



FRUIT AND SEED YIELD OF SQUASH VARIETIES (*CUCURBITA PEPO* SUBSP. *PEPO*) IN UZBEKISTAN

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ABSTRACT

The article provides information about origin, nutritional and health-promoting properties of squash. It also highlights findings of testing 20 varieties of squash and zucchini in Uzbekistan. The varieties were assessed for mass and productivity in technical ripeness. Seeds were characterized by weight, number of seeds in one fruit, in 1 kg, seed yield in percent of total weight of fruit, and seed productivity. The following varieties stand out for average mass of young fruit: Tintoretto (370 g), Gayrat (273 g), Vegetable Spaghetti (215 g), Yeryoma (211 g), Makaron (205 g); the following varieties stand out for productivity (28.8-47.7 t/ha): Markiza, Zavtrak Neftyannika, Karina and Tintoretto. The highest seed yield in percent to total fruit mass was reported in Rolik (1.7%), Seriy Kardinal (1.3%), Unumdor, Karina (1.2%) and Zavtrak Neftyannika, Delikates, and Markiza (1%). These varieties have high yield per hectare.

KEY WORDS: Squash, pumpkin, plants, young fruits, fruits, seeds, weight, productivity of young fruits, seed efficiency, seed yield.

INTRODUCTION

Squash belongs to the family of *Cucurbita pepo* L. There are many fast- and mid-ripening climbing and bush type varieties in *Cucurbita pepo* L. Squash is a summer vegetable pumpkin [4, 5].

Vegetable pumpkins originated from South and Central America. The scientists believe that squash was brought to Russia at the beginning of XIX century from Turkey and Greece. The crop is wide spread from the subtropics up to northern borders of agriculture [2].

The great value of squash is that it – as fast-ripening crop- replenishes the body's lack of plant food rich in vitamins and minerals during spring and summer period. Only young fruits at the age of 5-12 days are used as food when they have tender and dense pulp with no voids and underdeveloped seeds.

Young sets with limited delicate fiber are easily [1, 6].

Young fruits contain more than 88% of water. Therefore their caloric content is low- 27 kcal or 113 kJ per 100 g. They contain 2-3.1% of sugar; 1.7-2.0% of pectins; 0.5-0.6% nitrogen substances; 0.5-0.3% fat; 0.1% organic acids, 0.4% ash [3].

They are rich in vitamins and mineral salts. They are valuable sources of potassium, copper, iron and calcium. They contain 10-40 mg of vitamin C and very limited amount of carotene [7].

The chemical composition of squash (in% raw material): water 88-95, dry matter 5-12, the amount of sugars 2-6, of which sucrose is 10-12%, fiber 0.5-0.7, crude protein 0.5 -1.1. Squash contains 0.3 g of fat, 0.1 g of organic acids and 4 g of ash per 100 g of the edible part. Vitamins (mg per 100 g raw weight): B 1 and B 2 - 0.03 each; B 6 - 0.11; folic acid - 14; PP -0.06; C - 10-18; carotene 0.5-0.7. Ash elements 0.4%, including (in mg per 100 g of raw weight), sodium - 2; potassium - 238; calcium - 15; magnesium - 9; phosphorus - 12; iron - 0.4; energy value 27 kcal [7].

Squash has therapeutic value as a dietary product. It is easily digested and is useful for activating the digestion in atherosclerosis, obesity, especially for the elderly. It eliminates the excessive accumulation of cholesterol in the body [2].

MATERIALS AND METHODS

Trials to determine the yield of fruits, yield of seeds in different varieties of squash and zucchini, seed productivity were carried out in 2015-2016 on the pilot sites of the Research Institute of Vegetables and Gourds and Potatoes in Tashkent Region.

The scope of research covered varieties recognized in Uzbekistan in 2015, including Unumdor (standard) and Gayrat, 18 Russian varieties, of which 13 varieties of zucchini squash. Seeds are sowed on May 7. The plants layout is a two-line pattern according to the

scheme (140 +70)/2x50 cm. The area of the registration plot is 21 m². There were 40 plants on each plot.

10 young fruits were taken to determine the average weight of the fruit in technical ripeness; and 5 fruits for biological ripeness; and the average value was calculated. The agro technical cultivation of melon crops generally accepted in Uzbekistan was applied.

RESULTS AND DISCUSSION

The objective of research was to evaluate the varieties of squash and zucchini for morphological features, for food use, by the yield of young fruits, the average weight of seed fruits, seed yield, seed productivity during cultivation in open ground for spring crop. The studied varieties differ in the shape of the bush and in use for cooking (Table 1).

Table-1.
General characteristics of studies varieties of squash and zucchini

No	Variety	Origin	Species	Outstanding features	General application
1.	Spaghetti Raviolo	Russia	squash	easy transportation and storage	for cooking and canning
2.	Zavtrak neftyanika	Russia	zucchini	shipper and good-keeper	for cooking
3.	Delikates	Russia	zucchini	high-yielding	excellent dietary product
4.	Crokodil Gena	Russia	zucchini	for open and indoor planting	excellent body and taste
5.	General	Russia	zucchini	excellent taste	for eating fresh
6.	Ovoshnoy spaghetti	Russia	squash	easy transportation and storage	for cooking
7.	Rolik	Russia	squash	low-temperature tolerant	universal application
8.	Zolotinka	Russia	zucchini	excellent taste	for canning and cooking
9.	Black zucchini	Russia	zucchini	easy transportation and storage	for cooking and canning
10.	Markiza	Russia	zucchini	high set of fruits	for cooking and canning
11.	Makaronniy	Russia	squash	easy transportation and storage	excellent body and taste
12.	SeriyKardinal	Russia	zucchini	good-keeper	for cooking and canning
13.	Skvorushka	Russia	zucchini	highyield	10-15 cm young fruits for eating fresh
14.	Faraon	Russia	zucchini	good-keeper	universal application

Table-1 continuation.

No	Variety	Origin	Species	Outstanding features	General application
15.	Karina	Russia	zucchini	good-keeper, excellent taste	for all types of cooking and canning
16.	Gayrat	Uzbekistan	squash	good taste	for cooking
17.	Unimdor	Uzbekistan	squash	good taste	for cooking
18.	Yeryoma	Russia	zucchini	rich in vitamins	for dietary nutrition
19.	Tintoretto	Russia	squash	high yield	for cooking
20.	Negrityonok	Russia	zucchini	used to replace cucumber in salads	universal application

Squash and zucchini varieties with different morphological features of bush, formed young fruits with different mass in technical (consumer) ripeness.

The following varieties reported to have the highest average weight of young fruits: Tintoretto (370 g.), Gayrat (273 g), Ovoshnoy spaghetti (215 g), Yeryoma (211 g), Macaroni (205). The smallest mass of

young fruits was reported in following varieties: Zolotinka (55 g) and Karina (63 g).

The main indicator for the evaluation of varieties was the yield. The surveys of harvest showed that the highest yield (28,8-47,7 t/ha) was reported in Markiza, Zavtrak neftyanka, Karina and Tintoretto (Table 2.).

Table-2.
Average weight and yield of squash and zucchini

No	Variety	Average weights of young fruit, g	Yield of young fruits, t/ha		Share of salable yield out of total, %
			total	salable	
1.	Spaghetti Raviolo	146	22,3	19,5	87,4
2.	Zavtrak neftyanka	110	32,8	30,5	93,0
3.	Delikates	103	23,6	21,4	90,7
4.	Krokodil Gena	127	25,0	22,8	91,2
5.	General	180	23,2	21,7	93,5
6.	Ovoshnie spaghetti	215	17,2	15,1	87,8
7.	Rolik	145	19,8	17,6	88,9
8.	Zolotinka	55	19,2	17,5	91,1
9.	Black zucchini	135	25,6	23,1	90,2
10.	Markiza	124	28,8	26,4	91,7
11.	Makaronniy	205	16,5	14,2	86,1
12.	Seriy kardinal	155	23,2	21,0	90,5
13.	Skvorushka	105	20,6	18,9	91,7
14.	Faraon	105	26,8	24,9	92,9
15.	Karina	63	33,7	31,0	92,0
16.	Gayrat	273	25,8	23,4	90,7
17.	Unumdor	167	24,6	22,4	91,1
18.	Yeryoma	211	25,3	23,5	92,9
19.	Tintoretto	370	47,7	45,8	96,0
20.	Negrityonok	105	26,3	24,6	93,5
	LCD₀₅		0,72		

To project the productivity of seeds one should know how many seed fruits one plant can give; then weight the seed fruit, determine number of seeds in one fruit; calculate the percent age of seeds to total weight of

fruit. The average weight of seed fruit of squash and zucchini varied depending on variety from 1145 g (Makaronniy) up to 2620 g (Unumdor) (Table 3).

Table-3.
Average weight and seed yield of squash and zucchini depending on variety

Variety	Average weight of seed fruit, g	Seed yield in one fruit		Productivity of seed fruits, t/ha	Seed yield in % to total weight of fruit	Seeds productivity, kg/ha
		g	pcs			
Spaghetti Raviolo	1540	12,1	123,0	28,8	0,8	230,4
Zavtrak neftyanika	1628	16,1	125,4	30,7	1,0	307,0
Delikates	1636	15,8	154,8	30,7	1,0	307,0
Krokodil Gena	1755	7,7	77,3	32,6	0,5	163,0
General	1320	5,9	60,0	24,9	0,5	124,5
Ovoshnoy spaghetti	1654	22,0	112,7	30,7	1,4	429,8
Rolik	1742	28,1	209,7	32,6	1,7	554,2
Zolotinka	1533	12,7	165,5	28,8	0,8	230,4
Black zucchini	1658	12,0	79,5	30,7	0,7	241,9
Markiza	1567	15,1	124,0	28,8	1,0	288,0
Makaronniy	1145	9,0	74,5	21,1	0,8	168,8
Seriy kardinal	1829	24,3	191,5	34,5	1,3	448,5
Skvorushka	1940	11,4	109,5	36,5	0,6	219,0
Faraon	1737	11,6	104,5	32,6	0,7	228,2
Karina	2016	24,8	189,5	38,4	1,2	460,8
Gayrat	2044	17,0	152,0	38,4	0,8	307,2
Unumdor	2620	32,3	228,0	49,9	1,2	598,8
Yeryoma	1538	11,2	93,4	28,8	0,7	201,6
Tintoretto	1626	9,7	64,7	30,7	0,6	184,2
Negrityonok	1715	22,2	218,2	32,6	1,3	423,8

As one can see from table 3, yield of seeds does not depend on average weight of the seed fruit, and most likely, it is a variety trait. The highest yield of seeds in percent age to total weight of fruit was reported

in Rolik (1,7 %). The high yield of seeds was reported in Seriy kardinal (1,3 %), Unumdor, Karina (1,2 %) and Zavtrak neftyanika, Delikates, Markiza (1 %) (Figure 1).

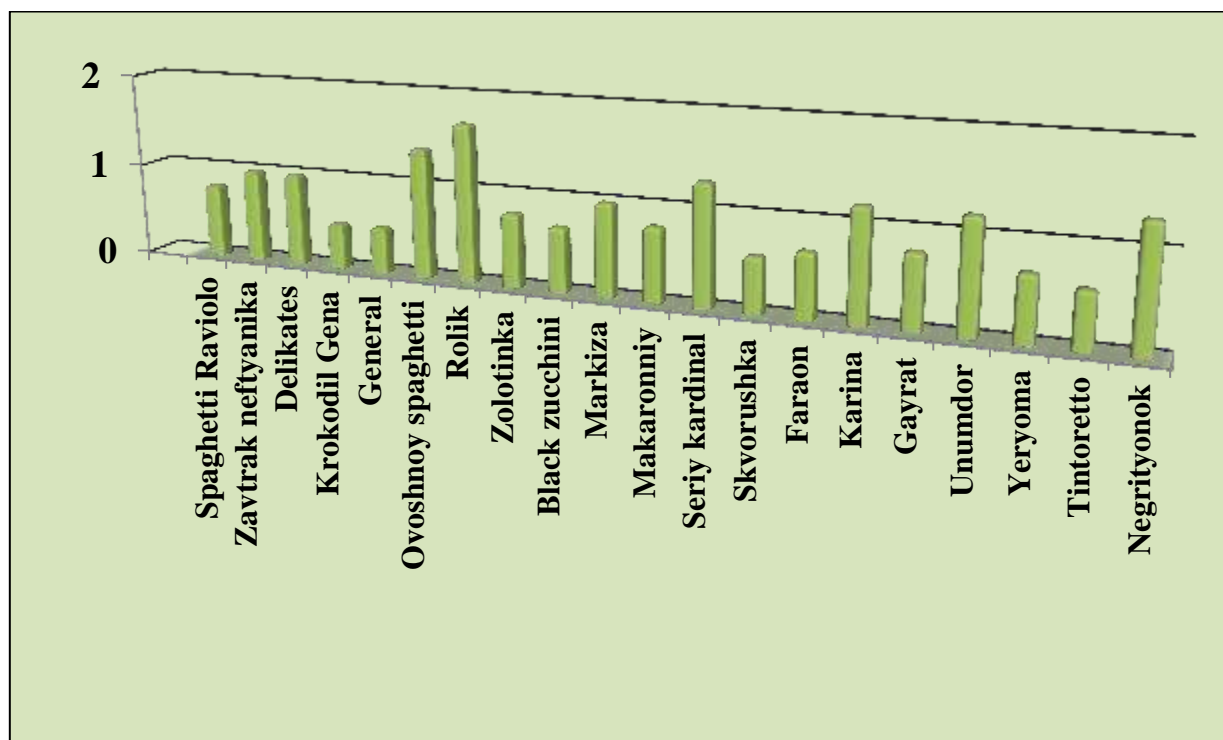


Figure1. Yield of seeds in % to the weight of fruit in squash and zucchini varieties

It's well known that fruits of varieties containing more seeds (1% or more of the mass of the fruit) are suitable for use in processed form (mashed potatoes, vegetable spreads, etc.), and varieties having less seeds in the fruit are suitable for fresh consumption as salads.

Analysis of the absolute mass of seeds (mass of 1000 seeds) showed that the largest seeds were reported in Ovoshnie spaghetti (195,2 g), and large seeds were also reported in Black zucchini (151,0 g), Tintoretto (150,0 g) and Unumdor (141,7 g), which had the highest average weight of seed fruit.

As rule, the varieties with the highest absolute mass of seeds had the smallest number of them in 1 kg.

CONCLUSIONS

The study of squash and zucchini varieties for productivity of young fruits and seed fruits in the spring sowing period in Uzbekistan demonstrated that the following varieties stand out for average weight of young fruit: Tintoretto (370 g), Gayrat (273 g), Ovoshnie spaghetti (215 g), Yeryoma (211 g), Makaronniy (205 g); whereas the high-yield (28,8-47,7 t/ha) was reported in Markiza, Zavtrak neftyanika, Karina and Tintoretto.

The highest seed yield as percentageto total weight of the fruit was reportedin Rolik (1,7%). High seed yield was also reported in Seriy kardinal (1,3%),

Unumdor, Karina (1,2%) and Zavtrak neftyanika, Delikates, Markiza (1%). These varieties had high yield of seeds per hectare.

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