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**DYNAMICS OF FRUIT OF SQUASH PLANT (*CUCURBITA PEPO VAR. MELOPEPO L.*) DEPENDING ON VARIETY, HYBRID IN THE CONDITIONS OF FOREST STEPPE OF THE RIGHT BANK UKRAINE**

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**Аннотация**

Приведены результаты экспериментальной работы по изучению урожайности и динамики плодоношения растений патиссона в зависимости от сорта. Исследованиями установлено положительное влияние сорта на формирование плодов растений патиссона. Выявлено, что в условиях Лесостепи правобережной Украины плодоношения патиссона продолжалось 7 декад. Наибольшую урожайность получено в гибрида Санни Делайт F<sub>1</sub> – 39,7 т / га, что на 6,7 т / га превзошло контроль. Наибольшим процентом раннего урожая характеризовались растения Перлинка и Сашенька соответственно 1,5 т / га.

**Abstract**

The results of experimental work on studying the yield and fruiting dynamics of squash plants depending on the variety are presented. Studies have shown a positive effect of the variety on the formation of fruits of squash plants. It was revealed that in the conditions of the Forest-Steppe of the right-bank Ukraine the fruiting of squash lasted for 7 decades. The highest yield was obtained in the hybrid Sunny Delight F<sub>1</sub> – 39.7 t / ha, which exceeded the control by 6.7 t / ha. The highest percentage of early harvest was characterized by Perlinka and Sashenka plants, respectively, 1.5 t / ha.

**Ключевые слова:** патиссон, сорта, динамика плодоношения, урожайность.

**Keywords:** squash, varieties, dynamics of fruiting, productivity.

**Formulation of the problem.** Ukraine is one of the world's top 100 producers of open-ground vegetables. Every year the demand for vegetable products grows. Gaining popularity in the cultivation of uncommon vegetable crops, which includes squash. Squash belongs to the Pumpkin family and is a variety of hard-skinned pumpkin. This plant is characterized by a short growing season, and therefore comes to the consumer's table at an early stage, when the usual cucumbers and tomatoes do not bear fruit in the open ground. The Institute of Vegetable and Melon Growing of the Ukrainian Academy of Agrarian Sciences is engaged in the selection of vegetable crops, in particular squash in Ukraine. The task of vegetable growers is to study new varieties in soil and climatic zones of Ukraine. The study of varieties and hybrids of squash in the Forest-Steppe of the Right Bank of Ukraine is insufficient, so research on this issue is relevant.

**Analysis of recent research and publications.** A study of the vegetable market showed that in recent years in the practice of vegetable growing, including foreign, squash has become widespread. It is very popular among consumers of the event. Squash has many advantages, which include high taste, rich chemical composition, short growing season, which allows you to quickly get fresh produce, intensive and long-lasting fruit.

Modern science raises the question of nutrition and increasing the share of vegetable products in the daily menu. The consumer is no longer satisfied with just vegetables, but wants to have vegetables of a certain variety and quality.

Homeland squash - Central America. It spread in Ukraine at the end of the 19th century. Squash - a bush variety of hard-boiled pumpkin, belongs to the vegetable pumpkin. The nutritional qualities of squash are much higher than those of zucchini. Squash pulp is tastier because it contains more valuable nutrients. Squash fruits are used unripe, they are used in food in fried, stuffed form. This delicious delicacy vegetable is easily digested by the human body. Squash fruits are often pickled, consumed boiled, fried. Young squash ovaries have a pleasant taste of mushrooms, tenderly crunchy and are a good vegetable dish. In its mature form, squash is well preserved, and in the winter months is also suitable for consumption.

Compared with other common pumpkin squash has a less rich set and the presence of vitamins, but it has more fiber and ash elements. Squash fruits contain: 5-13% dry matter, 2.5-5% sugars, 20-30 mg ascorbic acid, 0.6% pectin, provitamin A (0.2 mg%), B1 (0.06 mg), PP (0.3 mg). Squash contains much more ascorbic acid than pumpkin and zucchini. The seeds contain 50-55% oil, as well as santonin, which provides squash

anthelmintic effect. The seeds are rich in total and protein nitrogen and ash (5.58%).

Squash fruits contain easily digestible carbohydrates, pectin, vitamins and minerals that promote the assimilation of protein foods. Squash are especially useful in obesity, anemia, kidney disease, liver (promote better bile secretion and recovery of glycogen in the liver), gastric ulcer, as well as atherosclerosis. The caloric content of squash is about 20 kcal per 100 g.

Squash is an annual, shrubby and semi-shrubby form of a plant with a length of up to 30-60 cm. Morphologically, they do not differ from zucchini, but the fruits are bell-shaped, plate-shaped and round-flat shape. Fruit color - white, cream, green, yellow, without pattern and with a pattern in the form of stripes and spots.

The surface of the skin is smooth, common and warty. Fruit weight from 100 to 800 g. Squash plants are larger than the zucchini, the stem is twisted, the leaf blade is entire, medium or large. Seeds are white, cream, smaller than zucchini (weight of 1000 seeds is 65-85 g), retains germination up to 8-10 years, but the best sowing qualities in seeds 1-3 years of age.

Squash grows and develops as a zucchini, but squash plants are later - to obtain technical maturity, suitable for consumption of fruits takes 60-70 days after germination, which is 10-20 days more than the zucchini. It takes 100-120 days to obtain physiologically mature fruits (with mature seeds).

Squash is more demanding of heat than zucchini. Its seeds begin to germinate at a temperature of 13-14 °C, but the optimum temperature for seed germination and plant vegetation is 25-27 °C. At temperatures below 15 °C the growth and development of squash plants is delayed, and at subzero temperatures the plants die. Although squash is drought resistant, it needs more moisture than zucchini. Watering helps to increase fruit yield. The seeds begin to germinate at a temperature of 12-15 °C. Under favorable conditions, seedlings emerge 6-9 days after sowing.

The optimum temperature for the growth of vegetative organs is 20-27 °C, during flowering – 18-20 °C, for fruit set – 25-27 °C. From other pumpkin squash differs in relative cold resistance. They do not tolerate prolonged cooling to 6-10 °C. Squash does not tolerate shading, which leads to reduced yields. They are more demanding to moisture than zucchini. The greatest need for moisture during the period of mass flowering and fruit set. Plants are quite demanding to soil fertility, respond well to the application of organic fertilizers, prefer well-heated, fertile, medium loamy and light mechanical composition of soils.

**The purpose of research.** Study of the dynamics of fruiting of squash plants depending on the variety, hybrid in the Forest-Steppe of the right-bank Ukraine.

**Research methodology.** Studies to study the dynamics of fruiting plants of squash depending on the variety, hybrid in the Forest-Steppe of the right bank of Ukraine were conducted in 2016-2017. The soil where the study was conducted gray forest, medium loam, is characterized by the following indicators: the humus content is average and is 2.4%, the supply of P<sub>2</sub>O<sub>5</sub> –

21.2 mg / 100 g of soil, and K<sub>2</sub>O is low at 9.2 mg / 100 g of soil. Soil acidity is close to neutral. Field experiments were performed (randomized blocks). The scheme of the experiment was developed according to the methodology of the research case. During the research, observations, records, calculations were performed.

Sowing of seeds was carried out according to the terms recommended for the zone in the first decade of May. The experiment consisted of 4 variants, the experiment was repeated four times. Variants of the experiment were the following varieties and hybrid: Perlinka, Sashenka, Zhenichka and hybrid Sunny Delight F1.

The technology of growing squash was common for the area. The method of cultivation is seedling-free. The direction of the rows was from north to south. During the experimental work used field, statistical and laboratory research methods. The study noted the beginning and mass emergence of seedlings, the appearance of the first, third and fifth true leaves, the budding phase, flowering of male and female flowers, the beginning of fruit formation, the beginning of technical maturity and the end of fruiting squash plants.

Squash fruits were collected selectively as they were formed 3-4 times a week in accordance with the requirements of the current standard – "DSTU 6016: 2008 Cucumber, zucchini, squash. Growing technology. General requirements" [2]. The weight of the fruit from each section was determined separately by weighing, the diameter of the fruit was measured using a caliper. The squash yield indicators obtained in the experiments were processed by the method of analysis of variance [5].

**Research results.** Harvesting squash fruits in 2016 lasted 7 decades (Table 1). The beginning of technical ripeness was marked in the third decade of June, the last harvest was recorded in the third decade of August. The drop in air temperature in August led to the cessation of plant growth and the tying of squash fruits. The highest percentage of early harvest in 2016 was obtained in the variety Sashenka – 1.5%. A slightly lower percentage of early harvest was recorded in the hybrid Sunny Delight F1 – 1.3%.

The lowest this indicator was obtained in the variety Zhenichka – 0.9 %, which is less than the control by 0.3 %. The most intense fruiting of squash was observed in the second and third decade of July. During the period of intensive fruiting of squash, in particular in the second decade of July, the highest yield was obtained in the variety Sashenka – 12.5 t / ha, which is 1.2 t / ha more than the control variant and hybrid Sunny Delight F<sub>1</sub> – 13.5 t / ha, which is 2.2 t / ha more than the control. In the third decade of July, the highest yields were obtained in the variety Zhenichka – 8.5 t / ha and hybrid Sunny Delight F<sub>1</sub> – 10.5 t / ha, which is 0.7 and 2.7 t / ha more than the control. In August, with each successive decade, a decrease in yield was observed due to a decrease in air temperature. The highest percentage of late harvest was obtained in the varieties Sashenka and Zhenichka, respectively 4.7 and 5.3 %, which is higher than the control variant by 1.6 and 2.2 %. A higher percentage of late harvest in

these varieties indicates the resistance of varieties to low positive temperatures.

### 1. Dynamics of receipt of squash products depending on the variety, hybrid, 2016

Variety, hybrid		The period of receipt of squash products in 2016						
		3rd decade of June	the first decade of July	the second decade of July	3rd decade of July	the first decade of August	the second decade of August	3rd decade of August
Perlinka (control)	t/ha	0,4	2,3	11,3	7,8	5,9	3,7	1,0
	%	1,2	7,1	34,9	24,1	18,2	11,4	3,1
Sashenka	t/ha	0,5	2,4	12,5	7,4	5,0	4,4	1,6
	%	1,5	7,1	37,0	21,9	14,8	13,0	4,7
Zhenichka	t/ha	0,3	2,4	12,3	8,5	4,8	4,1	1,8
	%	0,9	7,0	36,0	24,9	14,0	12,0	5,3
Sunny Delight F <sub>1</sub>	t/ha	0,5	2,5	13,5	10,5	5,9	4,3	1,4
	%	1,3	6,5	35,0	27,2	15,3	11,1	3,6

Fruiting of squash varieties in 2017 lasted 7 decades (Table 2). The first harvest was carried out in the third decade of June, and the last harvest – in the third decade of August. The highest percentage of early harvest was observed in the variety Perlinka – 1.5%. In the first decade of July there was an increase in yield in all studied varieties and hybrids. The most intensive fruiting was observed in the second and third decade of July.

The highest yields in this period were provided by the variety Zhenichka – 12.6 t / ha and the hybrid Sunny Delight F<sub>1</sub> – 13.8 t / ha, which is 0.8 and 2.0 t / ha, respectively, more than the control variant. The highest percentage of late harvest was recorded in the varieties Perlinka – 5.4 % and Sashenka – 5.0 %.

### 2. Dynamics of receipt of squash products depending on the variety, hybrid, 2017

Variety, hybrid		The period of receipt of squash products in 2017						
		3rd decade of June	the first decade of July	the second decade of July	3rd decade of July	the first decade of August	the second decade of August	3rd decade of August
Perlinka (control)	t/ha	0,5	2,4	11,8	7,7	5,8	3,6	1,8
	%	1,5	7,1	35,1	22,9	17,3	10,7	5,4
Sashenka	t/ha	0,4	2,6	11,5	9,2	4,8	4,1	1,7
	%	1,2	7,6	33,5	26,8	14,0	12,0	5,0
Zhenichka	t/ha	0,3	2,5	12,6	9,8	5,6	3,8	1,2
	%	0,8	7,0	35,2	27,4	15,6	10,6	3,4
Sunny Delight F <sub>1</sub>	t/ha	0,5	2,8	13,8	10,5	6,1	5,4	1,6
	%	1,2	6,9	33,9	25,8	15,0	13,3	3,9

### 3. Commodity yield of squash fruits depending on the variety, hybrid, (average for 2016-2017)

Variety, hybrid	Yield capacity, t/ha			± before control
	2016	2017	average	
Perlinka (control)	32,4	33,6	33,0	0
Sashenka	33,8	34,3	34,1	+1,1
Zhenichka	34,2	35,8	35,0	+2,0
Sunny Delight F <sub>1</sub>	38,6	40,7	39,7	+6,7
HIP <sub>05</sub>	1,5	2,1	-	-

Observations and calculations of the dynamics of fruiting of squash fruits indicate that the formation of the crop is influenced by varietal characteristics and weather conditions of the growing season. With increasing temperature, the yield increases with decreasing – decreases, which was observed at the beginning and end of the squash fruiting period.

An important indicator in the evaluation of varieties and hybrids of squash is the yield (Table 3). In

2016, the highest yields were obtained in the variety Zhenichka – 34.2 t / ha and hybrid Sunny Delight F<sub>1</sub> – 38.6 t / ha, which is more than the control by 1.8 and 6.2 t / ha. The significance of this difference is confirmed by the results of analysis of variance over the years of research. The same pattern was observed in 2017. A significant increase relative to control was in the variety Zhenichka – 2.2 t / ha, in the hybrid Sunny Delight F<sub>1</sub> – 7.1 t / ha. On average, in two years of

research, the Zhenichka variety provided an increase in yield relative to control of 2.0 t / ha, and the hybrid Sunny Delight F1 – 6.7 t / ha.

**Conclusions and prospects for further research.** Studies on the study of squash assortment indicate that the largest percentage of early harvest is provided by the varieties Perlinka and Sashenka. The highest percentage of late harvest is provided by Perlinka and Zhenichka varieties. On average, over the years of research, it was found that the most productive variety is Zhenichka – 35.0 t / ha and hybrid Sunny Delight F1 – 39.7 t / ha.

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### PRE-SOWING AND INTER-ROW TILLAGE OF INDUSTRIAL CROPS

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### Abstract

The article examines the main technologies and technological processes of pre-sowing soil tillage. Analysis of the main technical systems for performance of technological operations on pre-sowing tillage is carried out. It is justified that inter-row tillage does not lose its relevance due to capabilities to improve soil structure in row