

THE ACTION OF PRODUCTS BASED ON NAD, ANA AND BA ON THE FRUIT LOAD CONTROL IN GOLDEN REINDERS APPLE TREES

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Abstract

The research was carried out in the plantation of the LLC 'Codru ST' enterprise founded in 2006. The efficiency of apple fruits chemical thinning on Golden Reinders variety grafted on the M9 rootstock was studied, under the action of the naphthylacetamide NAD (Geramid-New), naphthylacetic acid ANA (Dirager) and benzyladenine BA (Gerba 4LG), in different doses and thinning periods. Optimum values for the number of fruits in the crown, the average weight of a fruit, the production of fruits per tree and per hectare, as well as the average diameter of a fruit were obtained in the case of treatment with Geramid-New products 2.0 l/ha, Dirager 0.4 l/ha and Gerba 4LG 2.5 l/ha, recording values similar to the manual thinning option. A significant effect was recorded when treating with Geramid-New 2.0 l/ha when 80% of petals fell + 2-3 days, with Dirager 0.4 l/ha when the central fruit diameter was 8-9 mm and Gerba 4LG 2.5 l/ha when the fruit diameter was 10-15 mm.

Key words: apple, chemical thinning, growth regulators, fruit, average weight, diameter, production.

INTRODUCTION

In the last decade, the Golden Delicious variety and its clones, both worldwide and in the Republic of Moldova, are the most cultivated yellow apple varieties (Babuc V. et al., 2013; Balan V. et al., 2019; Bucarciuc V., 2022; Cimpoiș Gh., 2012; Peșteanu A., 2015; Peșteanu A. and Calestru O., 2020). The Golden Reinders variety records abundant and regular flowering on all types of fruit branches forming high yields, but in some years a lower quality is recorded (Ambrozic Turk B. and Stopar M., 2010; Peșteanu A., 2013; Peșteanu A., 2015; Peșteanu A. and Calestru O., 2020). In order to exclude this negative phenomenon, it is recommended to intervene by optimizing the fruit load through various thinning methods (manual, chemical) with different growth regulators and in various treatment doses (Greene D., 2002; Dorrighoni A. and Lezzer P., 2007; Ilie A. et al., 2016; Peșteanu A., 2013; Peșteanu A., 2015; Peșteanu A. and Calestru O., 2015; Peșteanu A. and Calestru O., 2017). That is why, at the initial stage, in apple plantations, the fruit load control of the trees is carried out by the chemical method and then, if necessary, the number of fruits can be corrected by the manual method depending on the degree of development and the physiological state of

the plants (Vămășescu S. and Balan V., 2014; Dennis F., 2000; Peșteanu A., 2017; Stopar M., 2000).

To solve this problem, it is necessary to study the use of different growth regulators whose active substance are NAD, ANA and BA, which allow to carry out treatments from the fall of the petals until the central fruit in the inflorescence is 15 mm diameter (Greene D., 2002; Hiroshi I. et al., 2018; Peșteanu A., 2013; Peșteanu A., 2015; Peșteanu A. and Calestru O., 2020).

MATERIALS AND METHODS

The researches were carried out between 2014 and 2017, in the intensive apple orchard of the SRL "Codru-ST" enterprise, planted near Paulești village, Calarași district. The plantation was founded in the fall of 2006, with one-year-old trees.

As biological material, the Golden Reinders variety grafted on the M9 rootstock was taken, the crown led according to the improved thin spindle system, the planting distance 3.5 x 1.2 m.

Growth regulators based on NAD, ANA and BA, produced by the company "L. Gobbi" SRL, Italy and established the following experience (Table 1).

Table 1. Scheme of the experience on the method of thinning and the dose of treatment of apple trees with growth regulators

Variants of the experiment	Activ ingredient	Treatment dose, l/ha	Aplication
Without thinning (c)	-	-	-
Hand thinning	-	-	Manual thinning after physiological fall, when the central fruit reaches 15-20 mm in diameter
Geramid New	NAD (44.8 g/l)	1.2	By spraying, when 80% of petals fall +2-3 days, when the central fruit reaches 4-7 mm in diameter
		1.5	
		2.0	
Dirager	ANA (37 g/l)	0.2	By spraying, when the central fruit reaches 8-9 mm in diameter
		0.3	
		0.4	
Gerba 4 LG	6BA (41 g/l)	2.0	By spraying, when the central fruit reaches 10-15 mm in diameter
		2.5	
		3.0	

The research was carried out according to the general methods for experiments with fruit species in the field and laboratory.

The trees were treated with the portable sprinkler in the windless hours, in the morning, from the +18°C temperature. The amount of solution per tree was 0.42 liters, resulting from the number of trees per unit area and the recommended amount of water of 1000 l/ha.

The records for the determination of the number of fruits, the average weight of a fruit, the production per tree, per surface unit and the diameter of the fruits were carried out during the harvest period.

The statistical processing of the main indices was carried out by the method of monofactorial dispersion analysis. The experimental results were processed using the ANOVA test and STATGRAPHICS 18 software package.

RESULTS AND DISCUSSIONS

The number of fruits in a tree results from the share of flowers, the setting coefficient, the fruit load control method and the dose applied within each individual growth regulator.

The data presented in Table 2 show that the number of fruits in the crown of the apple trees was in direct correlation with the factors taken into the study. A higher number of fruits on trees of the Golden Reinders variety was recorded on the variants under study in 2014 and 2016, where they constituted 103-307 and 107-285 pcs./tree, respectively. In 2015 and 2017, the number of fruits in the crown of the trees was the lowest during the research period

due to the higher values of fruits in the previous years, constituting 83-130 and 98-128 pcs./tree, respectively.

Further studying how the number of fruits varied during the research, a more destabilized gap was recorded in the control version, where the index under study, in the years 2014 and 2016, recorded the highest values, 307 and 285 pcs./tree, and in 2015 and 2017 no production was recorded due to alternative fruiting. Depending on the number of fruits obtained in the crown of the trees from the control variant, we can mention that the Golden Reinders variety is not completely prone to alternative fruiting, when productions of 58.55 and 54.33 t/ha were recorded in the crown of the trees (Table 2).

Table 2. The influence of growth regulators and treatment dose on the number of fruits in the crown of Golden Reinders apple trees, pcs./tree

Variants of the experiment	Treatment dose (l/ha)	Years				Average 2014-2017
		2014	2015	2016	2017	
Without treatment (c)	-	307	0	285	0	292.5
Hand thinning	-	112	110	113	107	110.5
Geramid New	1.2	154	124	143	128	137.3
	1.5	135	127	115	109	121.5
	2.0	116	107	114	101	109.5
Dirager	0.2	159	130	140	120	137.3
	0.3	140	124	131	114	127.3
	0.4	111	114	117	106	112.0
Gerba 4LG	2.0	139	106	135	115	123.8
	2.5	115	94	110	107	106.5
	3.0	101	83	107	98	97.3
DL 5%	-	7.4	6.9	7.2	6.3	-

The number of fruits on an apple tree of the Golden Reinders variety also differs significantly depending on the method of the fruit load control during the research. In the variant without thinning, the number of fruits per tree after the multi-year average recorded higher values (292.5 pcs./tree), compared to the manual thinning variant (110.5 pcs./tree). The number of fruits in the manual thinning variant was constant throughout the research and did not vary essentially from the multiannual average value, because the goal was to maintain 110-115 pcs./tree in the crown.

The growth regulators used in the chemical thinning of the reproductive organs during the research had their contribution on the average number of fruits in the crown of the apple trees. A higher number of fruits in the crown of apple trees was registered in the case of treatment with the growth regulator Dirager (112.0-131.3

pcs./tree) compared to the product Geramid New (109.5-137.3 pcs./tree), where fruit load control is triggered immediately after petal fall. The lowest number of fruits in the crown of apple trees was obtained when using the growth regulator Gerba 4 LG (97.3-123.8 pcs./tree). The different number of fruits in the apple trees of the Golden Reinders variety is explained by the action of each active substance specifically on blocking the development of the seeds in the seminal chamber of the fruits, their abscission and the climatic conditions that were recorded during the treatment period.

Since it is known that the Golden Reinders variety is part of the varieties where it is more difficult to chemically thin the reproductive organs, various treatment doses were also studied, including those recommended for apple cultivation in the Republic of Moldova.

If, for example, the average number of fruits for the years 2014-2017 in the version treated with the product Geramid New 1.2 l/ha was 137.3 pcs./tree, then in the case of the version Geramid New 1.5 l/ha the value of this index was 121.5 pcs./tree. Increasing the Geramid New product treatment dose to 2.0 l/ha essentially influenced the number of fruits in the tree card, where the index in the study was 109.5 pcs./tree, an approximate value with the manual thinning option.

This is explained by the fact that within some apple varieties, the use of smaller doses of the product can have a negative reaction on the number of fruits obtained in the crown of the trees, a lower influence on the normalization of the fruit load. A. Peșteanu and O. Calestru (2020) reached such results, in the conditions of 2018 within the Golden Reinders variety in the Republic of Moldova.

Higher values in the variants where the Dirager product was administered were obtained in the variant treated with a dose of 0.2 l/ha (137.3 pcs./tree). In the Dirager 0.3 l/ha variant, the index in the study decreased (121.5 pcs./tree), while in the case of the Dirager 0.4 l/ha variant, the number of fruits in the crown of the trees during 4 years was 112.0 pcs./tree, more constant value for Golden Reinders apple trees in the respective age period.

In the case of the variants treated with the growth regulator Gerba 4 LG, we register a

more essential influence on the index studied, compared to the variants treated with Geramid New and Dirager products. The lowest number of fruits per tree in the variants treated with Gerba 4 LG was obtained in the case of the 3.0 l/ha dose (97.3 pcs./tree), then higher values of the study index were recorded in the variant with the dose of 2.5 l/ha (106.5 pcs./tree), which was approximately at the level of the Geramid New 2.0 l/ha and Dirager 0.4 l/ha variants. A greater number of fruits in the case of the variants treated with the product Gerba 4 LG was registered in the case of administering the dose of 2.0 l/ha (123.8 pcs./tree),

The average weight of a fruit, as an indicator of quality (Table 3), varied greatly during the years studied in the trees of the Golden Reinders variety. The highest average weight of a fruit in the manual thinning variant was recorded in 2017 (171.3 g), and the lowest in 2016 (145.0 g). During the years 2014 and 2015, the average weight of a fruit recorded average values of 160.3 and 167.4 g, respectively. This indicator is largely correlated with the number of fruits obtained within a tree and the weather conditions in the years of reference. Also, the average weight of a fruit in that period decreased essentially due to the large number of fruits in the control version, where the index under study recorded the lowest values, in 2014 - 80.1 g, and in 2016 - 76.8 g.

The average weight of a fruit also changes under the influence of the method of control the fruit load. Lower values were recorded in the variants Geramid New 1.2 l/ha (126.7 g), Dirager 0.2 l/ha (127.8 g) and without thinning (78.4 g) compared with the other variants (137.8-175.1 g). The essential gap between the variants with a lower average weight is explained by the different number of fruits and the reaction of the growth regulator on the variety under study during the years of research. A lower weight of a fruit was obtained in the control variant in the years 2014 and 2016, constituting 80.1 and 76.8 g, respectively, and in the years 2015 and 2017 no harvest was obtained in the respective variants. This phenomenon was recorded due to the alternation of fruiting, which in the Golden Reinders variety is more pronounced than in the trees of other varieties. Within the variant

with manual thinning we record an average weight of 161.0 g, values considered more balanced within the variants studied.

Table 3. The influence of growth regulators and treatment dose on the average weight of a crown fruit of Golden Reinders apple trees, g

Variants of the experiment	Treatment dose (l/ha)	Years				Average 2014-2017
		2014	2015	2016	2017	
Without treatment (c)	-	80.1	0	76.8	0	78.4
Hand thinning	-	160.3	167.4	145.0	171.3	161.0
Geramid New	1.2	120.2	129.7	118.3	138.5	126.7
	1.5	134.7	145.0	146.4	168.2	148.6
	2.0	163.4	170.4	150.8	179.5	166.0
Dirager	0.2	116.8	127.4	120.7	146.3	127.8
	0.3	130.3	137.8	126.9	156.3	137.8
	0.4	159.0	157.1	144.3	173.3	158.4
Gerba 4LG	2.0	131.8	169.3	125.5	160.3	146.7
	2.5	159.2	182.3	148.9	173.4	166.0
	3.0	178.4	188.3	153.4	180.4	175.1
DL 5%	-	5.1	5.4	4.6	5.9	-

The products used for the chemical thinning of the fruits also had an interaction on the index studied in a differentiated way, recording average weights of a fruit according to the active substance used in the treatment and the administered dose.

Comparing the average weight of a fruit according to the growth regulators used for chemical thinning, it was found that as a result of treating the trees with the product Geramid New 2.0 l/ha, a value of 166.0 g was recorded, that is, an increase, compared with the manual thinning option, by 3.1%. Within the Geramid New 1.5 l/ha variant, the studied index was 148.6 g, and the lowest values (126.7 g) were recorded in the case of reducing the dose to 1.2 l/ha. The increase in the average fruit weight is correlated with the amount of product administered within each tree on the variants studied.

In the case of the variants using the Dirager product, the average weight of a fruit at different treatment rates is of interest for modern fruit growing. Thus, if the average weight of a fruit in the Dirager 0.2 l/ha version was 127.8 g, then in the trees treated with the 0.3 l/ha dose, the index in the study increased to 137.8 g. Further increasing the amount of product per surface unit (Dirager 0.4 l/ha), we record higher values of the index taken in the study (158.4 g).

The growth regulator Gerba 4 LG had a more visible effect on the average weight of a fruit,

registering lower values in the version treated with the dose of 2.0 l/ha (146.7 g), then in increasing order the version with the dose 2.5 l/ha (166.0 g), and fruits with higher values were recorded in the 3.0 l/ha (175.1 g) version. Fruit production is the main index by which the efficiency of the technological elements applied to apple culture can be appreciated. Apple fruit production is a complex characteristic, which depends on how the fruit load is managed, the amount of product applied to chemical thinning and how these technological elements interacted with environmental factors (Peșteanu A. and Calestru O., 2017; Peșteanu A. and Calestru O., 2020).

The data in Table 4 shows that the factors mentioned above had a major impact on fruit production within a tree.

Fruit production within one tree is correlated with the number of fruits on the crown of apple trees and the average weight of a fruit. A higher fruit production in the crown of apple trees with different fruit load management methods without the control variant was obtained in 2014 and 2017 compared to 2015 and 2016.

The fruit load control method during the research influenced the studied index, with higher values being recorded in the Geramid New 2.0 l/ha variant with 18.13 kg/tree, and lower values in the control variant, without thinning (11.85 kg/tree). Approximate values with manual thinning (17.77 kg/tree) were recorded in the version treated with the growth regulator Dirager in the dose of 0.4 l/ha -17.70 kg/tree and Gerba 4 LG 2.5 l/ha - 17.60 kg/tree. Fruit production within a tree in the other variants during the researches recorded lower or insignificantly higher values compared to the manual thinning variant.

Fruit production in the crown of apple trees was also correlated with the dose of product administered during the chemical thinning period. Among the trees of the Golden Reinders variety, higher apple productions were obtained in the Geramid New 1.5 l/ha (17.94 kg/tree) and Geramid New 2.0 l/ha (18.13 kg/ tree). The variant treated at the dose of 1.2 l/ha decreased fruit production (17.32 kg/tree).

Within the variants treated with Dirager 0.2 l/ha, fruit production per tree recorded insignificantly higher or lower values compared to the variants Dirager 0.3 l/ha and Dirager 0.4 l/ha.

Table 4. The influence of growth regulators and treatment dose on fruit production in the crown of Golden Reinders apple trees, kg/tree

Variants of the experiment	Treatment dose (l/ha)	Years				Average 2014-2017
		2014	2015	2016	2017	
Without treatment (c)	-	24.59	0	22.82	0	11.85
Hand thinning	-	17.95	18.41	16.38	18.33	17.77
	1.2	18.51	16.08	16.97	17.72	17.32
Geramid New	1.5	18.18	18.41	16.83	18.33	17.94
	2.0	18.95	18.23	17.19	18.13	18.13
	0.2	18.57	16.56	16.90	17.55	17.40
Dirager	0.3	18.24	17.09	16.62	17.82	17.44
	0.4	17.65	17.91	16.88	18.37	17.70
Gerba 4LG	2.0	18.32	17.95	16.94	18.43	17.91
	2.5	18.31	17.14	16.38	18.55	17.60
	3.0	18.02	15.63	16.41	17.68	16.94
DL 5%	-	0.27	0.35	0.32	0.43	-

Treatments with Gerba 4 LG growth regulator reduced fruit production per tree more significantly compared to Geramid New and Dirager products. The production within a tree of the Golden Reinders variety varied between 16.94 and 17.91 kg/tree. The value of this index for the Gerba 4 LG 2.0 l/ha variant was higher (17.60 kg/tree) than for the Gerba 4 LG 2.5 l/ha variant (17.11 kg/tree). In the case of the Gerba 4 LG 3.0 l/ha variant, production per tree recorded lower values (16.94 kg/tree), i.e. with a decrease of 5.5% compared to the Gerba 4 LG variant 2.0 l/ha.

Fruit production per unit area was not very different from that obtained within a tree. Higher values of fruit production in the variants with chemical thinning was obtained in 2014 (42.02- 45.12 t/ha), then decreasing in 2017 (41.79-44.17 t/ha), 2015 (38.29-43.83 t/ha) and lower values of this index were recorded in 2016 (39.00-40.93 t/ha) (Table 5).

The fruit load rationing method influenced the fruit production per unit area differently. Thus, if, on average, in the fruiting years 2014-2017 for trees of the Golden Reinders variety in the version treated with the product Geramid New 2.0 l/ha, the fruit production was 43.16 t/ha, in the control version, without thinning, the value of the studied index was 28.22 t/ha. Theoretically, the hypothesis would persist that higher fruit production should be recorded in the control variant, without thinning, but based on the studies carried out, we record diametrically opposite results, which is explained by alternative fruiting of the trees of the given variety in 2015 and 2017.

The further study shows that identical values of the index investigated with the manual thinning variant (42.30 t/ha) were recorded in the variant treated with the product Gerba 4 LG 2.5 l/ha (41.30 t/ha). In the other variants, this index was lower or higher compared to the manual thinning variant. The dose of product used in chemical thinning for the growth regulators studied had a direct influence on fruit production. If, for example, fruit production in the case of treating trees with the growth regulator Geramid New 1.2 l/ha was 41.24 t/ha, then the value of this index in the case of the Geramid New 1.5 l/ha variant - 42.61 t/ha. With the increase of the treatment dose, the value of the index in the study decreases, recording in the Geramid New 2.0 l/ha version a production of 43.16 t/ha. At first glance, it seems as if there is no significant difference between the obtained results, but taking into account the average diameter of a fruit, we register a priority of the studied index in the Geramid New 2.0 l/ha variant compared to the other variants (Table 6).

Table 5. The influence of growth regulators and treatment dose on fruit production in the Golden Reinders apple orchard, t/ha

Variants of the experiment	Treatment dose (l/ha)	Years				Average 2014-2017
		2014	2015	2016	2017	
Without treatment (c)	-	58.5	0	54.3	0	28.2
Hand thinning	-	42.7	43.8	39.0	43.6	42.3
	1.2	44.0	38.2	40.4	42.1	41.2
Geramid New	1.5	43.2	43.4	40.0	43.6	42.6
	2.0	45.1	43.4	40.9	43.1	43.1
	0.2	44.2	39.4	40.2	41.7	41.4
Dirager	0.3	43.2	40.6	39.5	42.4	41.4
	0.4	42.0	42.6	40.1	43.7	42.1
Gerba 4LG	2.0	43.6	42.7	40.3	43.8	42.6
	2.5	43.6	40.8	39.0	44.1	41.9
	3.0	42.9	37.2	39.0	42.1	40.3

If in the case of the variants treated with the growth regulator Geramid New, the yield was 41.24-43.16 t/ha, then in the variants treated with the product Dirager the legality registered on the control of the fruit organs is identical, constituting 41.42-42.15 t/ha, but taking into account the average diameter of the fruits, higher values were recorded in the Dirager variant 0.4 l/ha. Insignificantly higher fruit productions per surface unit were recorded in the Dirager 0.4 l/ha (42.15 t/ha) variant, then the Dirager 0.3 l/ha variant (41.48 t/ha), and the last position goes to the Dirager 0.2 l/ha (41.42

t/ha) variant, where the degree of thinning was higher. The influence of the growth regulator Dirager, when the central fruit reached 8-9 mm in diameter, had a more eloquent influence on the studied index.

The Gerba 4 LG product also contributed to fruit production on the variants studied. Thus, the average fruit production during the years 2014-2017 for apple trees of the Golden Reinders variety in the Gerba 4 LG 2.0 l/ha variant was 42.64 t/ha, in the Gerba 4 LG 2.5 l variant/ha was 41.90 t/ha, i.e. a decrease of 6.8% compared to the previous version. The previously mentioned legality is also valid for the variant treated with the Gerba 4 LG 3.0 l/ha growth regulator, where fruit production decreased by 5.4% compared to the Gerba 4 LG 2.0 l/ha variant and by 1.8% compared to the Gerba 4 LG 2.5 l/ha variant. The higher temperature of 25°C during 4-5 days in 2015, after the treatment, influenced the degree of fruit thinning in the Golden Reinders variety, being at the level of the multiannual average (Gerba 4 LG 2.0 l/ha), or smaller.

The obtained data allow us to highlight that higher productions with chemical thinning of the fruit organs were recorded in the Geramid New 2.0 l/ha variant, in the Dirager 0.4 l/ha variant and when applying the Gerba 4 LG product in the variant treated with 2.5 l/ha.

Fruit quality is a particularly important characteristic when approximately identical productions are recorded per surface unit and it is necessary to make decisions regarding the influence of the product or treatment dose, which is characterized by various morphological, organoleptic, technological, biochemical and, finally, by the food value.

Analyzing the diameter of the fruits, a criterion taken to classify the fruits by quality categories, during the research and the variants studied (Table 6), we note that the index in question is influenced by the method of normalizing the fruit load, by the products used for chemical thinning and the dose administered within each product.

Lower values of the fruit diameter during the years 2014-2017 in the manual thinning variant were recorded in 2016 (70.0 mm). A larger average diameter of the fruits in the respective variant was obtained in 2015 (72.8 mm) and 2017 (73.0 mm), while in 2014 the studied

index recorded average values (71.8 mm). The values regarding the average diameter of the fruits during the researches are considered optimal for the Golden Reinders variety.

Table 6. The influence of growth regulators and treatment dose on the quality expressed by the mean diameter of the fruits in the variety Golden Reinders, mm

Variants of the experiment	Treatment dose (l/ha)	Years				Average 2014-2017
		2014	2015	2016	2017	
Without treatment (c)	-	54.3	0.0	53.7	0.0	54.0
Hand thinning	-	71,8	72,8	70,0	73,0	71,9
Geramid New	1.2	65,7	67,2	65,0	68,7	66,7
	1.5	68,2	69,7	69,8	72,8	70,1
	2.0	72,4	72,9	70,4	74,1	72,5
Dirager	0.2	64,7	67,0	65,4	69,8	66,7
	0.3	67,4	68,7	66,8	71,4	68,6
	0.4	71,7	71,5	69,6	73,2	71,5
Gerba 4LG	2.0	66,3	72,9	66,2	72,1	69,4
	2.5	71,9	74,4	70,3	73,2	72,5
	3.0	73,9	75,0	70,9	74,2	73,5

The fruit load rationing method also influences the average diameter of a fruit. Lower values of the given index were recorded in the control variant without thinning (54.0 mm) and in the variants Geramid New 1.2 l/ha (66.7 mm), Dirager 0.2 l/ha (66.7 mm) and Gerba 4 LG 2.0 l/ha (69.4 mm). In the other variants, where chemical thinning was performed, this index evolved more rationally, recording the average fruit diameter greater than 70 mm.

The variant treated with Geramid New 2.0 l/ha and Dirager 0.4 l/ha recorded identical values to the control variant. The growth regulator Gerba 4 LG, which is characterized by a greater degree of thinning of the fruit organs, induced a greater growth on the index studied.

Also, the average diameter of a fruit changes under the influence of the product dose applied to the varieties under study. The study carried out showed that increasing the dose of the product when treated with Geramid New and Dirager led to an increase in the average diameter of a fruit. If, for example, in the Geramid New 1.2 l/ha variant the average diameter of a fruit was 66,7 mm, then, with the dose increased to 1.5 l/ha, it was 70.1 mm, and in the Geramid New variant 2.0 l/ha – 72.4 mm. In the case of treatments with the Dirager product, the larger diameter was recorded in the version with the dose of 0,4 l/ha (71.5 mm), but when applying the Gerba 4 LG product, we note that with the increase in the dose of the product, the index in the study increases.

Maximum values regarding the index under study being entered in the Gerba 4 LG variant 3,0 l/ha (73.5 mm).

In general, it is found that the number of fruits per tree, average fruit weight, fruit production per tree and per unit area, as well as average diameter of a fruit are correlated with fruit load thinning method, growth regulator and the dose administered, as well as the weather conditions during the treatment period, before and after application.

CONCLUSIONS

The growth regulators based on NAD, ANA and BA, in different doses, particularly influence the number of fruits, their average weight, the diameter of the fruits and the productivity of the apple plantation.

For a more efficient regulation of the fruit load in Golden Reinders trees by the chemical method and to exclude the influence of climatic phenomena, it is necessary to use 1-2 growth regulators when regulating the fruit load, depending on the method of action and application period, to be able to develop a fruit thinning strategy.

For the Golden Reinders variety, higher yields and competitive fruit quality were recorded when treated with the product Geramid New 2.0 l/ha at the fall of approx. 80% of petals plus 2-3 days. If the weather conditions are not favorable for treatment with the Geramid New product during this period, the growth regulator Dirager 0.4 l/ha can be applied later, when the central fruit in the inflorescence is 8-9 mm in diameter. If the number of fruit organs in the tree crown is high, it is recommended to treat with Gerba 4 LG 2.5 l/ha, when the size of the central fruit in the inflorescence is 10-15 mm in diameter.

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