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Araştırma Makalesi/*Research Article (Original Paper)*

The Effects of Different Doses of Cattle Manure on Yield and Yield Components as Second Crop Organic Soybean Production

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Abstract: Soybean {*Glycine max* (L.) Merill} is not only an important food source containing fat, protein, carbohydrate and minerals but also an important industrial plant providing raw material for many industries. Organic farming is an important element for sustainability of farming, protection of environment, and reduction of chemical fertilizers usage. Soybean, like other legumes, has rhizobium bacteria in its roots providing nitrogen and organic materials which facilitate the sustainability of organic farming. This study was conducted with the aim of researching the effects of the organic cattle manure doses on yield and yield elements of soybean under semi-arid climatic conditions in organic farming. In this study, organic cattle manure with the doses of 0, 500, 1000, 1500 and 2000 kg ha^{-1} were applied to Adasoy Soybean [*Glycine max* (L.) Merill] cultivar under the second crop conditions. There search was conducted according to the random blocks experimental design with three replications during 2013 and 2014. In results obtained from the two-years study determined that the seed yield varied between 1678.9 and 2611.8 kg ha^{-1}; plant height varied between 87.00 and 112.00 cm; number of branches per plant varied between 3.04 and 6.28; first pod height varied between 7.68 and 12.81 cm; number of pod per plant varied between 103.83 and 138.66 per $plant^{-1}$; protein ratio varied between 39.31% and 41.74%; 100 seeds weight varied between 12.49 g and 15.28 g; and oil ratio varied between 20.51% to 21.91%. According to the results of correlation analysis, positive and important correlations between seed yield with number of branches per plant (r=0.4964**), and number of pod per plant (r=0.4964*) and 100 seeds weight (r=0.5782**) were observed.

Keywords: Cattle manure, *Glycine max* (L.) Merill., Organic Farming, Soybean

İkinci Ürün Organik Soya Üretiminde Büyükbaş Hayvan Gübresinin Farklı Dozlarının Verim ve Verim Unsurlarına Etkisi

Öz: Soya {*Glycine max* (L.) Merill} içerdiği yağ, protein, karbonhidrat ve mineral maddeler ile önemli bir besin kaynağı olmakla birlikte pek çok sanayi koluna hammadde sağlayan önemli bir endüstri bitkisidir. Ayrıca sürdürülebilir tarımın sağlanması, çevrenin korunması ve kimyasal gübre kullanımının azaltılmasında organik tarım, önemli bir unsurdur. Soya baklagil bitkisi olması dolayısıyla köklerindeki rhizobium bakterileri sayesinde, toprağa azot ve organik madde sağlamakta ve tarımın sürdürülebilirliğini kolaylaştırmaktadır. Bu çalışma yarı kurak iklimin organik tarım koşullarında, soyanın verim ve verim unsurlarına, organik büyükbaş hayvan gübresi dozlarının etkisini araştırmak amacıyla yürütülmüştür. Çalışmada; Adasoy Soya (*Glycine max* [L.] Merill) çeşidine ikinci ürün koşullarında organik büyükbaş hayvan gübresi 0, 500, 1000, 1500 ve 2000 kg/ha dozlarında uygulanmıştır. Çalışma tesadüf blokları deneme desenine göre 3 tekerrürlü olarak 2013 ve 2014 yıllarında yürütülmüştür. Çalışmadan elde edilen iki yıllık birleştirilmiş varyans analiz sonuçlarına göre; verimin 1678.9-2611.8 kg/ha; bitki boyunun 87.00-112.00 cm; bitkide dal sayısının 3.04-6.28 adet/bitki; ilk bakla yüksekliğinin 7.68-12.81 cm; bakla sayısının 103.83-138.66 adet/bitki; protein oranının % 39.31-41.74; 100 tane ağırlığının 12.49-15.28 g ve yağ oranının % 20.51-21.91 arasında değiştiği saptanmıştır. Korelasyon analizleri neticesinde verim ile; bitkide dal sayısı (r=0.4964*), bakla sayısı (r=0.4964*) ve 100 tohum ağırlığı (r=0.5782**) arasında olumlu ve önemli korelasyonlar olduğu tespit edilmiştir.

Anahtar kelimeler: Büyükbaş hayvan gübresi, *Glycine max* (L.) Merill., Organik Tarım, Soya

Introduction

Soybean is an important source of vegetable oil and protein in the world. Soybean seed contains 18-25% oil and 40% protein. After the oil taken, the remaining pulp is contains 60-65% protein. Soybean pulp is one of the main sources of protein for farm animals and poultry all around the world. The soybean oil's 1/3 used in food industry and 2/3 as protein sources of the contemporary world are obtained from soybean (Golbitz 2004). Soybean oil contains Ca, Fe, and Zn elements together with vitamin B and vitamin E. As soybean protein contains rich valuable amino acids, it has higher levels of nutrition (Yılmaz et al. 2005). Soybean is used in more than 250 branches of food industry in today's world.

Soybean is a member of legume family. The *Rhizobium japonicum* bacteria living in its roots connect the nitrogen on the air to the soil. Thus, it is a very important crop as rotation plant (Arıoğlu 1994). Sustainability in agricultural production is a universal topic but, there is not any deal about how to do it. Sustainability is considered as related to organic farming which is very fast growing sector in many countries (Rigbyand Cáceres 2001). Therefore, some searches should be done and some precautions should be taken in order to ban the usage of synthetic chemical in agriculture.In the study processed by (Garcia and Blancaver 1983) in Indonesia, organic cattle manure and poultry manure were applied to the soybean. In the study, it is seen that harvest time of plots with organic cattle manure is 9 days later but the yield rate is higher to 62% compared to control. In another study done in India by (Reddy et al. 2000) 0, 4, 8 and 16 ton ha^{-1} of cattle manure and 0 and 22 kg ha^{-1} of phosphorus were applied annually to soybean in soybean-wheat rotation. In this study, it is seen that organic cattle manure increased the yield in the proportion of 42%, 57% and 75% respectively. In the plots where phosphor is applied together with organic cattle manure the yield rates are seen as 79%, 90% and 93% respectively. The highest yield 2.18 ton ha^{-1} is seen when 16 ton ha^{-1} of cattle manure and 22 kg ha^{-1} of phosphor were applied. In another research conducted by (Delate and Cambardella 2004) in the USA, oat, soybean, corn and clover were cultivated using both conventional and organic farming conditions. It was reported that the yield in soybean farming in both conventional and organic farming conditions was similar for the first 3 years but, in the fourth year it is reported that the yield in conventional farming was 2.7 ton ha^{-1} while the yield in organic farming conditions was 3 ton ha^{-1}. It is also reported in the research that the production of soil before and after harvest reacted to fertilizer application.In a research conducted by (Gupta and Gardner 2005) in the USA it is reported that apart from containing beneficial materials such as N, P, K, poultry manure contains harmful metals such as arsenic, cadmium, copper, manganese, zinc, lead, antibiotics, antioxidants, inhibitors and some other organic components. In the report it is also stated that clay absorbs the organic materials from poultry manure by connecting toxic materials. As a result, use of poultry manure enriches the plant and nutrition materials in the soil and the water holding capacity of it. It also helps to respiration of the soil and so the productivity and growing of plant was affected positively. In a research conducted under greenhouse conditions in Japan, (Tagoe et al. 2008) determined that when carbonized and dried poultry manures are applied to loamy soil as 50 and 100 kg ha^{-1} from both, for 4 different doses, productivity rate increases to 23% and 43% and 7% and 30%. Moreover yield of dry bean, seed yield, 100 seed weigh, rate of dry material and node production are affected directly from manure application. (dos Passos et al. 2014), in his research in Brasil stated that there was an increase in productivity in all elements when organic poultry manure and farm manures were combined with mineral fertilizers and applied together.The highest seed yield was observed when 5.5 ton ha^{-1} organic manure and 200 kg ha^{-1} mineral fertilizers applied and it is stated that mineral fertilizers and organic manure combinations brought a synergic effect. In the research conducted in Brazil, (Silva et al. 2014) applied cattle manure to soybean and observed that the K and P effectiveness of soil increased to 122 % and 38 % respectively. As a result the K and P in the plant increased to 41 % and 7 % and so this increased the number of pod per plant to 20 % and seed yield to 23 %. This study was conducted to determine effects of different doses of cattle manure on yield and yield components of organic soybean [*Glycine max* (L.) Merill] production as second crop under semi-arid climatic prevails in Harran Plain ecological conditions at Southeast Anatolia.

Materials and Methods

This research was conducted in Harran University Akçakale Vocational High School (Semi arid climatic conditions) of organic farming field at 2013-2014 years as 2nd crop at Southeast Anatolia. The research was conducted in randomized completely blocks experimental design with three replications. The two years lasting experiments were conducted in the same place. During this research, organic barley, which is appropriate to the organic farming regulations, was cultivated as a main crop. The soil was plowed with plough about 25 cm depth in November and it was plowed again with cultivator. After these, in order to freeze colds the field was plowed with gobble disk array and cattle manure (biofarm manure) was mixed right just after harvesting the

barley. Barley was harvested in the middle of May. After barley harvest stems were collected from the field. Soil was irrigated as and when needed. The soil was plowed with cultivator than farmed with gobble disk array. After ploting, different doses of cattle manure (biofarm) (500, 1000,1500 and 2000 kg ha^{-1}) were applied. No cattle manure was applied to control plots. Biofarm was produced from plant protein resources by fermentation methods. Biofarm contents 50 % organic material, 2 % total N, 1.6 % organic N, 2 % P and 2 % K. Biofarm's was pH between 7-8. In this research Adasoy soybean cv was used as plant material. Adasoy cv is a mid-later, half upright growing typed, elliptic leaved, brown bean colored, white flower colored and lying-resistant type of soybean. In the soil analysis, it is seen that it was a loamy soil. The percentage of salt, lime ($CaCo_3$), organic material, and soil reaction (pH) were observed as 1.36 %, 10.9 %, 1.11 % and 7.32 % respectively. In the experiment the length of plots were 5 meters, width of plots were 2.8 meters, and the spices among of plots were planned and applied as 3 meters. Sowings were made on June 20th in 2013 and on June 15th in 2014. Every plots consists 4 line at 70 cm intervals and 3-5 cm intra row spaces and every lines were planned 5 meters long.

The field was hoed six times against weeds, with both hand hoe and tractor hoe. Drip irrigation system was used and plants were irrigated for seven times in total. At the end of the growth time harvests were made on October 14th in 2013 and October 16th in 2014. The edge two lines of each plot and from the beginning and end 0.5 m has been excluded from the experiment as edge effects. The measurement counting and observations were made middle two lines every plots. On calculations of characteristics of seed yield (kg ha^{-1}), the number of pods per plant, plant height (cm), first pod height (cm), number of branches per plant and number of pod per plant, and 100 seeds weight were determined by INTSOY (International Soybean Program) were used (Bek and Arıoğlu 2005). The nutrition materials such as protein ratio (%) and oil ratio (%) in soybean were specified by using Official Methods of Analysis of the Association of Official Chemists (AOAC) techniques. Oil ratio of soybean was obtained by using technique of hexane extraction. The statistical analysis of the data after the research was calculated using the JUMP 7.0.1 packed program developed by SAS Institute 2013 and 2014 years. The data was calculated singly and commulatively using 'random blocks experimental design' and subjected to analysis of variance. The most important averages on F test were grouped according to Least Significant Difference (LSD) test. Moreover the Coefficient of Variation (CV, %) determined. Graphics were made on Excel program. Furthermore, in order to determine the correlation between the characteristics examined, correlation calculating program on JUMP is used (Yolcu 2009).

Results and Discussion

The average number plant height (cm), number of branches per plant, first pod height (cm), number of pods per plant, 100 seeds weight, seed yield (kg ha^{-1}), oil ratio (%) and protein ratio (%) were obtained in the research on application of different doses of cattle manure to 'Adasoy' soybean and the CV (%) and groupings according to LSD test are given in Table 1.

Table 1. Avarage numbers about yield and yield components obtained after applications of cattle manure to 'Adasoy' cv of soybean in different doses and groups formed after LSD test

Fertilizer	Plant Height (cm)	Number Of branches Per Plant	First Pod Height (cm)	Number of Pod Per Plant^{-1}
0 kg ha^{-1}	87.83 c	3.23 d	7.86 c	103.83 c
500 kg ha^{-1}	100.51 bc	3.04 d	8.61 c	106.16 c
1000 kg ha^{-1}	95.12 ab	4.17 c	9.85 bc	121.83 b
1500 kg ha^{-1}	102.87 ab	4.87 b	11.83 ab	119.50 b
2000 kg ha^{-1}	112.64 a	6.28 a	12.82 a	138.66 a
Mean	99.79	4.32	10.19	117.59
CV(%) /LSD	10.14/12.37**	8.30/0.43**	16.69/2.08**	5.63/8.12**
Fertilizer	**100 Seeds Weight (g)**	**Seed Yield (kg ha^{-1})**	**Oil Ratio (%)**	**Protein Ratio (%)**
0 kg ha^{-1}	12.49 c	1670.89 b	20.51 b	39.32 b
500 kg ha^{-1}	12.73 c	1680.00 b	21.78 a	40.03 b
1000 kg ha^{-1}	14.2 b	2440.25 a	21.91 a	39.67 b
1500 kg ha^{-1}	14.49 ab	2610.18 a	21.84 a	39.31 b
2000 kg ha^{-1}	15.28 a	2288.56 a	21.52 a	41.74 a
Mean	13.84	2137.98	21.51	40.01
CV(%) /LSD	4.73/0.80**	18.29/47.89**	2.10/0.55**	3.45/1.68*

(*: 0.05):statistically significant at 5% level.
(**: 0.01): statistically significant at 1% level.

Plant Height (cm)

It is determined by different researchers that, as shown on Table 1. There is a positive correlation between plant height and seed yield. (İşler and Çalışkan 1998; Iqbal et al., 2003). Plant height is one of the characteristics that directly affects on seed yield. It is observed in the experiment that average height of plants differs from 87.83 cm to 112.64 cm and the shortest plant was grown in control plot and the tallest plants 112.64 cm was grown in the plot with 2000 kg ha^{-1} of cattle manure. The average height of plants was observed as 99.79 cm. The applied doses of organic cattle manure affected the height of plants at the statistical level of importance. Higher doses of manure naturally boosted the height of plants. (Tanrıverdi et al. 2000; İlker et al. 2010) findings about height of plants also support the findings in this research.

Number Of Branches (Per Plant^{-1})

It is seen on Table 1 that number of branches per plant ranged from 3.23 to 6.28 per $plant^{-1}$. The least number of branches was observed in the plot with 500 kg ha^{-1} of cattle manure and the most pods were observed in the plot with 2000 kg ha^{-1} of cattle manure. It is understood that the average number of branches per plant was 4.32 in the research. Applied doses of cattle manure has an effect at statistical importance level on the number of branches per plant. 500 kg ha^{-1} of cattle manure had no effect on but cattle manure more than 1000 kg ha^{-1} had a positive effect on number of branch per plant. These findings are partly or completely similar to those of (Yılmaz et al. 2005; İlker et al. 2010). It can be said that these differences arises from genetic structure and environmental conditions and agronomic applications.

First Pod Height (cm)

It is seen on that height of first bean ranges from 7.86 to 12.82 cm (Table 1). The shortest first pod height 7.86 cm was observed in control plot and the tallest first pod height 12.82 cm was observed in the plot with 2000 kg ha^{-1} of cattle manure. Average height of first bean was calculated as 10.19 cm. Application of different doses of cattle manure used in the research had a statistical level of importance on the height of first bean. The first pod height in control plot without any manure was measured as very short; however, when the doses of manure were increased, the first pod height increased. Although we can said that the first pod height values remain within normal limits. The findings of (Tanrıverdi et al., 2000) showed that when the height of plant increases, the height of first bean also also elongate in agreement with the findings of this research (Arıoğlu 1999; Abdelhamid et al. 2004; İlker et al. 2010).

Number of Pod (Per Plant^{-1})

The pod number of per plant ranges from 103.83 to 138.66 (Table 1), the least number of pod per plant 103.83 was observed in control plot without any cattle manure and the highest number of pod per plant 138.66 was observed in the plot with 2000 kg ha^{-1} of cattle manure. The average number of pod per plant was obtained as 117.59. Although control plot and the plot application 500 kg ha^{-1} and with 1000 kg ha^{-1} and 1500 kg ha^{-1} cattle manure were obtained same statistically group (Table 1). This findings are completely or partially similar to those of (Reddy 2000; Tanriverdi et al. 2000; Abdelhamid et al. 2004; Gupta and Gardner 2005; İlker et al. 2010; da Silvia et al. 2014) findings.

100 Seeds Weight (g)

The 100 seed weight of ranged between 12.49 to 15.28, the least 100 seeds weight 12.49 g was grown in control plot without any manure, the heaviest 100 seeds 15.28 g was grown in the plot with 2000 kg ha^{-1} of cattle manure (Table 1). The average 100 seeds weight was found 13.84 g. It can be inferred from the research that when the doses of organic manure increases, the weight of seeds increases too. Similar findings are mentioned in (Yılmaz 1999; Tanrıverdi et al. 2000; Abdelhamid et al. 2004; Gupta and Gardner 2005; İlker et al. 2010) researches.

Seed Yield (kg ha^{-1})

Seed yield ranged between 1670.89 kg ha^{-1} and 2610.18 kg ha^{-1}, the lowest seed yield 1670.89 kg ha^{-1} was observed from control plot and the highest seed yield 2610.18 kg ha^{-1} was observed in the plot with 1500 kg ha^{-1} of cattle manure (Table 1). The average seed yield was observed as 2137.98 kg ha^{-1}. It is determined in this research that seed yield was affected positively from cattle manure until dose of 1500 kg ha^{-1} is reached, followed by negative yield increase from cattle manure 1500 kg ha^{-1}. It can be said that with doses 1500 kg

ha^{-1}, the rise of nitrogen increases characteristics to maximum point such as plant height, first pod, height number of branches per plant, so vegetative growth is encouraged. However, it can be said that at doses 1500 kg ha^{-1} generative growth is affected negatively so, yield productivity decreases with that much of manure doses. Thus, similar findings were observed in productivity factors such as plant height, number of pod per plant and 100 seeds weight (Table 1). Our findings about seed yield per unit area in this research is a lower than average soybean seed yield in Turkey, but we can say that it is around the normal limits of organic farming conditions. Similar findings are mentioned in (Garcia and Blancaver 1982; Tanrıverdi et al. 2000; Delate and Cambardella 2004; Gupta and Gardner 2005; Acar et al. 2006; Tagoe et al. 2008; İlker et al. 2010; Dos Pasos et al. 2014;). Among the literature examined, no literature was found that was in conflict with our findings. In addition, the cattle manure increases the organic matter in the soil. Organic matter application was more effective on clay loam soil than loam soil, especially at higher levels of 6 and 8% and manure was more effective in decreasing soil compaction (Shahgholi and Janatkhah 2018).

Oil Ratio (%)

It is seen on Table 1 that oil ratio ranged 20.51% to 21.91%, the lowest oil ratio 20.51% was obtained from control plot with no manure, and the highest oil ratio 21.91% was obtained from the plot application 1000 kg ha^{-1} of organic cattle manure. The average oil ratio was founded 21.51%. We can say that; organic manure applications, increased the oil ratio at a level of statistical importance when compared to control group, and oil ratio according to doses of manure applications grouped in the same statistical groups (Table 1), in agreement with (Yılmaz and Efe 1995).

Protein Ratio (%)

According to our research the proportion of raw protein ranged from 39.31% to 41.74%, the lowest protein ratio 39.32% was obtained from the plot with 1500 kg ha^{-1} of cattle manure and the highest raw protein proportion 41.74% was obtained from the plot with 2000 kg ha^{-1} of organic cattle manure (Table 1). The average proportion of raw protein was calculated as 40.01%. Protein ratio in the plot with 2000 kg ha^{-1} of cattle manure increased at a level of statistical importance $p \leq 0.01$ but, all other doses and control plots were grouped together in statistics in agreement with (Yılmaz and Efe 1995) findings.

Correlations Between Yield and Yield Components

The coefficient correlation between examined factors is given in Table 2. It is seen that there are some correlations between examined yield components.

It is determined in this research that there are positive and significant correlations between the number of branches per plant and plant height (r = 0.4409**); first pod height and plant height (r = 0.4181*); first pod height (cm) and number of branches per plant (r=0.6611**); number of branches per $plant^{-1}$ and plant height (cm) (r=0.5584**); number of pod per $plant^{-1}$ and number of branches per plant (r= 0.8263**); number of pod per $plant^{-1}$ and first pod height (cm) (r= 0.7158**); ash percent (%) and plant height (cm) (r=0.3658*); protein ratio (%) and plant height (cm) (r=0.3978*); 100 seed weight (g) and plant height (cm) (r=0.5004**); 100 seed weight (g) and number of branches per plant (r= 0.8192**); 100 seed weight (g) and first pod height (cm) (r=0.6417**); 100 seed weight (g) and number of pod per $plant^{-1}$ (r=0.8302**); seed yield (kg ha^{-1}) and number of branches per plant (r= 0.4964**); seed yield (kg ha^{-1}) and number of pod per $plant^{-1}$ (r=0.4186*); seed yield (kg ha^{-1}) and 100 seed weight (g) (r=0.5782**); oil ratio (%) and 100 seeds weight (g) (r=0.4168*); oil ratio (%) and seed yield (kg ha^{-1}) (r= 0.4181*) were obtained.

Table 2. Correlations between yield, yield components and other investigated traits

Variable	Variable	Correlation	Correlation Level
1.Number of branches per plant	8.Plant Height (cm)	0.4409**	
2.First Pod Height (cm)	8.Plant Height (cm)	0.4181*	
2.First Pod Height (cm)	1.Number of branches per plant	0.6611**	
3.Number of Pod Per Plnt^{-1}	8. Plant Height (cm)	0.5584**	
3.Number of Pod Per Plnt^{-1}	1.Number of branches per plant	0.8263**	
3.Number of Pod Per Plnt^{-1}	2.First Pod Height (cm)	0.7158**	
4.Protein Ratio(%)	8.Plant Height (cm)	0.3978*	
4.Protein Ratio(%)	1.Number of branches per plant	0.1788	
4.Protein Ratio(%)	2.First Pod Height (cm)	0.2136	
4.Protein Ratio(%)	3.Number of Pod Per Plnt^{-1}	0.2965	
5.100 seed weight (g)	8.Plant Height (cm)	0.5004**	
5.100 seed weight (g)	1.Number of branches per plant	0.8192**	
5.100 seed weight (g)	2.First Pod Height (cm)	0.6417**	
5.100 seed weight (g)	3.Number of Pod Per Plnt^{-1}	0.8302**	
5.100 seed weight (g)	4.Protein Ratio (%)	0.1584	
6.Seed Yield (kg ha^{-1})	8.Plant Height (cm)	-0.0539	
6.Seed Yield (kg ha^{-1})	1.Number of branches per plant	0.4964**	
6.Seed Yield (kg ha^{-1})	2.First Pod Height (cm)	0.2348	
6.Seed Yield (kg ha^{-1})	3.Number of Pod Per Plnt^{-1}	0.4186*	
6.Seed Yield (kg ha^{-1})	4.Protein Ratio(%)	-0.0519	
6.Seed Yield (kg ha^{-1})	5.100 seed weight (g)	0.5782**	
7.Oil Ratio (%)	8. Plant Height (cm)	0.1266	
7.Oil Ratio (%)	1.Number of branches per plant	0.2265	
7.Oil Ratio (%)	2. First Pod Height (cm)	0.2515	
7.Oil Ratio (%)	3.Number of Pod Per Plant^{-1}	0.2644	
7.Oil Ratio (%)	4.Protein Ratio (%)	-0.0915	
7.Oil Ratio (%)	5.100 seed weight (g)	0.4168*	
7.Oil Ratio (%)	6.Seed Yield (kg ha^{-1})	0.4181*	

(*: 0.05):statistically significant at 5% level.
(**: 0.01): statistically significant at 1% level.

Conclusion

Under semi-arid climatic and organic farming conditions, applied five different doses of cattle manure were positive effected on yield and yield components of Adasoy soybean cultivar. Obtained from our work seed yield was 2610 kg ha^{-1} under organic farming and application of 1500 kg ha^{-1} cattle manure. According to our research that soybean seed yield was affected positively from applied cattle manure until dose of 1500 kg ha^{-1} is reached, followed by negative yield increase from cattle manure over 1500 kg ha^{-1}. It can be said that with doses more 1500 kg ha^{-1}, the rise of nitrogen increases characteristics to maximum point such as plant height, height of first plant, number of branches per plant^{-1}, so vegetative growth is encouraged. However, it can be said that at doses over 1500 kg ha^{-1} generative growth is affected negatively so, yield productivity decreases with that much of manure doses. We can said that region soybean producers should apply 1500 kg ha^{-1} cattle manure for second crop soybean under semi-arid climate and organic farming conditions, at Southeast Anatolia. Although our average of soybean seed yield is a little low than world average which is 2270 kg ha^{-1}. Moreover, this yield was product as second crop. According to the regulations in Turkey transition period from conventional to organic agriculture was accepted as 2 years. In order to production organic products the soil must be cultivated properly according to organic farming conditions for minimum 3 years. Thus, it is clear that if organic cultivation continues on the same field, the yield will increase more. It is concluded that our seed yield within the normal limits under second crop conditions though. So organic soybean production can product successfully as second crop under Southeast Anatolia in semi arid climatic conditions.

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