

EVALUATION OF SOME NEW SWEET CHERRY CULTIVARS ADAPTED TO THE ROMANIAN NORTH-EAST CONDITIONS

EVALUAREA UNOR SOIURI NOI DE CIREȘ, ADAPTATE CONDIȚIILOR DE CULTURĂ DIN NORD-ESTUL ROMÂNIEI

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Abstract. *The North East region, Iasi county, is the most important sweet cherry (*Prunus avium* L.) production region in Romania. However, in the last two decades, fresh cherry production consisted primarily of few cultivars as 'Stella', 'Bing', 'Boambe de Cotnari'. In recent years, there has been increased interest in planting new cultivars by North Eastern growers. New cultivars from around the world currently are being tested in high density orchards. Some selections are being evaluated for harvest timing, fruit size, productivity, firmness, resistance to rain-induced cracking and flavor. The most promising cultivars/selections include 'Kordia', 'Karina', 'Regina', 'Ferrovia' and 'Sweetheart'.*

Key words: *Prunus avium*, fruit quality, fruit size, productivity

Rezumat. *Regiunea de Nord Est, respectiv județul Iași, este cea mai importantă regiune de producție pentru cireș (*Prunus avium* L.) din România. Cu toate acestea, în ultimele două decenii, producția de cireș s-a bazat pe un sortiment restrâns, în principal 'Stella', 'Bing', 'Boambe de Cotnari'. În ultimii ani, s-a observat un interes sporit pentru plantarea de soiuri noi, de către cultivatori, fapt pentru care noi soiuri din întreaga lume sunt în prezent testate în livezi cu densitate ridicată. Unele selecții sunt evaluate pentru calendarul recoltării, mărimea fructelor, productivitatea, fermitatea, rezistența la crapare. Cele mai promițătoare soiuri sunt 'Kordia', 'Karina', 'Regina', 'Ferrovia' și 'Sweetheart'.*

Cuvinte cheie: *Prunus avium*, calitatea fructelor, mărimea fructelor, productivitate

INTRODUCTION

Present paper aims to study the behavior of new cherry varieties for their recommendation and extension into production. The recommendation of the most important varieties and hybrids in the horticultural field must be done with great discernment, since the majority of fruit plantations are established upon the recommendation of authorized persons (Budan and Petre, 2006). Production capacity

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depends on the biological potential of the varieties to maximize the environmental conditions and applied technology.

Orchards with vigorous sweet cherry trees are still common in some European Countries and the most of planting material is grafted on *Prunus mahaleb* L. and *Prunus avium* L. seedlings.

Trees on these rootstocks are vigorous and difficult to maintain, especially during harvesting (Gjamovski *et al.*, 2016).

Vigorous and very tall cherry trees have no place in modern cherry production and thus the demand for less vigorous trees that are easier to control

If the conditions of work, fertilization and irrigation are considered to be optimal, it is necessary to have experience with varieties in order to determine which ones are more efficient in terms of productivity and which have a better resistance to limiting factors. These experiences tell us which of the varieties or hybrids studied in a particular area of production give the highest yields, which are the most valuable in qualitative and economic terms. At the same time, these experiences contribute to the study of varieties, coming with a contribution to information on the morphological and physiological characteristics (Iurea *et al.*, 2017; Sîrbu *et al.*, 2017). In this paper we aim to analyze mainly the fruits quality parameters and production of some new cherry varieties in an intensive system in Iasi County, region of North-East of Romania.

MATERIAL AND METHOD

The research was conducted in an comercial orchard, that is part of S.C. HORTIFRUCT S.R.L., located in the village of Șerbești, Iasi county.

The studied varieties were: '**Kordia**', '**Karina**', '**Regina**', '**Ferrovina**' and '**Sweetheart**'. To study the behavior of the five sweet cherry varieties of, there was made a comparative study of the 7-year-old plantation. All cultivars were grafted on Gisela 5 rootstock. The orchard was planted in 2010.

The planting distances are 4 meters between rows and 2 meters between trees, resulting a density of 1250 trees/ha. Training system is Central Vogel Lider (V.C.L.), as it can be seen in figure 1.

Spring frost tolerance was noted. Harvesting date and yield were recorded. The weight of the fruits, their size, and their cracking tolerance were measured and led us to classify the cultivars. All the data will contribute to the choice of an update sweet cherry assortment more convenient for modern training methods (Istrate *et al.*, 2016; Gjamovski *et al.*, 2016). Fruits were harvested from at least five trees on all cultivars. There were analyzed fifty fruits from each cultivar for fruit quality analysis and one hundred fruits were examined for cracking resistance. The fruit quality was determined based on weight, diameter (mm) and organoleptic characteristics (Perez-Sanchez *et al.*, 2010; Milatović *et al.*, 2013). Fruit flavor was estimated subjectively.



Fig. 1 Aspects from the experimental field in different stages of vegetation and production

RESULTS AND DISCUSSIONS

Most of the promising selections obtained in the last years breeding programs (Trajkovski, 1993) were screened on Gisela 5 rootstock, for their adaptability to new intensive high density orchards and for flowering capacity and precocity, and fruit characteristics.

With regard to the blooming period, 'Regina' and 'Karina' are the most late, the duration of the bloom develops during the first and second decades of April. This is an advantage as it reduces the risk of overlapping blooming with spring frost (Asănică *et al.*, 2012). 'Kordia' and 'Sweetheart' varieties with early flowering, are predisposed to late spring frosts (tab. 1).

Table 1

Phenology and productivity of the analyzed sweet cherry varieties, data for year 2018

Variety	Start of flowering	Fall of petals	Harvesting date	Average fruit diameter (mm)	Productivity (t/ha)
Regina	13.04	25.04	25 - 28.06	26 - 28	22 t/ha
Kordia	10.04	20.04	10 - 15.06	24 - 28	20 t/ha
Karina	13.04	25.04	25 - 28.06	24 - 26	20 t/ha
Ferrovia	13.04	25.04	10 - 15.06	24 - 28	20 t/ha
Sweetheart	10.04	20.04	05 - 08.07	22 - 24	19 t/ha

Fruit aspect is very important since it is the initial sensory attribute that can determine a consumer's choice. It is considered that there are three important characteristics associated with the appearance of fruit: color, size and shape, and surface texture. Fruit size is an important characteristic for commercial value.

Table 2 shows the data for the fruit quality characteristics of evaluated varieties. In terms of fruit size and weight, all analyzed varieties can be classified as large fruit (22 - 24 mm) to very large ones (24 - 28 mm), the following varieties were noted: 'Regina' (10.6 g) and 'Kordia' (10.3 g).

Table 2

Quality characteristics of the analyzed sweet cherry varieties, data for year 2018

Variety	Fruit characteristics				
	Flavor	Color	Shape	Weight (g)	Cracking resistance
Regina	Taste is mildly sweet, and pleasant.	Ripe fruits have dark red skin and flesh color.	Rounded shape.	10.6	Very good
Kordia	The flavor is moderately strong with a nice sugar-acid balance.	Shiny red that turns dark red when ripe.	Heart shaped	10.3	Very good
Karina	Taste is sweet with strong flavor.	Dark red shiny color.	Wide heart-shaped.	9.5	Very good
Ferrovia	Very sweet and slightly acid, very good flavor.	Bright red color.	Vaguely heart-shaped	10.1	Good
Sweetheart	Strong flavor with a good balance of sugar and acid.	When ripe, the skin is dark red and flesh is red.	Heart-shaped.	9.2	Poor

The skin color is relatively similar to all 5 varieties, with different shades from bright red to dark red, with high organoleptic characteristics.

Table 3

Evolution of the production (t/ha), between 2016-2018

Variety	2016	2017	2018	% to the control	Difference to the control (t/ha)	Significance of differences
Regina	10.2	13.7	22	155	7.8	***
Kordia	12.1	15.9	20	141	5.8	***
Karina	10.2	14.0	20	141	5.8	***
Ferrovia	10.0	13.5	20	141	5.8	***
Sweetheart	9.9	13.0	19	134	5.8	***
Average	10,48	14.2*	20,20	142,4	4.8	***

LSD 5% = 0.72 t/ha; LSD 1% = 1.57 t/ha; LSD 0.1% = 3.64 t/ha

*Control (Average production compared to the previous year)



Fig. 2 Aspects of the fruiting formations, June, 2018 (original)

The results of the varieties productivity are given in Table 3. Analyzing production evolution in the last three years can be observed a very significant increase in 2018 mainly due to the high percentage of flower buds differentiation and thus, the large number of fruits/bunch (fig 2). In 2018 there was used additional pollination, 2 bumble bee colonies per hectare.

Regarding fruit production among the evaluated varieties the most productive is 'Regina' (22.0 t/ha), followed by 'Kordia', 'Karina' and 'Sweetheart'.

CONCLUSIONS

1. The earliest varieties in terms of fruiting phenophases progress are: 'Kordia' and 'Sweetheart' and the lates ones are: 'Regina', 'Karina' and 'Ferrovia'.

2. Varieties phenology emphasized that the beginning and the progress of the fructification phenophases is conditioned by the climatological factor.

3. Regarding fruit production, the most productive is 'Regina' (22.0 t/ha), followed by 'Kordia', 'Karina' and 'Sweetheart'.

4. In terms of fruit size and weight, the following varieties were noted: 'Regina' (10.6 g) and 'Kordia' (10.3 g).

5. Temperatures of -3...-4°C during flowering period do not affect the level of production.

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