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STUDY REGARDING THE PRODUCTIVITY OF SOME PEACH VARIETIES

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Abstract

The study describes the behavior of eight peach varieties, with high adaptability to the pedoclimatic conditions of the South-Eastern region of the country, with very good productivity, increased frost and disease strength and with very good quality of the fruit. The objective of the study was the improvement of the peach assortment related to productivity and the extension of the fresh fruit consumption period. The best average yield was recorded to 'Raluca' (24.55 t/ha), followed by 'Southland' (24.02 t/ha). The ripening season of the fresh peach is extended to 97 days.

Key words: *Prunus persica, assortment, yield, fruit quality.*

INTRODUCTION

Peach [*Prunus persica* (L.) Batsch] is the third most important temperate tree fruit species in terms of production quantity (http://faostat.fao.org). It is originated from China where it has been cultivated for more than 4000 years (Cepoiu, 2006).

Peach breeding programs are confronted with the need to find genetic solutions to ever changing posed by disease and pests, the ever-changing environment (e.g. drought, global warming, cold temperatures, etc), superior quality of fruit, as well as the widening of the ripening time of the peach varieties for fresh market (Bassi & Monet, 2008) .

At Research Station for Fruit Growing Constanta (RSFG Constanta) peach is growing since 1960-1965 (table 1). The present study had as aim to improve the peach assortment in direct relation with their productivity and with the extension of fresh fruit consumption.

Table 1. The evolution of peach assortment (1965-2014) at RSFG Constanta

Year	Species	Number of varieties	Number of days
1965	Peach	7	50
	Nectarine	-	-
	Clingstone	-	-
1970	Peach	10	65
	Nectarine	-	-
	Clingstone	-	-
1980	Peach	15	90
	Nectarine	4	30
	Clingstone	4	30
1990	Peach	14	95
	Nectarine	8	55
	Clingstone	8	50
1995	Peach	12	97
	Nectarine	10	70
	Clingstone	10	50
2014	Peach	11	97
	Nectarine	13	75
	Clingstone	5	60

MATERIALS AND METHODS

RSFG Constanta is located in the south-eastern part of Romania, in the area between the Danube River and the Black Sea, and has specific steppe climatic conditions, with a semi-arid character.

Frosts return is a quite often phenomena in spring and affect fruit trees with early blooming as nectarine. Absolute temperature beyond the limits of resistance of peach and nectarine species, e.g. -25°C or above +40°C is rare (1/20

or 1/30 years). Rainfall is deficient to the requirements of the trees; the average amount of rainfall is around 400 mm, with unequal time distribution in the active growing season (April 1 to September 30). Chernozem soil type is deep, well supplied with humus, showing proper conditions for water circulation.
Phenological observations and measurements, and physical and chemical analyses on plants were done. The beginning of flowering was the date when 25% of the flowers in the different parts of the crown were in full bloom. The blooming intensity was noted from 0 (absent) to 5 (abundant), according to the research methodology of fruit tree breeding (Cociu, 1989). 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) guidelines.
During 2010-2014 the fruit yield was recorded starting with the 6th year after planting, when the fruit production was considered stable. Yield was described numerically by visually estimating the yield weight (kilograms per tree) approximately one week before the harvest maturity.

RESULTS AND DISCUSSIONS

The studied biological material is represented by eight peach cultivars, three of them created in Romania and five varieties from abroad, but well adapted in our climatic conditions.
The beginning of blooming at peach varieties is started on the 23th of March (in the years with early spring) at 'Springold' and 'Springcrest', follow by the other studied varieties (at 2-3 days apart), table 2. In the years with late spring, the blooming started on the 7th of April and ended on the 19th of May ('Redhaven'). The blooming time period at each variety was about 12-15 days in every year. The end of blooming was grouped on the 9.04 to 18.04 in the years with early spring and on the 19.04 to 03.05 in the years with cold spring.
The blooming intensity was noted with 3, 4 and 5 (maximum) at 'Springold', 'Springcrest', 'Raluca', and 'Southland', that means a large number of flower buds were differed.
The fruit ripening was recorded between 18.06 (early varieties) and 5.09 (late peach varieties), the fresh consumption of the peach lasting two and a half month.

Table 2. Phenological stages of some peach genotypes (multiannual data/RSFG Constanta)

Genotype	Origin	Beginning of flowering	End of flowering	Flowering intensity	Ripening time
Springold	USA	25.03-7.04	11.04-19.04	5	18.06-30.06
Springcrest	USA	24.03-9.04	11.04-22.04	5	22.06-03.07
Cardinal	USA	27.03-10.04	18.04-29.04	3-4	2.07-12.07
Raluca	Romania	29.03-15.04	25.04-03.05	5	11.07-21.07
Redhaven	USA	31.03-19.04	13.04-30.04	4-5	17.07-28.07
Southland	USA	31.03-21.04	9.04-20.04	5	27.07-15.08
Superba de toamnă	Romania	1.04-15.04	10.04-22.04	4	5.09-15.09
Flacăra clon 1	Romania	31.03-17.04	7.04-16.04	3-4	27.08-6.09

Fruit of all those peach varieties have a nice appaearance, bright red colour, big size and a good balanced taste (table 3). The dry matter content was higher for 'Raluca' (12.8 %) and 'Flacăra clon 1' (11.3). The acidity was 0.37 mg/100 g flesh fruit ('Raluca') and 0.78 ('Flacăra clon 1').

During 2010-2014, the average fruit weight was 75 g ('Springold') and 220 g ('Flacăra clon 1'), table 3; average yield for 'Flacăra clon 1' is 14.7 t/ha while for the 'Raluca' cultivar is 24.66 t/ha (table 4). The fruit destination is for fresh consumption and processing.

Table 3. Quality test of fruit (multiannual date/RSFG Constanta)

Genotype	Fruit appearance	Fruit flesh	Fruit mean weight (g)	Dry matter (%)	Acidity* (mg%)
Springold	Spherical, yellow with 30% red	Yellow, ferm, good quality	75	9.0	0.67
Springcrest	Spherical, yellow with 60% red	Yellow, juicy	97	7.7	0.66
Cardinal	Spherical, yellow with 60% red	Yellow, juicy, good taste	160	9.3	0.58
Raluca	Spherical, yellow with 80% red	Yellow, very juicy, good flavor	195	12.8	0.37
Redhaven	Spherical, yellow with 90% red	Yellow, juicy, very good taste	180	9.4	0.71
Southland	Ovoidal, yellow, 55% orange	Orange flesh, ferm, very good taste	250	9.9	0.61
Superba de toamnă	Spheric-ovoidal, white-pink,70% red	White, juicy, good flavor	150	10.0	0.56
Flacăra clon 1	Ovoidal, yellow, 60% red	Yellow, juicy, good taste	220	11.3	0.78

*Acidity: mg malic acid/100 g flesh fruit

Table 4. Average yield of some genotype of peach (2010-2014) RSFG Constanța

Genotype	Yield (t/ha)**						Fruit destination
	2010	2011	2012	2013	2014	Average (t/ha)	
Springold	19.5	23.0	25.2	21.7	23.3	22.54	Fresh consumption
Springcrest	21.7	24.9	25.7	23.0	25.1	24.08	Fresh consumption
Cardinal	14.3	15.0	14.8	15.3	14.5	14.78	Fresh consumption and proccesing
Raluca	21.8	23.0	25.7	26.0	26.8	24.66	Fresh consumption and proccesing
Redhaven	19.4	22.0	26.0	25.3	22.7	23.08	Fresh consumption and proccesing
Southland	19.7	21.7	25.0	27.7	26.0	24.02	Fresh consumption and proccesing
Superba de toamnă	13.3	15.0	15.3	16.1	13.8	14.7	Fresh consumption and proccesing
Flacăra clon 1	13.0	14.7	16.0	19.4	15.0	15.62	Fresh consumption and proccesing

**The orchard density: 833 trees/ha

CONCLUSIONS

The studied peach varieties could be successfully extended in areas were the peach finds favorable conditions, enriching the present assortment due to their qualities such as: superior fruit taste and flavor, annual high and constant productivity, precocity of fruiting.
Blooming at the intervals on the same tree had the advantage that the spring frosts damaged only partially the flower buds, even when flowering was early (24.03-1.04).
The earliest varieties are 'Springold', 'Springcrest', 'Cardinal' and 'Raluca' (middle of June-beginning of July), and the latest is Flacăra clon 1 (September).
During the study (2010-2014) the highest average yield proved to be recorded at 'Raluca' (24.66 t/ha) and 'Southland' (24.02 t/ha), followed by and 'Springcrest' (24.08 t/ha) and 'Redhaven' (23.08) t/ha.

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