

The Influence of Growth Regulators on the Fertility of Seedless Tarnau Sort

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Abstract: *The research was conducted in experimental filial base of scientific research institute of horticulture, viticulture and wine-making named after academician M.Mirzayev in 2012-2014. The object of the research is seedless sort of grape Tarnau for wine regionized in the republic of Uzbekistan and the scheme of plant layout in the experiment is 3x2,5 m. Agrotechnical history of experimental plot is common in the republic. It has been stated in the research that the optimal concentration of processing grape with Gibberellin after 5 days from flowering stage of Tarnau was 100 mg/l., under which additional yield per plantation square increased by 20,3% compared to unprocessed variant. Under the processing of more less concentration 25 mg/l the yield increased only by 12,3%. When Gibberellin was applied together with Dropp in 10mg/l, synergetic effect was not observed.*

Keywords: grape, sort, Tarnau, growth regulators, bunch, yield, fertility, berry, Gibberellin, Dropp, Krezacin, Camposan, concentration

1. Introduction

Viticulture – is one of leading branches of plant-growing in the republic of Uzbekistan. Native grapes for table use, sultana grapes and raisin grapes, dessert and strong wine prepared on the base of these grape sorts are famous with their best quality not only in our country, but also in abroad. At present the area under vine plantations of the republic makes 148 thousand hectares. Mid-annual grape production is increasing to 1 mln 651 thousand tons, but it doesn't satisfy public demand and raw manufacture [1].

In the short-range perspective of the republic the sharp increase is being planned in production of all types of vine products, in the extension of the areas under vine plants and rising the fertility. Despite high quality of cultivated sorts, some of them have deficiencies, and their elimination allows to increase the productivity and to improve product quality. One of the most effective methods for the solution of these tasks is a proper application of growth regulators.

This research is devoted to the study of using growth regulators for increase of productivity of seedless sort of grape Tarnau.

2. Materials and methods of research

Experiments were conducted on seedless grape sort Tarnau. The scheme of vine bush layout was in 3x2,5 m form. Each variant included single-row plot with planted 40 bushes, out of them 10 bushes were marked in the registration. Experiment repetition was four times.

Experimental work was conducted in 2012-2014 on vineyards of experimental filial base of scientific research institute of horticulture, viticulture and wine-making named after academician M.Mirzayev. The object of the research is seedless sort of Tarnau.

This sort differs from others with its regular stable high

fertility - 500 c/ha. Tarnau sort is used for preparing white wine, champagne and brandy wine materials.

Most authors (M.S. Juravel, A.I. Frolov, 1960; A.I. Frolov, 1961; K.V. Smirnov, Y.P. Perepelitsina, 1965) presented scientific data on the improvement of fertility of seedless grape sort under the influence of Gibberellin. [3, 4, 5].

In the researches of N.V. Agafonov, S.K. Smirnova, S.N. Salenkova (1989) on the sort of black Kishmish there were stated possibility and practicability of combined application of Gibberellin with Dropp, holding cytokine with new activity [2].

The growth regulator in the sort of Tarnau has not been studied yet since today in the republic. The research was conducted through using gibberellic acid, Dropp, Krezacin and Camposan.

3. Results and Discussion

The research revealed stimulant impact of Gibberellin on mass increase of berry in racemation (table 1). In all years of experimental observations application of Gibberellin in 100 mg/l concentration increased the mass of 100 berries by 18 % till the flowering phase. Under the reduced concentration the efficacy of gibberellin activity decreased relatively.

Combined application of gibberellin and Dropp didn't have preferences over separate application of these preparations. Under the processing with Krezacin in a simple form from blossom truss to flowering stage and combining gibberellin and Dropp the mass of 100 berries was increased by 9-10%.

At the beginning of maturation the processing of grape sort Tarnau with Camposan practically didn't affect to berry size. In all variants berries setting in the bunch raised to 2-8 %. The impact of Dropp was stronger than Gibberellin and other preparations. The most of berries tied in the bunch was observed at the combined application of gibberellin of 25 mg/l and Dropp 10 mg/l.

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The more berry mass and quantity was increased in the bunch, the more raised racemation mass in some level. Exceptional variant processed with Camposan in the concentration 100 mg/l resulted in reducing of racemation mass. In other variants racemation mass significantly increased (table 2). Most effect in the experiment was obtained at the processing with gibberellin in the

concentration 100 mg/l after flowering. Average racemation mass in three years increased by 80 g, or 21,5 %. Gibberellin concentration 25 mg/l was less effective, under its application racemation mass raised only to 51 gr or 13 %. By combined application of Gibberellin with Dropp synergetic effect was not defined.

Table 1: The influence of growth regulators on the mass and quantity of berries in racemation of Tarnau vine sort

Preparation	Concentration, mg/l	Processing date	Mass of 100 berries, g				Quantity of berries in racemation, pcs			
			2012	2013	2014	Annual average	2012	2013	2014	Annual average
Control-water	-	*IIa	170	160	165	165	210	220	214	214
Gibberellin	100	IIa	200	190	195	195	215	223	230	223
Gibberellin	25	IIa	190	180	186	185	220	225	233	226
Dropp	10	IIa	180	170	174	175	222	227	234	228
Gibberellin +Dropp	12,5+10	IIa	180	170	174	174	218	223	230	224
Gibberellin +Dropp	25+10	IIa	185	172	176	178	228	230	237	232
Krezacin	50	IIa	186	178	176	180	212	223	229	221
G.C.+D+Kr	25+10+50	IIa	189	175	178	182	218	222	226	222
Camposan	50	III	170	160	162	164	212	219	225	218
Camposan	100	III	168	158	160	162	213	222	226	220

*Legend: IIa - 5 days after flowering; III- at the beginning of ripening berries.

Comparable tendencies have been continued on the influence of preparations for productivity of Tarnau sort. The treatment with Gibberellin in concentration 100 mg/l increased bush prolificacy by 2,9-5 kg, and in concentration 25 mg/l – only by 1,8-3 kg. In 2012, compared to following years of high yield, additional yield was considerably high. In combined application of Gibberellin 25 mg/l and Dropp

10 mg/l in all years of research the increase of prolificacy was less, comparing to processing of Gibberellin in concentration 100 mg/l. At the beginning of maturation under Camposan processing berries didn't affect to yield amount of Tarnau sort. During research years prolificacy of bushes overgrew the control by 0,1-0,5 kgs.

Table 2: The influence of growth regulators on the mass of racemation and fertility of Tarnau sort

Preparation	Concentration, mg/l	Processing date	Racemation mass, g				Bush yield, kg				Fertility, c/ha			
			2012	2013	2014	Average	2012	2013	2014	Average	2012	2013	2014	Average
Control (water)		*IIa	380	361	375	372	26,2	14,4	15,7	18,7	436,4	239,9	261,5	311,5
Gibberellin	100	IIa	460	433	464	452	31,2	17,3	19,0	22,5	519,7	288,2	316,5	374,8
Gibberellin	25	IIa	430	404	435	423	29,2	16,2	17,8	21,0	486,4	269,8	296,5	349,8
Dropp	10	IIa	415	397	417	410	28,2	15,9	17,1	20,4	469,8	264,8	284,8	339,8
Gibberellin +Dropp	12,5+10	IIa	407	390	409	402	27,7	15,6	16,8	20,0	461,4	259,8	279,8	333,2
Gibberellin +Dropp	25+10	IIa	420	400	422	414	28,9	16,0	17,3	20,7	481,4	266,5	288,2	344,8
Krezacin	50	IIa	410	394	412	405	27,9	15,8	16,9	20,2	464,8	263,2	281,5	336,5
G.C.+D+Kr	25+10+50	IIa	400	380	402	394	27,2	15,2	16,5	19,6	453,1	253,2	274,8	326,5
Camposan	50	III	377	375	372	369	26,3	14,9	16,0	19,0	438,1	248,2	266,5	316,5
Camposan	100	III	370	350	370	363	25,9	14,7	15,9	18,8	431,4	244,9	264,8	313,2
SSD _{0,5}			5,6	7,3	7,9		0,4	0,3	0,3					

*Legend: IIa - 5 days after flowering; III- at the beginning of ripening berries.

It should be noted that prolificacy from the vine plantations during the research years considerably depended on weather conditions. At the experiment the most yield was produced in 2012 – 25, 9-31,2 kg per bush, or 431-519 c/ha. In 2013 the yield reduced to 14,4-17,3 kg per bush or 240-288 c/ha due to the damage by early spring frost.

4. Conclusions

At the processing of Tarnau grape sort with Gibberellin in 100 mg/l concentration additional yield made 20,3%, at more less concentration 25 mg/l, it was only 12,3%. At the combined application of Gibberellin with Dropp in 10 mg/l synergetic effect was not observed.

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