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The Effect of Time Shoulder (Topping) toward Growth and Results of Chocolate Seeds in Shadowing Conditions

Nursamsidar*, Kisman, I Wayan Sudika

Dry Land Study Program, University of Mataram, Indonesia

Abstract*— This study aims to determine the effect of shoots of some brown soybean strains on shading stress conditions on growth and yield. The study was conducted in December 2018 - March 2019 Sekarbela District, Mataram. The experiment used a completely randomized two-factor design (CRD). Factor 1 is the strain (G) consisting of G1 = KH9, G2 = KH14, G3 = KH1 G4 = Dena, G5 = Anjasmoro. Factor 2 is the prune time (T) consisting of T1 = without pruning, T2 = pruning 3 MST, T3 = pruning 4 MST, T5 = pruning 5 MST and T5 = pruning 6 MST. The results showed that the KH14 brown soybean strain had better growth characters compared to the KH9, KH1 and yellow Dena and Anjasmoro varieties of soybean. The brown KH1 soybean strain showed high yields and components such as the weight of 100 seeds and the weight of the seeds of the plantings which was higher than other strains. Prune time affects the character of growth and yield of soybean plants. Prune time 3 MST showed the highest character of growth (plant height, number of productive branches, number of books), as well as yields and the highest yield components did not differ with the age of pruning 5 MST. There was no interaction between the prune time factor and soybean strain on the growth character and soybean yield
***Keywords*— Chocolate soybean, pruning time, shade, growth, yield.**

I. INTRODUCTION

Soybean (Glycine max (L.) Merrill) is an important food commodity in Indonesia because it is a producer of protein, it is safe to consume and the price is relatively cheap compared to animal protein sources. BPS data (2019) shows that domestic soybean demand is still high, indicated by the number of soybean imports until 2017 of 2 671 914.1 tons

Soybean cultivation as intercropping under plantation stands, industrial timber estates (HTI), or intercropping with other annual food crops is a strategy to increase national soybean production. However, the presence of canopy shade from higher plants causes light to be a major obstacle or limiting factor for the growth and development of soybean plants. According to Asadi and Arsyad (1995); Asadi et al (1997), light intensity was reduced by 75% under the stand of plantation crops and 33% under intercropping with corn and sorghum

Decreasing the intensity of light will affect the growth and yield of plants. Reduction of light interception by 22% at the end of vegetative to reproductive start suppresses seed yield by 23% (Singer, 2001; Sopandie et al. 2003), affecting the pod filling phase after passing through the flowering phase (Mathew et el., 2000), causing elongation internod and plant vulnerability (Ephrath et el., 1993) and reduce seed weight (Sundari and Susanto, 2011). Some similar research results on the effect of low light intensity on growth and results have also been reported by Anderson and Osmond, 1987; Baharsjah, 1985; Chozin et al., 1999

The growth of soybean plants requires optimum solar radiation, (about 0.3-0.8 cal / cm2 / minute equivalent to 431-1152 cal / cm2 / day with light spectrum or wavelengths ranging from 400-700 nm to get high yields (Kassam 1978; Salisburry and Ross 1992) Free R / FR light and very low blue light intensity with a value of only 6.3 Wm-2 or 0.01 cal / cm2 / minute have been able to stimulate stem elongation in soybean plants (Wheeler et al., 1991) Board (2000) explains that the quality of light is determined by the ratio between red light with far red (FR) and blue light radiation which in this case affects the elongation process of the rod

The ability of plants to overcome shade stress depends on the ability of plants to carry out photosynthesis in light deficit conditions. This form of plant adaptation to low light intensity can be studied through specific responses at various levels such as anatomic, morphological, physiological, biochemical and molecular changes, this has been widely reported (Soepandie et al. 2001; Khumaida 2002; Murchie 2002; Alves 2002) . Anderson (2000) explains that plants that grow in such a dense environment are difficult to express their kinetic potential for maximum growth and development. Therefore a technology is needed to increase growth and yields in low light conditions. One such effort is pruning (Adisarwanto and Wudianto, 1999)

Pruning is one of the efforts to increase soybean productivity by cutting the upper section of the plant (Adisarwanto, 1999). Pruning improves crop yields by increasing root growth and availability of nitrogen nutrients (Saidi et al. 2007), increasing vegetative growth, triggering the growth of buds underneath which were initially dormant (Lakit 1995; Pinkard 2002) and increasing the leaf area index (Sadewa, 2000), have significant effect until very significant on the variable number of pods, number of seeds, weight of crop production, wet wet weight, weight of 100 dry beans of soybean plants (L 1995 and Bimasri 2013). Wachjar (1984) explains that basically pruning aims to regulate vegetative growth in the generative direction

Pruning stimulates the formation of productive branches in the hope that more flowers are formed so that the number of pods formed will increase more (Adisarwanto, 2002). the increase and growth of the number of branches is closely related to the increase in the number of fertile books (Sholeh et al. 2016). Several studies on other plants including cowpea mentioned that crop pruning is known to increase crop yields (Dugum et al. 1988; Ezedinma 1973), increase the number of pods in chickpea plants (Srirejeki et al. 2015), in tomato plants increase the percentage in fruit formation, total fruit weight (Febiola 2004; Esrita 2012) and addition of the number of side shoots due to cutting of shoots on Jatropha (Raden et al. 2009) and patchouli plants (Irawati and Setiari 2009)

There are several types of soybean species that develop in Indonesia, namely yellow soybeans, green soybeans and black soybeans. In addition to the yellow, black, and green soybeans above, there are also brown seeded soybean plants, a collection from Dr. Kisman which consists of several lines including KH7, KH8, KH9, KH14, KH50A, KH36D which are the results of crossing of soybeans and local soybeans in Lombok. The results of the initial description note that brown soybeans are able to grow and develop in the shade, so to improve the yield of brown soybeans it is necessary to conduct research on the application of shoot pruning technology in low light intensity conditions. Therefore research has been conducted on "the effect of topping time on topping on the growth and yield of cocoa beans under shading conditions".

II. MATERIALS AND METHODS

The method used in this study is an experimental method, by conducting a planting experiment using a poly bag. The experiment was carried out in a paranet house located on the South Ring Road, Sekarbela District, Mataram City. The experiment was arranged using a Completely Randomized Design (CRD) with two factorial experiments, as follows: Factor 1. Types of cocoa (G) strains consisted of: G1 = KH, G2 = KH14, G3 = KH1, G4 = Dena, G5 = Anjasmoro and Factor 2. Pruning time (T) consisting of: T1 = No Trimming, T2 = 3 MST, T3 = 4 MST, T4 = 5 MST, T5 = 6 MST. The combination of these two factors obtained 25 treatments. Each treatment was repeated 4 times to obtain 100 treatment units. All these polybag units are randomly placed under the paranet. The tools used in this experiment were scales, polybags, analytical scales, measuring devices (meters), scissors, labels and stationery - writing. The ingredients used in this experiment were the brown soybean strain of KH9, KH14, KH1 and Dena and Anjasmoro varieties of yellow soybean, inorganic fertilizer (NPK Ponska), manure and Marshall 25 ST pesticides, Dursban and Dethane M 45. The observed variables included: Plant height, number of books, number of productive branches, age of flowering, number of filled pods, number of planting seeds, weight of planting seeds, weight of 100 dry seeds and harvest age. The observational data were analyzed by Analysis of variance (Anova) at 5% significance level. Significantly different data (F arithmetic> F table), further tested using the DMRT (Duncan's Multiple Range Test) advanced test.

III. RESULTS AND DISCUSSION

Results of Analysis of Diversity (ANOVA) on Observed Variables

The results of the diversity analysis (ANOVA) of the observed variables showed that the treatment of prune time and strain type there was no interaction for all variables, while the treatment of prune time affected all observed variables. Likewise, the type of strain also affects all variables. (Table 1). Variables observed were plant height, number of productive branches, number of books, number of filled pods, number of seeds planted, weight of dry seeds of cropping, weight of 100 dried seeds, age of flowering and age of harvest.

Table.1 Results of analysis of variance (ANOVA) on some growth characters and soybean yields under pruning

Source	DF	Mean Square								
		(1*	(2*	(3*	(4*	(5*	(6*	(7*	(8*	(9*
Topping Periods	4	1894.14 s	85.84 s	565.46 s	8854.04 s	32399.10 s	324.14 s	1.41 s	1.37 ns	938089.10 ns
Lines	4	3713.31 s	72.69 s	356.16s	5257.01 s	20300.73 s	249.53 s	417.14 s	503.15 s	27.60 s
Topping periods * Strains	16	145.86 ns	2.83 ns	42.32 ns	955.93 ns	3382.95 ns	10.65 ns	0.76 ns	1.14 ns	2924.44 ns
Error	75	274,41	4,52	33,81	572,26	2161,21	15,03	0,84	0,48	36,08
Total	100									

Note : ns = non significant; s = significant;(1*hight plant;(2*Number of Branch;(3*Number of Node;(4*Number of fillet pod;(5*Number of seeds per plant;(6*Number of weight per plant;(7*Number of 100 seeds;(8*Days to Flower;(9* Harvesting date

Effect of soybean strain on the character of growth and yield of soybean plants under shade

In Table 2 it can be seen that the highest plants were obtained in the KH9 (G1) strain which was 119.65 cm while the lowest was obtained in Anjasmoro (G5) 85.86 cm. The highest number of productive branches was obtained in KH14 (G2) line which was 9.29 branches while the least number of branches in Anjasmoro (G5) was 4.76 branches which were not significantly different from Dena (G4) which were 5.45 branches. The highest number of books was seen in the KH14 (G2) line which was 19.20 books while the lowest was in Anjasmoro (G5) which was 9.35 books which were not significantly different from Dena (G4) 10.35 books and KH1 (G3) namely 10.9 books. The fastest flowering age was found in the Anjasmoro (G5) strain 33.71 days, while the longest flowering age was in the KH9 (G1) strain which was 45.24 days

Table 2 Effect of strain type on plant height, number of productive branches, number of books, age of flowering, number of filled pods, number of seeds planted, weight of dry seeds of planting, weight of 100 dried seeds, and age of harvest

Strain	Plant Height (cm)	Number of productive branches	The number of books	Flowering age (HST)	Number of filled pods	Number of planting seeds	Weight of planting seeds (g)	Weight 100 dry seeds (g)	Harvest Age (Days)
G1(KH9)	119.65d	7.33b	15.85 b	45.24d	79.80b	153.61b	8.68a	5.84a	114 d
G2 (KH14)	106.72c	9.29c	19.20c	39.45c	94.15c	180.44c	12.96b	7.29b	104.7c
G3 (KH1)	91.76 b	6.53b	10.90a	34.3b	59.35a	114.05a	18.08c	15.80d	91.43b
G4 (Dena)	95.29 b	5.45a	10.35a	33.96a	56.80a	110.84a	15.41b	14.95c	85.00a
G5 (Anjasmoro)	85.86 a	4.76a	9.35 a	33.71a	60.80a	109.81a	15.40b	14.52c	89.15b

Note: Figures followed by the same letters in the same column are not significantly different in the 5% DMRT follow-up test.

Table 2 shows the number of filled pods most obtained in the KH14 (G2) strain of 94.15 pods and the lowest in the Anjasmoro (G5) strain of 60.80 pods. The highest number of planting seeds obtained in the KH14 (G2) strain was 180.44 seeds while the least was Anjasmoro (G5) which was 109.81 seeds, which was not significantly different from KH1 (G3) which was 114.05. The highest seedling weight was obtained in the KH1 (G3) strain which was 18.80 g while the lowest in KH9 (G1) was 8.68 g. The highest weight of one hundred dry seeds was obtained in KH1 (G3) strain of 15.80 g while the lowest was obtained in KH9 (G1) strain of 5.84 g. The fastest harvest age is from the Dena (G4) variety that is 85 HST and is significantly different from other strains while the longest KH9 (G1) strain is 114 days.

Effect of soybean pruning time on the growth character and yield of soybean plants under shade

Table 3 shows that the highest plants were obtained at T1 (without pruning) ie 115 cm while the lowest was obtained at the pruning time of T5 (pruning 6 MST) ie 91.32 cm; the highest number of productive branches was obtained at the T2 prune (prune 3 MST) which was 9.85 branches, while the least was obtained at the pruning time T1 (without prune) at 4.80 branches; the most number of books obtained at the T4 pruning (pruning 5 MST) is 21.10 books while the least is obtained at T1 (without pruning) which is 7.20 books. The fastest flowering age was indicated at T1 (without pruning) at 36.96 while the longest at T2 (pruning 3 MST) was 37.65; The number of filled pods that were most obtained at the T2 pruning time (pruning 3 MST) and not significantly different from the T4 pruning time (pruning 5 MST) ie 93.15 and 90.45 respectively while the least obtained at the pruning time T1 (without pruning) ie 44,15 pods.

Table.3 Effect of pruning time on plant height, number of productive branches, number of books, age of flowering, number of filled pods, number of seeds planted, dry seed weight of planting, weight of 100 dried seeds, age of harvest

Prune Time	Plant height (cm)	Number of productive branches	The number of books	Flowering age (HST)	Number of filled pods	Number of planting seeds	Weight of planting seeds (g)	Weight 100 dry seeds (g)	Harvest Age (Days)
T1 (tanpapangkas)	115 d	4.80a	7.20a	36.96a	44.15a	59,75a	9.64 a	11.08a	94.70 a
T2 (pangkas 3MST)	102.8 c	9.85c	19.55c	37.65b	93.15c	141.8c	20.17 c	11.50 a	97.60 a
T3 (pangkas 4MST)	94.60 b	7.80b	14.35b	37.40ab	63.40b	103.45b	13.96 b	11.37a	97.30 a
T4 (pangkas 5MST)	93.48 b	6.80b	21.10c	37.45ab	90.45c	139.56c	20.20 c	11.72a	97.45 a
T5 (pangkas 6MST)	91.32 a	5.10a	13.45b	37.20ab	59.75b	93.10b	11.55b	11.71a	97.15 a

Note: Figures followed by the same letters in the same column are not significantly different in the 5% DMRT follow-up test.

Table 3 shows the number of planting seeds that were most obtained at the T2 pruning time (pruning 3 MST) and not significantly different from the pruning time of T4 (pruning 5 MST) ie 141.8 seeds and 134.56 seeds while at least at T1 pruning (without pruning) ie 59.75 seeds. The highest seed weight was obtained at the T2 pruning time (3MST pruning) and not significantly different from the T4 pruning time (5 MST pruning) ie 20.17 g and 20.20g respectively while the lowest was obtained at T1 (without pruning) ie 9.64 g. The weight of 100 dried seeds was not significantly different at all pruning times, with a weight ranging from 11.8 g - 11.70 g. The harvest age was not significantly different at all pruning times, which ranged from 97.15 - 97.70 days after planting.

IV. DISCUSSION

Effect of strain on the growth and yield of cocoa beans on shaded stress conditions

Light has a very important role in the process of growth and development of soybean plants. Low light intensity will affect the yield of these plants. It can be seen in table 2 that the KH9 (G1) strain had a plant height of 119.65 cm which was significantly higher than the other lines. Rahayu and Sumpena (2015) stated that differences in plant height can be caused by genetic factors and different adaptability of each soybean variety to the environment. The results of Mulyana's research (2006) show that the mechanism of morphological adaptation in shaded plants is to increase plant height. This result is clarified by Zhamal (2008); Harjadi and Yahya (2007) that the higher form of the plant (etiolation) is due to the activity of growth hormone, namely auxin. The results are in line with the report of Chozin et al. (1999) that the increase in height of rice plants varies between genotypes in a shaded environment

Based on Table 2, KH14 soybean strain (G2) has more productive branches than KH9, KH1, Dena and Anjasmoro soybean lines. The number of productive branches in each line ranged from 4.76 - 7.33 planted branches. Growth in the number of diverse branches is thought to be influenced by differences in genetic traits in each line, besides the difference in the number of branches can also be caused by environmental influences. The greater number of productive branches in KH14 is thought to be related to the greater number of books in KH14 lines. This condition is in line with what was reported by Irwan (2006); Adisarwanto (2007) that the number of branches in soybean depends on the environment and the variety. In line with the study of Muzaiyanah et al (2016) that the number of books correlates significantly positively with the number of branches in soybean plants

Based on Table 2, the fastest flowering age is Anjasmoro (G5) and Dena (G4) varieties at 33.71 days and 33.96 days, while the longest flowering age is obtained in KH9 (G1) soybean strain ie 45.24 day. The difference in flowering age in the various lines was suspected due to the genetic diversity factor of the strains tested. Similar results were reported by Suprapto (2001); Soverda et al. (2012); Kustera (2013) which states that the flowering age character in several soybean genotypes differ between genotypes

Based on Table 2, the highest number of pods produced by KH14 (G2) soybean lines was 94.15 pods, while the least was obtained at Anjasmoro (G5) which was not significantly different from KH1 (G3) and Dena (G4). The number of pods is determined at fertilization ie when pollen cells fertilize an egg in the ovary (Mimbar, 2004). The reduced number of crop pods is thought to be a result of reduced sunlight received by plants so that the process of photosynthesis is disrupted which results in reduced photosynthates which are allocated for pod formation. Chairudinet., Al (2015) reported that the decline in pods at various shading levels was caused by the inhibition of plant metabolic processes due to low light intensity. This implies a decrease in the amount of photosynthate to the seeds so that there is a decrease in the number of pods.

Based on Table 2, the number of seeds per plant line KH14 (G2) was higher than soybean lines KH9, KH14, Dena and Anjasmoro. This is thought to occur because KH14 (G2) soybean has more pods than other soybean strains. Saeed et al., (2007) reported that the number of seeds per plant had a significant positive correlation with the number of pods per plant. Results of the same study on green bean plants were reported by Makeen, et al., (2007); Rohman, et al. (2003); Judge (2008). Although KH14 (G2) soybean has the highest number of planting seeds, KH14 (G2) soybean has a lower seed weight than KH1, Dena and Anjasmoro because it has a relatively smaller weight of 100 seeds (7.29 gr / 100 seeds) and vice versa KH1 strain has a relatively small number of seeds per plant but has a higher seed weight per plant which is 18.08 g. . Weight increase of seeds per plant is not always followed by weight of 100 seeds. When associated with the number of filled pods, varieties that have many filled pods will have small seed sizes, due to competition between seeds to get photosynthate (Susanto and Adie, 2006)

Weight of 100 strain lines tested ranged from 5, 84 - 15.80 g / 100 seeds. According to Juwita (2012) the weight of 100 seeds is a quantitative character that is able to describe the size of the soybean seeds. Cahyono (2007) states that seed size is classified into three classes, namely small seeds (<10 g / 100 seeds), medium (11-14 g / 100 seeds) and large (> 14 g 100 seeds). In Table 4.2, there were three strains that had large seed sizes namely KH1, Floor Plan and Anjasmoro respectively 15.80 g / 100 seeds, 14.95 g / 100 seeds and 14.52 g / 100 seeds while KH9 and KH14 included soybean seeds each weighed 5.84 g / 100 seeds and 7.29 g / 100 seeds. This condition was explained by Wijayantiet., Al, (2014) not a positive positive correlation between the number of seeds per plant with a weight of 100 seeds. The difference in weight of 100 seeds of each strain is thought to be influenced by the genetic diversity of each strain, so strains with small seed weight will produce small seed weight sizes in other words, genetic factors are more dominant in determining the weight of 100 seeds of various lines in test.

The lines tested were significantly different in age at harvest. Dena (G4) tends to have a shorter harvest age while the longest harvest age is obtained in the KH9 (G1) strain. This is in line with the parameters of flowering age because the faster the age of flowering, the faster the age of harvest. According to Trihantoro (2010) flowering age is related to the physiological ripe age because the age of a plant is influenced by the flowering rate. Another factor that affects the age of soybean harvest is plant height. According to Rahajeng and Adie (2013) plant height affects the age of harvest and crop yields. The higher the plant, the longer the pod's ripe age will be, because the vegetative phase is longer

Effect of pruning time on the growth and yield of cocoa beans on shading stress conditions

Table 3 shows the best pruning ie at the T5 pruning time (prune 6 MST) which was significantly different from the other treatments. Pruning in this case aims to reduce the height of soybean plants under the shade. At the T5 pruning (pruning 6 MST) the height was 91.32 cm, shorter than the T4 treatment (93.48 cm), T3 (94.60 cm), T2 (102.80 cm), T1 (115 cm) . This condition is in line with research conducted by Srirejeki et al. (2015), namely bud pruning in bean plants can stop apical dominance so that stem length growth is slower. Other studies also conducted by Munawaroh and Aziz in Novianti (2016) report that pruning treatment on torbangun plants can inhibit plant height increase.

The most number of branches obtained at the T2 pruning (pruning 3 MST) is 9.85 branches, however the slow pruning time does not cause the addition of the number of branches at T3 (pruning 4 MST) and T4 (pruning 5 MST) as well as T5 (pruning 5) 6 MST) significantly. The growth of lateral branches due to pruning is influenced by the hormones auxin and cytokinins produced by plants (Takei et al., 2004). Significant increase in the number of branches was seen in pruning age of 3 MST, presumably because the plant was in the phase of maximum vegetative growth rate, consequently all buds with the potential to grow were maximally stimulated to produce more new branches, in contrast to pruning ages 5 and 6 of plant MST must divide the direction of vegetative growth into generative so that the formation of new shoots does not occur optimally. These results are in line with research reported by Rochayat et al., (2017) on frangipani plants, that pruning treatment shows an increase in the number of branches every week until the age of 6 MST and tends not to increase again at the age of 8 MST and so on. The same research results were also reported from Jatropha (Raden et al., 2009), patchouli plants (Irawati and Setiari 2009), Bitter (Januwati et al, 1996). According to Heddy (1986) this condition occurs because pruning of plant organs in the vegetative phase will cause the auxin growth hormone to accumulate at the point of growth which causes the emergence of new shoots and vice versa in the generative phase the hormone begins to decrease, the same thing is also reported (Lakit 1995; Pinkard, 2002)

Table 3 shows that the most number of books obtained at T4 pruning time (5 MST pruning) is 21.10 books and not significantly different from the T2 pruning time (3 MST pruning) which is 19.55 books, while the least at pruning time T1 (without prune) is 7.20 books. This is thought to occur because T4 (pruning 5 MST) has more branches than other pruning time treatments so that the chances of book formation are even greater. The increase and growth in the number of books is closely related to the number of branches where the more branches the more the number of books. The results of this study are in line with research reported by Anggraini et al 2017; Zamriyetty and Rambe (2006); Sholeh et al. 2016)

Table 3 shows that there were no statistically significant differences in the age of flowering in all treatments of soybean crop pruning time with control plants. Flowering age at all treatments when pruning ranged from 36-37 days after planting. This shows that the different pruning times did not affect the age of flowering days in all soybean lines which were pruned under the shade but were thought to be more influenced by genetic factors. This is in accordance with the opinion of Baharsja (1985) the main factor of flowering in soybean plants is more influenced by plant genetic traits

The number of crop pods is one of the components that affects the weight of soybean crop seeds. Zahara et al. (1994) states that in determining results, number of pods is the most important criterion. The highest number of pods was at the T2 pruning time (3 MST pruning) and not significantly different from the T4 pruning time (5 MST pruning) ie 93.15 and 90.45 pods, while the lowest at the T1 pruning time (without pruning) namely 44.15 pods. Overall treatment of pruning time increased in number of pods compared to plants without pruning. The results of this study are in line with those reported by Lakitan (1995); Bimasri (2013) that pruning has a significant effect on the number of pods, weight of crop production, wet weight

Table 3 obtained the highest number of seeds at T2 (prune 3 MST) and not significantly different from T4 (prune 4 MST), each of which was 141.8 seeds and 134.56 seeds while the lowest was at T1 (without prune) ie 59 .75 seeds. This happens because the treatment T2 (prune 3 MST) and T4 (prune 4 MST) produce more branches and pods compared to other treatments. Muzaiyanahet., All (2016) states the number of pods is positively correlated and is the factor that provides the greatest contribution to the number of seeds per plant

The highest seedling weight was at the T2 pruning time (pruning 3 MST) and not significantly different from the T4 pruning time (pruning 5 MST) ie 20.17 g and 20.20 g while the lowest at the pruning time T1 (without pruning)) which is 9.64 g. This is thought to occur because the number of seeds at the pruning time of T2 pruning (pruning 3 MST) and the pruning time of T4 (pruning 5 MST) is more than the other pruning time. Hapsari and Adie (2010) stated that the number of planting seeds was positively correlated with yields of crop seeds. Similar results were also reported by Wijayantiet., Al (2014); Muzaiyanah et all (2016)

The weight of 100 seeds reflects the size of the seeds. The dry weight of 100 seeds at all pruning times was not significantly different, with an average weight of 11.8 g - 11.70 g. These results indicate that the pruning time under shade does not spur increased seed weight. The difference in mean weight of 100 soybean seeds from each strain was assumed to be influenced by the genetic characteristics of each strain tested. Tulus (2011) in his research said that the maximum seed size is determined by genetic factors, whereas the actual size of the seeds produced is determined by the condition of the seeds during the filling period.

Table 3 shows that the age of harvest at all pruning times was not significantly different, with an average weight ranging from 94.60 days to 97.70 days. These results indicate that the pruning time under the shade does not affect the age of the harvest. According to Trihantoro (2010) flowering age is related to the physiological ripe age because the age of a plant is influenced by the flowering rate. The results of the same study were also reported by Pandiangan (2012) the age of harvest in soybean plants is very closely related to the age of flowering.

V. CONCLUSION

From the results of data analysis and discussion, it can be concluded that: 1) There is no interaction between pruning time and soybean strain on growth character and soybean yield 2) Under shading stress conditions, KH14 brown soybean strain shows better strain growth character than brown soybean plants KH9, KH1 and Dena and Anjasmoro varieties, while KH1 soybean strain showed 100 seeds weight and plant seed weight were higher than other strains. 3) Prune time 3 MST shows the highest character of growth (plant height, number of productive branches, number of books), as well as the highest yield and yield components not different from the age of 5 MST pankas

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