued with Duncan Multiple (Duncan Multiple Range Test) level of 5%

RESULTS AND DISCUSSION

This research was conducted at the Center for Research and Development of the University Dryland March Surakarta in Sukosari Village, District Jumantono, Karanganyar, Central Java. The location of these studies lies in 7o 30 'South Latitude and 110o 50' E with altitude of 180 meters above sea level. Daily temperatures in the research sites around 24-35oC and humidity around 55-82%. Type of soil in the study is ground Alfisol.

Land used for research plant mung bean are ground Alfisol. Land Alfisol digemburkan then weighed as much as 8 kg according to the size of polybags. Land Alfisol which have been weighed and then put in a polybag. Media soil ready mixed with manure as basal fertilizer. Alfisol soil used in this study have been analyzed at the Laboratory of Soil Chemistry, Faculty of Agriculture, University Sebelas Maret.

Table 1. Characteristics of initial soil Alfisol

Soil Chemical Properties	Unit	Result	Classification*
N-Total	%	0,119	Very Low
P-Tersedia	Ppm	0,120	Very Low
K-dd	me%	0,500	Medium
Kadar Bahan Organic	%	0,73	Very Low
pH		5,9	Somewhat dour
C-Organic	%	0,428	Very Low

* = Pengharkatan according to the Soil Research Institute (2005)
Source: Results Analysis in Soil Chemistry Laboratory FP 2016 UNS Surakarta

A. High Plants

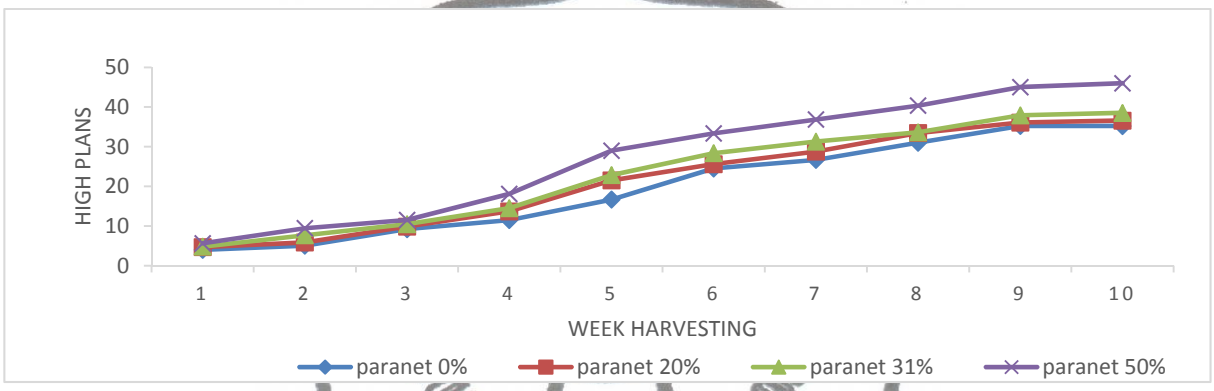

Figure 1. Effect of shade from the high level of green bean plants

Plant shade 50% showed a greater growth of the plants with shade level to another. Shade 0% as control only grew the most good, namely at week 4 to 6 weeks after planting, sedangan week next week is not so significant growth. Similarly, in the shade of 20% and 31% growth in shade most good, namely at weeks 4 to 7 weeks after harvesting next week and the week green bean plant growth is not so significant. Buranatham et al (1992) Plant mung bean are C3 plants that have a saturation level of light is lower than that of C4 plants, so that the plant has a good opportunity to develop in conditions of low light intensity such as intercropping, either with food crops such as maize, cassava nor with plantation crops, especially under plantations of young

B. Leaf Area Index

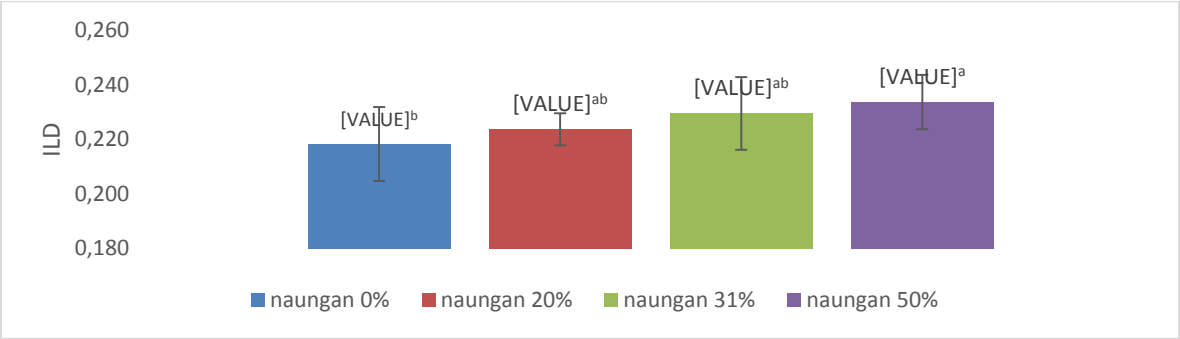

Figure 3. Effect of the level of shade from green bean leaf area index
Description: The figure followed by the same letter show no significant difference in DMRT 5%. Score 1 = 0%, 2 = 20%, 3 = 31%, 4 = 50%

Leaf area index on green bean plants. Leaf area index is highest at 31% shade and leaf area index is the smallest in the shade of 0%. Shade 0% as control has a leaf area index of 2.18 and was not significantly different from the shade 20, 31 and 50% which each have a leaf area index of 2.24, 2.30 and 2.34. This can happen because the unit price komonitas leaves of the plant is not only determined by the morphology of plants, related to the distribution of light and the nature of the leaves, but also by the density of the leaves. leaf density of population is closely related to plants or plant spacing. The closer the distance between the higher plant density among the lower leaves

C. Weight Stover

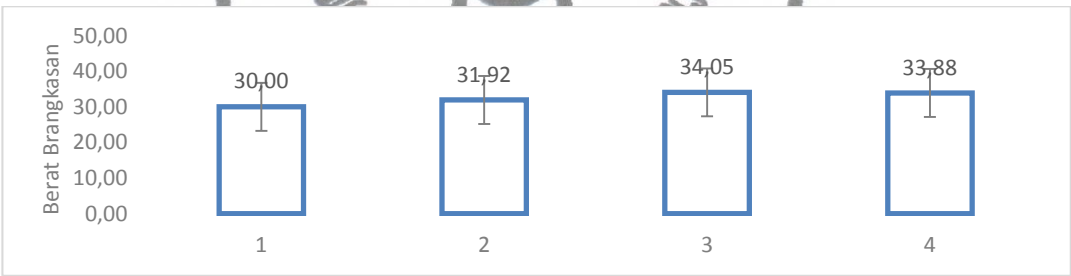

Figure 3. Effect of the level of heavy shade of green bean stover
Description: The figure followed by the same letter show no significant difference in DMRT 5%
Score 1 = 0%, 2 = 20%, 3 = 31%, 4 = 50%

Stover weight of a plant is the measure most often used to describe and study the condition of the plants during growth prose (Sitompul and Guritno 1995) Weight berangkasan least shade obtained at 0% as control of 30.00 and greatest at the rate of 31% shade amounting to 34.05. 20% shade stover has a weight of 31.92 and at a rate of 50% shade has a weight of 33.88

D. Biomass

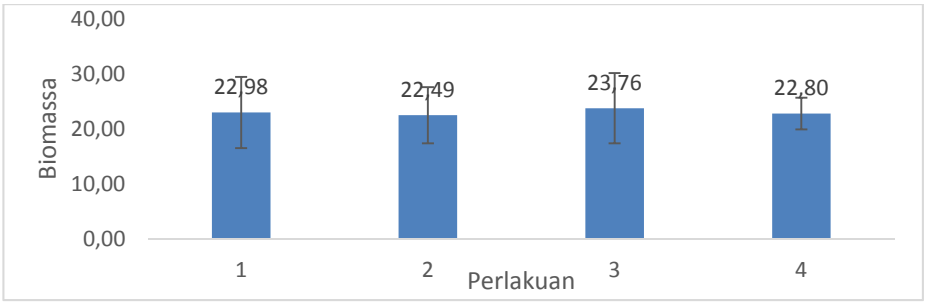

Figure 4. Effect of the level of heavy biomassaa shade mung bean
Description: The figure followed by the same letter show no significant difference in DMRT 5%
Score 1 = 0%, 2 = 20%, 3 = 31%, 4 = 50%

Shade does not significantly affect the biomass mung bean and obtained the greatest biomass in the shade 31% of 23,75gram. Low in the shade 20% have a weight of 22.49 grams. 0% shade obtained at 22.98 grams and 50% shade obtained biomass of 22.80 grams. Shade 31% had the highest weight because the weight of biomass associated with leaf area index, leaf area index higher if the biomass is a tanamam also show the same thing on each treatment. ILD relationships with less biomass a plant of course interwoven through the process of photosynthesis. The aging of the plant, the rate of photosynthesis will decrease with lower revenue quanta of radiation that are constant, due to the increase in ILD (Tanaka 1996).

E. Long Roots

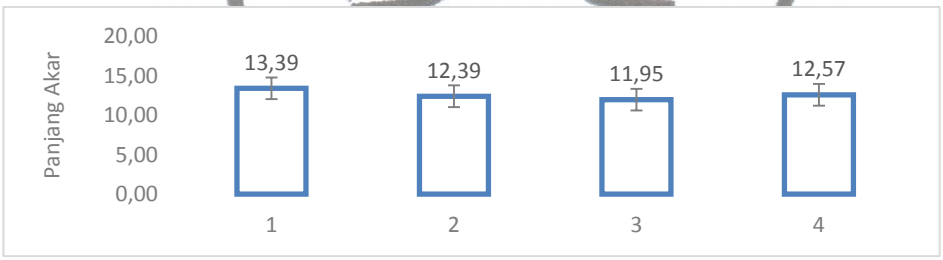

Figure 5. Effect of long-roots level shade mung bean
Description: The figure followed by the same letter show no significant difference in DMRT 5%
Score 1 = 0%, 2 = 20%, 3 = 31%, 4 = 50%

The longest root length is at 0% or no shade there is shade. In the shade of 0% know do long-shade 13.39. The length of the shade to its lowest level of 31% have shade the root length of 11.95. In the treatment of 20% and 50% have a length that is almost the same root, respectively 12.39% and 12.57%. In all 4 treatment is that 0%, 20%, 31% and 50% respectively treatment was not significantly different, so it can be said shade is not so influential on the growth of root length

F. Number Of Pods

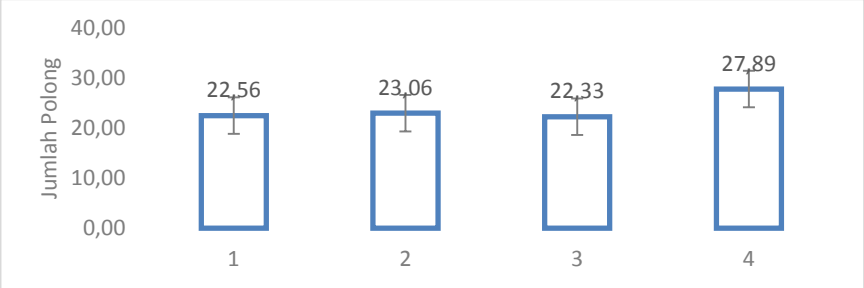

Figure 6. Effect of shade level against the green bean pods
Description: The figure followed by the same letter show no significant difference in DMRT 5%
Score 1 = 0%, 2 = 20%, 3 = 31%, 4 = 50%

The highest number of pods is shade 50% and the lowest number of pods is on the level of shade 0%. Shade 0% no significant difference in shade 20%, 31% and 50% shade. Shade 0% had pods of 22.56. Shade 20% had pods of 23.06, whereas 31% shade and the shade 50% respectively have pods of 22.33 and 27.89. The difference results in the shade treatment is due to the influence of moisture that occurs in each treatment. In the shade of a higher (50%) then moisten shall be maintained compared to the treatment without shade (0%). Shade resulted in changes to the sunlight received by plants, both in intensity and quality. The influence of light on plants is very complex, which affects the process fotokomia and also the shape and size of the plant, so that it will influence the final crop (Woodward and sheely. 1983)

G. Weight pods

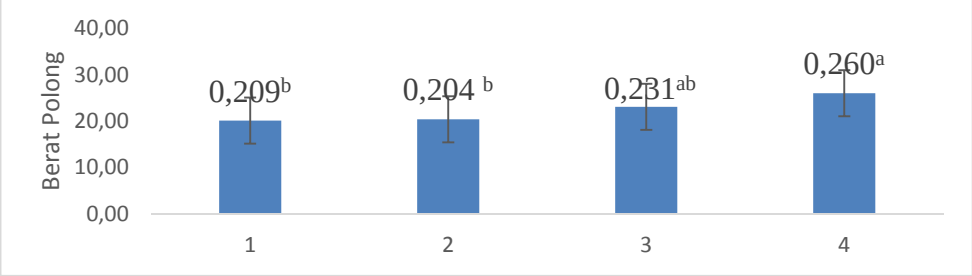

Figure 7. Effect of the level of heavy shade of green pea pods
Description: The figure followed by the same letter show no significant difference in DMRT 5%
Score 1 = 0%, 2 = 20%, 3 = 31%, 4 = 50%

Based on the figure 7 is known that the treatment has a weight of 0% for 0,209a pods. 20% shade treatment pod has a weight of 0,203b. Perlakua shade 31% and 50% respectively by weight mmpunyai pods of 0,231ab and 0,260a. 31% shade treatment was not significantly different from the treatment of 50% but significantly different from the treatment of 20% and that 0%. This can happen due to shade 50% showed a higher yield compared to other treatments premises. It is suspected because it is influenced by several factors, namely due to the shade that causes the intensity of the light received is

very low, besides the humidity is too low and too high would hamper growth and flowering plants (Kramer and Kozlowsky, 2006)

H. Serious Seeds

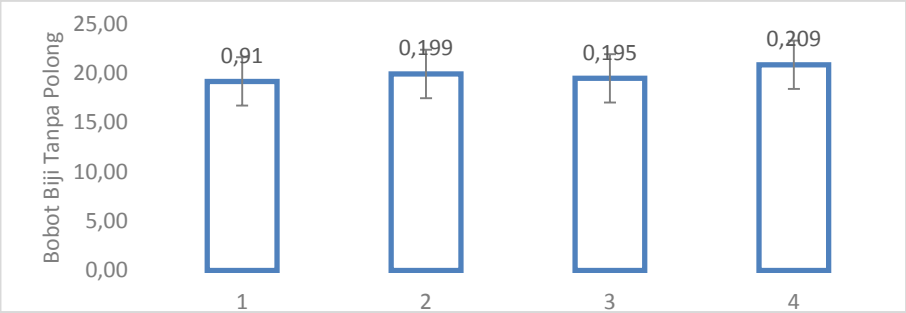

Figure 8. Effect of the level of shade against the weight of seeds without pods of green beans
Description: The figure followed by the same letter show no significant difference in DMRT 5%
Score 1 = 0%, 2 = 20%, 3 = 31%, 4 = 50%

Based on Figure 8, it can be seen that the weight of seed pods on the plant without treatment 50% of green beans have the highest weight compared with other treatments is equal to 0.207. Weight to its lowest at 0% shade treatment. In the shade of 20% and 31% respectively which has a weight of 0.199 and 0.195. in the shade of 0% has the lowest brat as a result of most of the pods are empty pods so as to have the results of a low weight without pods. Shade treatment between 0%, 20%, 31% and 50% were not significantly different between all four of those treatments. Treatment usage shade is not so significant on seed weight without pods on mung bean

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The conclusion that can be obtained by this study are as follows:

1. Providing shade 50% increase leaf area index and biomass plant mung bean, all shade treatment can increase plant height and number of leaves.
2. Providing shade 50% increase the weight of pods and seed weight of control of 29.4% and 8.81%

Recommrndation

Advice can be given in the cultivation of mung bean that 50% shade can still ditolerensi even suggest and to study better selanjutkan trying to plant several varieties of mung bean in order to determine the effect of shade on some varieties of green bean plants.

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