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POSSIBILITIES OF GROWING HIGH QUALITY VEGETABLES FROM VEGETABLE CROPS IN THE CONDITIONS OF TYPICAL GRAY SOILS OF ZARAFSHAN VALLEY

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Annotation. The effectiveness of phosphorus-containing fertilizers in the vegetable rotation system in the conditions of typical gray soils of the Zarafshan valley has been determined. Against the background of N200K90 provides high and quality yields by applying phosphorus-containing fertilizers 100 - 140 kg / ha.

Keywords. Zarafshan valley, carbonate, typical gray soil, crop rotation, phosphorus-containing fertilizers, fertilizer application, yield, crop quality.

Introduction

One of the main factors in increasing food production today is the efficient use of mineral fertilizers used in agriculture. One of the important issues is the expansion of the range of mineral fertilizers, the creation of cost-effective and environmentally friendly technologies for the production of products through the efficient use of raw materials, their introduction into production.

At a time when food security is a global concern, the importance of vegetables as well as cereals is growing. The cultivation of large quantities of vegetable crops is inextricably

linked with their consumption and medicinal properties. Carbohydrates, proteins and fats in vegetable crops serve as one of the main sources of nutrients for human life.

In recent years, along with white cabbage and potatoes, the area under sweet peppers and onions has been expanding in the crop rotation system of the country, which raises the issue of studying measures to increase their productivity and improve crop quality. .

It is necessary to study the phosphate regime of carbonate saline soils of the Zarafshan valley, to determine the fractional composition of soil phosphorus, the optimal type and rate of phosphorus fertilizers for such soils. In the conditions of carbonate saline soils, it is important to carry out scientific work in order to obtain high and quality yields from agricultural crops, as well as to improve the phosphate regime of the soil, to reduce the process of retrogradation.

Analysis of the relevant literature

According to the UN FAO standards, vegetable crops together with the vegetative mass (stem, leaf, root) produce 1 ton of nutrients in the following amounts: kg / t.

White cabbage	N – 5,5	P_2O_5 – 3,0	K_2O – 7,5
Potatoes	N – 4,0	P_2O_5 – 1,6	K_2O – 6,3
Onion (onion)	N – 4,3	P_2O_5 – 1,7	K_2O – 4,6
Sweet pepper	N – 4,0	P_2O_5 – 2,2	K_2O – 5,2
Tomato	N – 3,2	P_2O_5 – 1,2	K_2O – 5,8

However, these indicators are relative in nature, the magnitude of which is influenced by many external factors [3, 10].

In the conditions of Uzbekistan to produce 25-30 tons of white cabbage per hectare in gray soils - 150-200 kg of nitrogen per hectare, 100-150 kg of phosphorus and 75-100 kg of potassium in meadows and meadows - 120-150 kg of nitrogen per hectare in wetlands, 120-150 kg It is recommended to apply mineral fertilizers in the amount of 60–100 kg of phosphorus and potassium. Fresh pepper crop is demanding on soil fertility and its nutritional regime. In the conditions of irrigated gray soils of Uzbekistan in the cultivation of

fresh pepper is given 120-200 nitrogen, 140-150 kg of phosphorus, 90-100 kg of potassium per hectare.

Onion nutrients are absorbed very slowly in the first two months of development. The most assimilation occurs during the period when the bulbs are formed. The rate of mineral fertilizers for onions should be set at 100 - 150 kg of nitrogen, 100 - 150 kg of phosphorus and 75 - 90 kg of potassium per hectare, taking into account the planned yield and the level of nutrient supply of the soil. 2/3 of the same norm is given under plowing and 3/1 part during additional feeding. With an increase in the rate of nitrogen fertilizer, the growth period of onions is prolonged, the amount of vegetative mass increases, the bulbs become softer, and the storage properties deteriorate. [7, 8, 9, 13].

Data on the dynamics and balance of mobile phosphorus in the soil in the plant-soil-fertilizer system are obtained by the International Institute of Plant Nutrition (IPNI) through the GIS system for determining the nutrient cycle in agriculture (NuGIS) [11].

Johnson Dj, P. Fixen, P. Poulton [5] based on experiments conducted in the United States and England (Rotamsted Experimental Station) proposed a common model for different climates and soil conditions of two continents (Europe, America). The authors of this model were previously proposed by Sayers J.K., Johnston A.E., Curtin D. [12] model Dj. Johnston [5] noted that it is consistent with the refinement.

According to the improved model they proposed, soil phosphates are divided into the following 4 groups.

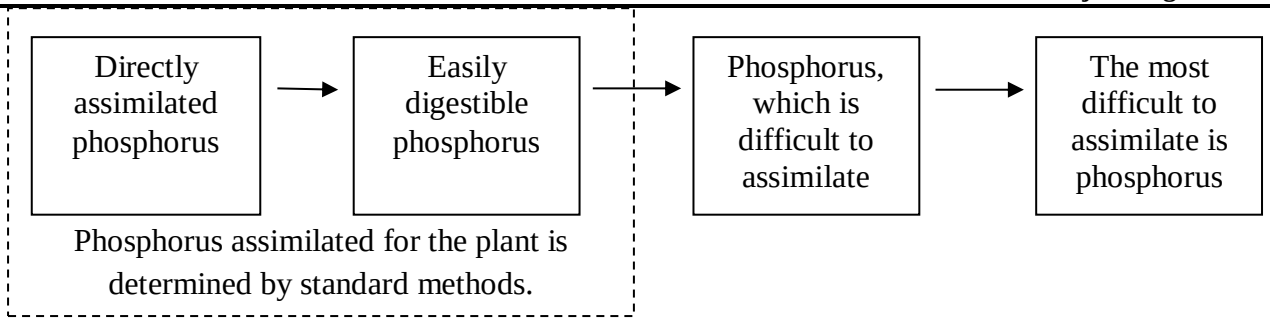
Group 1 - Phosphorus directly absorbed in the soil solution;

Group 2 - Easily assimilated (easily extractable) phosphorus;

Group 3 - Phosphorus that is difficult to assimilate (difficult to extract);

Group 4 - The most difficult to assimilate (very difficult to extract) phosphorus.

The conceptual block structure of this concept is as follows:



The conversion of the phosphate component of the applied fertilizer to the phosphorus fractions was found to be most water-soluble (group I), alkaline earth metal phosphate compounds (group II) and least soluble (group V) in the group of insoluble phosphates.

The effect of soil pH environment on the formation of the fractional composition of phosphates is very strong. In most crops, an pH above 6.0 indicates a phosphate deficiency. In addition, this process depends on the type and amount of cations in the soil.

Water-soluble monocalcium phosphates used in neutral and alkaline soils, such as di, tri calcium phosphates, are rapidly converted to a less soluble form in water [9].

Research methods

Scientific research was carried out in the conditions of typical carbonate gray soils of the Zarafshan valley.

The experiment was performed in 8 variants 4 repetitions. The field was 20 m long, 2.8 m wide, the area of one pile was 56 m2, and the piles were arranged in four tiers.

The object of study is ammophos (Ram) 11-12% N, 46% - R2O5, NKFU (RNKFU) 6-8% N, 16% R2O5, Ps-agro (PPs-agro) 4-6% N, 41 -44%, R_2O_5, 5-7% SO_3.

NH_4NO_3 (N - 34.5) was used as nitrogen fertilizer and K_2SO_4 (K_2O - 40%) as potassium fertilizer.

The experiments were carried out on the basis of the generally accepted "Biological control in agriculture" [5], "Methods of physiological research in horticulture and horticulture" [2], "Methods of conducting experiments in vegetable, melon and potato growing" [1]. The obtained data were analyzed for variance, correlation, and regression according to the "Methodology of field opyta" [4].

For agrochemical characterization of the soil of the experimental field, at the beginning of the experiment soil samples were taken from the driving layer (0 - 30 cm) and under the driving layer (30 - 60 cm) and analyzed.

The content of humus in the soil layers is 1.28 - 1.05%, total nitrogen 0.09 - 0.06%, total phosphorus 0.22 - 0.18%, mobile phosphorus 27, respectively, in the layer 0 - 30 and 30 - 60 cm. 5 - 11.8 mg / kg, total potassium 2.2 - 2.0%, exchangeable potassium 275 - 205 mg / kg, and a decrease in this amount was observed as it descended into the underlying layer.

Belonging to a group of soils that are less well supplied with mobile phosphorus and exchangeable potassium, the absorption capacity is 16.4 mg / eq per 100 g of soil.

Research results

Based on the data obtained on the use of phosphorus-containing fertilizers in the vegetable crop rotation system in the conditions of typical gray soils of the Zarafshan valley An additional yield of / was obtained. Application of NKFU fertilizer from 60 kg to 180 kg / ha allowed to obtain an additional yield of 179.1 - 216.1 ts / ha compared to the control option. While the highest yield was observed in the variant using NKFU 180 kg / ha, a reliable additional yield was obtained in the variant using NKFU 100 kg / ha.

In the fertilizer-free control variant of the onion crop of the crop rotation, the average yield was 160.5 ts / ha, while in the variant N200K90 the yield was 397.2 ts / ha.

With the increase in NKFU fertilizer standards (60, 100, 140, 180 kg / ha R_2O_5), the yield also increased and increased accordingly; 426.4; 438.5; 450.0 and 452.5 ts / ha were harvested.

Phosphorus-retaining Ammophos, NKFU and RS-agro fertilizers are almost the same 445.2 when applied at the same rate; 438.5 and 436.6 ts / ha were harvested. The highest yield of 450 ts / ha was obtained in the variant in which NKFU was applied at 140 kg / ha (in terms of R_2O_5).

In the variant using N_{200} K_{90}, an additional yield of 236.7 ts / ha was obtained compared to the fertilizer-free control variant, while in the variant using ammophos, an additional yield of 284.7 ts / ha was produced (Table 1).

In the seedless - control variant, the yield of sweet pepper was 145.5 ts / ha per hectare, while in the variant using nitrogen (N) 200 and potassium (K) 90 kg, the yield was 112.9 ts / ha more than in the control. Application of NKFU fertilizer from 60 kg to 180 kg / ha allowed to obtain an additional yield of 163.0 - 180.1 ts / ha compared to the control option. While the highest yield was observed in the variant using NKFU 180 kg / ha, a reliable additional yield was obtained in the variant using NKFU 100 kg / ha (Table 1).

Ammophos, NKFU and PS-agro fertilizers are almost the same 317.1 in the same (100 kg / ha) applied variants; 315.4 and 316.4 ts / ha were harvested. Phosphorus-containing fertilizers applied have a positive effect on the yield of sweet peppers.

The phosphorus-containing fertilizers used not only increase the yield of vegetable crops, but also affect the quality of the crop.

1 – table Different phosphorus-containing fertilizers for vegetable crops effect on productivity, ts / ha

№	Options	Crop types		
		white cabbage	onion	sweet pepper
1	Fertilizer - control	270,5	160,5	215,5
2	N200K90 – background	438,6	397,2	258,4
3	Fon + P100 (Ammofos)	475,4	445,2	317,1
4	Fon + P60 (НКФУ)	449,6	426,4	308,5
5	Fon + P100 (НКФУ)	473,5	438,5	315,4
6	Fon + P140 (НКФУ)	480,7	450,0	321,7
7	Fon + P180 (НКФУ)	486,6	452,5	325,6
8	Fon + P100 (PS-agro)	476,7	436,6	316,4
Sd, %		**3,8**	**4,07**	**3,2**
EKIF $_{05}$, ts / ga		**7,8**	**10,1**	**6,6**

In the fertilizer-free control variant of the experiment under typical carbonate gray soils, the dry matter content of white cabbage was 7.3%, total sugar content was 6.3%, vitamin C was 22.3 mg%, and nitrates were 194 mg / kg.

Application of mineral fertilizers had a positive effect on the quality of white cabbage, including ammophos, NKFU and PS-agro fertilizers in the same (100 kg / ha) variants with a dry matter content of 14.5%, total sugar content of 10.6%, vitamin C 34 , 3 - 34.4 mg,% and nitrates 248 - 249 mg / kg (Table 2).

Table 2. The effect of various phosphorus-containing fertilizers on crop quality of vegetable crops

№	Options	Dry matter,%			Total sugar content,%			Vitamin C mg%			Nitrate content, mg / kg		
		1	2	3	1	2	3	1	2	3	1	2	3
1	Fertilizer - control	7,3	14,6	15,2	6,3	7,6	5,4	22,3	10,5	118,5	194	42,6	56,5
2	N200K90 - background	12,8	12,8	14,8	10,4	8,0	5,3	33,1	12,7	121,6	268	45,4	65,7
3	Fon + P100 (Ammofos)	14,5	13,7	14,5	10,6	8,2	5,5	34,4	13,6	123,7	249	42,6	62,4
4	Fon + P60 (НКФУ)	13,6	11,9	13,7	10,2	8,0	5,4	34,0	12,5	123,4	252	40,8	58,9
5	Fon + P100 (НКФУ)	14,3	13,4	14,6	10,6	8,1	5,4	34,3	13,1	122,6	249	48,2	61,5
6	Fon + P140 (НКФУ)	14,5	11,9	15,1	10,3	8,1	5,6	34,6	13,2	122,7	256	47,1	67,6
7	Fon + P180 (НКФУ)	14,9	11,2	14,9	10,4	8,2	5,6	34,7	13,0	123,5	259	46,2	67,9
8	Fon + P100 (PS-agro)	14,5	12,9	14,7	10,6	8,2	5,5	34,5	13,7	121,4	248	45,0	65,4

Note.

1 - white cabbage,

2 - onion,

3 - sweet pepper

In terms of nitrate content, all variants were found to be less than the limited amount (300 mg / kg, NO_3) and meet quality requirements.

In the control variant, the total sugar content was 7.6%, while in the variant where the fertilizer was applied, its content increased by 8.0 - 8.2. Ascorbic acid was also found to be 10.5 mg% in the non-fertilizer-controlled variant, and 12.7–13.7 mg-% in the fertilized variant (Table 2).

The effect of phosphorus-containing fertilizers, ie an increase in the amount of ascorbic acid, a decrease in the amount of nitrates, had a positive effect on the yield quality of sweet pepper crops.

Conclusion.

Biochemical composition and yield quality of vegetable crops Phosphorus-containing ammophos, NKFU and RS-agro fertilizers obtained on the basis of Kyzylkum phosphorites in the conditions of carbonate soils of Zarafshan valley have a positive effect on yield and yield quality of vegetable crops. Against the background of N200K90, the application of phosphorus-containing fertilizers 100 - 140 kg / ha (in terms of R_2O_5) creates an opportunity to obtain high and quality yields.

References

1. Azimov B.J., Azimov B.B. Methods of conducting experiments in vegetable, melon and potato growing. Tashkent. - 2002. - 224 p.
2. Belik V.F. edited by. Physiological research technique in vegetable growing and melon growing. -M :. 1970, - S. 57 - 62.
3. Belogubova E.N., Vasiliev A.M., Gil L.S. Modern open field vegetable growing. Zhytomyr. - Ruta. 2007 .-- 433 p.
4. Dospekhov B.A. Field experiment technique. - M :. Agropromizdat. - 1985 .-- 351 s.
5. Johnston J., P. Pixen, P. Poulton Efficient use of phosphorus fertilizers in agriculture // Bulletin of the International Institute of Plant Nutrition. - 2015. - No. 2. - S. 8-11.
6. Kuperman F.M. Biological control in agriculture ". M: .1962, -S. 44-48.
7. Musaev B.S. Agrochemistry. - T :. Teacher, - 2001. - B. 130 - 284.
8. Khayitov M.A., Khoshimov F.H., Mashrabov M.I., Qodirova G.A., Davirova M.K. Recommendations for the effective use of phosphorus-containing fertilizers in the soils of the Zarafshan valley. –T :. "Navruz", - 2017. - 224 p.,
9. Hayitov MA, Mashrabov MI, Scientific bases of formation of phosphate regime of irrigated soils of Zarafshan valley. –T :. "Navruz", - 2018. - 20 p.
10. Khoroshkin A.B. Nutrition of vegetable crops // Potatoes and vegetables, - 2014 - №6. - S. 16-17.
11. Fixen P.E., T.W.Bruulsema, T.L.Jensen, R.Mikkelsen, T.S.Murrel, S.B.Philips, Q.Rand and W.M.Steward. 2010. Better Crops with Plant Pood. 94 (4). - P. 6-8.

12. Sayers J.K., Jonston A.E., and Curtin D. 2008. FAO. Fertilizer and Plant Nutrition Bulleten 18. FAO-UN. – 107 p.
13. Sattarov J., Siddiqov S., Abdullayev S., Ergashev A., Xaidmuhamedova Z., Kulmurodova Ya., Qosimov U., Akbarov N. Agrokimyo. –T:. Cho'lpon, - 2011. – B. -180-184, - B. 159 – 348.