INFLUENCE OF SOME TREATMENTS WITH BIOSTIMULATING SUBSTANCES ON PRODUCTIVITY OF GELU TABLE GRAPES VARIETY, GROWN IN THE VINEYARD AREA OF IASSY

INFLUENȚA UNOR TRATAMENTE CU SUBSTANȚE BIOSTIMULATOARE ASUPRA PRODUCTIVITĂȚII SOIULUI DE STRUGURI DE MASĂ GELU, CULTIVAT IN AREALUL PODGORIEI IAŞI

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Abstract. *By introducing in the table grapes cultivation technology of the biostimulating hormonal treatments can beprovide outstanding increases of production that contributes to the quality of marketed production. This paper aims to establish the optimal doses of biostimulating substances that can be applied to obtain an increase production yield of table grapes and improve their quality parameters. Were used commercial products Cropmax, Kelpak, Gibberellinic Acid (GA_3), in different concentrations and was found that Gelu variety react differently depending on the biostimulating substance, dose and moment of application. The best option was variant two, treated with 50 ppm of GA_3.*
Key words: biostimulating hormonal treatments, Gelu variety, GA_3, Iasi vineyard.

Rezumat. *Prin introducerea tratamentelor hormonale biostimulatoare în cadrul tehnologiilor de cultură la soiurile de viţa de vie pentru struguri de masă se pot asigura sporuri de producţie remarcabile ce contribuie lacreşterea calitativă a producţiei marfă. Lucrarea are ca scop stabilirea dozelor optime de substanţe biostimulatoare care pot fi aplicate în vederea obţinerii unui randament crescut al producţiei de struguri de masă şi îmbunătăţirea parametrilor calitativi ai acestora. S-au folosit produsele comerciale Cropmax, Kelpak şi acid giberelinic (AG3) în diferite concentraţii şi s-a constatat că soiul Gelu, reacţionează diferit în funcţie de substanţa biostimulatoare, doza şi momentul aplicării. Cea mai bună opţiune a fost reprezentată de varianta tratată cu AG_3, în concentraţie de 50 ppm.*
Cuvinte cheie: tratamente cu substanţe biostimulatoare, AG3, soiul Gelu, podgoria Iaşi.

INTRODUCTION

Plant growth and development is controlled by genetic factors and certain endogenous substances that are part of the plant hormones group. They are true chemical messengers that promote plant capacity to respond to environmental conditions(Toma and Jităreanu, 2007).

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Plant hormones (phytohormones) are a class of organic substances that at low concentrations affect physiological processes of growth, differentiation and development of plants. Recent research shows that phytohormones are polyfunctional substances that participate in regulating of many physiological processes. Also, they are not acting on all cells, but only on those whom they are compatible.Compatibility and the ability to react is determined by the presence of protein receptors on cells (Davies, 2004).

This work aims to study the influences of treatments with biostimulators on productivity of Gelu table grapes variety,grown in Iassy vineyard area.

Observations have been made to improve current technology culture of vine, which allows to obtain higher production, quantitatively and qualitatively.

MATERIAL AND METHOD

The study was conducted at Gelu table grape variety grown in the Ampelographyc Collection of Faculty of Horticulture belonging tothe University of Agricultural Sciences and Veterinary Medicine "Ion Ionescu de la Brad", Iassy. Rootstock used was Berlandieri x Riparia Kober 5 BB. Planting distances were 2.2 /1.2 m, half high leading form, bilateral cord with cutting in fruit links. Soil maintenance is done in the form of “black field”, and maintenance operations of vines are specific to industrial vineyard ecosystem.

The research was conducted in 2011, the experience scheme was as follows: Control sample– H_2O; Cropmax V_1–10 ml, Cropmax V_2–25 ml, Cropmax V_3–50 ml; Kelpak V_1–50 ml, Kelpak V_2–100 ml, Kelpak V_3–150 ml; gibberellinic acid (GA_3)V_1 - 25 ppm; GA_3 V_2–50 ppm; GA_3 V_3–100 ppm.

The experience was organized in three repetitions, with five stocks in each plot. Commercial substances Kelpak and Cropmax were applied foliar, first before flowering, after shaking of flowers, and second time at the berries formation phenophase. Gibberellinic acid (GA_3) application was performed by spraying inflorescences in the flowering phenophase, when70% of the corollas are fallen.

Results are average of three determinations and have calculated standard deviation.

RESULTS AND DISCUSSIONS

Geluis the first variety with blue-purple grapes that ripenin the N- Earea of Romania, and is characterized by high yields, diversifying assortment of table grape varieties in areas with low thermal resources. Grapes have medium size (275-304 g), cylindrical-conical form, semi-compact. Berries size are medium to large (4 g), elliptical, with blue-purple skin color covered with pruine. The pulp is colored, flavored, semi-crispy, with pleasantly and harmonious taste. Is avariety with medium vegetation period 165-172 days,buds opening from 25 April to 05 May, blooms from 10 to 18 June, and the full maturation of the grapes is done at the end of August from the 20th VIII, variety fits in the third period of grapes maturation. Produces high yields of grapes 22 t/ha, of which 92% is the percentage of comercial grapes (Țârdea and Rotaru, 2003).

After applying the biostimulating treatments, produced grapes were medium size, cylindrical,conical and half compact. At the control variant, the

average weight of a grape was 260.35 g, berries on the cluster reaching 254.22 g and rachis weight was 6.13 g (table 1).

Table 1

Physico-chemical properties of the control sample grapes and the samples treated with gibberellinic acid (GA_3)

Indicator	Control variant	GA_3 V_1	GA_3 V_2	GA_3 V_3
Production / vine stock (kg)	6.769	6.944	7.055	6.483
Number of grapes on stock	26.00	25.00	25.00	26.00
Grapes weight (g)	260.35	277.79	282.21	249.36
Number of berries/rachis	76.00	60.67	54.00	73.67
Berry weigh (g)	3.43	4.58	5.22	3.38
Weight of 100 berries (g)	343.58	457.89	522.00	338.50
Rachis weight (g)	6.13	5.76	5.95	7.52
Number of seeds/berry	1.67	2.07	2.00	1.67
Structure index	41.50	47.25	46.43	32.17
Berry grapes index	29.15	21.84	19.16	29.54
Skin weight (g)	0.65	0.60	0.67	0.44
Pulp weight (g)	2.78	3.98	4.55	2.94
Compozition index	4.27	6.68	6.79	6.68
Sugars (g/L)	151.00	158.00	164.00	143.00
Titratable acidity (g/ L tartaric acid)	6.83	7.41	7.16	6.25

Index structure of the cluster, represented by the ratio of berries grapes weight and clusterweight was 41.5. The number of normally developed berries grapes on the cluster was 67,and undeveloped berries grapes 9. Berries had different sizes, are elliptical, purple-blue,covered with a thin layer of pruine, which increases the commercial value andenhances the appearance of grapes (fig. 1).

Berry grapes index represented the number of berries per 100 g grapes (Constantinescu et al., 1970) had a value of 29.15. Index composition of berry, representing the weight of pulp/skin weight, reached 4.27. Weight of 100 berries grapes was 343.5 g, and the average producţion in the control sample was 6, 769 kg/wine stock. Sugar content value recorded was 151 g/L, with a titratable acidity of 6.83 g/L tartaric acid.

Table 2

Physico-chemical properties and structure of grapes treated with biostimulating substances Cropmax and Kelpak

Indicator	Cropmax CV_1	Cropmax CV_2	Cropmax CV_3	Kelpak KV_1	Kelpak KV_2	Kelpak KV_3
Production / vine stock (kg)	5.990	5.738	4.854	2.531	2.548	3.635
Number of grapes on stock	23.60	21.30	17.30	13.30	12.60	16.60
Grapes weight (g)	253.81	269.42	280.60	190.30	202.22	219.02
Number of berries/rachis	82.00	72.67	90.76	79.00	86.00	84.00
Berry weigh (g)	3.08	3.71	3.09	2.41	2.35	2.61
Weight of 100 berries (g)	308.00	370.76	309.16	240.89	235.14	260.73
Rachis weight (g)	6.52	8.18	7.63	5.31	9.45	9.40
Number of seeds/berry	2.00	2.33	1.67	2.00	1.73	2.00
Structure index	37.95	31.95	35.78	34.84	20.40	22.30
Berry grapes index	32.47	26.97	32.35	41.51	42.53	38.35
Skin weight (g)	0.41	0.46	0.37	0.29	0.28	0.33
Pulp weight (g)	2.67	3.24	2.72	2.12	2.07	2.28
Compozition index	6.49	7.00	7.33	7.33	7.47	7.00
Sugars (g/L)	147.00	144.00	151.00	159.00	163.00	162.00
Titratable acidity (g/L tartaric acid)	5.70	4.50	5.35	6.83	7.10	6.67

Treatments with Cropmax product were applied in three doses at three different phenophases: before flowering, 14 days after flowering and 35 days after flowering.

It is noted that the values obtained after treatments with Cropmax were generally lower than those obtained at control sample at production yield and the number of grapes per vine stock.

Production of grapes per vine stock ranged from 5.990 kg at sample CV_1 to 4.854 kg at sample CV_3. It was found that an increasing amount of grapes production per vine stock was inversely correlated to the dose applied, so at high Cropmax doses (≥50 mL), were recorded lower production yields.

Fig. 1 - Influence of growth regulators Cropmax on the grapes of Gelu variety

The number of normally developed berries in the cluster has not exceeded 76, and the number of undeveloped berries ranged between 12-14. Berry index value was highest at samples CV_1 and CV_3 (32), at sample CV_2 the value was 26.9 . Index composition of berry grapes was in the range of 6.49 at CV_1 and 7, 33 CV_3 sample. Sugar content ranged from 144 g/L at CV_2 and 151 g/L in CV_3 samples, in the context of the titratable acidity with values between 4.5 (CV_2) and 5.7 (CV_1) g/L tartaric acid.

Values obtained after treatments with Kelpak solution were much lower than those obtained from control sample in term of production from the grape vine and cluster number. Production of grapes per stock ranged from 2.531 kg to 3.635 kg at sample KV_1 respectively to sample KV_3 (table 2). It was found that using the biostimulatorKelpakgrape production on the stock increases with the applied dose. Index cluster structure showed maximum value at sample KV_1 (34.84) and minimum value at KV_2 sample (20.40).

The number of normally developed berries in the cluster it was not higher than 76, undeveloped berries exceeding 13. Weight of 100 berries ranged from 235.14 g and 260.73 g at samples KV_2 and KV_3.

Berry index value was highest at KV_2 (42.53) and KV_3 sample was 38.3. The higher value of this index were influenced by the berries size and their weight per rachis the berry composition index had values above 7 at all three variants.

It can be pointed that under the influence of gibberellinic acid the mass of grapes was growing on the stock vine to 6.944 kg (GA_3-25 ppm) and 7.055 kg (GA_3-50 ppm), berries weight and increasing the cluster bunch weight compared to control variant (table 1).

The number of berries per cluster was lower than control version, leading to an appreciation of the index structure to GA_3V_1 and GA_3V_2 samples, but the number of normally developed berries on the rachis does not exceed 50.

Decreasing of berries number in the cluster has increased the weight of 100 berries, the highest value (522.0 g) was registredat the variant treated with gibberellinic acid 50 ppm. Berry index has the most important value at variant V_3 (29.5), and the berry index composition ranged between 6.68 at variants V_1 and V_3, respectively 6.79 to version V_2.

Following correlations made regarding the production of grapes and the doses applied, the value of R^2=0.972 for variants treated with Cropmax,0.761 for those treated with Kelpak and 0.655 for the variants treated with GA_3.

CONCLUSIONS

1. After observations and measurements was found that the variety Gelu respond better to treatment with gibberellinic acid and optimal concentration was 50 ppm, this dose can be successfully introduced in the cultivation technology to increase productivity yield at this variety.

2. Inflorescences treatment with gibberellinic acid contributed to the growth of berries size and 100 berries weight, but did not influence the percentage of seedless grapes.

3. Commercial product Cropmax is recommended to be applied in low concentrations, because the higher doses used do not increasethe productivity.

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