# BIOLOGICAL PARTICULARITIES OF SOME NEW APRICOT VARIETIES CULTIVATED IN THE NORTHERN AREA OF THE COUNTRY

# PARTICULARITĂȚILE BIOLOGICE ALE UNOR SOIURI NOI DE CAIS CULTIVATE ÎN ZONA DE NORD A ȚĂRII

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***Abstract.*** *The research was carried out in the orchard of the company "Vilora" LLC, in 2020. The object of the research was the trees of apricot varieties Spring Blush, Pinkcot, Kyoto and Faralia grafted on the rootstock Mirobalan 29C. The planting distance was 4.0x2.2 m. Apricot trees were planted in the spring of 2018. The trees were driven according to the Trident system. The Kyoto variety had a higher resistance to the late return temperatures, which in the conditions of the northern area registered productions of 17.03 t/ha in the third year after planting.*
**Key words:** apricot, low temperatures, blooming, ripening.

***Rezumat.*** *Cercetările s-au efectuat în livada întreprinderii SRL „Vilora", în anul 2020. Obiect al cercetărilor au fost pomii soiurilor de cais Spring Blush, Pinkcot, Kyoto şi Faralia altoiţi pe portaltoiul Mirobalan 29C. Distanţa de plantare 4,0x2,2 m. Plantarea pomilor de cais s-a efectuat în primăvara anului 2018. Pomii au fost conduşi după sistema Trident. Rezistenţă mai sporită la temperaturile târzii de revenire a avut soiul Kioto, care în condiţiile zonei de nord a înregistrat producţii de 17,03 t/ha în anul trei după plantare.*
**Cuvinte cheie:** cais, temperaturi scăzute, înflorit, maturitate.

## INTRODUCTION

The apricot is an important species for regions with temperate climates, and apricots are in high demand among consumers (Balan *et al.,* 2008; Cociu, 1993).

The latest investigations carried out in the Republic of Moldova show that large areas of apricot are grown in the South and Centre of the country, but due to climate change in the last 10-15 years, apricot cultivation is planted in larger areas and in the area northern, northern steppe subzone and northern Dniester (Peşteanu *et al.,* 2018; Pîntea, 2019).

Until recently, apricot cultivation was considered a risky species. The main factors that conditioned the spread of apricot culture on a larger scale are the low return temperatures at the end of the rest period and late spring, which affect the generative organs (Abbas *et al.,* 2016; Cociu, 1993), premature wilting of trees (apoplexy), infections with various viruses (Balan *et al.,* 2008), the absence of a modern assortment of varieties, rootstocks (Duval *et al.,* 2012) and crown forms

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(Stănică, 2019; Negru, 2019) suitable for such varieties/rootstock associations, which would intensify the culture and would allow obtaining high and competitive productions (Cociu, 1993; Maria and Sosna, 2006; Peşteanu *et al.,* 2018).

## MATERIAL AND METHOD

The experiences took place in the super-intensive apricot plantation, within the didactic orchard of the enterprise "Vilora" LLC, Stolniceni village, Edineți district. The trees were planted in 2018, at distances of 4.0 m between rows and 2.2 m per row, at a density of 1136 trees/ha and were grafted on the rootstock Mirobalan 29C.

The biological material used in the experiment was represented by 4 varieties of apricot (Spring Blush, Pinkcot, Kyoto and Faralia) widely spread in countries with advanced fruit growing and which for growers in the Republic of Moldova are new varieties. The Kyoto variety was taken as a control. The trees were guided by the trident crown system (chandelier).

Approved methodological principles and methods in genetic improvement and the study of fruit species were used for the research. They were performed both in the field, where biometric measurements were performed to highlight the influence of biological characteristics of the variety on tree growth and fruiting, and in the laboratory.

The main results obtained were statistically processed by the method of dispersion analysis.

## RESULTS AND DISCUSSIONS

Investigations carried out in the spring of 2020 show that the length of the trunk circumference is influenced by the biological peculiarities of the variety, registering higher values for the Pinkcot variety compared to the Spring Blush, Kyoto and Faralia varieties (tab. 1). The difference between the Spring Blush variety and the other varieties is also statistically proven.

In the case of the Spring Blush and Faralia varieties, a higher plant height was recorded than in the Pinkcot and Kyoto varieties. The Kyoto variety has average values compared to the other varieties studied.

*Table 1*

**Bioconstructive parameters of apricot trees driven by crown shape trident in the third year of training**

| Variety | Length of the circumference, cm | Tree hight, cm | Crown lenght, cm | Crown width, cm |
|---|---|---|---|---|
| Spring Blush | 13.5 | 390 | 230 | 100 |
| Pinkcot | 14.5 | 320 | 240 | 103 |
| Kioto | 14.0 | 370 | 195 | 119 |
| Faralia | 14.0 | 390 | 225 | 118 |
| LDS 5% | 0.64 | 16.4 | 9.7 | 4.6 |

Higher values of crown length were recorded for Pinkcot compared to other varieties. Lower values within the bioconstructive parameters of the trees were recorded within the crown width. A smaller crown width was recorded for the

Spring Blush variety - 100 cm, whose growth shape is more pyramidal compared to the other varieties studied.

Depending on the width of the crown, the varieties studied can be divided into two groups. Spring Blush and Pinkcot can be placed in the first group, and the Kyoto and Faralia varieties in the second group.

The investigations show that in the study, the biological characteristics of the variety influence the number of branches of different origin and age and their total length.

Lower values were recorded for Spring Blush and Kyoto varieties, where the index in question was 16 and 14 pcs/tree, respectively. In the case of Pinkcot and Faralia varieties, the number of anticipated branches registered higher values compared to the previous varieties, constituting 43 and 52 pcs/tree, respectively (tab. 2).

The average length of the anticipated branches for the varieties studied varied from 21.4 cm to 31.9 cm. Spring Blush varieties recorded lower values of the average length of the anticipated branches - 21.4 cm. Next, in ascending order are placed the Kyoto variety - 24.1 cm, the Faralia variety - 26.0 cm and the Pinkcot variety - 31.9 cm.

*Table 2*

**The average number and length of different branches in the crown of apricot trees based on the biological characteristics of the variety**

| Variety | anticipated | | annual | | two years old | |
|---|---|---|---|---|---|---|
| | number of brunches, pcs. | average lenght, cm | number of brunches, pcs. | average lenght, cm | number of brunches, pcs. | average lenght, cm |
| Spring Blush | 16 | 21.4 | 41 | 44.5 | 3 | 198.3 |
| Pinkcot | 43 | 31.9 | 23 | 80.0 | 3 | 183.0 |
| Kioto | 14 | 24.1 | 29 | 68.9 | 3 | 184.0 |
| Faralia | 52 | 26.0 | 29 | 90.6 | 3 | 167.7 |
| LDS 5% | 0.85 | 1.43 | 1.15 | 2.28 | 0.12 | 8.7 |

Anticipated shoots are of great importance in the crown of apricot trees, because these elements of the crown are bearing fruitful microstructure. In the case of 2020, when flowering was early, and late spring frosts were recorded, part of the crop was possible to save due to this fruitful microstructure.

Lower values of the number of annual branches were registered for the Pinkcot variety - 23 pcs/tree, and higher values for the trees from the Spring Blush variety - 41 pcs/tree. In the case of the Kyoto and Faralia varieties, the index in question recorded identical values of the number of annual branches, amounting to 29 pcs/tree.

The study carried out on the average length of the annual branches showed that, on the varieties studied, the index in question varied from 44.5 to 90.6 cm. Lower values of the average length of annual branches were recorded in the Spring Blush variety, where the index in question was 44.5 cm, which was a decrease of twice compared to the Pinkcot and Faralia varieties.

The study performed on the number of branches with the age of 2 years considered as constant elements within the trident crown, did not have large deviations, because in all trees the number of branches was constant - 3 pcs/tree.

In the case of the average length of two-year-old branches, the index in question ranged from 167.7 cm to 198.3 cm. Lower values of the average length of the basic branches were recorded for the Faralia variety -167.7 cm, and higher for the Spring Blush variety - 198.3 cm. The average length of the two-year-old branches of the Pinkcot and Kyoto varieties was 183.0 and 184.0 cm, respectively.

Studying the total length of the anticipated branches, we noticed that lower values were registered for the Spring Blush and Kyoto varieties, where the index in question was 342 and 338 cm, respectively, this constituting 11.7-12.4% of the total share. of the branches in the crown of the trees (tab. 3).

*Table 3*

The crown structure of apricot trees according to the biological characteristics of the variety

| Variety | Branches lenght | | | |
|---|---|---|---|---|
| | anticipated | annual | two years old | summed up |
| Spring Blush | 342 | 1825 | 595 | 2762 |
| Pinkcot | 1372 | 1839 | 549 | 3760 |
| Kioto | 338 | 1998 | 552 | 2888 |
| Faralia | 1355 | 2629 | 503 | 4487 |
| LDS 5% | 16.2 | 63.4 | 23.6 | - |

Values higher than the total length of the annual branches were registered for the Faralia variety - 2629 cm, which constituted 58.5% of the total weight of the branches in the tree crown. In the case of the Kyoto variety, the total length of the annual branches was insignificantly higher than in the Spring Blush and Pinkcot varieties, but much smaller than in the Faralia variety.

Depending on the share of annual branches in relation to the total length of the branches in the tree crown, higher values of the index in question were recorded for the Spring Blush variety (21.6%), and further, the Kyoto variety is decreasing (19.2%), Pinkcot variety (14.6%) and Faralia variety (11.3%).

The total length of the vegetative macrostructure and the fruiting microstructure correlates directly with the biological peculiarities of the studied varieties. Higher values of the index in question were recorded for the Faralia variety - 4487 cm, and then, in decreasing order, the Pinkcot variety - 3760 cm, the Spring Blush variety - -2962 cm and the Kyoto variety - 2888 cm.

The data entered in table 4 show that the flowering started on March 23 with the Pinkcot variety. Two days later, the flowering of the Spring Blush variety was registered - March 25. Then, from March 28, the Faralia variety bloomed and the latest flowering was registered in the Kyoto variety, starting with March 29. Practically, during 7 days, the phenophase started flowering in the studied varieties in the northern part of the country.

The study carried out on the degree of flowering registered that in the

investigated varieties, 50% of the flowers were flowered in the Pinkcot variety on March 26, and in the Spring Blush variety this stage coincided with March 27. The latest varieties of flowers in the area were Faralia and Kyoto, which coincided with March 29 and March 30, respectively.

That is, the period between the beginning of flowering and the 50% flowering phenophase lasted about 2-4 days depending on the biological characteristics of the variety and the air temperature in that period.

The duration between the phenophase 50% flowering and full flowering (100%) in the apricot varieties studied was 2-3 days depending on the biological characteristics of the variety (tab. 4).

Depending on when 100% flowering was recorded, the varieties studied can be placed in the following sequence: Pinkcot variety - March 27, Spring Blush variety - March 29, Faralia variety - April 1 and Kyoto variety - April 3.

The fall of the petals invokes the period when the fruits had just been formed and they were quite sensitive to various biotic and abiotic hazards. The results listed in table 4 show that the fall of the petals in the studied varieties took place from 05 to 08 April, a shorter period of time compared to other previous periods.

*Table 4*

**The influence of the biological particularities of apricot varieties on the onset of phases flowering trees in the northern part of the country**

| Variety | The start of the phase the beginning of the flowering of the trees | | | | |
|---|---|---|---|---|---|
| | Triggering flowering | Flowering 50% | Full flowering | Falling petals | Endocarp strengthening |
| Spring Blush | 25.03 | 27.03 | 29.03 | 06.04 | 19.05 |
| Pinkcot | 23.03 | 26.03 | 27.03 | 05.04 | 18.05 |
| Kioto (m) | 29.03 | 31.03 | 03.04 | 08.04 | 21.05 |
| Faralia | 28.03 | 29.03 | 01.04 | 07.04 | 20.05 |

Hardening of the endocarp is a rather important phenophase for apricot. In addition, during this period, if the soil moisture was lower than 75% of the field capacity, it was necessary to water the trees to rule out water shortages.

The study carried out on the early ripening period of fruit harvesting of the apricot varieties studied shows that this phenophase began 87 days after the onset of Spring Blush flowering. In the Faralia variety, the harvest maturation was registered 117 days after flowering, and in the Pinkcot and Kyoto varieties 93 and 103 days, respectively.

If we compare the ripening period of the apricot fruit harvest with the Kyoto variety, considered as a control, we registered that the studied varieties are assigned to 4 maturation groups. The group of varieties with early ripening was attributed to the Spring Blush variety, whose fruit harvest began 16 days earlier compared to the control variety. The group Pinkcot was assigned to the group of early maturing varieties, the difference of which was 6 days in terms of the start of the harvest period compared to the control variant. The varieties with medium

maturity include the Kyoto variety (0 days), and the group of late maturing varieties Faralia variety, whose harvesting period started 14 days later compared to the control variant.

## CONCLUSIONS

1. The biological particularities of the variety influence the length of the trunk circumference and the bioconstructive parameters of the crowns.

2. The number of anticipated branches and their average length are correlated with the vigor of growth of the varieties studied and were of major importance in obtaining the harvest in spring 2020, when low temperatures were recorded in the northern area, which negatively influenced the production of apricots.

3. The development of vegetative phenophases in apricot trees studied with geographical and climatic locations is based on the sum of active temperatures recorded in the period from the beginning of flowering until the start of harvest and only after this stage the fruits can reach consumption and harvest.

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