UPDATED DATABASE CONCERNING EVALUATION OF NATIVE SOUR CHERRY GENOTYPES FROM THE ROMANIAN NATIONAL GERMPLASM

ACTUALIZAREA BAZEI DE DATE PRIVIND EVALUAREA GENOTIPURILOR AUTOHTONE DE VIŞIN DIN FONDUL NAȚIONAL DE GERMOPLASMĂ

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Abstract. *Romanian territory is located in the extended area limits of the geographic genetic center for cherry which grows wild or weedy in a high genetic diversity, all over the country. In the past, sour cherry has been propagated to a large extend by seeds or suckers, resulting in a wide range of variability. Subsequently, by selection and clonally propagation of valuable individuals within seedling population from different growing areas, many local cultivars were framed. Additionally, as a result of breeding programs started more than 50 years ago, 18 new varieties were released. Some of them are preserved in cherries collections which include 174 sour cherry (from which 60 are autochthonous biotypes, breeder's lines, old and new cultivars) accessions held in duplicate in two different locations (Pitesti and Iasi). To give new opportunities for conservation of cherry biodiversity and sustainable use of genetic resources, 60 native genotypes have been evaluated for some morphological and biological characteristics as well as agronomic traits like fruit use, plant use, status of sample, date of full blooming, harvest maturity, fruit shape, fruit size, fruit skin color, juice color, flesh juiciness, tree vigor, susceptibility to diseases, according to the numerical scale of IBPGR descriptors*

Key words: Romania, *Prunus cerasus L.*, evaluation, native germplasm

Rezumat. *Geografic, teritoriul României se află în cadrul limitelor extinse ale centrului genetic de formare a speciilor cireş şi vişin, acestea crescând în flora spontană sau semicultivată pe tot cuprinsul ţării. În trecut, vişinul a fost înmulţit şi diseminat pe scară largă, generativ prin sâmburi sau vegetativ prin drajoni, ceea ce a condus la o mare dispersie teritorială şi o largă variabilitate genetică. Ulterior, selecţia şi propagarea clonală a unor genotipuri valoroase din cadrul unor populaţii de pomi pe rădăcini proprii din diferite zone de cultură, a condus la formarea a numeroase soiuri locale. Relativ recent, ca rezultat al unui activ program de ameliorare început cu 50 de ani în urmă, au fost omologate sau înregistrate 18 soiuri noi. Unele dintre ele sunt conservate în colecţia naţională care cuprinde 174 de genotipuri (din care 60 sunt biotipuri autohtone, selecţii rezultate din programul de ameliorare,*

soiuri vechi şi creaţii contemporane) fiind menţinute în duplicat la Piteşti şi Iaşi. Pentru a oferi noi oportunităţi acţiunii de conservare a biodiversităţii şi folosirii durabile a resurselor genetice la vişin, 60 de genotipuri autohtone au fost evaluate folosind o scală numerică, conform metodologiei prezentate în descriptorii IPBGR, în ceea ce priveşte unele caracteristici morfologice, biologice şi agronomice, cum ar fi utilizarea fructului, a plantei, statutul probei, perioada de maximă înflorire, epoca de maturare a fructului, forma, mărimea, culoarea pieliţei fructului, culoarea şi suculenţa pulpei, vigoarea pomului, susceptibilitatea la boli.

Cuvinte cheie: România, *Prunus cerasus* L., evaluare, germoplasmă

INTRODUCTION

Sour cherry, one of the most important fruit tree species, owing to his economical and feeding value given by the nutritive fruit quality, meets in Romania good natural environmental conditions to express his agro-biological potential. Moreover, as a matter of fact, it is believed that some of the cherries have a secondary center of genetic origin in the Black Sea surroundings, including a significant part of the Romanian territory.

The weedy or naturalized sour cherry types grow abundantly all over the country in a high genetic diversity, in different fruit tree mixed populations up to 1600 m a.s.l.. So, tart cherry is a traditional crop in Romania, spread extensively for commercial purpose or in home gardens, for domestic consumption.

In the past, the richness in genetic diversity gave the possibility to generations of fruit growers to select valuable individuals from weedy populations, on the basis of fruit quality. Propagation was made vegetative (by suckers) and clonally (by grafting), and most of these so called „local varieties" have names derived from their local origin (Bizighesti, Baneasa, Bucovina, Drobeta, Locale de Bistrita, Timpurii de Marculesti, Timpurii de Pitesti, Timpurii de Osoi, Topoloveni, Leordeni, De Botosani, Topologu Tulcea, Crisana, Vrancean, Satmarean, etc.).

Collecting of the new varieties was an activity made as a hobby by rich landowners, enthusiast fruit growers, monks in the abbey orchards, or dispersed in different nurseries and research centers.

MATERIAL AND METHODS

Romanian cherry genetic resources have started to be methodically collected since 1967. At present there are a total of 174 sour cherry accessions held in duplicate at the Research Institute for Fruit Growing, Pitesti – Maracineni and Fruit Research Station, Iasi.

Five sour cherry trees per genotype grafted onto mahaleb seedlings are planted in each location.

Collections contain foreign or indigenous cultivars, selections, clones, local varieties and landraces. All accessions are evaluated for morphological and biological characteristics as well as agronomic traits according to the numerical scale of IBPGR descriptors. The main tasks are to estimate commercial value and to detect the possible useful sources of valuable genes for breeding program.

At this time, the target is to systematize collected data from the two institutions like fruit use, plant use, harvest maturity, blooming time, fruit skin color, fruit shape, fruit size, juice color, fruit taste, fruit cracking susceptibility, susceptibility to diseases, check and re-examine in order to update or adjust.

Under these circumstances, to give new opportunities for conservation of cherry biodiversity and sustainable use of local genetic resources, greater attention has been paid to characterize and preliminarily evaluate 60 *ex situ* collected wild genotypes and indigenous varieties.

Descriptors Used to Evaluate *Ex Situ* Collected Cherry Genotypes (scale steps and reference cultivars)

Fruit use: 1. Scion cultivar – dessert including distilling; 2. Scion cultivar – processing including distilling; 3. Dual or multipurpose use; 4. No use

Status of sample: 1. Wild; 2. Weedy; 3. Primitive cultivar / Landrace; 4.Breeders line; 5. Advanced cultivar; 6. Unknown; 7. Other.

Virus disease status: 1. Virus disease free from quarantine pest and disease; 2.Virus disease present; 3. Not tested; 4. Free from Sharka.

Blooming period: 1. Extermely early; 3. Early; 5. Mid-season; 7. Late; 8. Very late; 9. Extremely late.

Harvest maturity: 1. Extermely early; 3. Early (Ludwigs Fruhe, Meteor korai); 5. Mid-season (Heimanns Rubinweichsel, Erdi Botermo); 7. Late (Schattenmorelle, Ujfehertoi furtos); 8. Very late (Marasca types); 9. Extremely late (later than Marasca types).

Fruit shape: 1. Kidney-shaped; 2. Flat round; 3. Round; 4. Elongate; 5. Cordate.

Fruit size: 1.Extremely small; 3. Small; 5. Medium; 7. Large; 9. Extremely large.

Fruit skin colour: 1. Yellow; 3. Vermilion on yellow ground; 4. Light red (Montmorency, Favorit); 5. Red (Erdi botermo, Ujfehertoi furtos); 7. Dark red (Schattenmorelle); 9. Black

Juice colour: 1. Colourless (Montmorency); 3. Pink (Favorit); 5. Red (Schattenmorelle); 7. Purple (Meteor korai); 8. Brown red; 9. Black red (Marasca, Zahoracka)

Juiciness: 3. Dray**;** 5. Intermediate**;** 7. Juicy.

Tree vigor: 3. Weak (Kelleris 14); 5. Medium (Schattenmorelle); 7. Strong; 9. Extremely strong (Koroser).

Susceptibility to *Monilia laxa* : 1. None; 2. Very low - Erdi Jubileum; 3. Low - Erdi Botermo, Ujfehertoi furtos; 5. Intermediate - Schattenmorelle; 7. High - Montmorency; 9. Extremely high.

Susceptibility to *Blumeriella jaapii*: 1. None; 2. Very low - Csengodi; 3. Low - Meteor Korai, Montmorency; 5. Intermediate; 7. High - Schattenmorelle, Erdi Botermo, Pandy, Crisana; 9. Extremely high.

RESULTS AND DISCUSSIONS

As a first benefit of characterization and evaluation of at the time available germplasm fond, between 1950 – 2005, was facilitation of the knowledgeable use of different genitors in more than 300 cross combinations, from which over 8,000 seedlings were obtained and 10 new varieties as Bucovina, Nana, Dropia, Satmarean, Tarina, Timpurii de Cluj, Ilva, Pitic, Rival, Amada were released, (Budan et al., 2006). Certainly, in the breeding work have been used in the overwhelming scale foreign varieties but also, often, Crisana or Mocanesti a indigenous old cultivars and some advanced new breed Romanian cultivars as Satmarean, Dropia, Timpurii de Cluj, Rival, Tarina. Advanced selection made

between multitude indigenous local biotypes, with large fruit, red fruit and juice color, high juiciness, early harvest maturity, prevalent sour cherry taste and flavor, grown by amateurs for domestic purposes, especially for traditional delicious sweets, jam or alcoholic drinks making, gave the possibility for releasing and registering of an other 7 new varieties, recognized at the national level, as Timpurii de Pitesti, Timpurii de Osoi, Crisana 2, Mocanesti 16, Vrancean, Scuturator and De Botosani.

Evaluation made on 60 accessions, over several years, shows the great diversity of some morphological, biological and agronomical traits as blooming period, time of harvest maturity, fruit shape, size and skin color, juiciness and juice color, tree vigor, susceptibility to *Monilia laxa* (Aderh et. Ruhl) and *Blumeriella jaapii* (Rehm) Arx.

Table 1

Evaluation of some native sour cherry genotypes from the Romanian national germplasm

Genotype	Fruit use	Collection site*	Status of sample	Virus disease status	Blooming period	Harvest maturity	Fruit shape	Fruit size	Fruit skin color	Juice color	Juiciness	Tree vigor	Susceptibility to Monilinia laxa	Susceptibility to Blumeriella japii
Baneasa 4/2	3	I	4	3	5	5	4	5	5	3	5	6	7	5
Baneasa 6/26	3	I	4	3	5	5	4	5	5	3	5	5	5	5
Baneasa 44/7	3	P,I	7	3	5	5	3	5	5	5	6	6	7	3
Baneasa 6/26	3	I	4	3	5	5	4	5	5	3	5	5	7	5
Bizighesti	3	P,I	3	3	5	5	2	5	5	5	5	5	5	3
Breznita	3	P,I	3	3	5	5	2	5	5	5	5	5	5	7
Bucovina	3	P	4	3	5	5	2	5	5	5	6	5	7	7
Crisana 11/6	3	I	4	3	7	7	2	9	7	8	5	7	5	5
Crisana 15/10	3	P	4	3	7	7	2	9	7	8	5	7	5	5
Crisana 15/20	3	I	4	3	7	7	2	9	7	8	5	7	5	5
Crisana 2	3	P	4	3	7	7	2	9	7	8	5	7	5	5
Crisana Cluj	3	P	4	3	7	7	2	9	7	8	5	7	5	5
Crisana Nazarcea	3	I	4	3	7	7	2	9	7	8	5	7	5	5
De Botosani	3	I	5	3	6	7	2	9	7	5	5	7	3	5
Drobeta	3	P,I	5	3	5	5	2	3	5	5	5	5	5	5
Dropia	3	P	5	3	5	5	2	5	7	9	3	5	5	7
Focsani 3	3	PI	4	3	5	5	4	7	5	5	5	5	5	5
HV 12/105	3	P	4	3	5	5	2	5	5	5	5	5	5	5
HV 13/21	3	P	4	3	3	5	3	7	7	5	5	5	5	5
HV 47/11	3	P	4	3	5	5	4	9	5	3	7	5	3	3
HV 45/40	3	P	4	3	3	3	3	9	7	8	5	7	3	2
HV 43/32	3	P	4	3	3	3	3	9	7	8	5	7	3	2
Japonica	3	P	4	3	5	7	3	9	7	8	5	7	5	5

Ilva	3	P,I	5	3	5	7	2	5	7	9	5	5	7	5
Leordeni	3	P	3	3	7	5	2	9	5	3	6	7	5	5
Locale de Bistrita	3	P,I	3	3	7	7	2	9	5	5	5	7	5	5
Marculesti 33/20	3	I	4	3	3	4	2	7	5	3	7	6	5	5
Mari timpurii	1	P	5	3	3	3	3	8	5	3	7	6	3	3
Mari timpurii cl.11	1	P	4	3	5	3	2	7	5	3	7	5	3	3
Mari timpurii cl. 93	1	P	4	3	5	3	2	7	5	3	7	5	3	5
Marculesti 33/13	3	P,I	4	3	5	7	4	3	5	9	5	5	7	5
Marculesti 33/21	3	P,I	4	3	7	7	4	3	5	5	5	5	7	5
Marculesti 4 Vie	3	P	4	3	7	5	2	3	5	5	5	5	4	5
Mocanesti 104/24	3	I	4	3	5	5	2	5	5	5	5	5	5	5
Mocanesti 15/2	3	P	4	3	3	5	2	5	5	5	5	5	5	5
Mocanesti 16	3	P,I	4	3	5	5	2	7	5	3	5	5	5	5
Mocanesti 10/24	3	I	4	3	3	5	2	5	5	3	5	5	5	5
Mocanesti 32/20	3	I	4	3	3	5	2	5	5	3	5	5	5	5
Mocanesti 6/7	3	I	4	3	3	5	2	5	5	3	5	5	5	5
Nana	3	P,I	5	3	5	5	2	5	5	5	5	5	7	7
Pitic	3	P,I	5	3	9	9	4	3	5	3	5	1	5	7
P 1 Vie	3	P	3	3	5	5	3	7	7	5	5	7	5	5
Rival	3	P	5	3	5	6	4	7	6	5	7	6	8	5
Selectie Cotea	3	I	3	3	3	4	3	5	5	5	6	5	5	5
Satmarean	3	P	5	3	6	3	2	5	5	9	7	5	7	5
Scuturator	3	P,I	5	3	5	5	2	7	7	5	5	5	5	5
Suraia	3	P,I	3	3	6	5	2	5	5	9	5	5	5	3
Targu Jiu 200	3	P,I	4	3	7	7	4	7	5	3	6	8	5	5
Targu Jiu 401	3	I	4	3	7	7	2	9	5	3	6	7	5	5
Targu Jiu 404	3	P,I	4	3	7	7	4	7	5	5	6	6	5	5
Targu Jiu 505	3	I	4	3	7	7	2	9	5	3	6	7	5	5
Timpurii de Cluj	3	P,I	5	3	3	4	2	7	5	5	5	7	3	3
Timpurii de Marculesti	3	P,I	4	3	3	3	2	3	5	5	7	5	5	5
Timpurii de Osoi	3	I	5	3	4	3	2	5	7	5	5	5	5	5
Timpurii de Pitesti	3	P,I	5	3	4	3	2	5	5	5	5	5	5	5
Topologu Tulcea	3	P,I	3	3	3	5	2	5	5	5	6	5	5	5
Topoloveni 6	3	P	3	3	6	7	2	6	5	5	6	6	5	3
Turcesti	3	P,I	5	5	5	7	5	5	5	5	5	5	5	5
Tarina	1	P,I	5	3	4	3	4	5	7	5	5	5	5	5
Vrancean	3	P,I	5	3	7	7	2	5	5	5	5	3	5	7

**P = Research Institute for Fruit Growing, Pitesti*
I = Fruit Research Station, Iasi

Obtained results, as level of numerical scale for descriptors evaluation, range from 3 (Marculesti 33/20, Mari timpurii, Timpurii de Cluj, Timpurii de Marculesti cvs.) to 9 (Pitic cv.), for "blooming period" from 3 (Mari timpurii clones, Tarina, Timpurii de Marculesti, Timpurii de Osoi, Timpurii de Pitesti

cvs.) to 9 (Pitic cv.), for “harvest maturity” from flat round to elongate, for “fruit shape” from 3 (Drobeta, Marculesti 33/13, Marculesti 33/21, Marculesti 4 vie, Pitic, Timpurii de Marculesti cvs.) to 9 (Crisana clones, Leordeni, Locale de Bistrita, Tg. Jiu 401, Tg. Jiu 505 cvs.), for “fruit size” from red to dark red for “fruit skin color”, from pink to black red for “juice color”, from 3 (Dropia cv.) to 8 (Timpurii de Pitesti, Timpurii de Marculesti, Marculesti 33/20 cvs.), for “juiciness” from 1 (Pitic cv.) to 7 (Leordeni, Locale de Bistrita, Tg. Jiu 401, Tg. Jiu 505 cvs.).

Low susceptibility to *Monilia laxa* (Aderh et. Ruhl) was shown by De Botosani, HV 47/11, HV 45/90, HV 43/32, Timpurii de Cluj, Mari timpurii cl. 1, Mari timpurii cl.2 and P1 Vie genotypes. Observations made on Băneasa 44/7, Bizighesti, HV 45/40, HV 47/11, HV 43/32, Timpurii de Cluj, Mari timpurii cl. 1, Mari timpurii cl. 2, P1 Vie, Suraia and Topoloveni 6 accessions lead to the same level of evaluation concerning the susceptibility to *Blumeriella jaapi* (Rehm) Arx.. As “plant use”, all genotypes are of “dual or multipurpose use”.

Collected data offer new possibilities to select valuable genotypes useful by their characteristics for breeding program and also to register other interesting local landraces with fruit of quite importance to domestic market.

Unfortunately, the lack of coordination and limited financial support means that only limited results have been achieved in recent years.

At present, germplasm is preserved only by the research institution’s efforts, no other governmental or non-governmental organizations being involved, excepting, from time to time, some insignificant financial support given by short term research projects. Also, for weedy sour cherry trees, very common in some Romanian geographic area, there is no funding to support a national program or research projects for identification, evaluation, collection and *ex situ* conservation of these natural biodiversity, endangering and dramatically decreasing for the future the disposable native genetic resources. So, to avoid further losses, development of a national strategy and governmental and/or international financial support for cooperation program or research projects regarding the enhancement of germplasm by exploration and selection of natural and semi-natural ecotypes and agro-types, followed by *ex situ* preservation and complex evaluation of the most valuable native genotypes is required.

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