CORALIS - A NEW SWEET CHERRY CULTIVAR FOR COMMERCIAL PLANTATIONS

CORALIS – UN NOU SOI DE CIREŞ PENTRU PLANTAȚIILE COMERCIALE

IUREA Elena[1], SÎRBU Sorina[1], CORNEANU Gelu[1]
e-mail: iurea_elena@yahoo.com

Abstract*: The aim of the paper is to improve the autochthonous sweet cherry assortment with new cultivars with late maturation and high quality fruits. The sweet cherry assortment from Romania contains many cultivars with maturation in the medium season. The current tendency is to create a balance by reducing the number of the cultivars with medium season maturation and by increasing the number of the cultivars with very early and late season maturation. Analyzing the main phenological stages for the two cultivars it was noticed that the new sweet cherry cultivar 'Coralis' is late both for the beginning of flowering time and for fruits maturation. Regarding the average productions on four years (2011-2014) from the statistical point of view, 'Coralis' cultivar (20.0 kg/tree) recorded positive production differences compared to the control cultivar (19.8 kg/tree). Under the aspect of fruits weight and equatorial diameter 'Coralis' (9.1 g and 24.7 mm) recorded significant differences and distinct positive significant differences compared to the control cultivar (6.9 g and 21.8 mm).*
Key words: assortment, sweet cherry, cultivar, late ripening, fruit production

Rezumat: *Scopul lucrării este de a îmbunătăți sortimentul de cireş autohton cu soiuri de cireş cu maturare târzie, cu fructe de calitate. Sortimentul de cireş din România, cuprinde o abundență de soiuri cu maturare medie a fructelor. Tendința actuală este de a realiza un echilibru, prin reducerea ponderii soiurilor cu epocă mijlocie de maturare a fructelor şi a sporirii ponderii soiurilor extratimpurii şi târzii. Analizând principalele stadii fenologice la cele două soiuri, s-a constatat că noul soi de cireş 'Coralis' este tardiv atât în ceea ce priveşte începutul înfloritului cât şi cel al maturării fructelor. Referitor la producțiile medii pe patru ani (2011-2014), din punct de vedere statistic, soiul de cireş 'Coralis' (20.0 kg/pom) a înregistrat diferențe de producție pozitive față de soiul martor (19.8 kg/pom). Sub aspectul greutății fructelor şi a diametrului ecuatorial, 'Coralis' (9.1 g şi 24.7 mm) a înregistrat diferențe semnificative (g) şi distinct semnificative pozitiv (mm) față de soiul martor (6.9 g şi 21.8 mm).*
Cuvinte cheie: sortiment, cireş, soi, maturare târzei, producție de fructe

INTRODUCTION

The obtaining of new cultivars with improved features and characteristics is a permanent requirement both from the growers and from the fruits consumers side. This is also the main objective of the genetic breeding and

[1]Research and Development Station for Fruit Tree Growing, Iaşi, Romania

controlled or natural selection which have been happening for centuries (Branişte *et al.,* 2007).

Regarding the sweet cherry assortment accepted for the commercial trees nursery in Romania, it contains both autochtonous and foreign cultivars, verified through studies and long time observations in the regional research stations whose results are validated by National Institute for Variety Testing and Registration Bucharest and Ministry of Agriculture and Rural Development - Romania.

From the maturation and fresh fruits consumption point of view, all these cultivars cover a long period (46-50 days) between May (for very early cultivars) to July (for the very late cultivars) (Petre, 2006; Iurea, 2015).

The research concerning the assortment improvement for the sweet cherry tree, the cultivars quality and the avoidance of market overcrowding with fresh cherries on short term are important objectives. The tendency is to create a balance, assured by reducing the number of the cultivars with maturation in the medium season of sweet cherry and by increasing the number of the very early and late sweet cherry cultivars (Budan and Grădinariu, 2000). Therefore in March 2016 a new cherry cultivar obtained at RSFG Iaşi, was registered under the name '*Coralis*'.

The aim of the paper is to improve the autochtonous sweet cherry assortment with new cultivars with late maturation and high quality of the fruits.

MATERIAL AND METHOD

The studies have been done during 2011-2014, on the sweet cherry cultivar '*Coralis*' (HC 885302) and the comparison has been done with the regional control cultivar '*Boambe de Cotnari'*.

The fruit-growing trees can be found in the experimental plots, grafted on mahaleb and planted at a distance of 5 x 4 m, with free flattened palmette crown shape on the direction of the trees row, without a sustaining system or irrigation system. On the row with trees, the cultivar was worked with the lateral disk with feeler and between the trees rows the soil was heated. Diseases and pests control was done applying phytosanitary treatments.

In the experimental field there have been done observations and determinations concerning the trees vigour, the resistance to anthracnose and monilia and the main phenological stages (Cociu and Oprea, 1989).

The physical characteristics of the fruit were determined this way:

- the fruit/stone weight (g) by weighting 10 fruits/stones in three repetitions with the electronic scale (Radwag, sensitivity 0,01g);

- the fruit/stone dimensions (mm) were determined with the digital calliper Luumytools for 10 fruits/stones in three repetitions; the fruit's equatorial diameter (D) and stone/fruit ratio;

- the fruit's colour, the pulp firmness and stone adherence to pulp was determined in accordance to the UPOV TG/35/7 questionnaire.

The chemical and quality characteristics of the fruits were determined this way:

- the soluble dry substance was determined refractometric, using a hand refractometer Zeiss;

- the resistance of the fruits to cracking was determined by immersion 100 fruits from each cultivar in distilled water and after 6 hours it was verified the number of cracked fruits, determining this way the percentage of fruit's cracking per cultivar (Cociu and Oprea, 1989).

- the productivity was determined by weighting the fruits per tree, per variants and per repetitions.

The experimental data was statistically interpreted by analysing the variance.

RESULTS AND DISCUSSIONS

The two studied genotypes are of middle tree vigour. Concerning the diseases resistance, the year 2013 was a rainy year (in the first 6 months of the year there have been accumulated 446.5 mm of precipitations), that being very favourable for the evolution of the pathogens, therefore the sweet cultivars taken to the study manifested a low sensitivity both to anthracnose (attack frequency was between 3.1 to 3.8%) and to monilia (attack frequency was between 2.0 to 2.1 %) (tab. 1).

Table 1

The characteristics of the tree for two sweet cherry cultivars (RSFG Iaşi; average 2011-2014)

Genotype	Tree vigour*	Resistance to:					
		Anthracnose** (on leaves) (*Coccomyces hiemalis* Higg.)			Monilia** (on fruits) *(Monilinia fructigena)*		
		F%**	I%	A.D. %	F%	I%**	A.D.%
Coralis (HC 885302)	5	3.1	5	0.06	2.0	5	0.04
Boambe de Cotnari (control)	5	3.8	5	0.08	2.1	5	0.04

*- tree's vigour degree on a scale between 1 to 9: 1= very weak; 3= weak; 5 = medium; 7= strong; 9= very strong (***, 2006).

**F% - attack frequency (%); I% - intensity degree on a scale between 1 to 6: 1 = 3% attacked surface; 3 = 25%; 4 = 50%; 6 = 100%; A.D. % - attack degree (Cociu and Oprea, 1989).

During 2011-2014, the flowering beginning for the *'Coralis'* cultivar was recorded between 10th and 25th of April and for the control cultivar *'Boambe de Cotnari*' it was recorded between 8th and 21st of April. Analysing the phenological stages for these two cultivars it was noticed that the new sweet cherry cultivar '*Coralis*' blooms time was a couple days later than the control cultivar *'Boambe de Cotnari'* (tab. 2). The late flowering time presents a great importance to avoid the damage caused by late spring frost (Milatović *et al*, 2**011**).

Regarding the harvesting maturity this oscillates in large limits each year. Thus, it can be noticed that '*Coralis*' were ripening time in the 3rd 10-days of June or the first 10-days of July, a week later than '*Boambe de Cotnari'* (tab. 2).

Regardless to all the climatic conditions of the year, the order in which the sweet cherry cultivars reach the ripening time is always the same, the difference being that the time period between two successive cultivars which is larger or shorter.

Table 2

The main phenological stages for two sweet cherry cultivars (RSFG Iaşi; 2011-2014)

Phenological stages	Year	Genotype	
		Coralis (HC. 885302)	Boambe de Cotnari (control)
Flowering beginning data	2011	25.04	20.04
	2012	21.04	15.04
	2013	24.04	21.04
	2014	10.04	8.04
	Average	***20.04***	***16.04***
Fruits maturity data	2011	4.07	18.06
	2012	20.06	13.06
	2013	24.06	22.06
	2014	30.06	25.06
	Average	***27.06***	***20.06***

Analysing the average productions on four years (2011-2014) from the statistical point of view it is noticed that *'Coralis'* (20.0 kg/tree) registered statisticaly positive differences compared to the control cultivar '*Boambe de Cotnari'* (19.8 kg/tree) (tab. 3).

The fruit's quality is determined by the fruit's size, epidermis' colour, stone's size and the easy detachment of the stone from the pulp.

The two studied genotypes registered an average weight of the fruit between 6.9 g for the control cultivar '*Boambe de Cotnari'* and 9.1 g for the cultivar '*Coralis*' existing positive significant differences (tab. 3). A continuous growth of the fruit's weight determines also a corresponding growth of the equatorial diameter (D). Thus, the cultivar '*Coralis*' (24.7 mm) registered distinct positive significant differences compared to the control (21.8 mm) (tab. 3).

For the size of the stone, the cultivars registered a weight between 0.30 – 0.34 g this being a middle size of stone according to the UPOV questionnaire.

The fruit/stone ratio for the cultivar '*Coralis*' (30.33) was superior compared with the control cultivar (20.29). As a percentage of the stone from the fruit's weight it registered negative significant differences from the statistical point of view compared to the control (4.93%) (tab. 3).

Table 3

Fruits production and physical characteristics for two sweet cherry cultivars (RSFG Iaşi; average 2011-2014)

Genotype	Fruits' production (kg/tree)	Fruit's weight (g)	Stone's weight (g)	Fruit/stone ratio	Stone / fruit's weight (%)	Fruit equatorial diameter (mm)
Coralis (HC 885302)	20.0	9.1*	0.30*	30.33	3.29^0	24.7**
Boambe de Cotnari (control)	19.8	6.9	0.34	20.29	4.93	21.8
DL 5% DL 1% DL 0.1%	7.3 13.4 29.7	1.3 2.3 5.2	0.04 0.08 0.18	12.21 22.42 49.68	1.46 2.68 5.95	1.3 2.4 5.3

Note: - plantation year: 2000, plantation distance 5 x 4 m

Fruits' colour is bicoloured for the cultivar '*Boambe de Cotnari'* and dark red for the cultivar '*Coralis*' (tab. 4).

The pulp firmness is an important quality feature especially for the fruits that are for fresh consumption (Kappel *et al*., 2000). The two studied genotypes ('*Coralis*' and '*Boambe de Cotnari'*) have firm pulp.

The content in dry substance is very important for sweet cherries, because the taste of the fruits depends a lot on it. Regarding the studied cultivars, the values of this parameter were between 16.1% ('*Boambe de Cotnari'*) to 19.5% ('*Coralis*') (tab. 4).

The studied cultivars registered good resistance to the fruit's cracking with values under 21% (tab. 4).

Table 4

The physico-chemical and quality features of the fruits for two sweet cherry cultivars (RSFG Iaşi; 2011-2014)

Genotype	Skin colour	Pulp firmness	Fruit's shape	DS* (%)	Stone's adherence to pulp	Fruits cracking after 6 hours (%)
Coralis (HC. 885302)	Dark red	Firm	Kidney-shaped	19.5	Non-adherent	20.0
Boambe de Cotnari (control)	Half yellow, half red	Firm	Heart-shaped	16.1	Non-adherent	20.7

*DS – dry substance

CONCLUSIONS

1. The cherry cultivar '*Coralis*' it's according with the current objectives concerning the tree's vigour, the flowering lateness, the productivity, the fruit's quality and ripening time placed at the extremity of the sweet cherries harvest season.

2. The new cultivar with late fruit's maturation could extend the sweet cherry season for fresh consumption or processing with 7-15 days.

3. '*Coralis*' was registered in March 2016 in the National List of Variety and submitted for patent.

Acknowledgments. *This study has been partially financed by the Ministry of Agriculture and Rural Development, Grant No. ADER 3.2.2. /2015, with title 'Tree species breeding to increase safety and food security'.*

REFERENCES

1. Branişte N., Budan S., Butac M., Militaru M., 2007 – *Soiuri de pomi, arbuşti fructiferi şi căpşuni create în România*, Editura Paralela 45, Piteşti, 476 pp.
2. Budan S., Grădinariu G., 2000 – *Cireşul*, Editura Ion Ionescu de la Brad, Iaşi, 262 pp.
3. Cociu V., Oprea Şt., 1989 – *Metode de cercetare în ameliorarea plantelor pomicole*, Editura Dacia, Cluj-Napoca, 172 pp.
4. Iurea Elena, Sîrbu Sorina, Corneanu G., **2015** – *Results concerning the creation of cultivars with ripening ages at the limits of cherries maturation season and their evaluttion.* Lucr. ştiințifice, seria Horticultură, vol. 58, nr. 2, Iaşi, p. 99-104.
5. Milatović, D. 2011 - *Oplemenjivanje i sorte višnje*, în Trešnja i višnja, Ed. Naučno voćarsko društvo Srbije, Čačak, Srbije, p. 119-213.
6. Petre L., 2006 – *Rezultate obținute în ameliorarea sortimentului de cireş, vişin şi nuc la SCDP Iaşi,* Lucr. ştiințifice. ICDP Piteşti-Mărăcineni, vol. XXII, Piteşti, p. 45-49.
7. *, 2006** - *Protocol for distinctness, uniformity and stability tests of sweet cherry* (*Prunus avium* L.) available at http://www.cpvo.europa.eu