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THE INFLUENCE OF THE HEIGHT OF STEM AND LOWER PODS OF PEA PLANTS ON PEA YIELD

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Abstract. *The pea plant stands out among cereal crops for its nutritional value. Peas are rich in protein, carbohydrates, vitamins (especially group B) and minerals (iron, potassium, magnesium, zinc), which make them a valuable nutritional product. Chickpeas also contain the amino acid lysine, which is often lacking in vegetarian diets. In addition, chickpeas have a low glycemic index, which helps control sugar and blood sugar levels. Today, it is important to choose varieties suitable for climate change. Selection by morphological characters using foreign*

collections and local varieties is widely introduced in selections aimed at the selection of productivity in chickpea cultivation. In our research, when we analyzed the height of plants and lower pods from morphological characters, it was noted that the yield increased in samples with lower plant height and lower pods. Among the samples, samples 12134, 12117 and 12108 with high yield, short height and low location of lower pods were selected and recommended for use in selection work.

Key words: pea, grain, plant height, legumes, yield, flexibility, stability, stress, pattern.

ВЛИЯНИЕ ВЫСОТЫ СТЕБЛЯ И НИЗКИ РАСТЕНИЙ ГОРОХА НА УРОЖАЙНОСТЬ ГОРОХА

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Аннотация. *Горох выделяется среди злаковых культур своей пищевой ценностью. Горох богат белком, углеводами, витаминами (особенно группы В) и минеральными веществами (железо, калий, магний, цинк), что делает его ценным пищевым продуктом. В нуте также содержится аминокислота лизин, которой часто не хватает в вегетарианских диетах. Кроме того, нут имеет низкий гликемический индекс, что помогает контролировать уровень сахара и сахара в крови. Сегодня важно выбирать сорта, подходящие для изменения климата. В селекциях, направленных на отбор продуктивности при возделывании нута, широко внедряется отбор по морфологическим признакам с использованием зарубежных коллекций и местных сортов. В наших исследованиях при анализе высоты растений и нижних стручков по морфологическим признакам отмечено, что урожайность увеличивается у образцов с меньшей высотой растений и меньшими стручками. Среди образцов выделены и рекомендованы для использования в селекционной работе образцы 12134, 12117 и 12108 с высокой урожайностью, низкой высотой и низким расположением нижних стручков.*

Ключевые слова: горох, зерно, высота растений, бобовые, урожайность, гибкость, устойчивость, стресс, закономерность.

Introduction

Pea (*Pisum sativum* L.) is an annual herbaceous crop belonging to the legume family. Among the legumes, Pisum sativum L. is the oldest pea and is a self-pollinated (2n=2x=14) food crop [1]. *Pisum sativum* L was cultivated in the Mediterranean region, primarily in the Middle East [2]. Today, chickpea is considered as a high-yielding and nutritionally rich crop, cold-tolerant

legume cultivated worldwide for food, industry, and forage [3]. According to I.V. Savchenko and others, Canada, France, China, Russia, as well as India, Ukraine, and Germany are among the leading pea growing countries in the world [4]. The pea crop is planted in early spring, while it makes better use of the autumn and winter moisture reserves in the soil, and is less affected by diseases and pests [5].

In recent years, the negative impact of the global climate change process has been reflected in one of the most important sectors, agriculture. Plants live under the complex influence of abiotic and biotic factors that occur during development. It is determined by genotype-environment interaction. The manifestation or value of a trait caused by genotype - environment interaction is called the normal reaction of the genotype. An increase in the response of the genotype, that is, adaptation to changing environmental conditions and the formation of high yield characteristics is one of the most effective methods in solving selection and agrotechnological problems [7, 8]. In this regard, the study and assessment of the ecological adaptability of genotypes in the selection of pea productivity, the scope of their use, adaptation to natural and climatic conditions is an urgent issue of modern processes in pea cultivation.

Cultivation of high-tech pea varieties involves overcoming the above-mentioned shortcomings. Of course, among the morphological traits of the pea plant, plant height, height of the first branches above ground level, leaf structure and other parameters are important factors in increasing productivity [6, 9]. According to other studies, the plant leaf from the morphological traits is considered as the main organ that contributes up to 50% of the positive effect on the yield [10].

The purpose of our research is to evaluate the effect of plant height and lower pod height on the yield of pea plant.

The object of the research and its methodology. Scientific experiments were carried out for 3 years at the "Dormon" experimental field of the Institute of Genetics and Plants Experimental Biology by planting seeds of foreign collection samples of pea by 20 grams in 3 replications on 3 m^2 plots.

The following methods were used in the conducted research: Kwon and Torrie methods based on inheritance and correlation [11].

The principles and procedures of statistics were calculated based on Celik and Torrie's method [12].

The results of the research. The productivity of the pea plant is one of the main important directions of the selection breeding process. Morphological traits are very important in increasing productivity. Because the resistance of the genotype in external environmental conditions is manifested in the phenotype. Therefore, from a theoretical point of view, the selection of

resistant high-yielding varieties based on the phenotype will create an important basis for saving the volume and time of genetic research. In the studied samples of foreign collection of peas, plant height and height of lower pods showed different differences in the effect on productivity. That is, in the analysis of the general average parameters of the samples with low plant height and low location of the first pods, it was found that the yield increased. According to the plant height, 13 samples 12108, 12109, 12131, 12119, 12107, 12125, 12118, 12120, 12129, 12115, 12111, 12112 and 12103 ranged between 50,0-57,6 cm. The plant height of the rest of the samples was below 50.0 cm. The height of the lower pods was recorded in 12 samples and varied in the range of 20.0-21.8 cm. In the remaining samples, it was noted that theindicator was below 20.0 cm. When analyzing the productivity in 3 m^2 area, it was observed that samples 12134, 12117 and 12108 yielded in the range of 702-760 g. While the samples 12116, 12128, 12133. 12121, 12124, 12114, 12127, 12125, 12111 and 12103 was noted to yield up to 600-690 g (table-1).

Table-1

Morpgological and yield parameters

№	Catalog no.	Plant height, cm	Lower pod height, cm	Yield in 3 m^2, g
1	12101	42,3±1,58	19,3±1,15	595±20,2
2	12102	49,1±2,6	17,7±0,93	527±18,7
3	12103	57,6±0,88	21,8±0,96	622±64,9
4	12104	47,1±1,25	18,5±1,29	422±70,7
5	12105	48,9±0,92	20,5-1,06	512±38,9
6	12106	47,3±1,17	20,3±0,86	500±40,4
7	12107	50,5±1,67	19,8±1,02	527±96,7
8	12108	52,9±0,78	18,5±1,12	702±59,1
9	12109	53,5±1,80	18,9±1,04	380±40,4
10	12110	49,3±1,82	19,8±1,14	415±2,88
11	12111	57,3±0,99	21,3±0,72	645±25,9
12	12112	57,3±0,81	21,7±1,00	507±30,3
13	12113	43,8±1,43	17,3±1,01	557±33,1
14	12114	47,6±1,22	17,8±0,93	632±4,33
15	12115	50,1±3,29	21,0±0,63	467±18,7
16	12116	40,7±1,07	13,9±0,41	652±45,3
17	12117	46,9±1,02	17,3±0,58	760±20,2
18	12118	50,9±1,49	20,1±0,97	437±38,9
19	12119	52,7±1,52	19,4±0,97	562±25,6

20	12120	52,3±1,07	20,1±0,87	582±62,6
21	12121	47,8±1,36	16,8±0,79	690±2,75
22	12122	44,7±0,86	16,2±0,55	517±37,4
23	12123	48,9±1,80	19,8±1,18	575±23,0
24	12124	48,1±0,56	17,3±0,89	600±49,0
25	12125	52,5±1,11	20,0±0,75	602±53,4
26	12126	47,1±1,23	18,6±0,75	537±18,7
27	12127	47,3±1,06	18,5±0,67	622±12,9
28	12128	37,3±0,77	14,7±0,73	615±23,0
29	12129	50,8±1,28	20,7±0,51	487±4,33
30	12130	49,2±1,13	20,0±0,66	597±4,31
31	12131	50,4±1,20	19,2±0,89	437±28,0
32	12132	49,5±0,64	19,9±1,16	385±36,3
33	12133	45,6±0,55	16,2±0,51	640±3,91
34	12134	43,1±1,13	15,4±1,02	742±17,1
35	12135	47,7±1,05	20,3±0,77	300±34,6
36	12136	46,4±0,98	15,4±0,63	428±40,1

In our experiments, the tall plants of the samples 12103, 12111 and 12125 had a plant height of 57.6 cm, 57.3 cm and 52.5 cm, respectively, and the height of the lower pods was 21.8 cm, 21.3 cm and 20.0 cm which yielded 622 g, 645 g and 602 g, respectively. The higher plant height and higher height of lower pods of these 3 samples may be due to genetics or influence of environmental factors. In the rest of the samples, higher plant height and higher height of the lower pods were distinguished by the fact that they had an insignificant effect on the yield.

On the contrary, in high-yielding samples 12116 (yield 652 g, plant height 40.7 cm, lower pod height 13.9 cm), 12128 (yield 615 g, plant height 37.3 cm, lower pod height 14.7 cm), 12134 (yield 742 g, plant height 43.1 cm, lower pod height 15.4 cm), 12133 (yield 640 g, plant height 45.6 cm, lower pod height 16.2 cm), 12121 (yield 690 g, plant height 47.8 cm, lower pod height 16.8 cm), 12117 (yield 760 g, plant height 46.9 cm, lower pod height 17.3 cm), 12124 (yield 600 g, plant height 48.1 cm, lower pod height 17.3 cm), 12114 (yield 632 g, plant height 47.6 cm, lower pod height 17.8 cm), and 12127 (yield 622 g, plant height 47.3 cm, lower pod height 18, 5 cm) lower plant height and the height of the lower pods led to an increase in yield. Only in sample 12108 (yield 702 g, plant height 52.9 cm, height of lower pods 18.5 cm) it was noted that the height of the plant is a characteristic of the variety, and it was observed that the height of the lower pods is low despite the height of the plant. In general, it was noted that the lower plant height and lower pod height

had a higher percentage than the higher plant height and higher height of lower pod in relation to the total number of samples.

When we analyzed the effect of traits on each other graphically, it was noted that the height of the lower pods increased along with the height of the plants. Correspondingly, the yield index was found to be lower in the samples with higher plant height and higher location of lower pods, as shown in diagram 1.

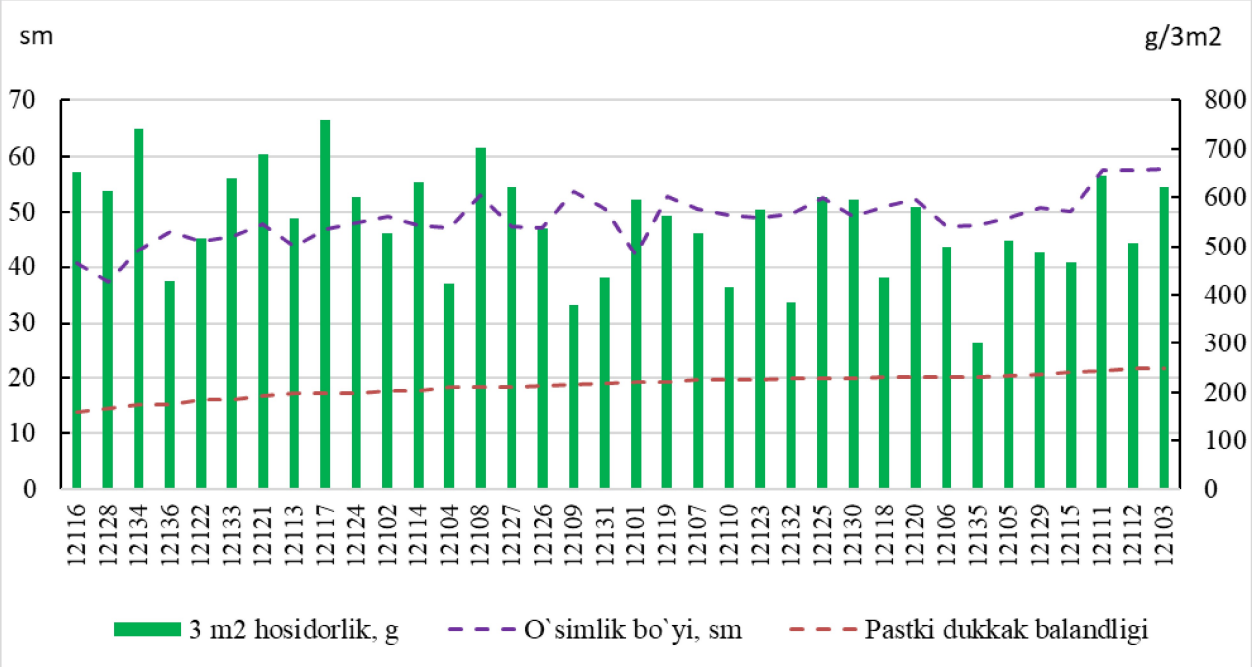

Diagram-1. - Yield in 3m², g - - - Plant height, cm - - - Height of lower pod

On the contrary, it was found that the yield was higher in samples with lower plant height and lower pod height. It was observed in the results of the analysis that in relation to the total number of samples the yield is higher in the samples with lower plant height and lower height of pods located lower.

Conclusion. In the conducted studies, it was found that the height of the lower pods increased along with the high plant height of the samples. Correspondingly, it was found that the yield index was lower in the samples with high plant height and lower pods located higher. Among the samples, 12134, 12117 and 12108 samples with high yield, low height and low location of lower pods were selected for selection breeding process.

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According to the decision of the Higher Attestation Commission of the Republic of Uzbekistan dated March 31, 2023 No. 332/5/6, the publication of the main scientific results of dissertations in biological sciences is included in the list of recommended national scientific publications.

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