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Advances in Agronomy, Plant Breeding and Horticulture

SHORT COMMUNICATION

Vol. 8 (2), pp. 25 - 27, March, 2020

Available online at
https://primescholarslibrary.org/

Developing biologically clean potato seed material

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Abstract

The article showed the results of raising the coefficient of tubers reproduction due to the thickness of the planting and mass of the seed material. It was found out that to raise the coefficient of potato tubers reproduction in the system of seed growing in the optimal fertilizing area of 70 × 15 m^2 and average mass of the planting tuber 30 to 50 g, it is purposeful to raise the thickness of the per hectare to 95,000 of plants.

Keywords: Potato, biochemical content, starch, protein, vitamin C, seed material, productivity, condor sort.

INTRODUCTION

The technology of growing potato seeds material have a lot of common elements and ways which are also used in growing food potato. But there are also some peculiarities (Bolotskih, 2002; Pisarev, 1985, 1982). For planting potato, it is very important to use tubers of the same size. The best fraction is considered to be the tubers with the mass of 50 to 80 g (2, 8219 ounces) (Badina et al., 1883; Zamotaev, 1989).

The objective of the current research was to study the growth of potato tubers reproduction coefficient that is, getting as many tubers from one plant as possible by studying the thickness of planting and the mass of the seed material.

MATERIALS AND METHODS

In 2004 to 2006, special experiments were carried out in sub-mountainous areas of Uzbekistan (Bakhmal region), 1200 m above the sea level. The soil of the experimental land-typical serozem soil is by mechanical composition-medium argillo-arenaceous (loamy). The depth of humus horizon is 20 to 25 cm; humus content, 1.2 to 1.7%; movable phosphorus, 31 to 45 mg/kg and exchange potassium, 205 to 300 mg/kg. For crops that are wheat and alfalfa, agrotechnology is generally used. Planting was carried out according to triple repetition on four-rowed field with the growing space of 70 × 15 cm; 70 × 25 cm (controlled); 70 × 35 cm; 90 × 15 cm; 90 × 25 cm; 90 × 35 cm. The area of the allotment was 56 m^2. The mass of the planting tubers were 30 to 50 and 60 to 80 g. During the period of vegetation, phonological observations, studies of the growing dynamics every ten days, picking and counting the crop according to the variants and repetition factors were carried out. The crop data was analyzed from mathematical point of view according to the method of using dispersion analysis. 8 to 10 days before planting, the seeding materials were treated with fungicides. Field experiments were carried out according to the methodology of Russian Scientific Research Institute of potato growing (1967, 1989). Medium early sort of potato condor was studied on the experimental lot (Dospekhov, 1985).

RESULTS

This research showed that the experimental variant of planting; 70 × 15 cm, when potato was gathered on October 10 to 12, medium productivity of a plant was about 456 g/plant, the number of tubers was 9.4, and when gathered later, on October 25 to 28, the medium productivity of a plant was 642 g while the number of tubers was 10.4, and in the controlled variant accordingly 485; 9.0; 676; 9.1. We found that the optimal terms of harvesting potato in sub-mountainous conditions of Uzbekistan are October 25 to 28 (Table 1).

Studying the effect of the crop material's mass on biochemical content of tubers showed that broadening the space between rows (90 cm) results in the growth of the starch to 0.5%. The total amount of starch from a hectare area depends on the yield of potato. Therefore with the optimal growing space of 70 × 15 cm, the total amount of the starch from the hectare area is 27.0% more in comparison to the space area of 70 × 25 cm. The content of water-soluble protein and ascorbic acid in tubers do not change essentially at different schemes of

Table 1. Productivity of condor sort of potato depending on the thickness of planting and tuber weight (2004 - 2006 years).

Plant growing space (cm/cm)	Weight of the planted tuber	Time of harvesting					
		October 10 - 12			October 25 - 28		
		Plant weight (g)		Tuber weight	Plant weight (g)		Tuber weight
		Top	Tuber		Top	Tuber	
70 x 15	30-50	275	456	9.4	345	642	10.4
70 x 25 (controlled)	60-80	280	485	9.0	320	646	9.1
70 x 35	60-80	288	496	8.0	300	650	8.2
90 x 15	60-80	280	365	9.1	300	345	9.0
90 x 25	60-80	295	397	8.2	305	356	8.4
90 x 35	60-80	306	567	7.8	327	380	7.9

Table 2. The effect of the crop material mass on the biochemical content of potato.

The pants' growing space (cm/cm)	The content of a tuber		
	Starch (%)	Protein (%)	Vitamin C mg/100 g (%)
70×15	13.8	1.4	16.6
70 × 25 (controlled)	13.7	1.4	16.8
70×35	13.9	1.5	16.9
90×15	14.0	1.5	17.8
90×25	14.1	1.5	17.9
90×35	14.2	1.6	17.9

planting (Table 2).

Crop capacity achieved by using 70 × 15 cm planting scheme became 26.1 t/h, and in the controlled variant 20.4 t/h, that is, when potato is planted more thickly, its crop capacity was to 5.7 t/h more. For potato seeds producing wide-lined planting (90 cm) in the intensive farming is not reasonable, as plants thickness of 40 to 50 t/h on irrigated lands do not provide the expected growth of the reproduction coefficient.

When cultivating potato with the growing space of 70 × 25 cm, the outcome of seed tubers from a hectare was 310,000 tubers, and with the thickness of plants 70 x 15 cm, the outcome of seed tubers was 405 thousand tubers, that is, to 95 tubers more.

When growing the seeds of elite potato using intensive technology with the growing space of 70 × 15 cm, the outcome of the goods seeds was 92%, the tubers reproduction coefficient was 24.1, and in the controlled variant accordingly, 94.0; 9.1.

Using the tubers of small fraction from 30 to 50 g for seeding purposes allows raising considerably the reproduction coefficient of seed material. The optimal growing space is 70 × 15 cm, with planting norm 4.5 tons/h, and the thickness of plants should be 95,000 plants (Table 3).

When growing seeds of elite potato sorts and in the initial potato seed farming, cutting the tubers into 2 to 4 parts allows raising the reproduction coefficient to 1.5 to 1.6 times without decreasing the quality indexes of seed material (Table 4).

Conclusion

Conclusively, in order to raise the reproduction coefficient of potato tubers in the system of seed growing with the optimal growing space of 70 x 15 cm, medium planting weight of the material; that is, 30 to 50 g thickness of plants per hectare must be 95,000. When using this technology the following year, 405,000 tubers of a high quality can be grown. The reproduction coefficient here is 24.1. To raise the coefficient of reproduction, bigger tubers should be cut into 2 to 4 parts, that is, the tubers with the mass of 80 to 100 g should be cut into two parts and the tubers with the mass of 120 to 150 g, into four parts.

These measures when done before planting the tubers also raise the reproduction coefficient of tubers to 1.5 to 3.6 times. In potato seeding, narrowing planting according to the scheme 70 x 15 cm does not have effect on the starch, protein and vitamin C content in tubers. However, when narrowing reaches 95,000 plants in a hectare, the gross amount of starch from a hectare is 27% more than the controlled variant.

Table 3. The influence of the seed material weight and growing space on the productivity and marketability of potato tubers.

Plant growing space (cm/cm)	Medium weight of the planted (g)	Planting norm (t/h)	Planting thickness (thousand items per hectare)	Outcome of tuber (thousand items per hectare)	Productivity (t/h)	Marketability (%)	Reproduction coefficient
70×15	30-50	5.0	95.2	405	26.1	92.6	24.1
70 × 25 (controlled)	60-80	3.1	57.1	310	20.4	93.0	15.2
70×35	60-80	2.5	40.8	160	18.0	94.0	9.1
90×15	60-80	4.0	74.0	226	19.2	93.0	18.6
90×25	60-80	3.0	44.0	191	13.5	94.2	11.1
90×35	60-80	2.0	35.0	119	12.0	94.6	5.6

Table 4. The influence of pre -planting cutting of bigger tubers on the development of plants and the reproduction coefficient of seeds material.

The variant of cutting tuber	Per plant			Per one whole tuber			
	The space of plant leaf (m^2/plant)	The height of the plant (cm)	The mass of the plant top (g)	Number of tuber (item)	Tuber weight (g)	Reproduction coefficient	
						items	g
Control –whole tuber	1.2	56	497	14.1	780	-	-
Into two parts	1.0	48	405	20.4	1460	1.5	1.6
Into four parts	0.8	42	348	48.7	2403	3.6	3.1

REFERENCES

Badina GV, Yablokov YN, Sinitsina SM (1883). Seed growing of field crops. - Leningrad: Kolo, p. 143.

Bolotskih AS (2002). Potato plant- Xarkov p. 250.

Dospekhov BA (1985). The methodology of field experiment. Moscow: Kolos, p. 271-282.

Pisarev BA (1985). Early-season variety of potato M. Agropromizdat, p. 34.

Pisarev BA, Trofimets LN (1982). Potato seed growing. M.: Rosselxozizdat, pp. 203 – 206.

Zamotaev AI (1989). Intensive technology in potato growing – M.: Rosagropromizdat, pp. 27 – 28.