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HEAT AND DROUGHT RESISTANCE OF SOME INTRODUCED VARIETIES OF ROSES FLORIBUNDA IN ABSHERON

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ABSTRACT

The article presents data on the study of 10 varieties of floribunda roses (Anabell, Bella Rosa, Charleston, Eutin, Frisko, Krasnij Mak, Masquerade, Mecta, Regensberg, Rosemary Rose) in the conditions of the Absheron Peninsula. Observations showed that the flowering of roses under these conditions ceases with the onset of intense heat (from 39 ° C to 41 ° C and above) in the second half of July and until mid-August. In the presence of regular watering, varieties differed in terms of water deficit. It was revealed that the water regime of leaves is not the same in different varieties of roses. The absence of watering a decrease in the length and width of the leaf in the studied varieties of roses, and the changes in width are more significant. Relatively low water deficit and lower amplitude of its change, the variety Charleston is characterized, which is possibly associated with a relatively high water-holding capacity of leaf tissues. Studies have shown that actively growing tissues are less stable than old ones and therefore high temperatures cause the greatest harm to the leaves of young plants. This suggests that the indicators of water retention capacity depend on varietal characteristics. In the process of studying the heat and drought resistance of these varieties, it was revealed that the varieties: Masquerade, Bella Rosa, Eutin, Mesta, Regensberg are characterized by the highest water holding capacity and minimal daily loss of water, and the most promising in terms of heat resistance are varieties: Anabell, Bella Rosa, Eutin, Masquerade, Mecta, Regensberg recommended by us for use in landscaping the region, as well as in breeding works.

KEYWORDS

Rose, floribunda, temperature, drought resistance, heat resistance, climate, water regime, Absheron.

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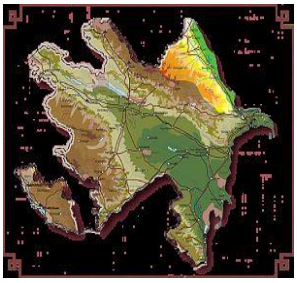
INTRODUCTION



In the collection of the Central Botanical Garden there are many introduced varieties of roses belonging to various garden groups, including floribunda roses [4]. The study of biological and economically valuable traits of roses is relevant, as it allows you to reveal their potential in new soil and climatic conditions.

The objective of the study was to identify the highly decorative varieties of floribunda roses most adapted to the conditions of Absheron, to create a crop assortment and select the best varieties for breeding, as well as use them in green construction.

The climate of Absheron is characterized by very hot and dry weather in spring and summer. The coldest months are January-February, and the hottest are July and August, with an average air temperature of 27.3 ° C, the maximum temperature reaches 35.8 ° C, and in other years up to 40 ° C and higher. High maximum temperatures and prolonged drought make July and August the most unfavorable months for plant growth and development. Drought is one of the most important factors affecting plants. It is very important to understand the negative effect of drought recognition of the importance of plant adaptation to unfavorable environmental conditions [3; 6].

In this regard, in the dry subtropical conditions of Absheron, we analyzed a number of morphophysiological parameters characterizing the drought resistance of some varieties of floribunda roses. In addition, when breeding new varieties of roses under the conditions of Absheron, it is necessary to evaluate the selection material according to the degree of its heat resistance.

METHODOLOGY

The research material was introduced 10 varieties of roses from the floribunda group (Anabell, Bella Rosa, Charleston, Eutin, Frisco, Krasnij Mak, Masquerade, Mecta, Regensberg, Rosemary Rose). The research was carried out at the experimental site of the Central Botanical Garden in 2012-2016. The variety study of floribunda roses was carried out using the method of variety assessment and variety testing of ornamental crops [1]. The water regime of plants was assessed by the method of N.A. Gusev [2], the degree of damage to the leaf blades of experimental plants was taken into account. The study of water retention capacity was carried out in different phases of plant development. The heat resistance of rose varieties was determined by the method of V.P. Tarabrin. [five].

RESULTS

Studies have shown that with the onset of intense heat (from 39 ° C to 41 ° C and higher) in Absheron, the flowering of roses stops from the second half of July to mid-August. During this period, we analyzed a number of

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morphophysiological their parameters characterizing the drought resistance of roses.

To assess the impact of drought and the resistance of roses to it, it is important to study, first of all, the following main parameters: total water content of leaves; water retention capacity of leaves; the intensity of water loss by leaves during transpiration [2].

It was revealed that different varieties of roses have different water regime of leaves. This suggests that the indicators of water retention capacity depend on varietal characteristics. In many rose varieties, drought increases the water-holding capacity of the leaves, and the highest daily water loss is characteristic of the Frisko variety, which shows its vulnerability to droughts (table 1).

The indicators of the total water content of the studied varieties were quite high (Fig. 1). Absheron has the highest water-holding

Table 1.Water regime of leaves of some varieties of floribunda roses,%

No.	Variety name	Daily water loss	Water-holding capacity	Total water content
1.	Anabell	32,64	24,96	57,60
2.	Bella Rosa	21,53	49,27	71,80
3.	Charleston	33,25	27,92	61,17
4.	Eutin	22,40	46,80	69,20
5.	Frisko	43,48	8,60	52,08
6.	Krasnij Mak	17,03	40,32	57,35
7.	Masquerade	15,33	61,24	76,57
8.	Mecta	27,80	45,48	73,28
9.	Regensberg	26,20	49,62	75,82
10.	Rosemary Rose	37,46	22,69	60,15

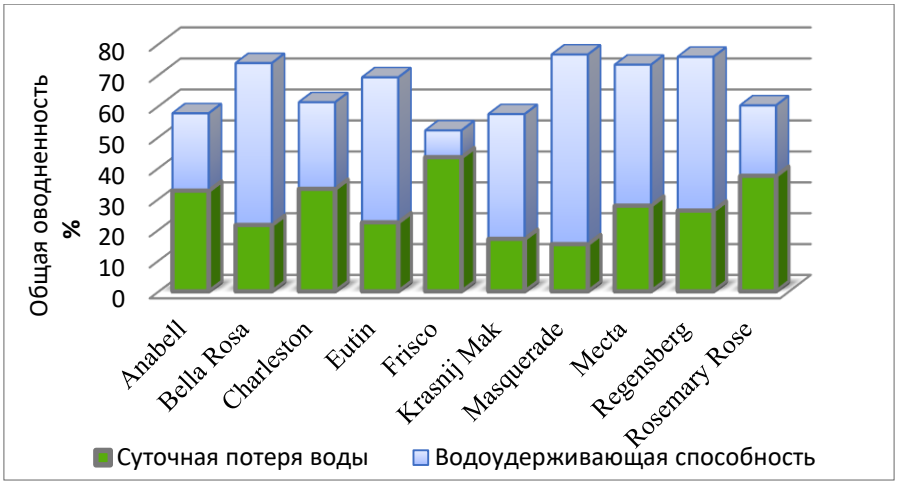

Fig. 1. Features of the water regime of the leaves of some roses

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Floribunda In The Flowering Phase.

the ability and minimum daily water loss are characterized by the following varieties: Masquerade, Bella Rosa, Eutin, Mecta, Regensberg. On the irrigated area of these roses, the surface of the leaves is smooth, glossy, dark green, with a waxy bloom of varying severity. And in roses grown in a rainfed area, the formation of light-leaved shoots and their small-leaved nature were noted. As a result of measuring the length and width of the leaf blade, these varieties revealed their varietal differences in connection with the reaction to growing conditions (Table 2).

The data obtained allowed us to draw the following conclusion: under the conditions of Absheron, the absence of watering causes a decrease in the length and width of the leaf in the studied varieties of roses, and the changes in width are more significant.

Table 2.Morphometric parameters of the leaf blade of some floribunda roses in irrigated and rainfed plots

	Plots	
Variety	irrigation	rainfed
	Sheet length (cm)	
Anabell	5,4 ±0,1	3,0±0,1
Charleston	4,5±0,1	3,2±0,2
Frisko	5,6±0,2	3,1±0,4
Krasnij Mak	6,1±0,2	4,6±0,3
Rosemary Rose	5,7±0,15	3,6±0,2
	Sheet width (cm)	
Anabell	3,6±0,1	2,0±0,4
Charleston	3,1±0,1	2,2±0,3
Frisko	3,8±0,3	2,2±0,2
Krasnij Mak	4,2±0,4	3,4±0,4
Rosemary Rose	3,4±0,2	2,1±0,1

Under conditions of regular watering, some varieties of floribunda roses partially fall off in the autumn, and in the absence of watering, the foliage completely falls off.

It was found that even in the presence of regular watering, the varieties differed in the level of water deficit. The Charleston cultivar is characterized by a relatively low water deficit and a smaller amplitude of its change, which is possibly related to the relatively high water-holding capacity of leaf tissues. The results obtained in determining the water deficit in the leaves of the studied varieties of roses grown in a rainfed area are similar. In early August, the leaves of the Rosemary Rose cultivar showed the maximum water deficit, and in early September the varietal differences in this indicator were equalized.

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Observations of changes in the level of water deficit in the leaves of floribunda roses showed that the differences between the control and experimental variants reach a maximum during the period of maximum intensity of meteorological factors (heat in July-August), which means that it is at this time that watering becomes necessary.

The study of the heat resistance of some varieties of roses of the floribunda garden group showed that under the influence of high temperatures and, depending on the variety, the degree of leaf damage varies within wide limits.

Tests of some varieties of roses have shown that in hot weather the maximum degree of damage to the leaf blades is observed in varieties Krasniy Mak, Rosemary Rose, Frisco and is manifested at air temperatures from + 35 ° C to + 40 ° C. At temperatures above + 50 ° C, the leaves completely die.

It was revealed that at a high temperature maximum of tissue death, in some varieties, no burns are observed on their leaves even in the hottest periods of summer, and the integrity of their leaves is preserved even at + 45 ° C.

The results of the study show that actively growing tissues are less resistant than old ones, and therefore high temperatures cause the greatest harm to the leaves of young plants.

CONCLUSIONS

Thus, based on the study of 10 varieties of floribunda roses (Anabell, Bella Rosa, Charleston, Eutin, Frisko, Krasnij Mak, Masquerade, Mecta, Regensberg, Rosemary Rose), it was revealed that in the conditions of Absheron, 6 are the most adapted to hot and dry conditions. rose varieties: Bella Rosa, Charleston, Eutin, Masquerade, Mecta, Regensberg, which are recommended for use in landscaping the region, as well as in breeding works.

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ESSAY

The study of biological and economically valuable traits of roses in new soil and climatic conditions is relevant. The ability of plants to endure high temperatures and adapt to

adverse environmental influences is their resistance to high temperatures.

The objective of the study was to identify the varieties of floribunda roses most adapted to the conditions of Absheron. In 2012-2016, studies on introduced 10 varieties of roses from this group (Anabell, Bella Rosa, Charleston, Eutin, Frisco, Krasnij Mak, Masquerade, Mecta, Regensberg, Rosemary Rose) were conducted at the Central Botanical Garden of the National Academy of Sciences of Azerbaijan. The used method is based on the substitution reaction of hydrogen ions from chloroplast membrane cells to magnesium ions in a chlorophyll molecule under the influence of high temperatures, which subsequently turn into brown pheophytin.

During the process, the leaves were immersed in a water bath at a temperature of + 40°C, after 30 minutes they were removed and transferred for a while to a crystallizer with water at room temperature. The procedures were repeated five times, each time raising the temperature by + 5°C.

Next, the leaves were removed from the crystallizer, poured with a solution of 0.2 M HCl, where they acquired a brown color. After 10-20 minutes, the leaves were washed with water and laid out on plates. The degree of damage of the leaf blade was noted in %.

To determine the indicators of the water regime of the plants, 10 leaf blades were selected, counted, weighed, and kept at + 100°C –105°C in the oven for 2 hours.

Water content (W), water holding capacity (R), moisture content (L) in leaf samples were calculated by the formula:

$W = 100 \cdot (M-M2) / M$ $R = 100 \cdot ((M-M2) - (M-M1) / M = 100 \cdot (M1-M2) / M$

$L = W-R$

where M is the mass of fresh samples;

M1 - sample mass after a day;

M2 is the mass of the sample after drying.

Of the studied 10 varieties of roses, the most adapted to the dry conditions of Absheron are: Bella Rosa, Charleston, Eutin, Masquerade, Mecta, Regensberg, which are recommended for use in landscaping the region, as well as in breeding works.