GALAXY INTERNATIONAL INTERDISCIPLINARY RESEARCH JOURNAL (GIIRJ)
ISSN (E): 2347-6915
Vol. 11, Issue 12, December (2023)

STUDY OF YIELD AND PHOTOSYNTHETIC PRODUCTIVITY OF CHICKPEA VARIETIES AND LINES

Dilmurodov Sherzod Dilmurodovich [1],
Senior Researcher (PhD),

Kayumov Norboy Shakirjonovich [1]
Junior Researcher, ,

Boysunov Nurzod Bekmurodovich [1],
Doctor of Philosophy (PhD),

Abdimajidov Jaloliddin Raxmatulla ugli [1],
Junior Researcher,

Shodiev Sherzod Shomiljon ugli[1],
Junior Researcher,

Juraev Husniddin Madatovich[2],
Master Student,

[1]Southern Research Institute of Agriculture, 180100,
Karshi city, Kashkadarya Region, Uzbekistan.
[2]Tashkent State Agrarian University
Email: s.dilmurodov@mail.ru, tel: +998 97 229 26 62,

ABSTRACT

Currently, the main part of the protein requirement of the human body is accounted for by the pea crop, which is a leguminous crop. In recent years, there have been many cases of the seeds rotting without sprouting as a result of the planting of pea seeds imported by farms, and the plants dying due to severe damage by various diseases. It also leads to excessive costs as the cultivated pea plants are not adapted to harvest by the machinery. Due to the fact that it is not possible to collect the crop in a short period of time with the help of manual labor, the cultivated crop is spilled and the destruction occurs. Therefore, it is the best way for all pea-growing farmers, peasants and owners of private homesteads to choose only varieties adapted to the soil and climatic conditions of our republic, resistant to diseases, resistant to abiotic factors, high-yielding and with high grain quality.

Keywords: winter chickpea, genotype, variety, line, yield, productivity, chlorophyll, green biomass.

INTRODUCTION

Currently, the average area of peas is 20,000 hectares. New varieties of chickpeas for irrigated lands have been created and agrotechnologies for growing 22-28 ts/ha of abundant crops have been developed and are being widely implemented in farms. [2, 3, 5, 8].

The seed is elongated, nose-shaped, round, with clearly visible sharp corners, reminiscent of a sheep's head with bent horns. The color of the seed is very diverse, but most often it is yellow-pink, orange, light red, yellow-white, rarely black, brown, dark purple, red-gold. 1000 grains are from 60 to 600 g in different varieties [1, 4].

Usually large grain peas have taller stalks and a longer growing season. Low-growing peas with fine grains are distinguished by their early ripening. Pea is a typical self-pollinating plant. The flower opens after pollination in the bud. The peduncle is straight during flowering, bends down when the flower begins to fade, and remains so until the fruit ripens. The first flower is formed at the bottom of the main stem, and after six to seven days, flowers also open on the side branches. The flowering period of one plant usually lasts 20-30 days [6, 9, 12, 15].

In the flat hills of the Lalmikor zone, the flowering period of the Milyutinsky-4 variety ends in 19-25 days, in irrigated lands, this period extends to 25-30 days. It takes three days from budding to full bloom. After pollination, the bud opens and remains in this state for 12 hours. Two to three weeks after pollination, the size of the pod is equal to the mature grain of this variety. On cloudy and rainy days, the plant is not well pollinated, the opposite is true when the weather is open, dry and hot [7, 10, 11, 13, 14].

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

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.

Table-1. Yield and protein content of winter chickpea varieties and lines, Guzor-2022.

№	Name of genotypes	Grain yield, c/ha				Protein content, %
		Rep-1	Rep-2	Rep-3	Mean	
1	**Obod (check)**	18.2	18.8	17.4	**18.1**	26.7
2	**Polvon (check)**	15.3	16.4	15.9	**15.9**	24.2
3	KR-20-LCAYT-RF-1	22.2	23.1	23.7	**23.0**	29.1
4	KR-20-LCAYT-RF-2	13.6	14.2	14.5	**14.1**	22.3
5	KR-20-LCAYT-RF-3	25.4	26.3	25.9	**25.9**	27.7
6	KR-20-LCAYT-RF-5	17.2	18.4	17.6	**17.7**	24.3
7	KR-20-LCAYT-RF-6	13.5	12.8	12.4	**12.9**	22.2
8	KR-20-LCAYT-RF-7	15.3	16.4	15.8	**15.8**	25.9
9	KR-20-LCAYT-RF-8	22.6	21.8	21.6	**22.0**	29.0
10	KR-20-LCAYT-RF-10	24.3	25.1	24.7	**24.7**	28.5
11	KR-20-LCAYT-RF-11	17.4	17.3	18.2	**17.6**	25.5
12	KR-20-LCAYT-RF-12	12.7	13.8	13.4	**13.3**	23.9
13	KR-20-LCAYT-RF-13	20.8	21.6	20.9	**21.1**	29.1
14	KR-20-LCAYT-RF-14	14.8	14.2	14.6	**14.5**	26.7
15	KR20-CICTN-01	16.2	15.9	16.1	**16.1**	21.9
16	KR20-CICTN-11	18.3	18.4	17.6	**18.1**	24.4
17	KR20-CICTN-17	24.8	25.6	25.3	**25.2**	29.3
18	KR20-CICTN-24	13.8	13.2	12.8	**13.3**	25.8
19	KR20-CICTN-33	15.2	15.6	16.1	**15.6**	24.7
20	KR20-CICTN-37	26.3	26.1	25.8	**26.1**	28.1
	Minimum				**12.9**	**21.9**
	Mean				**18.6**	**26.0**
	Maximum				**26.1**	**29.3**
	LSD				**0.77**	**0.57**
	LSD %				**4.14**	**2.18**
	CV %				**2.6**	**1.3**

When studying the correlative relationship of productivity with other indicators, there is a negative correlation with the vegetation period of r=-0.69; r=0.88 with the number of pods per plant; r=0.89 with the number of grains in one plant; r=0.79 with a weight of 1000 grains; it was found that there is a strong positive correlation with the amount of protein, r=0.79.

It was found that the protein content of the grain of winter chickpeas was in the range of 21.9-29.3 percent. It was noted that the amount of protein was 26.7% in the sample Abad variety and 24.2% in the Polvan variety. It was found that there are 7 lines in which the protein content of the grain is superior to the model varieties.

In order to evaluate the photosynthetic productivity of winter chickpea cultivars and lines, the amount of green biomass was estimated using the GreenSeeker tool in 3 development phases. In this case, the device evaluates the degree of greenness of varieties and lines and the coverage of the earth with leaves using infrared rays. It was found that the amount of green biomass of winter chickpea varieties and lines was 0.244-0.312 in the budding phase, 0.275-0.375 in the flowering phase, and 0.456-0.618 in the podding phase. It was noted that there were 10 lines with higher green biomass content than the model cultivars.

Table-2. Selection of varieties and lines of high photosynthetic productivity of winter chickpea, Guzor-2022.

№	Name of genotypes	Grain yield, c/ha	Level of greenness, NDVI			Chlorophyll content		
			Budding date	Flowering date	Podding date	Budding date	Flowering date	Podding date
1	**Obod (check)**	18.1	0.258	0.318	0.527	32.9	43.2	50.8
2	**Polvon (check)**	15.9	0.245	0.296	0.456	29.2	38.8	44.5
3	KR-20-LCAYT-RF-1	23.0	0.294	0.361	0.590	32.9	45.8	53.8
4	KR-20-LCAYT-RF-2	14.1	0.230	0.287	0.494	26.1	37.0	45.9
5	KR-20-LCAYT-RF-3	25.9	0.308	0.375	0.603	34.9	42.0	49.0
6	KR-20-LCAYT-RF-5	17.7	0.261	0.314	0.526	30.9	36.5	44.0
7	KR-20-LCAYT-RF-6	12.9	0.280	0.303	0.504	33.0	39.4	46.6
8	KR-20-LCAYT-RF-7	15.8	0.234	0.284	0.474	28.4	40.1	45.6
9	KR-20-LCAYT-RF-8	22.0	0.294	0.346	0.574	35.9	46.1	55.1
10	KR-20-LCAYT-RF-10	24.7	0.312	0.368	0.590	33.0	43.4	51.3
11	KR-20-LCAYT-RF-11	17.6	0.263	0.320	0.525	27.7	36.5	43.2
12	KR-20-LCAYT-RF-12	13.3	0.236	0.275	0.479	29.7	36.0	44.4
13	KR-20-LCAYT-RF-13	21.1	0.288	0.357	0.580	34.9	41.6	47.9
14	KR-20-LCAYT-RF-14	14.5	0.254	0.288	0.537	30.8	37.4	45.9
15	KR20-CICTN-01	16.1	0.246	0.296	0.488	26.8	34.5	42.9
16	KR20-CICTN-11	18.1	0.291	0.334	0.545	32.8	38.1	45.7
17	KR20-CICTN-17	25.2	0.305	0.374	0.618	36.3	43.2	52.9
18	KR20-CICTN-24	13.3	0.257	0.296	0.534	27.2	35.7	45.1
19	KR20-CICTN-33	15.6	0.224	0.285	0.493	29.4	37.0	44.4
20	KR20-CICTN-37	26.1	0.296	0.352	0.610	33.5	40.8	48.2
	Minimum	**12.9**	**0.224**	**0.275**	**0.456**	**26.1**	**34.5**	**42.9**
	Mean	**18.6**	**0.269**	**0.321**	**0.537**	**31.3**	**39.7**	**47.4**
	Maximum	**26.1**	**0.312**	**0.375**	**0.618**	**36.3**	**46.1**	**55.1**
	LSD	**0.77**						
	LSD %	**4.14**						
	CV %	**2.6**						

It was found that the correlative relationship between the amount of green biomass and the yield is strongly positive, r=0.83 in the budding phase, r=0.94 in the flowering phase, and r=0.88 in the podding phase.

The amount of chlorophyll in the leaves of the varieties and lines was 26.1-36.3% in the budding phase, 34.5-46.1% in the flowering phase, and 42.9-55.1% in the podding phase. 8 varieties and lines with high chlorophyll content in leaves were found to have high photosynthetic productivity.

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.

REFERENCES

1. Amanov, O. A., Otakulova, D. A., & Kayumov, N. S. (2021). Study of chickpea lines in rainfed areas on the basis of yield and grain quality traits. In Наука, Образование, Общество: Актуальные Вопросы, Достижения и Инновации (pp. 34-36).
2. Amirkulov, O. S., Ziyadov, E. O., & Kayumov, N. S. (2021). Selection of chickpea lines in rainfed areas on the basis of yield and protein content traits. In Наука, образование, инновации: актуальные вопросы и современные аспекты (pp. 63-65).
3. Dilmurodov, S., & Kayumov, N. (2022). Selection of productive lines of winter chickpea for dryland areas. Theoretical aspects in the formation of pedagogical sciences, 1(1), 27-31.
4. Kayumov, N. S. (2021). Selection of drought resistant lines of chicckpea for rainfed areas with low rainfall. In Наука, образование, инновации: актуальные вопросы и современные аспекты (pp. 59-62).
5. Kayumov, N. S., & Dilmurodov, S. D. (2020). Selection of heat and drought tolerant varieties and lines of chickpea for rainfed areas. In Высокие технологии, наука и образование: актуальные вопросы, достижения и инновации (pp. 129-131).
6. Shakirjanovich, K. N., & Dilmurodovich, D. S. (2021). Analysis of yield and protein content of drought-resistant chickpea lines for rainfed areas. International journal of discourse on innovation, integration and education, 2(1), 108-111.
7. Shakirjonovich, K. N. (2023, January). Field study of heat and drought resistance of chickpea varieties and samples in rainfried areas southern institute of agricultural scientific research. In Proceedings of International Conference on Modern Science and Scientific Studies (Vol. 2, No. 1, pp. 4-7).
8. Shakirjonovich, K. N., & Dilmuradovich, D. S. (2023). Productivity, Grain Quality Indicator and Continuity of the Growth Period of Chickpea Varieties and Samples. Vital Annex: International Journal of Novel Research in Advanced Sciences, 2(1), 4-10.
9. Файзуллаева, Д., Каюмов, Н. Ш., & Дилмуродов, Ш. Д. (2020). Лалмикор майдонлар учун нўхатнинг эртапишар тизмалари селекцияси. Молодой ученый, (34), 161-163.
10. Жабаров Ф. О., Дилмуродов Ш. Д. ЛАЛМИКОР МАЙДОНЛАР УЧУН КУЗГИ НЎХАТНИНГ ОБОД ВА ЛАЛМИКОР НАВЛАРИНИ БИРЛАМЧИ УРУҒЧИЛИГИНИ ТАШКИЛ ЭТИШ //ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ. – 2023. – Т. 27. – №. 2. – С. 12-14.
11. Dilmurodovich D. S. et al. Selection of New Genotypes of Winter Chickpeas with High Productivity, High Photosynthetic Productivity, Resistance to Fusariosis Disease and Adaptation to Mechanism //Lampyrid: The Journal of Bioluminescent Beetle Research. – 2023. – Т. 13. – С. 117–126-117–126.
12. Dilmurodovich D. S., Odirovich J. F. Growth, Development And Productivity Indicators Of Bread Wheat Lines Established In Local Conditions //Texas Journal of Agriculture and Biological Sciences. – 2023. – Т. 15. – С. 95-102.
13. Dilmurodovich D. S. et al. CREATION OF NEW DROUGHT-RESISTANT, HIGH-YIELDING AND HIGH-QUALITY VARIETIES OF BREAD WHEAT FOR RAINFED

AREAS //British Journal of Global Ecology and Sustainable Development. – 2022. – Т. 2. – С. 61-73.

14. Дилмуродов Ш. Д. ВЫБОР ВЫСОКОФОТОСИНТЕТИЧЕСКОЙ ПРОДУКТИВНОСТИ, АДАПТИВНЫХ К МЕХАНИЗМУ И ВЫСОКОУРОЖАЙНЫХ ЛИНИЙ ОЗИМОГО НУТА ДЛЯ БОГАРНЫХ РАЙОНОВ //Life Sciences and Agriculture. – 2023. – №. 2 (14). – С. 28-35.
15. Дилмуродов Ш. Д. ЗАСУХОУСТОЙЧИВЫЙ ОБРАЗЕЦ ДВУХСЕЗОННОЙ (ДВУХРОСТНОЙ) МЯГКОЙ ПШЕНИЦЫ ОТ КОНТРОЛЬНОГО РАСТЕНИЯ //Life Sciences and Agriculture. – 2023. – №. 2 (14). – С. 11-16.