Calculate dynamic changes in bean yield in different plant densities

Somaye Ghadaksaz[1], Tayeb Saki Nejad[2], Alireza Shokohfar[3]

1- Department of Agriculture. Science and Research Branch, Islamic Azad University, Khuzestan, Iran,
2- Assistant Professor Department of Physiology, Islamic Azad University, Ahvaz branch (*Thesis Supervisor*)
3- Assistant Professor Department of Physiology, Islamic Azad University, Ahvaz branch
[*]Corresponding Arthur: saki1971@iauahvaz.ac.ir

Abstract : General purpose of testing conditions to get the best crop production figures for comments in order to get maximum yield is. Appropriate distribution of plants per unit area in one of the most consistent factor is to increase yield. In order to study the effect of different densities on bean cultivars, experimental farm in 2008 Farm Research, Islamic Azad University of Ahvaz was executed. Factorial experiment in randomized complete block design with three replications was formed. The first factor consists of three densities (45, 55, 65) plants m and the second factor consists of three digits (ZOHREH, SHAME and JAZAYERI) were. The results showed that between different varieties of grain yield and all yield components (seed number per pod and NO. pod) statistically significant difference in the level of 5 percent there. ZOHREH figure was superior to other cultivars and varieties having SHAME with little JAZAYERI showed no statistical difference. Grain yield in different cultivars ZOHREH, SHAME and JAZAYERI, respectively1523.33, 1372.67, 1352 kg ha was. . Most biological functions in the plant density of 55 3042.89 kg/ha obtained the density of levels with other significant difference at 5 percent showed. Highest harvest index and density of about 55 plant varieties ZOHREH m according to the results the best varieties for planting varieties bless and best density, density of 55 plants per square meter is .

1. Introduction

Grains of the main sources of protein-rich food for human and animal nutrition are known. About 22 percent in human nutrition of plant protein, 32 percent fat and 7 percent of carbohydrates are whole grains provide. Similarly, 38 percent of protein in animal feed plant, 16 percent fat and 5 percent of the carbohydrate source is provided. Some grains in addition to international trade oil production for different purposes are used in human and animal nutrition.

Among grains, soy, beans and peas in terms of acreage, respectively first to third place are met. Nightingale eyed beans in tropical countries especially African countries; the wide level is automatically assigned.

Density effect on yield and yield components

Salvador (2006) in testing the effect of population density on the yield of green pod bean showed plant growing season in both surveys. Randomized complete block design experiment with three replicates and densities 11-17-33 m cultivated plant varieties, including limited growth Test results showed that the green pod yield increased with increasing density and the best density for plant varieties in 33 m was recommended .

McEwen and Mafyt (1998) Effects of planting date and seed rate on yield reported that cultivation on suitable plant density increased from 12 to 36 plants m No. pod the plant from 6.6 to 6.4 reduced, but at the same density of pods per square meter was 177 to 235 .

Sabagh Poor (1996) reported quoting with increasing density and number of pods per plant, seeds per pod, although reduced amounts of these components per unit area can be accelerated .

Nori and Nabi Pur Kashani (2004) to evaluate the effect of plant density on growth, yield components and grain yield of mung bean in spring cultivation experiment with a factorial randomized complete block design with four replications. The first factor includes four row spacing (10, 15, 20 and 25 cm) equal to (80, 100 133 and 200 thousand plants per hectare) and the second factor includes three varieties of mung bean (Gohar, VC1973A and NM92) was. The results show that the highest grain yield with density 13.3 plants per square meter and 15 cm plant spacing (3010.1 kg per ha) and cultivar VC1973A 2976.4 kg per ha grain yield and minimum density of 20 plants m square distance of 10 cm 2645.2 kg per hectare and gem figure 2227.1 kg ha was obtained. Among yield components, pod number per square meter than other increase in yield explained .

Agha Alikhani Qlavndv Ala (2004) to investigate the effect of different planting densities of

10, 13, 20 and 40 plants m on yield and yield components of two varieties of gem-ray and a line (VC-1973A) Vetch Green experiment was performed. The results showed that VC-1973A lines yield the highest won and according to the earliness and ripening time than the other two varieties are preferred for mechanized harvesting. Mung bean planting density on yield very significant effect on the surface was a percentage, so that densities of 20 and 10 plants m highest kg / ha 2221 and the lowest kg / ha 1650 grain yield were produced. Among yield components, only the number of pods per plant was affected by the density. Correlation studies showed that the density of characters with the first pod height and distance from the ground and positive correlation with grain yield per plant, harvest index and number of branches and pods correlation was negative. Moreover, it seems, the number of pods that a high correlation ($0.88 = r$) with grain yield per unit area is the most important component is the yield of mung bean .

2. Materials and Methods

This test Crop in 2008 University Research Farm in three kilometers south of Ahwaz, Ahwaz city geographic 31 degrees 20 minutes North and longitude 48 degrees 41 minutes east and 18 m above sea level is located. To determine the physical properties and chemical field soil test before planting field soil sampling conducted Shadow following results were obtained .

Treatments were tested in compression as the main treatment and bean cultivars as sub-treatment is intended. In this review Tuesday Picks 45, 55 and 65 plants per square meter as the main factor was applied. That it will provide for easy order results with D1, D2 and D3 will be shown. The bean genotypes tested Tuesday as has been under cultivation, these figures include ZOHREH, SHAME and Jazayeri (V1, V2 and V3) were .

3. Results and Discussion
A- Yield

The differences in yield of different densities were significant at the five percent level (Table 1). Densities of 55 plants per square meter with 1658.89 kg of grain per hectare compared to other compression rates were highest. Appears to cause yield loss in density of 65 plants per square meter due to competitive absorption of radiation in plants, food and moisture, the grain yield also increased in density 45 plants per square meter than the density of 65 plants per square meter due to better distribution of inputs environment (light, nutrients, moisture) between plants, yield per plant (number of pods per plant) increased.. Perhaps one reason for high grain yield (pods) at plant

density of 55 square meters in total dry matter is more, the test results and Aspyng Naynhys (1998) on beans and bean showed that with increasing density of grain yield per plant reduced yield loss in high density increasing percentage of sterile flowers and pods severe loss and significant reduction in dry matter were attributed was consistent. (Shams and Zanganeh, 2004)

Analysis of variance of grain yield (Table 1) suggests that the cultivar effect on grain yield at 5% average means and comparisons with related Table 1 a significant difference between the figures does not show. Been blessed with grain varieties (1523.33) kilograms per hectare than the other two varieties are superior yield the lowest figure Jazayeri 1359 kg ha rate showed. Differences in yield characteristics and differences of cultivars and varieties of genetic material also allocate more productive and more reproductive parts of seeds per pod number were attributed to the ZOHREH. The test results Akynvla and Whitman (1988) were consistent .

Table1. Analysis of variance

Mean square		df	SOV
HI %	Seed yield		
9.60[**]	1603[ns]	2	R
2160.06[**]	418882.11[**]	3	Density
68.314[**]	74839.00[**]	2	Cultivar
52.1[**]	94.974[ns]	6	D * C
05.0	50.1151	16	E
9	10	-	%CV

B- Harvest index

Density effect on harvest index was significant at five percent. (Table 1) such that the highest rate of harvest index 70.3 percent owned density was 55 plants per square meter. Growth in the appropriate space density creates a balance between weight and total weight of the pods were dry, while the density of 45 plants per square meter competition, seed dry weight loss and increased biological function leading to decreased harvest index. Effect of variety on the harvest index, significant differences in the level of five percent did not show. Comparison of the results shown in 4-19, between SHAME and variety of JAZAYERI observed harvest index is not statistically different, but with the ZOHREH of both varieties showed significant differences. Jazayeri cultivars had the lowest harvest index due to reduced photosynthesis and reduced material handling light to penetrate the lower parts of the plant community and therefore economic yield in this figure dropped to reduce and eventually harvest index has shown .

C- **Component Yield**

C-1- Number of pods per plant

Analysis of variance table 1 that showed effect of density on NO. Pods are significant difference in the 5% level indicated. So the density of 45 plants per square meter pods per plant (11.01) and the density of 65 plants the number of pods per plant (9.08) was reduced. Table comparing mean density of the best in terms of number of pods per plant density of 55 plants (average densities) were observed. In fact, with increasing density of pods per plant is always less. Because it suggests that reducing plant density per unit area, increase the plant community is light in hand more space available for plant development plant placed. In this case, dominance of low-end buds and side branches begin to grow more plants and should develop with the development of active plant leaf area and plant more institutions take advantage of the environment (light, moisture and nutrients) increases And so the plant will produce more flower number and flower number increased because of increased pods are ultimately the number of pods per plant is greater. . Bennett et al and Graham in the eye beans nightingales and battery in soybeans reached similar results. Between cultivars as well as the number of pods per plant, significant difference at 5% level showed. Jazayeri than two digits and ZOHREH SHAME fewer pods per plant have produced but statistically between the two JAZAYERI and the variety SHAME there was much difference. It can be caused due to developmental differences and abilities enjoying the environment are different cultivars. ZOHREH number of pods per plant with an average 11.33 and 10.29 with a mean figure Jazayeri pods per plant, respectively, the highest and lowest No. Pod produced at the plant .

C-2- Number of seeds per pod

Based on Analysis of variance table 1 number of seeds per pod, plant density influenced statistical difference at 5% level indicated. Probably due to incorrect estimation error is tested. Most grain density 55 plants m average was 11.87. Lowest density of 65 seeds per plant was due to competition between plants for the use of environmental features is a plant that has been less developed and reduced yield per plant and blessed with an average number of seeds had the highest number 15.83 .

C-3- Seed weight

Compare different levels of congestion on the seed weight showed increased density of grain weight decreases with increasing density, which provides nutritional space per plant is reduced, competition between plants was more a result the amount of food and reduced the share of each plant That's why the single-grain weight is reduced, statistically significant differences between different levels of congestion is not present. In this experiment, seed weight was not significantly affected by cultivar and statistically different between the treatments tested there was no significant difference. But between the three cultivars, varieties ZOHREH had the highest seed weight. The pilot reported that the pattern of cultivation on seed weight had no significant effect because the seed weight or seed has considerable stability .

4. Conclusion

General purpose of testing conditions to get the best crop production figures for comments in order to get maximum yield is. Appropriate distribution of plants per unit area in one of the most consistent factor is to increase yield. Grain yield components including No. pod, number of seeds per pod with a reduction in density from 65 to 55 plants per square meter increased. This indicates that the bean plants increased the available space to attempt to directory creation of conditions to be able in most exploited to enhance yield. Most grain density was 55 plants per square meter. Cultivars and the yield of its components had different variety than the ZOHREH of the other two varieties were superior. Harvest index was affected by the plant density and harvest index in the best density equivalent to 55 plants m 70.3 respectively. Figures of the harvest index were together statistical difference in terms of variety and ZOHREH to the other two varieties were superior .

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