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# GROWTH AND FRUCTIFICATION OF CHERRY TREES

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***ABSTRACT.*** *The experiment was carried out during the years 2012-2013 on varieties cultivar 'Valerii Cicalov' and cultivar 'Record' cherry trees (Cerasus avium L.M.) grafted on the mahaleb rootstock (Cerasus mahaleb Mill), planted at a spacing of 6x5 m on a sandy loam soil with low status of organic matter. The trees have been formed after natural ramification improved with high volume. The staggered cutting of older branches during vegetation period (V4) and rest (V3) in wood for 3-4 years, advantages the formation of older branches and fruit branches, compared to cutting production during the rest period (V1) and vegetation period (V2). The fruit harvesting in 2012-2013 was 20.1-33.4 kilos/tree of cultivar 'Valerii Cicalov' and 18.9-26.4 kilos/tree of record. The staggered cutting of older branches branches during the vegetation period garnishes the frame with fruit branches, provides an increase of fruit production by 32% to cultivar 'Valerii Cicalov' and by 21% to cultivar 'Record' compared to cutting production during the rest period (witness).*

***KEYWORDS****: cherry trees, variety, cutting the trees, growth, branches of fruit.*

## INTRODUCTION

The maintaining of branches after their formation at the required optimal volume for creating a favorable ratio between the growing and fructification period, is achieved by implementing cutting maintenance and fruiting (Mitre et al. 2007, 2012, Balan 2012). To determine the level cutting of trees it must be taken into account the biological characteristics of variety, the

reaction of different types of cutting. So the level of cutting maintenance degree and of fruiting is determined differently, depending on variety and cutting system. The rational cuttings contribute to early fruit trees (Claverie & Lauri 2005) and obtain high and qualitative fruits, hastens the redemption of invested capital in plantation which increases the economic efficiency of the fruit growing (Balan et al. 2001, Simion et al. 2004). Robinson & Hoying (2014) account that training system and rootstock affect yield, fruit size, fruit quality and crop value of sweet cherry and Vertical Axis system of higher cumulative yield per hectare. The cutting of cherry tree in fruiting period involves improvement works of the light regime and ventilation, or limiting the height and horizontal branches extension. The cutting is also applied to older branches exceeding 4-5 years, to obtain branches from buds with high biological potential, well-suited to differentiating the productive shoots each year with high value and high quality fruit (Budan & Gradinariu 2000, Robinson et al. 2014).

In order to identify some effective methods of maintenance and regeneration of cherry trees by applying the cutting reduction during the vegetation and trees resting, in 2011 an experiment was organized in Vindex-Agro Company.

## MATERIAL AND METHODS

The research was conducted in the cherry orchard (*Cerasus avim* L. M.) of Vindex-Agro Company, planted in 2003 of the unincorporated village Malaiesti, Orhei district. The biological material was formed by cultivar 'Valerii Cicalov' and cultivar 'Record', grafted on the mahaleb saplings (*Cerasus mahaleb* Mill). The planting distance was 6x5 m. The trees have been formed after natural ramification improved with high volume. The tree head consists of a basal level with 3 branches above there are 3-4 embranchments inserted on the shaft spiral spaced at 35 cm from each other. To achieve the expected aim, the following variants were investigated: V1 - cutting production (maintenance and fructification), during the rest period (witness); V2 - cutting production (maintenance and fructification), during the vegetation period; V3 - staggered cutting of older branches during the rest period in wood for 3-5 years; V4 - staggered cutting of branches during the vegetation period in wood for 3-5 years. The experience was organized in

randomized blocks; each version includes four repetitions of each 8 trees. To record the effect of cutting reduction, biometric measurements were performed according to the methods used in horticulture. The average length and branches totaling, number and density of fruit formations determined from 3 typical trees, but the fruit harvest from 32 trees using statistical methods of calculating (Mojsejčenko et al. 1994). During the vegetation in the orchard the maintenance works were made on soil and plant protection of trees stipulated in the intensive technology culture of cherry tree.

## RESULTS AND DISCUSSION

The regeneration cuttings become dominant for cherry since fruiting period and it is one of the main methods of control of growth and load of fruit trees (Lugli et al. 2009, Babuc 2012). These cuttings can be made during the rest period as well as during the vegetation period, having the advantage of reducing tree vigor and training of younger branches items proportionally and uniformly distributed in adapted system ramification (Donica et al. 2005).

The number of branches formed from sleeping buds differs on age of shortened branches. Based on the result, we observe that an effect of the staggered cutting causes the rejuvenation of ramifications. The forming of spigots and sequenced cutting of older branches cause favorable conditions to form well developed sprout and subsequently they hold fruit formations, they contribute to the growth of cherry tree productivity and fruit quality. Forming spigots on wood for 3-4 years gave results, having from 4-6 sprouts for cultivar 'Valerii Cicalov' and 2-3 sprouts for cultivar 'Record'. Depending on the position and spigot length in ramification, it forms 3-4 sprouts unevenly distributed. In some case they were formed on mother branch of older branches and not on the sprout. The sprouts in the age of 5 years for cultivar 'Record' did not form sprouts. The results prove that the staggered cutting of older branches during the vegetation period in wood for 3-5 years (V4), favor the formation of fertile branches and younger branches compared to the staggered cutting of older branches during the

rest period in wood for 3-5 years (V3) and cutting production during the rest (V1) and during vegetation (V2) period (Balan & Ivanov 2012).

The average length and summed annual branches for cherry tree were influenced by the studied factors. The presented data shows that annual branches length formed on the spigot from bugs is correlated with the age and their number. So, the older the spigot is, the fewer formed sprouts are, if the length of these are bigger then it is due to location and nutrition. Analyzing the growth of annual branches on the spigot, it can be mentioned that the average length of annual branches on the spigot for cultivar 'Valerii Cicalov' was between 43 cm and 61 cm in 2012 and 33 cm till 50 cm in 2013. For cultivar 'Record' the values of annual increases on the spigots were situated between 22 cm and 50 cm (Figure 1).

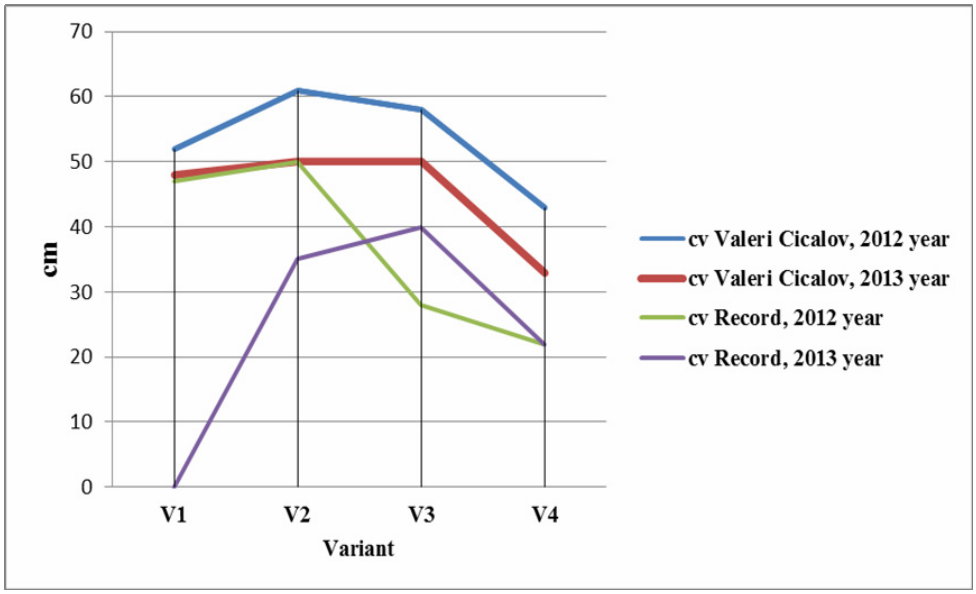


Figure 1. Average length of annual branches on the spigot according to cutting system.

The summed length of annual branches formed from bugs was influenced significantly by variety and by cutting system. In the first year, after cutting trees for cultivar 'Valerii Cicalov' the summed length of annual

branches in V3 were 2.21m/spigot but the trees of the same variety cutting during vegetation period (V4) the value of this index was reduced, making 1.55m/spigot (Figure 2). The lower values were recorded in the variety where cutting were applied during the rest period. In 2013 the summed length of annual branches for cultivar 'Valerii Cicalov' also differs by cutting system and it is from 0.96 m/spigot till 1.66 m/spigot. Irrespective of the cutting system the summed length of annual branches from cultivar 'Record' has lower values than cultivar 'Valerii Cicalov' and has varied from 47cm/spigot in V3 at cutting reduction in wood for 5 years. In 2012 were 150 cm/spigot in V2 at cutting reduction in wood for 4 years. In 2013 the increases totaling were the value of 67 cm.

The trees ability to generate quantitative and qualitative crops closely related to the length of annual increases which is determined by environmental factors, soil and plantation maintenance.

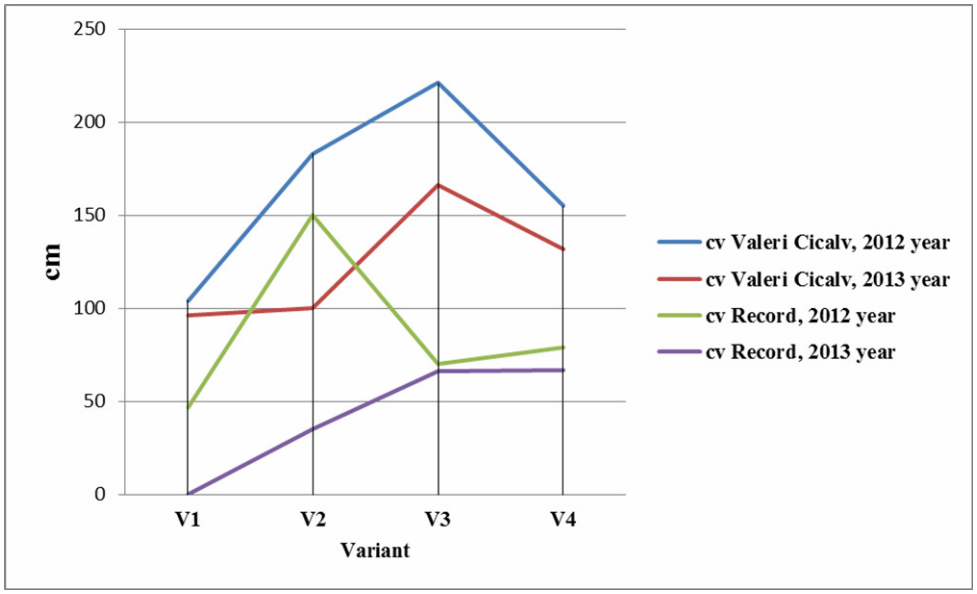


Figure 2. Summed length of annual branches on the spigot according to cutting system, cm.

The number of fruit formations, formed on spigot branches varies depending on the system and cutting period (figure 3 and figure 4). We observe both varieties a considerable increasing the number of fruit formations in 2013 to 2012. This is due to the age of the branch on the spigot. The number of May bunches varied from 29 in 2012 till 367 in 2013. Conducting the sequenced cutting as well as procedures for maintenance of ramification during the vegetation period contributed positively to the filing of fruit branches formations. Cultivar 'Record' characterized by slower growth compared to cultivar 'Valerii Cicalov', generated also a lower number of fruit formation, having the values from 12 in 2012 till 247 bouquets in 2013 in V3.

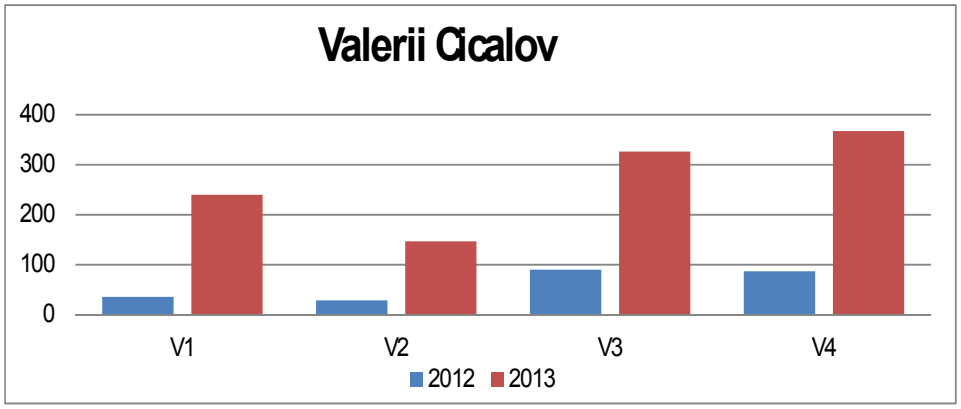


Figure 3. Number of fruit formation for cultivar 'Valerii Cicalov' on the spigot formed branches, according to cutting system.

The strategically direction of this study is directed towards exploitation of growth potential of trees according to fruiting potential of each variety. The obtaining of high yields, stable and qualitative can be made only by maintaining the physiological balance among branches of different age and filling with floral buds.

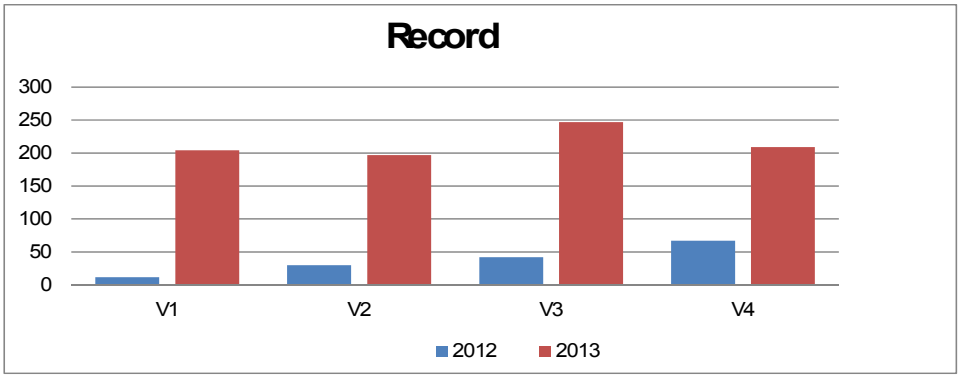


Figure 4. Number of fruit formation for cultivar 'Record' on the spigot formed branches, according to cutting system.

Over time, the fructification cutting led to the creation of differences between the growth and formation of May bunches because May bunches bring fruits 8-12 years but medium and long branches have a slow evolution.

The carried research (Tab.1) revealed that the fruit harvest was influenced by the system and period of cutting trees. In 2012 the fruit harvest for cultivar 'Valerii Cicalov' was 20.1-23.4 kg/tree but for cultivar 'Record' - 18.9-22.3 kg/tree. In 2013 it was an increase of fruit harvest in V4 where applied the sequenced cutting of older branches during the vegetation period, having 33.4 kg/tree or more than 32% in V1. Cultivar 'Record' is less receptive at applied cutting it had a lower increase of fruit quantities but the quality of these fruits is net superior. The difference between control (V1) and sequenced cutting version of older branches during vegetation period (V4) for cultivar 'Record' in 2013 is 21.1%.

The productivity of cherry trees increases significantly compared to the control so for cultivar 'Valerii Cicalov' as well as for cultivar 'Record' in V4 where was applied the staggered cutting of older branches during vegetation period. In 2012-2013 the cherry yield was about 9.46 t/ha for cultivar 'Valerii Cicalov' and 7.52 t/ha for cultivar 'Record'.

Table 1. The harvest cherry trees depending on variety and cutting system.

| Cutting system | Productivity (kg/tree) | | Productivity (t/ha) | |
|---|---|---|---|---|
| | 2012 year | 2013 year | 2012 year | 2013 year |
| cultivar 'Valerii Cicalov' | | | | |
| V1 | 20.1 | 25.3 | 6.69 | 8.42 |
| V2 | 22.7 | 27.9 | 7.56 | 9.29 |
| V3 | 21.8 | 30.2 | 7.26 | 10.06 |
| V4 | 23.4 | 33.4 | 7.79 | 11.1 |
| Average | 22.0 | 29.2 | 7.33 | 9.72 |
| cultivar 'Record' | | | | |
| V1 | 20.1 | 21.8 | 6.69 | 7.26 |
| V2 | 22.3 | 23.7 | 7.42 | 7.89 |
| V3 | 19.2 | 25.7 | 6.39 | 8.56 |
| V4 | 18.9 | 26.4 | 6.29 | 8.79 |
| Average | 20.1 | 24.4 | 6.70 | 8.13 |

## CONCLUSIONS

The phasing rejuvenation of the older branches for 3-5 years wood depends on the sorts and circumstances of the trees. The cutting of the older branches is made only for lateral branches or may bouquets which have vegetarian bugs.

The capacity forming of the sprout on the spigot is biggest when reductive branches are made on wood for 3-4 years. The older the wood the lower is the number of the sprout formed. Staggered cutting of older branches during vegetation period provides the garnishing of older branches with medium and vigorous length fruit branches. The cuttings will be made during the harvest or after harvest. The large wounds will be disinfected with CuSO4 solution on them as they are protected with mastic.

The fruit harvest in 2012-2013 was 20.1-33.4 kg/tree for cultivar 'Valerii Cicalov' and 18.9-26.4 kg/tree for cultivar 'Record'. Staggered cutting of older branches during vegetation period favors the garnishing of older branches with fruit branches, having an increase of the fruits about 32% for

cultivar 'Valerii Cicalov' and about 21% for cultivar 'Record' compared to productive cutting during the rest period (witness).

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