Selection of High Productivity New Lines of Winter Chickpea

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Abstract:
Currently, the main part of the protein requirement of the human body is accounted for by peas and lentils, which are leguminous crops. In recent years, there have been many cases of seeds rotting without sprouting and plants dying due to severe damage caused by various diseases as a result of the planting of imported pea and lentil seeds by farms. It also leads to excessive costs as the cultivated pea and lentil stalks are not adapted to harvest by the machinery.

In the study, 20 winter chickpea genotypes were evaluated and selected under irrigated field conditions. Winter chickpea genotypes were determined by parameters such as growth period.

Keywords: winter chickpea, genotype, variety, line, growing season, maturity.

Introduction

Chickpea is a valuable leguminous plant used in the national economy for various purposes. Peas are mainly used as a food product. Light-colored varieties of peas are grown for food, and dark-grained varieties are grown as concentrates for animal husbandry [3, 6, 12].

Chickpea seeds are rich in protein, unlike other legumes. According to data, the grain of leguminous crops (dry matter) contains the following amount of protein: 27-28% in buckwheat, 28-30% in chechevitsa, 24-25% in beans, 38-41% in soybeans, and 18-32% in

peas. reported to be at most 32% protein and 8% fat [2, 8, 10, 14].

In the process of conversion of free molecular nitrogen from the air into organic nitrogen, the bacteria in the chickpea root collect at least 50 kg/ha from each hectare of the pea area and increase the fertility level of the land. This amount of organic nitrogen is equivalent to adding 10 t/ha of rotted manure to the ground. [1, 4, 9, 13].

Chickpea grain is distinguished by its delicacy. Chickpea protein contains unique amino acids such as lysine, arginine, histidine, tyrazine, cysteine, etc., which are very necessary for the body of humans and livestock. These amino acids cannot be synthesized by the body itself, so it is obtained through food [5, 7, 11, 15].

Materials and Methods

Field experiments were conducted in the experimental field of Guzor district branch and Kamashi district branch of Southern Agricultural Scientific Research Institute. Experiments in field conditions were conducted in the field experiment area of the Laboratory of Genetics and Breeding of Legumes. Experiments in laboratory conditions were carried out in the institute's "Laboratory of Plant Biochemistry and Evaluation of Quality Indicators" and "Laboratory of Organo-Mineral Fertilizers and Agrochemical Gross Analysis".

The experiment layout is based on Complete block design and Alpha lattice design of GenStat 13 software. Phenological observations, calculations and analyzes are carried out according to the method of the All-Union Plant Science Institute VIR, 1984, and biometric analyzes are carried out according to the methods of the Center for Testing Agricultural Crops (1985, 1989).

Results:

Currently, in the cultivation of winter chickpea varieties, selection of varieties suitable for harvesting with the help of mechanization and introduction into production remains one of the most urgent tasks. Because the main part of the grown crop is collected by manual labor. Therefore, when choosing varieties suitable for mechanized harvesting of winter chickpea, it is necessary to take into account the location of the lower pods and the length of the plant with the surface of the soil.

Table-1. Selection of varieties and lines of winter chickpea adapted to mechanization, Guzor-2022.

№	Name of genotypes	Plant height, cm				The location of the lower pods (relative to the soil surface), cm			
		Rep-1	Rep-2	Rep-3	Mean	Rep-1	Rep-2	Rep-3	Mean
1	**Obod (check)**	53.6	52.6	54.2	**53.5**	16.3	17.3	16.9	**16.8**
2	**Polvon (check)**	46.8	45.9	46.4	**46.4**	12.6	13.2	12.9	**12.9**
3	KR-20-LCAYT-RF-1	62.6	63.5	61.8	**62.6**	18.6	19.4	19.1	**19.0**
4	KR-20-LCAYT-RF-2	42.6	43.2	42.8	**42.9**	14.2	15.3	13.8	**14.4**
5	KR-20-LCAYT-RF-3	59.2	60.4	61.6	**60.4**	20.3	18.2	19.6	**19.4**
6	KR-20-LCAYT-RF-5	51.4	52.6	50.8	**51.6**	14.3	15.2	14.8	**14.8**
7	KR-20-LCAYT-RF-6	41.4	42.3	40.7	**41.5**	15.2	15.3	15.1	**15.2**

8	KR-20-LCAYT-RF-7	38.9	39.2	38.1	**38.7**	12.6	12.8	12.3	**12.6**
9	KR-20-LCAYT-RF-8	64.3	65.3	63.4	**64.3**	20.8	21.2	20.6	**20.9**
10	KR-20-LCAYT-RF-10	62.4	60.6	59.7	**60.9**	18.6	19.2	18.9	**18.9**
11	KR-20-LCAYT-RF-11	45.3	46.8	46.2	**46.1**	13.6	14.2	14.1	**14.0**
12	KR-20-LCAYT-RF-12	52.3	54.2	51.9	**52.8**	15.3	16.2	16.4	**16.0**
13	KR-20-LCAYT-RF-13	57.6	58.3	58.1	**58.0**	19.6	18.8	19.2	**19.2**
14	KR-20-LCAYT-RF-14	39.5	38.2	39.7	**39.1**	11.6	12.5	12.4	**12.2**
15	KR20-CICTN-01	44.3	45.2	45.8	**45.1**	15.6	16.2	15.8	**15.9**
16	KR20-CICTN-11	49.2	50.6	48.3	**49.4**	14.3	14.7	14.6	**14.5**
17	KR20-CICTN-17	60.4	60.8	60.7	**60.6**	18.9	19.2	18.8	**19.0**
18	KR20-CICTN-24	45.9	46.3	46.2	**46.1**	15.3	15.1	15.6	**15.3**
19	KR20-CICTN-33	53.6	52.4	51.7	**52.6**	18.3	19.2	19.6	**19.0**
20	KR20-CICTN-37	63.2	64.8	63.4	**63.8**	20.8	21.3	21.7	**21.3**
	Minimum				**38.7**				**12.2**
	Mean				**51.8**				**16.6**
	Maximum				**64.3**				**21.3**
	LSD				**1.31**				
	LSD %				**2.52**				
	CV %				**1.6**				

According to the results of the 3rd return, when analyzing the plant height of winter chickpea varieties and lines, it was found that the average height was 38.7-64.3 cm. The standard plant height was 53.5 cm in the Abad variety and 46.4 cm in the Polvon variety. According to the statistical mathematical analysis, it was observed that the plant height was higher in 7 lines. The height of the 7 lines selected according to the plant height indicator was 58.0-64.3 cm.

It was found that the distance between the lower pods and the soil surface of winter chickpea varieties and lines was in the range of 12.2-21.3 cm. It was found that the lower pods were located at a distance of 16.8 cm from the soil surface in the case of the Obad variety and 12.9 cm in the Polvon variety. It was found that there were 8 lines with higher performance than the model varieties.

7 lines with a high plant height and a large distance of the lower pods from the soil surface were selected and used for breeding to create new varieties adapted to mechanization.

Table-2. Productivity indicators of winter chickpea varieties and lines, Guzor-2022.

№	Name of genotypes	The number of pods per plant, pcs				The number of grains per plant, pcs	TKW, g
		1 grains	2 grains	3 grains	Total		
1	**Obod (check)**	28	4	1	33	39	322.6
2	**Polvon (check)**	27	2	0	29	31	362.4
3	KR-20-LCAYT-RF-1	35	3	1	39	45	357.5
4	KR-20-LCAYT-RF-2	25	2	0	27	30	320.8
5	KR-20-LCAYT-RF-3	36	5	1	42	49	370.1
6	KR-20-LCAYT-RF-5	33	5	0	38	42	295.3
7	KR-20-LCAYT-RF-6	27	2	0	29	32	283.4
8	KR-20-LCAYT-RF-7	34	4	0	38	43	266.1

9	KR-20-LCAYT-RF-8	35	3	2	40	46	345.6
10	KR-20-LCAYT-RF-10	39	4	1	43	48	365.9
11	KR-20-LCAYT-RF-11	32	3	1	35	39	310.8
12	KR-20-LCAYT-RF-12	30	1	0	31	33	272.1
13	KR-20-LCAYT-RF-13	35	4	0	39	44	348.1
14	KR-20-LCAYT-RF-14	27	1	1	29	32	319.3
15	KR20-CICTN-01	36	2	0	38	41	292.4
16	KR20-CICTN-11	38	3	1	42	47	272.0
17	KR20-CICTN-17	41	4	0	45	49	356.1
18	KR20-CICTN-24	26	4	0	30	35	267.2
19	KR20-CICTN-33	28	4	0	32	36	303.2
20	KR20-CICTN-37	46	3	0	49	51	362.9
	Minimum	**25**	**1**	**0**	**27**	**30**	**266.1**
	Mean	**33**	**3**	**1**	**37**	**41**	**319.7**
	Maximum	**46**	**5**	**2**	**49**	**51**	**370.1**
	LSD					**2.02**	**3.37**
	LSD %					**4.97**	**1.05**
	CV %					**3.1**	**0.7**

The number of pods per bush and the number of grains in pods and the number of grains per bush are particularly important for increasing productivity. The average number of pods per plant in 20 varieties and varieties of winter chickpea studied was from 27 to 49 pieces. The number of pods in one plant was 33 in the model Abad variety and 29 in the Polvan variety. It was found that there were 12 lines with higher number of pods than the model cultivars.

When the number of grains per plant was studied, it was noted that it was in the range of 30-51. It was found that there are 11 lines where the number of grains per plant is higher than that of the model varieties.

The weight of 1000 grains of winter chickpea varieties and rows is the main indicator of high productivity. According to the demand of the population, there is a great need for large grain pea grains.

It was noted that the weight of 1000 grains of 20 varieties and varieties of winter chickpeas was in the range of 266.1-370.1 g. The weight of 1000 grains was 322.6 g in the Andoza Obad variety, while this indicator was found to be higher in 8 varieties and lines.

The main indicator of all agricultural crops is productivity. All other indicators serve for selection aimed at increasing productivity.

In the framework of the study, it was found that the yield indicators of winter chickpea varieties and rows were in the range of 12.9-26.1 ts/ha. Productivity was 18.1 t/ha in model Abad variety and 15.9 t/ha in Polvon variety, and it was found that the productivity in 7 lines is superior to model varieties.

Conclusions:

Among the 20 varieties and lines studied in the nursery of winter chickpea competition in irrigated fields, 3-4 days earlier compared to standard varieties, adapted to mechanization, plant height 58.0-64.3 cm, weight of 1000 grains 345.6-370.1 g, 7 lines with high photosynthetic productivity with yield of 21.1-26.1 t/ha, protein content of 27.7-29.3%

were selected. Obikor (KR20-CICTN-37) variety, which is early-early, fruitful, adapted to mechanization, has high photosynthetic productivity, and its indicators are higher than standard varieties, was selected in the competitive variety testing nursery, and it was recommended to submit it to the Agricultural Crops Variety Testing Center.

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