

## THE INFLUENCE OF TREATMENT WITH GROWTH STIMULATOR (GOBBI GIB 2LG) ON THE QUANTITY AND QUALITY OF SEEDLESS GRAPE 'BEAUTY SEEDLESS'

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### Abstract

*Viticulture for the agriculture of Moldova is an important and effective branch. Increasing productivity of table grape varieties is imposed by society. The purpose of the research from this article is to study the influence of Gobbi Gib 2LG on the quantity and quality of seedless grapes of 'Beauty seedless' variety. The research was conducted in the vineyards of the company "Terra Vitis" LTd from Southern wine region in Moldova. Research results have shown that the dose of 2.4 l / ha is most useful for conditions south of Moldova, for 'Beauty seedless' variety.*

**Key words:** 'Beauty seedless' grapes, growth stimulators.

### INTRODUCTION

It is to be noted that table grapes production is commercialized as on the internal market as well as on the external one. At the same time you can find also imported commercialized grapes from other regions and countries on the same internal market.

The development of this branch has a particular importance for the Republic of Moldova because it is closely connected to the difficulties that appeared within wine products commercialization and workplace ensuring for the population.

Nowadays, beginning with the 2006<sup>th</sup> year we can observe a very big attention for the development of table grapes production. The calculations show us that the Republic of Moldova is able to produce 135000-136000 tons of grape per year meant for fresh consumption, including 115000-116000 tons meant for commercialization, out of which approximately 30000 tons are meant for commercialization after the storage. The

amount of the grape on the market may reach up to 80000-85000 tons and the export at its turn may reach 20000-30000 tons.

In order to assure the production of such a volume of grapes there is a need of 20-22 thousand ha of vineyards with table grapes varieties whereof 15-16 thousand ha of vineyards in the fruiting period, which gives an average, harvest up to 8-9 t/ha. First of all it is necessary to create new vineyards with typical table grapes, having a high productivity and being widely demanded by the consumers; secondary to create new households and specialized enterprises with a corresponding advanced technological infrastructure.

There are a lot of growth-regulation substances, that we use in the table grapes culture - for seedless varieties, with female flowers and for seed table grapes varieties inclined to forming small undeveloped berries: gibberellins (GA<sub>3</sub>), gibersib (mixtures GA<sub>11</sub> + GA<sub>7</sub> + GA<sub>11</sub>),  $\alpha$ -ANA ( $\alpha$ -naphthyl acetic acid), mixtures GA<sub>3</sub> +  $\alpha$ -ANA etc. (Manankov M.K., 1981 (МАНАНКОВ М.К., 1981); Čajlahân M.H. and

others, 1980 (Чайлахян М.Х. и др., 1980); Kazahmedov P.È. and others, 2004 (Казахмедов Р.Э. и др., 2004).

Through the research of Smirnov K.V. and others, 1965, 1984, 1998 (Смирнов К.В. и др., 1965, 1984, 1998), Vatukaev A.A., 1966, 1987 (Бутукаев А.А., 1966, 1987), Agafonov A.H. and others, 2007 (Агафонов А.Х. и др. 2007), Krasohina S.I., 2008 (Красохина С.И., 2008), Derendovskaâ A.I. and others, 2009 (Дерендовская А.И. и др., 2009) it was proved that the application of gibberellins to table grapes varieties lead to increased size and weight of grapes and berries; improve the appearance of grapes; grapes and berries structure modification; improving the processes of accumulation of sugars, formation in some varieties of seedless berries.

## MATERIALS AND METHODS

The purpose of the research was to study the influence of the Gobbi Gib 2LG, produced by „L Gobbi” Ltd., Italy on the table grapes varieties productivity.

To achieve the final purpose it was necessary to track down the following objectives:

- the action of Gobbi Gib 2LG on the table grapes variety Beauty Seedless, on its berry morphological parameters and mechanical properties;
- the action of Gobbi Gib 2LG on the productivity and quality of the grapes;
- finding out the optimal concentration of the Gobbi Gib 2LG which has a more efficient action within the table grapes seedless varieties;

The research in the field of studying the action of Gobbi Gib 2LG (active substance GA3, the commercial name for L.Gobbi S.R.L. ITALY, this regulator accepted in Moldova) as growth regulator needed to increase the productivity and quality of the grapes was effectuated by “Terra-Vitis” Ltd. located in the Cahul district.

As the object of study it was taken the Beauty Seedless a seedless table grapes variety grafted on the Berlandieri x Riparia SO4 rootstock. Density of plants - 2222 plants/ha (3 x 1.5 m). Training system - horizontal cordon. The soil - ordinary black soil (chernozem).

The GG2LG was used by means of treating the vines within different stages of its

development: the technology used in Italy (3.6; 4.6 l/ha) - on 8 cm shoots length; one week before the blossom; while blossoming 30% of the bloom; while blossoming 50% of the bloom; while blossoming 80% of the bloom; the treatment of Ø 3-4 mm grains; 8-10 days after the last treating; the technology suggested for Moldova (Mihov D., 2010, Дерендовская, А. и др., 2010) was the treatment of Ø 3-6 mm grains (2.0 and 2.4 l/ha). In this experiment we use 3 variations and 3 repetitions.

## RESULTS AND DISCUSSIONS

### *The reaction of the Beauty Seedless table grapes variety to the Gobbi Gib 2LG treatment*

While the control variant the average bunch weight is 251.7 g, the weight of the grains in the bunch - 248.0 and the weight of the cluster 3.7 g. The bunch characteristic value (grains weight/cluster weight) - 67.0. There were ascertained the bunch dimensions: 19.5 - length; top part width - 14.5; middle part width - 8.7; and the bottom width - 3.8 cm (Table 1, Figure 2).

The number of berries per the bunch - 239.0 berries, including 24.7 berries of undeveloped berries, which is approximately 10.0%. The berries have a medium size, oval-shaped, black as colour. The weight of 100 berries is 113.8 g. The berries characteristic value (pulp weight/weight of berry skin) - 409; the crushing strength is not too high and consists the force of 1432 g/cm<sup>2</sup>.

As it is already known all the seedless varieties and some of the early-ripening varieties contain seed rudiments while different stages of their development. When growing in normal conditions the development of the germ stops itself and the seeds do not form.

Before the bloom definitely took place it was fixed the blossoms' pound flesh on the vine at an average of 15-18 inflorescences for each vine (the vine age 3-4 years).

The harvest in the control variant reached 3.9 kg/vine. The sugar content 173 g/dm<sup>3</sup> (this units of measure accepted in Moldova, similar g/1000 cm<sup>3</sup>, g/l), titratable acidity - 11.7 g/dm<sup>3</sup>.

### *The usage of Gobbi Gib 2LG by the Italian technology*

While this type of treating, the vines has been sprayed with Gobbi Gib 2LG before the bloom

took actual place (2) (04.05.2013), (15.05.2013); while blossoming (3) (20.05.2013), (25.05.2013), (30.05.2013); in the post fecundation period (2) (12.06.2013), (23.06.2013).

Within such type of treatment, multiple - 7 treatments with GG2LG the efficiency came through the bunch characteristic value increasing up to 1.6-1.7 times depending on the used dosage. It was noted the berries weight increases up to 1.6-1.7 times and vine weight increases up to 1.5-2.0 times when compared to the control. The berries characteristic value is the same as of the control or may be a bit lower.

When using Gobbi Gib 2LG while growing weight of the bunch and berries leads as to the

vine weight increasing as to its dimension increasing (specially on the top and in the middle) which dominates the bunch compactness degree and allows an open distribution of the grains within the bunch, especially when it's about the variant (GG2LG-4.6 l/ha) (Table 1, Figures 1, 2).

The quantity of berries is equal to the control. At the same time the grain characteristic value increases and so the weight of a 100 grains increases up to 1.5 (GG2LG-3.6 l/ha) - 1.7 (GG2LG-4.6 l/ha). Within these terms the harvest data increases up to 2.3-2.6 kg/vine. The sugar content is at the same level as that of the control, or may even be a little higher but it is to be mentioned that decreases the level of the titratable acidity (Table 1, Figures 1, 2).



Figure 1. The Gobbi Gib 2LG influence on the external appearance of the bunch and berries. The Beauty seedless variety, (Italian technology). The variant of experience: 1-Control - H<sub>2</sub>O; 2-GG2LG -3.6 l/ha; 3-GG2LG-4.6 l/ha

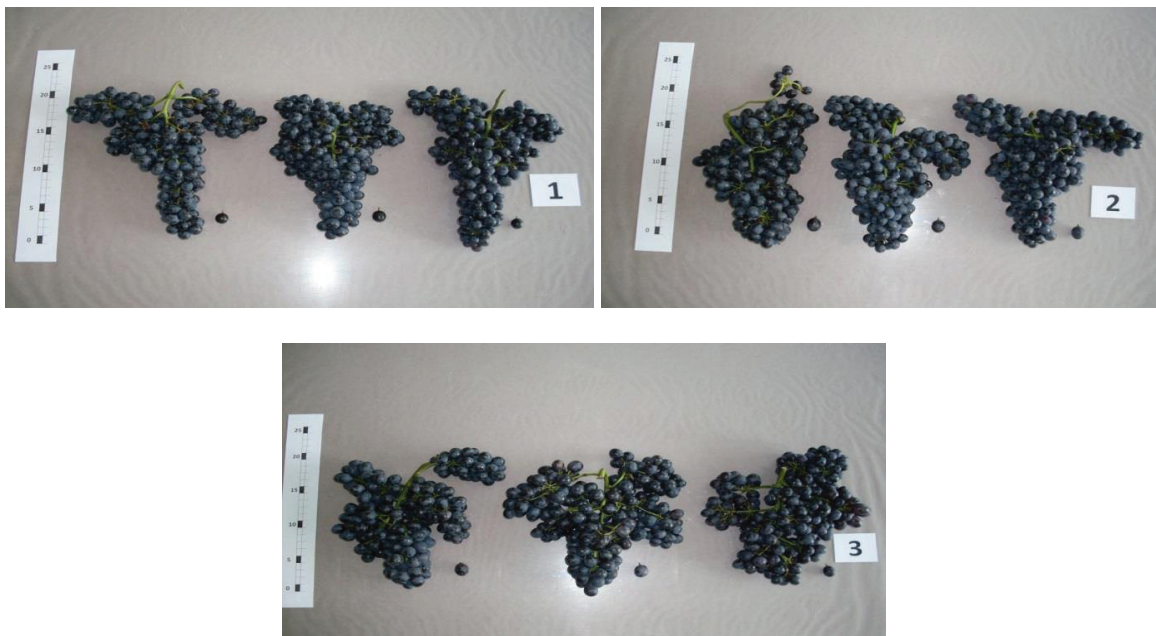


Figure 2. The Gobbi Gib 2LG influence on the external appearance of the bunch and berries. The Beauty seedless variety, "Terra vitis" Ltd., 2013, (Italian technology). The variant of experience: 1-Control -H<sub>2</sub>O; 2-GG2LG-3.6 l/ha; 3-GG2LG-4.6 l/ha

Table 1. The reaction of the Beauty seedless variety to the Gobbi Gib 2LG treatment. „Terra vitis” Ltd., (Italian technology)

Characteristic value	The variant of experience					DL 0.95
	Control-H <sub>2</sub> O	GG2LG - 3.6 l/ha		GG2LG - 4.6 l/ha		
	$\bar{x}$	$\bar{x}$	% to the control	$\bar{x}$	% to the control	
Bunch weight, g	251.7	404.8	160.8	424.4	168.6	
including - berry	248.0	399.1	160.9	417.0	168.2	
- cluster	3.7	5.7	154.1	7.4	200.0	
Bunch characteristic value (berries weight / cluster weight)	67.0	70.0	-	56.4	-	
Bunch dimensions, cm						
- length	19.5	19.5	100.0	19.7	101.0	
- width / on the top	14.5	16.3	112.4	18.3	126.2	
at the middle	8.7	9.8	112.6	13.0	149.4	
at the bottom	3.8	5.0	131.6	7.6	200.0	
Pedicle dimensions, mm	3.2	4.7	146.9	3.3	103.1	
The quantity of berries per bunch, berries, total	239.0	245.0	102.5	227.7	95.3	
including undeveloped berries	24.7	5.0	-	1.7	-	
Berry size, mm						
- length	11.6	15.2	131.0	15.6	134.5	
- width	10.2	12.1	118.6	12.5	122.5	
100 berries' weight, g	113.8	175.4	154.1	191.4	168.2	
Berry characteristic value (pulp weight/ skin weight)	4.9	7.1	-	7.7	-	
Crushing strength of berries, g/cm <sup>2</sup>	1432	1968	137.4	1437	100.3	
Harvest, kg/vine	3.9	6.2	159.0	6.5	166.7	<b>0.58</b>
The content of:						
- sugar, %	17.3	16.6	-	18.2	-	
- titratable acidity, g/dm <sup>3</sup>	11.7	10.8	-	10.9	-	

In the control variant the crushing strength of the berries was equal to 1432 g/cm<sup>2</sup>. In the variant GG2LG-3.6 l/ha this data increased up to 1.4 times if compared to the control. At the same time the crushing strength of the berries from the variant GG2LG - 4.6 l/ha has the same strength as that of control and is equal to 1437 g/cm<sup>2</sup>.

Now it can be seen that the use of Gobbi Gib 2LG by treating the planting stock while the period of vegetation in certain periods using small doses (following the Italian technology) leads to: a diminution of the bunch compactness degree; an increase of the characteristic value of the bunch; a weight increase of a 100 berries; a harvest increase up to 1.6 (GG2LG-3.6 l/ha) - 1.7 (GG2LG-4.6 l/ha) and to the berries quality modification. Resuming one can say that the ideal concentration of the Gobbi Gib is 2LG 3.6 l/ha.

**The usage of Gobbi Gib 2LG by the Moldova technology**, took place in the period of post fecundation by means of spraying the bunch

zone when the diameter of the grains was 3-6 mm (12.06.2013).

Compared to the control it was observed that using GG2LG in a dose of 2.0 l/ha led to a considerable increase of the bunch weight and of the berries in the bunch up to 1.8 times. At the same time while this variant, it was noted a cluster increase up to 2.4 times which brings to the decrease of the bunch value structure (berries weight/cluster weight).

The same regularity was observed while using the specimen in a dose that corresponded to 2.4 l/ha (Table 2, Figures 3, 4).

After being subjected to GG2LG it could be observed as an increase of the bunch dimensions, especially in the middle and at the bottom parts of it as well as a pedicle increase of the Beauty seedles variety. (Table 1, Figures 1, 2).

When treating the inflorescences locally by means of a manual sprayer containing GG2LG it was fixed that the quantity of berries is the same as the of the control, nevertheless

increased the size of the grains (length, width) and the grains became oval-shaped. The weight of a 100 grains became twice bigger.

It could be noted an increase of the characteristic value of the berries (pulp

weight/skin weight) up to 1.8 times. The crushing strength increased up to 1.2 times (GG2LG -2.0 l/ha) -1.5 (GG2LG-2.4 l/h).

Table 2. The reaction of the Beauty seedless variety to the Gobbi Gib 2LG treatment while the post fecundation period. „Terra vitis” Ltd., 2013, (Moldova technology)

Characteristic value	The variant of experience					DL 0.95
	Contol - H <sub>2</sub> O	GG2LG - 2.0 l/ha		GG2LG - 2.4 l/ha		
	— x	— x	% to the control	— x	% to the control	
Bunch weight, g	251.7	454.8	180.7	508.3	202.0	
including - berry	248.0	446.0	179.8	499.9	201.6	
- cluster	3.7	8.8	237.8	8.4	227.0	
Bunch characteristic value (berries weight/ cluster weight)	67.0	50.7	-	59.5	-	
Bunch dimensions, cm						
- length	19.5	21.7	111.3	21.8	111.8	
- width / on the top	14.5	16.0	110.3	16.3	112.4	
at the middle	8.7	11.8	135.6	11.3	129.9	
at the bottom	3.8	5.2	136.8	5.5	144.7	
Pedicle dimensions, mm	3.2	4.0	125.0	3.5	109.4	
The quantity of berries per bunch, berries, total	239.0	238.0	99.6	242.0	101.3	
including undeveloped berries	24.7	-	-	1.7	-	
Berry size, mm						
- length	11.6	16.4	141.4	16.8	144.8	
- width	10.2	12.6	123.5	14.5	142.2	
100 berries' weight, g	113.8	196.3	172.5	217.6	191.2	
Berry characteristic value (pulp weight/ skin weight)	4.9	9.3	-	8.9	-	
Crushing strength of berries, g/cm <sup>2</sup>	1432	1766	123.3	2073	144.8	
Harvest, kg/vine	3.9	7.0	179.5	7.8	200.0	<b>0.58</b>
The content of:						
- sugar, %	17.3	16.1	-	16.1	-	
- titratable acidity, g/dm <sup>3</sup>	11.7	11.5	-	11.8	-	

The harvest of the Witness variant consisted - 3.9, kg/vine, at the same time the use of GG2LG brought to a double increase of the harvest. Within the variant GG2LG - 2.0 l/ha - it consisted - 7.0 kg/vine, the variant GG2LG - 2.4 l/ha - 7.8 kg/vine.

Inside the grains there was a inconsiderable fell down of the composition of the dry matter (sugar), and the titratable acidity rate was not higher than that of the control.



Figure 3. The Gobbi Gib 2LG influence on the external appearance of the bunch and berries. The Beauty seedless variety, „Terra vitis” Ltd., 2013, (Moldova technology). The variant of experience: 1-Control - H<sub>2</sub>O; 4-GG2LG - 2.0 l/ha; 5- GG2LG - 2.4 l/ha

Accordingly, Gobbi Gib 2LG was used within the vineyard on the zone of *bunch placement* for the sort Beauty seedless at a certain period of development with a dose of 2.0 and 2.4 l/ha and this led to a double bunch weight and characteristic value increase. At the same time the number of berries in a bunch stayed the

same as that of the control, nevertheless the increase of the parameters brought to a weight growth of a 100 berries up to 1.7-1.9 times. The increase of berries parameters causes the bunch compatibility which can lead at its turn to the grain deterioration while packing and transporting.

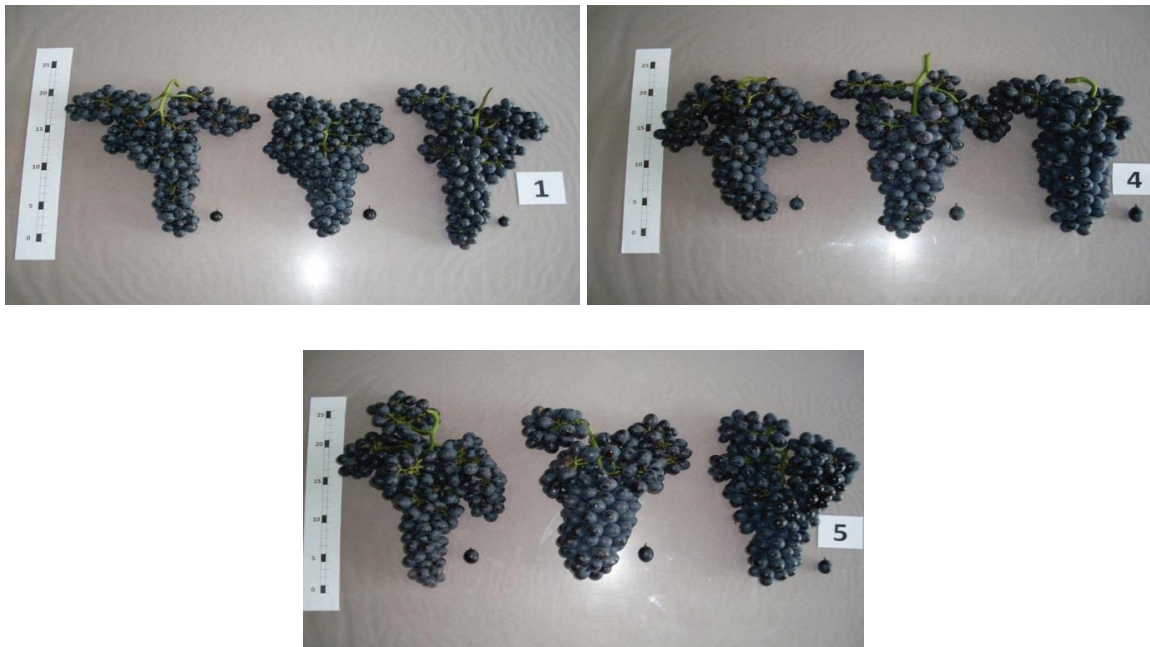


Figure 4. The Gobbi Gib 2LG influence on the external appearance of the bunch and berries. The Beauty seedless variety, “Terra vitis” Ltd., 2013, (Moldova technology). The variant of experience: 1-Control-H<sub>2</sub>O; 4-GG2LG-2.0 l/ha; 5-GG2LG-2.4 l/ha



Figure 5. The Gobbi Gib 2LG influence on the external appearance of the bunch and berries. The Beauty seedless variety, “Terra vitis” Ltd., 2013. The variant of experience: 1-Control-H<sub>2</sub>O; 2-GG2LG -3.6 l/ha; 3-GG2LG-4.6 l/ha, (Italian technology); 4-GG2LG-2.0 l/ha; 5-GG2LG-2.4 l/ha (Moldova technology)

Thus, it can be said that the use of Gobbi Gib 2LG, leads as to an increase of cluster productivity up to 1.6-1.7 (Italian technology) and to 1.8-2.0 times (Moldova technology) indifferent the ways of applications and concentration as well as to the quality production modification. Data analysis gives us a reason to recommend the use of the Gobbi Gib 2LG within seedless variety as an obligatory process within their harvest in the Republic of Moldova.

## CONCLUSIONS

In the issue of the received data, after using Gobbi Gib 2LG within the vitis it may be said that its action depends on the biological particularities of the sorts notwithstanding the method of using it. Within the seedless variety Beauty seedless the efficiency of the treatment showed through:

1. The bunch parameters increasing up to 1.6-2.0 times; weight berries increasing up to 1.6-

1.7 times, cluster weight increasing up to 1.5-2.4 times, a bunch structure value decrease (berries weight/cluster weight);

2. The quantity of berries is the same as that of the control, but at the same time the control parameters increase, the weight of a 100 berries increases up to 1.5-1.7 times, also increases the grain crushing strength;

3. The harvest increases up to 2.3-3.9 kg/vine (which is 1.6-2.0 times higher than that of the control) grain quality modifies also;

Taking into consideration the obtained results on Gobbi Gib 2LG one may can confirm that the treatment may be included into the table grape sorts levelling technological system as growth regulator aiming to increase the productivity and the quality of the production based on the 2 schedules:

Within the apyrene sort (without seeds) Beauty seedless:

I schedule (Italy method), through vine spraying using the specimen within different periods of development:

- ✓ before the bloom;
- ✓ while blossoming;
- ✓ in the post fecundation period.

II schedule (Moldova method), through spraying the zone of the bunch placement using the specimen only within one single period:

- ✓ post fecundation period.

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