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Journal of Nutrition and Food Processing
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Research Article

Effects Study of Water Deficiency in Raspberry Varieties

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Received date: December 11, 2023; Accepted date: February 02, 2024; Published date: February 19, 2024

Citation: Sokhib Islamov, Erkin Zuftarov, (2024), Effects Study of Water Deficiency in Raspberry Varieties, *J. Nutrition and Food Processing*, 7(2); **DOI:10.31579/2637-8914/168**

Abstract:

This article provides information on the results of the study of water deficiency in leaf tissue of raspberry varieties. The leaves of raspberry varieties obtained from annual branches were identified in three periods, namely in June, July and August of the summer, when the plant has a high demand for water, at 6 am, at 1 pm and at 6 pm.

Key words: raspberry varieties; leaf; leaf tissue; water deficiency; drought resistance

Introduction

The course of the most important physiological and biochemical processes in plants depends on the water supply of plants. As a result of water deficiency, metabolism is disrupted and this affects the growth, development of plants and their productivity [2; 216-б]. The study of water deficiency in leaves is one of the most important processes in determining the drought resistance of plants.

Drought is one of the unfavorable environmental factors in the cultivation of raspberries. Heat, dry air and lack of moisture in the soil during the growing season, like other plants, adversely affect the growth and development of raspberries [1; 28-31-б.].

As a result of changing climatic conditions in the country, frequent water deficiency in the summer, the stages of growth and development of plants are difficult. Based on this problem, today it is important to study and select varieties suitable for the climatic conditions of our republic, which are highly resistant to abiotic factors, especially drought. Therefore, research on the effects of drought on raspberry cultivation is very relevant [4,5].

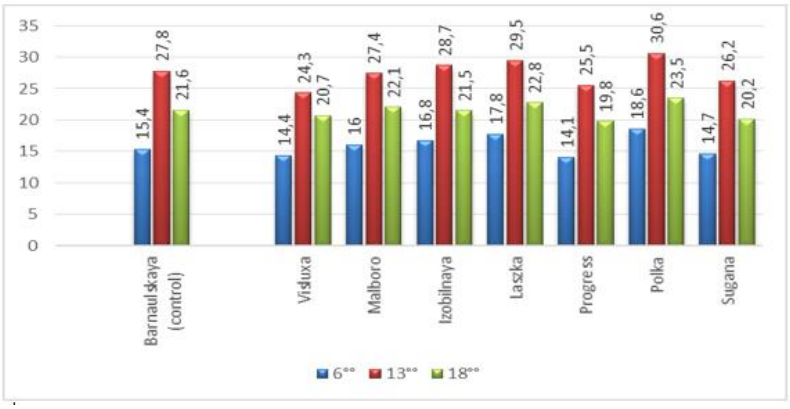
In order to study the drought resistance of raspberry varieties, the water deficiency in raspberry leaves was determined during the research.

Materials and Methods

To assess the drought resistance of raspberry varieties, a study of water deficiency in leaves was carried out according to the method of E. A. Goncharova “Evaluation of resistance to various stresses of fruit and berry and vegetable (succulent) crops” (1988). In three periods (June, July, August) the annual branches of raspberries was studied by taking 20 leaves from each variety at 6 am, 1 pm. and 6 pm.

Results and Discussion

Water deficiency of raspberry leaf tissue was detected in three periods, namely in June, July and August of summer, when the plant's demand for water is high. At 6 am in June, the water water deficiency in the Barnaulskaya control variety was 15.4%, the lowest water water deficiency was 14.1% in the Progress variety, and the highest water water deficiency was 18.6% in the Polka variety. At 1 pm when the air temperature reached a maximum, the water deficiency in all varieties increased, with the highest water deficiency in the Polka variety being **Figure 1.** Water deficiency in raspberry leaves in June (2019–2021), %



30.6%, while the lowest water deficiency in the Visluxa variety was 24.3%. At 6 pm, a decrease in air temperature also led to a slight decrease in leaf water deficit, with the highest water deficit being 23.5% in the Polka variety, while the lowest water deficit in the Progress variety was 19.8% (**Figure 1**).

In July, the highest water deficiency was observed in the leaves compared to other months due to the increase in air temperature. At 6 am in the morning, the water deficiency in the control variety Barnaulskaya was 19.5%, the lowest water

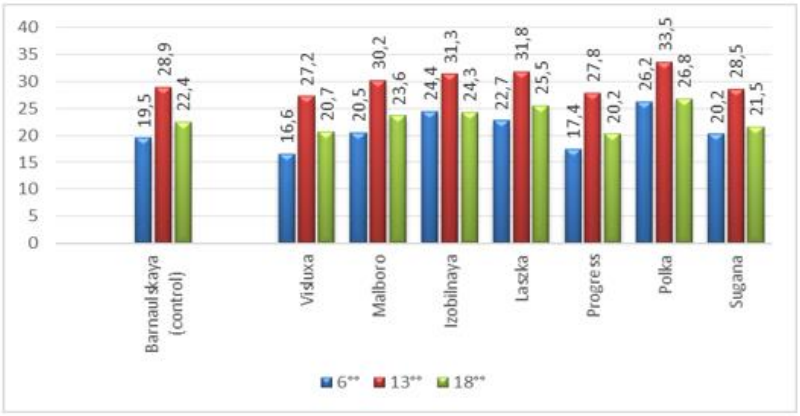


Figure 2. Water deficiency in raspberry leaves in July (2019–2021), %deficiency in the Visluxa variety was 16.6%, and the highest water deficiency in the Polka variety was 26.2%. At 1 pm, when the air temperature reached a maximum, the water deficiency increased in all varieties, with the highest water deficiency being 33.5% in the Polka variety, while the lowest water deficiency in the Visluxa variety was 27.2%. At 6 pm, the water deficiency in the varieties decreased slightly and the highest water deficiency was 26.8% in the Polka variety, while the lowest water deficiency in the Progress variety was 20.2% (**Figure 2**).

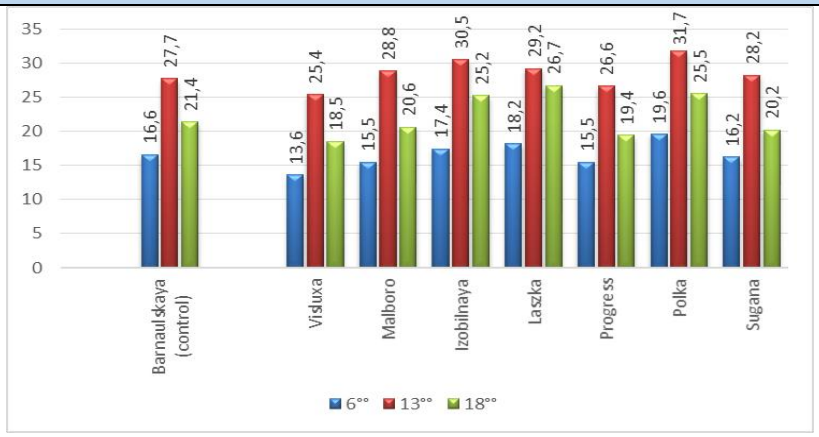


Figure 3. Water deficiency in raspberry leaves in August (2019–2021), %

In August, the highest water deficiency in the varieties was observed at 1 pm, when the air temperature peaked, as in other months.

The picture shows that the water deficiency in the control variety Barnaulskaya was 27.7%, the lowest in the Visluxa variety was 25.4%, and the highest in the Polka variety was 31.7% (Figure 3).

CONCLUSION. In raspberry varieties, the highest level of water deficiency occurred during the day, but decreased in the evening. Water deficiency in raspberry varieties peaked in July compared to other months of the summer. In July, the highest water deficiency was 26,2-33,5% in the Polka variety and 22,7-31,8% in the Laszka variety. The lowest water

deficiency was 16,6-27,2% in Visluxa, 17,4-27,8% in Progress and 20,2-28,5% in Sugana.

So, we can see from the above results that the Polka and Laszka varieties with a high water deficit are not drought-resistant, while the Progress, Visluxa, and Sugana varieties with a low water deficit are drought-resistant.

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DOI:10.31579/2637-8914/168