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STUDY OF HEAT RESISTANCE OF RASPBERRY VARIETIES

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Abstract:

The article studied the degree of heat damage to the leaves of raspberry varieties grown in Tashkent region of Uzbekistan. Leaves were taken from each variety in June, July and August and the degree of heat damage at laboratory temperatures of 40°C, 45°C, 50°C, 55°C, 60°C was determined. The highest level of heat damage was observed in July. In the Progress variety, the level of heat damage to the leaves at a temperature of 60°C was 88,6%, while in the Izobilnaya variety the level of heat damage was the highest at 99,2%.

Keywords: Raspberry, Varieties, Leaves, Temperature, Heat Resistance.

INTRODUCTION.

In recent years, global warming has become one of the major threats to humanity. According to experts, the average global temperature has increased significantly over the past 100 years. The past four years have seen the hottest climate on the planet. Therefore, the creation of new heat-resistant varieties in agriculture and the study of heat resistance of existing varieties remains one of the most pressing issues today [5].

The climate of Uzbekistan is sharply continental and the summer season is constantly hot. As a result of a sharp rise in air temperature and a decrease in air humidity, the sensitivity of many crops to high temperatures increases and the resistance of generative and vegetative organs decreases. Decreases in the taste quality of fruit plants from high temperatures, changes in the biochemical composition of fruits, reduction of biologically active substances, and the unsuitability of such fruits for long-term storage have been confirm by several scientists.

Raspberries are one of the most popular valuable berry crops in our country. Its fruit is distinguished by its wonderful taste and fragrant aroma, which is not only valuable as a consumable product, but also medicinal [1.2.3].

Nowadays, given the growing demand for berries in the country, it is an important task to cultivate promising and of course high-yielding varieties of favorite berries such as raspberries on farms, to select heat - and drought-resistant varieties and to expand their area.

Given the above, we analyzed the heat resistance of raspberry varieties grown in Tashkent region in the laboratory in 2019-2021.

MATERIALS AND METHODS.

The investigations on the heat resistance of raspberry varieties were conducted using the method of F.F. Matskov (1976). To do this, raspberry varieties were studied in a laboratory in a water bath at temperatures 40°C, 45°C, 50°C, 55°C, 60°C. At a temperature of 40°C, the raspberry leaves were put in a water bath for 20 minutes, while at the remaining temperatures, they were put for 10 minutes. Raspberry leaves were put in cold water for 15–20 min after taking a water bath and then put in a 2% solution of hydrochloric acid (HCl) for 10 min. Raspberry leaves were taken from a 2% solution of hydrochloric acid (HCl) and then their degree of heat damage was determined.

RESULTS AND DISCUSSION.

Over the years of the research, the degree of damage from high temperature to raspberry varieties was studied in the laboratory in June, July, and August, and three-year average results were obtained (Table).

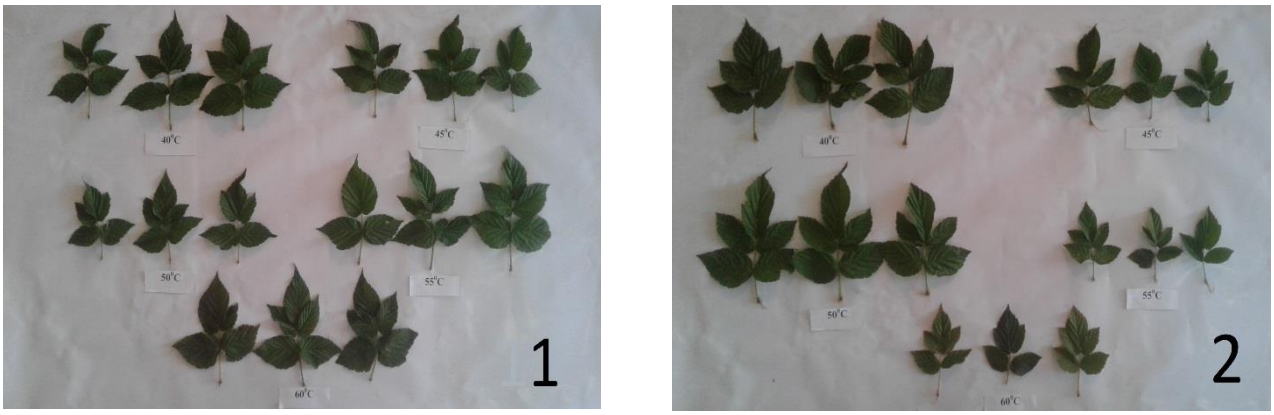

Fig. Damage of leaves of raspberry varieties Progress (1) and Izobilnaya (2) under the influence of high temperatures

When the heat resistance of raspberry varieties was studied in June, the damage level in all varieties at a temperature of 40°C was very low, namely, damage were 2,3% in the Barnaulskaya (control) variety, 1,8% in the Visluxa variety, 1,8% in the Malboro variety, 2,8% in the Izobilnaya variety, 2,5% in the Laszka variety, 1,5% in the Progress variety, 2,1% in the Polka variety and 1,6% in the Sugana variety. All varieties of raspberries were able to tolerate temperatures up to 55°C. The highest levels of heat damage to leaves were observed in Izobilnaya variety (51,8%) and Lyashka variety (49,3%), the lowest levels were observed in the Progress variety (38,6%), the Sugana variety (41,1%), and the Malboro variety (41,4%).At a temperature of 60°C, varieties of raspberry Izobilnaya variety 92,5%, Laszka variety 89,3%, Polka variety 88,4% damage with the highest level, the lowest rate was 78,5% for the Progress variety and 81,7% for the Sugana variety.
In all varieties of raspberries 100% heat damage at a temperature of 60°C was not observed.

Table
Damage to the leaves of raspberry varieties from various high temperatures,% (2019-2021)

Varieties	Temperature °C				
	40°C	45°C	50°C	55°C	60°C
June					
Barnaulskaya (control)	2,3	6,4	12,1	45,2	86,8
Visluxa	1,8	5,4	11,8	42,6	84,5
Malboro	1,8	5,8	10,5	41,4	83,2
Izobilnaya	2,8	7,2	13,4	51,8	92,5
Laszka	2,5	6,7	12,5	49,3	89,3
Progress	1,5	4,9	10,0	38,6	78,5
Polka	2,1	6,5	12,2	42,5	88,4
Sugana	1,6	5,2	11,2	41,1	81,7
July					
Barnaulskaya (control)	3,1	9,6	15,5	57,8	96,5
Visluxa	2,7	8,2	13,6	51,3	94,3
Malboro	2,5	8,5	14,2	52,5	92,8
Izobilnaya	3,9	10,2	16,8	60,8	99,2
Laszka	3,4	9,8	16,2	59,5	96,6
Progress	2,3	7,4	12,7	50,4	88,6

Polka	2,8	8,7	14,2	54,7	95,1
Sugana	2,5	7,9	13,5	52,2	93,8
August					
Barnaulskaya (control)	2,5	6,8	12,5	46,3	87,4
Visluxa	1,7	5,5	11,4	42,2	83,5
Malboro	1,9	5,7	11,8	44,7	82,6
Izobilnaya	2,6	7,2	13,2	52,4	94,1
Laszka	2,7	7,6	13,8	50,2	90,6
Progress	1,8	5,2	11,3	41,7	77,5
Polka	2,4	6,5	12,7	45,5	88,7
Sugana	1,9	5,8	11,5	42,5	82,3

The level of heat damage to the leaves in July was slightly higher than in June. The level of leaf damage at a temperature of 40°C was 3,1% in Barnaulskaya (control) variety, 2,7% in Visluxa variety, 2,5% in Malboro variety, 3,9% in Izobilnaya variety, 3,4% in Laszka variety, 2,3% in Progress variety, 2,8% in the Polka variety and 2,5% in the Sugana variety. In July, leaf damage also increased from 55°C and and the highest level of damage at a temperature of 60°C was observed in the Izobilnaya variety 99,2%, Laszka variety 96,6%, Barnaulskaya variety 96.5%. The lowest level of heat damage was 88,6% in the Progress variety (Fig).

In August, the level of heat damage to the leaves of raspberry varieties was the same as in June. In August, as in other months, the level of heat damage in all varieties of raspberries increased when the temperature rises above 55°C. The lowest damage level was observed in Progress (77,5%), Sugana (82,3%), and Malboro (82,6%) varieties when the temperature reached 60°C. The highest heat damage level was 94,1% in the Izobilnaya variety.

CONCLUSION.

In all varieties of raspberries studied during the years of research, no degree of heat damage of 100% of the leaves was observed even at a temperature of 60°C.

In June, July and August, the level of damage from high temperature the leaves of raspberry varieties studied was not significantly higher up to a temperature of 50°C.

Progress, Sugana and Malboro varieties of raspberries were more heat resistant than other varieties. In Izobilnaya and Laszka varieties the level of heat damage to the leaves was higher than in other varieties and and these varieties became heat intolerant.

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