

## PRODUCTIVITY OF APRICOR OCHARD BY THE METHOD OF CONDUCTING THE CROWN IN THE PERIOD OF GROWING AND FRUCTIFICATION OF THE TREES

### PRODUCTIVITATEA PLANTAȚIEI DE CAIS ÎN FUNCȚIE DE MODUL DE CONDUCERE A COROANEI ÎN PERIOADA DE CREȘTERE ȘI FRUCTIFICARE A POMILOR

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**Abstract.** The experimental plot is placed in the orchard “Agroparc Management” Ltd. founded in 2015 year. The study subject of the experience was Spring Blush and Pinkcot apricot varieties grafted on Mirobalan 29C rootstock, conducted by 6 forms of crowns. The distance of plantation is 5.0 x 3.0 m. The research was conducted during the period of 2018 year. During the research, it was studied, amount of flowers and degree of setting, number of fruits, mean fruit weight and yield. It was established that, the formation of crowns of the apricot trees influence on amount of flowers, degree of setting, number of fruits, mean fruit weight and yield of studied varieties.

**Key words:** Apricot, varieties, crowns, setting, yield

**Rezumat.** Lotul experimental a fost amplasat în livada întreprinderii SRL „Agroparc Management”, fondată în anul 2015. Ca obiect de studiu au servit pomii de cais de soiurile Spring Blush și Pinkcot, altoite pe portaltoiul Mirobalan 29C, conduse după 6 forme de coroană. Distanța de plantare 5,0x3,0 m. Cercetările au fost efectuate pe parcursul anului 2018. Pe parcursul cercetărilor sa studiat ponderea ramurilor de diferite vârstă, cantitatea de flori și gradul de legare, cantitatea de fructe, greutatea medie și recolta. Sa stabilit că forma de conducere a coroanei la cais a influențat asupra ponderii ramurilor de diferite vârstă, cantității de flori și gradului de legare, cantității și greutatea medii a unui fruct, producției obținute.

**Cuvinte cheie:** Cais, soiuri, coroane, grad legare, producție

## INTRODUCTION

The culture of the apricot, whose fruits - apricots - are highly sought after, both for fresh consumption and in the food industry, has long been viewed with distrust, and considered risky, due to the traits related to low resistance to frost, sensitivity at specific diseases, premature loss of trees from plantations and short duration of fruit storage (Balan *et al.*, 2008; Cimpoieș, 2018; Cociu *et al.*, 1993).

Nowadays, in the Republic of Moldova, for the establishment of apricot plantations are used vigorous varieties / rootstocks, for which crowns with large gauges are recommended, where the vegetal macrostructure prevails over the

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rodent microstructure (Babuc, 2012; Cimpoieș, 2018; Pesteanu *et al.*, 2018).

At the European level, the culture of the apricot in the last two decades has undergone great transformations regarding the assortment of varieties and rootstocks, the crown form, reaching today remarkable performances in the technology of cultivation of the mentioned species by means of harvests of 25-30 t/ha of fruits of superior quality (Cociu *et al.*, 1993; Hoza, 2005; Pinteș, 2019).

The optimization of the structure of the apricot plantation can be achieved only through the implementation in production of new crown shapes suitable for the species concerned in the intensive system. This would allow for higher, constant and competitive quality productions (Negru, 2018; Pesteanu *et al.*, 2018).

The aim of this study was to evaluate the behavior of six crown shapes on the precocity and yield of two new apricot varieties grafted on Mirobalan 29C rootstock in the climatic conditions of the Republic of Moldova.

## MATERIAL AND METHOD

The researches carried out during the year 2018 in the intensive apricot orchard of the company "Agroparc Management". The plantation was founded in the spring of 2015, with one-year-old trees from the Spring Blush and Pinkcot varieties, grafted onto the Mirobalan 29C rootstock. Planting distance 5.0x3.0m.

In order to solve the suitability of apricot varieties to different forms of crown management, the following variants have been studied: 1 – Non-layered (control); 2 - Mixed pyramid; 3 – Slender Spindle; 4 – Open vase; 5 – Free palmetto; 6 - Pal - spindel.

Plots were placed in blocks, each variant having 4 repetitions. Each rehearsal consisted of 8 trees. The researches were carried out under field and laboratory conditions according to accepted methods of carrying out the experiments for studying apple orchards.

Statistical processing of the data was performed by the method of dispersion analysis.

## RESULTS AND DISCUSSIONS

The apricot is a species that bears both on anticipated shoots and annual branches of different growth waves, as well as on fruit formations that have differentiated on branches with the age of 2 years.

Studying the weight of the anticipated branches (tab. 1) we record that the Pinkcot variety recorded higher values compared to the Spring Blush variety. If, in the Spring Blush variety, the weight of the anticipated shoots on the variants in the study constituted from 6.0 to 21.5%, then in the Pinkcot variety it ranged from 34.3 to 50.6%. These anticipated branches will bloom later and to a certain extent will prevent the affection of the low temperatures during the late spring.

In contrast, in the Spring Blush variety, the percentage of annual branches predominates compared to the Pinkcot variety, where the index in the study constituted, respectively 73.3-77.2% and 36.3-52.1%.

In the case of two-year-old branches, a higher weight was registered in the

Spring Blush variety (3.6-15.4%) compared to the Pinkcot variety (6.3-13.3%).

In the case of three-year old branches, higher values were registered for the Pinkcot variety (0.8-4.1%) compared to the Spring Blush variety (0.4-1.8%).

Studying the influence of the formation of the crown on the weight of the branches of different ages within the crown, we note that in the Spring Blush variety a higher share of the anticipated branches was recorded in the control variant (21.5%) and slender spindle (21.2%) and mixed pyramid (20.0%). At the formation of the trees after the open vase was registered the lowest values (6.0%). The other variants recorded average values. A higher weight of the branches with the age of 2 years was obtained in the case of the open vase.

Studying how the vegetative and rodent macrostructure developed within the Pinkcot variety, we record that the proportion of the anticipated branches and of the one year ones was approximately the same, constituting respectively 34.3-50.6% and 36.3-52.1%.

Table 1

**The structure of the crown in apricot trees according to the biological particularities of the variety and the way of its management, a. 2018,%**

Variety	The crown type	Branches lenght			
		anticipated	annual	two years old	three years old
Spring Blush	Non-layered (control)	21.5	73.3	3.9	1.3
	Mixed pyramid	20.0	74.3	4.0	1.7
	Slender Spindle	21.2	73.6	3.6	1.6
	Open vase	6.0	77.2	16.4	0.4
	Free palmetto	15.6	75.6	7.0	1.8
	Pal-spindel	17.4	77.7	3.9	0.9
Pinkcot	Non-layered (control)	50.6	38.7	8.1	2.6
	Mixed pyramid	34.3	52.1	9.5	4.1
	Slender Spindle	53.8	36.3	6.3	3.5
	Open vase	41.4	44.5	13.3	0.8
	Free palmetto	48.5	42.9	6.6	2.0
	Pal-spindel	48.8	40.2	9.9	1.1

Within the anticipated branches higher values were obtained in the variants formed as slender spindle (53.8%) and non-layered pyramid (50.6%). Mean values were recorded in the variants conducted in the form of free palmetto (48.5%) and pal-spindle (48.8%), and lower values when crown formation after the open vase (41.4%), mixed pyramid (34.3%).

Higher values of the quantity of flowers in the period of 2018 at the Spring Blush variety was recorded in the crown shape as open vase 1440 pcs/tree. Further down, the mixed pyramid is placed - 934 pcs/tree, slender spindle - 888 pcs/tree, pal-spindle - 873 pcs/tree, free palmetto - 838 pcs/tree and control variant - 813 pcs/tree (tab. 2).

As a result of pollination, the fertilization of the reproductive organs the

greatest amount of fruits was registered at the formation of the open vase crown - 255 pcs/tree. In the case of the formation of apricot trees after the mixed pyramid crown, the amount of fruits constituted - 168 pcs/tree, free palmetto - 149 pcs/tree and of the Non-layered (control) - 144 pcs/tree. The smallest amount of fruits was registered in the pal-spindel crown - 110 pcs/tree and slender spindle - 119 pcs/tree.

For the apricot trees of the Spring Blush variety the degree of setting was influenced by the way the crowns are run. A higher degree of setting was recorded in the variants where a shorter cut was used in the formation. At the formation of the crowns after the mixed pyramid system the degree of setting of the productive organs constituted 18.0%. In the case of open vase, Non-layered (control) crown and free palmetto, the index in the study ranged from 17.7 to 17.8%.

Table 2

**The quantity of flowers and the degree of binding of the reproductive organs to the apricot depending on the biological particularities of the variety and the way of conducting the crown, a. 2018**

variety	The crown type	The quantity of flowers, pcs/tree	The quantity of fruits, pcs/tree	The setting degree, %
Spring Blush	Non-layered (control)	813	144	17.7
	Mixed pyramid	934	168	18.0
	Slender Spindle	888	119	13.4
	Open vase	1440	255	17.7
	Free palmetto	838	149	17.8
	Pal-spindel	873	110	12.6
Pinkcot	Non-layered (control)	971	201	20.7
	Mixed pyramid	1098	235	21.4
	Slender Spindle	1074	187	17.4
	Open vase	1943	375	19.3
	Free palmetto	919	193	21.0
	Pal-spindel	962	153	15.9
LSD 5%		17.2	3.9	-

The lowest values of the degree of setting of the ovaries were recorded in pal-spindel variant - 12.6% and slender spindle - 13.4%. This decrease in the degree of setting can be explained by the fact that a higher degree of crown cutting was used for these crowns.

The legacy shown for the Spring Blush variety is valid and for the Pinkcot variety, but with higher values. The amount of fruit in the case of variants while be conducting by different training mode ranged from 187 pcs/tree to 375 pcs/tree. Higher values than in the previous variety were obtained within the open vase. Further downward is the variant founded after the mixed pyramid crown - 235 pcs/tree, control variant - 201 pcs/tree, free palmetto 193 pcs/tree, slender spindle - 187 pcs/tree and pal-spindel - 153 pcs/tree.

A larger number of flowers within the crowns studied were registered within the crown of the open vase - 1943 pcs/tree, the amount of fruits constituting 375 pcs/tree, and the degree of setting of the reproductive organs was 19.3%.

Productivity is the final index after which it is possible to appreciate how all the agrotechnical works were carried out in the respective plantation and which from the links of the technological chain deserves improvement.

The investigations show that fruit production at a tree is closely correlated with the amount of fruits and their average weight (tab. 3).

The biological characteristics of the variety influence the index in question. Lower values of the average weight of a fruit were recorded in the Spring Blush variety (42.3-53.8 g) compared to the Pinkcot variety (50.1-63.1 g).

Table 3

**Productivity of the apricot plantation according to the biological particularities of the variety and the way of conducting the crown, a. 2018**

Variety	The crown type	The average weight, g	Production		In % compared to witness
			kg/tree	t/ha	
Spring Blush	Non-layered (control)	47.3	6.81	4.54	100.0
	Mixed pyramid	44.7	7.51	5.01	110.3
	Slender Spindle	51.3	6.10	4.07	89.6
	Open vase	42.3	10.78	7.19	158.3
	Free palmetto	46.0	6.85	4.57	100.7
	Pal-spindel	53.8	5.91	3.94	86.7
Pinkcot	Non-layered (control)	56.7	11.40	7.60	100.0
	Mixed pyramid	54.1	12.71	8.48	111.6
	Slender Spindle	58.9	11.01	7.34	96.5
	Open vase	50.1	18.78	12.52	164.4
	Free palmetto	57.1	11.02	7.35	96.7
	Pal-spindel	63.1	9.65	6.44	84.8
LSD 5%		0.76	0.11	-	-

In the case of the Spring Blush variety, lower values of the average weight of the fruit were recorded in the case of the trees formed by open vase crown type (42.3 g). With the increase of the degree of cutting, the average weight of a fruit is increased, registering higher values when the trees was formed after the crowns slender spindle - 51.3 g and pal-spindle - 53.8 g.

The study of apricot production in a tree ranged from 5.91 kg in the case of crowns following the pal spindle system to 10.78 kg/tree when they were conducted after open vase system. Mean values were recorded in the other crowns.

The harvest at a surface unit correlated directly with the production obtained within a tree. Lower values are obtained when trees were formed after the pal-spindel system - 3.94 t/ha, and the highest values at the crown open vase -

7.19 t/ha. The other variants recorded average values, from 4.07 to 5.01 t/ha.

In Pinkcot variety, the lower average apricot weight was recorded in the case of the open vase variant - 50.1 g. With the decrease of the amount of fruits in the crown of the trees, the average weight of the apricot fruits increases, constituting in the trees formed by the pal-spindel system - 63.1 g.

The productivity of the trees on the variants in the study ranged from 9.65 to 18.78 kg. Lower values of fruit production were recorded at crown formation after the pal-spindel system - 9.65 kg/tree, and higher in the open vase variant - 18.78 kg/tree, where the degree of cutting at crown formation was more limited.

The production of apricots per unit area is directly correlated with the productivity of a tree. Higher values for both varieties studied or recorded when the trees were conducted after open vase system. The other variants recorded average or insignificantly lower values.

## CONCLUSIONS

1. The quantity of flowers in the studied varieties was closely correlated with the method of crown formation. In the crowns with a larger number of basic branches within the tree there is an increase in the amount of flowers, compared to those where the degree of cutting was higher.

2. Fruit production is correlated by the method of crown conduce, and to obtain early yield to apricot it is necessary to minimize the cuts during the formation period, to increase the weight of the fruit buds in the shortest period of time.

3. Higher yields in the fourth year after planting were recorded in the variant where the trees were conducted by the open vase system, which constituted an increase with 53.8% et the Spring Blush variety and 64.4% et the Pinkcot variety compared to the control variant.

## REFERENCES

1. Babuc V., 2012 - *Pomicultura*. Chișinău, p. 348-354.
2. Balan V. et al., 2008 - *Caisul și caisele*. București: Ceres, 686 p.
3. Cimpoieș Gh., 2018 - *Pomicultura specială*. Chișinău: Golograf-com, 336 p.
4. Cociu, V. et al. 1993 - *Caisul*. București: Editura Ceres, 401 p.
5. Hoza D., 2005 - *Cultura caisului: ghid practic*, 90 p.
6. Negru I., 2018 - *Dezvoltarea pomilor de cais altoiți pe portaltoiul Mirobalan 29C în funcție de modul de formare a coroanei în perioada de creștere a plantației*. Lucrări științifice UASM. Chișinău Vol. 47. Horticultură, Viticultură și vinificație, Silvicultură și grădini publice, Protecția plantelor, p.77-82.
7. Peșteanu A., Manziuc V., Cumpanici A., Gudumac E., Braghiș A., 2018 - *Producerea caiselor*. Manual tehnologic. Chișinău, 291 p.
8. Pîntea M., 2019 - *Cercetari agrobiologice asupra sortimentului modern de cais*. Știința în Nordul Republicii Moldova: realizări, probleme, perspective. Ediția a 3-a. Balti, p. 249-253.