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## INFLUENCE OF VARIOUS SIDERATE CROPS ON ELEMENTS OF SOIL FERTILITY AND YIELD OF POTATO VARIETIES

**Abstract:** The purpose of the research is to study the influence of various siderate crops on the growth, development, yield formation, yield and seed quality of potato varieties, as well as soil fertility elements, and on their basis the selection of the best siderate and varieties, allowing to obtain a stable high healthy seed potato.

In 2016-2019, studies were carried out on old-irrigated medium loamy typical gray-earth soils with a groundwater table of 6-8 m. The soils were characterized by favorable agrophysical properties and a low content of humus, nitrate nitrogen, mobile phosphorus, and an average content of exchange potassium. Studied medium early varieties - Sante, Kondor, Arizona, Saviola and Bardoshli-3 on the following winter green manures - rape, oil radish, barley, peas, gray mustard and peas + oil radish. Winter plowing was used as a control. The highest yield is determined by growth (plant height 71.6-219.6 cm), development (density of bushes 103.4-556.2 pieces per 1 m<sup>2</sup>), biomass yield (19.3-35.1 t / ha) and seeds (rape - 22.7-24.3 c / ha, gray mustard - 17.8-19.6 c / ha, oil radish - 22.0-23.5 c / ha, peas - 26.7- 28.6 c / ha, barley - 83.0 - 85.1 c / ha) pure and mixed crops of green manure crops;

With these siderates, studied their influence on the mechanical components of the soil (in the arable layer the share of macro-aggregates is 13.4-25.9%, and of micro-aggregates 24.7-27.6%), physical (bulk density decreased by 1,23-1,31 g/cm<sup>3</sup>), and water properties (an increase in water permeability by 71.0-124.7 m<sup>3</sup>/ha), soil fertility (an increase in humus by 1.17-1.22%, nitrate-nitrogen - 12.38-33.56, mobile phosphorus - 31.37 -43.25, exchangeable potassium - 311.4-326.2 mg/kg of soil, the degree of weed infestation - 7.4-17.5% or not exceeding I and II points, an increase in the number of earthworms in 3.1- 6.3 times);

Potato plant development (the growing season lengthened to 4-8 days, 69.4-83.6 cm high; multi-stem 4.3-5.4 or more 1.1-1,6 pcs; powerful tops 404.4-495.3 g), formed not productive, healthy (yield of tubers 617.5-998.8 g, number of tubers - 6.7-11.2, average weight of one tuber - 76.2-93.1 grams) bushes and crops, yield (35.5-39.6 t/ha) and (marketable yield 29.1-39.1 t/ha, yield of seed tubers 21.2-29.2 t/ha, multiplication factor within 6.4-8.6) with high seed qualities of various varieties of potatoes;

When planting seed tubers of the studied potato varieties grown after the best siderates the growth, development, yield and seed qualities were studied after green manure crops, and when cultivated as a two-yield crop - field germination (95.8-98.6%) of seed tubers, productivity, plant infection (apparent: 7.6-8.8 latent: 23.3-26.7%) viruses and yield (21.5-31.0 t/ha, the proportion of degenerate tubers less than 3.3-4.1%) of early and mid-early potato varieties, promising medium-early varieties were identified and green manure crops for specific local conditions.

**Key words:** siderate crops, sideration, green fertilizers, biomass, growth and development, vegetation period, potato varieties, leaf surface area, productivity, yield of commodity and seed crops, reproduction coefficient, seed quality.

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### Introduction

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It is known that the use of green manure gives great opportunities in preserving and increasing soil fertility, which have a positive effect on the quantity and quality of the crop, especially on reducing the infection of seed potatoes with viruses.

The influence of green manure crops on soil fertility of crops, growth, development, infection of plants with weeds, diseases and productivity of cotton, grain and other crops [1,2,3,4], and in potato growing [5,6,7,8] have been studied.

However, the influence of summer and autumn green manure crops on the elements of soil fertility of crops, growth, development, yield formation, quantity and quality of the crop in the context of potato varieties has not been studied. In this regard, the purpose of the research is to study the influence of various green manure crops on the growth, development, yield formation, yield and seed qualities of potato varieties, as well as elements of soil fertility and, on their basis, the selection of the best green manure crops and varieties, allowing to obtain a stable high healthy seed yield. potatoes.

### Conditions, materials and research methods.

The studies were carried out in the conditions of old-irrigated typical sierozem soils of the Khisor farm in the Yakkabag district of the Kashkadarya region in 2016-2019. The mechanical composition of the soil is medium loamy, with the occurrence of groundwater 6-8 m. In the experimental plot, the humus content in the arable layer (0-30 cm) of the soil was 0.093-1.15%, the bulk density was 1.27-1.31 g/cm<sup>3</sup>, and specific gravity - 2.6-2.9 g/cm<sup>3</sup>, total nitrogen - 0.057-0.093%, phosphorus - 0.144-0.163%, potassium - 2.6-2.9%, nitrate nitrogen - 5.14-6, 51 mg/kg, mobile phosphorus - 17-27 mg/kg and exchangeable potassium - 287-307 mg/kg.

**The objects** of the study are old-irrigated typical sierozem soils of the Kashkadarya region, autumn rapeseed - varieties Nemerchansky-2268; oil radish - Raduga varieties; barley - Temur varieties; peas (green peas) - Vostok-55 varieties; gray mustard - Yubileynaya varieties, early ripening potato varieties of medium-ripening varieties Bardoshli-3, Sante, Kondor, Arizona and Saviola.

For these potato varieties, the following green manure crops were studied:

#### Winter green manure (spring green manure):

1. Winter plowing (control); 2. Spring plowing; 3. Rape - variety Nemerchansky-2268; 4. Oil radish - grade Rainbow; 5. Barley - Timur variety; 6. Peas - grade Vostok-55; 7. Gray mustard - grade Jubilee; 8. Peas + oil radish.

The area of the plot for green manure is 224 m<sup>2</sup>, and for varieties it is 14 m<sup>2</sup>, the experiment was repeated three to four times. Sowing of green manure

crops was carried out in the fall of October 14-19, seeding rates: rapeseed - 16.0; barley - 160; peas - 70; mustard gray - 14.0; oil radish - 20.0 kg/ha, and with the combined sowing of crops, the rate was taken in half. Fertilizers were applied at the rate of N<sub>30</sub>P<sub>100</sub>K<sub>60</sub> kg/ha. After sowing winter green manures 2 times - in autumn and spring with a rate of 450-500 m<sup>3</sup>/ha.

In winter green manure crops, 10-12 days before planting potatoes, and in summer green manure crops in late autumn, the yield was determined during the period of mass flowering or heading, then with the help of the KIR-1.5 unit, they were crushed, discarded and plowed to a depth of 28-30 cm.

In the experiments, all counts, analyzes, observations and activities were carried out on the basis of generally accepted methods and agricultural recommendations [9, 10].

### Research results.

The biomass yield of summer green manure crops was 19.3-30.2 t/ha. The highest biomass yield (29.3-30.2 t/ha) was obtained from the siderata oil radish and pea+oil radish. In winter green manure crops, the biomass yield by species was 22.1-35.1 t/ha. The highest biomass yield (35.1 t/ha) was observed in the siderata oil radish, a relatively high yield (29.6-32.3 t/ha) when sowing peas+oil radish.

When sown in autumn as green manure crops, the mixture of peas+oil radish > 0.25 mm (0-30 cm) was 19.8-25.9%, or 8.2-13.0% higher than the control variant. When sowing peas, gray mustard in its pure form amounted to 18.3-25.3%, which is more than the control by 6.7-12.4%.

After various autumn green manure crops were also studied in medium early potato varieties Sante, Kondor, Arizona, Saviola and Bardoshli-3, in which it was observed that during the growing season of potato varieties before the first watering when sowing peas+oil radish as a siderata was provided in the arable layer (0-20 and 20-30 cm) with a bulk density of 1.23 and 1.27 g/cm<sup>3</sup>, or its decrease in comparison with the control (autumn plowing) by 0.05 and 0.07 g/cm<sup>3</sup>.

When sowing peas and gray mustard in pure form as a green manure before the first watering, in potato varieties during the period of growth in the arable layer (0-20 and 20-30 cm), a volumetric mass of 1.24 and 1.28 g/cm<sup>3</sup> was revealed, which shows a decrease in comparison with autumn plowing by 0.04 and 0.06 g/cm<sup>3</sup>.

When used as green manure peas+oil radish before the last irrigation during the period of growth in the arable layer, the bulk density was 1.24 and 1.28 g/cm<sup>3</sup>, which provided the greatest decrease by 0.06 and 0.07 g/cm<sup>3</sup> in comparison with control. In the autumn, when sowing peas and gray mustard as green manure in pure form according to potato varieties before the last irrigation in the arable layer, a decrease in volumetric mass of 1.25 and 1.29 or 0.05 and 0.06 g/cm<sup>3</sup> ha was revealed.

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In the summer and autumn periods, a mixture of peas+oil radish, gray mustard and peas as green manure provided the highest humus content (1.17-1.22 or 0.02-0.03%) when sown in its pure form. The C: N ratio was favorable when the green manure crops were sown with mixed crops and the humification of the crop was increased. The highest concentration of N-NO<sub>3</sub> (12.38-33.56 mg/kg) was observed when sowing peas as green manure, relatively high when sowing peas+oil radish - (12.35-31.54 mg/kg). The greatest accumulation of mobile phosphorus in the soil (31.37-43.25 mg/kg) was observed in the summer and autumn periods, when rapeseed and gray mustard were sown in pure form, peas+oil mustard. Autumn green manure significantly changed the amount of available phosphorus. An increase in N-NO<sub>3</sub> under the action of green manure increases the amount of available phosphorus. The amount of exchangeable potassium was brought to the maximum amount (311.4-326.2 mg/kg) when sowing rapeseed, gray mustard and peas+oil radish as green manure.

According to the data obtained, the germination of tubers of potato varieties in winter green manures was observed 11-15 days after planting, and the field germination of seed tubers was 99.2-99.9%. Compared to the control variants of green manure, germination was 3-4 days earlier, field germination of tubers - 2.8-3.2%, budding - 1-4 days, flowering - 1-5 days longer, the growing season was increased to 4- 8 days.

When studying winter green manures in potato varieties Sante and Kondor, in comparison with the control, the highest indicators were revealed when sowing peas as green manures - field germination of seed tubers is 3.4-3.5% higher, seedlings are earlier by 4 days, budding and flowering - 3 -5 days, the duration of the growing season is 7-8 days longer.

It was determined that, when using a mixture of peas+oil radish and mustard in pure form as green manure, that a relatively high field germination of seed tubers (99.6-99.8 or 3.4-3.5%), seedlings (15 or 4 days earlier), budding (34 or 4 days long) and flowering (17-18 or 3-4 days long), the length of the growing season (87-89 or 7 days long). This pattern was also observed in potato varieties Arizona, Saviola and Bardoshli-3 tested on winter green manure.

Studies of potatoes of medium early varieties Sante, Kondor, Arizona, Saviola and Bardoshli-3, studied in winter green manures, showed that the growth, development and formation of growth organs (stems, leaves and side shoots) on the 30th day of cultivation amounted to 37.6- 46.5 or higher 2.9-7.6 cm, the growing season for 40-70 days ranged from 48.5 to 83.6 or higher from 2.6 to 16.4 cm. The tallest plants in winter green manure were noted in varieties Arizona, Saviola and Bardoshli-3.

The tallest plants were observed after sowing as green peas in a pure form - compared to the control variant, the height of plants on the 30th day of the

growing season is 45.8-46.5 or 7.6 cm higher, in the following 40-70 the th days of the growing season are longer, that every 10 days of the growing season 80.5-83.6 or 16.2-16.4 cm, after sowing peas+oil radish and pure peas on the 30th day of the growing season by 5, 7-7.2 cm, on the 40-70 th days of the growing season 77.2-81.7 or 12.9-14.5 cm higher than compared to the control (autumn plowing).

The highest formation of leaves, stems and side shoots from one bush in potato varieties Arizona, Saviola and Bardoshli-3, studied on winter green manures, was observed in autumn when sowing peas (green peas) as a pure green manure, which is 40 the th day of growing season was from a bush: leaves 140.6-145.6 or more 17.3-19.0; stems 4.5-4.6 or 1.0-1.3; side shoots 3.3-3.6 or 1.1-1.2, then on the 70th day of growing season from the bush the number of leaves increases by 217.8-242.6 or 42.6-53.7, and side shoots up to 8.6-9.4 or 3.0-3.8 pcs.

When sowing in the form of green manure, a mixture of peas + oil radish and blue mustard in pure form on the 40th day of growing season by varieties compared with the control of leaves from a bush is 16.2-16.9 more pieces, stems 1.1-1.0 ; lateral shoots 0.9-1.2, then on the 50-70-day the leaves increased by 17.1-47.0; lateral shoots 2.2-3.4.

The leaf surface area per hectare was 70.6-71.6 thousand m<sup>2</sup> for medium-early varieties of potatoes Sante and Kondor in autumn when sowing peas (green peas) as green manure. It is noted that when peas are used in the form of green manure, the leaf surface area is 21.3-21.8 thousand m<sup>2</sup>/ha higher than the control.

The potatoes studied on winter crops of green manure were found to have the highest leaf surface area on the 40-70th days of vegetation of plants of medium early potato varieties Arizona, Saviola and Bardoshli-3. When using the biomass of winter green manures, the leaf surface area by varieties was 67.8-72.1 thousand m<sup>2</sup>/ha, which is 17.5-21.3 thousand m<sup>2</sup>/ha more than the control. It was determined that the most in the leaf area (71.5-72.1 thousand m<sup>2</sup>/ha) when sowing peas in their pure form as green manure. When sowing a mixture of peas+oil radish and blue mustard in its pure form, the leaf surface area was 70.0-71.8 per hectare, or 19.7-21.0 thousand m<sup>2</sup>/ha more than the control. When using the biomass of winter green manures, the leaf surface area by varieties was 67.8-72.1 thousand m<sup>2</sup>/ha, which is 17.5-21.3 thousand m<sup>2</sup>/ha more than the control. It was determined that the most in the leaf area (71.5-72.1 thousand m<sup>2</sup>/ha) when sowing peas in their pure form as green manure. When sowing a mixture of peas+oil radish and blue mustard in its pure form, the leaf surface area was 70.0-71.8 per hectare, or 19.7-21.0 thousand m<sup>2</sup>/ha more than the control.

When studying the yield formation and potato productivity of medium early varieties Sante and Kondor after winter green manures, the productivity of tubers from one bush, the number of tubers and the

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average weight of one tuber were the highest when sowing peas as a green manure, which, compared with the control on the 60th day of the growing season, tubers per bush was 399.3-336.3 or 131.0-63.6, the average weight of one tuber was 76.7-74.7 or more by 18.4-11.3 g, the number of tubers was 5.2-4,5 or more by 0.6-0.2 pcs., These indicators increase by 70-80 days of the growth period in accordance with the law, in the last growing season (90 days) the number of tubers increased accordingly from the bush: 643.8 - 652.3 or 250.1-203.6, 78.5-93.1 or 8.0-17.1 g, 8.2-7.0 or 1.7-1.1 pcs.

After sowing a mixture of peas+oil radish and blue mustard in the form of green manure, which, compared with the control (autumn plowing), the potato varieties tested 60 days of growing tubers on one bush: the yield of tubers is 57.5-120 g, the number of tubers is 0,2-0.7 g, with an average tuber mass of more than 11.3-14.1 g, these indicators increase according to the law after 70-80 days, and in the last period of growth (90 days) from a bush: tuber yield 617.6 -627.1 or 223.9-178.4 grams, the number of tubers is 7.0-8.1 or 1.1-1.6 pieces, with an average tuber mass of 76.2-89.6 or 15.7-13.6 grams more. These patterns were also observed in potato varieties Arizona, Saviola, and Bardoshli-3, studied in winter green manures.

The productivity of potatoes of medium early varieties Sante and Kondor, studied in winter green manures, was the highest when sowing pure peas in the form of green manure (final yield 643.8-652.3 or 250.1-203.6 g). The greatest increase in bush weight was observed in medium-early potato varieties Arizona, Saviola and Bardoshli-3 grown on green manure crops, and on one bush relative to the control (autumn plowing): tops weight 450.5-495.3 or 161.0-197.7 , the final yield is 678.5-998.8 or 16.9-311.0 g, productivity per bush was 898.9-998.8 g. At the same time, it was obtained from one bush: 237.3-311.0 grams more than from the control (autumn plowing). When using mixed peas + oil radish and gray mustard in its pure form, according to potato varieties, it was obtained from one bush: the final yield was 876.5-988.7 g, which is 214.9-300.9 g more than in the control ( autumn plowing).

It was noted that the yield of medium early potato varieties Sante and Kondor, studied in winter

green manures, was the highest when using peas as green manure, and the yield was 32.3-35.8 tons per hectare or an additional yield of 8.8-11.5 tons. Relatively high yields of 30.7-32.8 t/ha were obtained by sowing a mixture of peas+oil radish and blue mustard in its pure form as green manure and an increase in yield was obtained by 7.2-8.5 t/ha more than in the control (autumn plowing).

The highest yield (35.5-39.6 t/ha) of mid-early potatoes varieties Arizona, Saviola and Bardoshli-3 was recorded when sowing peas as green manure with an additional yield of 7.6-11.4 t/ha or 127.2-140 ,4%. A relatively high yield (33.6-38.7 t/ha) was obtained when sowing a mixture of peas+oil radish and gray mustard as green manure.

In the studied potato varieties Sante and Kondor, after winter green manure, the marketable yield per hectare was 23.4-35.3 t or 93.2-98.6%, of which 15.5-25.7 t/ ha or 66.3- 72.8% seed.

The total yield of potato varieties Arizona, Saviola and Bardoshli-3, studied on winter green manure, was 29.1-39.1 t or 94.5-98.9% of the marketable yield, 19.6-29.2 t/ha or 67,6-74.8% of the marketable yield was seed, and the multiplication factor was 5.9-8.8. When studying peas as winter green manure varieties, the marketable yield was 38.0-39.1 per hectare; the yield of seed tubers is 28.3-29.2 tons, and the multiplication factor is 8.6-8.8% (table 3).

When using winter green manure crops, potato varieties showed a positive correlation between the yield and leaf area  $r = 0.797$  ( $R^2 = 0.6347$ ), between the yield and the average weight of one tuber per bush - a high degree  $r = 0.877$  ( $R^2 = 0.7689$ ), between marketable and seed yields (Picture 1) - a high degree  $r = 0.995$  ( $R^2 = 0.9910$ ).

When using the biomass of winter green manure crops for green manure, the highest field germination of tubers of medium early potato varieties Sante and Kondor was found to be 97.4-98.0% or 6.2-6.4% higher than the control variant (autumn plowing), the germination rate (16 or 3-4 days earlier), lengthening the growing season (86-87 or 6-7 days), tall (70.1-74.6 or 12.3-15.1 cm higher) and multi-stem plants (4.3 - 5.5 or more 1.0-2.0 pcs.), Which was obtained when planting potato tubers in conditions of sowing peas as green manure.

**Table 3. Productivity of the selected potato varieties after the use of the biomass of autumn green manure crops**

№	Name of green manure crops	Yield by years, t/ha			Average yield, t/ha	Compared to control	
		2017	2018	2019		t/ha	%
<b>The variety Arizona</b>							
1	Control (autumn plowing)	30,1	25,8	28,9	28,2	-	100,0
2	Spring plowing	27,9	24,4	25,6	25,9	-2,3	91,8



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3	Rape	33,7	33,8	34,5	34,0	5,8	120,5
4	Oil radish	33,0	33,2	34,1	33,4	5,2	118,4
5	Barley	32,1	32,3	33,0	32,4	4,2	114,9
6	Peas	37,9	39,7	41,4	39,6	11,4	140,4
7	Gray mustard	36,8	38,5	39,1	38,1	9,9	135,1
8	Peas+oil radish	37,2	39,0	40,1	38,7	10,5	137,2
	$S_x = (\%)$	<b>2,43</b>	<b>2,13</b>	<b>2,24</b>			
	<b>HCP<sub>0,5</sub> = (t/ha)</b>	<b>0,82</b>	<b>0,70</b>	<b>0,77</b>			
<b>The variety Saviola</b>							
1	Control (autumn plowing)	30,1	25,6	28,7	28,1	-	100,0
2	Spring plowing	27,8	24,3	25,5	25,8	-2,3	91,8
3	Rape	33,4	33,9	34,3	33,8	5,7	120,2
4	Oil radish	32,9	33,6	34,0	33,5	5,4	119,2
5	Barley	31,7	32,5	32,9	32,3	4,2	114,9
6	Peas	35,4	37,5	39,2	37,3	9,2	132,7
7	Gray mustard	34,6	36,5	37,0	36,0	7,9	128,1
8	Peas+oil radish	35,0	37,2	37,7	36,6	8,5	130,2
	$S_x = (\%)$	<b>2,18</b>	<b>2,57</b>	<b>2,87</b>			
	<b>HCP<sub>0,5</sub> = (т/га)</b>	<b>0,72</b>	<b>0,85</b>	<b>0,97</b>			
<b>The variety Bardoshli-3</b>							
1	Control (autumn plowing)	30,0	25,3	28,6	27,9	-	100,0
2	Spring plowing	27,6	24,1	25,4	25,7	-2,2	92,1
3	Rape	31,5	31,9	32,8	32,0	4,1	114,7
4	Oil radish	30,8	31,5	32,3	31,5	3,6	112,9
5	Barley	30,4	30,8	31,2	30,8	2,9	110,4
6	Peas	34,4	35,5	36,6	35,5	7,6	127,2
7	Gray mustard	32,3	33,8	34,7	33,6	5,7	120,4
8	Peas+oil radish	32,5	34,9	35,3	34,2	6,3	122,6
	$S_x = (\%)$	<b>2,69</b>	<b>3,47</b>	<b>4,35</b>			
	<b>HCP<sub>0,5</sub> = (т/га)</b>	<b>0,83</b>	<b>1,08</b>	<b>1,40</b>			

The smallest infection with viral diseases was observed when sowing seeds grown under conditions of using blue mustard, rapeseed in its pure form and a mixture of peas+oil radish as green manure, compared

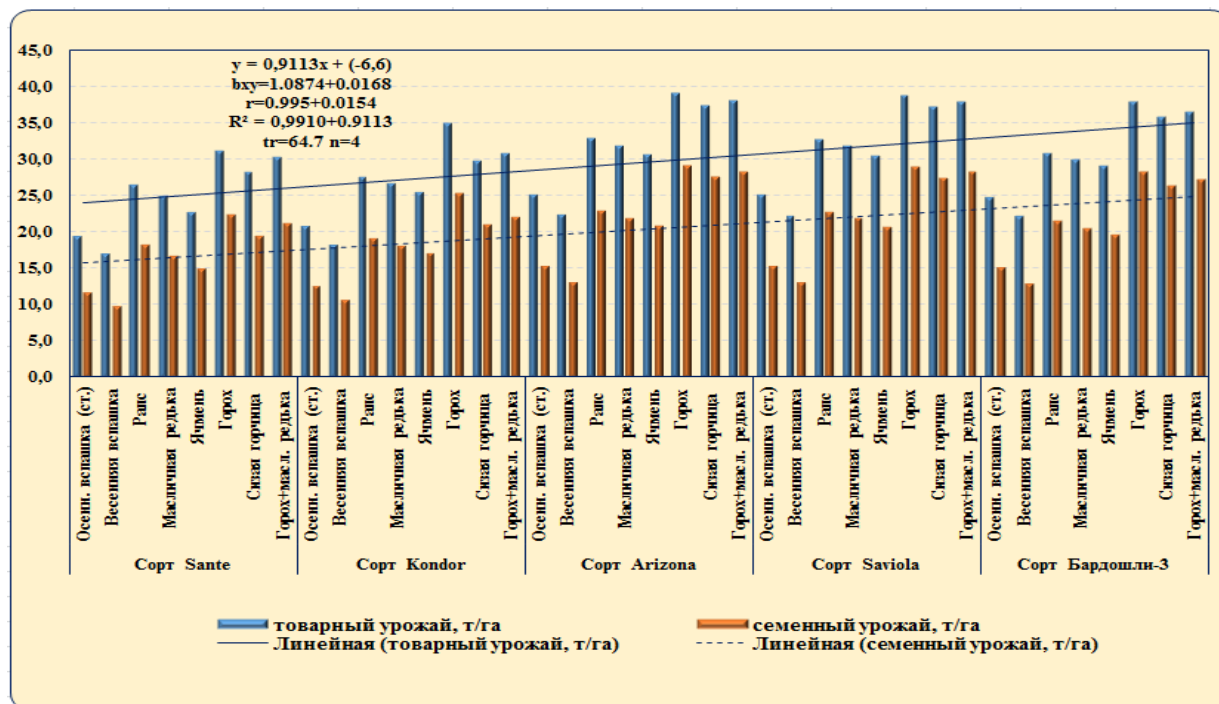
with the control (autumn plowing) by varieties decreased by 11.4-11.0% obvious, by 27.6-27.0 (including viruses X-7.8-7.1; S-12.2-11.8; Y-7.0-6.7; M- 1.0-0.9) percent of the latent form of morbidity.

## Impact Factor:

ISRA (India) = 6.317  
 ISI (Dubai, UAE) = 1.582  
 GIF (Australia) = 0.564  
 JIF = 1.500

SIS (USA) = 0.912  
 ПИИЦ (Russia) = 3.939  
 ESJI (KZ) = 9.035  
 SJIF (Morocco) = 7.184

ICV (Poland) = 6.630  
 PIF (India) = 1.940  
 IBI (India) = 4.260  
 OAJI (USA) = 0.350



Picture 1. Influence of winter green manure crops on the yield of commercial and seed tubers of potato varieties.

When planting seed tubers of medium early potato varieties Arizona, Saviola and Bardoshli-3 grown after winter green manure crops, on the 20th day after planting, field germination of tubers by varieties was 95.7-98.6% or 4.0-6, 4% higher compared to control, seedlings appear 4-5 days earlier, the growing season lengthened by 4-7 days, plant height is above 6.5-15.6 cm, the number of stems in the bush is more than 0.6-1.2 pcs., the viral incidence of plants and tubers: the explicit form decreased by 8.6-11.4%, and the latent 17.4-27.4% (of which viruses X-3.5-7.9; S-9, 8-12.1; U-3.6-7.1; M-0.5-1.0).

Potatoes grown under pea conditions as green manure crops have the highest field germination (98.6 or 6.4-6.9%) when sowing seed tubers of Arizona, Saviola and Bardoshli-3 varieties, seedlings appear 4-5 days earlier, the vegetation of plants is increased by 7 days, the height of plants is 75.3-78.1 or higher by 15.0-15.6 cm, there are 4.4-4.6 or 1.2 more stems in the bush, the infection of plants and tubers by viruses: a decrease in the apparent form by 8.5-8.7, hidden by 26.3-26.4% (of which viruses X-6.5-6.6; S-11.2; Y-8.0; M- 0.6).

The lowest incidence of viral diseases (explicitly: 7.6-8.0 or 11.1-11.3% less; hidden: 23.3-24.1 or 27.1-27.8% less, of which viruses: X-5.3-6.0; S-10.7-11.1; Y-6.4-6.9; M-0.5-0.6%) was observed after green manure cultures - rapeseed, gray mustard and a mixture of peas+oil radish. The same pattern was observed when sowing seed tubers of potato varieties Arizona, Saviola va Bardoshli-3 after winter green manure crops.

When planting a reproduction of seed tubers grown after winter green manure, in comparison with the control (autumn plowing), the marketable yield of the Arizona variety increased by 2.1-8.5 tons or 6.8-9.8% per hectare, the percentage of degenerate tubers decreased by 2, 3-3.8%.

The highest marketable yield (29.1-31.1 t / ha) and a relatively low proportion of degenerate tubers (2.0%) were observed when planting seed tubers after peas. A relatively high yield (26.9-29.7 t / ha) and the minimum share of degenerate (1.6-2.0%) tubers by varieties were recorded when planting seeds grown after blue mustard in pure form and a mixture of peas + oil radish as green manure crops.

## CONCLUSIONS

1. Under the conditions of old-irrigated typical sierozem soils of the Kashkadarya region, when studying the sowing of rapeseed, oil radish, barley, peas and blue mustard in a pure form, as well as a mixture of peas + oil radish as green manure crops in summer and autumn periods, the biomass yield per hectare was in autumn 19.3-30.2 tons, in spring 22.1-35.1 tons. The highest yield of biomass in both periods was obtained under the conditions of sowing oil-bearing radish in its pure form and a mixture of peas + oil-bearing radish. The biomass yield of winter green manures was 3.7-4.9 t/ha higher than summer green manures.

2. When using green manure crops, the growth and development of medium early varieties of potatoes occurs more intensively than in early

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	<b>GIF (Australia) = 0.564</b>	<b>ESJI (KZ) = 9.035</b>	<b>IBI (India) = 4.260</b>
	<b>JIF = 1.500</b>	<b>SJIF (Morocco) = 7.184</b>	<b>OAJI (USA) = 0.350</b>

ripening, forms a tall (69.4-83.6 or 10.2-16.4 cm high), multi-stem (4.3-5.4 or more 1.1-1.6 pcs.), Powerful tops (404.4-495.3 g) and a root system with a wide leaf surface (69.6-72.1 or more 19.9-21.3 thousand m<sup>2</sup>). As a result, the productivity of these varieties was 617.5-998.8 g per bush, the number of tubers - 6.7-11.2, the average weight of one tuber - 76.2-93.1 grams.

3. The highest yield (33.5-39.6 or 6.4-11.4 t/ha additionally), of which marketable yield 29.8-39.1 t/ha, seed tubers yield 21.2-29.2 t/ha, the multiplication factor in the range of 6.4-8.8 for medium early potato varieties Kondor, Arizona, Saviola and Bardoshli-3 was recorded using peas, gray mustard and a mixture of peas+oil radish as winter green manure crops.

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