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THE EFFECT OF MINERAL FERTILIZERS ON THE YIELD AND IMPROVING QUALITY OF SEEDLESS VARIETIES OF GRAPES

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Annotation
The article considers the influence of the phenological phases of seedless grape varieties, the characteristics of harvested shoots, the weight and chemical composition of grape juice, the weight of grapes and its mechanical composition, yield, yield of dried products, the amount of fertilizers on the tasting price of dried products. The experiments were carried out on five variants in two varieties. Of all these varieties, the highest result was recorded in three variants (N_{160} P_{120} K_{40} kg in its pure form). When fertilizer was given in larger quantities, this adversely affected the biological properties of the genus.

Keywords: Grapes, variety, phase, fertilizer, twig, harvest, vine, grape bush, grape bunch, berry, juice, dry product

注解

文章考虑了无核葡萄品种的物候期、收获的枝条特征、葡萄汁的重量和化学成分、葡萄重量及其机械成分、产量、干品产量、肥料用量等因素的影响。 **干品的品**尝价格。 对两个品种的五个变体进行了实验。 **在所有**这些品种中，最高的结果记录在三个变种中（N160 P120 K40 kg 纯品）。 **当施肥量**较大时，这对该属的生物学特性产生了不利影响。

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关键词：葡萄、品种、阶段、肥料、树枝、收获、藤蔓、葡萄灌木、葡萄串、浆果、果汁、干产品

Introduction

Today, the total area of vineyards around the world is 7 million. 546 thousand hectares, gross grape harvest makes up 62 million tons. The main part of the grape harvest - 83% is used for making wine, 12% for fresh consumption and 5% is for drying (raisins). Present time, 31 million tons of grapes grown in Europe, 12.5 million tons in the USA, 13.5 million tons in Asia, 3.1 million tons in Africa and 3.1 million tons per share in Australia and New Zealand, with an average yield of 82.2 c/ha all around the world. Currently, there is an urgent issue of creating new varieties and developing the most optimal agrotechnical measures to increase the yield of grapes in the viticultural countries of the world. In recent years, scientific research aimed at the development of viticulture, an important branch of world agriculture, has led to the production of promising seedless grape varieties, increasing their yield and quality, selecting the best seedless varieties for the production of dried products (raisins), vine loads and the most optimal quantities of mineral fertilizers and growth regulators have been developed. Optimization of these developments based on the soil and climatic conditions of the area and the characteristics of the cultivar used will significantly increase the efficiency of the viticulture sector. An important biological feature of the vine is the length of the growing season and the long-term absorption of nutrients. This allows fertilizer standards to be used judiciously to provide the vine with the nutrients it needs. Fertilizers are usually understood as a way to create a supply of nutrients in the soil to improve the general condition of the soil, as well as to introduce the main (large) part of fertilizers into the soil for good biochemical processes in plants and their normal growth and development (Temurov Sh. 2002) [4]. In viticulture application of fertilizers is even more important, since the vine is a perennial plant with a well-developed root system and a more or less developed above-ground part of the vine (Buzin N.P. 1963) [2].

By applying favorable mineral and organic fertilizers before the start of the growing season, it is possible to ensure the rapid growth of the plant and the rapid accumulation of green mass, which is necessary to increase the overall growth of the bush and obtain a high yield of grapes harvest(Buzin 1962) [1].

The effectiveness of combining fertilization with growth can be explained by the different nutrient requirements of the vine, as well as the ability to manage nutrients according to the requirements of the vine plant in the individual growth phases, taking into account all the changes in the soil.

In addition, the positive effect of nutrition may be associated with an increase in the total amount of nutrients in the vineyards (Malikov A. 2018) [5]. In recent years, complex measures have been taken in the Republic of Uzbekistan to create new high-yielding varieties and hybrids that are resistant to widespread dangerous diseases and pests, as well as to develop optimal agricultural technologies for cultivation. However, the improvement of agrotechnical measures used in viticulture, depending on the soil and climatic conditions of each region, will further increase the productivity of the viticulture industry. For seedless grape varieties, the expansion of scientific research to determine the norms of mineral fertilizers is an urgent task of both theoretical and practical importance.

Research methods.

Experiments were carried out according to the methods given in the methodological literatures by M.A. Lazarevskiy's "Methods of botanical description and agrobiological study of grape varieties" (1946), N.N. Prostoserdov's "Study of grapes to determine its use" (1963), V.F Moiseichenko's " Methods of accounting and observations in experiments with fruit and berry crops"(1967). Statistical analysis of the results of the study was carried out in computer programs "Excel 2010" and "Statistica 7.0 for Windows" with a confidence interval of 0.95% according to the method shown by B.A. Dospekhov.

Research results.

Although the natural soil and climatic conditions of the republic are very favorable for growing grapes of all directions, it is important to place them on the territory and provide them with nutrients, especially in moderation. For this, a detailed study of the growing season, its phenological phases, knowledge of the conditions for their transition will allow carrying out agrotechnical measures aimed at obtaining high and high-quality grapes, in particular, timely and high-quality fertilization. The results of experiments aimed at studying the effect of mineral fertilizers on the transition to phenological phases in seedless grape varieties showed that although there were slight differences in the transition of phenophases when fertilizing Kishmish marble variety with different norms. At the same time, the breaking of the buds began 1-3 days earlier than on the fertilized variants. This situation was also noted during the periods of flowering and ripening of grape varieties, and the timing of the onset of phenophases differed from the control by 1–3 and 3–6 days, respectively. In grape varieties, the duration of the period from bud break to ripening was less than 2-3 days in experimental variants. The effect of mineral fertilizers on the transition to the phenological phases in seedless grape varieties showed that there were no significant differences in the Kishmish Sogdiana variety either. Only the duration of the period from bud break to maturity was 4 days shorter than the control on vines fertilized with N_{160} P_{120} K_{40} (Table 1).

Table 1

Influence of the fertilizer rate on the transitional periods of the phenological phases of seedless grape varieties, 2015-2018

Variety	**Phenophases**	**Experiment options**				
		Unfertilized – control	**N_{120} P_{90} K_{30}**	**N_{160} P_{120} K_{40}**	**N_{200} P_{150} K_{50}**	**N_{240} P_{180} K_{60}**
Kishmish Marble	Buds breaking	15.IV	12.IV	12 IV	12.IV	14.IV
	Flowering	27.V	25.V	24.V	26.V	26.IV
	Ripening	17.VIII	12.VIII	11.VIII	13.VIII	14.VIII
	The period from bud to ripening, day	124	122	121	123	122
Kishmish Sogdiana	Buds breaking	12.IV	10.IV	8.IV	10.IV	12.IV
	Flowering	22.V	21.IV	20. IV	21.IV	20.V
	Ripening	25.VIII	22.VIII	18.VIII	21.VIII	24.VIII

	The period from bud to ripening	135	133	131	132	134

One of the main characteristics of grape variety is its productivity, which is divided into such types as germinal, potential and actual yield.

The yield of grapes is determined by the number of flower buds formed on the winter buds of ripe varieties of that year, and the biological yield, determined by determining the state of their period, the biological yield of plant organic matter, the total yield per hectare, as well as the actual yield that can be obtained only when winter buds are able to produce a 100% crop in the most optimal conditions.

In addition, one of the most varietal characteristics determining the productivity of a vine is its yield coefficient and branch productivity. It should be noted that agrotechnical conditions, in particular the application of fertilizers, are an important factor affecting the true yield of grape varieties.

The results of experiments on the yield of seedless grape varieties showed that the number of harvested branches in the fertilized varieties of Kishmish marble varied significantly compared to the unfertilized version. Consequently, the maximum number of branches of one crop -37.7% of mineral fertilizers – was fixed in this variant due to N_{240} P_{180} K_{60}

Among the variants of the experiment, the minimum number of single-yield shoots-30,5% of mineral fertilizers was determined in this variant due to N_{160} P_{120} K_{40}. It should be noted that in this variant, the number of single yield shoots was the smallest among the experimental variants, but also showed an advantage over the control variant and was 4% higher than in the first control (unfertilized) and 2% higher than in the second control variant (N_{120} P_{90} K_{30}).

The experimental variant, given at the expense of mineral fertilizers N_{200} P_{150} K_{50} , had an intermediate severity between these options, respectively, with a higher rate of 5.8% compared to the first control and 3.8% compared to the second control. The analyzes showed that the application of fertilizers for varieties of seedless grapes of the marble variety Kishmish with different norms led to significant difference in the number of branches with two bunches of grapes.

Experimental data showed that the maximum number of two-bunch branches – 3.8% was determined in this variant when applied N_{240} P_{180} $K_{60}$of mineral fertilizers. This is 1.3 and 1.0% higher than the control options, respectively. The minimum number of branches of one yield was recorded - 3.5% of mineral fertilizers in the variant given at the expense of N_{160} P_{120} K_{40}, and in this variant the advantage over the control was 1.2 and 0.9%, respectively. In the experimental variant, given at the expense of mineral fertilizers N_{200} P_{150} K_{50}, the indicator of two-bunches shoots had an intermediate expression between these options, respectively, 1.0% higher than the first control and 0.7% higher than the second control.

The analysis showed that the introduction of different amounts of fertilizers also affected the yield of Kishmish Marble grapes. Consequently, the number of grape bunches corresponding to productive branches was the largest 1,40, in this variant due to mineral fertilizers N_{240} P_{180} K_{60}.

This is 0.30 and 0.20 higher than the control options, respectively. The lowest value of this indicator was recorded 1.32 given at the expense of N_{160} P_{120} K_{40} mineral fertilizers and in this variant the advantage over the control was 0.22 and 0.12, respectively. In the variant of the experiment, given at the expense of mineral fertilizers N_{200} P_{150} K_{50}, the number of grape bunches corresponding to

harvested shoots was intermediate between these options and was higher than in the first control by 0.66, and in the second it was by 0.46 pieces, respectively.

The number of grape heads corresponding to each formed branch was somewhat different from the number of collected branches.Consequently, the number of grape bunches, corresponding to the total number of formed branches, was the largest in this variant due to mineral fertilizers N_{160} P_{120} K_{40} and made up 0.45 pcs. This is 0.15 and 0.03 higher than the control options, respectively. The lowest value of this indicator was 0.32, it was recorded when mineral fertilizers in the variant given at the expense of N_{200} P_{150} K_{50}, and this variant was determined only the advantage (0.02) over the first control. In this variant, the indicator decreased by 0.13 pcs compared to the second variant. The same trend was observed in the experimental variant of mineral fertilizers N_{240} P_{180} K_{60}, i.e. the number of grape bunches per common branch was 0.10 pcs higher than in the first control, and 0.05 pcs lower in the second control (Table 2) .

Table 2

The impact of mineral fertilizers on the productivity of seedless grape varieties, 2015-2018

T/p	Variants	Bud load on the vine,pcs	Yields of branches in%			Number od bunches on the fruit stalk	Number of bunch of grapes per branch
			Single crop	Two crops	Total		
Kishmish marble							
1	Unfertilized – control	124	26,5	2,5	29,0	1,10	0,30
2	N_{120} P_{90} K_{30}	121	28,5	2,8	31,3	1,20	0,42
3	N_{160} P_{120} K_{40}	122	30,5	3,5	34,0	1,32	0,45
4	N_{200} P_{150} K_{50}	122	32,3	3,7	36,0	1,76	0,32
5	N_{240} P_{180} K_{60}	123	37,7	3,8	41,5	1,40	0,40
Kishmish Sogdiana							
1	Unfertilized – control	150	25,6	7,1	32,7	1,10	0,40
2	N_{120} P_{90} K_{30}	154	26,0	8,0	34,0	1,20	0,42
3	N_{160} P_{120} K_{40}	151	31,0	9,7	40,7	1,20	0,50
4	N_{200} P_{150} K_{50}	152	34,9	8,5	43,4	1,27	0,45
5	N_{240} P_{180} K_{60}	155	27,2	8,3	35,5	1,25	0,41

The data in the table show that the rate of fertilizer application also had a significant impact on the yield performance of the seedless grape variety Kishmish Sogdiana. The largest number of single-yielding shoots of this variety - 34.9% of mineral fertilizers was recorded in this variant due to N_{200} P_{150} K_{50}. The smallest number of single-crop shoots of this variety in comparison with the control - 27.2% of mineral fertilizers was determined in this variant due to N_{240} P_{180} K_{60}. This is 1.6% higher than in the first control (without fertilizers) and 1.2% higher than in the second control (N_{120} P_{90} K_{30}).

The experimental variant due to mineral fertilizers N_{160} P_{120} K_{40} had an intermediate expression among these variants in terms of the number of branches on the vine and was higher than the first control by 4.4%, the second control by 4.0%. Feeding the vines at different rates resulted in differences in the number of shoots with two bunches in this variety as well. Experimental data showed that the maximum number of two-bunches branches was 9.7% when applied N_{160} P_{120} K_{40} of mineral fertilizers in this variant and it was higher by 2.6 and 1.7%, respectively, than in the control options. The smallest amount of this indicator was 8.3% in the variant given by N_{240} P_{180} $K_{60}$of mineral fertilizers. This is 1.2% higher than in the first control (without fertilizer) and 0.3% higher than in the second control (N_{120} P_{90} K_{30}). The experimental variant, given at the expense of mineral fertilizers N_{200} P_{150} K_{50}, had an intermediate expression between these variants in terms of the number of shoots with two bunches, respectively, and it was higher than the first control by 1.4% and the second control by 0.5%. An analysis of the number of bunches corresponding to the branches formed by the grape variety Kishmish Sogdiana showed that in the variant given at the expense of mineral fertilizers N_{200} P_{150} K_{50}, it was the highest - 1.27 pieces. This is 0.17 and 0.07 higher than the control options, respectively. The lowest value of this indicator 1.20, it was recorded in the given variant -N_{160} P_{120} K_{40} mineral fertilizers, and in this variant the advantage over the first control was 0.10, and at the level of the second control variant. In the variant of the experiment, given at the expense of mineral fertilizers N_{240} P_{180} K_{60}, the number of grape bunches corresponding to harvested shoots was intermediate between these options, respectively, by 0.15 compared with the first control and 0.05 pieces higher than with the second control. The number of grape bunches from the harvest was the largest - 0.50 pieces in this variant due to mineral fertilizers N_{160} P_{120} K_{40}. This is 0.10 and 0.08 higher than the control options, respectively. The lowest value of this indicator - 0.41 was recorded in the variant given at the expense of N_{240} P_{180} K_{60} mineral fertilizers, and was 0.01 pieces higher than in the first control and 0.01 pieces lower than in the second control. In the variant of the experiment, given at the expense of mineral fertilizers N_{200} P_{150} K_{50}, the number of grape bunches corresponding to the total number of branches was 0.05 pieces more than in the first control, and 0.03 pieces more than in the second control. Fertilizing the vine at different rates also had a significant impact on the quality indicators of seedless grape varieties. The analysis showed that the weight of 100pcs of berries of the Kishmish marble variety was the largest in the variant given at the expense of mineral fertilizers N_{160} P_{120} K_{40} and made up 390 g. This was 70 g more than in the first control and 30 g more than in the second control. The lowest value of this indicator was recorded in this variant due to the application of 375 g of mineral fertilizers N_{240} P_{180} K_{60} and was 65 g higher than in the first control, and 25 g higher in the second control. In the variant of the experiment, given at the expense of mineral fertilizers N_{200} P_{150} K_{50}, the weight of 100 berries was intermediate and was 55 g higher than in the first control, and 15 g - in the second control.

Seedless grape varieties fed at different rates also affected the sugar content in the bunch of grape. The highest sugar content was 26.3% it was determined in the variant due to N_{160} P_{120} K_{40} of mineral fertilizers. In this variant, the sugar content of berry juice was 1.2% higher than in the first control, and 0.9% - in the second control. The lowest value of sugar content was 24.6% it was recorded of mineral fertilizers in the variant given at the expense of N_{240} P_{180} K_{60}, and was 0.5% lower than in the first

control, and 0.8% lower than in the second control. In the experimental variant, given at the expense of mineral fertilizers N_{200} P_{150} K_{50}, the sugar content of berry juice was at the level of the control options, no significant difference was noted. It was noted that the fertilization of different varieties of Kishmish marbled grapes with mineral fertilizers did not significantly affect the acidity of the berry juice, and the difference between the variants of the experiment did not exceed 0.5%. The data in the table showed that under the influence of mineral fertilizers, the mass of the bunch of grapes and the chemical composition of the juice also differed from each other in the Kishmish Sogdiana grape variety. At the same time, the weight of 100 berries was the largest in the variant given at the expense of mineral fertilizers N_{160} P_{120} K_{40} and made up 420 g. This is 80 g more than in the first control, and 30 g more than in the second control. The lowest value of this indicator was 380 g when applied in the variant of N_{240} P_{180} K_{60} mineral fertilizers, and it was 40 g higher than in the first control, and 10 g lower than in the second control. In the experimental variant, given at the expense of mineral fertilizers N_{200} P_{150} K_{50}, the weight of 100 berries had an intermediate expression and was 60 g higher than in the first control, and 10 g higher than in the second control. Feeding with different rates also affected the sugar content in bunches of Kishmish Sogdiana grapes. The highest sugar content was 24.1% when in the variant given by N_{160} P_{120} $K_{40}$of mineral fertilizers. In this variant, the sugar content of berry juice was 1.8% higher than in the first control, and 0.6% - in the second control. The lowest value of sugar content - 23.2% of mineral fertilizers was recorded in the variant given at the expense of N_{240} P_{180} K_{60}, and it was 0.9% higher than in the first control, and 0.3% lower than in the second control. In the experimental variant, given at the expense of mineral fertilizers N_{200} P_{150} K_{50}, the sugar content of the berry juice was at the level of the control options, and the difference from the control options was 1.4 and 0.2%, respectively. The same trend was observed in the effect of fertilizing different rate with mineral fertilizers of the Kishmish Sogdiana grape variety on the acidity of berry juice, and the difference between the experimental options ranged from 0.3 to 0.4%. The results of the experiment showed that grape varieties were influenced by the weight of the grape bunches, pieces, berries, husks, peel, pulp and seed rudiments, as well as the weight of 100 berries, the size of the berries, the color and thickness of the skin. Consequently, the heaviest bunches in the Kishmish marble grape variety was 384 g when the variant was applied N_{160} P_{120} $K_{40}$of mineral fertilizers. In this variant, the mass of the grape bunch was 64 g higher than in the first control, and 32 g in the second control. The smallest bunches of grapes in the studied varieties was 348 g, it was recorded in this variant due to N_{240} P_{180} K_{60} of mineral fertilizers, which was 28 g higher than in the first control and 4 g lower than in the second control. In the variant of the experiment, given at the expense of mineral fertilizers N_{200} P_{150} K_{50}, the mass of grape bunches was expressed in an intermediate expression (table 1).

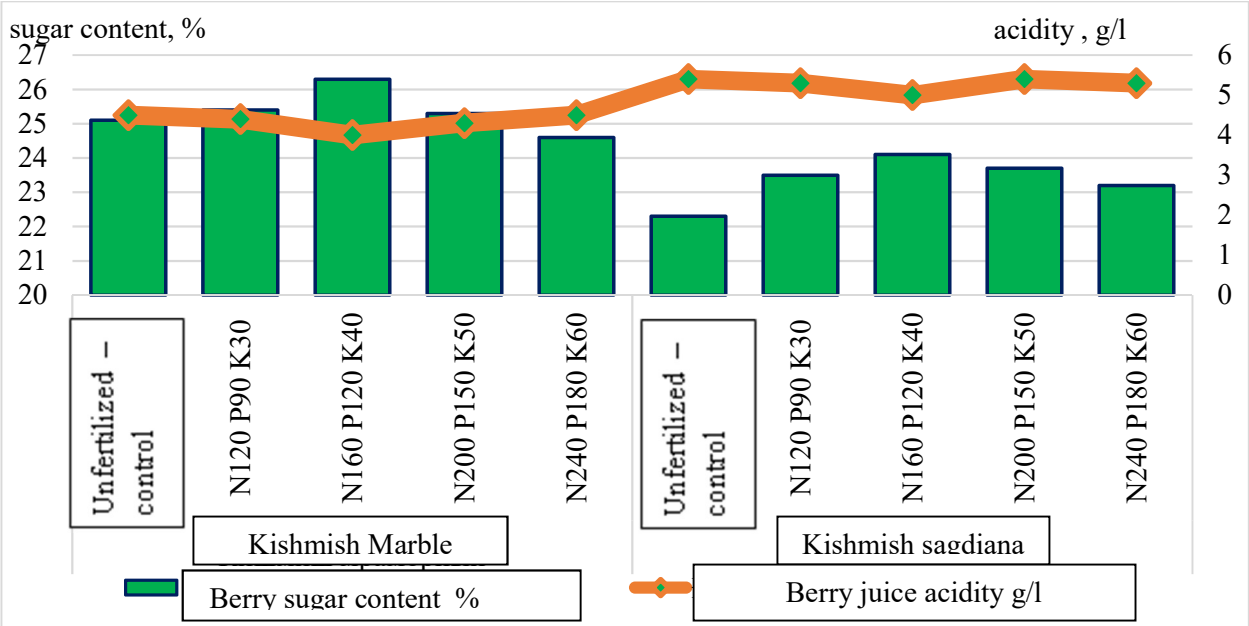

Figure 1. The influence of mineral fertilizer norms on grape weight and chemical composition of juice, 2015-2018

It was noted that the number of berries on a bunch of grapes increased with an increase in the rate of fertilizer application. At the same time, the maximum number of berries on a grape head was determined 130 in the variant due to application of N_{240} P_{180} K_{60} mineral fertilizers. In this variant, the number of berries on the bunch of grapes was 18 more than in the first control, and 13 more than in the second control. The lowest berries in the bunch of grapes was 122 when mineral fertilizers applied in the variant by N_{160} P_{120} K_{40}, which showed 10 pcs more than in the first control and 5pcs more than in the second control. Mineral fertilizers in the experimental variant, introduced at the expense of N_{200} P_{150} K_{50}, had an intermediate expression in terms of the number of berries on the bunches, and the difference from the control options was more than 16 and 11 pieces, respectively.

The norm of mineral fertilizers did not have a significant impact on the mass of the components of the bunch of Kishmish marble grapes. Experiments have shown that the difference in bunch weight compared with control options increased by 0.4-0.6%, pulp weight by 0.5-0.9%, skin weight by 0.8-1.6%, rudimentary seeds mineral fertilizers N_{160} P_{120} K_{40} variant, it decreased to 0.10-0.20%, in other variants it increased to 0.15-0.20% (Table 3).

The data in the table showed that the heaviest bunches of the Kishmish Sogdiana grape variety was 440 g and it detected in the variant due to N_{160} P_{120} K_{40} of mineral fertilizers , which was 90 g higher than in the first control and 60 g higher in the second control. The smallest bunches of grapes was 392 g when applied N_{240} P_{180} K_{60} of mineral fertilizers in this variant, which was 42 g higher than in the first control and 8 g lower than in the second control.

In the experimental variant, given at the expense of mineral fertilizers N_{200} P_{150} K_{50}, the weight of grape bunches had an intermediate expression and differed from the first control by 50 g and was at the level of the second control (400 g). In this variety, it was also found that the number of berries on grape

clusters increased with an increase in the rate of fertilization. At the same time, the largest number of berries on bunch of grapes was 129 pcs. due to the application of N_{240} P_{180} K_{60}mineral fertilizers in this variant, while the number of berries on bunch of grapes was 25pcs more than in the first variant control and 16 pcs more than in the second control.

The minimum number of berries on grape bunches was 120 pcs, when mineral fertilizers were taken into account in this variant due to N_{160} P_{120} K_{40}, it was 16 pcs. more than in the first control, and 7 pcs more than in the second control. The experimental variant, due to mineral fertilizers N_{200} P_{150} K_{50}, took an intermediate position in terms of the number of berries on the bunches, and the difference from the control variants was more than 22 and 13pcs, respectively.

The norm of mineral fertilizers did not have a significant effect on the mass of the components of the bunch of the Kishmish Sogdiana grape variety. At the same time, the difference in bunches weight compared with the control options was 0.1-0.2%, pulp weight made up 0.4-0.7%.

Table 3

Influence of fertilizer rate on seed weight of grape varieties and its mechanical composition, 2015-2018

T/p	Variants	Average weight of grape bunch, g	The number of berries in the bunch, pieces	Total weight of the components of the bunch of grapes, %			
				bunch	pulp	skin	Rudiment seeds
Kishmish marble							
1	Unfertilized – control	320	112	2,2	92,0	5,8	0,45
2	N_{120} P_{90} K_{30}	352	117	2,7	92,8	4,5	0,35
3	N_{160} P_{120} K_{40}	384	122	2,2	92,9	4,2	0,25
4	N_{200} P_{150} K_{50}	355	128	2,6	92,4	5,0	0,50
5	N_{240} P_{180} K_{60}	348	130	2,8	92,5	4,7	0,55
	$ЭКФ_{05}$	4,6	4,1				
	Sx	0,76	0,68				
Kishmish Sogdiana							
1	Unfertilized – control	350	104	2,6	86,2	5,2	0,48
2	N_{120} P_{90} K_{30}	400	113	2,7	86,6	1,7	0,38
3	N_{160} P_{120} K_{40}	440	120	2,5	86,9	1,9	0,29
4	N_{200} P_{150} K_{50}	400	126	2,8	86,8	1,8	0,56
5	N_{240} P_{180} K_{60}	392	129	2,6	86,2	1,6	0,60
	$ЭКФ_{05}$	6,0	4,6				
	Sx	0,99	0,76				

The weight of the skin in all variants of the experiment was lower than in the unfertilized variant, and the difference was 3.3–3.6%. The seed rudiment increased when mineral fertilizers were applied, i.e., in the variant given at the expense of N_{160} P_{120} K_{40}, its content decreased to 0.09-0.19%, and in other variants it increased to 0.18-0.22%.

The norms of mineral fertilizers had a significant impact on the yield of seedless grape varieties, in particular, on the number of bbunches in a vine and their average weight. According to the results of the experiment, the maximum number of grapes in the Kishmish marble vine was 36.0 pcs, when mineral fertilizers N_{240} P_{180} K_{60} were used on the variant in which the number of grape bunches was 4.5 pcs more than in the first control and 3.3 pcs in the second control. The smallest number of bunches was 33.0 pcs. in the variant given by N_{160} P_{120} K_{40} mineral fertilizers, and was 1.5 pcs. more than in the first control, and 0.3 pcs. more than in the second control. In the experimental variant, given at the expense of mineral fertilizers N_{200} P_{150} K_{50}, the number of bunches in the vine was intermediate and had 3.0 pcs more than in the first control and 1.8 pcs more in the second control. Analyzes showed that mineral fertilizers had a significant impact on the mass of grape bunches. At the same time, the heaviest grape bunches was 120% when applied in the variant N_{160} P_{120} $K_{40}$of mineral fertilizers. The smallest increase in the mass of a bunch of grapes compared to the control was 108.8%, it was found in the application of N_{240} P_{180} K_{60} of mineral fertilizers variant. The experimental variant, due to mineral fertilizers N_{200} P_{150} K_{50}, took an intermediate position in terms of weight gain of grape bunches relative to the control, and the difference was 10.9%. In the grape variety Kishmish Sogdiana, the maximum number of bunches in the vine was 41.0 pcs, it was noticed in the variant when applied N_{160} P_{120} K_{40} mineral fertilizers which the number of bunches was 8pcs more than in the first control and it was 7pcs more than in the second control. The smallest number of bunches was 36.0 pcs. in the variant when mineral fertilizers given by N_{200} P_{150} K_{50}, and it was 3 pcs. more than in the first control, and 2 pcs. more than in the second control. In the experimental variant given at the expense of mineral fertilizers N_{240} P_{180} K_{60}, the number of grape bunches in the bush was intermediate and had 4 more bunches from the first control and 3pcs more from the second control.

The grape variety Kishmish Sogdiana had the heaviest bunches 125.7% compared to the control it was recorded mineral fertilizers in this variant due to N_{160} P_{120} K_{40}. The smallest increase in the weight of the bunch of this variety compared to the control was 112.0% in the variant of the experiment of mineral fertilizers was given by N_{240} P_{180} K_{60}. In the variant of the experiment, given at the expense of mineral fertilizers N_{200} P_{150} K_{50}, the weight gain of grape bunches relative to the control was intermediate and the difference constituted 12.0%. The change in the number of grape bunches in the vine and their average weight with the introduction of different amounts of mineral fertilizers ultimately led to a difference in the yield of the vine and the overall yield in both variants of the experiment. Experimental data showed that the highest yield of Kishmish marble grapes made up 16.7 kg due to the application of N_{160} P_{120} K_{40} of mineral fertilizers. The lowest yield in the experimental variant of vine was determined 16.2 kg when applied N_{200} P_{150} K_{50} of mineral fertilizers. When applying mineral fertilizers due to N_{240} P_{180} K_{60}, the average yield vinein the experimental variant was intermediate and amounted to 16.5 kg (Table 4).

Table 4
The effect of mineral fertilizer rates on the yield of seedless varieties of grapes, 2015-2018

T/p	Variants	Average weight of grape bunch, g	Yield per vine, kg	Productivity , c/ha
Kishmish marble				
1	Unfertilized – control	320,0	12,0	133,3
2	N_{120} P_{90} K_{30}	352,0	15,5	172,2
3	N_{160} P_{120} K_{40}	384,0	16,7	185,5
4	N_{200} P_{150} K_{50}	355,0	16,5	183,5
5	N_{240} P_{180} K_{60}	348,0	16,2	180,0
	$ЭКФ_{05}$		0,6	1,3
	Sx		0,11	0,22
Kishmish Sogdiana				
1	Unfertilized – control	350,0	13,6	151,1
2	N_{120} P_{90} K_{30}	400,0	15,6	173,3
3	N_{160} P_{120} K_{40}	440,0	19,6	217,8
4	N_{200} P_{150} K_{50}	410,0	17,1	190,0
5	N_{240} P_{180} K_{60}	392,0	16,1	178,9
	$ЭКФ_{05}$		0,5	1,6
	Sx		0,08	0,26

The effect of mineral fertilizers on the yield of seedless grape varieties was even more clearly expressed in the results obtained per hectare. Consequently, the highest yield of the Kishmish marble grape variety - 185.5 c/ha or 29.1% yield increase compared to the control was determined in the experimental variant given at the expense of mineral fertilizers N_{160} P_{120} K_{40}. The lowest yield of 180.0 c/ha or 35.0% yield increase relative to the control was determined in the experimental variant when applying mineral fertilizers due to $N_{240}P_{180}K_{60}$.

When applying N_{200} P_{150} K_{50} due to mineral fertilizers, the yield was intermediate between the above options, the yield increase was 37.7% compared to the control. The data in the table showed that the same trend was noted in the influence of mineral fertilizer norms on the yield of Kishmish Sogdiana grapes. In particular, the highest yield in the vine made up 19.6 kg, it was due to application N_{160} P_{120} $K_{40}$of mineral fertilizers. The lowest yield in the vine was 16.1 kg it was found in the variant when applied at the expense of N_{240} P_{180} $K_{60}$of mineral fertilizers. When applying mineral fertilizers due to N_{200} P_{150} K_{50}, the average yield of vine in the experimental variant took an intermediate place among the above options and amounted to 17.1 kg. The following results of the influence of mineral fertilizers on the overall yield of Kishmish Sogdiana grapes were noted. At the same time, the highest yield - 217.8 c/ha or 44.1% yield increase relative to the control was determined in the experiment variant given at the expense of mineral fertilizers N_{160} P_{120} K_{40}. The lowest yield was 178.9 c. per

hectare or 18.4% yield increase compared to the control was determined in the experimental variant when applying mineral fertilizers due to $N_{240}P_{180}K_{60}$. In the experimental variant, given at the expense of $N_{200}P_{150}K_{50}$ mineral fertilizers, the yield was intermediate between the above options; the additional yield obtained compared to the control was 25.7%. In the experiments, we also studied the effect of the amount of mineral fertilizers on the yield of dried products from seedless grape varieties. To do this, the harvest of grape varieties Kishmish marble and Kishmish Sogdiana, grown on the background of various amounts of mineral fertilizers, was dried using by the "Oftobi" method at the expense of 10 kg of raw materials. Experiments have shown that the highest yield of dry product from Kishmish marble grapes - 2.63 kg, or 4.8% more than in the control, was determined in the experimental variant by applying mineral fertilizer $N_{160}P_{120}K_{40}$ (Table 5).

Table 5

Influence of mineral fertilizers on the yield of dried products of Kishmish marble and Kishmish Sogdiana varieties, 2015-2018

T/p	Variant	Drying grapes,kg	Dry product yield	
			kg	control,% relative
Kishmish marble				
1.	Unfertilized – control	10,0	2,51	100,0
2.	$N_{120}P_{90}K_{30}$	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 Sogdiana				
1	Unfertilized – control	10,0	2,20	100,0
2	$N_{120}P_{90}K_{30}$	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

The smallest yield of dry product - 2.53 kg and more than the control yield of 0.8%, was noted in the experimental variant when applying mineral fertilizers due to $N_{240}P_{180}K_{60}$. When applying mineral fertilizers due to $N_{200}P_{150}K_{50}$, the yield of the dried product was intermediate between the above options, the yield of the finished product was higher than the control by 1.2%. The data in the table showed that the yield of the dried product of the Kishmish Sogdiana grape variety was also affected by the rate of application of mineral fertilizers. Therefore, the maximum yield of dried products was

2.41 kg, or 9.5% more than the control, it was determined in this variant of the experiment due to mineral fertilizers $N_{160}P_{120}K_{40}$. The lowest yield of dried products for this variety was 2.30 kg or 4.5% higher than the control when applying mineral fertilizers due to N_{240} P_{180} K_{60}. When applying mineral fertilizers due to $N_{200}P_{150}K_{50}$, the yield of the dried product was intermediate between the above options; an increase in the yield of the finished product by 7.7% was noted compared to the control.

Differences in the tasting price of dried products from the Kishmish marble and Kishmish Sogdiana grape varieties grown against the background of different amounts of mineral fertilizers, depending on the rate of fertilizer application, were noted. At the same time, the highest tasting score for the size of dried grapes of the Kishmish marble variety, its color, completeness, pulp texture and taste was 9.4 points and it was determined in the experimental version of mineral fertilizers N_{160} P_{120} K_{40}. The smallest total expression of scores according to the tasting assessment was recorded in the experimental variant with the introduction of 8.1 mineral fertilizers due to N_{200} P_{150} K_{50}. When applying mineral fertilizers at the expense of $N_{240}P_{180}K_{60}$, the tasting price of the dried product was intermediate between the above options. It was noted that the total score of this option was 8.7. From the data of the table it can be seen that the highest total sum of tasting points of the dried product of the Kishmish Sogdiana grape variety was 8.8 points and it was was recorded in the experiment variant given at the expense of mineral fertilizers N_{160} P_{120} K_{40}. The lowest expression of the total tasting score was recorded in the experimental variant with the introduction of 8.2 mineral fertilizers due to N_{240} P_{180} K_{60}. When applying mineral fertilizers at the expense of $N_{200}P_{150}K_{50}$, the tasting price of the dried product was intermediate between the above options, the total score of this option was 8.6 (Table 6).

Table 6

Tasting price of dried products from seedless grapes grown on the background of various amounts of mineral fertilizers, 2015-2018

T\p	Variant	Tasting price, in points					Overall score
		Large-scale	Color	Completeness	Consistency	Taste	
Maximum points		**1,0**	**1,0**	**1,0**	**2,0**	**5,0**	**10**
Kishmish marble							
1	Unfertilized – control	0,6	0,5	0,4	1,0	4,5	7,0
2	N_{120} P_{90} K_{30}	0,7	0,8	0,8	1,5	4,6	8,4
3	N_{160} P_{120} K_{40}	1,0	0,9	0,9	1,6	4,9	9,4
4	N_{200} P_{150} K_{50}	0,7	0,6	0,7	1,4	4,7	8,1
5	N_{240} P_{180} K_{60}	0,8	0,7	0,9	1,5	4,8	8,7
Kishmish Sogdiana							
1	Unfertilized – control	0,8	0,7	0,7	1.5	4,4	8,2
2	N_{120} P_{90} K_{30}	0,8	0,8	0,7	1,7	4,5	8,5
3	N_{160} P_{120} K_{40}	0,8	0,8	0,8	1,8	4,6	8,8
4	N_{200} P_{150} K_{50}	0,8	0,8	0,7	1,7	4,6	8,6

5	N_{240} P_{180} K_{60}	0,8	0,7	0,7	1,7	4,3	8.2

Conclusion

1. In seedless grape varieties - Kishmish marble and Kishmish Sogdiana, the duration of the period from bud break to ripening was shorter than the control by 3 and 4 days when fertilizing with N_{160} P_{120} K_{40}.
2. It is noted that the number of vines, corresponding to the formed branches, is the highest when mineral fertilizers are applied due to mineral fertilizers N_{240} P_{180} K_{60}, i.e. 1.40 for the variety Kishmish marble and 1.27 for the variety Kishmish Sogdiana.
3. The number of grape bunches corresponding to the developed branches was the largest in this variant due to mineral fertilizers N_{160} P_{120} K_{40} - 0.45 pieces of the Marble Kishmish variety and 0.50 pieces of the Sogdian Kishmish variety.
4. Application of nutritious substances with different norms affects the sugar content of the bunch of seedless grape variety. The highest sugar content was determined in the variant taking into account 26.1% of the Kishmish marble variety and 24.1% of the Kishmish Sogdiana variety due to mineral fertilizers N_{160} P_{120} K_{40}
5. The heaviest bunches - 384 g of the Kishmish marble grape variety and 440 g of the Kishmish Sogdiana variety of mineral fertilizers were identified in this variant due to N_{160} P_{120} K_{40}.
6. Feeding at different rates has a high impact on the yield of seedless varieties of grapes.The highest yield of grapes was determined on the experimental variant of the Kishmish marble variety 185.5 c/ha and the Kishmish Sogdiana variety 217.8 c/ha or 39.2% and 44.1% of mineral fertilizers N_{160} P_{120} K_{40}, respectively.

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