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## NEW BREEDING RELEASES FROM THE RESEARCH INSTITUTE FOR FRUIT GROWING, PITEȘTI

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### Abstract

*The apple, pear, plum and cherries breeding program was started at the Research Institute for Fruit Growing, Pitesti, in 1967, with the constant main goal to release new varieties of superior characteristics than the already existing ones. During this period of time, specific objectives have been established for each particular species according to their agrobiological particularities and technological progress, increasing the available genefund and knowledge accumulation. This article presents a synthesized overview of the objectives and breeding activities developed in the last years, which afforded registration of new cultivars. In addition, it provides the description of their main biological characteristics and technological particularities.*

**Key words:** new cultivars, apple, pear, plum, cherries.

### INTRODUCTION

According to the specific breeding objectives for each particular species, over the last decade, new varieties have been released, with superior characteristics than the already existing ones in the commercial Romanian fruit growing, as a result of constant selection and evaluation of apple, pear, plum and cherries performed at the Research Institute for Fruit Growing, Pitesti. This article presents a synthesized overview of the objectives and breeding activities developed over the last years at the institute, as well as some of the most recently released cultivars.

### MATERIAL AND METHOD

Over the last years, the sour cherry varieties have been researched for according to the specific characteristics of each fruit species, specific breeding objectives as fruit quality (taste, firmness, juiciness, commercial appearance), combination of functionally different major resistance genes to scab (*Venturia inaequalis*), tolerance to powdery mildew (*Podosphaera leucotricha*), storage maintaining and shelf life extension for apple; resistance to fire blight (*Erwinia amylovora*), tolerance to *Psylla* sp., late ripening, fruit quality and high yielding for pear; early or late

fruit ripening, high yielding, high fruit quality for the fresh market or processing (drying, compotes, jams), spur fruiting, tolerance to PPV (*Plum Pox Virus*) and self fertility for plum; extension of harvesting season (early and late ripening cultivars), tolerance to leaf spot (*Blumeriella jaapii*) and brown rot, high productivity, fruit quality and cracking resistance for sweet cherry; self fertility, red colored fruit (skin, flesh, juice), tolerance to leaf spot and brown rot, upright or spreading tree habit, small and spherical stone shape and high yielding capacity [1, 2, 3, 4, 5].

The annual breeding activity consisted in seven cross pollinations, about 3,500 blossoms pollinated by conventional methods, 1,000 seedlings, first evaluation of 8,000 seedlings, second evaluation of 50 selections for apple; 5 cross pollinations, 2,000 blossoms pollination, 400 seedlings, first evaluation of 1,500 seedlings, second evaluation of 20 selections for pear; 20 cross pollinations, 4,000 flowers pollination, 400 seedlings, first evaluation of 5,000 seedlings, second evaluation of 60 selections for plum; 10 cross pollinations, 8,000 flowers pollination, 200-500 seedlings, first evaluation of 3,000 seedlings, second evaluation of 40 selections for sweet cherry; 10 cross pollinations, 9,000 flowers pollination, 600-1,000 seedlings, first evaluation of 4,500

seedlings, second evaluation of 40 selections for sour cherry.

For each species, the main varieties used as genitors in cross combination, in relationship with breeding objectives, are showed in tables 1, 2, 3, 4 and 5 [6].

Table 1. Genitors used in the apple breeding

| Fruit quality   | Resistance to scab   | Resistance to <i>Podosphaera leucotricha</i>   | Storage maintaining and shelf life extension   |
|---|--|--|--|
| Jonathan<br>Golden<br>Delicious<br>Gala<br>Idared<br>Frumos de<br>Voinesti<br>Falstaff<br>Pinova<br>Rebra | Prima<br>Florina<br>Pionier<br>Romus 4<br>Rebra<br>Ariwa<br>Ariane<br><i>Malus floribunda</i><br>821<br><i>Malus kaido</i><br><i>Malus robusta</i><br>MAL 59/9 | <i>Malus robusta</i><br>MAL 59/9<br><i>Malus zumi</i><br><i>Malus kaido</i><br>White Angel | Delicios de<br>Voinesti<br>Idared<br>Wagener<br>Granny Smith<br>Goldrush<br>Enterprise |

Table 2. Genitors used in the pear breeding

| Resistance to <i>Erwinia amylovora</i>                                     | Tolerance to <i>Psylla</i> sp.                                    | Fruit quality   | Late ripening and self life  | High productivity  |
|--|---|---|--|--|
| <i>Pyrus serotina</i><br>Kieffer seedling<br>H 20-5-70<br>Pitesti<br>Euras | Honeysweet<br>Imperiale<br>Severianka<br>Tse Li<br>Chang Pa<br>Li | Beurre<br>Bosc<br>Beurre<br>Hardy<br>Williams<br>Abate<br>Fetel<br>Monica<br>Argessis | Passe<br>Crassane<br>Comtesse<br>de Paris<br>Cure<br>Doyenne<br>d'hiver<br>Euras | Napoca<br>Haydeea<br>Abate Fetel<br>Packham's<br>Triumph |

Table 3. Genitors used in the plum breeding

| Tolerance to PPV   | High yield                                    | Good quality                                | Diferent ripening time  | Self fertility   |
|--|---|---|---|--|
| Grase de<br>Beetz<br>Boambe de<br>Leordeni<br>Ontario<br>Wilhelmina<br>Spath | Stanley<br>Anna<br>Spath<br>Grase de<br>Beetz | Tuleu gras<br>Centenar<br>Ontario<br>Vision | <i>Earlyness</i><br>Early Rivers<br>Ruth Gerstetter<br>Diana<br>Ialomita<br><i>Lateness</i><br>Anna Spath<br>Vinete romanesti<br>Valor<br>President | Stanley<br>Anna<br>Spath<br>Ialomita<br>Cacanska<br>Lepotica |

Table 4. Genitors used in the sweet cherry breeding

| Harvesting season extension  | Self fertility                                   | Fruit quality   | Tolerance to leaf spot and brown rot        | Improving fruit cracking resistance         | Low vigour  | High yield                        |
|--|--|---|---|---|---|-----------------------------------|
| Big. Burlat<br>Early Rivers<br>Spectral<br>Sublim<br>Sam<br>Skeena<br>Kordia<br>George<br>Hudson | Stella<br>Newstar<br>Sunburst<br>Lapins<br>Maria | Summit<br>Ring<br>Hedelfinger<br>Germersdorf<br>Van<br>Superb<br>Ulster | Viscount<br>Gedelfinger<br>Big.<br>Napoleon | Kristin<br>Kordia<br>Lapins<br>Early Rivers | Cerna<br>Van<br>compact<br>Stella<br>compact<br>Lambert<br>compat | Daria<br>Van<br>Superb<br>Kristin |

Table 5. Genitors used in the sour cherry breeding

| Self fertility   | Red colored fruit   | Tolerance to leaf spot and brown rot fruit                                   | Upright or spreading tree habit   | High yielding capacity   |
|--|---|--|---|--|
| Schattenmorelle<br>Nana<br>Oblacinska<br>Vladimirskaia | Heimans<br>Rubin<br>Rival<br>Schatten<br>morelle<br>Sumadinka | Spanka<br>Griot<br>Moscovski<br>Anglaise Hative<br>Mari timpuri<br>Northstar | Heimanns<br>Konserven<br>Erdi Nagy<br>Tarina<br>Anglaise Hative<br>Eugenia<br>Montmorency | Schatten<br>morelle<br>Spaniole<br>Oblacinska<br>Nana<br>Sumadinka<br>Ilva<br>Ludwigs<br>fruhe |

## RESULTS AND DISCUSSIONS

During the last eight years, five new apple varieties, four pear, three plum, four sweet cherry and two sour cherry have been registered, as shown below.

### Apple [1, 2]

NICOL, columnar scab field resistant variety with mid sized (138 g) red coloured fruit; good testing quality (flesh is moderately firm, juicy, fine texture of yellowish colour); harvesting season is in the first decade of September (can be stored until January); low tree vigor; was released in 2005, from a Mc. Intosh Wijcik x Pionier cross combination.

COLMAR, columnar scab field resistant variety with mid sized (135 g) red skin fruit; good testing quality; storage until January; low tree vigor; was released in 2006, from a Mc. Intosh Wijcik x Florina cross combination.

COLONADE, columnar scab field resistant variety with large (150 g) red skin coloured fruit; good testing quality; low tree vigor; harvesting season in the second decade of September (storage till January); was released in 2007, from a Florina x Mc. Intosh Wijcik cross combination.

RUSTIC, field tolerant to scab and powdery mildew variety with attractive, mid sized (130-160 g) fruit; spherical, slight flat shape; green coloured skin covered by red on the sunny side; white flesh, juicy, crispy and good eating qualities; harvesting time in the late September (can be stored till March); was released in 2008, from a Florina x Pionier cross combination.

REBRA, scab tolerant variety with mid sized (145-160 g) fruit; green coloured skin covered by red on the sunny side; good taste; harvesting season in the first decade of September (can be stored till February); was

released in 2003, from a Prima x Florina cross combination.

**Pear** [1, 2, 5]

PARAMIS, winter maturing variety with tree of a mid vigour and good grafting affinity with Quince A rootstock; comes into bearing in the 3<sup>rd</sup> year after planting; medium to large sized (180-200 g) fruit, globulous-conic shaped, yellowish-green skin coloured; white buttery flesh; good taste; harvesting season in the end of September (can be stored till January); was released in 2008, from a Monica x Passe Crassane cross combination.

PARADOX, variety of a medium tolerance to fire blight and *Psylla* sp. with medium sized (160 g) fruit; yellowish skin; white, crisp, juicy flesh; good flavor; harvesting season in the end of September (can be stored till February); was released in 2009, from a Monica x Pastravioare cross combination.

PARADISE, tolerant to fire blight and *Psylla* sp. variety with attractive, mid sized (130-150 g) red skin coloured fruit and white, juicy flesh; harvesting season in the end of September (can be stored till January); was released in 2010, from H 26-67-76 P x Pastravioare cross combination.

ISADORA, winter maturing variety, tolerant to *Psylla* sp., mid sized (120 g), yellowish-green skin coloured, white, crisp flesh; harvesting season in the first decade of October (can be stored till April); was released in 2012, from Haydeea x Tse Li cross combination.

**Plum** [1, 2 ,4]

ROMAN, tolerant to *PPV* variety with ripening season in the first decade of August; large fruit (65 g) for fresh market use; ovoid shape; reddish-blue skin colour; yellow flesh; sweet – acid taste; semi clingstone; mid vigor tree; rare pyramidal canopy; was released in 2004, from a Tuleu Gras x Early Rivers cross combination.

AGENT, tolerant to *PPV* variety with ripening season in the end of August; mid sized fruit (35 g) for fresh market and for desiccation uses; spherical-oval shape; reddish-freckled skin colour; yellowish, sweet slightly astringent taste flesh; small free stone; mid vigor tree; was released in 2004, from an individual positive selection in a seedlings population obtained by open pollination.

ROMANTA, tolerant to *PPV* variety with ripening season in the early August; large fruit (62 g) for fresh market use; ovoid shaped; dark blue skin colour; yellowish flesh; sweet-acid taste; free stone; mid vigor tree; was released in 2012, from a Stanley x Valcean cross combination.

**Sweet Cherry** [1, 2, 3]

SUPERB, tolerant to leaf spot variety, for fresh market uses, with ripening season (in the middle of June); medium-large fruit size; cordate, smooth, symmetrical shape; shallow suture; firm, crisp in texture at optimum maturity; attractive purplish-red skin color and red flesh; good flavor and testing quality; semi freestone; medium stem length; vigorous, spreading tree's growth habit; very productive; was released in 2004, from a Boambe de Cotnari x Thurn und Taxis cross combination.

SUBLIM, tolerant to leaf spot, with early ripening season (in the end of May); medium fruit size; globosely to slightly oblate, smooth, symmetrical shape; firmness, crisp in texture, similar to Bigarreau Moreau; attractive purple skin color; red meaty flesh; subacid good eating quality; semi freestone; susceptible to rain cracking; vigorous, more upright than spreading tree's growth habit; productive; was released in 2006, from a Muncheberger fruhe x Bigarreau Moreau cross combination.

SPECTRAL, tolerant to leaf spot variety with very early ripening season (in the mid of May); medium fruit size; globosely to slightly oblate, smooth, symmetrical shape; firmness, crisp in texture, similar to Bigarreau Burlat; attractive purple color; red flesh; subacid good eating quality; semi freestone; short stem; susceptible to rain cracking; vigorous, spreading tree's growth habit; was released in 2008, from a Muncheberger fruhe x Bigarreau Burlat cross combination.

SPECIAL, valuable biotype of intensely specific bitter taste (still prevalent in the full maturity) cherry from the spontaneous flora, of mid season ripening time (second decade of June), moderate yielding, with large fruits (22 mm / 6g); kidney shape;); small, round, non-adherent to the fruit pulp kernel (0.45g); black-red skin, pulp and juice; firm and juicy pulp; high value of soluble solids (18 °Brix); 0.6% total acidity; 11.85% total glucides; 12.7 mg%

ascorbic acid; was registered as a crop variety in 2012, to be cultivated by the amateur fruit-growers for domestic use or even for the commercial purpose of processing in the food industry as homeland product (jam and cherry alcoholic drink) with particularly aroma, sweet and bitter taste.

#### **Sour Cherry [1, 2]**

RIVAL, self fruitful variety with ripening season at the end of the second decade of June; medium fruit size; roundish-oblate shape; dark red skin color; red flesh; red juice; acid taste; good canning, jam and juice processing qualities; semi-clingstone; medium pit size; medium-long stem; medium vigorous, upright to spreading but not weeping tree growth habit; very good fruiting system with good differentiation of leaf buds; very high yielding; moderate leaf spot susceptibility and slight high to brown rot fungus; was released in 2004, from a Griot Moscovski x Nana cross combination.

STELAR, partial self fruitful variety with early ripening season (in the first decade of June); large fruit size; roundish-oblate shape; dark red skin color; pink-red flesh; pink-red juice; sub-acid taste; good processing quality for canning and jam; semi-clingstone; medium pit size; long stem; vigorous, upright tree's growth habit; good bearing system; good differentiation of leaf buds; high yielding; moderate leaf spot susceptibility and slight light to brown rot fungus; was released in 2008, from a Mocanesti 16 x Anglaise Hative cross combination.

## **CONCLUSIONS**

During the last eight years, five new apple varieties, four pear, three plum, four sweet cherry and two sour cherry have been registered, as presented below.

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