

Reaction of Common bean Crop (*Phaseolus vulgaris L.*) under Irrigation Intervals and Green manure

Narjes Khastehband^{*1}, Ebrahim Amiri¹ and Ali Abdzad Gohari²

1- Department of Agriculture, Islamic Azad University, Lahidjan branch, Lahidjan.Iran

2- Department of Irrigation, Islamic Azad University, Shoushtar branch, Shoushtar.Iran

Corresponding author Email: agri.sarcheshmeh@yahoo.com

ABSTRACT: To investigate the effects of irrigation management and green manure on yield of common bean, split plot in a randomized complete block design with three replications was conducted in the city of Astaneh Ashrafiyeh crop year 2012. Main plots with no irrigation and irrigation during the study period of 6, 12 and 18 days and includes green manure plots with values 0, 1, 2, and 3 cm in each plot were selected. Results showed that irrigation management on yield probability level, and the performance of the five sheaths and biological significance. Different levels of green manure on yield, pod yield and biomass were significantly five percent level. The interaction of different levels of irrigation management and green manure on yield was significant at five percent level, while the pod yield and biological yield was significant. Comparison of the data showed that the highest seed yield, pod yield and biological yield in irrigation management 6 days, respectively, with values of 2475, 3278.1 and 4426.6 kg/ha. Maximum yield, pod yield and biomass production at different levels of green manure 1407.8, 2181.1 and 2958.5 kg/ha. The interaction of different levels of irrigation management and green manure on yield of 3313.6 kg ha had the highest.

Keywords: Common bean, Irrigation Intervals, green manure, Yield

INTRODUCTION

legumes is Plant sources of protein rich considered one of the most important and second most important source of human food And as much as anything besides cereal and human countries in terms of quality and quantity are Important cereal and staple diet of the people of the world, Energy equivalent of cereal grains. The amino acids are rich. Bean crop year, has a right root abundant secondary roots, beans and tubers on the roots of small irregular brown, nitrogen-fixing is located. The compound leaves are composed of three pairs of leaflets with long petioles placed alternately on the stem. Plants need water, and when cultivated, the major difference is that so many factors, climate, vegetation and soil interactions to the water requirements of plants. After being released into the soil and ground water, water is distributed by other forces within the soil. Effect of water stress on plants could be determined from smaller sizes of

leaf or low heights in plants or decreased wet or dry weight (Abdzad Gohari, 2012). Rabinz and dominigo, (1961) showed that stress before flowering stage reduces the number of pods formed. Derberot and Tucker (1952) found that the occurrence of yield loss due to stress before flowering occurs. Brhozen and Daos (1959) stated that due to the tension in the vegetative stage, plants were short, but due to the residual soil moisture during flowering, yield was not reduced. Conversely, Kerikbom (1955) observed that irrigation had no effect on germination to flowering stage before returning the soil as green manure crops to increase the amount of organic matter in the soil. Green manures also indirectly increase the availability of nutrients by plants long insures for use by crops.

MATERIALS AND METHODS

A field experiment was conducted out in Astaneh Ashrafiyeh city, Guilan province, Iran (37° 16' N, 49° 56'

E, 3 m above sea level) during 2012 growing season. Main plots with no irrigation and irrigation during the study Intervals of 6, 12 and 18 days, and plots of green manure with values 0, 1, 2, and 3 cm in each plot were selected. Each experimental unit dimension 2.5×4 m was planted with four rows. Information on meteorological data in Table (1) is presented. To determine the physical and chemical characteristics of soil samples were taken randomly (Table 2). Tilled agricultural land, first in March and then in May I planted bean seeds (local cultivar Dehsari) hand and began to row at a depth of 4-3 cm. plant stack is 35 cm. To measure the amount of water delivered to each experimental unit of meter used. The amount of water during the growing season, the plant was supplied by irrigation water and rainfall. After harvesting the product, to estimate the sheath, after omitting the two rows

of plants of the parties, pods of land harvested after removing the seeds from the seed, in the oven at 70 ° C for 48 hours. Were excluded, after drying, the samples were weighed using a balance accurate to a hundredth. To estimate yield, after omitting the two sides of the plant rows, pods harvested from the ground, the pods, leaves and stems were separated from the plant and into the oven at 70 ° C for 48 hours were excluded. After drying, the samples were weighed using a balance accurate to a hundredth. Total weight of dry pods (with seeds), shoot dry weight and leaf weight, dry weight biomass per gram is obtained. The unit was converted into kilograms per hectare. The data analysis and comparison of means (Duncan test at the 5% level), and graph drawing software MSTATC were performed using Excel software.

Table 1. Information on meteorological data

Month	Max Temp (°C)	Min. Temp (°C)	Rain fall (mm)	Wind Speed (m/s)	Max Humidity(%)	Min Humidity(%)
May	27.3	17.3	39.5	1.2	92	58.9
Jun	41.9	20	0	0.9	85.9	49

Table 2. Characteristics of soil in the study area

Soil depths (Cm)	Particle size distribution (%)			Total nitrogen	Organic carbon	Soil Texture	Potassium absorbent (mg/kg)	Phosphor absorbent (mg/kg)
	Sand	Silt	Clay					
0-20	49	32	32	0.084	0.68	Loamy	239	0.07
20-40	49	19	19	0.065	0.66	Loamy	191	2.17

RESULTS AND DISCUSSION

Irrigation management on yield in% probability level had a significant effect (Table 3). The comparison showed that different irrigation, irrigation 6 days 2475.8 kg/ha with a maximum yield (Fig 1). Different levels of green manure at the 5% level, there was a significant effect on grain yield (Table 3). The maximum yield of 2 cm in each plot fertilizer value of 1407.8 kg/ha was observed (Fig. 2). The interaction of different levels of irrigation management and green manure on yield was significant at the 5% level (Table 3). Comparison of the data showed that the highest yield in irrigation management for 6 days and 2 cm in each plot fertilizer value of 3313.6 kg/ha (Figure 3). Sing (1999) the same study found that irrigation and the use of green manure in fruits and vegetables is a high performance product. Means were compared among treatments, irrigation 6 days with 3278.1 kg/ha pod yield is maximum (Fig. 4). Pod yield the highest amount of fertilizer levels 1 and 2 cm in each plot were 2176.8 kg/ha and 2181.1 kg/ha was observed (Fig. 5). Water stress during pod formation allocated to fruit with irrigation, reduced. Allocation of less material because of its greater transmission of fruits and leaves during the grain filling period during which the plants are watered, respectively. Rapid growth during water shortages delayed

the fruit and decreased performance. Incidence of 1 to 2 days of water shortages, delayed flowering and flow er production decreases significantly.

Comparison results indicated that the amount of biomass in treatment for 6 days, with most of the other treatments (Figure 6). Between different levels of green manure in amounts of 1 and 2 cm in each plot, respectively, with a mean of 2880.1 and 2958.5 kg ha-highest amount of fertilizer conditions, with an average of 2034.4 kg ha biological yield the lowest (Figure 7). If the beans are usually 55 to 65% available soil water storage capacity utilization by roots is not significantly less yield loss. At maturity, 70 to 80% can be easily (Rabir et al 1967). Rabinz and dominigo (1961) showed that stress before flowering stage reduces the number of pods formed. Derberot and Tucker (1952) found that the occurrence of yield loss due to stress before flowering occurs. Brhozen and Daos (1959) stated that due to the tension in the vegetative stage, plants were short, but due to the residual soil moisture during flowering, yield was not reduced. Conversely, Kerikbom (1955) observed that irrigation from germination to flowering stage had no effect on yield.

Table 3. Variance analysis for effects of irrigation and green manure on common bean

Source of variation	Mean squares			
	df	Pod yield	Seed yield	Biological yield
Blocks	2	3267776.225 ^{ns}	1224471 ^{ns}	6476991.662 ^{ns}
Irrigation Intervals	3	10428681.178 ^c	104097.492 ^{**}	19367175.735 [*]
Error	6	1356166.634	629780.122	2735559.236
Green manure	3	1216063.074 [*]	724655.831 [*]	2104725.38 [*]
Interaction	9	673089.34 ^{ns}	443517.915 [*]	1356497.526 ^{ns}
Error	24	372585.253	156337.584	647332.141
CV (%)		31.3	37.7	30.8

***: Significant at 1, 5% level and ^{ns}: Not significant

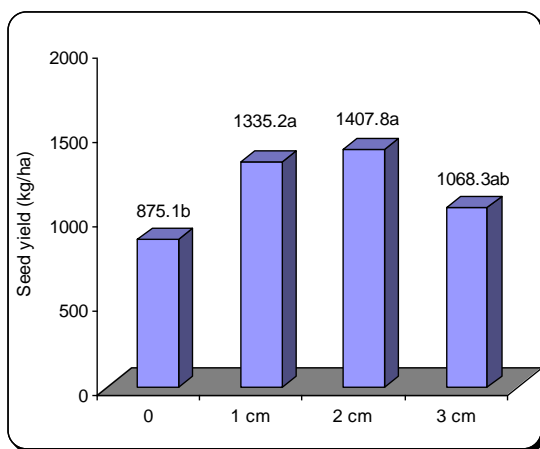


Figure 2. Seed yield in Green manure levels

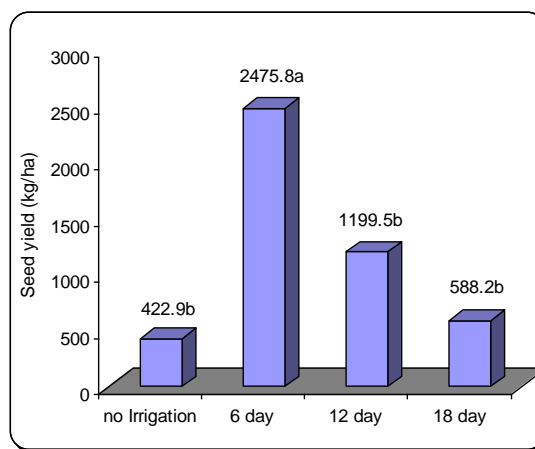


Figure 1. Seed yield in irrigation management

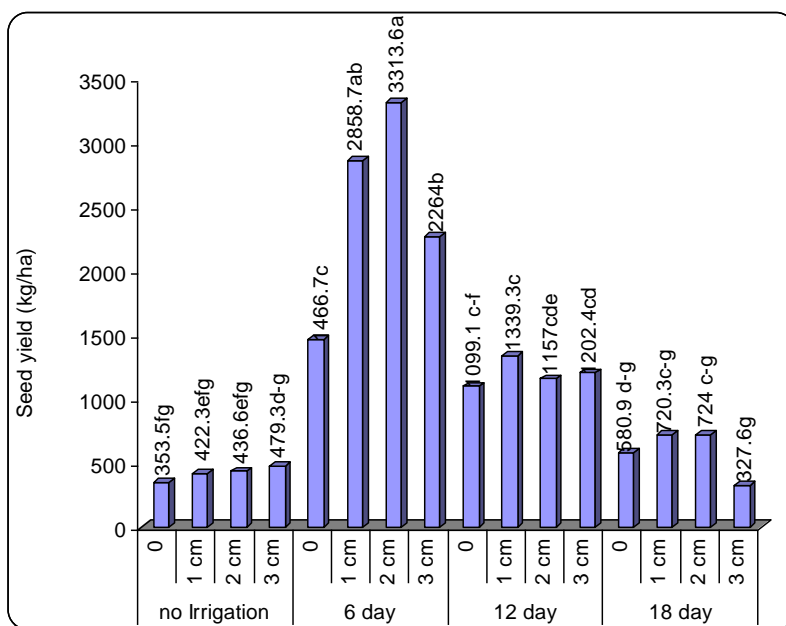


Figure 3. irrigation management and green manure levels on common bean

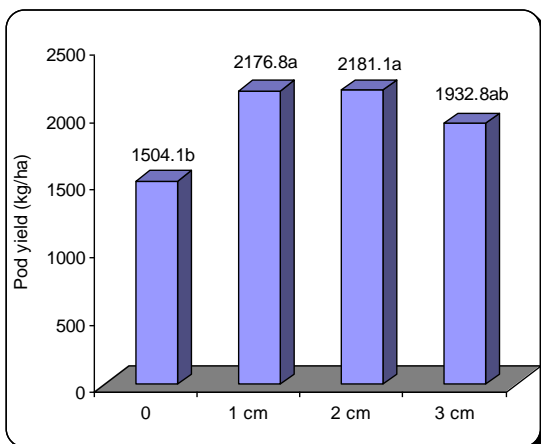


Figure 5. Pod yield in green manure levels

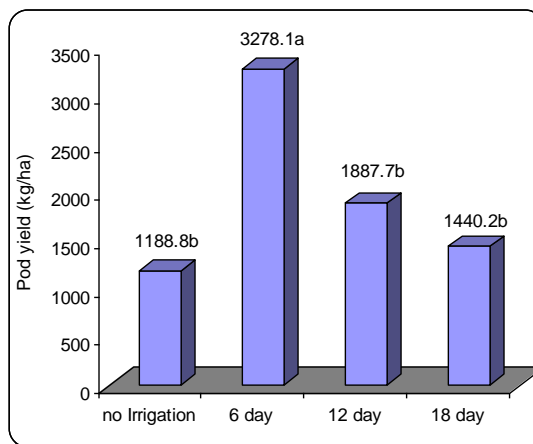


Figure 4. Pod yield in irrigation management

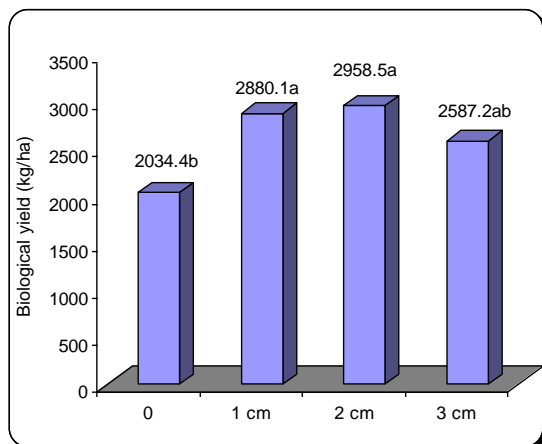


Figure 7. Biological yield in green manure levels

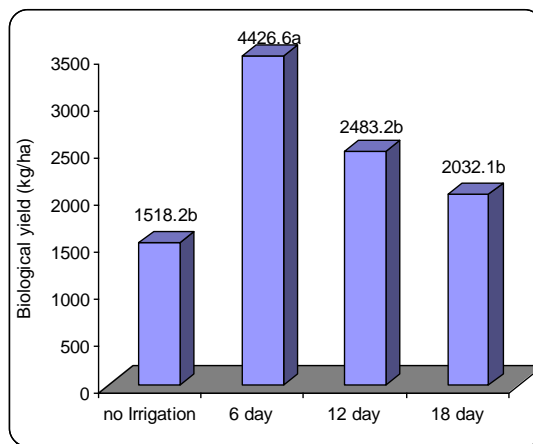


Figure 6. Biological yield in irrigation management

CONCLUSION

Results showed that irrigation management on yield probability level, and the yield of the five sheaths and biological significance. Different levels of green manure on yield, pod yield and biomass were significantly five percent level. The interaction of different levels of irrigation management and green manure on yield was significant at five percent level, while the pod yield and biological yield was significant. Based on pod yield and water use efficiency in irrigation management was significant at the five percent level. Comparison of the data showed that the highest seed yield, pod yield and biological yield in irrigation management 6 days, respectively, with values of 2475, 3278.1 and 4426.6 kg/ha. Maximum yield, pod yield and biomass production at different levels of green manure 1407.8, 2181.1 and 2958.5 kg/ha. The interaction of different levels of irrigation management and green manure on yield of 3313.6 kg/ha had the highest. It may be different levels of

green manure and irrigation management 6 days to 2 cm in each plot for the proposed study area.

REFERENCES

Abdzad Gohari A. 2012. Effect of soil water on plant height and root depth and some agronomic traits in common bean (*Phaseolus vulgaris*) under biological phosphorous fertilizer and irrigation management. International Research Journal of Applied and Basic Sciences. Vol., 3 (4), 848-853.

Brhozen R.O. and Daos, G. 1959. Early History and Origin of the Peanut, in Peanuts Culture and Uses, American Peanut Research and Education Association, Stillwater, Okla. pp. 17-45.

Derberot N.W., and Tucker, T.C. 1952. Growth yield and yield components of sunflower as affected by source, rate and time of application of nitrogen. Agron. S. 49: 54-56.

Kerikbom D. 1955. Seed yield determination of peanut crops under water deficit: Soil strength effects on pod set, the source sink ratio and radiation use efficiency. Field Crops Research. 109: 24-33

Rabinz R and dominigo, R. 1961. Relative water requirement of plants. J. Agric. Res. (Washington. D.c.). 3: 1-63.
Rabir D.S, Abo-El-Ela, H.K and Gaber, A.M. 1967. Water Requirements of Peanut Grown in Sandy Soil under Drip Irrigation and Biofertilization. Australian Journal of Basic and Applied Sciences. 3(1): 55-65.

Sing J.A. 1999. Morphological observations in the leaf surface of *Phaseolus vulgaris* L. and their possible relationship to stomata response. Ann. Rep. Bean Improve. Coop. 42, 75-76.