Calculated regression equations and correlation of seed yield with its components in bean plants

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Abstract: Research was performed in field research of Islamic Azad University of Ahvaz, The split plot design experiment in a randomized complete block design with four replications and treatments as the main and were performed, The main treatments for nitrogen fertilization at different stages of plant growth and Secondary treatment includes different amounts of nitrogen fertilizer were. when the amount of each component and functional correlation with seed yield can be studied how the effects of these components impact on yield and realized yield will decrease this purpose by providing regression equations of the correlation coefficient was calculated and evaluated in this calculate the highest correlation with number of pods per plant and seed yield showed what pods increased seed yield increase showed a high correlation between weight and the lowest seed yield was obtained with other words whatever pods plant or seed number per pod increased seed weight, high levels of nitrogen decrease trace higher correlation showed statistically significant with other nitrogen fertilizers, which was low, and no fertilizer at bloom periods together the different growth showed no difference, The highest correlation between yield components, number of pods per plant was functioning and seed weight had the lowest correlation:

regression equations and correlation	No. pods per plant	No. seed in pod	seed weight
Seed Yield	Y=-337.02+163X R^2=0.97	Y=-562.4+1120.99X R^2=0.79	Y=-28987+10998X R^2=0.32

The number of pods per plant increase by treatment nitrogen fertilizer in the early stages of growth before flowering, vegetative growth, which increased by the appropriate number of pods per plant, thus increasing yield and high correlation with the indicated.

[Tayeb Saki Nejad, Alireza Shokoohfar. **Calculated regression equations and correlation of seed yield with its components in bean plant.** Life Science Journal. 2011; 8(3):142-147] (ISSN:1097-8135). http://www.lifesciencesite.com.

Key words: regression equations, seed yield, components

1. Introduction

The study of dry matter accumulation, leaf area index and net photosynthesis

According to Evans and others, a positive relationship was between plants shoot dry weight and grain yield there. However, maximum dry matter production necessarily a direct correlation between grain yields is highest, because the biological function of path formation (TDM) and economic yield (grain dry matter) is different (environmental impact on the reduction of reproductive organs). Maximum of dry bean yield physiological maturity stage can be produced. After this stage, total dry matter yield 10 to 20 percent decrease and this operation due to shade leaves, this transfer of nutrients to the roots and secrete various substances from roots to soil (1).

Dry weight of each organ as a proportion of the total dry weight confirms that the new bean varieties are more general types of grain are not. Dry matter was because the shares of fruits at 40 percent lower than the same public figures are pea.

Dry matter production of beans of the same factors which affect the total dry weight of pea effect makes. LAI (LAI) between beans 3.5 to 4 is variable. LAI coatings plant in more than 5, increase light penetration and shade leaves commissioning into the vegetation and thus reduces the net photosynthetic rate (NAR) as the crop yield decreases.

In experiments conducted on bean in central Czechoslovakia observed that the highest increase in square planting pattern of dry matter and LAI against 4.2 and 90 cm in height and leaf number 12 to number 13 in the amount of each plant G 20.63 per square meter per day, respectively. With LAI up to 3.5 and large distances row (37.5 cm), increased dry matter 18.1 grams per square meter in the day. LAI increased to 6.5 to 7 dry matter productions to eight to 12 grams per day decreased (3).

NAR values for the bean cultivar in southern Czechoslovakia won. The LAI values with low (0.8-1.6) of 13.2 to 30.3 m g per day varied was. Czechoslovakia East under the NAR median value between 1972 to 1974, 9.09 grams per square meter per day with maximum 12.7 grams per square meter in the day. All parameters in the manufacturing process more beans of soy. (NAR 20% higher). This can result in sensitivity to temperature is soy.

Bean and soybean planting under two sets of different ecological conditions and land south and East Post Czechoslovakia has indicated that before a crop can achieve its maximum production, certain climatic conditions should be established. The main prerequisite in this regard, there are favorable conditions in the days that photosynthesis occurs. The views pica in 1972, NAR values in the Bean 80 days of 150 days than 9 grams per square meter per day have been.

Summer field (1977) NAR beans about 11.89 years and 60 days during 60 days of soybean NAR was 10.74. Thus, under certain conditions during the growing season, higher NAR Bean is able to produce more material in comparison with soybean earn. Vegetation patterns (e.g., 15.8 × 8 / 15 cm with a network model with wider spacing or row 37.5 cm) even with a fixed number of plants per unit area (40 square cm plants) can also impact on the NAR leaves. Vegetation was in an initially higher NAR. Elongation stage in the second half when the plants during the 125 to 150 cm, NAR have wider row distance is greater. If the network type of coverage is higher LAI, but the shadow of more established vegetation and therefore are much lower NAR. Leaf area ratio (LAR) as the ratio of total leaf area as the most important component of the photosynthetic system is the user. The experiments mentioned above LAR in plants values intervals are planted rows high, mid-flowering was higher, but then the result was reversed. Higher amounts of LAR in a network type of vegetation after mid-flowering stage could be due to the more established shade. Establish mutual shadow effects in NAR and LAR may affect yield of bean plants and in particular morphological pattern has leaves. Arrangement with bean leaf beet leaf pattern comparison and announced that while the majority of bean leaves (approximately 85 percent) are more or less horizontal, but more than 50 percent of sugar beet leaves are nearly vertical and thus the light more influence within vegetation will beet. Bean leaves in the shade, horizontal operation increases (7, 11).

As pattern density also plays an important role in crop production is. Development and production plant densities of seed yield, plants with 23 to 139 m were studied under conditions of Czechoslovakia. High density of plant yield, LAR has about 4.5 to 5 and NAR 2.7 to 4.13 grams per square meter per day with a relative increase of 31% to 55% yield was the highest densities in the range of 86 to 96 plants per square meter, i.e. generally the recommended optimum density was observed in agricultural operations. Significant results it was dry seeds as part of the total dry weight in the range of densities, does not change much. (8, 9)

2. Material and Method

2.1. Profile geographic location test

Research was performed in field research of Islamic Azad University of Ahvaz on 3 km south of Ahwaz city is located in the following

Geographical specifications, tests were performed:

Latitude: 20 31	Altitudes: 18 m
Longitude: 41 48	Average rainfalls: 256 mm

2.2. Local climate experiment

Experiment where climate is arid and semi arid and according to weather data Ahvaz 40 94 / 213 mm average annual precipitation, average annual temperature of 24/25, 92/32 Average annual maximum temperature, mean minimum degree Annual Heat 4 / 18 ° C is. Minimum temperatures in crop (80-79) 2 / 3 in January and maximum temperatures in September 51 have been reported.

2.3. Land preparation and planting

In order to experiment on 25/6/79 Date of operation include land preparation tillage depth of 20 cm, disk and trowel and phosphate fertilizer injection (type of phosphate fertilizer, phosphate fertilizer was calcium) were as fallow land in the years before the land Map classification scheme based on the plot that was a size 4 × 6 experimental plots and 10 lines in each plot was planted.

The distance of two rows of seeds between rows 60 and 20 cm were considered. Different amounts of nitrogen fertilizer as a treatment (25 = 50 = and = 1000 kg per hectare) were calculated and weighed along with seeds and tape was placed.

Before planting seeds with rhizobial bean (R. Leguminosarum) sugar syrup by inoculation and cultivation, and irrigation was done immediately. Planting date was 22/7/79.

2.4. Characteristics and test design

The split plot design experiment in a randomized complete block design with four replications and treatments as the main and were performed under defined:

A) Main treatment

The main treatments for nitrogen fertilization at different stages of plant growth and Bean are defined as follows:

a_1 : Forming nitrogen fertilizer while planting

a_2 : $\frac{1}{2}$ N simultaneous planting and $\frac{1}{2}$ the rest during vegetative growth before flowering

a_3 : $\frac{1}{2}$ N simultaneous planting and $\frac{1}{2}$ the rest during flowering

B) Secondary treatment

Secondary treatment includes different amounts of nitrogen fertilizer were as follows:

b_1 : 25 kg ha

b_2 : 50 kg ha

b_3 : 100 kg ha

Land area is 2500 square meters.

2.5. Harvest and measurements

On the final product lines 7 and 6 and 5 as the final area of area 4 / 5 was considered the parameters of grain yield and its components (pods per plant, mean seed number per pod, seed weight) was the whole plant.

2.6. Statistical calculations

On all results, analysis of variance was followed by Duncan's test, comparison was done and the results are presented as tables, charts with Harvard graph, Excel 2000 was to plant growth analysis with computer programs for agricultural SAS estimate was calculated.

3. Result and Discussion

3.1. Yield components of variation

3.1.1. The number of pods per plant

Among yield components number of pods per plant is one of the most important components of grain yield and yield component is variable, the ability to flower and pod formation in legumes is high but so is the actual production potential and genetic characteristics that are completely dependent on environmental conditions and change very much because this is a yield component, analysis of variance of this parameter at 1% indicate that fertilization in different periods of growth and nitrogen fertilizer levels and their interactions have significant effects from their shows (Table 1).

The highest number of pods and treatments and has been obtained (Table No. 2, 3) that this phenomenon is also one of the reasons for increasing grain yield can be considered because the number of pods per plant is a high correlation with yield the interaction of treatments and compared to other treatments showed the highest number of pods, number of flowers in the fall treatments were found and the number of pods per plant showed decreased possibly due to injection of the fertilizer N after flowering, which was worse, is growth.

Table 1. Comparison of average number of pods per plant in the fertilization different periods of growth

Treatment	Mean	Duncan
a_1	30	A
a_2	29	A
a_3	25	B

Table 2. Comparison of average number of pods per plant at different levels of nitrogen fertilizer

Treatment	Mean	Duncan
b_1	29.8	A
b_2	22.3	B
b_1	21.4	B

Table 3. Comparison of cross-fertilization of the different periods of growth and levels of nitrogen fertilizer on the number of pods per plant

Treatment	Mean	Duncan
a_1b_3	30.6	A
a_2b_3	30.1	A
a_1b_2	26.7	B
$a_2\ b_2$	26.2	B
$a_1\ b_1$	23.1	C
$a_2\ b_2$	22.8	C
$a_3\ b_3$	20.8	D
$a_3\ b_2$	20.2	D
$a_3\ b_1$	19.8	D

3.1.2. The number of seeds per pod

Unlike the number of pods that yield one of the variable component is considered, the number of seeds per pod, the most stable component of yield is because the number of cells in all ovarian eggs are nearly equal. Thus the number of seeds per pod and its changes, a similar effect because the number of pods not yield fluctuations. Elongation period of grain filling the pod to the number of seeds per pod is effective.

Table 4. Comparison of average number of seeds per pod in the fertilization different periods of growth

Treatment	Mean	Duncan
a_2	129	A
a_1	127	A
a_3	106	B

Table 5. Comparison of average number of seeds per pod at different levels of nitrogen fertilizer

Treatment	Mean	Duncan
a_3	4.12	A
a_2	4.12	A
a_1	4.11	A

Table 6. Comparison of cross-fertilization of the different periods of growth and levels of nitrogen fertilizer on number of seeds per pod

Treatment	Mean	Duncan
a_3 b_3	4.27	A
a_3 b_2	4.23	A
a_2 b_2	4.23	A
a_2 b_1	4.2	A
a_3 b_1	4.17	A
a_1 b_3	4.12	A
a_2 b_3	4.12	A
a_1 b_2	4.11	A
a_1 b_1	4.09	A

ANOVA table showed that the effects of different levels and split application of nitrogen fertilizer at different periods of the bean plant growth and their interaction showed significant (Table 4, 5) and this shows that different levels of nitrogen fertilizer when the limit were high have been able to plant needs in terms of supply and when they fix nitrogen in the lower level had been applied biological nitrogen fixation needs in terms of plant nitrogen supply and the supply has not changed in different periods of the fertilization effect on growth grain number have.

3.1.3. Seed weight

ANOVA table showed that fertilization in different periods of growth and nitrogen fertilizer levels and their interaction at 1% was significant.

Duncan test at 1% showed that the treatments and the highest seed weight and respectively 129 and 127 g were treated seed weight of 106 grams lowest group belonged to the average (Table 7) in the injection of nitrogen fertilizer after flowering, seed weight and it has caused is due to the intensification and increased leaf length and stem diameter, which makes the assignment less filling materials and increased grain weight has been.

Different levels of nitrogen fertilizer by Duncan test showed that the 1% level and a level of treatment and treatment are higher than your other two treatments showed (Table 8).

The interaction between the treatments and the highest seed weight of 129 grams and the treatment showed little seed weight allocated to that (Table 9).

Table 7. Comparison of average Seed weight in the fertilization different periods of growth

Treatment	Mean	Duncan
b_3	4.5	A
b_2	4.42	A
b_1	4.4	A

Table 8. Comparison of average Seed weight at different levels of nitrogen fertilizer

Treatment	Mean	Duncan
b_3	132	A
b_2	117	B
b_1	116	B

3.2. Yield correlation with pods per plant, seeds per pod and seed weight

When the amount of each component and functional correlation with grain yield can be studied how the effects of these components impact on yield and realized yield will decrease this purpose by providing regression equations of the correlation coefficient was calculated and evaluated in this calculate

the highest correlation with number of pods per plant and grain yield showed what pods increased grain yield increase showed a high correlation between weight and the lowest seed yield was obtained with other words whatever pods plant or seed number per pod increased seed weight, decrease (Fig1, 2 & 3) a small amount of high levels of nitrogen showed a higher correlation statistically significant with the other treatments The nitrogen was low, and did not bloom fertilizer in different growth periods also showed no differences with each other, but on the number of pods per plant by treatment nitrogen fertilizer in the early stages of growth before flowering, vegetative growth that increases in the appropriate result of increased number of pods per plant and high correlation with grain yield showed.

Table 9. Comparison of cross-fertilization of the different periods of growth and levels of nitrogen fertilizer on Seed weight

Treatment	Mean	Duncan
$a_2\ b_3$	129	A
$a_1\ b_3$	127	A
$a_2\ b_2$	127	A
$a_1\ b_2$	126	A
$a_2\ b_1$	109	B
$a_1\ b_1$	108	B
$a_2\ b_1$	108	B
$a_3\ b_1$	102	BC
$a_3\ b_3$	95	C

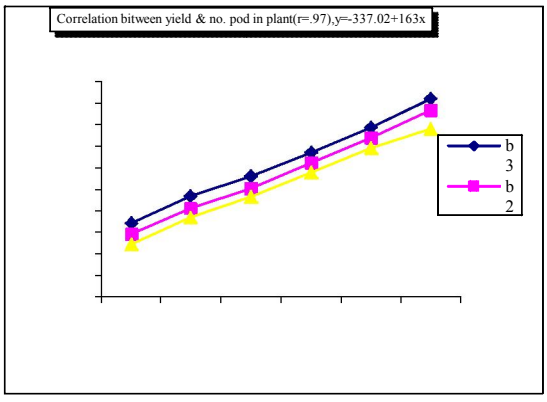

Fig 1. Correlation between numbers of pods with seed yield at different levels of nitrogen fertilizer

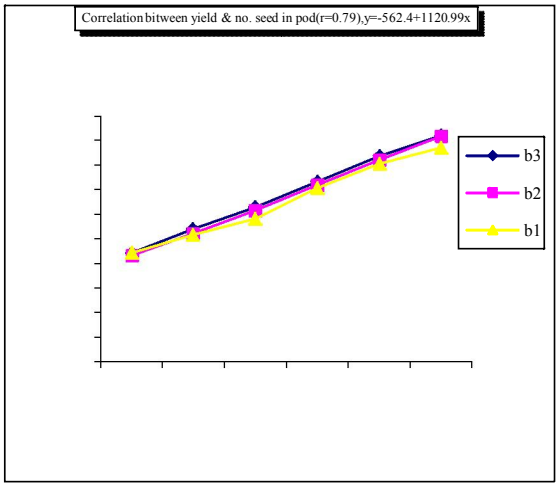

Fig 2. Correlation between the numbers of seeds per pod, grain yield at different levels of nitrogen fertilizer

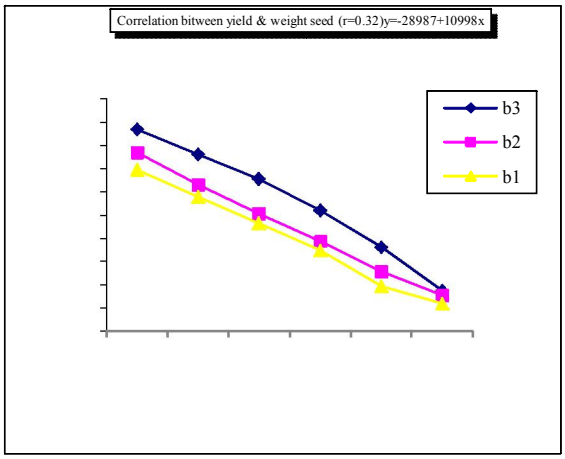

Fig 3. Correlation between seed weight with grain yield at different levels of nitrogen fertilizer

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6/5/2011