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A PERSPECTIVE OF APRICOT SELECTION FOR THE DOBROGEA AREA

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Abstract

In the conditions of Romania, and in particular in Dobrogea Region, there are two limiting factors in apricot growing: flower damage caused by late spring frosts and insufficient knowledge of the biology of Monilinia laxa disease. The annual production in Romania in the past years varied from 43,606 t in 2014 to 35,704 t in 2018 (Romania National Institute of Statistics, 2020). In the last 25 years, at Research Station for Fruit Growing Constanta were created and realesed more then 10 apricot cultivars. Climate change requires the introduction of new varieties of apricot better adapted to new challenges. The apricot selection "R8P22" has medium vigor, the blooming occurs in the last decade of March is abundant and lasts 10 days. The fruit is medium size, with an average weight of 55 grams. The flesh is yellow-orange with good smoothness and succulence, with sweet-acid taste and flavor.

Key words*: Prunus armeniaca, cultivars, yields.*

INTRODUCTION

Apricot is a thermophiles, heat-sensitive species whose flowering and fruiting phenophases are recorded when air temperature exceeds 10-12^{0}C. Some of the limiting factors that maintain the yield to a relatively low level are the absence of varieties that can better adapt to various ecological conditions (Balan V. et al., 2008).

In the agroecological conditions of Dobrogea, there are two limiting factors in apricot growing: flower damage caused by late spring frosts and the intensity of climatic accidents.

The purpose of this study is to provide data on the new apricot cultivars widen the fresh consumption that lasts from 10 period of June to August 15 in Dobrogea area.

MATERIALS AND METHODS

The study was carried out at Research Station for Fruit Growing Constanta, located in south-eastern Romania, near the Black Sea.

The site is located at 44°10' Northern latitude and 28°29' Eastern longitude, and 70 m above sea level. Climate is continental with warm and droughty summers, frequent dry winds all the year round and temperate winter generally without snow. The mean annual temperature is 12.0°C and the total active temperature is 3988°C, out of which 3170°C during the growing season; the annual precipitation amount is 400 mm, out of which during the growing season (April 1 to September 30), 240.7 mm.

The lowest winter temperatures below -20°C are not very often: 1 out of 10-15 years and so are the spring frosts susceptible to cause apricot yield damage.

The climatic water deficit reaches as much as 400 mm/year, so irrigation application is needed for apricot.

The zonal soil type is a calcaro-calcic chernozem formed on loess, with loam texture and a proper capacity of water preserving, holding and circulation. The humus content ranges between 2.5 and 4%; pH of the soil is poor alkaline (7.0-8.1).

The cultivars planted at 4 m × 4 m scheme in 2009 with north-south row orientation and the crown shape is improved vase. The apricot trees are grafted on Constanta 14 described by Indreias et al. (2010).

The floral, agronomic and fruit-quality characteristics were checked for four years (2016 to 2019). The beginning of flowering was considered when the first open flower was visible and its end was noticed when the last petals of the flowers fell.

The blooming intensity was noted from 0 (absent) to 5 (abundant), according to the research methodology of fruit tree breeding (Cociu and Oprea, 1989).
Determination of dry matter was conducted by reading it directly from the refractometric scale (Zeiss, Germany) and the determination of acidity was based on potentiometric titration with the solution of sodium hydroxide (AOAC, 1995).
The trees and fruit characteristics were evaluated according to the Methodology for trying new varieties of fruit trees, shrubs and rootstock in order to approve the homologation and International Union for the Protection of New Varieties of Plants (UPOV, 2007) guidelines.
During 2016-2019 the fruit yield was recorded starting with the 7th year after planting, when fruit production was considered stable. The average yield was evaluated by weighing the fruit of three apricot trees of each cultivar (kg/tree) and then as kg/ha.

RESULTS AND DISCUSSIONS

The swelling of the vegetative buds (Table 1) began on the 11th of March and lasted until the 4th of April, while the blossoming began on the 17rd of March and lasted until the 30th of March.

Table 1. Main vegetative phenophases and active thermal sum (2016 - 2019)

Variety	Swelling of the buds		Blossoming		Beginning of sprout growth		Ending of sprout growth	Ending of the vegetative period		Duration of the veg. period (days)
	Data	tºC	Data	tºC	Data	tºC	Data	Data	tºC	
R8P22	11.03-25.03	125-135	17.03-30.03	240-255	04.04-26.04	340-377	20.07-30.07	19.10-03.11	3467-4109	210-248
Traian (control)	16.03-04.04	120-143	22.03-30.03	190-237	01.04-20.04	340-381	10.07-25.07	25.10-10.11	3653-4100	210-239

The beginning of sprout growth for the R8P22 selection was almost in the same period with witness variety. The beginning of blossoming (Figure 1) for the R8P22 selection (Table 2). occurred between the 20nd of March and the 3th of April, while the ending of the blossoming occurred between the 28st of March and the 12th of April.

Figure 1. R8P22 blossoming

Table 2. Observations and determinations concerning the fructification phenophases (average 2016-2019)

Variety	Beginning of blossoming		Ending of blossoming		Duration (days)	Ripening of the fruit		Duration of the fruct. stage (days)	Average tºC
	Data	tºC	Data	tºC		Data	tºC		
R8P22	20.03-03.04	149-190	28.03-12.04	261-310	8-14	25.06-02.07	1468-1545	70 - 90	1506
Traian (witness)	18.03-30.03	140-228	28.03-05.04	264-300	8-12	28.06-08.07	1534-1700	98 - 105	1617

The blossoming takes up to 8-13 days, which is enough for the realisation of the pollination and the fertilisation.

As concerns the ripening of the fruit, the R8P22 proved to be early than the Traian variety, which ripens in the same climatic and soil conditions with 3-6 days later. In the 4 studied years, the R8P22 reached the ripening stage between the 25th of June and the 2nd of July, the earliest being in 2018 (25th of June) and the latest in 2017 (8nd of July).

The R8P22 selection has a high coefficient of natural fertility of 30.5% (Table 3), being superior to the control variety Traian (27.4%). The fruit production of this hybrid is positively influenced by the fertility percentage.

As concerns the fruit production (Table 4), it has been observed that in favourable years, its values are higher than those of the witness variety.

Table 3. Behaviour during the pollination and fertilisation process (average 2016-2019)

Variety	Autofertility %					Natural fertility %				
	2016	2017	2018	2019	Average	2016	2017	2018	2019	Average
R8P22	4.8	10.6	11.9	9.8	9.27	29.4	32.9	28.7	31.3	30.5
Traian (control)	1.8	3.7	2.8	1.2	2.3	22.4	31.4	28.3	27.6	27.4

Table 4. Fruit production between 2016 and 2019 (year X of vegetation) (4 m x 4 m = 625 tree/ha)

Period		R8P22	Traian
2016	kg/tree	20.9	18.7
	t/ha	13.06	11.6
2017	kg/tree	30.1	22.3
	t/ha	18.8	13.9
2018	kg/tree	12.8	7.5
	t/ha	8.0	4.6
2019	kg/tree	16.7	12.4
	t/ha	10.4	7.7
Average 2016-2019	kg/tree	20.1	15.2
	t/ha	12,6	9.4

The year 2017 is considered to have been favourable for the fruit production from a climatic point of view, the lower temperatures during the blossoming (5.7-12.6º C) leading to a delay in this phenophase and implicitly, to a good thing, thus realizing a greater production (18.8 t/ha), the difference being significantly positive when compared to the witness variety.

The year 2018 was unfavourable to the cultivation of apricot trees because of the climatic accidents that occurred during the blossoming stage (-2.9ºC in the air and -5°C on the ground), which led to the destruction of the tied fruit; however, this hybrid proved to be more resistant, the production being of 8.0 t/ha.

The year 2019 was not quite favourable for the apricot tree because of the extended draught from the previous year, thus determining a production of 10.4 t/ha of the R8P22.

In 2016, the R8P22 realised an average production of 13.06 t/ha and it is safe to say that it has remade its productive potential faster than the witness variety.

Analysing the average of the fruit production over a period of 4 years and taking into account the year 2019, when the production was quite low, we can state that this hybrid realized an average production of over 12.6 t/ha.

A criterion based on which a variety in promoted into the assortment is the appreciation of the resistance to cold and variations in temperature (Figure 2).

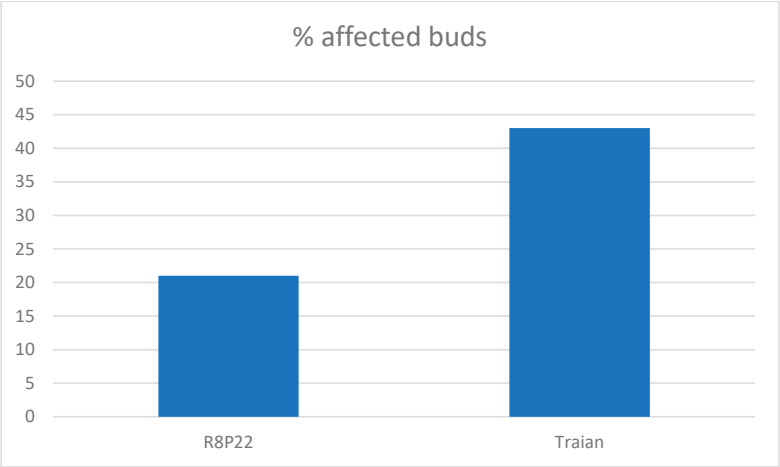

Figure 2. Resistance to cold of flowering buds

Between 2016 and 2019, before the beginning of the vegetative stage, observations for this hybrid were performed on over 760 flowering buds. We can state that the P8R22 is highly resistant to low temperatures and fairly resistant to comeback cold periods, the average percentage of destroyed buds over a period of 4 years being of 21.6%, as compared to 43.1% for the control variety.

CONCLUSIONS

The R8P22 hybrid can be considered a variety with early ripening stage and it can improve the structure of the current assortment, which is still lacking in early varieties (in the area).
This hybrid is constant in terms of fruiting, having good results even in unfavourable years for apricot cultivation.
The hybrid has a semi-early ripening period, which makes it an economically hybrid.
The guarantee of this variety's value is also given by its adaptability to local climatic and soil conditions, expressed through its high resistance to the extreme temperatures specific to this area, to diseases and pests, which recommends its homologation as variety and its extension within crops.

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