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Evaluation of some Garden Pea Cultivars for Growth and Yield Characteristics under Assiut Conditions

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Abstract

An experiment was conducted in 2016/2017 and 2017/2018 seasons to study the performance of different cultivars of garden pea under Assiut condition. Five cultivars were evaluated on black soil in replicated randomized block design and results were found significant for all characters among these cultivars. All cultivars exhibited considerable variation in their performance for most of the parameters. Better growth and yield parameters in terms of days to flowering, number of branches/plant, green pod length, green pod width, number of green pod/plant, number of seeds per pod, total dry seed yield per feddan were noticed in all cultivars. Maximum number of branches per plant was observed in Alaska (6.5) and minimum was in Master B (4.5). In case of number of pods per plant was maximum in Dwarf Gray Sugar (64.8) followed by Victory Freezer (60.0) and minimum in Lincoln (52.5). Among all these cultivars, highest total dry seed yield was recorded in Master B cultivar (1430.30 and 1440.50 kg/Fadden respectively). As general Alaska and Dwarf Gray Sugar may be selected as promising cultivars under Assiut conditions.

***Keywords**: Garden pea, Cultivars, Yield.*

Introduction

Pea (*Pisum sativum* L.) is one of the important favorable vegetable crops grown in Egypt. Green peas have a nutritionally favorable composition in respect to macronutrients: low fat, high fiber and protein content (National Food Administration 1, 2002), and starch with a low glycemic index (Foster-Powell *et al*. 1995). Among micronutrients, peas have high ascorbic acid, carotene, thiamine and riboflavin content and, comparing with other vegetables, they are rich in iron (National Food Administration 1, 1995 and Nilsson *et al*., 2004).

Material and Methods

The present investigation was carried out on a clay soil at the experimental farm, Faculty of Agriculture, Assiut University, Assiut, in 2016/2017 and 2017/2018 seasons. Seeds of five Garden pea (*Pisum sativum* L.) Cultivars namely; Lincoln, Alaska, Victory Freezer, Master B and Dwarf Gray Sugar, were planted in pre- irrigated soil which had about 50% of its available moisture. Seeds sown con October 16 and 18 for the 1st and 2nd year, respectively.

A randomized complete block design with three replicates was used, each represented by 5 plots of the lines. Each experimental plot consisted of five rows, 3.5 m long and 60 cm wide. All plots were planted by hand with one seed per hill along the both southern and northern sides of ridges. Hills were spaced 30 cm apart. The normal cultural practices of cultivation, irrigation, fertilization,

weed and pest control of garden pea were followed as recommended for the region.

Experimental procedures

Data were collected for the following characters

1- Days to flowering, recorded as number of days from planting to flowering i.e., when 50% of the plants were in bloom.

2- Number of branches per plant, counted also at harvest.

3- Green pod length, in cm, at the time of green harvest.

4- Green pod width, in cm, at the time of green harvest.

5- Number of pods per plant as total harvested pods.

6- Number of seeds per pod as average of seeds number per 20 pods.

7- Total dry seed yield in kg/feddan.

Statistical analysis:

Analysis of variance of RCBD experiments as described by (Gomez and Gomez 1984) was performed. All data were subjected to statistical analysis using F test and means were compared using Duncan's test.

Results and Discussion

The results of yield and yield components of certain garden pea genotypes, which were studied in this experiment are presented in Tables 1 and 2.

1- Days to flowering

Number of days to flowering was markedly affected by cultivars. Garden pea genotypes showed significant differences in days to flowering in both seasons. In the first season, time to flowering of the used cultivars ranged from 58.5 and 57.5 days for Master B to 74.5 and 75.5 days for Victory Freezer. In the first and second season respectively. Cultivar Master B was the earliest line in both seasons, while cultivar Victory Freezer was the latest in flowering also in both seasons. The other Garden Pea cultivars were in between.

2- Number of branches per plant

The variations in the values shown by number of branches per plant are significant in both seasons. In the first season, it ranged from 4.7 branches to 6.5 branches. Alaska recorded the highest value (6.5 branches) followed by Victory Freezer (5.8 branches), which was not significant different from Dwarf Gray Sugar (5.6 branches) and Lincoln (5.5 branchess). In the second season, the values of number of branches per plant ranged from 4.5 branches to 6.0 branches. Alaska recorded the highest value (6.0 branches), while cultivar Master B recorded the lowest value (4.5 branchess). The other garden pea cultivars were in between. More time to flowering in some genotypes with more number of branches is an indication of more vegetative growth due to climatic condition. It was observed that some genotypes had determinate type growth and their plant bloomed and exhausted simultaneously, hence these had less branches per plant as have been observed by Hussain and Badshah (2002). Variation could be due to genetic variability of different germplasm. Similar results were elucidated by Wadan *et al.* (1993).

3- Green pod length

Green pod length was significantly affected by cultivars in the first season and ranged from 12.3 cm to 15.8 cm, the pod length of cultivar Master B (15.8 cm) was significantly longer than all other cultivars and fol-

lowed by cultivars Alaska (14.4 cm), Victory Freezer (13.6 cm) and Assiut 48 (8.89 cm), while lincoln recorded the lowest value for pod length (12.3 cm). In the second season, the green pod length ranged from 11.5cm to 15.00 cm. Master B recorded the highest value of pod length (15.0 cm). Alaska (14.0 cm) and Victory Freezer (13.5 cm) were not significantly different in pod length followed by Dwarf Gray Sugar (12.5 cm) while cultivar Lincoln recorded the lowest value for pod length (11.5 cm).

4- Green pod width

Results revealed that green pod width was significantly different with Garden Pea cultivars. In the first season, the values ranged from 0.74 cm to 0.89 cm. Master B recorded the highest value (0.89 cm) followed by Victory Freezer (0.87 cm), Dwarf Gray Sugar (0.81 cm), Alaska (0.79 cm) and Lincoln (0.74 cm) . In the second season, the green pod width at five cultivars ranged from0.70 cm to 0.90 cm. Master B recorded the highest value of pod width (0.90 cm), while cultivar Lincoln recorded the lowest value (0.70), the other cultivars were in between.

5- Number of pods per plant

Data revealed clearly that there are significant differences between garden pea cultivars in number of pods per plant in all growing seasons under study. Garden Pea cultivars ranged from 52.50 pods to 64.80 pods and from 49.50 pods to 65.0 pods in the two seasons, respectively. In the first season, cultivar Dwarf Gray Sugar produced the highest number of pods per plant (64.80 pods) followed by Victory Freezer (60.0 pods), while cultivar Lincoln produced the lowest number of pods per plant (52.5 pods). In the second season, cultivar Dwarf Gray Sugar (65.0 pods) ranked first for number of pods per plant and Lincoln (49.5 pods) ranked last. The other Pea cultivars were in between. Some researchers observed number of pods per plant as the most useful yield component. These findings agree with Javaid *et al*. (2002) and Khan *et al*. (2013).

6- Number of seeds per pod

The behavior of this character was differed significantly between Garden Pea cultivars and ranged from 9.8 seeds to 10.8 seeds and from 9.5 seeds to 10.55 seeds in the two seasons, respectively. In the first season, Victory Freezer gave the highest value (10.8 seeds) but not significantly different from Master B (10.78 seeds) followed by Lincoln (10.5 seeds) but not significantly different from Alaska (9.85 seeds). In the second season, Master B gave the highest value (10.55 seeds) of seeds per pod. Dwarf Gray Sugar (9.5 seeds) gave the lowest value, which was not significantly different from Alaska (9.75 seeds). The possible reason of less number of seeds per pod may be that environment was not suitable at the time of pollination and fertilization. These findings are in agreement with Ali *et al.* (2002a) and Quasim *et al.* (2001).

7- Total dry seed yield (kg/feddan)

The five cultivars of Garden Pea showed significant differences in total seed yield in both seasons and ranged from 955.20 kg/feddan to 1430.30 kg/feddan and from 940.50 kg/feddan to 1440.50 kg/feddan in the two seasons, respectively. In the

first season, the highest yield was obtained from cultivar Master B (1430.30 kg/feddan) followed by Dwarf Gray Sugar (1315.35 kg/feddan), Alaska (1280.35/feddan), while Lincoln gave the lowest yield (955.20 kg/feddan). In the second season, the highest yield was obtained from Master B (1440.50 kg/feddan). Cultivar Lincoln gave the lowest yield (940.50 kg/feddan). More yields in different genotypes may be due to optimum plant survival, long and more number of seeds per pod, which ultimately contributed significantly towards final yield. The performance of a cultivar mainly depends on interaction of genetic makeup and environment. These findings are in agreement with Arshad *et al.* (1998). Similar results have also been reported by Natarajan and Arumugam (1983) who observed that positive association of grain yield with plant height, pods per plant.

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Table 1. Yield and yield components of certain garden pea cultivars grown in 2016-2017 and 2017-2018 seasons, respectively.

Cultivars	Days to flowering		Number of branches/ plant		Green pod length		Green pod width (cm)	
	2016/2017	2017/2018	2016/2017	2017/2018	2016/2017	2017/2018	2016/2017	2017/2018
Lincoln	71.5 a	70.5 a	5.5 b	5.5 b	12.3 c	11.5 c	0.74 b	0.70 b
Alaska	67.5 b	65.5 b	6.5 a	6.0 a	14.4 b	14.0 b	0.79 b	0.75 b
Victory Freezer	74.5 a	75.5 a	5.8 b	5.5 b	13.6 b	13.5 b	0.87 a	0.90 a
Master B	58.5 c	57.5 c	4.7 c	4.5 c	15.8 a	15.0 a	0.89 a	0.90 a
Dwarf Gray Sugar	65.5 b	64.5 b	5.6 b	5.5 b	12.4 c	12.5 c	0.81 a	0.80 a

Duncan's multiple ranges test. Values with the same letter are not significantly different.

Table 2. Yield and yield components of certain garden pea cultivars grown in 2016-2017 and 2017-2018 seasons, respectively.

Cultivars	Number of pods/ plant		Number of seeds /pod		Total dry seed yield (kg/feddan)	
	2016/2017	**2017/2018**	**2016/2017**	**2017/2018**	**2016/2017**	**2017/2018**
Lincoln	52.5 b	49.5 b	10.5 a	10.5 a	955.20 d	940.50 d
Alaska	56.5 b	55.0 b	9.85 ab	9.75 ab	1280.35 b	1277.00 b
Victory Freezer	60.0 a	58.0 a	10.8 a	10.0 a	1170.30 c	1185.00 c
Master B	56.8 b	55.5 b	10.78 a	10.55 a	1430.30 a	1440.50 a
Dwarf Gray Sugar	64.8 a	65.0 b	9.8 ab	9.5 ab	1315.35 b	1332.00 b

Duncan's multiple ranges test. Values with the same letter are not significantly different.

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تقييم بعض أصناف البسلة لصفات النمو والمحصول تحت ظروف أسيوط

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الملخص

أجريت هذه الدراسة بمزرعة كلية الزراعة – جامعة أسيوط خلال المواسم الزراعية ٢٠١٦/٢٠١٧ و٢٠١٧/٢٠١٨ بهدف تقييم أداء خمسة أصناف من البسلة فى كلا الموسمين وهي:

لنكولن، الاسكا، فيكتوريا فريزر، ماستر بى و دوارف جراى شوجر وذلك بزراعتهم فى ثلاث مكررات فى قطاعات كاملة العشوائية وتم دراسة الصفات الآتية:

١- ميعاد التزهير
٢- عدد الفروع بالنبات.
٣- طول القرن الأخضر (سم)
٤- قطر القرن الأخضر (سم).
٥- عدد القرون /النبات
٦- عدد البذور/القرن
٧- المحصول البذور الكلى /الفدان (كجم/ فدان)

وقد أظهرت النتائج ما يلي:

١) أعطى الصنف ماستر بى اقل عدد للأيام حتى موعد التزهير وأكبر قيمة لطول وعرض القرن الاخضر فى كلا الموسمين.
٢) أعطى الصنف الاسكا أكبر عدد فروع /النبات.
٣) أعطى الصنف ماستر بى اعلى قيمة لمحصول البذور/الفدان
٤) أعطى الصنف فيكتوريا فريزر اعلى عدد قرون /النبات.

وبناء على النتائج السابقة فأن الدراسة توصى باستخدام الاصناف ماستر بى والاسكا فى الإنتاج العالى والمبكر للبسلة تحت ظروف أسيوط.