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THE EFFECT OF MINERAL FERTILIZERS ON THE MECHANICAL STRUCTURE OF A BUNCH OF GRAPES, AND ON THE CHEMICAL COMPOSITION OF GRAPE JUICE

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ABSTRACT
In this article, the influence of the use of mineral fertilizers in various concentrations on the mechanical structure of a bunch of grapes of seedless Kishmish VIR and Kishmish Botir varieties with large clusters and on the chemical composition of grape juice was studied, and the optimal rate of fertilizer application was determined. The above mentioned varieties can be grown in all regions of Republic of Uzbekistan and it is possible to obtain high yields by utilizing optimal rate of fertilizer. It has not been developed optimal rate of fertilizer for every variety of grape. Therefore it is important to develop using right amount of mineral fertilizer application for new created seedless varieties of grape with good perspective. It was found that extra 15-20% more yields of a bunch of grape varieties could be obtained under mineral fertilizers. The practical significance of the research results is that it was taken from 24 to 39 centners higher yield per hectare from large bunch of grape varieties in the most favourable norm of mineral fertilizing.

KEYWORDS: *grapevine, bunch of grapes, juice, fertilizer, methods, growth, control, reduction, piece, yield, dried products.*

INTRODUCTION

Grapevine is valuable subtropical plant. Its fruits are the most important products for human body in respect of their dietetic and nutritional content. There are glucose, fructose and sucrose in ripen grapes, especially in seedless grapes, that are rapidly digestible sugars up from 28 to 30% eaten by the body. Fresh grapes include apple vinegar, citric, amber, sorrel and formic and other many organic acids, mineral salts such as, potassium, calcium, phosphorus, sodium which they are essential for human health and coloring pigments, dubile substances in fruit peel [10]. Using fertilizers is an important factor in controlling the productivity of cultivated plants in agriculture. As other plants, vine`s plant also requires a number of nutrients for its growth and development and among them nitrogen, phosphorus, potassium are basic substances. If any of these nutrients in soil are insufficient, it will have a negative impact on the growth and development of the grape and if there is not any of them it would be lead to the death of the plant.

Nitrogen fertilizers intensify the growth of the branches. The lack of nitrogen stops the nitrogen synthesis in the pant, branches stop growing and the leaves do not grow [1; 2].

When the excess nitrogen fertilizer is given, especially during the later phases of the postpartum period, the period of growth lasts, branches and crops slow down and disease and pest resistance will be diminished of whole plant.

Phosphorus is a part of cell nucleus (nucleoprotein) and other organic compounds (whistle, phosphatides). Sufficient nutrition of plants with phosphorus provides much faster aging of branches and increases the resistance of grape plants to cold and disease. In addition, phosphorus positively effects to formation of blossom buds, accelerates maturing of grape bunches and reduces spillabling of flower buds. High quality and plenty of extractive wine is obtained from grapes grown in phosphorus-fed areas. S.G.Bondarenko [3; 4; 5; 6; 7; 8]

Potassium plays an important role in the carbohydrate exchange of plants. Its deficiency weakens the process of formation of carbohydrates in plants, slows to flow of plastic substances from leaves.

When potassium is sufficient, there will be large amount of sugar in bunches and starch accumulates in stem. As a result of good maturing of wood in stem increases the plant`s frost resistance. S.F.Serpukhovitina [9].

MATERIALS AND METHODS

Using the most favorable rate of mineral fertilizing for large bunch of grapes of seedless varieties is introduced in Tashkent and Surkhandarya regions in more than 9,2 hectares in 2017. Field and producing practices and exploring agrobiological features of grape varieties: M.A.Lazarevsky “Methods of botanical description and agrobiological study of grape varieties”, X.Boriyev and others “Methods of calculations and methods of phenological observations in planting of fruit and berry fruit”, V.F.Moiseichenko`s methodical manual is named “Methods of accounting and observations with fruit and berry crops” and the results were analyzed by B.A.Dospexov`s method of dispersion.

RESULTS AND DISCUSSION

The mechanical structure of the grapevine bunches, and the chemical composition of the grape juice depends on the soil and climatic conditions and agrotechnical measures at the place where the grapes growth, in particular, from mineral fertilizers. Mineral fertilizers are one of the main factors for improving the mechanical structure of a bunch of grapes and the chemical composition of grape juice.

The data in Table-1 shows that the number of bunches of grapes on a Kishmish VIR variety grapes is 31,5-37 pieces, the weight of bunches of grapes is 320-384 *g*. It was established that the weight of bunches of grapes with the highest concentration of fertilizers in *N* (Nitrogen)$_{160}$ *P* (Phosphorus)$_{120}$ *K* (Potassum)$_{40}$, grow on 20% higher compared to the control group.

The number of bunches of grapes on a Kishmish Botir variety grapes is 33-40 pieces, the weight of bunches of grapes is 350-440 g. It was established that the weight of bunches of grapes with the highest concentration of fertilizers in $N_{160}P_{120}K_{40}$(kg), grow on 25,7% higher compared to the control group.

Table-1

The effect of mineral fertilizers on the change in weight of grapes bunches of varieties Kishmish VIR and Kishmish Botir

No.	Option (kg)	Bunches on the a grapevine, pieces	Bunches of grape weight	
			g	Compared to control, %
1	2	3	4	5
Kishmish VIR variety				
1	**Without fertilizer (control)**	31,5	320,0	100,0
2	N_{120} P_{90} K_{30} **(control)**	32,7	352,0	110,0
3	$N_{160}P_{120}K_{40}$	33,0	384,0	120,0
4	$N_{200}P_{150}K_{50}$	34,5	355,0	110,9
5	$N_{240}P_{180}K_{60}$	36,0	348,0	108,8
Kishmish Botir variety				
1	**Without fertilizer (control)**	33,0	350,0	100,0
2	N_{120} P_{90} K_{30} **(control)**	34,0	400,0	114,3
3	$N_{160}P_{120}K_{40}$	40,0	440,0	125,7
4	$N_{200}P_{150}K_{50}$	37,0	410,0	117,1
5	$N_{240}P_{180}K_{60}$	36,0	392,0	112,0

When using mineral fertilizers in various concentrations for the growth of grapes, the yield varies significantly.

The data in Table 2 show that the harvest from each grapevine a Kishmish VIR variety is 10,0-12,7 kg, the yield is 111,1-141,0 centner/ha. It was established that the grapevine harvest with the highest concentration of fertilizers in $N_{160}P_{120}K_{40}$, was 12,7 kg, the yield was 141,1 centner/ha, and grow on 26,9% higher compared with the control group.

The harvest from each grapevine a Kishmish Botir variety is 11,6-17,6 kg, the yield is 128,9-195,5 centner/ha. It was established that the grapevine harvest with the highest concentration of fertilizers in $N_{160}P_{120}K_{40}$, was 17,6 kg, the yield was 195,5 centner/ha, and grow on 51,7% higher compared with the control group.

Consequently, under the influence of mineral fertilizers, the harvest and yield of the vine increases, which was recorded.

Table-2
The effect of mineral fertilizers on the yield of varieties Kishmish VIR and Kishmish Botir

No.	Option (kg)	Harvest vines, kg.	Yield of grapes	
			Centner/ha	Compared to control, %
1	2	3	4	5
Kishmish VIR variety				
1	**Without fertilizer (control)**	10,0	111,1	100,0
2	$N_{120}\ P_{90}\ K_{30}$ **(control)**	11,5	127,8	115,0
3	$N_{160}P_{120}K_{40}$	12,7	141,0	126,9
4	$N_{200}P_{150}K_{50}$	12,2	135,5	121,9
5	$N_{240}P_{180}K_{60}$	12,5	138,8	124,9
Kishmish Botir variety				
1	**Without fertilizer (control)**	11,6	128,9	100,0
2	$N_{120}\ P_{90}\ K_{30}$ **(control)**	13,6	151,0	117,1
3	$N_{160}P_{120}K_{40}$	17,6	195,5	151,7
4	$N_{200}P_{150}K_{50}$	15,1	167,7	130,1
5	$N_{240}P_{180}K_{60}$	14,1	156,6	121,4

Table-3
The effect of mineral fertilizers on the volume of the output of dried products made from grapes of varieties Kishmish VIR and Kishmish Botir

No.	Option	Dried grapes, kg	Dried products output	
			kg	Compared to control, %
1	2	3	4	5
Kishmish VIR variety				
1	**Without fertilizer (control)**	10,0	2,51	100,0
2	$N_{120}\ P_{90}\ K_{30}$ **(control)**	10,0	2,54	101,2
3	$N_{160}P_{120}K_{40}$	10,0	2,63	104,8
4	$N_{200}P_{150}K_{50}$	10,0	2,54	101,2
5	$N_{240}P_{180}K_{60}$	10,0	2,53	100,8
Kishmish Botir variety				
1	**Without fertilizer (control)**	10,0	2,20	100,0
2	$N_{120}\ P_{90}\ K_{30}$ **(control)**	10,0	2,35	106,8
3	$N_{160}P_{120}K_{40}$	10,0	2,41	109,5
4	$N_{200}P_{150}K_{50}$	10,0	2,37	107,7
5	$N_{240}P_{180}K_{60}$	10,0	2,30	104,5

When receiving dried products from the harvest of grapes of varieties Kishmish VIR and Kishmish Botir grown under the influence of mineral fertilizers, the method "Oftobi" was used.

According to the analysis of the data in the last Table 3, harvest in volume 10 kg of the grapes of varieties Kishmish VIR and Kishmish Botir was obtained, and dried in the "Oftobi" method. It was established that the volume of dried products from the variety Kishmish VIR grapes was 2,51–2,63 kg, and was higher by 0,8–4,8% compared to control group. It was revealed that the volume of dried products with the highest concentration of fertilizers in $N_{160}P_{120}K_{40}$ was 2,63 kg, and was higher by 4,8% compared to control group. The volume of dried products from the variety Kishmish Botir grape was 2,20-2,41 kg, and was higher by 4,5-9,5% compared to control group. It was revealed that the volume of dried products with the highest concentration of fertilizers in $N_{160}P_{120}K_{40}$ was 2,41 kg, and was higher by 9,5% compared to control group.

CONCLUSION

1. Consequently, under the influence of mineral fertilizers, the number and weight of bunches of grapes is growing. It was recorded that when applying mineral fertilizers in a higher concentration, the number of bunches of grapes increases, and the weight of bunches of grapes decreases.

2. Thus, the use of mineral fertilizers can significantly increase the yield of grapes. Yield increase occurs due to the increase in the number of bunches of grapes and their weight.

3. As a result, it was established that the volume of dried products from grapes of varieties Kishmish VIR and Kishmish Botir depends on the concentration of mineral fertilizers.

4.

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