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THE INFLUENCE OF GROWTH REGULATORS ON THE ACHIEVING OF HIGH PRODUCTIONS FROM THE KORDIA CHERRY VARIETY ON THE MAXMA 14 ROOTSTOCK

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Abstract

The object of the researches were cherry trees of the Kordia variety grafted on the MaxMa 14 rootstock. The research was carried out during 2021. To study the effect of the growth regulators Auxiger (1-naphthylacetamide (1-NAD - 1.5 g/l) and 1-naphthylacetic acid (1-NAA - 0.6 g/l)) and Gibbera, SL (gibberellins, 10 g/l mixture of GA4+7) on the degree of fruit setting, development processes, fruit production and economic production efficiency, the following treatment variants were experimented: 1. Control – no treatment; 2. Auxiger, 0.7 l/ha; 3. Gibbera, SL, 0.25 l/ha; 4. Gibbera, SL, 0.5 l/ha. The growth regulator Auxiger was administered only once, during the period of intensive fruit growth, when their diameter reached 12-13 mm (14.05.2021), and Gibbera, SL in three rounds. The first treatment at the end of the flowering phase (26.04.2021), and subsequent two at an interval of 7-10 days, (05.05.2021) and (14.05.2021), respectively. In the reference period it was established that the degree of fruit binding, development processes, higher fruit productions was recorded when treated with the growth regulator Gibbera, SL in a dose of 0.5 l/ha.

Key words*: cherry, growth regulator, degree of binding, ripening period, production.*

INTRODUCTION

The cherry is a tree species adapted to the conditions of the temperate zone and has a major importance from an economic point of view. In recent years, world production of cherries has grown rapidly due to the health benefits of their consumption and high profits for producers (Long et al., 2014; Pești eanu et al., 2018).

Cherries are a food, which contains high amounts of nutrients such as vitamin C, polyphenols, carotenoids, potassium and fibre, while being comparatively low in calories. Cherries are also rich in tryptophan, serotonin and melatonin (Cimpoies, 2018).

In determining the importance of the crop, cherry production and fruit size are the main indicators that growers pay attention to (Balan, 2015; Long et al., 2014). Cherry growers tend to maximize plantation productivity, however, there is a negative correlation between yield per tree and fruit quality. In addition, the productivity of the cherry plantation can be quite variable depending on the variety/rootstock association, years and production areas (Budan & Grădinăriu, 2000).

Most cherry varieties produce a high level of ethylene during flowering. Ethylene has a negative influence on flowers, registering their premature aging, which ultimately results in low pollination and binding to flowers (Neamțu & Irimie, 1991).

We record cherry yields below the expected level when there was inadequate pollination by insects in the plantation, low viability and germination of pollen, unsuitable climatic conditions for the uniform growth of the pollen tube, rapid senescence of ovules, lack of overlap of flowering with pollinators, or insufficient number of pollinators. To solve the respective problems, it is necessary to plant 2 pollinating varieties and increase the density of pollinating trees (Budan & Grădinăriu, 2000; Cimpoies, 2018; Long et al. 2014; Long et al., 2020).

In order to extend the period of successful pollination and increase the productivity of the plantation and the quality of the fruits, the use of growth regulators is recommended (Neamțu & Irimie, 1991; Pești eanu & Lozan, 2021; Sabir et al. 2021). Different concentrations of growth regulators administered at optimal times can influence the degree of flower setting, fruit size,

fruit shape, fruit firmness and weight, fruit ripening period, including their handling (Zhang & Whiting 2011).

There are multiple studies on the effects of growth regulators in fruit trees, and the results vary depending on the PGR, the time of application, the concentration and even the application technology. Gibberellins also play a vital role in pollen germination, fruit formation and cherry fruit development (Greene, 1988; Zhang & Whiting, 2013).

Preharvest applications of gibberellins to cherries increased fruit size and delayed ripening (Kappel & MacDonald, 2007; Pește anu et al., 2018; Sabir et al., 2021; Stern et al., 2007) Ovule viability and the degree of fruit set in cherry can be influenced by treatment with GA3, GA4+7 and the mixture of these gibberellic acids. Compared to other GA isomers alone, the combination of GA3 and GA4+7 improves ovule longevity and increases cherry production (Sabir et al., 2021).

The application of GA4+7 slows down the senescence process of the leaves in the year of application and increases the average weight of the leaf blade compared to the control (Neamțu & Irimie, 1991).

Gibbera SL growth regulator is recommended especially for apple, but is now widely used in other fruit species as well. The product contains 10 g/l gibberellic acids GA4 and GA7 and is designed to support plants during flowering and fruiting. Gibbera, SL stimulates the formation of fruits, increases the number of buds, ovaries and fruits, improves the growth and formation processes, accelerates the ripening time, increases the yield, as well as prevents cracking and discoloration of the fruits, improves the appearance and quality of the products (Pește anu & Lozan, 2021; Пештяну & Кумпанич, А., 2021). The objective of this research was to evaluate the potential effects of different concentrations of GA4+7 on the increase in the number of bound ovaries and fruits in the crown, the intensification of growth processes and the maintenance of the physiological balance in the crown of the tree, the increase of the yield and the quality of production in cherry plantations from the Kordia variety, trees grafted onto MaxMa 14 rootstock.

MATERIALS AND METHODS

The researches were carried out during the 2021 vegetation period in a cherry orchard, planted in the spring of 2015 with annual trees in the form of a rod. Trees of the Kordia cherry variety, grafted on the MaxMa 14 rootstock, served as the object of research. Planting distance 5.0 x 3.0 m. The trees were guided according to the usual spindle crown system. In accordance with the elaborated experience scheme, the following variants were tested (Table 1).

The plots were placed randomly, consisting of 4 repetitions in each variant. Each repetition consisted of 5 model trees. The boundaries between the experimental plots were isolated from the rest of the orchard by a row in which no growth regulator treatments were applied. An untreated tree was left between replicates to prevent accidental spraying of treated trees with other variants and surfaces during treatments.

Table 1. Experimental scheme for determining the effectiveness of the growth regulator Gibbera, SL, for stimulating growth-formation processes, accelerating the ripening time of cherries

Variants	Activ substance	Method and date of application
Control - no treatment	-	-
Auxiger LG - 0,7 l/ha	1-naftilacetamidă (1-NAD – 1,5 g/l) and acid 1-naftilacetic (1-NAA – 0,6 g/l)	By spraying during the period of intensive fruit growth (14.05.2021)
Gibbera, SL - 0,25 /ha	(GA_{4+7}), 10,0 g/l	The first spraying, at the end of the flowering phase (26.04.2021), and two subsequent ones at an interval of 7-10 days, (05.05.2021) and (14.05.2021), respectively
Gibbera, SL - 0,50 l/ha		

The treatment of the trees on the experimental sector was carried out with the portable sprinkler in the morning hours, when there was no wind. The amount of solution expected when treating a tree with the growth regulators studied to stimulate the growth-formation processes, accelerating the ripening time of cherries was 1.6 litres, resulting from the number of trees per unit area and the amount of water recommended by 1000 l/ha.

The researches were carried out in field and laboratory conditions according to accepted methods of conducting research on fruit crops where the growth regulators were tested.

The leaf surface study was determined according to the method described by V. Balan (2009).

Average and total one-year growth length was determined by measurements on 4 model trees of each variety.

Observations to determine the degree of flowering of the trees were carried out during the white button period and after the fall of the ovules at the beginning of June.

Cherry production was determined at the stage of full fruit ripening by recording the weight. The production from each tree was collected separately and weighed, then the average production for each variety was determined and converted to tons per hectare.

Average fruit weight was determined by weighing 100 fruits and then dividing the result by 100, in four replicates.

The fruits were harvested in two periods, as they ripened. The proportion of fruit harvested in the first and second periods was determined by weighing and counting for the model trees in each replicate.

The economic efficiency of the production of cherries of the Kordia variety was established by the method of calculating the investments made in the cherry plantation in the year 2021.

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

RESULTS AND DISCUSSIONS

Among the main photometric characteristics of fruit plantations, the leaf area and the length of annual growths are of particular importance, since the productive potential of the orchard depends on these indicators.

The obtained experimental data (Table 2) demonstrate that the smallest leaf area within a tree was recorded in the control variant - 10.8 m^2/tree.

Treating the variant with the growth regulator Auxiger LG at a dose of 0.7 l/ha resulted in an insignificant increase in the leaf surface (11.1 m^2/tree), i.e. a 2.8% increase compared to the control variant.

The use of the growth regulator Gibbera, SL in doses of 0.25 l/ha and 0.5 l/ha increased the leaf area compared to the control variant and the variant treated with the growth regulator Auxiger LG in a dose of 0.7 l/ha. In the case of the variant treated with the growth regulator Gibbera, SL, in a dose of 0.25 l/ha, the leaf surface increased by 10.2% compared to the control and by 7.2% compared to the variant where the Auxiger LG product was administered in dose of 0.7 l/ha.

When the variant was treated with the growth regulator Gibbera, SL at a dose of 0.5 l/ha, the leaf area increased to 12.6 m^2/tree, or 13.6% higher compared to the treated variant with the growth regulator Auxiger LG in a dose of 0.7 l/ha and with 5.9%, respectively with the variant treated with the product Gibbera, SL in a dose of 0.25 l/ha.

In the case of treatment with the growth regulator Gibbera, SL in a dose of 0.25 l/ha and 0.5 l/ha, the difference between the studied variants of this index was 0.7 m^2/tree, which was also confirmed by statistical data of mathematical processing.

To obtain stable productions, fruit plantations must form 25-30 thousand m^2/ha of leaf surface. The conducted research demonstrates that in the control version, without treatment, the smallest leaf area was recorded - 7.2 thousand m^2/ha.

The use of the growth regulator Gibbera, SL at a dose of 0.25 and 0.5 l/ha resulted in an increase in leaf area compared to the control variant. In the case of the variant treated with the growth regulator Gibbera, SL, in a dose of 0.25 l/ha, the leaf surface per surface unit increased by 0.7 thousand m^2/ha compared to the control variant and by 0.5 thousand m^2 /ha compared to the variant where the Auxiger LG product was administered in a dose of 0.7 l/ha.

The leaf area registered in the variant treated with the growth regulator Gibbera, SL in a dose of 0.5 l/ha increased the index in the study by 1.2 thousand m^2/ha compared to the control variant, and in the case of the variant Auxiger LG in a dose of 0.7 l/ha, with 1.0 thousand m^2/ha.

The development of annual growth is another important indicator that changes under the influence of the studied growth regulators. Stresses during the growing season, such as: drought, high temperatures, insufficient soil moisture, blocking the activity of mineral

elements, aggravate the physiological processes in plants and slow down the development of annual growth. Only treatment with growth regulators can contribute to the improvement of biochemical processes in the plant and a more uniform development of physiological processes.

The study carried out on the average and summed length of one-year increases demonstrates that the growth regulators used in the research influence the studied indicator in a different way (Table 2).

The lowest value of the average length of the annual growth was registered in the control variant, without treatment - 80.0 cm, and the most developed branches in the variants treated with the growth regulator Gibbera, SL in a dose of 0.5 l/ha.

The research carried out proves that the average length of the annual growths in the variant treated with the growth regulator Auxiger LG in a dose of 0.7 l/ha was 82.0 cm, which represents an increase of 2.5% compared to the control variant.

In the case of the variant treated with growth regulator Gibbera, SL at a dose of 0.25 l/ha, the average length of annual growth increased by 7.4% compared to the variant Auxiger LG at a dose of 0.7 l/ha and with 10.0% compared to the control variant.

Table 2. Influence of growth regulators on leaf area and annual growth in the Kordia variety cherry plantation

Variants	Leaf surface		Length of annual growths	
	m^2/tree	thousan ds m^2/ha	cm	m/tree
Control	10.8	7.2	80.0	20.0
Auxiger LG - 0.7 l/ha	11.1	7.4	82.0	20.5
Gibbera, SL - 0.25 l/ha	11.9	7.9	88.0	22.0
Gibbera, SL - 0.50 l/ha	12.6	8.4	94.0	23.5
LDS 0,05%	0,47	0,36	3,9	0,94

The use of the growth regulator Gibbera, SL in a dose of 0.5 l/ha, led to obtaining the highest values (94.0 cm) of the average length of the annual growths, being 6.9% higher compared to the variant treated with the growth regulator Gibbera, SL at a dose of 0.25 l/ha, by 14.7% with the variant Auxiger LG at a dose of 0.7 l/ha and by 17.5% compared to the control variant. These results are also proven by statistical data.

The summed length of one-year growths correlates with the number and average length of one-year branches formed in the crown of the tree, which changes under the influence of the treatments with the studied growth regulators. Lower values of the total length of annual growth during the study period were recorded in the control variant, and higher in the variants treated with the growth regulator Gibbera, SL in a dose of 0.5 l/ha. If in the control version the total length of annual growth was 20.0 m/tree, in the version treated with the growth regulator Auxiger LG, in a dose of 0.7 l/ha - 20.5 m/tree, then in the versions where the product Gibbera, SL was administered in a dose of 2.5 and 0.5 l/ha - 22.0 and 23.5 m/tree, respectively. This phenomenon is explained by the fact that the variants treated with the growth regulator based on gibberellic acid improve the physiological processes that take place during the intensive growth of the shoots, namely during the months of May-June.

The results recorded in the version treated with the growth regulator Gibbera, SL in a dose of 0.25 l/ha show that the total length of annual growth decreased compared to the version treated with the growth regulator Gibbera, SL in a dose of 0.5 l/ha by 1.5 m/tree, but increased compared to the version where the Auxiger LG product was used in a dose of 0.7 l/ha by 2.0 m/tree, and compared to the control version by 3.5 m/ tree.

The study carried out in the spring of 2021 showed that in the crowns of cherry trees of the Kordia variety, a sufficient number of flower buds were differentiated and no significant deviations were observed on the variants taken in the study, ranging from 7990 pcs/tree in the case the variant in which the treatment with the growth regulator Gibbera, SL in a dose of 0.5 l/ha was foreseen and it increased to 8020 pieces/tree in the variant Gibbera, SL in a dose of 0.25 l/ha (Table 3).

The treatments carried out in accordance with the research program demonstrated that in the variants treated with the growth regulator Gibbera, SL in a dose of 0.25 and 0.5 l/ha, allowed the formation of a different number of fruits in the crown of the trees.

A smaller number of fruits in the crown of cherry trees of the Kordia variety was recorded in the control variant - 1786 pcs/tree and in the

variant treated with the growth regulators Auxiger LG in a dose of 0.7 l/ha - 1800 pcs/tree. The number of fruits in the variants treated with the growth regulator Gibbera, SL, based on gibberellic acid, varied from 1900 to 2023 pcs/tree, i.e. there was an increase of 6.4 - 13.3% compared to the control variant.

Examining separately the effect of the growth regulator on the number of fruits formed in the crown of cherry trees of the Kordia variety, it is observed that approximately identical values as in the control variant were recorded in the variant treated with the growth regulator, Auxiger LG in a dose of 0.7 l/ha - 1800 pcs/tree. This phenomenon is explained by the fact that treatment with this growth regulator is recommended only once during the period of intense fruit growth (fruit diameter of 12-13 mm) and has no positive effect on increasing the degree of binding and the number of fruits from the crown of trees of the Kordia variety.

Table 3. The influence of growth regulators on the number of fruits and the percentage of their binding in the crown of cherry trees of the Kordia variety

Variants	Number of flowers, pcs./tree	Number of fruits, pcs./tree	Binding percentage, %
Control	8009	1786	22.3
Auxiger LG LG - 0,7 l/ha	7995	1800	22.5
Gibbera, SL - 0.25 l/ha	8020	1900	23.7
Gibbera, SL - 0.50 l/ha	7990	2023	25.3
LDS 0.05%	375	84,1	-

The obtained results demonstrate that gibberellic acid GA4+7 has a positive effect on the number of fruits formed in the crown of cherry trees. In the case of using the growth regulator Gibbera, SL in a dose of 0.25 l/ha, the number of fruits formed was 1900 pieces/tree, which represents an increase of 6.4% compared to the control variant and 5.6 % in the case of the Auxiger LG variant in a dose of 0.7 l/ha.

In the case when the trees were treated with the growth regulator Gibbera, SL in a dose of 0.5 l/ha, there was a 13.3% increase in the number of fruits tied in the crown of the trees compared to the control variant. Compared to the variant treated with the growth regulator Auxiger LG at a dose of 0.7 l/ha, this indicator increased by 12.3%, and compared to the variant Gibbera, SL at a dose of 0.25 l/ha, with 6.5%.

This increase in the degree of flower binding in the variants treated with the growth regulator based on gibberellic acid GA_{4+7}, Gibbera, SL in a dose of 0.25 and 0.5 l/ha also influenced the obtaining of a greater number of fruits in the crown of trees of the Kordia variety compared to the control variant and the variant treated with the growth regulator Auxiger LG at a dose of 0.7 l/ha.

Lower values of the degree of fruit set was recorded in the control variant (22.3%), which in turn was followed by the variant treated with the growth regulator Auxiger LG in a dose of 0.7 l/ha (22.5%).

The variant treated with the growth regulator Gibbera, SL in a dose of 0.5 l/ha recorded the highest values of the index in the study (25.3%), and in the case of the treatment dose of 0.25 l/ha the weight of the fruits. bound decreased (23.7%), i.e. an average value was recorded between the previous variants and the control variant.

The results obtained do not allow to conclude that the treatment with the growth regulator based on gibberellic acid GA_{4+7}, Gibbera, SL in a dose of 0.5 l/ha had a positive impact on the stimulation of fruit shapes, respectively on the binding percentage of them. in the crown of the tree and finally on the number of fruits formed.

It was suggested to study yield and average fruit weight, as there are dogmas in the literature that if trees are treated with a growth regulator whose active ingredient is gibberellic acid (GA_{4+7}), fruit development is blocked, production in within a tree and per unit area is reduced and can negatively influence the differentiation of fruit buds for the next year, i.e. a weaker flowering is expected. Other studies show conflicting results compared to the hypothesis mentioned above.

The studies carried out demonstrated that the studied growth regulators, Auxiger LG and Gibbera, SL positively influence the average fruit weight and production in general.

The average fruit weight in the studied variants underwent insignificant changes and was correlated with the number of fruits obtained within the tree and the growth regulator used in the treatment.

The investigations carried out highlight the fact that higher values of the average weight of the

fruits were recorded in the Auxiger LG version in a dose of 0.7 l/ha - 9.4 g. In the control version, the average weight of the fruits was 8 .9 g. Productivity is an indicator that shows how all agronomic measures have been applied in the Kordia cherry orchard.

The previously presented results showed that the highest number of fruits was obtained in the variants in which treatments were carried out with the growth regulator based on gibberellic acid GA_{4+7}, Gibbera, SL in a dose of 0.25 and 0.5 l/ha, 1900 and 2023 pcs/tree, respectively, compared to the other variants (tab. 3). Consequently, the average fruit weight decreased insignificantly in these variants, where it constituted 8.9 and 8.7 g, respectively (Table 4).

Table 4. The influence of the growth regulator on the number of fruits, the average weight and the production of cherries of the Kordia variety

Variants	Number of fruits, pcs/tree	Average weight, g	Fruit production		In % compared to control
			kg/ tree	Fruit production, t/ha	
Control	1786	8.9	15.9	10.6	100.0
Auxiger LG - 0.7 l/ha	1800	9.4	17.3	11.5	108.5
Gibbera, SL - 0.25 l/ha	1900	8.9	16.9	11.3	106.6
Gibbera, SL - 0.50 l/ha	2023	8.7	17.6	11.7	110.4
LDS 0.05%	87	0.22	0.73	0.49	-

In the case of using the growth regulator Gibbera, SL in a dose of 0.25 l/ha, the average fruit weight was at the same level as in the control variant, but the number of fruits was much higher, which proves that the products based on of gibberellic acid have an influence on the average weight of the fruits and the yield of the trees.

Because, the control variant, recorded a reduced number of fruits within the crown of the trees, respectively, in this variant, lower productions were obtained per tree (15.9 kg) as well as per surface unit (10.6 t).

The investigations carried out highlight the fact that the treatment carried out with the growth regulator Gibbera, SL in a dose of 0.25 l/ha, recorded lower values of fruit production compared to variants 2 and 4, but higher compared to the control variant, constituting 16.9 kg/tree and 11.3 t/ha, respectively.

In the variant treated with the growth regulator Auxiger LG at a dose of 0.7 l/ha, due to the lower number of fruits per tree and the significant increase in the average fruit weight, it had a positive impact on the production obtained per tree (17.3 kg) and productivity per surface unit (11.5 t/ha), a fact also confirmed by statistical data. The values obtained in the respective variant were approximately equal to those recorded in the variant treated with the growth regulator Gibbera, SL in a dose of 0.25 l/ha.

The investigations carried out highlight the fact that the variant treated with the growth regulator Gibbera, SL in a dose of 0.5 l/ha registered a slight decrease in the average weight of the fruits compared to the other variants, and due to the greater number of fruits recorded a significant increase in production per tree (17.6 kg) and per surface unit (11.7 t/ha).

In the case of the study of the effect of the treatment dose on the recorded yield, the difference between the variants treated with the growth regulators Auxiger LG in the dose of 0.7 l/ha and Gibbera, SL in the dose of 0.5 l/ha is not recorded, which is also confirmed by statistical data.

That is, the difference between the fruit production obtained between the control variant and the variant treated with the product Auxiger LG in a dose of 0.7 l/ha was 8.5%, in the variant Gibbera, SL in a dose of 0.25 l/ha - 6.6%, and in the Gibbera version, SL in a dose of 0.5 l/ha, the corresponding value reached 10.4%.

The optimal moment for harvesting cherries is considered ripe for consumption, because after the fruit is easily separated from the fruit formation, no physiological process takes place in it to improve its quality.

In 2021, the flowering of the cherries was triggered over a longer period of time and therefore the ripening was more staggered. Therefore, the cherries were harvested in two stages, when they had the characteristic color of the variety and a better flavor.

The investigations carried out highlight the fact that the treatment of the experimental variants with the growth regulators Auxiger LG in a dose of 0.7 l/ha and Gibbera, EW in a dose of 0.25 and 0.5 l/ha influenced the coloring of the fruits. The proportion of fruits harvested in the first and second pass of the picker is considered to be the

most important indicator for that species. The obtained results show that in the control version, 67.5% of the fruits were harvested in the first harvest period (07.05.2021), and the rest, 32.5% in the next installment (07.08.2021) (Table 5).

Table 5. The influence of the growth regulator on the weight of fruits of the Kordia variety collected when reaching the optimal harvest period, %

Variants	Harvesting period	
	05.07.2021	08.07.2021
Control	67.5	32.5
Auxiger LG - 0.7 l/ha	89.5	10.5
Gibbera, SL - 0.25 l/ha	87.4	12.6
Gibbera, SL - 0.50 l/ha	92.4	7.6

Treating the trees with the growth regulator from the Auxiger LG variant in a dose of 0.7 l/ha increased the weight of the fruits harvested at the first pass to 89.5%, an increase of 22.0% compared to the control variant. At the second collection, the share of harvested fruit was 10.5%.

Variants treated with the growth regulator Gibbera, SL, at a dose of 0.25 and 0.5 l/ha, also had a positive impact on the weight of fruits harvested at the first harvest.

If the trees were treated with the growth regulator Gibbera, SL in a dose of 0.25 l/ha, the proportion of fruits harvested at the first pass was slightly lower (2.1%) than in the variant treated with the growth regulator growth Auxiger LG in a dose of 0.7 l/ha and which was 87.4%.

The highest proportion of cherry fruits harvested at the first harvest was recorded in the version treated with the product Gibbera, SL in a dose of 0.5 l/ha, where this indicator constituted 92.4% and 7.6%, respectively, of fruits from the crown of trees.

The economic efficiency of cherry production depends on some strict economic rules that allow to minimize production costs.

The investigations carried out highlight the fact that the growth regulators Auxiger LG and Gibbera, SL had a positive influence on the weight of the bound fruits and the productivity of the plantation, which allowed to obtain a higher sales income compared to the control variant.

In the case of the control variant, the income from sales was 307.4 thousand lei/ha, when treated with the growth regulators Auxiger LG and Gibbera, SL, this figure recorded values of 339.0 - 351.0 thousand lei/ha. Higher values of the income from sales were registered in the Gibbera, SL version in the dose of 0.5 l/ha - 351.0 thousand lei/ha. Next, in decreasing order are the variants treated with the growth regulators Auxiger LG in a dose of 0.7 l/ha - 342.0 thousand lei/ha and Gibbera, SL in a dose of 0.25 l/ha - 339.0 thousand lei/ha (Table 6).

Table 6. Economic production efficiency of cherry fruits from the Kordia variety in the case of treatment with growth regulators

Variants	Sales income, thousands of lei/ha	Cost of production, thousands of lei/ha	Profit, thousands of lei/ha	The profitability, %
Control	307.4	100.4	207.0	206.2
Auxiger LG - 0.7 l/ha	342.0	107.0	235.0	219.6
Gibbera, SL - 0.25 l/ha	339.0	105.5	233.5	221.3
Gibbera, SL - 0.50 l/ha	351.0	107.2	243.7	227.1

The investigations carried out highlight the fact that for the treatment with the growth regulator Gibbera, SL in the dose of 0.25 l/ha - 0.3 thousand lei/ha was invested in the procurement of the product, for the variant Gibbera, SL in the dose of 0.5 l/ha - 0.6 thousand lei/ha, and when treated with the growth regulator Auxiger LG in the dose of 0.7 l/ha - 1.4 thousand lei/ha.

The lowest production cost was recorded in the control version - 100.4 thousand lei/ha. In the version treated with the growth regulators Gibbera, SL in a dose of 0.25 l/ha, the studied indicator was 105.5 thousand lei/ha. The treatment with the growth regulators Auxiger LG in a dose of 0.7 l/ha and Gibbera, SL in a dose of 0.5 l/ha had a significant impact on the production cost (107.0-107.3 thousand lei/ha), as the additional investment to purchase the product and collect the additional fruit took its toll compared to previous variants.

The profit of the product is directly related to its sales revenue and production cost. Lower profit values were recorded in the control version - 207.0 thousand lei/ha, and higher in the version treated with the growth regulators Gibbera, SL in a dose of 0.5 l/ha - 243.7 thousand lei/ha. The

variants treated with the growth regulators Gibbera, SL in a dose of 0.25 l/ha and Auxiger LG in a dose of 0.7 l/ha, recorded a profit of 233.5 and 235.0 thousand lei/ha, respectively.
The effectiveness of the treatment with the growth regulator Gibbera, SL in the dose of 0.5 l/ha is also confirmed by the level of profitability. While the level of profitability of the control variant was 206.2%, in the case of the use of growth regulators the indicator in the study varied from 219.6 to 230.0%, but maximum values were recorded in the variant treated with the product Gibbera, SL in a dose of 0.5 l/ha - 227.1%.

CONCLUSIONS

Based on the experimental results, the growth regulator Gibbera, SL can be included in the technological scheme of cherry plantation cultivation to increase the degree of fruit binding, intensify the processes of growth and formation, and accelerate the ripening of cherry

fruits in the dose of 0.5 l/ha, applied 3 times by foliar treatment. The first treatment to be carried out at the end of the flowering period, and the next 2 at an interval of 7-10 days after the previous one.

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