

Use of Siderate Crops in Potato Farming

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Abstract:

In this article, the results of the research conducted for the first time on the growth, development, green mass and yield of various siderate crops in the conditions of the typical gray soils of Kashkadarya region, which have been irrigated since ancient times, are described.

Keywords: siderate crops, planting time, growth and development, growth period, biomass, potato varieties, leaf level, commodity and seed yield, reproduction coefficient, seed quality.

INTRODUCTION

Different soil-climate conditions in the use of siderate (main, cover, intermediate crops, fodder) crops in the crop rotation system, which ensure food security, improve soil fertility properties, increase the yield and quality of agricultural crops in the growing demand for food products in the world determining the type of siderate crops suitable for the conditions, achieving high biomass and seed yield, and using it as a green fertilizer require regular improvement of agrotechnics.

In our republic, the influence of siderate crops on soil fertility, plant growth, development, morbidity and productivity of cotton, grain and other crops planted [1, 2, 3, 4], and on potato cultivation [5, 6, 7, 8] has been researched.

Currently, the amount of potatoes grown in the republic, including the developing potato growing region of Kashkadarya, cannot meet the needs of the population. Taking this into account, the government of the Republic has entrusted scientists with the task of developing research on the creation of fruitful, disease-resistant, high-taste and storable potato varieties, suitable for local conditions and modern technology, as well as the traditional selection method in the organization of seed production, free of viruses based on the gradually accelerated technological method. there are huge tasks such as growing seeds, fully supplying the population with potato products, and exporting them abroad. The importance of siderate crops in maintaining, increasing and protecting the natural fertility of the soil in the short rotation rotation, which is used in agricultural crops such as cotton, winter wheat, vegetable crops and potatoes (1,2,3,4).

These agrotechnical measures, firstly, enrich the soil with nutrients, preserve and increase its natural fertility, and secondly, have allelopathic properties and have a positive effect on the mechanical, water-physical, agrophysical, agrochemical and microbiological properties of the soil.

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Therefore, it is relevant to conduct research on the use of biomass of siderate crops as sideration in potato cultivation in the conditions of typical gray soils that have been irrigated for a long time.

In the world, maintaining and increasing soil fertility, increasing the effectiveness of green fertilizers in the following priority directions: enriching the organic content of the soil; selection of siderate crop types and planting periods that produce high green mass, improvement of agrotechnics for their cultivation; role of various siderates in maintaining and increasing soil fertility, improving mechanical, agrophysical, agrochemical and microbiological properties of soil; Research is being conducted on the development of agrotechnologies that improve soil properties.

The purpose of the study. In the conditions of the typical gray soils of Kashkadarya region that have been irrigated for a long time, studying the biomass yield of summer and autumn siderate crops and the dates of planting siderate crops for seed and seed yield, the growth, development, harvest of potato varieties when the mass of siderate crops is used, and the effect on yield and seed quality and soil fertility. It consists in improving the cultivation technology based on the separation of promising siderate crop types and potato varieties, which allow obtaining a high-yielding, healthy and pure harvest.

As the object of the research, the typical gray soils of the Kashkadarya region, which have been irrigated since ancient times, "Nemerchansky-2268" of winter rapeseed, "Raduga" of oil radish, "Yubileynaya" of blue mustard, "Temur" of barley, "Vostok-55" of gorokh (blue pea), "Vostok-55" of potatoes, high-speed Kuvonch-1656 m, medium-speed Bahro-30, Bardoshli-3, Sante, Condor, Arizona, Selvana and Saviola varieties were obtained.

RESEARCH PLACE, CONDITIONS AND METHOD

A field experiment of 2019-2022 was conducted in the conditions of the typical gray soils of the "Hisor" farmers' association, Yakkabog district, Kashkadarya region. Typical gray soils that have been irrigated since ancient times, groundwater is located at a depth of 6-8 meters. The mechanical composition of the soil should be average. The amount of humus (0-30 cm) in the arable layer (0-30 cm) of the experimental field is 1.16-0.93%, the volume mass of the soil is 1.27-1.32 g/cm³, the specific mass is 2.58-2.65 g/cm³, total nitrogen 0.095-0.094%, total phosphorus 0.144-0.163%, potassium 2.6-2.9%, nitrogen content in nitrate form 5.14-6.51 mg/kg, mobile phosphorus 17-27 mg/kg, exchangeable potassium was 287-307 mg/kg. In the obtained data, it was found that the amount of these nutrients is a little less in the subsoil layer of the soil.

The area of Delyanka is 224 m² by siderates, 14 m² by varieties, the number of repetitions is 3. Siderate crops were planted in 2 periods (July and October). Siderates were planted in summer on July 29-30, and in autumn on October 12-18. The norm of planting them is as follows:

Rapeseed-16.0; gorokh (blue peas) – 70; blue mustard (mustard)-14.0 and oil radish-20.0 kg/ha. In mixed options, this planting was taken from half of the norms. Before planting, N₃₀P₁₀₀K₆₀ kg per hectare was applied, and autumn siderates were fed with N₃₀ in early spring. After planting, summer siderates were irrigated 9 times at the rate of 450-500 m³/ha, autumn siderates 3 times, 1 of which was done in early spring. 10-12 days before planting potatoes, the productivity of siderate crops was determined, then it was harvested, threshed, disced on the KIR-1.5 aggregate and plowed to a depth of 28-30 cm.

Conducting field and production experiments, planting, crop care, harvest, calculation and analysis are generally accepted by the Ministry of Agriculture, All-Russian Institute of Plant Science,

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All-Russian Scientific Research Institute of Potato Farming, Scientific Research Institute of Vegetables, Poly crops and Potatoes of Uzbekistan, Agriculture was carried out based on the methods and recommendations of the State Commission for testing new varieties of crops. Productivity indicators were analyzed mathematically using Microsoft Excel according to the methods of B.A. Dospekhov.

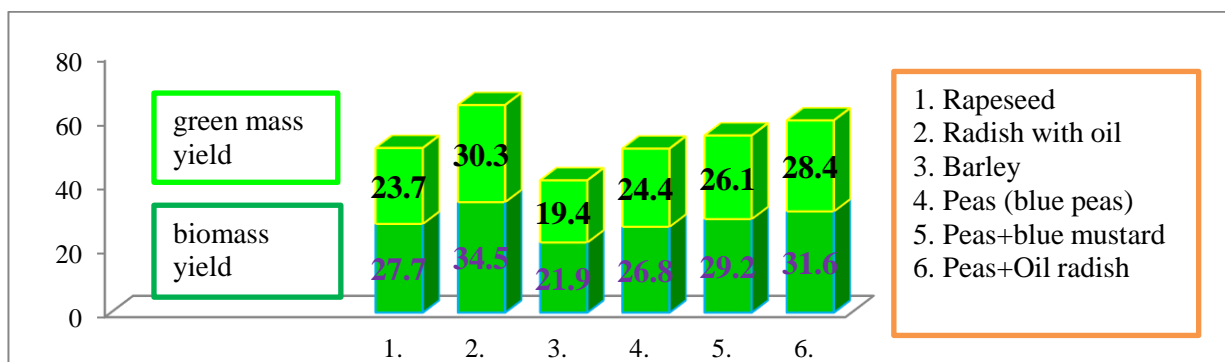
RESEARCH RESULTS

In the flowering phase of summer siderate crops, the average plant height by crop type is 83.2 in rapeseed, 99.7 in oil radish, 71.6 in barley, 98.6 in buckwheat, 108.3 in buckwheat+blue mustard, and 108.3 in oil radish+oil radish. It was equal to 102.3 cm. The thickness of siderat crops in 1 m² of the stem number by years in rapeseed - 547.4-557.6, in oil radish - 465.0-469.6, in barley - 470.8-488.1, in gorokh - 101.8-104.7, in buckwheat + blue mustard - 406.4-418.0 and in buckwheat + oil radish - 451.3-471.8 units, the number of stalks in rapeseed, oil radish, blue mustard - 1, in barley - 2.0-2.1, in gorox - 2.3-3.3 and in gorox + oil radish - 2/1 units (Table 1).

During the growth period of autumn siderate crops, the formation of growth organs is observed, according to the type of siderate crop, the plant height is 30.0-42.1 cm, the stem thickness per 1 m² is 470.0-475.0 in rapeseed, 475.6-485 in oil radish, in barley - 352.0-359.0, in buckwheat - 195.7-201.6, in buckwheat + blue mustard - 467.4-486.0, in buckwheat + oil radish - 475.7-499.2 pieces, root length in rapeseed - 63.4-67.9, in oil radish - 65.3-69.7, in barley - 43.0-61.3, in buckwheat - 38.5-52.1, in buckwheat + blue mustard - 64, 3-70.4, in gorox+oil radish - 39.6-43.2 cm. was, these indicators increased according to the law, and the biomass was plowed into the ground. In the flowering phase, plant height according to the type of siderate crops - 85.6-226.8 cm, the number of side branches - 6.7-25.7 units, root length - It was equal to 108.6-144 cm (Table 2).

Biomass yield in summer siderate crops was 19.3-30.2 tons per hectare. Biomass yield was 30.2 tons per hectare when oil radish was planted as a siderate crop, and 29.3 tons when it was planted in a mixture of chickpeas + oil radish.

Biomass yield of various siderate crops planted in the autumn term was 22.1-35.1 tons per hectare. Among studied siderate crops, the highest biomass yield was 35.1 tons per hectare when siderate oil radish was planted. Relatively high biomass yield (29.6-32.3 t/ha) was recorded when buckwheat (green pea) + oil radish and blue mustard were planted in a mixture.



Biomass yield of autumn siderate crops.

The number of earthworms in 1 m² of plowing layer of soil during the growing season of the studied potato varieties in summer siderate crops is 78.7-107.9 in March; April 272.5-319.0; May is 356.3-498.7 pieces, compared to control (autumn plow): 46.9-76.1 respectively; 214.5-261.0; It was found that there were 274.3-416.7 units.

Table 1

Biometric indicators of summer siderate crops during the growing season

№	Name and variety of siderat crops	30-33 days after germination					Plants in the growing season												
		3.08-3.09					20-23.09				10-13.10				18-21.10				
		plant height, cm	Number of plants per 1 m ² , pcs	number of stems, pcs	number of side branches, pcs	root length, cm	plant height, cm	number of stems, pcs	number of side branches, pcs	root length, cm	plant height, cm	number of stems, pcs	number of side branches, pcs	root length, cm	plant height, cm	number of stems, pcs	number of side branches, pcs	root length, cm	Number of plants per 1 m ² , pcs
2019																			
1.	Rapeseed	28,3	557,6	1	3,5	32,2	66,8	1	5,3	66,1	78,5	1	6,6	107	85,8	1	7,6	113,1	557,6
2.	Radish with oil	30,4	465,0	1	5	32,8	76,6	1	6,3	64,0	93,3	1	7,3	102,4	100,3	1	8,3	109,0	465,0
3.	Barley	28,4	478,4	2,1	-	30,0	57,7	2,1	-	57,4	66,7	2,1	-	99,6	72,6	2,1	-	105,8	478,4
4.	Peas (green)	32,7	104,7	2,3	2,6	30,0	78,3	2,3	5	54,7	90,0	2,3	6	82,3	101,3	2,3	7	87,3	104,7
5.	Peas+blue mastard	35,2	417,3	2	4,6	33,2	80,4	2	7	76,9	94,6	2	8	104,1	109,5	2	9	110,3	417,3
6.	Peas+Oil radish	25,5	471,8	2/1	3,1	28,7	78,6	2/1	5,3	92,4	92,4	2/1	6,1	91,1	102,4	2/1	7,1	96,5	471,8
2021																			
1.	Rapeseed	28,3	547,4	1	3,5	31,6	63,9	1	5,6	65,1	76,3	1	6,4	111	80,1	1	8	113,4	547,4
2.	Radish with oil	28,9	467,3	1	3,6	30,7	73,2	1	6,0	61,1	88,6	1	7,4	103	96,4	1	8,1	105,4	467,3
3.	Barley	25,7	470,8	2	-	30,4	62,4	2	-	53,7	69,1	2	-	87,9	70,5	2	-	89,7	470,8
4.	Peas (green)	29,9	101,8	2,6	3,4	30,6	75,0	2,6	4,8	67,3	88,2	2,6	6,0	100,7	94,8	2,6	6,6	102,7	101,8
5.	Peas+blue mastard	31,7	406,4	2	4,1	33,2	81,7	2	5,6	78,2	97,4	2	7,0	111,8	103,9	2	8	113,4	406,4
6.	Peas+Oil radish	25,6	451,3	2/1	3,7	29,2	81,2	2/1	4,0	71,8	95,8	2/1	4,7	106,5	101,0	2/1	5,5	107,9	451,3
2022																			
1.	Rapeseed	29,5	563,4	1	3,3	32,5	66,2	1	5,3	66,4	74,1	1	6,6	111,9	83,7	1	8,1	114,4	563,4
2.	Radish with oil	30,3	469,6	1	3,4	34,4	77,3	1	5,8	62,0	96,6	1	7,4	102,6	102,4	1	8,3	105,0	469,6
3.	Barley	28,1	488,1	2	-	32,2	56,9	2	-	51,7	66,1	2	-	81,0	71,7	2	-	83,2	488,1
4.	Peas (green)	30,7	103,7	3,3	3,4	33,5	75,7	3,3	4,7	68,2	91,8	3,3	6,0	99	99,7	3,3	7,1	101,3	103,7
5.	Peas+blue mastard	32,7	418,0	2	4,2	34,9	81,4	2	5,8	77,9	97,6	2	7,0	112,2	111,5	2	8,2	116,8	418,0
6.	Peas+Oil radish	27,8	465,9	2/1	3,4	30,6	79,5	2/1	4,0	73,7	95,8	2/1	4,7	104,4	103,5	2/1	5,5	106,4	465,9

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Table 2

Biometric indicators of autumn siderate crops during the growing season

№	Name and variety of siderat crops	33-35 days after germination					Plants in the growing season											
		23-26.11					26.02-1.03			18-21.03			27-30.03					
		plant height, cm	Number of plants per 1 m ² , pcs	number of stems, pcs	number of side branches, pcs	root length, cm	plant height, cm	Number of plants per 1 m ² , pcs	root length, cm	plant height, cm	number of stems, pcs	number of side branches, pcs	root length, cm	plant height, cm	number of stems, pcs	number of side branches, pcs	root length, cm	Number of plants per 1 m ² , pcs
2020																		
1.	Rapeseed	28,8	478,2	1	3,2	25,5	38,9	474,0	67,9	96,1	1	7,7	97,9	115,6	1	10,4	140	474,0
2.	Radish with oil	32,8	486,5	1	6	28,9	41,7	483,0	69,7	99,1	1	16,8	98,5	125,0	1	25,4	129,6	483,0
3.	Barley	27,9	360,9	4,7	-	26,9	36,5	357,0	61,3	53,8	4,7	-	104,6	88,9	4,7	-	118	357,0
4.	Peas (green)	30,4	201,5	3,8	3,6	26,4	41,8	198,8	52,1	100,9	3,8	5,1	95,0	212,0	3,8	7,8	112	198,8
5.	Peas+blue mastard	34,8	483,7	2	7,2	31,0	42,1	479,7	70,4	116,2	2	9,9	115,3	221,7	2	17,2	144	479,7
6.	Peas+Oil radish	30,4	497,4	2,2/1	3,4	21,0	33,0	494,5	43,2	100,3	2,2/1	8,2	106,3	218,5	2,2/1	17,1	123	494,5
2021																		
1.	Rapeseed	26,5	476,2	1	3,8	23,7	35,2	470,0	63,4	91,6	1	6,3	102,3	112,4	1	8,4	139,3	470,0
2.	Radish with oil	30,5	481,5	1	6,1	27,0	35,3	475,6	66,8	88,2	1	14,4	98,0	111,5	1	20,9	120,3	475,6
3.	Barley	25,9	356,4	4,8	-	25,2	31,0	352,0	59,3	51,8	4,8	-	106,4	85,6	4,8	-	115	352,0
4.	Peas (green)	28,4	200,1	4	4	24,8	33,1	195,7	49,5	101,5	4	4,4	95,3	193,8	4	6,7	108,6	195,7
5.	Peas+blue mastard	29,7	472,5	2	7,4	30,9	35,2	467,4	66,4	112,3	2	8,8	115,8	210,3	2	14,4	140,3	467,4
6.	Peas+Oil radish	26,7	482,4	2,7/1	4,3	23,8	30,3	475,7	39,6	96,6	2,7/1	5,8	103,3	204,9	2,7/1	12,3	119,1	475,7
2022																		
1.	Rapeseed	27,1	478,1	1	3,3	29,8	32,8	475,0	65,0	98,3	1	8,0	104,0	117,0	1	11,9	140,3	475,0
2.	Radish with oil	31,4	488,1	1	5,2	33,1	35,7	485,0	65,3	103,1	1	16,6	101,3	135,0	1	25,7	128	485,0
3.	Barley	27,4	363,2	4,6	-	29,7	30,0	359,0	43,0	55,1	4,6	-	104,7	89,8	4,6	-	117,2	359,0
4.	Peas (green)	28,6	198,0	3,3	3,3	30,8	31,0	201,6	38,5	102,9	3,3	5,0	96,1	217,0	3,3	7,0	110,5	201,6
5.	Peas+blue mastard	31,6	489,1	2	6,7	33,7	34,3	486,0	64,3	117,9	2	10,5	117,2	226,8	2	16,5	139,3	486,0
6.	Peas+Oil radish	28,5	501,0	1,7/1	4	30,8	30,4	499,2	41,2	101,5	1,7/1	8,5	104,0	222,5	1,7/1	13,4	118,6	499,2

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Figure 1. Peas+blue mustard

Table 3

Changes in the number of earthworms in potato fields after different autumn siderate crops (2019-2022)

№	The name of siderat crops	During the growth period of the potato plant		
		The number of earthworms, in units per m		
		April-May	June	July
		Soil layers, cm		
		0-30	0-30	0-30
1	Control (autumn plow)	63,2	86,6	98,1
2	Spring plow	38,5	69,5	84,3
3	Rapeseed	134,6	367,0	457,4
4	Radish with oil	159,5	448,7	582,5
5	Barley	132,0	395,5	428,9
6	Peas	149,7	421,8	498,5
7	Peas + blue mustard	145,8	420,4	496,8
8	Peas + oil radish	164,5	467,5	617,8

After the autumn siderate crops, the above laws were also observed for medium-ripening potato varieties Sante, Condor, Arizona, Saviola and Bardoshli-3, and during the growing season of potato varieties, the number of earthworms per 1 m² of the plowing layer of the soil in siderate varieties was respectively: 132.0-164.5; 395.5-467.5; It is 428.9-617.8 pieces, compared to the control (autumn plow) in April-May 68.8-101.3; June 280.4-380.9; July was found to be 330.8-519.7 units more (Table 3).

So, compared to summer siderate crops, different siderate crops in the autumn term: buckwheat + oil radish mixed, oil radish, buckwheat (blue pea), buckwheat + blue mustard, barley and rapeseed are sown in their pure state, and when their biomass is used as siderate, the volume of organic mass in the plow layer increases and and increased the number of earthworms by 3.1-6.3 times.

It was found that the growing season of Arizona, Saviola and Bardoshli-3 varieties of potatoes studied in autumn siderate crops developed with a wide leaf level in one bush on 40-70 days. When autumn siderate crop biomass was used as siderate, the leaf area by varieties was 67.8-72.1 thousand m² per hectare, compared to the control (autumn plow), it was 17.5-21.3 thousand m² per hectare

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more (Table 4).

Table 4

Biometric indicators of potato varieties planted after autumn siderates (2019-2022)

№	The name of siderat crops	Plant height, cm	Weight of 1 plant bush, g	From these:		1 plant leaf level, m ²	The leaf level of the plant per hectare, thousand m ²
				stem, g	leaf, g		
Arizona variety							
1	Control (autumn plow)	67,2	297,6	179,8	117,8	0,776	50,8
2	Spring plow	60,5	266,4	160,9	105,5	0,719	47,9
3	Rapeseed	75,8	469,3	283,0	186,3	1,001	69,5
4	Radish with oil	74,9	461,7	278,4	183,3	0,998	68,9
5	Barley	72,7	452,5	272,8	179,7	0,996	68,3
6	Peas	83,6	495,3	299,1	196,2	1,028	72,1
7	Peas + blue mustard	79,6	486,4	293,8	192,6	1,018	71,4
8	Peas + oil radish	81,7	487,9	294,7	193,2	1,021	71,8
Saviola variety							
1	Control (autumn plow)	65,5	291,8	177,4	114,4	0,734	50,7
2	Spring plow	60,1	264,9	159,7	105,2	0,715	47,7
3	Rapeseed	75,7	462,1	277,9	184,2	1,000	69,3
4	Radish with oil	74,6	460,7	277,3	183,4	0,998	68,8
5	Barley	72,6	452,3	274,7	177,6	0,996	68,1
6	Peas	82,8	494,5	298,5	196,0	1,026	71,9
7	Peas + blue mustard	78,6	485,3	293,6	191,7	1,011	70,7
8	Peas + oil radish	80,7	486,5	294,1	192,4	1,010	70,9
Durable-3 (Bardoshli-3) variety							
1	Control (autumn plow)	64,3	289,5	175,6	113,9	0,723	50,3
2	Spring plow	59,6	264,6	159,6	105,0	0,688	47,3
3	Rapeseed	73,3	461,3	277,4	183,9	0,970	68,9
4	Radish with oil	72,5	460,5	277,2	183,3	0,963	68,7
5	Barley	70,8	450,5	273,8	176,7	0,961	67,8
6	Peas	80,5	493,9	298,3	195,6	1,002	71,5
7	Peas + blue mustard	77,2	483,8	292,9	190,9	0,996	70,0
8	Peas + oil radish	79,7	484,6	293,3	191,3	1,001	70,4

The widest (71.5-72.1 thousand per m²) potato plants with a leaf surface was determined when the gorokh (blue pea) was planted pure for siderate, and compared to the control (autumn plow) the leaf surface per hectare was 21.2-21.3 thousand per hectare m² was higher. The highest increase in the weight of one bush was recorded in the varieties of potatoes grown in autumn siderate crops Arizona, Saviola and Bardoshli-3, and the weight of one bush compared to the control (autumn plow) was 450.5-495.3 or 161.0-197 ,7, it was found that the yield of tunganak was higher by 678.5-998.8 or 16.9-311.0 grams (Table 5).

Table 5

Effect of autumn siderates on morphological and productivity indicators of potato varieties (2017-2019)

№	The name of siderat crops	Plant height, cm	In one bush:						
			stem, pcs	side branch, pcs	leaf, pcs	bush weight, grams	bud yield, gram	number of nodes, pcs	Average weight of 1 pod, grams
Arizona variety									
1	Control (autumn plow)	67,2	3,6	5,6	188,9	297,6	687,8	8,5	80,9
2	Spring plow	60,5	3,3	4,8	169,6	266,4	551,6	7,2	76,6
3	Rapeseed	75,8	4,6	7,3	205,8	469,3	841,5	10,0	84,1
4	Radish with oil	74,9	4,5	6,8	199,2	461,7	824,1	10,0	82,4
5	Barley	72,7	4,0	6,6	193,8	452,5	786,5	9,6	81,9
6	Peas	83,6	4,6	9,4	242,6	495,3	998,8	11,2	89,2
7	Peas + blue mustard	79,6	4,5	8,8	236,6	486,4	979,7	11,0	89,1
8	Peas + oil radish	81,7	4,6	9,3	239,4	487,9	988,7	11,0	89,8
Saviola variety									
1	Control (autumn plow)	65,5	3,3	5,2	186,5	291,8	679,8	8,5	79,9
2	Spring plow	60,1	3,0	4,5	166,8	264,9	573,6	7,2	79,6
3	Rapeseed	75,7	4,3	7,0	203,1	462,1	838,5	10,0	83,8
4	Radish with oil	74,6	4,2	6,6	196,6	460,7	819,1	10,0	81,9
5	Barley	72,6	4,1	6,4	190,3	452,3	780,8	9,6	81,3
6	Peas	82,8	4,6	9,2	241,7	494,5	997,6	11,2	89,1
7	Peas + blue mustard	78,6	4,3	8,5	237,9	485,3	978,5	11,0	88,9
8	Peas + oil radish	80,7	4,4	9,2	240,1	486,5	984,8	11,0	89,5
Durable-3 (Bardoshli-3) variety									
1	Control (autumn plow)	64,3	3,2	5,0	175,2	289,5	661,6	8,5	77,8
2	Spring plow	59,6	3,0	4,2	165,6	264,6	475,5	6,8	69,9
3	Rapeseed	73,3	4,3	6,7	189,5	461,3	721,7	8,7	82,9
4	Radish with oil	72,5	4,2	6,2	187,1	460,5	689,8	8,5	81,1
5	Barley	70,8	3,8	5,9	181,3	450,5	678,5	8,2	82,7
6	Peas	80,5	4,5	8,6	217,8	493,9	898,9	10,0	89,8
7	Peas + blue mustard	77,2	4,3	8,0	212,9	483,8	876,5	9,8	89,4
8	Peas + oil radish	79,7	4,4	8,4	216,7	484,6	897,7	10,0	89,8

According to the analysis, there is a highly positive linear relationship between the average single nodule weight per stem and yield, correlation coefficient $r=0.877$ ($R^2=0.7689$) (Appendix 64). On the 20th day after planting the seed tubers of Arizona, Saviola and Bardoshli-3 varieties of potatoes grown in the options using autumn siderate crops, the field fertility by varieties was 95.7-98.6 or 4.0-6.4% compared to the control (autumn plow), germination is 4-5 days earlier, the duration

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of the growing season is 4-7 days longer, the plant is 6.5-15.6 centimeters long, the stems are 0.6-1.2 more than one bush, and the plant and buds are infected with viruses. infected with diseases: openly by 8.6-11.4%, secretly by 17.4-27.4% (including virus X-3.5-7.9; S-9.8-12.1; U- 3.6-7.1; M-0.5-1.0;) was found to decrease by percent (Table 6).

Table 6

Field fertility, growth, development and virus infection of potato varieties grown under conditions of autumn siderates when seed nodules are planted (2019-2022)

№	The name of siderate crops from which seed pods are grown	Fertilization of seed pods on the 20th day, %	Duration of periods, in days		Plant height, cm	Stems, pods in one bush	Infection with viruses, %					
			planting-germination	sprouting - bush yellowing			openly	hiddenly	In this term:			
									X	S	Y	M
Arizona variety												
1	Control (autumn plow)	92,2	19	82	62,5	3,6	19,1	51,1	13,2	22,8	13,6	1,5
2	Spring plow	88,6	20	80	55,7	3,3	24,3	60,3	16,4	25,3	16,5	2,1
3	Rapeseed	97,8	16	87	69,6	4,6	7,7	24,1	6,0	10,7	6,9	0,5
4	Radish with oil	96,3	16	87	68,7	4,5	8,8	29,5	8,1	12,3	8,6	0,6
5	Barley	95,9	16	86	67,9	4,0	10,5	33,7	9,7	13,1	10,0	1,0
6	Peas	98,6	15	89	78,1	4,6	8,7	26,3	6,6	11,2	8,0	0,6
7	Peas + blue mustard	98,1	15	88	74,5	4,5	8,0	23,8	5,7	11,0	6,6	0,6
8	Peas + oil radish	98,5	15	88	76,7	4,6	8,2	24,0	5,8	11,0	6,7	0,6
Saviola variety												
1	Control (autumn plow)	92,2	19	82	62,5	3,3	19,1	51,2	13,2	22,9	13,6	1,5
2	Spring plow	88,6	20	83	56,0	3,0	24,3	60,3	16,4	25,3	16,5	2,1
3	Rapeseed	97,8	16	87	69,5	4,3	7,7	24,1	6,0	10,7	6,9	0,5
4	Radish with oil	96,3	16	87	68,6	4,2	8,8	29,6	8,1	12,3	8,6	0,6
5	Barley	95,9	16	86	67,6	4,1	10,5	33,8	9,7	13,1	10,0	1,0
6	Peas	98,6	15	89	78,1	4,5	8,7	26,4	6,6	11,2	8,0	0,6

7	Peas + blue mustard	98,1	15	88	74,2	4,3	8,0	23,9	5,7	11,0	6,6	0,6
8	Peas + oil radish	98,5	15	88	76,5	4,4	8,2	24,1	5,8	11,0	6,7	0,6
Durable-3 (Bardoshli-3) variety												
1	Control (autumn plow)	91,7	20	81	60,3	3,2	19,0	51,1	13,2	22,9	13,5	1,5
2	Spring plow	88,5	21	82	55,6	3,0	24,3	60,2	16,3	25,3	16,5	2,1
3	Rapeseed	97,5	16	86	68,3	4,2	7,6	23,7	5,7	10,7	6,8	0,5
4	Radish with oil	96,1	16	86	67,9	4,1	8,7	29,1	7,9	12,1	8,5	0,6
5	Barley	95,7	16	85	66,8	3,8	10,4	33,5	9,5	13,1	9,9	1,0
6	Peas	98,6	15	88	75,3	4,5	8,5	26,3	6,5	11,2	8,0	0,6
7	Peas + blue mustard	98,0	15	87	69,7	4,3	7,8	23,3	5,3	11,0	6,4	0,6
8	Peas + oil radish	98,5	15	87	71,5	4,4	8,0	23,8	5,6	11,1	6,5	0,6

CONCLUSIONS:

1. In the conditions of the typical gray soils that have been irrigated since ancient times in the Kashkadarya region, during the summer and autumn seasons, when planting rapeseed, oil radish, barley, sorghum and sorghum + blue mustard, sorghum + oil radish in a mixture, the biomass yield per hectare: in autumn: 19.3-30,2 tons, in spring it was 22.1-35.1 tons. The highest biomass yield was obtained in both periods when oil radish was planted for siderate pure, gorox+mustard and gorox+oil radish mixed. Compared to summer siderates, it was found that the biomass yield of autumn siderate crops is higher by 3.7-4.9 tons per hectare.

2. When rapeseed, oil radish, barley, sorghum and blue mustard are planted in the autumn period, and rapeseed and blue mustard siderate crops are planted in the summer period, seed yield per hectare: in autumn rapeseed - 22.7-24.3, in autumn blue mustard - 17.8 -19.6, oil radish-22.0-23.5, gorox-26.7-28.5, autumn barley-83.0-85.0 centner, spring rapeseed-15.5-16.7; in blue mustard was 13.5-14.5 ts/ha. Rapeseed and blue mustard provided an additional 7.2-7.6 and 4.3-5.1 centners of seed yield when planted in the autumn period compared to the spring period.

3. After the application of autumn and summer siderates, all varieties of tested potatoes showed high field germination, germination rate, growth and development of seed pods, especially when used in a mixture of gorox, gorox+blue mustard and gorox+oily radish potatoes. Kuvonch-1656 m, medium speed It has been proven that the field fertility of seed pods of Bahro-30, Sante, Condor, Arizona, Saviola and Bardoshli-3 varieties increases by 2.7-3.5%, they germinate 3-5 days earlier, and the growth period is extended by 3-10 days.

4. When siderate crops are used, the growth and development of medium-tezpishar varieties is faster compared to potato tezpishar varieties, tall (67.2-83.6 or 7.1-16.4 cm in length), pedunculate (4.2-5.7 or 1, 1-1.8 pieces more), a wide leaf surface (69.6-72.1 or 19.9-21.3 thousand m² more),

strong palak (404.4-495.3 grams) and formed a root system. As a result, it was found out that the yield of these varieties was 617.5-998.8 grams of buds, the number of buds was 6.7-11.2, and the average weight of one bud was 76.2-93.1 grams.

5. The seed tubers of potato varieties grown after the use of sorghum, rapeseed, sorghum+blue mustard and sorghum+oily radish as a siderate crop in potato cultivation achieved 95.8-98.6% field fertility when planted as a double crop, 3-6 days before germination, extension of the period of the growing season to 6-8 days, the plant is 9.8-15.6 centimeters long, the stem is 1.4-2.0 more than one bush, the plant is affected by viral diseases (open: 7.6-8, 8, secretly: by 23.3-26.7%), it was found that the incidence of disease is sharply reduced, and seed quality improves. Especially in the autumn period, it was observed that the damage of plants and tubers by viral diseases was significantly reduced when rapeseed, sorghum, and oil radish were planted in pure form and mixed with sorghum + blue mustard, sorghum + oil radish. Then it increased from 21.5 to 31.0 tons per hectare and provided a healthy (the weight of the tubers is less than 3.3-4.1%) and high-quality harvest.

REFERENCES:

1. Gorelov E.P., Oripov R.O. Green manure in the fight against weed fields. // J. Agriculture of Uzbekistan. - 1972.- No. 8.- P.15-17.
2. Oripov R.O. Phytosanitary and bioenergy value of catch crops.- T.: - 1988.-S. 50.
3. Kholikov B.M. Re-crops and soil fertility. // J. of agriculture Uzbekistan. - T. : - 2004. - No. 5. - P.42.
4. Berdnikov A.M., Kosyanchuk V.R. Cultivation of potatoes using green manure. // J. Agriculture. - M.: - 1999. - No. 4. - P.26.
5. Whistle V.N., Marukhlenko A.V. When plowing siderates, the yield and quality of potatoes increase. // J. Potatoes and vegetables. - 2010. - No. 4. - P.16-17.
1. 8. Grishin S.A., Brysozovsky I.I. The combined application of green manures and mineral fertilizers increases the profitability of the industry. // J. Potatoes and vegetables. - 2010. - No. 1. - P.6-7.
6. Terekhov I.V. Siderata are effective. // J. Potatoes and vegetables. - 2015. - No. 7. - P.33-34.
7. Dospekhov B.A. Field experiment technique. - M. : "Agropromizdat". - 1985. - S. 351.
8. Алиева, М. (2020). Хизмат кўрсатиш соҳаси тармоқларини ривожлантириш истиқболари. *Архив научных исследований*, (13).\
9. Алиева, М. Т. (1994). Развитие и размещение отраслей по переработке шерсти Узбекистана.
10. Алиева, М. (2020). Harvard Journal of Fundamental and Applied Studies. *Архив научных исследований*, (12).
11. Akramovna, O. N. (2021). Scientific basis for increasing the efficiency of cultivation of crops on the lands of farms and the population. *ACADEMICIA: AN INTERNATIONAL MULTIDISCIPLINARY RESEARCH JOURNAL*, 11(2), 1297-1304.
12. Ochilova, N. A. ECONOMIC PERFORMANCE OF DEHKAN FARMS IN KASHKADARYA REGION. GWALIOR MANAGEMENT ACADEMY, 117.

13. Akramovna, O. N. (2021). Management of Farming and Horticulture and their Economic Efficiency. Academic Journal of Digital Economics and Stability, 582-586.