RESEARCHES CONCERNING THE BEHAVIOUR OF CHERRY VARIETIES WITH DIFFERENT RIPPENING PERIODS IN THE CONDITIONS OF THE NORTHEAST OF ROMANIA

CERCETĂRI PRIVIND COMPORTAREA UNOR SOIURI DE CIREŞ CU DIFERITE EPOCI DE COACERE ÎN CONDIŢIILE ZONEI DE NE A ROMÂNIEI

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Abstract: *The aim of this study is to improve the sweet cherry tree assortment for the Northeast area of Romania by promoting the new cultivars created at RSFG Iasi, renewing the current sweet cherry tree assortment with new quality cultivars and especially extending the sweet cherry season, filling the existing gaps during the consumption period. At this time, the market is unbalanced in favor of cultivars in the first part of the fruit season. The tendency is towards rebalancing, by reducing the proportion of cultivars with medium season maturity and increasing the early and the late ones. In terms of productivity, the three-year average production (2016-2018) cultivars as followes Golia (19.7 kg / tree), Margonia (23.3 kg / tree) and Bucium (24.7 kg / tree) was remarkable. Regarding the average weight of the fruit, it recorded values between 4.8 g (Cetatuia) and 7.6 g (Bucium).*

Key words: cherry tree , cultivar, early, late, fruit

Rezumat: *Scopul acestui studiu vizează îmbunătăţirea sortimentului de cireş pentru zona de NE a României prin promovarea soiurilor noi create la SCDP Iaşi, reînnoirea actualului sortiment de cireş cu noi soiuri de calitate şi îndeosebi, prelungirea sezonului de cireşe, completarea golurilor existente în perioada de consum. În acest moment, piaţa este dezechilibrată în favoarea soiurilor din prima parte a sezonului de maturare a fructelor. Tendinţa este spre reechilibrare, prin reducerea ponderii soiurilor cu epocă mijlocie de maturare şi a sporirii celor extratimpurii şi târzii. Sub aspectul productivităţii s-au remarcat prin producţiile medii pe trei ani (2016-2018) soiurile Golia (19,7 kg/pom), Margonia (23,3 kg/pom) şi Bucium (24,7 kg/pom). Referitor la greutatea medie a fructului, aceasta a înregistrat valori cuprinse între 4,8 g (Cetăţuia) şi 7,6 g (Bucium).*

Cuvinte cheie: cireş, soiuri, timpurii, târzii, fruct

INTRODUCTION

The soil and climate conditions in Iaşi County are particularly favorable for the sweet cherry growing, here originating varieties like Crăieşti de mai, Crăieşti

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Moldoveneşti, Boambe de Cotnari, Crăieşti de Comarna. Due to the attributes of having an earlier ripning age in comparison to other fruit tree species (since May), cherry tree is the first link in the annual fruit production chain (Budan and Gradinariu, 2000; Grădinariu and Istrate, 2004; Petre, 2006; Iurea *et al*., 2016).

The purpose of this study is to improve the sweet cherry assortment for the Northeastern area of Romania by promoting the new varieties created at RSFG Iasi, renewing the current cherry assortment with new quality varieties, esspecially extending the cherry season, filling existing gaps during the consumption period, specifying the areas where the varieties give the best results.

MATERIAL AND METHOD

The studies were carried out between 2016 and 2018, having as research material six cherry varieties created at RSFG Iasi, approved in the years 1999 – 2015 (Cetățuia, Cătălina, Bucium, Golia, Margonia–and George). Of the six genotypes studied, two are maturation early (Catalina, Cetățuia), two with medium maturation (Bucium, Golia) and two with late maturation (Margonia, George). The comparison of varieties was made with the Boambe de Cotnari zonal control cultivar. The trees were grafted on the mahaleb.

The comparative competition culture was placed in three rehearsals of 3 trees at a distance of 5 x 4 m and guided as a free flattened palmette without a support system.

On the row of trees, the soil was plowed with the side disc with the touch probe, between the rows of trees the soil is rooted. Fighting diseases and pests was done as a response to warnings received, therefore, phytosanitary treatments were done.

Observations and determinations were made regarding the vigor of trees, the main fructification phenophases (Fleckinger., 1960), the behavior of the cherry-specific diseases (Cociu and Oprea, 1989), the fruit production and the main physical and chemical characteristics of the fruit according to the questionnaire UPOV).

The experimental data were statistically interpreted by variation analysis and the coefficient of variation (s%) for which the following values are arbitrarily admitted:

- 0 - 10% - low variation coefficient;
- 10 - 20% - average variation coefficient;
- 20 - 30% - high variance coefficient.

RESULTS AND DISCUSSIONS

The vigor of the trees in the cherry varieties studied is medium, just like the control variety with the exception of the Golia low variety (tab. 1). The period of blooming took place between April 1st and 23rd, so in the Cetățuia and Cătălina varieties the blooming was early and the varieties George and Margonia showed a late blooming process (tab. 1). In 2016, blooming took place earlier than in 2017 and 2018 with 3-10 days.

The harvest maturity was recorded in the third decade of May (Cetățuia and Cătălina), the first decade of June (Bucium, Golia) the end of the third decade of June (Margonia) - the first half of July (George) , and the number of days at the

end of the blossom at maturation ranged from 34-86 days, showing a large variation coefficient (28.9 - 27.7%) (tab. 1).

Table 1

The vigor of trees and the main stages of fructification in cherry varieties

Variety phenophase	Tree vigor	Beginningof blooming (fase E)	End of blooming (fase G)	Date of fruit maturation	No. of days from blooming to maturation
Deadlines in 2016-2018 (earliest-at the latest)					
Cetățuia	average	01 - 09.04	08 - 17.04	11 - 22.05	34 - 36
Cătălina	average	02 - 10.04	10 -19.04	17 - 27.05	38 - 39
Bucium	average	06 – 13.04	14 – 20.04	07 – 08.06	50 - 55
Golia	low	05 - 10.04	14 - 19.04	06 - 10.06	53 - 54
Margonia	average	09 - 15.04	15 - 23.04	20 - 24.06	63 - 67
George	average	04 - 14.04	14 -21.04	07 - 15.07	85 - 86
Boambe de Cotnari (control)	average	04 - 10.04	12 - 19.04	06 – 16.06	56 - 59
Variation coefficient (%)	x	55.1-19.0	19.2-8.9	47.3 -30.1	28.9-27.7

With regard to disease resistance, the years 2016 and 2018 being rainy years (with a surplus of 173 mm in 2016 and 73.5 mm in 2018 by 31 July), favorable years for the evolution of pathogens (moniliose and anthracnose) they showed a slight sensitivity to both anthracnose (the frequency of the attack was between 2.0-3.8%) and to moniliosis (the frequency of the attack was between 2.1-3.3%) (tab. 2).

Table 2

Resistance of the five varieties to the limiting factors of production (2016-2018)

Variety	Resistance to leaf Anthracnose* (*Coccomyces hiemalis* Higg.)			Resistance to fruit Moniliosis* *(Monilinia fructigena)*		
	F%	I%*	G.A.%	F%	I%*	G.A.%
Cetățuia	2.0	3	0.060	2.9	8	0.232
Cătălina	2.1	3	0.063	2.8	5	0.140
Bucium	2.3	2	0.046	3.3	5	0.165
Golia	2.5	2	0.050	2.2	4	0.088
Margonia	2.4	1	0.024	2.9	8	0.232
George	3.8	1	0.038	2.1	5	0.105
Boambe de Cotnari (control)	2.6	3	0.078	2.5	8	0.200

*note the intensity of attack on the scale 1-6: 1 = 1-3% the surface attacked 2=4-10%; 3=11-25%; 4=26-50%; 5=51-75%; 6=76-100% (Cociu and Oprea, 1989).

From the group of early varieties, representative of Cetățuia and Cătălina, we notice the higher production at Cetățuia (16.7 kg/tree) compared to Cătălina (9.3 kg/tree) (tab. 3).

The group of medium-maturate varieties is evidenced by the fruit production of the Bucium variety (24.7 kg/tree) compared to that of the Golia

variety (19.7 kg / tree) and in the late maturating varieties the highest yield of fruit registered in the Margonia variety (23.3 kg/tree). From a statistical point of view, it is noted that there were insignificant production differences compared to the Boambe de Cotnari (15.7 kg /tree) (tab. 3).

Regarding the average weight of the fruit, it recorded values between 4.8 g (Cetatuia) and 7.6 g (Bucium). From a statistical point of view, the differences are insignificant compared to the control (tab. 3).

As for the kernel size, the varieties recorded a weight of 0.27-0.35 g, being small to medium in size according to the UPOV questionnaire.

The percentage of fruit kernel weight recorded between 4.04% (Golia) and 5.76% (George). From a statistical point of view, the differences are insignificant compared to the control (tab. 3).

Table 3

Fruit production and physical properties of cherry varieties (2016-2018)

Variety	Average production of fruits (kg/tree)	Average fruit weight (g)	Average weight of the kernel (g)	Kernel of fruit weight (%)
Cetățuia	16.7	4.8	0.27	5.56
Cătălina	9.3	7.5	0.33	4.36
Bucium	24.7	7.6	0.33	4.29
Golia	19.7	7.3	0.30	4.04
Margonia	23.3	7.0	0.35	4.98
George	15.7	5.8	0.33	5.76
Boambe de Cotnari (control)	17.7	7.6	0.37	4.86
LSD 5%	14.2	4.6	0.18	3.92
LSD 1%	20.2	6.6	0.25	5.57
LSD 01%	29.2	9.5	0.37	8.07

As far as the color of the fruit is concerned, red has been dominant with shades of bright red (Bucium) to dark red (Cetățuia, Cătălina, Golia, George). Only Margonia variety has the color of the yellow fruit epidermis (tab. 4) (fig. 1).

Table 4

Physical and chemical properties of fruits (2016-2018)

Variety	The color of the epidermis	Firmness of the pulp	Form of the fruit	SDM (%)	Grip of the kernel to the pulp
Cetățuia	dark red	semifirm	reniform	14.5	Semi-adherent
Cătălina	dark red	semifirm	cordiform	19.3	Non-adherence
Bucium	bright red	firm	cordiform	19.4	Non-adherence
Golia	dark red	firm	cordiform	17.3	Non-adherence
Margonia	yellow	firm	cordiform	16.9	Non-adherence
George	dark red	firm	cordiform	16.0	Non-adherence
Boambe de Cotnari (control)	bicolour	firm	cordiform	18.9	Non-adherence

Firmness of the pulp is an important quality element, especially for fruit intended for fresh consumption. In our case, early varieties (Cătălina, Cetățuia) have the semifirm pulp, and the other varieties have firm pulp.

The soluble dry matter content was between 14.5% (Cetatuia) and 19.4% (Bucium) (tab. 4)

Regarding the destination, fruits of early varieties are destined for fresh consumption (Cetățuia and Cătălina), and the medium and late maturing varieties are destined for both fresh consumption and processing (Bucium, Golia, Margonia, George).

Fig. 1 The cherry varieties studied

CONCLUSIONS

1. The varieties studied were marked by early ripening stage (Cetățuia, Cătălina), tardivity (Margonia, George) and special fruit quality, all showing precocity and good resistance to cherry-specific diseases (anthracnose and moniliose).

2. Early ripening cherry varieties (Cetățuia, Cătălina) and late (Margonia and George) fruits provide an extension of the fresh fruit season and processing for 9-12 days.

3. The studied varieties ensure the fresh fruit consumption for 55-58 days, with special taste qualities offered by the unique microclimate found in the Iasi area.

REFERENCES

1. **Budan S., Grădinariu G., 2000 –** *Cireşul*, Editura Ion Ionescu de la Brad, Iaşi, 262 pag.
2. **Cociu V., Oprea Şt., 1989** – *Metode de cercetare în ameliorarea plantelor pomicole,* Editura Dacia, Cluj-Napoca, 172 pp.
3. **Fleckinger J., 1960** - *Phenologie et arboriculture fruitiere,* Rev. Bon Jardinier, tome 1, p. 362-372.
4. **Grădinariu G., Istrate M., 2004** - *Pomicultură generală şi specială*, Editura Tipo Moldova Iasi, 528 p.
5. **Iurea Elena, Sorina Sîrbu, Margareta Corneanu,** 2**016 -** *Results on creating cherry cultivars with different ages of ripening at SCDP Iaşi,* Revista Fruit Growing Research , nr. XXXII, Ed. INVEL Multimedia, Piteşti-Mărăcineni, p. 26-31.
6. **Petre L., 2006 –** *Rezultate obținute în ameliorarea sortimentului de cireş, vişin şi nuc la SCDP Iaşi,* Lucr. Şt. ICDP Piteşti-Mărăcineni, vol. XXII, Piteşti. 5 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