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BREEDING OF NEW PEAR WINTER CULTIVAR 'PANDORA'

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ABSTRACT

Psylla and fire blight resistance combined with fruit quality are still pearbreeding aims at Research Institute for Fruit Growing (RIFG) Piteşti, Romania. The new pear cultivar 'Pandora' was registered in 2019, being released by interspecific hybridization between 'Euras' cv. [(*Pyrusserotina*xOlivier de Serres) x Doyenne d'hiver] and 'Tse Li' cv. (*P.ussuriensis*). The trees are medium vigor, weak branching and semi-upright habit being productive and with low tendency to biennial bearing. The fruit ripens 10-15 days earlier than 'Euras', at end of September.Fruit weight is about 250g, flesh is yellowish white, fine, crisp, juicy, sweetand flavored. The skin color changes from green to yellow upon maturity. It is highly resistant to fire blight and pear psylla under the standard spraying program. Therefore, this new cultivar shows a good potential for commercial fruit growing.

Keywords: breeding, *Pyrus*, resistance, description.

INTRODUCTION

'Pandora' is a new winter cultivar released from the pear breeding program of Research Institute for Fruit Growing (RIFG) Piteşti, Romania. It is a long storage cultivar, very attractive and flavored. It is resistant to fire blight and pear psylla under the standard spraying program.

The pear breeding program started in 1967 at RIFG Piteşti andhad as objectives new cultivars with high quality fruit and resistance to fire blight (*Erwinia amylovora* Burill), tolerance to fumagine (*Capnodium salicinum*) and pear psylla.Twelve dessert pear cultivars have already been released: 'Trivale' (1982), 'Triumf' (1983), 'Argessis' (1985), 'Daciana', 'Carpica' (1989), 'Getica', 'Monica' (1994), 'Ervina' (2003), 'Paramis' (2008), 'Paradise', 'Paradox' (2010), 'Isadora' (2012). 'Monica'is favored for its appearance and 'Daciana' for its taste.

Interspecific hybridization of *Pyrus* has been released by RIFG Piteşti since 1991, when the fire blight disease spread in pear orchards for the first time. The breeding strategy involves the intercrossing of European (*P. communis* Linn.), Japanese (*P. pyrifolia* Nakai) and Chinese (*P. bretschneideri* Rehd.) in order to combine buttery juicy texture with crisp texture, sweet and strong flavor, to extend storage period, to increase the resistance to pests and diseases. The interspecific hybridization is still consider a method with great potentialof pear breeding especially for ripening season extension, fruit quality, disease resistance and cold hardiness (Layne, 1997).

MATERIALS AND METHODS

'Pandora' was obtained by artificial pollination between 'Euras' cv. (registered in 1994, by Research Station for Fruit Growing Voinesti, Romania, authors: NistorAndrieş and Gheorghe

Moruju) and 'Tse Li' cv. (synonym 'Tsu Li' or 'Su Li', an ancient pear cultivar from Shandong, China, introduced at Research Institute for Fruit Growing Piteşti in 1994, from USA,by CociuVasile) made in 2003. The pedigree of interspecific hybridization of 'Pandora' is shown infigure 1. Seedlings were raised in 2004 and planted in selection filed, on own roots, in 2005. The seedlings began to crop in 2011 and the hybrid tree was selected as a promising one in 2013. The new cultivar was registered in 2019 by the State Institute for Variety Testing and Registration with certificate number 9730/24.10.2019, authors: N. Branişte and Mădălina Militaru.

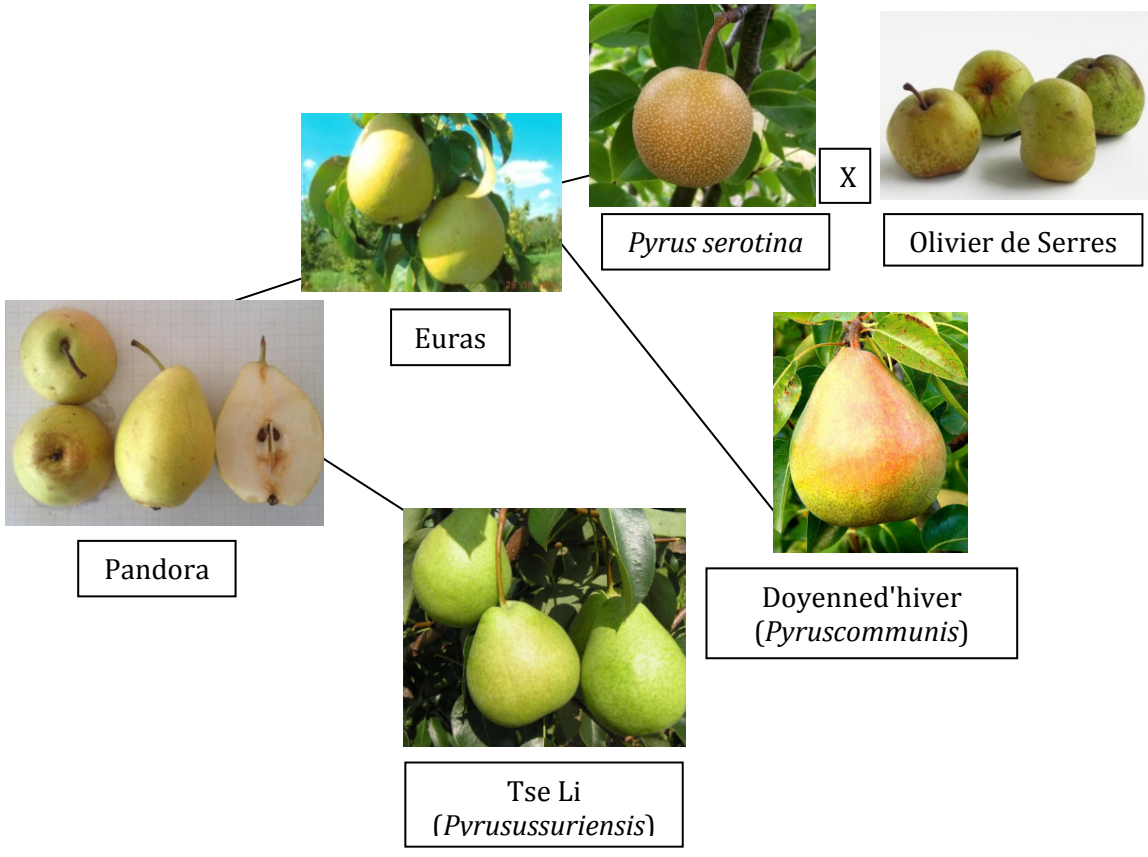

Figure 1. Pedigree of 'Pandora'cv.

RESULTS AND DISCUSSIONS

Tree

The habit is semi-upright with medium vigor. The fruit cropping is generally high and regular every year. Even after a high cropping season, the tendency toward biennial bearing is very low. The vegetative buds are big size and shape of apex is obtuse. The leaf blade is 9.96 cm in length, 5.66 cm in width and 2.5 cm length of petiole. The incisions of margin of leaf blade are bluntly serrate. The corolla is 3.4 cm in diameter and white. Most of flowers have 5 petals and a few flowers have 6-7 petals. The petals are large (15.4 mm in length and 10.5 mm in width) and circular in shape (Table 1, Fig. 2a).

Fruit

'Pandora' fruit is large, about 250 g weight as average (for young trees, 280-300 g/ fruit), 8.7 cm length, 7.3 cm the maximum diameter and ratio length/diameter is 1.2.The fruit stalk is 3.21 cm in length and 2.8 mm in thickness (Table 2, Fig. 2b). At harvest, the

depth andwidth of eye basin are medium, 11.08 mm depth and 26.55 mm width, respectively. The flesh is yellowish white, fine, crisp, juicy, sweet, strongly flavorful and typical aroma with few grit cells. The juiciness varied from juicy to very juicy, depending on the maturity stage. The soluble solids content is 16.8% Brix, higher than 'Euras' cv. Fruits of 'Pandora' has a green ground color at harvest, which changes into yellow after storage.

Flowering and harvest time

Flowering occurs a few days along about a week, before 'Monica' and 'Euras'cvs. Harvest maturity is the same as 'Monica' cv. (end of September in Piteşti, Argeş), but one month earlier than 'Euras' cv. Fruit mature homogeneously within the tree, so that only two pickings are required. 'Pandora' cv. is not susceptible to preharvest drop and the storage ability is excellent, the fruits keepingbeing 120-130 days under cold storage. Fruit picked too early, after long storage, can show some brown core and sometimes flesh browning. The shelf life of 'Pandora' proved to be good: stored until January at 1^0C, the shelf life period was about two weeks.

Table 1. Cultivar description using UPOV guidelines

No. UPOV	Characteristics	States of expression	Note
1	Tree: vigor	medium	5
2	Tree: branching	weak	3
3	Tree: habit	semi-upright	3
4	One year old shoot: growth	zig-zag	3
5	One year old shoot: length of internode	long	7
6	One year old shoot: predominant color on sunny side	brown red	5
7	One year old shoot: number of lenticels	many	7
8	One year old shoot: shape of apex of vegetative bud	obtuse	2
9	One year old shoot: position of vegetative bud in relation to shoot	markedly held out	3
10	One year old shoot: size of bud support	large	7
11	Young shoot: anthocyanin coloration of growing tip (during rapid growth)	weak	3
12	Young shoot: intensity of pubescence (upper third)	strong	7
13	Leaf blade: attitude in relation to shoot	outwards	2
14	Leaf blade: length	long	7
15	Leaf blade: width	medium	5
16	Leaf blade: ratio length/width	large	7
17	Leaf blade: shape of base	obtuse	3
18	Leaf blade: shape apex (excluding pointed tip)	right-angled	2
19	Leaf blade: length of pointed tip	medium	5
20	Leaf blade: incisions of margin (upper half)	bluntly serrate	3

No. UPOV	Characteristics	States of expression	Note
21	Leaf blade: depth of incisions of margin	shallow	3
22	Leaf blade: curvature of longitudinal axis	medium	5
23	Petiole: length	medium	5
24	Petiole: presence of stipule	absent	1
26	Shoot: location of flower bud	mainly on spurs	1
27	Flower bud: length	long	7
28	Flower: sepal length	long	7
29	Flower: attitude of sepals in relation to corolla	adpressed	1
30	Flower: position of margins of petals	overlapping	3
31	Flower: position of stigma in relation to stamens	above	3
32	Flower: size of petal	large	7
33	Flower: shape of petal (excluding the claw)	circular	1
34	Flower: shape of base of petal (excluding the claw)	truncate	3
36	Immature fruit: color of sepals (early summer)	green-brown	2
37	Fruit: length	long	7
38	Fruit: maximum diameter	large	7
39	Fruit: ratio length/diameter	large	7
40	Fruit: position of maximum diameter	clearly towards calyx	3
41	Fruit: size	very large	9
42	Fruit: symmetry (in longitudinal section)	strongly asymmetric	3
43	Fruit: profile of sides	convex	3
44	Fruit: ground color of skin	green	2
45	Fruit: relative area of over color	absent or very small	1
48	Fruit: relative area of russet on cheeks	small	3
49	Fruit: relative area of russet around stalk attachment	absent or very small	1
50	Fruit: length of stalk	medium	5
51	Fruit: thickness of stalk	medium	5
52	Fruit: curvature of stalk	absent or very weak	1
53	Fruit: attitude of stalk in relation to axis of fruit	oblique	2
54	Fruit: depth of stalk cavity	deep	7
55	Fruit: attitude of sepals (at harvest)	converging	1
56	Fruit: eye basin (at harvest)	present	9
57	Fruit: depth of eye basin (at harvest)	medium	5
58	Fruit: width of eye basin (at harvest)	medium	5

No. UPOV	Characteristics	States of expression	Note
59	Fruit: relief of area around eye(at harvest)	smooth	1
60	Fruit: texture of flesh	medium	5
61	Fruit: firmness of flesh	firm	7
62	Fruit: juiciness of flesh	juicy	7
63	Seed: shape	elliptic	3
64	Time of beginning of flowering	very early	1
65	Time of maturity for consumption	late	7

Table 2. Fruit characteristics of 'Pandora' on 2016-2018 at RIFG Pitești

Cultivar	Mean fruit weight (g)	Total soluble solids (Brix, %)	Titrable acidity (%)	pH	Duration of storage (days)	Yield* (kg tree^{-1})
Pandora	250a	16.8a	0.60a	5.24a	125a	16.78a
Euras	156c	14.6b	0.52a	4.92b	140b	13.86b
Monica	175b	12.8c	0.48a	3.94c	106c	15.62a

*Values are the mean for 4 to 6 year old trees, grafted on *Pyruscommunis* seedlings
The different letter indicates significant differences between means according to Duncan's multiple range test, P≤0.05

Pest and disease susceptibility

During 2016-2018, period of observation, no symptoms of fire blight and psylla.

a. b.

Figure 2. 'Pandora' flowers (a) and fruits (b)

CONCLUSIONS

• 'Pandora' produced attractive fruits, with crispy, juicy and tasty flesh, a good storability and a very good shelf life.
• It is licensed in Romania by the State Institute for Variety Testing and Registration and is presently available from RIFG Pitești nursery.

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