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ÎMBUNĂTĂȚIREA SORTIMENTULUI CU NOI SOIURI DE PĂR OBȚINUTE LA SCDP VOINEȘTI

IMPROVING THE ASSORTMENT WITH NEW PEAR VARIETIES, OBTAINED AT RSFG VOINEȘTI

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Abstract

The pear (*Pyrus communis)* breeding at the Research Station for Fruit Growing (RSFG) Voinesti, Romania began in 1950, but since 1960 it has been introduced as the main selection objective, resistance to the main diseases and pests along with other agrobiological and technological characteristics. The main source of resistance to disease and pests is some cultivated biotypes with genetic ancestry in *Pyrus serotina*. Over a period of more than half a century, a vast biological material was selected, which served to register, between 2004 and 2021, 7 pear varieties: 'Corina' (2004), 'Orizont' (2004), 'Tudor' (2007), 'Romcor' (2009), 'Cristal' (2009), 'Aroma' and 'Andrei' (2021), who cumulated in their genotype the most qualities established for selection. There are also many perspective selections in the test field trial.

Cuvinte cheie: soiuri de păr, genotipuri, elite, testare
Key words: pear varieties, genotypes, ellite, testing.

1. Introduction

In order to revive pear culture, breeders of this specie had in mind obtaining varieties with improved qualities compared to the variety in cultivation, primarily resistance/tolerant to diseases and pests that limited the establishment of new plantations, respectively: *Erwinia amylovora* (blight fire), *Venturia pirina* (pear scab), *Psylla sp.* (pear *Psylla*). Also, another important objective was the late ripening of the fruits and their good storage capacity in warehouses without refrigeration facilities.

2. Material and methods

Interspecific sexual hybridisation was the basic method used to create the initial selection material and to a lesser extent intraspecific. For each stage of work, the criteria for the promotion of biological material had a certain specificity in accordance with the proposed objectives and the work phase, but for all phases the mandatory objectives were: resistance to the scab (*Venturia pirina*), resistance or tolerance to blight fire (*Erwinia amylovora*), tolerance to *Psylla sp*. Selections retained in F1 were re-crossed (backcroos, modified backcroos) usually with European varieties with a pleasant taste and appearance, obtaining new F2, F3 and F4 generations.

Starting with F3 and especially in F4, the percentage of descendants having resistance to diseases and pests drops very significantly, so obtaining some F4 and F5 generations is not justified.

For the varieties of pear approved by RSFG Voinești, in the period 2004 - 2021, which show resistance to diseases and pests, the only criterion for choosing the parents that transmit these characteristics, were the own phenotypic observations and the experience of some growers in the field was taken into account.

For resistance to *Psylla sp*., assessment was done according to an own scale with grades from 1 (no symptoms of attack) to 5 (strong attack).

In the case of bacterial fire and scab, all genotypes were eliminated regardless of the frequency or intensity of the attack.

The Distinctness, Uniformity and Stability (DUS) test included, in addition to the certification of resistance to diseases and pests, the other observations and determinations necessary in the case of experiments of this kind (phenology of the fruit organs, the vigour of the trees growth, the fruiting potential, the type of fruiting, taste and appearance of the fruits, pomological description, etc.).

The biological material used in interspecific and intraspecific sexual hybridisations at RSFG Voinești is presented in table 1.

The parents that strongly transmit characters that constitute the mentioned selection criteria are limited in number for the character of resistance to diseases and pests and more numerous when it comes to the rest of the attributes.

From the research undertaken at RSFG Voineşti (Gh. Moruju, N. Andreieş) it was found that the number of individuals who inherit the characteristic of resistance to scab, especially in the case of interspecific hybrids of the *Pyrus communis* x biotype cultivated with ancestry in *Pyrus serotina*, decreases in proportion what advancement in filiations. If only the recurrent parent is used for backcroos or modified backcroos, in F1, 70% of the hybrids show resistance to scab, in F2 only 25-30% and in F3 only 10-15%. The probability that a genotype includes 3-4 characters that are the subject of improvement, the trait of resistance to diseases and pests being eliminative is about 0.5% in F2 (Andreieş, 1985).

3. Results and discussions

As result of pear breeding program, a number of more than 10,000 hybrids were selected and, during 2004 - 2021, 7 varieties were registered.

'Corina', hybridization scheme: [Passe Crassane x (B.C.*Pyrus serotina* x Olivier de Serres)] x Decana de iarna, registered in 2004, author N. Andreies.

- The vigour of the tree is medium, good affinity with the rootstock of quince A. Resistant to the attack of scab (*Venturia pirina*), sensitive to the attack of *Psylla sp.* and sooty (*Capnodium salicinum*). Does not show symptoms of bacterial fire (*Erwinia amylovora*).
- The fruit is medium-large in size, truncated-conical shape, slightly asymmetrical, greenish-yellow in colour, sometimes with a slight rosy tinge on the sunny side, the roughness is often present on the entire surface of the fruit. The pulp is tender, white, juicy, without sclereids, sweet, slightly acidic, discreet flavour. Very good taste, ripe for consumption in October-November.

In cold storage conditions, the storage time increases.

'Orizont', obtained by interspecific sexual hybridisation according to the following formula: [(B.C. *Pyrus serotina* x Olivier de Serres) x Olivier de Serres] x Josephine de Malines, registered in 2004, author N. Andreieş.

- Spread: little spread, propagated in the RSFG Voinesti nursery and exploited in the county and neighbouring areas.
- The vigour of the tree is medium, it has an affinity with the rootstock of quince A, globular crown, tendency to ungarnish the branches, involves shortening cuts. It is resistant to *Venturia pirina*, does not show symptoms of attack by bacterial fire (*Erwinia amylovora*), tolerant to attack by *Psylla* sp.
- The medium-large fruit (150-200 g), globular, the background colour is yellow when ripe for consumption with a red tint on the sunny side. Creamy pulp, semi-coarse, juicy, sweet-sour taste, slightly tannic. The consumption period is December-February in spaces without refrigeration.
- Qualities: winter variety, attractive fruits, good taste, good resistance to diseases and pests.
- Flaws: it shows the phenomenon of the branches becoming bare and in cool years the taste becomes astringent.

'Tudor', obtained after the following hybrid combination: [(B.C. *Pyrus serotina* x Decana de iarna) x Passe Crassane] x TN 30-44 Angers, registered in 2007, author N. Andreieş.

- Spread: spread in the RSFG Voineşti nursery and exploited in the Dâmboviţa Fruit Growing Basin and neighbouring areas.
- The tree has medium vigour, long skeletal branches, pyramidal crown. It has affinity with the quince rootstock A, but in the test culture, better results were obtained when it was grafted on the frank rootstock. It is resistant to attack by scab (*Venturia pirina*), does not show symptoms of attack by bacterial fire (*Erwinia amylovora*), tolerant to attack by *Psylla* sp.
- The fruit is large pyriform, regular contour, waxy skin, the background colour at maturity is yellow, over which the red colour overlaps on about half of the fruit surface, attractive appearance. Creamy pulp, fondant, semi-fine texture, no sclereids, medium juiciness, good taste - very good, specific aroma. The skin is a little thick. The period of consumption in storage conditions without cold sources is between the first decade of September and the second decade of October.
- Qualities: large, attractive fruits, very good taste, high degree of resistance/tolerance to the main diseases and pear pests.
- Flaws: the skin of the fruit is a bit thick, and the branching capacity is weak, which implies shortening cuts.

'Cristal', variety obtained by intraspecific sexual hybridisation according to the following formula: [(Rosior Pietros x Decana de iarna) x Decana de iarna] x Beurre Hardy.

Resistant/tolerant to specific diseases and pests, registered in 2009, certified in 2010, author N. Andreieş.

- Spread: spread in the RSFG Voinesti nursery and distributed in the county and neighbouring areas.

- The vigour of the tree is medium, good affinity with quince type A, broad pyramidal crown. It blooms approximately at the same time as the Williams variety. Good fruiting potential like the other approved varieties.

- Fruit truncated, symmetrical, slightly ribbed, medium-large, ground colour: yellow, white pulp, smooth, juicy, sweet, without sclereids, very good taste, fine aroma.

- Maturity for consumption in warehouses without cold, is achieved in the months of October-November.

Qualities: fruits with good appearance and taste, good fruiting potential, resistance/tolerance to specific diseases and pests.

'Romcor', interspecific variety obtained according to the following hybridisation scheme: [Passe Crassane x (*Pyrus serotina* x Olivier de Serres)] x Decana Comisiei, registered in 2009, author N. Andreieş.

- Spread: spread in the RSFG Voinesti nursery.

- The tree has medium vigour, pyramidal crown, it was tested only on the frank rootstock on which it achieves high fruit productions (30-40 t/ha). Resistant to the attack of scab (*Venturia pirina*), tolerant to bacterial fire (*Erwinia amylovora*), relatively sensitive to *Psylla* sp. and sooty (*Capnodium*).

- The fruit is large (250 gr.), truncated-oval shape, convex profile, slightly wavy surface. The colour when ripe is yellowish-green, with numerous brown lenticels, covered with slight waxy secretions, spots of rust. The flesh is greenish-white, without sclereids, semi-fine, juicy, sweet-sour, slightly astringent, specific discreet aroma, good taste.

- It is ripe for consumption from October till November, under cold-free storage conditions.

- Advantages: high fruiting potential, rot resistance, very good taste, late ripening.

- Disadvantages: some sensitivity to *Psylla* sp. and sooty (*Capnodium*), and the colour of the fruit is not very attractive.

'Aroma', obtained after the following hybrid combination: Untoasa Hardy x pollen mixture, registered in 2021, authors : Nistor Andreieş and Mihaiela Erculescu.

-The tree is of medium vigour, with medium branching and a semi-erect form; fruiting mainly on short fruit branches. It has good affinity with quince type A rootstock, it flowers at about the same time as the Williams variety. The fruiting potential is good.

It is resistant to the attack of scab (*Venturia pirina*); shows good resistance to the attack of bacterial burn (*Erwinia amylovora*); tolerant to attack by *Psylla* sp.

- The fruit is large, the average weight is 230 g, the shape is ovoid - elongated, slightly asymmetric, skin colour is yellow, with small and rare spots of rust, attractive appearance. The pulp is creamy, firm, juicy, vinous, very few sclereids (almost absent), sweet-sour taste, pleasantly acidic, refreshing, discreet aroma, good to very good taste. Maturity for consumption is achieved in the first decade of September.

'Andrei', obtained after the following hybrid combination: Untoasa Hardy x pollen mixture, registered in 2021, authors: Nistor Andreieş and Mihaiela Erculescu.

The tree is of medium vigour, with medium branching and a divergent habit; fruiting mainly on short fruit branches. It has a good affinity with quince type A rootstock, it blooms approximately at the same time as the 'Williams' variety. The production potential is high.

It is resistant to the attack of scab (*Venturia pirina*); shows good resistance to the attack of bacterial burn (*Erwinia amylovora*); tolerant to attack by *Psylla* sp.

The fruit is large, average weight 250g, short - truncated shape, slightly asymmetric, yellowish green epidermis colour and rust spots. The pulp is white, juicy, very few sclereids, slightly sour sweet taste, well-balanced, discreet aroma, very good taste. The dry matter content is 16%.

Maturity for consumption is achieved in the 3rd decade of September - the first decade of October.

Along with these mostly interspecific varieties at RSFG Voinești, intraspecific varieties were also approved: 'Timpurii de Dâmbovița' (1967), 'Republica' (1973), winter variety and 'Aniversare' (1974), autumn variety, author: eng. Gh. Moruju.

4. Conclusions

The main sources of genes for resistance/tolerance to scab (*Venturia pirina*), bacterial fire (*Erwinia amylovora*), *Psylla sp*., were the biotypes from *Pyrus serotina*.

Important sources of genes for the nice appearance and good taste of the fruits, proved to be the following varieties: 'Doyenné d'hiver', 'Doyenné du Comice', 'Williams', 'TN 30-44 Angers', 'Olivier de Serres', 'Josephine de Malines', 'Untoasa Hardy'.

The late ripening of the fruits is transmitted in descent by the varieties: 'Olivier de Serres', 'Passe Crassane', 'Roșior Pietros', 'Doyenné d'hiver'.

Increased resistance to scab, bacterial fire and *Psylla sp*., can be obtained in intraspecific hybridisations carried out with parents originating from *Pyrus communis*, when the descendents have these characteristics.

Using classical breeding method, the time required to create a new genotype with the desired characteristics is approximately 25-30 years.

All 7 varieties obtained at RSFG Voinești in the period 2004 – 2021, mostly accumulate the characteristics established by the selection objectives superior to the parental genotypes, being multiplied and promoted in the orchards of private growers.

References

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Tables and Figures

Table 1. The biological material used in interspecific and intraspecific sexual hybridisation in F1, F2 and F3

Type / Selection	Variety	Resistant to *Venturia pirina*	Source for			
			***Psylla* tolerance**	**Blight fire tolerance**	**Nice appearance and taste**	**Maturity of consumption**
Biotypes cultivated having the ascendant in *Pyrus serotina*	*Pyrus serotina*	x	x	x	-	-
Olivier de Serres	*Pyrus communis*	-	-	-	0	x
Decana de iarna	*Pyrus communis*	-	-	-	x	x
Decana Comisiei	*Pyrus communis*	-	-	-	x	-
Passe Crassane	*Pyrus communis*	-	-	-	x	x
Josephine de Malines	*Pyrus communis*	-	-	-	x	x
TN 30-44 Angers	*Pyrus communis*	-	-	-	x	0
Untoasa Clairgeau	*Pyrus communis*	-	-	-	x	-
Williams	*Pyrus communis*	-	-	-	x	-
H 6/101 E	Interspecific	x	x	x	0	0
H 4/33 E	Interspecific	-	-	-	0	0
Other F2 and F3 selections	Interspecific	x	x	x	0	0

”x” = character with significant manifestation; ”-” = character with uncertain manifestation; ”0” = character with moderate manifestation

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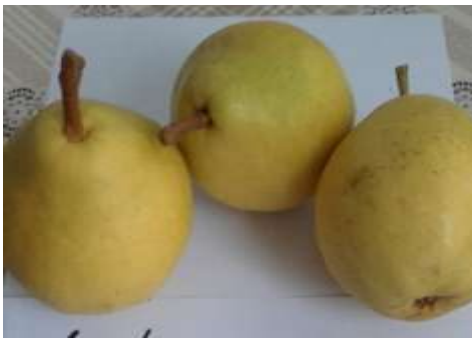
Corina

Orizont

Cristal

Tudor

Romcor



Aroma

Andrei

Photo 1. Pear cultivars registered at RSFG Voinești, Romania