

THE FAVORABILITY OF SOME PEACH VARIETIES UNDER THE CONDITIONS OF AN INTEGRATED PRODUCTION SYSTEM

Snejana DAMIANOV, Ioana GROZEA, L. MOLNAR, Ana Maria VÎRTEIU
University of Life Sciences "King Mihai I" from Timisoara, Romania
Corresponding author: snejana_damianov@usvt.ro

*Abstract. The peach is one of the most valuable cultivated fruit species that stands out for its early fruiting, high production potential, superior fruit quality. The trees begin to bear fruit economically from the third year after planting, the establishment of the first commercial peach plantations in Romania until now, the assortment has been subjected to a continuous process of improvement, as a result of the appearance of new more valuable varieties, the increase in demands for the quality of the fruits, of the diversification of the forms of capitalization, of the expansion of the culture areas. The adaptability of Romanian peach varieties is determined by the resistance of the fruit buds to the frosts during the winter. The data show that there is a strong negative correlation between the percentage of frosted fruit buds and fruit production. A percentage of over 55% frozen flower buds already calls into question the realization of the production plan. The verification of the adaptability of the new varieties was done through comparative cultures, organized simultaneously in several centers, with trees of the same age and on the same rootstock. Gum leaks are found in almost all stone trees, but in the case of an attack with this fungus, the leaks are abundant, leading to the rapid exhaustion of the trees. For observations or analyzed for each tree 300 leaves, 50 shoots (50 x 3 trees) 100 fruits, in three repetitions. The interpretation of the results was done by calculating the analysis of the variant, being also analyzed the expression of the character of resistance obtained by correlating the frequency with the intensity of the attack. The disease is caused by *Stigmina carpophyla* (syn. *Coryneum beijerinckii* Oud.) In the subepidermal tissues, the fungus develops its mycelium, where the fruiting bodies appear, which come to the surface by breaking the epidermis. They spread the pathogen during the vegetation period, being able to germinate at temperatures of 2-24°C. The fruits are deformed and fall before ripening. The flesh of the fruit becomes felty and has a bland taste. On the young shoots, around the buds, the bark turns brown, cracks and ulcers appear, leading to the drying of the buds. Young branches can be deformed, swellings, ulcerations, open cankers appear, which produce abundant gum leakage. The attack on the shoots is very dangerous because it leads to the drying of the trees. In almost all stone trees, gum leaks are found, but in the case of an attack with this fungus, the leaks are abundant, leading to the rapid exhaustion of the trees. The attack with this fungus is strong in the springs following winters with moderate temperatures, because the conidia retain their viability. Infections are favored by lesions in the bark of the branches caused by hail or caused by the attack of some insects.*

Key words: peach varieties, disease, leaf spotting, resistance, intensity attack.

INTRODUCTION

The peach can be grafted onto frank peach, cork oak, blackberry, plum and dovecot. Among these rootstocks, the best in production is the French peach. It is obtained from the seeds of late varieties (Elberta, Elita, Bașc), which germinate at 75-100%. In mid-ripening varieties (first half of

August), the germination capacity is below 30%, and in the others it is absent. Peach pits must be stratified shortly after removing from the fruit, sowing in the nursery will be done in autumn. 2-3 tons of seeds are needed per 1 ha.

The seeds can be sown in the seedling school or directly in the first field, which is better (1 year reduction in the duration of obtaining the planting material).

In field II, the peach emits numerous early shoots that allow it to project and form a crown in the nursery. The peach grafted on the frank peach has sufficiently vigorous and uniform growth, does not show premature death, requires drained soils and lasts 15-20 years.

In Timiș county, the peach was very well represented in the Sânicolaul Mare, Periam, Comloșul Mare, Lovrin, Giarmata - Bencec fruit-growing basins. Currently, the vast majority of plantations in Timiș County are old and even in the process of being deforested, since in the last 10 years almost no appreciable areas have been planted.

In Romania, the local peach populations, planted in family gardens, make better use of the thin soils in the hilly area, and the varieties in the current range also respond economically to the dry sandy soils (in irrigated regime) to the left of Jiului. With a new and valuable assortment, suitable for ecological conditions, peach and nectarine can ensure a fresh consumption of delicacy, a period of two and a half months (Europe) to three and a half months (California, USA). Through the introduction of pavers into culture, the opportunity was created to supply fruit processing factories with raw material, to obtain finished products, which can ensure a harmonious diet.

The peach is more sensitive to the attack of *Taphrina*, *Sphacelotheca* and *Coryneum*, and in years with cold and wet springs, the evolution of pathogens is faster, the attacked fruits show blackish-brown spots of different sizes, which contain numerous conidia.

These spots appear on the growing fruit and in severe attacks can cover the entire fruit.

The peach, like the nectarine (a variety of the peach distinguished from it by its fruits with smooth skin, without pubescence), is considered one of the high-value fruit species in all tree-growing countries. It is a large tree species that loves heat and light, but with less frost resistance than heat resistance. The choice for each area of the most productive varieties, adapted to the ecological conditions, is the lever of great importance for increasing the profitability of the orchards. The data obtained in different countries show that the production varieties possible to achieve by introducing suitable varieties are much higher compared to those achieved by perfecting the other links of the peach culture technology. In the improvement of the peach, a lot of work is done on different programs based on the resistance of the tree and the quality of the fruits.

At the establishment of the first commercial peach plantations in Romania until now, the assortment was subjected to a continuous process of improvement, as a result of the appearance of new more valuable varieties, the increase in the requirements for the quality of the fruits, the

diversification of the forms of exploitation, the expansion of the areas of culture. The adaptability of Romanian peach varieties is determined by the resistance of the fruit buds to the frosts during the winter. The data show that there is a strong negative correlation between the percentage of frosted fruit buds and fruit production. A percentage of over 55% frozen flower buds already calls into question the realization of the production plan. The verification of the adaptability of the new varieties was done through comparative cultures, organized simultaneously in several centers, with trees of the same age and on the same rootstock. This made it possible to establish, with maximum certainty, the best varieties in each area.

MATERIAL AND METHOD

The experiment was placed in a linear arrangement on a number of 3 variants, with 3 repetitions in each variant. Each repetition included a number of 10 seedlings.

The variants of the experiment were the grafted seedlings from the varieties *Redhaven*, *Flacăra* and *Jerseyland*.

The measurements in the variants were carried out on September 9, 2022, determining: the average diameter (thickness) of the rootstocks at the grafting point and diameter of the saplings at 50 cm height from the ground and the height of the saplings.

Varieties taken in research of the measurements made on the peach species:

Redhaven It is a variety obtained at the Michigan Experimental Station in the town of South Haven in the state of Michigan (USA). It is of medium vigor, very productive, blooms semi-early and behaves quite well in the form of a pot crown. Fruits abundantly, 5-year-old trees yielded an average of 49 kg/tree. The fruits are medium, elongated oval, rounded and slightly asymmetrical, of very good quality. Ripening begins in the first days of August and lasts until around August 18-20.

The Flame Obtained by Popa. P. in 1975 in Bucharest - Băneasa from the crossing of the varieties I.H. Hale and Elberta. The tree is of low or medium vigor, with a spherical crown, thick skeletal branches, suitably long, garnished with mixed fruit formations. The fruit is large or very large, with an average weight of over 250 g.

The ripening period takes place in the first decade of September. It is one of the best late ripening varieties, with moderate but constant production.

Jerseyland Variety obtained in the U.S.A. and released into production in 1946. The tree is vigorous, has medium leaves, with kidney-shaped glands and large, campanulate flowers.

The ripening period is at the end of July. From the point of view of disease resistance, peach varieties behave differently. In the selection of resistant elites, it was found that an important role is played by the correlation between the presence of papillae and the petiole of the leaves and the high resistance to powdery mildew.

Recent research on peaches shows that the introduction of the resistance character in a variety requires that it exists in a parent and that the mode of transmission of the respective characteristic is known.

Observations and determinations regarding the frequency, intensity and degree of attack in peach leaf spotting, out at the Sânnicolaul Mare nursery. The experience includes a number of 8 nectarine peach varieties with linear placement: Romamer 2, ARK 90, ARK 114, ARK 107, ARK 109, ARK 145 Cora, Hardiret.

For observations or analyzed for each tree 300 leaves, 50 shoots (50 x 3 trees) 100 fruits, in three repetitions. The interpretation of the results was done by calculating the analysis of the variant, being also analyzed the expression of the character of resistance obtained by correlating the frequency with the intensity of the attack. The observations on the shoots were made during their growth period, shoots being taken from all around the crown of the trees.

Scoring the attack

F = 0 I – 0% (not attacked)

F = 0.1 – 3 I = 3% (very weakly attacked RFB)

F = 3.1 – 11 I = 10% (weak RB attacks)

F = 11.1 – 25 I = 25% (middle attack RB)

RESULTS AND DISCUSSIONS

In the interpretation of the results, the knowledge related to the properties of immunity, hypersensitivity and tolerance of the varieties to pathogens was used

As a rule, the technology used in connection with genetic resistance tends to become unitary and is based on the following definitions:

- immunity - total absence of attack by a pathogen or total resistance;
- resistance - the ability of a host population to reduce or annihilate the destructive effects of the parasite;
 - specific (total) resistance – resistance that is manifested only by certain physiological races of the pathogen;
 - non-specific (general) resistance - resistance that manifests itself equally against all physiological races of the pathogen;
 - tolerance - the reaction of sensitive organisms to the attack of a pathogen manifested by reduced damage.

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The introduction into the peach culture of varieties with good resistance and very good resistance to the attack produced by leaf spotting (*Coryneum beijerinckii*) makes it possible to significantly reduce phytosanitary treatments and implicitly environmental pollution when applying these treatments in percentages of 66.4 - 75% .

Varieties with medium resistance to the attack of this disease allow to reduce the number of treatments and implicitly the pollution of the environment by 50%.

Peach plantations are affected by the complex of pathogens with a preponderance of mycotic nature, constantly changing, its presence in crops being influenced, in addition to the different evolution of climatic conditions every year, by dirigible technological factors (resistant genotype, fertilization, decime).

Table 1.

The results of the measurements made on the peach species of the Sannicolaul Mare nursery in 2022

| Variety peach | Peach varieties Diameter (thickness) of seedlings – mm Height of seedlings – mm | | | | Height of seedlings – mm | | | |
|---------------|---|-------------------|-------|----------|--------------------------|-------------------|--------|----------|
| | Treated variant | Untreated variant | Dif + | % growth | Treated variant | Untreated variant | Dif. + | % growth |
| Redhaven | 21,8 | 19,1 | 2,7 | 11,4 | 2,37 | 2,10 | 0,27 | 11,3 |
| Flacăra | 20,9 | 19,3 | 1,6 | 10,8 | 2,38 | 2,18 | 0,20 | 10,9 |
| Jerseyland | 21,4 | 19,5 | 1,9 | 10,9 | 2,44 | 2,26 | 0,18 | 10,8 |

DL 5% = 2,04
 DL 1% = 2,75
 DL 0,1% = 3,65

Table 2.

The expression of the resistance character of some peach varieties determined within the observations made in the plantation

| No. crt | Variety/hybrid | F% | I% | Ga% | Note | Meaning |
|---------|----------------|------|----|------|------|---------|
| 1. | Romamer (Mt.) | 47,4 | 25 | 11,8 | 6 | RM |
| 2. | ARK 90 | 24,8 | 25 | 6,2 | 7 | RB |
| 3. | ARK 107 | 14,6 | 10 | 1,4 | 8 | RB |
| 4. | ARK 109 | 3,6 | 3 | 0,1 | 9 | RFB |
| 5. | ARK 114 | 50,1 | 25 | 12,5 | 6 | RM |
| 6. | ARK 145 | 95 | 25 | 23,7 | 5 | RM |
| 7. | Cora | 22,1 | 25 | 5,5 | 7 | RB |
| 8. | Hardiret | 81,6 | 25 | 20,4 | 5 | RB |

F = 0.1 – 3 I = 3% (very weakly attacked RFB)
 F = 3.1 – 11 I = 10% (weak RB attacks)
 F = 11.1 – 25 I = 25% (middle attack RM)

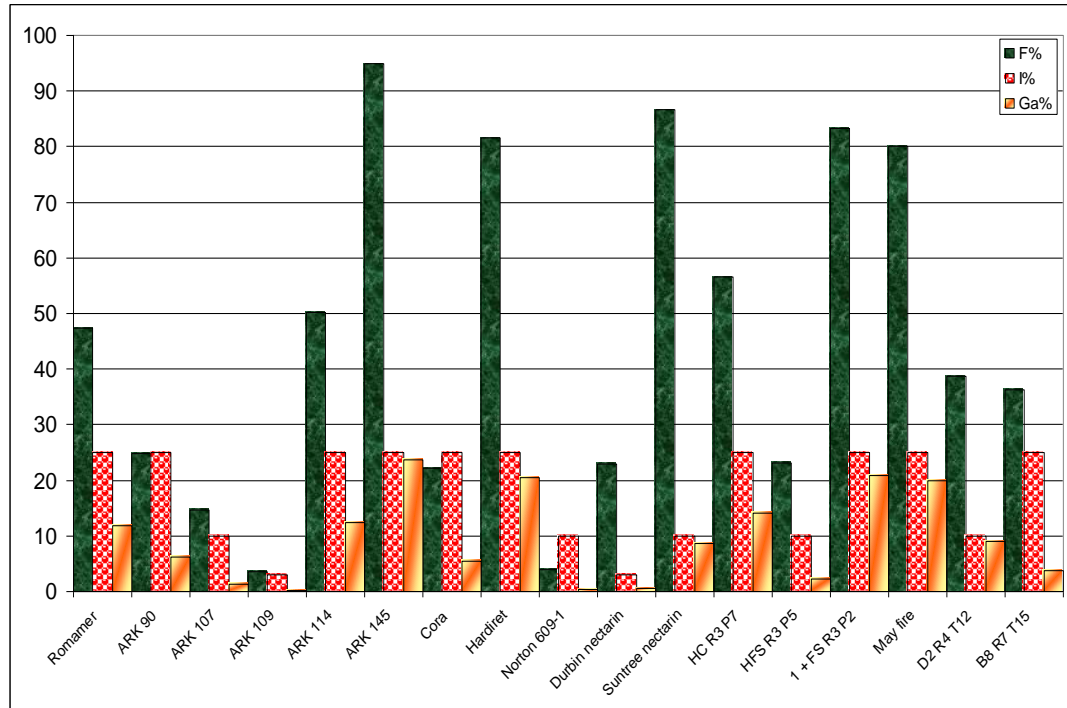


Figure 1. Resistance character expression

Analyzing the sensitivity of the varieties according to the receptivity of the leaves to the pathogen attack, it can be shown that it decreases with age, the young ones being hypersensitive and being attacked in a higher percentage, while the adult leaves, due to the thickening of the cuticle, have a weaker receptivity to diseases. This remark is the same whatever the variety. The variable remains the intensity of the attack, which depends on the sensitivity of the variety.

CONCLUSIONS

In the peach varieties Redhaven, Flacăra and Jerseyland, when the height of the saplings was 70 cm, under the conditions of compliance with the culture technology and the necessary treatments, and the average height of the saplings reached 95 cm, in normal climatic conditions, without special meteorological phenomena, ensured vegetative growth increments, contributing to obtaining a good quality peach tree planting material.

The average diameter or thickness of the saplings increased compared to the control by 11.4% in the Redhaven variety, 10.8% in the Flacăra variety and 10.9% in the Jerseyland variety.

The height of the seedlings increased compared to the control by percentages of 11.3% in the Redhaven variety, 10.9% in the Flacăra variety and 10.8% in the Jerseyland variety.

The study of the behavior of the infection with the fungus *Coryneum beijerinckii* reveals the fact that the symptoms appeared only on the leaves, the highest sensitivity to this fungus was shown by the variety ARK 145.

Varieties and hybrids: ARK 90, ARK 107, Cora, Hardiret, they had good resistance to the attack caused by leaf spotting (*Coryneum beijerinckii*).

Average resistance to the attack caused by leaf spotting (*Coryneum beijerinckii*) was shown by the varieties and hybrids: ARK 114, ARK 145.

There were no obvious differences in attacks produced by pathogens and pests and there were phenomena of phytotoxicity. Also, there were no meteorological phenomena such as: prolonged drought, hail, late spring frosts, etc.

Through the appropriate application of the maintenance works in the plantation, two passes with the machines through the nursery fields were reduced and implicitly the soil pollution through subsidence was reduced.

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