Genetic Particularities for the Biology of Early Apricot Phenotypes Created in Romania

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The apricot tree finds favourable growing conditions within the latitudes of 48° North and 35° South, in the subtropical region, except for the tropical region proper.

The qualitative and technological characteristics of the fruit rank apricot among the highly appreciated fruit-trees.

Under favourable conditions, apricot trees yield fruit relatively fast, i.e. 3-5 years after planting, and the adequate culture technologies result in high yields every year; when grafted on the most suitable stocks, they adapt to the most varied soil types.

The growing demand in fresh consumption is determined by the high content in sugars, mineral salts (Mg, P, Fe, Ca, K, S, Na, Mn, Fl, Co, Br), vitamins and acids, composition of high nutritive value.

The rich chemical composition of the fruit can also be used for medicinal purposes, since apricots are consumed in physical and intellectual asthenia, anemia, insomnia, convalescence; they are also recommended to slow growing children and children with rickets.

Apricots are processed as compote, syrup, jam, marmalade, etc. They can also be processed as either non-alcoholic drinks, juice or nectar, or alcoholic beverage as distillate and liqueur. They are highly appreciated both on the Romanian and foreign markets as dried fruit; for the peoples in cold weather areas, they are considered a delicacy. Apricot kernels are rich in nutrients, containing 29.5-57.7% fats; 28% pectic substances, and 3.1% mineral salts; they are used in confectionery, together with almonds, or industry, as raw material for industrial oil extraction.

-Apricot wood is used for handicrafts.

Although the current high demand cannot be met yet, the supply has continuously grown, partly owing to the results of the researchers’ work in the fields of apricot genetics and breeding. The topic of the present paper is the authors’ contribution to complete the existent assortment by certifying early maturing cultivars: ‘Rareş’, ‘Valeria’, ‘Carmela’, ‘Viorica’, ‘Auraş’, ‘Cristal’, ‘Fortuna’.

Materials and Methods

The methods employed are particularized by the identification and application of apricot breeding strategies based on the results of genetic research.

The breeding strategies were established starting from the breeding objectives specific to the new stage, according to the international breeding objectives determined in fruit-tree growing research institutes from France, Italy, Greece, Spain, Turkey, Harrow Vineland – USA.
The objectives refer to: resistance to viral diseases, particularly Plum-pox, resistance to stable diseases of the apricot-tree, Monilinia laxa, Stigmina carpophila, Cytospora cincta, in correlation with increased fruit quality and changing tree architecture which allows crop intensification, extra-early fruit ripening to cover a deficit period for apricot consumption from indigenous varieties on the domestic market and provide future export, increasing genetic productivity, a highly complex trait closely related to frost resistance, particularly of the flowering buds, resistance to diseases, self-compatibility and compatibility with other varieties.


Results and Discussions


RAREȘ

Fruit
Size: Average-large, 60-65 g, superficial ventral midline, clearly marked joint
Form: elongated-spherical, peduncular cavity of average depth and width

Colour: light yellow-orange all over the surface, uniformly coloured
Peduncle: short and thin, dark green in colour, well stuck on the branch
Pulp: juicy, good consistence
Taste: very good, balanced, highly pleasant aroma
Stone: medium (4 gr.), non-adherent to the pulp; oval in shape, curved midline, sharp pointed, light brown in colour, rugged surface; sweet, strongly almond-flavoured kernel.

Ripening time: first decade of June

Tree
Vegetation: Low vigour tree with strong basic branches, brown-reddish in colour and medium lenticels. Fruition on May clusters of flowers and one-year-old short branches. Slightly vigorous annual offshoots, with short internodes. Adequately large crown (diameter between 3-3.5m).

The tree starts fruition in the third year from planting, manifesting fruition precociousness.

Resistance to diseases: Good resistance to the specific diseases: Monilinia laxa, Stigmina carpophila, Cytospora cincta and Plum-pox.

Flowering: early. White flowers with big round or short oval shape.

Resistance to frost and wintering: Good, as flower bud loss is low in the years recording climatic accidents.

Production and use
Agronomic features: Average yield/year is 30-35 kg at a density of 625 trees/ha. It is the most highly maturing of the current apricot crops. The fruit is the most resistant to manipulation and transport.

Use: fresh consumption and processing

VALERIA


Fruit
Size: Average-large, 60-65 gr.
Form: elongated-spherical, peduncular cavity of low depth and width

Colour: light yellow-orange, slight red spots
Peduncle: short and thin, reddish-green in colour
**Pulp:** juicy, good consistence  
**Taste:** very good, balanced  
**Ripening time:** first decade of June  
**Tree**  
**Vegetation:** Low vigour tree with slightly open branches. Early fruition, especially on May clusters and mixed branches.  
**Resistance to diseases:** Good genetic resistance to the specific diseases: *Monilinia laxa*, *Stigmina carpophilla*, *Cytospora cincta* and tolerant to Plum-pox.  
**Flowering:** early  
**Production and use**  
**Agronomic features:** Average yield/year is 30-35 kg at a density of 625 trees/ha. It is the earliest of the current genetically resistant apricot crops. 2-3 days earlier maturity than the ‘Rareş’ variety and less after the Mediterranean varieties, e.g. Spain, Greece, and Turkey.  
**Use:** fresh consumption and processing as compote and jam.

**CARMELA**

**Fruit**  
**Size:** Large, 95-100 g. Average soft skin thickness.  
**Form:** elongated-spherical, height = 5.8 mm, depth = 5.6 mm, width = 5.4 mm. Medium large and deep peduncular cavity, average deep ventral midline, slight dark grey joint.  
**Colour:** bright yellow-orange, carmine-red covering on about 45% of the fruit surface. Average fine skin thickness. Particularity: shiny skin, similar to nectarines.  
**Peduncle:** short and thin, dark green in colour, well stuck on the branch  
**Pulp:** orange in colour, strong consistence, sweet-slightly acid taste, pleasant aroma specific to apricots  
**Taste:** very good, balanced, highly pleasant aroma  
**Stone:** medium in size (4.5%), non-adherent to the pulp; oval in shape, curved midline, sharp pointed, light brown in colour, rugged surface; sweet, strongly almond-flavoured kernel.  
**Ripening time:** second decade of June  
**Tree**  
**Vegetation:** Medium vigour, Height = 3.5 m, and crown volume = 4.5 m. Strong basic branches, brown-greyish in colour and rare lenticels slightly differing from the wood colour. Fruition on 2-year-old May clusters, typical of apricot and cherry. The typical cherry cluster may consist in 5 fruiting buds and 1 vegetative bud, except the top cluster which gathers 16 fruiting buds. Branch length is 20 cm, average petiole, large flowers (round or short oval in shape, white-pinkish in colour). Pistil equal in length with stamens.  
The tree starts fruition in the third year from planting, manifesting fruition precociousness.  
**Resistance to diseases:** Good resistance to the specific diseases: *Monilinia laxa*, *Stigmina carpophilla*, *Cytospora cincta* and Plum-pox.  
**Flowering:** early. White-pinkish flowers with big round or short oval shape.  
**Resistance to frost and wintering:** Good, as flower bud loss is low in the years recording climatic accidents.  
**Production and use**  
**Agronomic features:** Average yield/year is 38-40 kg at a density of 625 trees/ha. It is large-fruit phenotype, with the most attractive colours, improving the native assortment and exceeding the quality of the imported fruit.  
**Use:** fresh consumption and processing as juice, nectar, puree.

**VIORICA**

**Fruit**  
**Size:** Large, 118-127 g. Round form, H=5.8, D=6.4, d=5.8.  
**Form:** spherical, medium large and deep peduncular cavity.  
**Colour:** bright orange, uniform in colour, no green spots. Average fine skin thickness. Particularity: spherical form slightly flat on tops, uniform skin colour, similar to a smooth orange.  
**Peduncle:** short and thick, dark green in colour, well stuck on the branch  
**Pulp:** yellow-orange in colour, juicy, strong consistence  
**Taste:** very good, balanced, highly pleasant aroma specific to apricots  
**Stone:** small size (spherical, slightly curved; sweet, strongly almond-flavoured kernel.  
**Ripening time:** the beginning of the third decade of June  
**Tree**  
**Vegetation:** Medium vigour, Height = 4 m, and crown volume = 3.8-4.5 m. Strong basic branches, brown
colour, no visible lenticels, but slightly silvery edges from place to place. Fruition on 2 and 3-year-old May clusters on short and medium-sized mixed branches situated to the extreme part of the 2-year-old branch; cherry-like clusters may be present. The annual offshoots are medium vigorous and have short internodes. Average-sized petiole. Pistil equal in size with stamens. The tree starts fruition in the third year from planting, manifesting fruition precociousness.

**Resistance to diseases:** Good resistance to the specific diseases: *Monilinia laxa*, *Stigmina carpophilla*, *Cytospora cincta* and tolerance to *Plum-pox*.  
**Flowering:** average. White flowers with big round or short oval shape.  
**Resistance to frost and wintering:** Good, as flower bud loss is low in the years recording climatic accidents.  

**Agronomic features:** Average yield/year is 35-40 kg in the fourth year after planting, at a density of 625 trees/ha. It is an early ripening variety of special commercial aspect given by its size, form, and colour, good taste, and high biochemical quality. Also, highly resistant to manipulation and transport.  
**Use:** fresh consumption and processing.

**AURAŞ**

**Synonym:** V.T. 47/112  
Homologated at S.C.D.P. Constanţa in 2003  
Author: Elena Topor  
**Main characteristics**

- **Flowering:** very late, after the Umberto variety.  
- **Ripening:** very early (17–30 June).  
- **Self-fertilization:** by 71.7% self-pollinating flowers and 78.3% free pollinating flowers; no pollinators required.  
- **Tree**  
  - **Vigour:** high, slightly open  
  - **Fruition:** predominantly on the May clusters  
- **Fruit**  
  - **Form:** oblong, average weight between 44-48 g.  
  - **Skin:** orange, red pigments on half fruit.  
  - **Pulp:** orange, medium firmness, aromatic.  
  - **Stone:** average size, oblong, non-adherent to pulp, bitter kernel.

**CIRISTAL**

**Synonym:** V.T. 51/45  
Homologated at S.C.D.P. Constanţa in 2003  
Author: Elena Topor  
**Main characteristics**

- **Ripening:** very early (19-30 June)  
- **Flowering:** average  
  - **Self-fertile:** 44.1% by self-pollination and 85% by free pollination; no pollinators required.  
  - **Tree**  
    - **Vigour:** average, slightly open  
  - **Fruition:** predominantly on May clusters and 1-year-old branches  
- **Fruit**  
  - **Form:** oblong, average weight between 45-50 g  
  - **Skin:** orange, covered in carmine-red on ¼ of the fruit  
  - **Pulp:** orange, medium firmness, gross texture, aromatic  
  - **Stone:** large, non-adherent, bitter kernel.

**Use:** fresh consumption and industrial processing (tested at I.C.D.I.M.P.H. Bucharest)

**FORTUNA**

**Synonym:** V.T. 48/45  
Homologated at S.C.D.P. Constanţa in 2004  
Author: Elena Topor  
**Main characteristics**

- **Flowering:** early, extremely abundant  
- **Ripening:** very early (16-29 June)  
- **Self-fertile:** 43.8% natural fertility, 33.6% self-fertility; no pollinators required.  
- **Resistant** to main specific diseases, free from viral diseases.  
- **Tree**  
  - **Vigour:** high  
  - **Fruition:** predominantly on clusters and 1-year-old branches  
- **Fruit**  
  - **Form:** round, average weight between 41.0-70.0 g  
  - **Skin:** orange with carmine-red on the sun-bathed side  
  - **Pulp:** orange, gross-firm texture, aromatic, juicy  
  - **Stone:** average, round in shape, non-adherent to the pulp, sweet kernel  
- **Use:** fresh consumption and industrial processing

**Conclusions**

The data above emphasize the genetics of apricot maturity, the exploitation of the initial and induced genetic variability, and the employment of the corresponding improvement methods. After the year 2000, these characteristics have resulted in the creation and validation of the cultivars presented above: ‘Rares’, ‘Valeria’, ‘Carmela’, ‘Viorica’, ‘Auraş’, ‘Cristal’, known
for their early fruit maturation given the climatic conditions in Romania (15-20 June), and for their many qualitative, agronomic, and adaptability features, which inscribes them into the new generation of varieties created in the European countries of long tradition in apricot growing.

The third stage of the apricot breeding programme is undergoing a new direction, as the Bucharest University of Agronomic Sciences and Veterinary Medicine has included all these new varieties in the curriculum, together with the latest varieties created in Italy and Switzerland – countries that have developed apricot growing during the last decade, based on the market-imposed standards, according to the intellectual protection conditions created for both personal inventions and purchased patents.

References