

# CONTRIBUTIONS TO THE IMPROVEMENT OF THE ROUMANIAN PEAR VARIETIES IN THE PAST 10 YEARS

## CONTRIBUȚII LA ÎMBUNĂȚĂȚIREA SORTIMENTULUI DE PĂR DIN ROMÂNIA ÎN ULTIMII 10 ANI

*MILITARU Madalina<sup>1</sup>, BRANIȘTE N.<sup>1</sup>, SESTRĂȘ Adriana<sup>2</sup>, ANDREIEȘ N.<sup>3</sup>, BUTAC Mădălina<sup>1</sup>, STANCIU Cosmina<sup>4</sup>*

<sup>1</sup>Research Institute for Fruit Growing Pitesti

<sup>2</sup>Research Station for Fruit Growing Cluj-Napoca

<sup>3</sup>Research Station for Fruit Growing Voinesti

<sup>4</sup>The State Institute for Variety Testing and Registration

**Abstract.** *In Romania the pear genetic breeding program started in 1950 has been focused on obtaining varieties with a high yielding potential, top fruit quality, tolerance / resistance to the disease and specific pest, late ripening season and fruit good storage. Therefore, following the hybridizations carried on at the Research Institute for Fruit Growing Pitesti, Research Station for Fruit Growing Cluj and Research Station for Fruit Growing Voinesti, 13 new varieties with a wide range of ripening (from early June to late March-April) were developed. These cultivars are listed in the Romanian Official Catalogue of Varieties and Hybrids Crop Plants. This paper describes the particular characteristics of these varieties: Virgiliu hibernal, Jubileu 50, Milenium, Roșioară de Cluj, Arvena, Meda, Latina (at RSFG Cluj), Corina, Orizont, Tudor, Romcor (at RSFG Voinesti), Ervina, Paramis (at RIFG Pitesti).*

**Key words:** varieties, pear, characteristics

**Rezumat.** *Programul de ameliorare genetică a părului, început în România încă din anul 1950, și-a orientat eforturile spre obținerea de soiuri cu potențial de producție ridicat, calitate superioară a fructelor, toleranță / rezistență la bolile și dăunătorii specifici, maturare târzie și capacitate bună de păstrare a fructelor. Prin lucrările de ameliorare efectuate la Institutul de Cercetare – Dezvoltare pentru Pomicultură Pitești, Stațiunea de Cercetare – Dezvoltare pentru Pomicultură Cluj și Stațiunea de Cercetare – Dezvoltare pentru Pomicultură Voinesti s-a realizat un conveer de soiuri cu maturarea fructelor de la foarte timpurie (începutul lunii iunie) până la foarte târzie (martie - aprilie), în ultimii 10 ani fiind înscrise în Catalogul Oficial al Plantelor de Cultură 13 noi soiuri. Lucrarea prezintă principalele caracteristici ale acestor soiuri: Virgiliu hibernal, Jubileu 50, Milenium, Roșioară de Cluj, Arvena, Meda, Latina (Cluj), Corina, Orizont, Tudor, Romcor (Voinesti), Ervina, Paramis (Pitești).*

**Cuvinte cheie:** soiuri, păr, caracteristici

## INTRODUCTION

The pear is a valuable and important fruit species owing to the productive characteristics of trees, fruit taste as well as their nourishing and therapeutic quality (Sestraș, 2004). In Romania, the studies of pear genetic breeding have a

long tradition, the first hybridizations being performed at the beginning of the 20th century (Cociu, 1992, 1999). The general objectives were similar to those worldwide with a major and continuous concern for improving the yielding potential of the varieties and increasing the fruit quality (Braniște, 2007; Budan, 2002). Starting with the 1960's, the research was focused on the development of varieties with genetic resistance to diseases like *Erwinia amylovora*, *Venturia pirina* and pests (*Psylla* sp.). The Romanian genetic breeding program knew a large advancement after 1968, following the breeding work carried out at the Research Stations Voinești – Dâmbovița by Gh. Moruju, R. Thiesz, N. Andreieș, Cluj – Napoca by M. Străulea, V. Ghidra and at Research Institute for Fruit Growing Pitești by N. Braniște (Andreieș, 1993).

This paper is a synthesis of the objectives and pear breeding work finalized by developing 30 new autochthonous cvs. of which 13 ones registered in the past 10 years, reaching a wide range marketing from very ripening cvs. (June) to very late ripening cvs. (March - April). (ISTIS Catalogue, 2009).

## MATERIAL AND METHOD

The biological material involved in the hybridizations included a rich genetic fund: *Pyrus* species, autochthonous and foreign varieties, clonal selections, interspecific and intraspecific hybrids.

The fundamental method used to obtain a genetic variability necessary to selection and development of the new varieties was the cross pollination between the best available parents. Due to a strong heterozygosity of the most pear varieties following the controlled hybridization resulted a great number of new genic recombinations, which is phenotypically demonstrated as early as F1 generation. To improve the fruit quality, interspecific hybridizations were performed using very good genitors in the crossing like „the best” cv. with „the best” cv. Also, interspecific crosses between *P. communis* and nashi pears (*P. pyrifolia*) were done to combine the flavour of the European pears with the firm and crispy flesh of the Asian pears. For resistance to *Venturia pirina* and *Psylla* sp. the interspecific hybridization method was used according to the scheme: valuable cv. x *Pyrus serotina*, followed by backcrossings until F4 progeny was obtained.

## RESULTS AND DISCUSSIONS

To provide a great deal of breeding material with a high genetic diversity within the pear genetic breeding, cross pollinations were done as follows: 600,000 flowers at Research Station for Fruit Growing Voinești, 250,000 flowers at Research Station for Fruit Growing Cluj and 300,000 at Research Institute for Fruit Growing Pitești. Of the hybrid seeds resulted, thousands of hybrids were obtained of which new valuable genotypes were selected both for the commercial and breeding utilizations. To reach the objectives of the breeding program, there were used as gene resources, *Pyrus* species, autochthonous and foreign varieties listed in table 1.

Table 1

## Gene sources used in the pear genetic breeding

No.	Breeding objective	Gene sources
1.	Resistance to <i>Erwinia amylovora</i>	<ul style="list-style-type: none"> <li>• <i>P. communis</i> x <i>P. pyrifolia</i> (Bell, 1990)</li> <li>• Magnes, Monterey, Moonglow, Orient, Tyson, Old Home, Farmingdale, Maxine, Waite, Le Conte (Van der Zwet, 1982; Quamne, 1982)</li> <li>• Dawn, Harbin, Harrow Delight, Garber, Ba Li Hsiang, Chien Pa Li, Huang Sui Li, Hung Guar Li, Ta Tau Huang, Decana Krier, Galbene, Pere de iarna, Pere gutui, Tămăioase de Călinești (Cociu et al., 1999)</li> <li>• Mac (Bell et al., 1982; Braniste and Andreieș, 1990)</li> </ul>
2.	Resistance to <i>Venturia pirina</i>	<ul style="list-style-type: none"> <li>• <i>P. ussuriensis</i>, <i>P. pyrifolia</i>, <i>P. x bretschnederi</i> (Braniste and Rădulescu, 1994)</li> <li>• Williams, Conference, Dr. Jules Guyot (Bell, 1990)</li> <li>• Contesa de Paris, Decana de iulie, Timpurie de Trevaux, Triomphe de Vienne, Madame Levavasseur, Jeanne d'Arc, Notair Lepin, Starking Delicious, Republica, Euras, Argessis, Maria Romana (Braniste and Andreieș, 1990; Cociu et al., 1999)</li> </ul>
3.	Resistance to <i>Micosphaerella sentina</i>	<ul style="list-style-type: none"> <li>• Conference, Doyenne de Comice, Bonne Louise d'Avranche (Cociu et al., 1999)</li> </ul>
4.	Resistance to <i>Psylla</i> sp.	<ul style="list-style-type: none"> <li>• <i>P. betulaefolia</i>, <i>P. calleryana</i>, <i>P. fauriei</i>, <i>P. ussuriensis</i>, <i>P. x bretschnederi</i>, <i>P. nivalis</i>, <i>P. ussuriensis</i> x <i>P. communis</i>, <i>P. eleagrifolia</i> x <i>P. communis</i> (Bell, 1990)</li> <li>• Honeysweet, Sierra, Tait Dropmore, Philip, John, Ure (Braniste and Andreieș, 1990)</li> <li>• Krupna Bursusus, Zielinka, Karamanka, Jerisbasma, Vodenjac (Bell, 1992, 2003)</li> </ul>
5.	Hardiness	<ul style="list-style-type: none"> <li>• <i>P. communis</i>, <i>P. ussuriensis</i>, <i>P. pyrifolia</i> (Bell, 1990)</li> <li>• David, John, Peter, Philip, Pioneer 3, Andrew, Thomas, Simon, Hanson Seedless, Harbin (Stushnoff and Garley, 1982)</li> </ul>
6.	Tree low vigour and fruiting spurs	<ul style="list-style-type: none"> <li>• <i>P. serotina</i> x <i>P. communis</i> (Cociu et al., 1999)</li> <li>• Beurre Papa Lafosse, Beurre Rance, Girogile, Marguerite Marillat, Abundent, Packham's Triumph, Grand Champion, Berenthal, Beurre Hardenpont, Beurre Durondeau, Conference (Alston, 1982; Ardelean, 1986; Ghidra et al., 2001)</li> </ul>
7.	Late blooming	<ul style="list-style-type: none"> <li>• <i>P. luxemburgiana</i> (Cociu et al., 1999)</li> <li>• Frangipane, Double de Guerre, Jeanne d'Arc, Gorham, Doyenne du Comice, Favorita lui Clapp, Beurre Bosc, Napoca (Alston, 1982; Nyeki, 1982; Thibault, 1982; Cociu, 1999)</li> </ul>
8.	High yield	<ul style="list-style-type: none"> <li>• Santa Maria, Williams, Dr. Lucius, Cedrata romana, Cure, Napoca, Republica (Cociu et al., 1999)</li> </ul>
9.	High content in vitamin C	<ul style="list-style-type: none"> <li>• Alexandre Lucas, Thompson, President Drouard, Matya, Moonglow, Beurre Starckmans, Doyenne Goubolt (Braniste and Rădulescu, 1994; Cociu et al., 1999)</li> <li>• Beurre precoce Morettini, Beurre Hardy, Bonne Louise d'Avranche, Haydeea (Sestraș et al., 2002)</li> </ul>
10.	High content in sugar	<ul style="list-style-type: none"> <li>• Triomphe de Jodoigne, President Carnot, Beurre d'Anjou, Bergamotte Esperen, Notair Lepin, Grand Champion (Braniste and Rădulescu, 1994; Cociu et al., 1999)</li> </ul>

		<ul style="list-style-type: none"> <li>• Doyenne d'Hiver, Contesa de Paris, Beurre Hardy, Haydeea, Williams, Beurre precoce Morettini (Sestraş et al., 2002)</li> </ul>
11.	Nice fruit taste	<ul style="list-style-type: none"> <li>• Highland, Beierschmidt, Delbarexquise d'hiver, Graslin, Napoca, Untoasa de Geoagiu, Argessis (Branişte and Rădulescu, 1994)</li> <li>• Passe Crassane, Olivier de Serres, Josephine de Maline, Williams, Conference (Cociu et al., 1999)</li> </ul>
12.	Good storage	<ul style="list-style-type: none"> <li>• Păstrăvioare, Delbarexquise d'hiver, Pere de mai, Republica, Euras, Olivier de Serres (Cociu et al., 1999)</li> </ul>

Presently, as a result of over 50 years of continuous work there is an adequate material basis including a various germplasm fund in terms of the potential gene sources (350 accessions at Voineşti, Cluj and Piteşti), hundreds of hybrid plants in the selection fields as well as promising selections in the trial microfields. The successful results are obviously if we take into account the 30 new autochthonous varieties listed in the Romanian Official Catalogue of Varieties and Hybrids Crop Plants, of which 13 ones were registered in the past 10 years (table 2). Thanks to their valuable agronomic characteristics it worth to be mentioned the following varieties: Meda (fig. 1a.), Latina (fig. 1b.), Roşioară de Cluj (fig. 1c.), Arvena (fig. 1d.), Ervina (fig. 1e.), Corina (fig. 1f.).

Table 2

Pear varieties registered between 2000-2009

No.	Variety	Parents	Maintainer and registration year	Major characteristics
0	1	2	3	4
1	Arvena	Triomphe de Vienne (p.n.)	SCDP Cluj 2007	- autumn cv. - high yield
2.	Corina	Interspecific hybrid F3	SCDP Voineşti 2003	- tolerant to <i>Psylla</i> sp. and <i>Erwinia amylovora</i>
3.	Ervina	Interspecific hybrid F2	ICDP Piteşti 2003	- late blooming - good storage capacity
4.	Jubileu 50	Napoca x Beurre precoce Morettini	SCDP Cluj 2003	- special taste quality
5.	Latina	Cj 20-4-3 X Comtesse de Paris	SCDP Cluj 2009	- autumn cv. - high yield
6.	Milenium	CJ 16-4-12 X Comtesse de Paris	SCDP Cluj 2003	- good storage
7.	Meda	V 53-15-3 X Comtesse de Paris	SCDP Cluj 2009	- nice marketing appearance - special taste quality
8.	Orizont	Interspecific hybrid F3	SCDP Voineşti 2003	- scab resistant - tolerant to fire blight and <i>Psylla</i> sp. - good storage capacity

0	1	2	3	4
9.	Paramis	Monica x Passe Crassane	ICDP Pitești 2008	- bear precocity - good taste
10.	Roșioară de Cluj	Red Williams x Untoasă Giffard	SCDP Cluj 2005	- bear precocity - scab tolerant - high sugar content
11.	Romcor	Interspecific hibrid F4	SCDP Voinești 2009	- good storage - resistance to scab and fire blight
12.	Tudor	[(P. Serotina x D. d'hiver) x Passe Crassane] x TN 30-44 Angers	SCDP Voinești 2007	- good storage - scab resistance - <i>Psylla</i> sp. tolerance
13.	Virgiliu hibernal	Passe Crassane x Comtesse de Paris	SCDP Cluj 2000	- good storage - good taste



a) Meda cv.



b) Latina cv.



c) Roșioară de Cluj cv.



d) Arvena cv.



e) *Ervina* cv.



f) *Corina* cv.

Fig. 1 (a-f). Pear varieties registered between 2000-2009 (original photo)

## CONCLUSIONS

1. The new pear varieties developed at Cluj-Napoca, Voinești and Pitești have enriched the Romanian range of varieties.
2. The breeding work and development of new cultivars are encouraged by a further need of having high quality fruit in accordance to the consumer requirements, to provide fresh fruit to the market throughout the year and to use at the most the pedoclimatic conditions specifically to each growing area.

## REFERENCES

1. **Andreieș N.**, 1993 - *Hibridi de păr rezistenți la Venturia pyrina și Psylla sp. obținuți la Voinești*. Lucrări științifice ICDP Pitești-Mărăcineni vol. XVI, Pitești: 71-76.
2. **Braniște N., Budan S., Mădălina Butac, Mădălina Militaru**, 2007 - *Soiuri de pomi, arbuști fructiferi și căpșuni create în România*. Editura Paralela 45: 106 - 132.
3. **Budan S., Braniște N.** - 2002. *Prezent și perspective în ameliorarea speciilor pomicole*. Lucrări sesiune științifică ASAS „Concepții moderne în cercetarea horticolă românească”: 41 - 49.
4. **Cociu V., Braniște N., Roman R., Micu Chiriacula, Budan S., Popescu A., Popescu Irina, Drăgoi D.**, 1992 - *Cercetări privind modernizarea sortimentului de plante pomicole*. Lucrări științifice ICDP Pitești-Mărăcineni „25 de ani de cercetare în pomicultură”: 6 – 39.
5. **Cociu V.**, 1999 - *Progrese în ameliorarea plantelor horticole din România*. Editura Ceres: 51-65.
6. **Ghidra V., Ileana Chiș, Sestraș R., Mariana Dejeu**, 2004 - *Pear varieties and selections, with extra-early and early ripening, obtained at the Fruit Research Station Cluj*. Not. Bot. Hort. Agrobot., Cluj: 48-51.
7. **Sestraș R.**, 2004 - *Ameliorarea speciilor horticole*. Ed. AcademicPres: 128 – 164.
8. \*\*\*\*\* *Catalogul oficial al soiurilor de plante de cultură din România pentru anul 2009*. București: 44