

RESULTS CONCERNING THE CREATION OF CULTIVARS WITH RIPENING AGES AT THE LIMITS OF CHERRIES MATURATION SEASON AND THEIR EVALUATION

REZULTATE PRIVIND CREAREA DE SOIURI CU EPOCI DE COACERE AFLATE LA EXTREMITĂȚILE SEZONULUI DE MATURARE A CIREȘELOR ȘI EVALUAREA LOR

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Abstract: The paper's aim is to present the valuable characteristics of a couple cherry cultivars created at SCDP Iași, which improve the inland cherry assortment with early and late maturation cultivars, with quality fruits. At the moment the domestic market, but also the external one is unbalanced, favoring the cultivars from the first part of the fruits maturation season (June). The tendency is to create a balance, assured by reducing the weight of the cultivars with average age of fruits maturation and by increasing the weight of the extra early and late cultivars. Analyzing the average productions on three years (2011-2013), from the statistical point of view, it can be seen that the cultivars Marina (31,1 kg/tree) and Margo (30,9 kg/tree) registered significantly positive production differences compared to the witness cultivar Boambe de Cotnari (21,7 kg/tree). In terms of fruits weight (g) and of equatorial diameter (mm), the cultivars Anda (7,6 g and 23,7 mm) and Marina (7,2 g and 22,2 mm) got remarked with significantly positive differences compared to the witness.

Key words: objectives, cherry, cultivars, early, late, fruit.

Rezumat: Scopul lucrării este de a prezenta caracterile valoroase a unor soiuri de cireș create la SCDP Iași, care îmbunătățesc sortimentul de cireș autohton cu soiuri cu maturare timpurie și târzie, cu fructe de calitate. În acest moment piața internă dar și cea externă este dezechilibrată în favoarea soiurilor din prima parte a sezonului de maturare a fructelor (luna iunie). Tendința este de realizare a unui echilibru, asigurat prin reducerea ponderii soiurilor cu epocă mijlocie de maturare a fructelor și a sporirii celor extratimpurii și târzii. Analizând producțiile medii pe trei ani (2011-2013), din punct de vedere statistic, se constată că soiurile Marina (31,1 kg/pom) și Margo (30,9 kg/pom) au înregistrat diferențe de producție semnificativ pozitive față de soiul martor Boambe de Cotnari (21,7 kg/pom). Sub aspectul greutatei fructelor (g) și a diametrului ecuatorial (mm), s-au remarcat soiurile Anda (7,6 g și 23,7 mm) și Marina (7,2 g și 22,2 mm) cu diferențe semnificativ pozitive față de martor.

Cuvinte cheie: obiective, cireș, soiuri, timpurii, târzii, fruct.

INTRODUCTION

Due to the feature of having an earlier ripening age of the fruits compared

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to the other fruit-growing trees species (beginning from May), the cherry tree represents the first ring in the annual chain of fruits production (Budan and Grădinariu, 2000; Grădinariu and Istrate, 2004; Petre, 2006).

The researches concerning the assortment improvement for the cherry species, the cultivars quality and the avoidance of short term congestion on the fresh cherry market are objectives that gain increasingly higher importance.

At the moment, the internal market and also the external one is unbalanced in the favour of the cultivars from the first part of the fruits maturation season (June). The tendency is to create a balance, assured by reducing the share of the cultivars with middle age of fruits maturation and by increasing the share of the extra early and late cultivars (Budan and Grădinariu, 2000).

The aim of the paper is to present the valuable characteristics of some cherry cultivars created at SCDP Iași, which improve the inland cherry assortment with cultivars with early and late maturation, with quality fruits.

MATERIAL AND METHOD

As working material, there were used the cherry genotypes existent in the national collection. The basis of this germplasm background were set in 1981 and it consists at the moment of 555 genotypes from inside the country and from abroad, with old and new cultivars, local cherry biotypes, hybrids and clones.

The method of creating the new cultivars was the classic one and it consisted in making controlled sexed hybridizations, hybrid kernels harvesting, obtaining hybrid saplings, selecting according to the established objectives and testing the hybrids (Cociu & Oprea, 1989).

The time from hybridizations to homologation was long (16-26 years) due to the species biological particularities (low kernel germination, low viability of the saplings in the first years from planting/transplanting, late starting of ripening etc.).

The breeding programme objectives took into account the creation of new cherry cultivars that would be qualitative competitive and with genetic resistance to diseases, pests, stress factors (frost, draught), reduced vigour of trees, flowering lateness and superior quality fruits under commercial, technological aspect and under the aspect of the chemical features, with ripening ages from the extremities of the maturation season of the cherries.

The studies have been taken during 2011 – 2013, having as research material six cherry cultivars (Cătălina, Cetățuia, Marina, Margo, Anda and George). From the six genotypes taken in study, two of them are with early maturation (Cătălina, Cetățuia) and four genotypes are with late maturation (Marina, Margo, Anda and George). The comparison of the cultivars was made against the local area witness Boambe de Cotnari.

For the creation of the new cherry cultivars with early and late maturation of the fruits, there have been used the cultivars Van, Boambe de Cotnari, Bigarreau Drogan, Cilegia di Ottobre, HC. 23/31, Lijana and Fromm.

The selected elites were grafted on mahaleb, after which were planted in competition micro crops at a distance of 4 x 5 m. The trees were led under flattened free pelmet shape, without sustaining system and without irrigation system.

In experimental planting there were followed: the trees vigour, (Cociu and Oprea, 1989); the main fructification phenophases (Fleckinger, 1960); physical features

(fruit's and kernel's weight, equatorial diameter of the fruit, the report fruit/kernel, % kernel from the fruit's weight, the epidermis colour); chemical and quality features of the fruits (SUS%, pulp firmness, fruit shape, kernel adherence to pulp, fruits resistance to cracking); the productivity (it was determined according to the fruits production kg/tree and the fertility index that represents % of resulted fruits at 25-30 days after the petals fall and high productivity cultivars are considered to be the ones with values over 30-35%)(Cociu and Oprea, 1989).

The experimental data were statistically interpreted by analyzing the variance and it was calculated the variation coefficient (s%) for which it is arbitrary admitted the following values: 0 -10% - low variation coefficient; 10 – 20% - average variation coefficient; 20 – 30% - high variation coefficient.

RESULTS AND DISCUSSIONS

Following the notifications and determinations made in the national cherry collection, numerous potential genitors were established for different useful characteristics and features, which have been used in intraspecific controlled hybridizations.

On the basis of these features, there have taken place annual hybridization programmes with the participation of 208 genotypes from which 34 maternal and paternal genitors have been used frequently, being followed 16 features of the trees and of the fruits.

The results after using the germplasm background for creating new cherry cultivars during 1981-2013 can be seen in Table 1. There have been made 774 hybrid combinations with the participation of 208 genitors, pollinating 738,041 flowers from which 135.804 hybrid fruits have been harvested, from which there have been extracted 97.847 kernels good to be sowed.

Out of these kernels, 7.782 hybrids have risen from which 1.720 ripened. Following the selections, 86 hybrids were promoted as elites, 33 being multiplied, planted and studied in competition micro crops (tab. 1).

During 1999-2011, from the elites studied in the competition micro crops, 22 elites have been homologated as new cultivars and in December 2013 four hybrid selections have been registered for homologation at ISTIS (one with early ripening age, two with average ripening age and one selection with late ripening age).

Table 1

The use of germplasm background for creating new cherry cultivars (1981-2013)

The hybridization year	Of combinations	Used genitors (nr.)		Pollinated flowers -nr-	ybrid harvested fruit -nr-	Resulted hybrid kernels -nr-	Arisen saplings -nr-	Hybrids on fruit -nr-	Perspective hybrid selections -nr-	Homologated cultivars -nr-	Hybrid elites suggested for homologation
		♀	♂								
Total 1981-2013	774	208		738.041	135.804	97.847	7.782	1.720	86	22	4

The trees vigour for the six cherry cultivars taken in study is average (table 2). The flowering period was between 10th of April and 10th of May, therefore for the cultivars Cetățuia and Cătălina the flowering was early and Anda and Margo cultivars manifested lateness for flowering.

The values registered for natural fertility for the six cultivars were between 9,8% (Cătălina) and 77,8% (Cetățuia), registering a high variation coefficient (59,3%) and they are classified as of high productivity, because the fertility index registered values above 30%, exception being the cultivar Cătălina (tab.2).

The harvesting maturity was registered in the third decade of May (Cătălina and Cetățuia), the end of the third decade of June (Anda, Margo) – the first decade of July (Marina, George) and the number of days from the end of the flowering to maturation was between 27-70 days, registering a high variation coefficient (39 – 32%) (tab. 2).

Table 2

The trees vigour and the main fructification phases for the cherry cultivars with early and late ripening age (2011-2013)

Cultivar/ Phenophase	Tree's vigour	Beginning of flowering (phase E)	End of flowering (phase G)	Natural fertility (%)	Fruits maturation date	Nr. Of days from the end of flowering to maturation
Limit dates (earliest - latest):						
Cătălina	middle	12 - 21.04	24.04-1.05	9,8	22.05-4.06	27-35
Cetățuia	middle	12 - 20.04	20 - 27.04	77,8	22 - 30.05	29-37
Marina	middle	16 - 23.04	22.04-01.05	64,8	18.06-01.07	58-62
Anda	middle	20 - 24.04	01 - 05.05	45,4	18 - 24.06	49-55
Margo	middle	22 - 26.04	01 -10.05	55,3	18 - 24.06	44-54
George	middle	18 - 23.04	30.04 -1.05	51,2	02 -10.07	64-70
Variation coefficient (%)	-	31,9-12,1	95,0-166,7	59,3	57,5 -81,2	39,0-32,0

No matter the climatic conditions of the year, the order in which the cherry cultivars reach maturity is always kept the same, the only difference being that the time interval between two successive cultivars is longer or shorter (Istrate, 1998).

Analyzing the average productions over three years (2011-2013), from the statistical point of view, it can be noticed that the cultivars Marina (31,1 kg/tree) and Margo (30,9 kg/tree) registered production differences positive significant compared to the witness cultivar Boambe de Cotnari (21,7 kg/tree) (tab. 3).

The weight of the fruit is a dimension that is influenced by the local climatic conditions and by the biological particularities of each cultivar. From the statistical point of view, the cultivars Anda, Marina and Margo registered positive significant differences compared to the witness.

Under the aspect of equatorial diameter (mm), the cultivar Anda got remarked (23,7 mm), with positive significant differences and the cultivars Marina (22,2 mm), Cătălina (21,9 mm) and Margo (21,5 mm) with positive differences compared to the witness (21,2 mm) (tab. 3). As kernel size, the

cultivars registered a weight between 0,14-0,31 g, having a small to middle size according the UPOV questionnaire.

The report fruit/kernel was between 20,3 (Cătălina) and 27,1 (Cetățuia, Anda and Marina) registered very significant positive differences. The percent of the kernel from the fruit's weight registered values between 3,66% (Cetățuia) and 5,0% (George). From the statistical point of view, the cultivars Cetățuia, Anda and Marian registered negative significant differences compared to the witness (tab. 3).

Table 3
Fruits production and physical features of the cherry cultivars (2011-2013)

Cultivar/ Biotype	Average production of fruits (kg/tree)	Fruit's average weight (g)	Kernel's average weight (g)	Report fruit/kernel	Kernel from the fruit's weight (%)	Fruit's equatorial diameter (mm)
Cătălina	19,4	6,3	0,31	20,3 ⁰⁰	4,96	21,9
Cetățuia	21,3	3,8 ⁰⁰	0,14 ⁰	27,1 ⁺⁺⁺	3,66 ⁰	18,0 ⁰⁰
Boambe de Cotnari (Mt)	21,7	6,7	0,33	22,1	4,92	21,2
Marina	31,1 ⁺	7,2	0,27	26,7 ⁺⁺⁺	3,75 ⁰	22,2
Anda	15,1	7,6	0,28	27,1 ⁺⁺⁺	3,73 ⁰	23,7 ⁺⁺
Margo	30,9 ⁺	6,8	0,30	22,7	4,43	21,5
George	18,1	5,5 ⁰	0,27	20,4 ⁰⁰	5,00	19,8
LSD 5%	8,2	1,1	0,14	0,9	1,0	1,8
LSD 1%	11,6	1,5	0,20	1,3	1,4	2,5
LSD 0,1%	16,8	2,2	0,29	1,9	2,0	3,7

The fruits colour was from yellow (Anda, Margo), double coloured (Marina) to dark red (Cătălina, Cetățuia, George) (tab. 4).

The pulp firmness is an important quality element, especially for the fruits intended for fresh consumption (Kappel et al., 2000). In our case, the early cultivars (Cătălina, Cetățuia) have semi firm pulp and the late cultivars have firm and very firm pulp. The content in SUS was between 15,8% (Margo) and 18,6% (Anda) (tab. 4).

All the cultivars taken in study manifested a good resistance to the fruits cracking phenomenon, the registered values being under 16%.

Table 4
Physico-chemical and quality features of the fruits (2011-2013)

Cultivar	Epidermis colour	Pulp firmness	Fruit shape	SUS -%-	Kernel's adherence to pulp	% of fruits cracked after 6 hours
Cătălina	Dark red	middle	Heart-shaped	16,7	Non-adherent	6,3
Cetățuia	Dark red	middle	Kidney-shaped	16,9	Semi-adherent	15,5
Marina	Double coloured	firm	Heart-shaped	16,0	Non-adherent	10,1
Anda	Yellow	very firm	Kidney-shaped	18,6	Non-adherent	10,0
Margo	Yellow	firm	Heart-shaped	15,8	Non-adherent	1,3
George	Dark red	firm	Heart-shaped	17,0	Non-adherent	4,0

CONCLUSIONS

1. The new created cultivars correspond to the actual goals concerning the trees vigour, flowering lateness, fruits resistance to cracking, productivity, fruits quality and having ripening ages at the extremities of the cherries maturation season.

2. The creation of the new cherry cultivars with early maturation (Cetățuia, Cătălina) and late maturation (Marina, Anda, Margo and George) of the fruits ensures an extending of the season of fresh fruits and fruits for industrialization with 10-15 days.

3. There are perspectives for an increasing consumption of fresh fruits for the cherry species on a period of 42-46 days, with outstanding taste qualities offered also by the unique microclimate which can be found on the axis Cotnari, Iași, Răducăneni from the Iași County.

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