STUDIES REGARDING THE ESTABLISHMENT OF THE INTENSIVE AND SUPER-INTENSIVE CULTIVATING TECHNOLOGY OF THE PEACH-TREE IN DIOSIG FRUIT-GROWING AREA

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RESEARCH ARTICLE

Abstract

The peach-tree is one of the most appreciated fruit-growing to the special qualities of the fruit and to the biological possibilities of the tree.

The intensive and super-intensive peach-tree growing raises a number of questions regarding regarding the possibility of applying the system, because in the case of the peach-tree, there are no reduced vigour varieties or mother plants in production, which could easily allow the appliance of those systems on a large scale.

Taking into account the general tendency of intensifying the tree-growing, it is raised the problem of trying and finding solutions of making possible, in the case of peach-tree, too, the planting of more trees on a hectare, promoting the intensive and super-intensive cultivating system.

This way, researches were performed in Diosig, using varieties and planting distances, on their basis being decided the intensifying degree of the peach-tree.

Key- words : *peach-tree, varieties, planting distances, the behaviour of the flower buds, thick growing of the trunk, fruit production.*

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INTRODUCTION

The peach-tree belongs to the most valuable fruit-growing species.

Taking into account their savour, the peaches are placed immediately after the grapes, oranges and apple, they have a complex chemical composition and can be eaten both fresh varieties prove a spaced.

Peach-tree varieties prove a spaced out ripening, beginning with the 15th - 20th of June until the end of September, covering a period of more than 100 days.

The peach-tree shows some technological advantages: it is extremely precocious and productive; it hasn't got any response at fertilizing and irrigation; lower sensibility in case of hoar-frost compared to the apricot-tree; fruit are easily carried and handled.

Among the disadvantages of the peach-tree, the following could be pointed out: high demands for light and heat as well as for the soil; pretension to cutting very sensitive in case of blistering, reduced longevity and a certain percentage of early perishing.

MATERIAL AND METHOD

The biological material consisted in 3 peach-tree varieties: Springold, Redhaven and Autumn Gorgeous, grafted on a month plant, Oradea 1, which represented a factor during the experiment.

The trees were planted leaving a distance of 4 meters between the rows and 3, 2, 1 and 0,5 meters between the trees in a row, having as result variants with planting distances comprising 833, 250, 2500, 5000 tree planted on a hectare, representing variants of intensive and super-intensive cultivating systems.

The soil in the orchard was maintained in good conditions as an early autumn ploughing long before and using the dish harrow.

Regarding the rigorous maintenance of soil as ploughing, during the last 2 years, there was noticed a certain reducing of the strictness applied to the appearance of many weeds, beginning especially with the second part of the summary.

The fertilization of the poet was done by the yearly usage of N_{100}, P_{100}, K_{100} Kg doses

of active substance per hectare, and disease and pest control was done according to the technology applied in the production farms.

In order to notice the behaviour of the trees depending on planting distance, the growth of the tree thickness and the loss quality and quantity ; and the loss of flower buds was given in percentage of the total amount of the analysed buds.

At the same time, when spring began, it was found out the way the flower buds passed the winter, by means of gathering the fruit-behaviour branches and gathering the fruit-bearing branches and deciding upon the buds viability.

RESULTS AND DISCUSSIONS

1. The resistance of the varieties to the frost

Taking into account the temperature during the winter 2021 – 2022 and 2022 – 2023 we found out the way in which the varieties analysed were influenced by these values of the temperature.

The researches of the data obtained during the spring of 2022 showed that all the varieties studied were strongly influenced by the low temperatures during the winter, which practically destroyed the crop 100%.

The behaviour of the buds when confronted with negative temperatures in 2023 is presented in table no 1.

Table 1

Behaviour of the buds when negative temperatures 2023

Variety	Number of analysed buds	Number of variable buds	Number of dead buds	Percentage of dead buds
Springold	100	12	88	88
Redhaven	83	67	16	13
Autumn Gorgeous	40	16	24	60

When looking at data in this table it can be noticed that, during the winter 2022 – 2023, when the lowest temperature only came close to the limiting value of resistance at the peach-tree, there was also registered an important loss of flower buds.

The loss differs depending on the variety, finding that the Radhave behaved the best out of the 3 varieties studied, having 13% loss, which places it between the common limits, from the practical point of view.

A more serious situation can be noticed at Springold with early ripening, which showed a loss more of more than 80% of the flower buds, so that there is a strong reason for compensation cutting.

Between the 2 varieties the Autumn Gorgeous is placed, with loss of 60%

There can be noticed that the resistance at lower temperatures is strongly influenced by the biological factors and variety being established the fact that both the variety with early and late ripening show a strong sensibility when confronting low temperature.

2. The growth in thickness of the truck

The growth in thickness of the truck was obtained by measuring the truck was obtained by measuring the truck at about 30 cm above the ground, at the end of vegetation period using sliding callipers; after that, the results were counted for the surface of the truck's section expressed in cm.

Table 2

The surface of the truck's section at the peach-tree depending on the variety and the planting distance at the beginning of 2023

Variety	4x3 m 833 trees/hectare	4x2 m 1250 trees/hectare	4x1 m 2500 trees/hectare	4x0,5 m 5000 trees/hectare	Mean of variety and planting distance	%
Springold	26,9	23,4	22,2	14,1	21,6	118
Redhaven	16,2	17,5	14,3	11,7	14,9	81
Autumn Gorgeous	21,1	20,8	17,6	13,5	18,3	100
Mean	21,0	20,6	18,0	13,8	18,3	100
% given 4x3 m	100	98	86	66	-	-

Table number 2 shows that the 3 varieties behave differently regarding the vigour expressed by the surface of the truck's section.

This way, Springold proves to be the most vigorous, overcoming by 18,3% the being of the 3 varieties taken as witness, being followed by the Autumn Gorgeous , its vigour equalized the mean of the 3 varieties.

When tacking into account the Redhaven variety, we noticed a reduced vigour by 19% confronted with the varieties mean, an extremely important fact for the success of intensive and super-intensive plantation, as it is known that the peach-tree doesn't expose less vigorous mother-plants and varieties. The reduced vigour of the Redhaven variety can also be noticed when referring to the height of the trees as well as to the length of the mixed branches, which are shorter than those belonging to the other 2 varieties under researches.

As concerns the behaviour of the varieties under the influence of the planting distances, it can also be noticed, a strong difference, that is the reducing of the trunk to the extent of the reducing the planting distance, in turn, and increasing the number of trees planed on a hectare.

This way, compared to the trees planted at 4x3m (833 trees/hectare), the trees planted at 4x2m prove to be 2% less vigorous, those planted at 4x1m are 14% less vigorous and those planted at 4x0,5m are 34% less vigorous.

This progressive decrease of vigour, as the number of trees planted on a hectare increases, can be explained by the fact that the trees, possessing smaller and smaller nutritions space turn to account less and less light, food and water but the reduced vigour of trees planted at small distances doesn't have negative effect on the production, on the contrary, the reduced growth being a factor which stimulates the fruit-growing expressed in tons, per hectare.

Beginning with the data in this table which show that if we plant the trees at 4x1m and using the Redhaven, we obtain 14 – 19% less vigorous trees, it is proved we can use in future the intensiveness of the peach – tree growing, using the bilological materials existing in the culture.

3 .Fruit production

On the basis of those presented in table no.3, we can notice that the variety with the best production is Autumn Glamorous, very closely to it coming the Radhaven, which produces an average of almost 15 tons/hectare during a fixed period. The lowest production is given by the Springold, this being a direct consequence of the fact that it has fruit with an early ripening and a great sensitiveness towards lower temperatures.

As the planting distance concerns, it can be noticed that, during the whole period and counted mean researched, the fruit producing increases as the decreasing of the planting distance, simultaneously with the increasing of the number of trees planted on 2 hectare.

This way, given the trees planted at 4x3m distance, by planting them at 4x2m the production grows with 41%, and by planting at 4x1m and 4x0,5m distance, the production is doubled and tripled.

It can also be noticed that among the trees planted at 4x1m, 1x0,5m distance, the level of the crops comes closer at Springold variety, as a consequence of the fact that, it being more vigorous, the production of the trees planted a 4x0,5m remains the same or even decreases.

Comparing the data of the trunk's growth with those of the production given the planting distance, it can be noticed the existence of a reversed relationship if it depends on the production counted for each hectare, meaning that the less vigorous the trees are, the richer the fruit production is, this growth being more striking than reducing the trees vigour.

Table 3

Production of fruit depending on the planting distance and variety of the peach-tree, in the conditions of Diosig region (tones/ hectare)

Variety	Year	Planting distance (m)				Variety and distance mean	%
		4x3 m 833 trees/hectare	4x2 m 1250 trees/hectare	4x1 m 2500 trees/hectare	4x0,5 m 5000 trees/hectare		
Springold	2020	3,2	6,5	13,8	12,7		
	2021	1,2	3,4	3,0	4,2		
	2022	12,3	27,5	34,1	35,4		
	2023	2,0	3,1	6,3	12,5		
Mean		4,7	10,1	14,3	16,2	11,3	82
Redhaven	2020	4,5	8,3	10,6	11,6		
	2021	2,9	3,1	4,9	7,6		
	2022	16,9	25,6	51,4	50,2		
	2023	5,0	7,6	15,2	21,0		
Mean		7,4	11,2	18,0	22,5	14,8	108
Autumn Gorgeous	2020	6,5	9,9	16,1	23,3		
	2021	6,3	6,1	7,8	7,6		
	2022	13,8	20,8	29,2	58,8		
	2023	4,0	6,1	12,0	15,0		
Mean		7,6	10,7	16,4	21,6	15,1	100
%		100	141	214	328	13,7	100

CONCLUSIONS

The analysis of the behaviour of the flower buds during the low temperature winter periods shows that, taking into account the 3 varieties, a better resistance is recorded by Redhaven, which showed 13% frozen buds in 2023 spring compared to Spingold, which had a percentage of 88% of destroyed buds.

The data concerning the growing and ripening of the trees depending on the variety and planting distance allow us to draw the following conclusions: referring to the vigour of the varieties studied, it can be seen that this is different, Redhaven proving less vigorous whereas Autumn Gorgeous and Springold showed more vigour. This way, we can afford to say that Redhaven is better-suited to be introduced in the super-intensive culture, comparing to the other 2 varieties which were analysed.

The planting distances strongly influence the growth in thickness of the tree, because it reduces as the planting distance of the tree, it turns, reduces from 3 m to 2 m, 1 m and 0,5 m. The decreasing of the vigour of the trees as planting distance in turns decreases to 34%, proves to be an encouragement which comes to promote the super – intensive growing system for the peach – tree, too.

Fruit production is influenced by varieties and planting distances. The three varieties which were analysed register, depending on the fruit – ripening period, a smaller production at Springold with early ripening, and a richer one at Redhaven and Autumn Gorgeous.

The planting distance positively influence the production obtained on each hectare as the trees are planted thickly, obtaining a more numerous number of trees per hectare and a richer production, succeeding in obtainig a doubled or even a tripled production.

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