

EFFECT OF PLANT VARIETY AND GROWING METHODS ON YIELD AND QUALITY IN SUMMER SQUASH

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Abstract

The impact of different growing methods on yield and quality of some summer squash varieties was carried out at Küçük Menderes Basin conditions (38° 16' North and 27° 59' West), in Ege University, Ödemiş Vocational College (altitude 123 m) –(sandy loam soil). This study was conducted one production season, three different cultivation methods and three different squash varieties yield and quality characteristics in randomized block design with three replications. Each plot had 15 plants. Cultivation of squash varieties was carried out in order to determine the performance. Results of this study, the varieties had statistically significant effects on yield; on the other hand cultivation methods did not affect the yield statistically significant. Maximum efficiency was obtained from under cover of the type of ST-07-6001. However, under cover of the cultivation methods was the most important application. The highest yield was obtained from V1. Moreover, increasing the yield of fruit in fruit diameter increased. Applications with the highest fruit yield had higher diameter. Also the increase in fruit length also increased fruit diameter. As a result, these two characters are related to the increase in fruit size also increased yield. Highly efficient ST-07-6001, V1 and cultivation under cover as a result of this study is defined as two applications that can be recommended to local farmers.

Keywords: *Cucurbita pepo L., cultivation methods, varieties, yields.*

Introduction

Squash is a vegetable included in *Cucurbita* genus of the family *Cucurbitaceae*. Squash growing season and evaluated according to their characteristics in terms of which differ significantly from other vegetables is a summer vegetable. In squash, fruits, shapes, sizes, colors, and pulp characters are significantly differs among the varieties. Sakız and Girit were summer squash varieties long considered the normal harvest the fruits vegetables circuits are required diameter of 10-25 cm (Vural et al., 2000; Yolda et al., 2000; Kaygısız et al., 2006). In Turkey, annual squash production is 293,709 tons (Anonymous, 2013). Hybrid varieties have higher yield and earliness than open-pollinated varieties. In spring, summer squash can be planted in the field after danger of late frost. In the production of vegetable species and varieties differ due to their adaptation to the local culture is a very important pre-adaptation of the work done (Robust and Fidan, 1995). Summer produced, with strong vegetative growth, as in many types of vegetables on a regular and timely irrigation and fertilization significantly affect yield. Mohammad (2004), application of high nitrogen levels and the limited number of fruit juice and fruit number and decreased yield are reported to be a strong relationship between the yields. The consumption of fresh berries of summer squash seeds fresh and soft because it is more preferable compared to large fruit (Handenburg et al., 1986; Kaygısız et al., 2006). The study was conducted to determine the yield and quality under field conditions with three different cultivation type and three different squash varieties.

Materials and Methods

The study, under the conditions of Küçük Menderes Basin (38° 16' North and 27° 59' West), Ege University, Ödemis Vocational College (altitude 123 m) with sandy loam soil was carried out on the land.

Squash varieties (*Cucurbita pepo* L. var. STR-07-6001 F1-V1-, Eskendery-V2-and black squash-V3-) and different breeding shape (under cover seeding-UCS-, open conditions sowing-OCS-and seedling production with-SP-) seed were used in this study which was conducted in spring (on March 22).

Sowing the seeds of tubes peaks was carried out by placing the seeds drop by 2 seeds.

In the undercover production, after sowing, lines were covered by a thin polyethylene film (which is used early watermelon production to cover tunnel) and when the polyethylene film was touch the plants, small holes opened on the coating material, then coating material on plants was completely removed.

The production of seedlings was also carried out on the same day. Seedlings of the squash were planting in plots. Each plot was consist of 15 plants. Plants were planted on 100×50 cm distances. There was 2 m distance between each parcel and border squash plants were planted around the each parcel.

Study was carried out according to a randomized complete block design in 3 replications. 250-300 kg/ha 33% Ammonium Nitrate, 200-250 kg/ha TSP, commercial fertilizer was applied with 200 kg/ha of potassium sulfate in plots. In the study, during plant growth and manually cleaned weeds, watering was performed regularly.

Soil samples were taken from the experimental area and analyzed by standard methods (Lindsay et al., 1978; Bremner, 1965; Bouyoucos, 1962; Bingham, 1949). Physical and chemical properties of soil of experiment field are given in Table 1.

Table 1. Physical and chemical properties of soil.

		(0-30cm)	(30-60cm)
pH		7,15	6,86
Salt	(%)	0,03	0,03
O.M.	(%)	0,57	0,77
CaCO ₃	(%)	0,56	0,64
Sand	(%)	84,92	76,92
Clay	(%)	2,72	2,72
Silt	(%)	12,36	20,36
Structure		Sandy	Sandy
Total N	(%)	0,12	0,13
Available P	(ppm)	0,22	0,25
Available K	(ppm)	71	70
Available Ca	(ppm)	1500	1486
Available Mg	(ppm)	485	480
Available Fe	(ppm)	4,92	4,80
Available Mn	(ppm)	2,81	2,15
Available Zn	(ppm)	3,22	2,85
Available Cu	(ppm)	0,49	0,52
Available Na	(ppm)	9	9

According to Table 1, soil test area is neutral reactions. Available K contents of soil are normal; the amount of available P was deficient. Calcium content was determined as medium in the field trial; Mg contents are in good condition. Fe, Cu, Mn and Zn were found satisfactory.

In the experiment, the yield (kg/ha), weight of per plant (g), number of fruit per plant, the average fruit weight (g), fruit diameter (cm), fruit length (cm), and dry matter (%) determining values was detected. The data is rated from TAR ST statistical package program (Açıkgöz et al., 1993).

Results and Discussion

Yield and Yield Criteria

Yield and yield criteria of the experiment are presented in Table 2.

Table 2. Yield and yield criteria

Applications	Total yield (kg / ha)	Weight of per plant (g)	Number of fruit per plant (units)	Fruit weight (g)	Fruit diameter (cm)	Fruit length (cm)	Dry matter (%)
Cultivation method							
UCS	61942,1	3097,10	18,33a	175,99	4,44	16,02	6,62
OCS	52116,1	2605,81	16,63a	160,92	5,09	16,22	7,22
SP	40027,1	2001,36	9,96b	197,67	5,28	16,881	5,32
LSD _{%5}	Ns	Ns	5,58*	Ns	Ns	Ns	Ns
Variety							
V1	64556,3a	3227,82a	19,66a	175,91	5,11	15,75	4,29b
V2	52723,7a	2686,19a	15,20ab	183,91	4,87	16,29	8,45a
V3	35805,3b	1790,27b	10,07b	174,77	4,83	17,09	6,43a
LSD _{%5}	17858,7*	892,93*	5,68*	Ns	Ns	Ns	2,12**
Interactions (Growing method x cultivar)							
UCS X V1	79721,1	3986,06	27,00	147,86	4,40	15,19	4,59
UCS X V2	63664,9	3183,25	16,07	196,98	4,57	15,05	9,80
UCS X V3	42440,2	2122,01	11,93	183,14	4,37	17,00	5,47
OCSX V1	63473,2	3173,66	20,00	172,48	4,90	16,13	4,22
OCS X V2	53579,5	2678,98	19,77	128,03	4,97	15,64	10,04
OCS X V3	39295,6	1964,78	10,13	182,26	5,40	17,09	7,40
SP X V1	50474,6	2523,73	11,97	207,39	6,03	16,75	4,07
SP X V2	43926,8	2196,34	9,77	226,71	5,07	17,97	5,50
SP X V3	25680,1	1284,01	8,13	158,92	4,73	16,55	6,40
LSD _{%5}	Ns	Ns	Ns	44,93**	Ns	Ns	Ns

As the total yield characters, variety of factors was found statistically significant, growing method x variety interaction was not significant statistically (Table 2). Growing method

factors examined, the highest yield of UCS (61942,1 kg/ha), while the lowest value was 40027,1 kg has the SP.

V1 took first line with 64556,3 kg. The others varieties V2 and V3 have been followed (52723,7 kg and 35805,3 kg, respectively).

As for interaction, the highest values are obtained from the UCSxV1 (79721,1 kg). The lowest value was obtained from the interaction SPxV3 (25680, 1 kg).

Yolda et al. (2000), in their study, the total yield was found 6856-10033kg / da. These values were recorded as higher than our study. Ertek et al. (2004) were investigated the effects of irrigation on the yield of squash (*Cucurbita pepo* L.), 22.40 to 35.00 t / ha were obtained between the values. These yields were recorded lower than the values obtained in our study. Rulevich et al. (2003) investigated the effects in field conditions black polyethylene mulch and well established on the polyester coating on low plastic tunnels with two squash varieties. These applications and combinations create in comparison with the control plot goes, early and total yield of fruit have.

In the study, control parcel gets better results (45% yield increase). The obtained data are not correlated with our results. However, application of mulch to control rates of 19% in the plots, with the use of cover material provides a 16% increase in efficiency. SP increase the number of fruits per plant of applications that have defined. These results obtained in this study are consistent with the results.

Weight of per plant, the total yield showed similar values; the highest values were obtained in UCS and V1 applications (3097.10 and 3227.82 g, respectively).

In the character number of fruit per plant, weight per plant and total yield results were parallel with the values obtained. The highest values of UCS, V1 with applications UCSXV1 interactions were obtained from V1 (respectively 18.33, 19.66, 27.00). However, there was no statistically significant interaction. Important factor in increasing the number of fruits that increase yield, increased fruit yield also increased with the number was determined.

Dunwell et al. (2001) stated the necessity of regular watering in the growing season to increase efficiency to prevent the size and shape of the weak plants.

Average fruit weight in terms of character compared to growing method; The SP had the first place with 197.67 g value, while it was 175.99 g and 160.92 g in UCS following OCS took last place, statistically significant difference was found between applications. When assayed for this property of varieties, fruit weights obtained as 174.77 g - 183,91g of this character in terms of interaction between the recorded and noted to be statistically significant (Table 2).

Ercan and Kurum (2003) viewed plants, flowers, fruits and seed characters in summer squash, and fruit weights were detected between 112.60 - 162.40 g; Ertek et al (2004) found fruit weights between 186 to 219 g; Yolda et al. (2000) have the record of fruit weight between 319-396 g.

Nerson (2005), investigated fruit shape and plant density on seed yield and quality in their study, and the effect of the average fruit weight were determined as 0.8 to 1.4 kg.

Growing method practices are detected in terms of fruit diameter as 4.44 to 5.28 cm, and the length of the fruit between 16.02 to 16.88 cm, when it comes to variety of applications; fruit diameter determined from 4.83 to 5.11 cm, and growing method variety applications; the length of fruit from 15.75 to 17.09 cm. When investigated for application interaction 4.37 to 6.03 cm and the length of the fruit from 15.05 to 17.97 were recorded as centimeters.

Ertek et al (2004), were detected fruit diameter from 4.09 to 4.44 cm; and fruit size as 15.26 to 15.87 cm. Ercan and Kurum (2003), were determined fruit diameter from 3.70 to 4.55 cm; and fruit size as 13.64 to 15.32 cm. Yolda et al. (2000) had measured 3.40 to 5.97 cm diameter of the fruit; 13.6 to 22.8 cm in length. Applications with high fruit diameter and high efficiency is achieved is recorded. Also the increase in fruit length increased fruit diameter. As a result, the increase in both the yield increased characters.

Dry matter (%) character is analyzed, and the variety factors found statistically significant effect on these character, breeding and growing method x variety interaction was not significant statistically (Table 2). The highest value of OCS with the value of 7.22 %, the lowest value had measured with the SP (5.32 %).

Conclusion

Küçük Menderes Basin and in conditions of cultivation of squash varieties carried out in order to determine the performance results of this study. The varieties that yield statistically significant effects, cultivation methods did not affect the yield statistically significant.

However, under cover of the cultivation methods, the most important application in obtaining high yields, respectively. The highest yield was obtained from V1. The increase in fruit length also increased fruit diameter. As a result, these two characters are related to the increase in fruit size also increased yield.

As a result of this study, ST-07-6001, V1 and cultivation under cover is defined that can be recommended to local farmers in Küçük Menderes Basin.

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