

# Study five Genotypes of pea (*Pisum sativum L.*) in Terms of Yield and Yield Components under Conditions Sulaymanyah - Bakrajo

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**Abstract**— to study the relationships between morphological characters of pea plant an experiment was carried out at the research field of Agricultural Technical Institute of Bakrajo, affiliate to the Sulaimania Polytechnic University. And the experiment was conducted in two consecutive years 2011-2012 and 2012-2013. Experiment was conducted in randomized complete blocks design (RCBD) in three replications. Result of analysis of variance shown that there was significant difference among pea genotypes in the majority of traits. The results of mean comparing of traits are shown in between majority genotypes significant difference exists. The data recorded showed that all traits increased across the pea genotypes. Correlation analysis for traits in 2011-2012 showed that grain yield was in the strongest relation with Number of reaches per plant ( $r = 0.641$ ). After this traits the plant height ( $r = 0.549$ ) and 100 grain weight ( $r = 0.543$ ) showed the most correlation with grain yield and in 2012-2013 years showed that grain yield was in the strongest relation with 100 grain weight ( $r = 0.543$ ). After this traits the Number of reaches per plant ( $r = 0.523$ ) showed the most correlation with grain yield.

**Index Terms**— Compare means, Correlation, Genotype, *Pisum sativum L.* Yield Component,

## I. INTRODUCTION

Since ancient times human known pea and carried of them when he noticed their nutritional value then took and collects wild plants and then uses them for the food without learns replanted after, the south-west Asia area, Afghanistan, India and the hills of the Caucasus original homeland for this plant, there exist wild varieties. It is also the Middle East such as Iraq and Iran are considered the second homeland of peas [1]. As featured here plants with large seed which was the basis for the major varieties of cereal and vegetative contemporary [2]. Peas need to cool air and sustain low temperatures which help to configure the length of the grain inside the pods, which works to increase the weight of the crop so we recommend planting peas in during the months of September and October [3]. Peas grown succeed in all types of land, but they succeed cultivated and given a good crop in yellow heavy land good drainage as it succeed grown also in sand land and give its early [4]. *Pisum sativum L.* a cool-season legume can be grown for human consumption.,

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green manure and animal feed. The peas (*Pisum sativum L.*) that are grown in order to get on the green and the dry seeds of vegetable crops important in the world and widespread, in view of the importance of food manufacturing, dry seeds are richer than green seeds [5], where the proportion of Carbohydrate ratio from % 45-50, and protein from %20-25 of dry matter [6], [7]. In spite of the importance of the cultivation of this crop is limited in the central region of Iraq as well as in some parts of the northern region as Sulaimanyah and Erbil, and the demand for consumption annually for its entry in the worse meals are green, frozen or dried, there is also a sizeable quantities of dry seeds are imported annually from outside the country to meet the needs of domestic consumption [8], so is the process of entering any species into the country for the purpose of seed production is important and appropriate that the cultivation of any species or its success depends mainly on the environmental conditions prevailing in the region [9], particularly temperature and light intensity, as the high temperatures during the of flowering stage leads to stop the process of flowering and is the temperature 25-20 Co best degree to get higher production quantity and quality [10], and that the temperature rise to 27 Co during the flowering stage has caused a decreasing of production and its components [11], [1]. Due to the absence applied research on the different varieties of peas for seed production or yield components, we decided to do this research, which aims to introduce new varieties of peas for the purpose of seed production and yield components under conditions of Bakrajo in Sulaimanyah, It has increased in the last decade increased significantly demand for the cultivation of this important legumes crops. In an experiment that performed on the peas plant, it was cleared that, there was positive and significant correlation between the number of pods per plant, the weight of 100 grain weight and the number of lateral branches with grain yield. Also, indicated that, the number of pods per plant, the pod length and vine length had most direct effect on the grain yield of the peas [12]. The peas grain yield had a positive correlation with the plant height, the number of pod, the number of grains per pod and the yield of the pod, and pod yield showed the high direct effect in this plant [13].

The purpose of this study was to evaluate of comparison of relationship of some traits of pea genotypes using of correlation and ANOVA analysis in order to determinate the best pea genotypes to achieve the highest yields.

## II. MATERIAL AND METHODS:

## Study five Genotypes of pea (*Pisum sativum L.*) in Terms of Yield and Yield Components under Conditions Sulaymanyah - Bakrajo

The experiment was carried out at the research field of Agricultural Technical Institute of Bakrajo, affiliate to the Sulaimania Polytechnic University. And the experiment was conducted in two consecutive years 2011-2012 and 2012-2013. The study site is located at an elevation of 760 m above the sea level. The soil of Bakrajo farm belongs to (Clay Loam). The table 1 shown Bakrajo soil physical and chemical analysis. Temperature during the cropping period ranged between 5°C to 36°C. We relied on agriculture in the rain only, without the use of any supplementary irrigation, there rainfall during the experimentation was 479.5 mm in 2011-2012 and 502.2 mm in 2012-2013. The purpose of the experiment is a comparison of five varieties of pea (Local, Green, Shanngha, Canada and Dam). After the preparation of the soil were peas planted on the lines , The distance between the lines was 35 cm , the distance between plants was 20cm inside the panels and the area of the each panel was 2\*2 m (4 m<sup>2</sup>). Experiment was performed by RCBD design and planted three replications for each verity of peas. And planting seeds was in 15th of November in both seasons. Experiment carried out under the same conditions in the two seasons such as the soil preparation, plowing hoeing, weeding, weeds control by herbicide and the proportion of rainfall fairly close in two seasons.

Data analysis was done by using SPSS for analysis of variance & compare means by Duncan and correlation coefficient analysis.

**Table1.** Soil physical and chemical analysis

properties	Sample 1 value	Sample 2 value
EC	0.31	0.31
PH	7.10	7.17
%N	0.24	0.32
Available P(ppm)	28.8	27.2
Soluble K+ Meq/L	0.228	0.233
Soluble K+ Meq/L	0.369	0.400
Soluble K+ Meq/L	2.3	2.5
Soluble K+ Meq/L	1.2	1.2
%Sand	12.17	14.54
%Silt	45.72	41.23
%Clay	42.11	44.23

### III. RESULTS AND DISCUSSION

#### A. Analysis of Variance

Result of analysis of variance (Table 2&3) showed that there was significant difference among different genotypes in pea in the majority of traits. This indicated effect these genotypes for improved morphological traits. The data showed that all growth parameters increased gradually by application these genotypes.

#### B. Compare Means

##### a) Plant Height

The results of mean comparing of traits are shown in (Table 4&5) between majority genotypes significant difference exist. The data recorded in Table 4&5 showed that plant height increased across the pea genotypes, there were some significant differences in the plant heights. The minimum plant height was recorded in the Local genotype. The maximum plant height was recorded in Dam genotype.

##### b) Number of reaches per plant

Mean comparing of the cob length (Table 4&5) showed that between majority genotypes significant difference were exists. The lowest Number of reaches per plant was related to Local and Green genotypes and maximum was related Dam genotype. In the table 5 minimum Number of reaches per plant was recorded in the Local genotype and maximum Number of reaches per plant was recorded in Dam genotype.

##### c) Number of pod per plant

The results of mean comparing of traits are shown in (Table 4&5). Between different genotype significant difference were exist. The data recorded in Table 4 & 5 showed that Number of pod per plant increased the treatments at all genotypes. There were significant differences in the Number of pod per plant. The minimum number of pod per plant was recorded in the Local genotype and maximum was recorded in the Dam genotype.

##### d) Number of seed per plant

Mean comparing of the Number of seed per plant (Table 4&5) showed that between all genotypes significant differences were exists. The minimum Number of seed per plant was recorded in the Local genotype. The maximum was recorded in Dam genotype. In the table 5 minimum Number of seed per plant was recorded in the Local genotype and maximum Number of reaches per plant was recorded in Canada genotype. The data recorded in Table 4 showed that 100 seed weight increased the treatments at all genotypes.

##### e) Day to 50% flowering

Mean comparing of the Day to 50% flowering (Table 4&5) showed between some genotypes no significant difference were exists. The minimum Day to 50% flowering was recorded in the Local genotype and maximum was recorded in Dam genotype. In the table 5 minimum Day to 50% flowering was recorded in the Local genotype and maximum Day to 50% flowering was recorded in Canada genotype.

##### f) Day to maturity

The results of mean comparing of traits are shown in (Table 4&5) showed that between genotypes no significant difference were exists. The data recorded in Table 4 showed that day to maturity increased across the pea genotypes. The

minimum day to maturity was recorded in the Local genotype and maximum Day to maturity was recorded in Dam genotype. In the table 5 minimum Day to maturity was

Minimum 100 seed weight was recorded in the Canada genotypes and maximum was recorded in Shanghai genotype.

Recorded in the Green genotype and maximum was recorded in Shanghai genotype.

g) 100 seed weight

Mean comparing of the 100 seed weight (Table 4&5) showed that between genotypes significant difference were exists. The data recorded in Table 4 showed that 100 seed weight increased across the pea genotypes. There were significant differences in the 100 seed weight. The minimum 100 seed weight was recorded in the Local genotype and maximum was recorded in Canada and Dam genotype. In the table 5

Table-2. Analysis of variance (RCBD) for studied traits in 2011-2012

S.O.V	Df	MS							
		plant height	Number of reaches per plant	Number of pod per plant	Number of seed per plant	Day to 50% Flowering	Day Maturity	to 100 weight	grain yield
Replication	2	14.600	0.243**	3.467	0.051	2.6	.467	31.267	402.179
Treatment	4	158.433**	2.613**	28.1*	2.267**	74.733**	17.433	482.233*	383529.909**
Error	8	10.933	0.017	6.8	0.133	8.183	11.883	101.933	1995.235

Table-3. Analysis of variance (RCBD) for studied traits in 2012-2013

S.O.V	Df	MS							
		plant height	Number of reaches per plant	Number of pod per plant	Number of seed per plant	Day to 50% Flowering	Day Maturity	to 100 weight	grain yield
Replication	2	8.6	0.042	32.467*	.275	39.267*	50.067	23.649	412.24
Treatment	4	135.6**	2.719**	68.267**	1.153*	34.767*	80.767*	372.796*	395314.743**
Error	8	6.1	0.205	5.217	.294	7.267	21.067	80.111	2034.159

Table 4. Mean comparing in pea genotypes in 2011-2012

Traits name genotypes	plant height	Number of reaches per plant	Number of pod per plant	Number of seed per plant	Day to 50% Flowerin g	Day to Maturity	100 grain weight	grain yield
Local	37.67a	3.5a	16a	3.27a	99.6667a	161.67a	174.67a	1236.3a
Green	45.67b	3.5a	18ab	3.3a	100.05b	164a	186.67ab	1649.6b
Shangha	47.1b	4.03b	19.6abc	4.7b	100.053bc	165.3a	201.3b	1242.2a
Canada	51.33bc	4.36b	22bc	4.73b	100.1c	167a	203b	1191.5a
Dam	57.33c	5.76c	23.6c	5.13b	100.12b	167.6a	203b	2013.3c

**Study five Genotypes of pea (*Pisum sativum L.*) in Terms of Yield and Yield Components under Conditions Sulaymanyah - Bakrajo**

**Table-6.** Correlation coefficient of studied traits in 2011-2012

Traits name genotypes	plant height	Number of reaches per plant	Number of pod per plant	Number of seed per plant	Day to 50% Flowering	Day to Maturity	100 grain weight	grain yield
Local	42a	4.5bc	16a	3.6a	103.67a	169.3ab	185.3ab	1453.2b
Green	55.33c	3.2a	20.67ab	3.97ab	110ab	162a	200.3bc	1680.5c
Shangha	48.33b	4.03b	24.33bc	4.93b	110.3ab	172.67b	203.3c	1250.7a
Canada	45.33bc	5.3cd	24.67bc	5b	112.67b	161.67a	176.3a	1240a
Dam	58c	5.76d	28.67c	4.67b	107.67ab	161.67a	193.3bc	2126.7d

**Table 5.** Mean comparing in pea genotypes in 2012-2013

Traits name	plant height	Number of reaches per plant	Number of pod per plant	Number of seed per plant	Day to 50% Flowering	Day to maturity	100 grain weight	grain yield
plant height	1							
Number of reaches per plant	.770**	1						
Number of pod per plant	.675**	.651**	1					
Number of seed per plant	.742**	.745**	.758**	1				
Day to 50% Flowering	.414	.147	.466	.538*	1			
Day to maturity	-.189	-.338	.043	-.077	.254	1		
100 grain weight	.144	.242	-.127	.033	-.221	-.341	1	
grain yield	.549*	.641*	.384	.234	-.204	-.498	.543*	1

**C. Correlation Analysis**

To determine association between studied traits we calculated coefficient of correlation. Studied in 2011-2012 years showed (Table 6) that grain yield was in the strongest relation with Number of reaches per plant ( $r = 0.641$ ). After this traits the plant height ( $r = 0.549$ ) and 100 grain weight ( $r = 0.543$ ) showed the most correlation with grain yield (Table 6). Increasing plant height and number of seed per plant caused increase majority traits according highest correlation this trait with other traits. The highest positive correlation were observed between plant height and Number of reaches per plant ( $r = 0.770^{**}$ ) and Number of pod per plant & Number of seed per plant ( $r = 0.758^{**}$ ). Significantly positive correlations were also observed for plant height and Number of seed per plant and Number of pod per plant; Number of reaches per plant and Number of pod per plant and Number of seed per plant; Number of seed per plant and Day to 50%

Flowering; However, negative correlation was also found among certain characters in the present study. Studied in 2012-2013 years showed (Table 7) that grain yield was in the strongest relation

With 100 grain weight ( $r = 0.543$ ). After this traits the Number of reaches per plant ( $r = 0.523$ ) showed the most correlation with grain yield (Table 7). Increasing Number of reaches per plant and number of pod per plant caused increase majority traits according highest correlation this trait with other traits. The highest positive correlation were observed between Number of pod per plant and Number of reaches per plant ( $r = 0.604$ ) and Number of seed per plant & Day to 50% Flowering ( $r = 0.575$ ). Significantly positive correlations were also observed for plant height and Number of pod per plant and; Number of pod per plant and 100 grain weight. The plant height was positively correlated with grain yield. This was supported by [14, 15, 16, 17], similarly accordance with our results. Plant height

positively correlated with Total plant yield. The high value of genotypic and phenotypic variation suggest that there is good scope for yield improvement through selection for pods/plant, seeds/plant and yield/plant. These findings are in agreement with other reports [18].

**Table-7.** Correlation coefficient of studied traits in 2012-2013

Traits name	plant height	Number of reaches per plant	Number of pod per plant	Number of seed per plant	Day to 50% Flowering	Day to maturity	100 grain weight	grain yield
plant height	1							
Number of reaches per plant	.131	1						
Number of pod per plant	.514*	.535*	1					
Number of seed per plant	.198	.344	.604*	1				
Day to 50% Flowering	.209	.082	.429	.575*	1			
Day to maturity	-.341	.151	-.141	.209	.005	1		
100 grain weight	.383	.465	.565*	-.200	-.157	.010	1	
grain yield	.405	.523**	-.123	-.353	.050	-.342	.596**	1

#### IV. CONCLUSIONS

Totally it was observed that Number of reaches per plant and 100 seed weight significant and positive correlation with yield trait. The results compare means showed Between genotype minimum Grain yield was recorded in the Canada genotype and maximum was recorded in Dam genotype.

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