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THE YIELD, QUALITY AND UTILIZATION OF SWEET CHERRIES

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ABSTRACT

This article is a comparative analysis of the Kordia, Regina, Summit, Sharetta and Sweet Stefanny sweet cherry varieties, grafted on Gisela 6, which are grown in a super-intensive cultivation system in the north of the Republic of Moldova. The orchard was planted in 2018 with a distance between trees of 4x1. The orchard is drip irrigated and protected with an anti-hail netting; the trees have slender spindle-shaped crowns; the soil between the rows is kept grassy, and the soil in the rows is cultivated. During the years 2023-2024, the yield of the Summit, Sharetta and Sweet Stefanny varieties significantly increased (18.38-19.59 t/ha) as compared to the Kordia and Regina varieties (12.71-13.22 t/ha). The diameter, the average weight, the quantity of soluble dry matter and the firmness of the fruit depend on the biology of the variety.

INTRODUCTION

The cultivation of sweet cherries (*Prunus avium* L.) has a long tradition in the Republic of Moldova, as the climatic conditions are favorable for this. Sweet cherry orchards occupied 5.3 thousand hectares in 2021, or 3.6% of the total area of orchards. Due to the fact that the sweet cherry is a productive and valuable crop, which ripen early, many farmers have focused on growing sweet cherries, which has led to the creation of intensive plantations with a new range of rootstocks and varieties that meet the modern quality standards and requirements (Babuk, 2012; Balan, 2012).

Fruit growers use a variety of sweet cherry orchard management techniques to make the crop profitable. Newly approved sweet cherry varieties produce large, consistent yields of excellent quality fruit, are adapted to environmental conditions, and are easy to maintain using modern growing techniques (Cimpoies, 2018; Asanica et al. 2013).

The Skeena, Ferrovia, Kordia and Regina varieties are the most valuable types of sweet cherries grown in the Republic of Moldova. These varieties are especially appreciated, when there is a shortage of sweet cherries on the market (Balan et al. 2023; Ivanov, 2023). They are always in demand also due to their quality and transportability (Cimpoies, 2018; Long et al. 2014). The sweet cherries have different ripening periods, which helps to constantly meet the demands of the fresh fruit market, namely the early period (until June 10; Bigarreau etc.), the medium period (June 10-30; Ferrovia, Kordia, Lapins, Skeena, Sweet heart, Stella etc.) and the late period (after 1 July; Regina, Record, Recordnaia, Sumit, Taina, etc.) (Cimpoies, 2018; Long et al. 2014).

Thus, the variety is a very important factor in the modern development of fruit growing, and is becoming increasingly important along with new technologies used in sweet cherry cultivation and the ways of production utilization. Currently, under the pressure of the ever-increasing demands of the market, the requirements regarding the characteristics of the sweet cherry varieties are as follows: they must be agro-productive; the fruit must have a diameter of over 26 mm, a firm texture of the flesh, a sweet taste and an intense specific aroma; it must be red coloured or bicoloured and visually attractive; the peduncle must be thick or medium in length (Babuc, 2012; Long et al. 2014).

The purpose of this work was to investigate the Kordia, Regina, Summit, Sharetta and Sweet Stefanny sweet cherry varieties, grafted on Gisela 6, grown in a super-intensive cultivation system in the north of the Republic of Moldova.

ATERIAL AND METHODS

The studies were conducted in the years 2023-2024, in the northern fruit-growing area of the Republic of Moldova, namely in the sweet cherry orchard of the *Sermofarm* Company in the village of Sturzeni, the district of Riscani. The orchard of the Kordia, Regina, Summit, Sharetta and Sweet Stefanny varieties, grafted on Gisela 6 rootstock (*Cerasus vulgaris* x *Prunus canescens*), which were planted at a distance of 4x1 m, was established in the spring of 2018. The tree crowns had a slender spindle-shaped form, and the rows stretched from north to south.

The soil was kept artificially grassed; the grass was mowed when it reached a height of 25-30 cm and used as mulch. The soil in the row of trees was cultivated with a tiller or, if necessary, treated with herbicides. The orchard was drip irrigated: the water was distributed through mains with drippers fixed at 40 cm from the ground in the direction of the row. The orchard was protected with an anti-hail netting. The phytosanitary protection in the orchard was carried out depending on the weather conditions, and the period and phytosanitary status of the plantation.

During the experiment 4 groups of 8 trees each were used. The measurements were made in the field and laboratory conditions (Balan et al. 2001). The physical. chemical and technological characteristics of the sweet cherries were studied. The weight of the harvested sweet cherries was determined by weighing and calculating the fruit from 32 trees of each variety. The fruit diameter and weight were identified using a template provided with holes of 26, 28, 30, 32, 34 and 36 mm corresponding to the weight of 8.5, 10, 11.5, 13, 14.5 and 16 g respectively. The content of soluble dry substances was determined in the orchard by using the Brix ATAGO N-20E portable refractometer.

The firmness of the sweet cherries was measured using the AGROSTA 100 dendrometer produced by *Firm Tech* with a measurement index above 250 g/mm^2 favourable for sweet cherries (Long et al. 2014). The total acidity was determined using the method of titration with 0.1% of NaON solution. The statistical processing of the data was carried out using the dispersion analysis method.

RESULTS AND DISCUSSIONS

The trees of the Kordia, Regina, Summit, Sharetta and Sweet Stefanny varieties, grafted on Gisela 6 rootstock, began to bear fruit in the 3rd year after they had been planted; they yielded an output of 0.9-1.5 kg/tree. The older the trees became, their yield increased significantly, and, in the 6th year after planting, it was 6.85-9.12 kg/tree (Tab. 1). The Summit, Sharetta and Sweet Stefanny varieties

produced higher crops – 8.58 kg/tree, 8.27 kg/tree and 9.12 kg/tree respectively. In 2024, the fruit harvest decreased and amounted from 3.73 kg/tree in the Kordia variety to 6.85 kg/tree in the Summit variety. As for the harvest by year, the yield was higher in the Summit, Sharetta and Sweet Stephanie varieties, and the obtained indices correspond to reality, in comparison with the Cordia and Regina varieties, at a significance level of $P<0.05$.

Table 1

Yield of the new sweet cherry varieties

(Gisela 6 rootstock, planting distance – 4x1 m, slender spindle-shaped crown, the age of the trees – 6-7 years)

Variety	Harvest, kg/tree			Harvest t/ha		
	Year 2023	Year 2024	Average indices	Year 2023	Year 2024	Average indices
Kordia	6.85	3.73	5.29	17.12	9.32	13.22
Regina	5.72	4.44	5.08	14.31	11.12	12.71
Summit	8.58	6.85	7.72	21.45	17.12	19.29
Sharetta	8.27	6.43	7.35	20.68	16.08	18.38
Stefanny	9.12	6.55	7.83	22.80	16.38	19.59
LSD 0,05%	1.42	1.39	-	2.12	1.85	-

The uniformity of the fruit and its size are important indices when selling fresh sweet cherries (Long et al. 2014; Balan et al. 2023). The size of the sweet cherries in the studied varieties ranged from 27.89 to 30.82 (Tab. 2). The diameter of the fruit of the Summit, Sharetta and Stephanie varieties ranged from 29.80 mm to 30.82 mm. The weight of the sweet cherries was directly proportional to their diameter. In the 7th year of vegetation, the weight of the sweet cherries ranged from 9.9 g to 12.11 g. The Stephanie variety, which weighed 12.11 g, followed by the Summit (11.92 g) and Sharetta (11.79 g) varieties, showed average indices.

Table 2

The quality of the sweet cherries

(Gisela 6 rootstock, planting distance – 4x1 m, slender spindle-shaped crown, the age of the trees – 7 years)

Variety	Sweet cherry diameter, mm	Sweet cherry weight, g	Soluble dry matter, Brix%	Fruit firmness, kg/cm^2	Sweet cherry acidity, g of malic acid/100 g of fresh fruit
Kordia	28.41	10.21	18.65	3.04	0.67
Regina	27.89	9.90	17.04	3.25	0.59
Summit	30.48	11.92	18.93	3.26	0.59
Sharetta	29.80	11.79	18.63	3.29	0.57
Stefanny	30.82	12.11	19.05	3.26	0.65
LSD 0,05%	1.25	0.45	1.13	0.12	0.12

It should be mentioned that the sweet cherries of Summit and Stefanny varieties were the largest – their size ranged from 30.48 to 30.82 mm in equatorial diameter and 11.92-12.11 g/fruit, the differences being significant as compared to the Kordia and Regina varieties. The share of soluble dry matter ranged from 17.04 to 19.05 Brix%. The flesh elasticity index ranged from 3.04 to 3.29 kg/cm^2, being

lower in the Kordia variety. The titratable acidity ranged from 0.57 to 0.67 g of malic acid per 100 g of fresh fruit, with minor differences between varieties.

CONCLUSIONS

The variety plays a decisive role in the sweet cherry cultivation. The average production capacity of the Summit, Sharetta and Sweet Stefanny varieties, grafted on Gisela 6 and planted at 2500 trees/ha, ensured a significant increase in the harvest (18.38-19.59 t/ha) as compared to the Kordia and Regina varieties (12.71-13.22 t/ha). The sweet cherry quality – its diameter, the average weight, the content of soluble dry matter and the fruit firmness – dependent on the biology of the variety.

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