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Study of Some Physiological, Biochemical and Morpho-Economic Characteristics of Local and Foreign Soybean Varieties Grown as a Recurrent Crop in the Conditions of Navoy Region

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ABSTRACT: In the article, the variety "Selekta-201" of the foreign Russian selection, grown after the wheat harvest as a repeated crop in Navoi region, as a control, "Sparta" of the Krosnodar selection, "Nena" of the Kazakhstan selection and local "Ustoz-MMAn-60", "To'maris-MMAn-60" ", "Oyjamol" soybean cultivars from physiological indicators during the true leaf and podding periods the results of the analysis of chlorophyll "a", chlorophyll "b" and total chlorophyll in plant leaves, the number of pods in one bunch of plants and the weight of 1000 seeds from the yield indicators, the amount of oil in the grain from the biochemical indicators were studied. In the conditions of Navoi region, an increase in the amount of chlorophyll "a", chlorophyll "b" and the total carotenoid was found in some varieties, while in some it was decreased and showed different productivity indicators.

KEYWORDS: soybean, variety, leaf, chlorophyll, carotenoid, yield.

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INTRODUCTION

The soil and climatic conditions of Uzbekistan allow, with the effective use of irrigated lands, to grow and harvest several different crops a year. The spring, summer and autumn warm period lasts from early March to mid-November, depending on the geographical location of the region. The high temperature, which persists from mid-May to the end of September, is extremely favorable for the growth, development and production of heat-loving crops (soybean plant, beans, etc.).

In recent years, the acceleration of the production of food products and fodder for livestock requires increasing the cultivation of soybean plant.

Soybean plant (Glycine hispida Max) is a major leguminous grain crop whose plant can solve protein and oil problems, improve soil nitrogen balance, and increase food production [7].

Soybean is an annual plant. Its homeland is East Asia. Several varieties are grown in China, India, Japan, Australia, North America and the Far East. There are also tree species in China. It grows up to 2.8 m tall and blooms year-round. In China, the soybean plant milk industry and various other food products are developed [8].

Soybean is one of the most valuable crops because it contains 50% protein and 28% oil. Today, more than 400 different products that are essential for human consumption are made from soybean. Ecolog is a pure high-quality raw material used in the food industry. 35% of the vegetable oil consumed by the population, which does not contain harmful substances, is obtained from soybean. Soybean isolate is obtained after pressing the oil, and the content of oxyl in its composition reaches 75% . It is used to make baby food, breadcrumbs, sausages, products for the confectionery industry, coffee and its substitutes. The industry produces linoleums, the highest quality and most expensive car paints. [1,8].

Soybean oil makes up the majority of vegetable oils produced worldwide. Depending on the variety, soybean plant grain has a length of 7.0-8.5 mm, a width of 5.8-7.1 mm, a thickness of 4.2-5.8 mm, contains 13.5-25.4% fat (in terms of on dry matter), 29.0-60.3% (nitrogen in terms of 6.25) extractives will be mixed protein, 2.8-6.8% mixed fiber, 3.3-6.4% ash and 14.1 -33.0% free nitrogen. The amount of lysine in soybean flour is 10-20 times higher than in wheat flour. If 50% soybean flour is added to the

dough, the amount of lysine doubles. In addition, soybean flour is richer in vitamins than wheat flour. It is recommended to process the shade in the "soft" mode. Soybean can be called a pantry of protein [1,8].

Soybean contains 40-45% protein, 22-25% vegetable oil and 12 different vitamins necessary for the human body. One of the world's leading scientists, Shpakovsky B.A. (1926), Vavilov P.P. (1983) studied the importance of biological nitrogen fixation in soybean roots and grain in the food industry. The scientist was the first to write down the method of making artificial milk from soybean in his works[2,3].

It is known that about 95% of plant dry matter is organic matter, which is formed as a result of the process of photosynthesis. Most of the organic matter in plants is used for the formation of reproductive parts. Generally, plant yield depends primarily on net photosynthesis productivity, leaf surface area, assimilation period duration, amount of organic matter used for respiration, and external and internal factors [13].

In the leaves of plants, chlorophyll is formed in the presence of special conditions: developed stroma of plastids, light, magnesium, iron, etc. Because pigments are formed only in lamellae and granules of plastids. Magnesium is directly included in the chlorophyll molecule, and iron is included in the enzymes involved in the formation of chlorophyll (chlorophyllase, etc.). Chlorophyll is produced only in plants grown in light. It is not produced in plants grown in the dark [19].

Photosynthesis is one of the main processes in the plant organism, and its dynamic state is determined by the organic effect of internal and external factors. Any change in environmental conditions primarily affects the speed and direction of photosynthesis processes. This ultimately leads to changes in plant growth, development and productivity. The growth and productivity of plants in different climatic and soil conditions depends on the adaptation of various physiological processes, especially photosynthesis, to environmental conditions. In the process of photosynthesis, pigments are considered light acceptors, and their physical and chemical properties determine the primary reactions of photosynthesis, that is, the efficiency of the photosynthetic apparatus in green plants is determined by the state and amount of pigments located in the membranes of chloroplasts [15,18,24].

Chlorophyll a is the only pigment common to all photosynthetic organisms. Because the light energy absorbed by this pigment can be used directly in photosynthetic reactions. The light energy absorbed by all other pigments is also delivered to chlorophyll "a" and is used in photosynthesis through it. Chlorophyll "a" has a red spectrum of 660-663 nm and a blue spectrum of 428-430 nm, and chlorophyll "6" has a red spectrum of 642-644 nm and a blue spectrum of 452-455 nm. absorbs rays equal to Chlorophyll molecules do not absorb the green and infrared rays of the light spectrum at all.So, chlorophyll has the ability to selectively absorb light rays without absorbing them all. This property of chlorophyll can be determined by passing light rays through its alcohol or acetone solution and viewing it in a spectroscope. In the spectroscope, the spectrum light absorbed by chlorophyll appears dark, it reflects the light. Chlorophyll appears red in reflected light. Its fluorescence ability indicates its photochemical activity [21,4].

O.Mirzaev, A.Tagaevs [12] stated that in the natural climate of Andijan region, it was possible to plant early and mid-early varieties of soybean in fields free of winter wheat and obtain a grain yield. Our scientists have determined that only then soil fertility will be preserved and favorable conditions will be created for the next crops.

According to M.Mannopova and others [14], the variety "To'maris-MMAn-60" is suitable for growing as a main crop in spring and as a repeated crop. Resistant to diseases, spider mites, bollworms, leafhoppers, moths, and moths are harmful pests, it is necessary to fight against them.

According to Z.M.Koldashov and M.K.Hamroeva [15], the yield indicators of soybean varieties depend on the number of pods, the more the number of seeds in a pod, the higher the yield of the variety. They do not improve due to the fact that they do not receive the necessary temperature, the supply of nutrients is insufficient, and the intake of nutrients is not uniform. If a certain part of pods in the lower layer are close to the soil during harvesting, some of the seeds in the upper layer will not ripen well.

MATERIALS AND METHODS

Our experiments were conducted in Navoi region. As an object of research, the Selekta-201 variety of Russian selection was planted as a control, the Sparta variety of Krosnodar selection, Nena of Kazakhstan selection, Ustoz-MMAn-60, Oyjamol, To'maris To'maris-MMAn-60 from local varieties were planted as repeated crops.

Our experiments were conducted in the field of "Lochin" farm, Karmana district, Navoi region, Umid Kurgani, and Jaloyir territory. The total land area of Navoi region is 10937.3 thousand hectares, which is 24.8% of the territory of the republic. Of this, the region's cultivated land area is 1.1 percent or 111.9 thousand hectares, and its irrigated farming area is 91.4 thousand hectares. It can be seen that the main land areas of Navoi region consist mainly of desert zone and foothills.

Taking this into account, the influence of the scorching summer heat of the Kyzylkum desert at 45-50^0 C and above dominates the period of growth and development of agricultural crops in the agricultural regions of the region. During this period, the wind coming from the mountain slopes joins with the hot current of the desert to form an unpleasant hot garmsel, which in turn has a very negative effect on the development of agricultural crops. Such weather conditions can be seen in all agricultural districts of the region: Karmana, Navbahor, Kyziltepa, Konimekh, Nurota, Khatirchi districts[18].

From the physiological indicators, the amount of total chlorophyll, chlorophyll "a", chlorophyll "b", pigments in the leaves of the soybean plant, calculated from the growing point of the soybean, was separated from 3 leaf tissues and viewed in a spectrophotometer (Agilent Cary 60 UV-Vis. Germany) with 96% ethanol, and was determined by the following equation .

Ch-a=13.36A_{664} – 5.19 A_{649}

Ch-b=27.43A_{649} – 8.12 A_{664}

F* [mg/g] = *(V *C) / P

Here: F is the chlorophyll content in the leaves of the plant [mg/g]; V – liquid volume [ml]; C – chlorophyll concentration [mg/l]; P – leaf weight, [g] [16,23,27]

Statistical analysis.

Analysis of the variance of the various traits of the cotton cultivars under two different irrigation regimes progressed according to Steel [28]. In this case, the Fisher criterion (F), the standard deviations (SD), the standard error (SE), and the degree of significant difference ($P \leq 0.05$*, $P \leq 0.01$**, and $P \leq 0.001$***) determined the reliability of the differences between the genotypes for each trait.

RESULTS AND DISCUSSION

Physiological indicators of soybean varieties grown as a repeated crop in Navoi region in 2022, the amount of chlorophyll "a", chlorophyll "b" and total chlorophyll in the leaves of the plant were studied in the phase of true leaf release, in the phases of budding, flowering, podding, and the following results were obtained [23].

The highest index of chlorophyll "a" in the leaf release phase was recorded in the Sparta variety from the group of foreign varieties (7.72±0.15 mg/g), and from the group of local varieties in the Oyjamol variety (13.8±2.18 mg/g). It was found that the lowest rate was found in the Nena variety from the group of foreign varieties (3.51±0.12 mg/g), and the Tomaris-MMAn-60 variety from the group of local varieties (8.16±1.1 mg/g). An average value of 3.61 ± 1.21 mg/g was recorded in Selekta-201 variety planted as a control (Table 1).

Table 1. Amount of pigments in plant leaves during true leaf release in soybean varieties in Navoi region conditions

Varieties	Chlorophyll "a", mg/g			Chlorophyll "b", mg/g			Carotenoids, mg/g		
	$\bar{x} \pm S_{\bar{x}}$	G,%	V,%	$\bar{x} \pm S_{\bar{x}}$	G,%	V,%	$\bar{x} \pm S_{\bar{x}}$	G,%	V,%
Selekta-201 control	3,61±1,21	4,0	5,7	1,24±0,12	3,2	4,9	1,34±0,24	4,7	5,8
Tomaris-MMAn-60	8,16±1,12	4,2	6,3	1,93±0,14	3,9	6,2	1,63±0,51	5,2	5,9
Oyjamol	3,8±2,18	4,9	6,6	1,75±0,13	4,3	5,8	1,52±1,27	4,9	5,7
Ustoz-MMAn-60	9,31±4,31	5,1	7,1	2,32±0,14	3,1	4,6	1,95±1,78	5,1	6,1
Sparta	7,72±0,15	3,8	5,8	2,31±0,04	3,3	4,8	1,98±0,32	3,8	6,6
Nena	3,51±0,12	4,1	5,6	1,16±0,71	4,1	5,3	1,12±0,14	4,5	7,1

The highest indicator of chlorophyll "a" in the flowering phase is in Nena from the group of foreign varieties (2.59±0.19 mg/g), and from the group of domestic varieties To'maris-MMAn-60 (2.87±0.12 mg/g) was noted, the lowest value was found in the Sparta variety from the group of foreign varieties (1.94±0.18 mg/g), and the Oyjamol variety from the group of local varieties (1.89±0.05 mg/g). The Selekta-201 variety planted as a control (1.90±0.13 mg/g) had an average value compared to other varieties (Table 2).

Table 2. The amount of pigments in the leaves of soybean varieties in the period of flowering in Navoi region

Varieties	Chlorophyll "a", mg/g			Chlorophyll "b", mg/g			Carotenoids, mg/g		
	$\bar{x} \pm S_{\bar{x}}$	G, %	V, %	$\bar{x} \pm S_{\bar{x}}$	G,%	V,%	$\bar{x} \pm S_{\bar{x}}$	G,%	V,%
Selekta-201 (control)	1,90±0,13	2,5	3,3	1,83±0,19	2,3	3,36	0,83±0,09	2,1	3,5
Tomaris-MMAn-60	2,87±0,12	6,1	7,5	1,82±0,11	5,6	6,4	0,73±0,13	6,3	6,9
Oyjamol	1,89±0,05	2,7	3,9	1,89±0,23	2,1	3,2	0,81±0,11	2,2	3,3
Ustoz-MMAn-60	2,18±0,07	3,6	4,1	1,95±0.14	3,7	4,5	0,82±0,07	3,4	4,1
Sparta	1,94±0,18	4,4	5,7	1,91±0,12	3,7	4,5	0,85±0,02	4,3	5,4
Nena	2,59±0,19	3,8	4,7	1,39±0,14	3,7	4,3	1,11±0,27	3,6	4,3

During the general flowering period, the highest index of chlorophyll "a" was found in the Sparta variety from the group of foreign varieties (1.97 ±0.12 mg/g), and from the group of domestic varieties, the To'maris-MMAn-60 variety (2.93±0.28 mg/g g) was noted, the lowest indicator was found in the Nena variety from the group of foreign varieties (1.92±0.16 mg/g), and the Oyjamol variety from the group of local varieties (1.42±0.12 mg/g). The Selekta-201 variety planted as a control (1.57 ±0.18 mg/g) had an average value compared to other varieties(Table 3).

Table 3. The amount of pigments in plant leaves during general flowering in soybean varieties in the conditions of Navoi region

Varieties	Chlorophyll "a", mg/g			Chlorophyll "b", mg/g			Carotenoids, mg/g		
	$\bar{x} \pm S_{\bar{x}}$	G, %	V,%	$\bar{x} \pm S_{\bar{x}}$	G,%	V,%	$\bar{x} \pm S_{\bar{x}}$	G,%	V,%
Selekta-201 (control)	1,57 ±0,18	4,3	5,7	3,62±0,02	3,3	4,1	0,98±0,12	4,3	5,4
Tomaris-MMAn-60	2,93±0,28	3,5	7,4	1,39±0,03	2,7	6,5	1,31±0,02	3,7	5,9
Oyjamol	1,42±0,12	4,7	5,8	6,65±0,12	3,5	4,1	1,52±0,18	4,7	5,1
Ustoz-MMAn-60	2,24±0,05	5,7	6,3	9,68±0,01	4,6	5,7	2,16±0,11	5,1	6,3
Sparta	1,97 ±0,12	5,2	6,7	7,69±0,25	5,4	6,9	0,68±0,07	5,1	6,4
Nena	1,92±0,16	3,5	4,3	7,95±0,29	3,3	4,7	1,21±0,18	3,8	4,9

The highest index of chlorophyll "a" in the general podding phase was recorded in the Sparta variety from the group of foreign varieties (21.7±0.17mg/g), and from the group of local varieties in the Oyjamol variety (22.3±0.14 mg/g). the lowest indicator was found in the Nena variety from the group of foreign varieties (18.6±0.52 mg/g), and from the group of local varieties in the To'maris-MMAn-60 variety (17.7±0.23 mg/g). The average value was recorded in the Selekta-201 variety planted as a control (17.9±0.32 mg/g) (Table 4).

Table 4. The amount of pigments in plant leaves during the general podding period in soybean varieties in the conditions of Navoi region

Varieties	Chlorophyll "a", mg/g			Chlorophyll "b", mg/g			Carotenoids, mg/g		
	$\bar{x} \pm S_{\bar{x}}$	G,%	V,%	$\bar{x} \pm S_{\bar{x}}$	G,%	V,%	$\bar{x} \pm S_{\bar{x}}$	G,%	V,%
Selekta-201 (control)	17,9±0,32	4,4	5,3	7,9±0,01	4,2	5,3	8,7±0,02	4,5	5,1
Tomaris-MMAn-60	17,7±0,23	5,2	6,8	8,1±0,07	4,8	6,3	8,5±0,1	4,9	5,3
Oyjamol	22,3±0,14	4,3	5,1	9,8±0,05	3,9	4,8	11±0,03	4,1	4,9
Ustoz-MMAn-60	18,3±0,63	6,6	7,5	7,6±0,2	5,8	6,5	9,5±0,3	6,2	7,1
Sparta	21,7±0,17	6,7	7,2	6,29±0,08	5,8	6,9	10,6±0,05	6,2	7,1
Nena	18,6±0,52	5,3	6,8	7,7±0,2	4,8	6,5	9,9±1,3	5,1	6,6

When studying the bioecological and morphophysiological characteristics of various foreign and local soybean varieties planted in the form of repeated crops in the soil-climatic conditions of Navoi region in 2019-2022, the control variants had the following indicators (Table 5).

Table 5. The total number of pods of soybean varieties in the conditions of Navoi region

Varieties / year	2019	2020	2021	2022
Selekta-201 (control)	50,0±4,0	88,3±3	91,3±2,01	102,5±3,9
Tomaris-MMAn-60	81,8±8	96,4±2,9	94,5±3,2	97,5±8,2
Oyjamol	54,1±2,7	85,6±1,8	93,3±7,3	214±12,3
Ustoz-MMAn-60	73,12±1,2	97,1±4,9	85±5,7	277,2±20,6
Sparta	120,0±11	130,7±6,3	106,5±3,8	110,9±4,8
Nena	82,4±6	80,3±3,5	75,6±5,2	131,6±2,4

The high indicator of the sign of podding was observed in the Nena variety of the foreign Kazakhstan selection between the 2019-2022 experimental years. The highest result was observed in 2022 (respectively 97.5±8.2), and the lowest indicator was observed in 2019 (respectively 81.8±7.9).

In the period of 2019-2022 experimental years of the foreign Russian selection Sparta, the highest result was observed in 2022 (153.9±11.1, respectively), and the lowest result was observed in 2019 (54.1±2.7, respectively).

In the period of 2019-2022 experimental years of local Oyjamol variety, the highest result was observed in 2022 (respectively 129.4±16), and the lowest result was observed in 2019 (respectively 72.5±9.5).

Local Ustoz-MMAn-60 variety in the period of 2019-2022 experimental years showed a high result in 2020 (respectively 130.7±6.3), and the lowest result was observed in 2021 (respectively 106.5±3.8).

The local To'maris-MMAn-60 variety in the 2019-2022 experimental years showed a high result in 2022 (131.6±2.4, respectively), and the lowest result in 2021 (75.6±5.2, respectively).

One of the main indicators determining the quality of seed grain is its absolute weight. Currently, the seed weight of 1000 seeds is of great importance in increasing the productivity of soybean varieties created and being created by breeding scientists, the power of seed germination, germination and high seed oiliness. Fertilization of such seeds is good and allows to create a high yield. The more complete the seed, the more sufficient nutrient reserves are created for its sprout to be fully supplied with the necessary nutrients in the first stages of its development [1].

Our experiments, in the conditions of Navoi region, the parameters of 1000 grain weight of foreign and local soybean varieties planted from the wheat crop planted as a repeated crop were studied in the period of 2019-2022 and the following results were recorded (Table 6).

Table 6. Indicator of soybean varieties by weight of 1000 seeds in the conditions of Navoi region

Year/varieties	Selekta-201 (control)	Nena	Sparta	Oyjamol	Ustoz-MMAn-60	To'maris-MMAn-60
2019	154,223±0,12	172,463±0,13	160,656±0,15	183,142±0,01	169,152±0,03	178,13±0,09
2020	148,912±0,09	162,288±0,05	168,475±0,10	197,294±0,05	169,164±0,10	168,162±0,03
2021	139,929±0,14	144,276±0,05	155,155±0,05	152,083±0,09	154,227±0,04	152,262±0,04
2022	162,119±0,38	176,142±0,41	192,065±0,49	187,054±0,35	172,731±0,76	227,423±1,19

In the group of foreign soybean varieties, the highest indicator of the weight of 1000 seeds was recorded in the 2019 Nena variety (172,463±0.13 g), and from the local varieties in the Oyjamol variety (183,142±0.01 g) (Table 6). Sparta (160.656±0.15 g.) and Ustoz-MMAn-60 (169.152±0.03 g.) had the lowest index of 1000 seed weight in the group of foreign and local soybean varieties.

2020 was recorded in the foreign Sparta variety (168.475±0.10 g.), and from the local varieties in the Oyjamol variety (197.294±0.05 g.).Nena (162.288±0.05 g) and To'maris-MMAn-60 variety (168.162±0.03 g) had the lowest value of 1000 seeds in the group of foreign and local soybean varieties.

2021 was recorded in the foreign Sparta variety (155.155±0.05 g.), and from the local varieties in the Ustoz-MMAn-60 variety (154.227±0.04 g.). Nena (144.276±0.05 g.) and Oyjamol variety (152.083±0.09 g.) had the lowest index of 1000 grain weight in the group of foreign and local soybean varieties.

2022 was recorded in the foreign Sparta variety (192.065±0.49 g.), and from the local varieties in the To'maris-MMAn-60 variety (227.423±1.19 g.). Nena (176.142±0.41 g.) and Ustoz-MMAn-60 variety (172.731±0.76 g.) had the lowest index of 1000 seed weight in the group of foreign and local soybean varieties.

In the Selekta-201 variety planted as a control, the weight of 1000 seeds in the period of 2019-2022 was from 139.929±0.14 g to 162.119±0.38 g.

Soybean contains not only essential amino acids, but also 13-24% oil, 25% carbohydrates, 4.5-5.5% fiber, 7% minerals (including calcium, phosphorus, sodium, iodine, molybdenum, nickel), 2% phosphotides and vitamins E, B1, B2, B6, pantothenic acid, niacin, choline, folic acid, biotin are also available. Vegetable oils contain saturated and unsaturated fatty acids, and these fatty acids include oleic, lipoic, and linolenic fatty acids. The chemical composition of vegetable oils mainly consists of glycerides - 95-98%, free fatty acids - 1-2%, phosphatides - 1-2%, sterols - 0.3-0.5%, vitamins and carotenoids. Oil and fatty substances are found in large quantities in plants, their characteristic feature is that they do not dissolve in water [1,4].

In our experiments, the amount of oil in the grain of foreign and domestic soybean varieties of the quality of the research object was determined (Table 7).

Table 7. Fat content in grains of foreign and local soybean

varieties / year	2019	2020	2021	2022
Selekta-201 control	20,9±1.5	21,2±1.3	21,9±0.9	22,1±0,5
Tomaris-MMAn-60	26,3±1,7	25±1,8	24,6±0,7	23,3±1,9
Oyjamol	21,1±3,2	22,7±1,2	23,3±0,7	20,6±0,07
Ustoz-MMAn-60	25,1±1,6	25,8±4,5	20,4±1,3	19,5±1,3
Sparta	23,1±0,9	25,9±1,2	22,3±0,6	23,6±0,2
Nena	26,7±0,9	26,4±0,8	26,7±0,04	19,7±0,5

According to our results, in the conditions of Navoi region in 2019-2022, the amount of oil in the grain of soybean varieties was from 19.5±1.3% to 26.7±1.2%. In the group of local soybean varieties, the highest indicator of oil content in grain in 2019-2021 was To'maris-MMAn-60 variety (26.7±0.9%, 26.4±0.8%, 26.7±0.04%), compared to and the lowest rate was recorded in 2021-2022 in the Oyjamol variety (20.4±1.3%, 19.5±1.3%).

In the group of foreign soybean varieties, the highest indicator of the mark was found in the Nena variety belonging to the selection of Kazakhstan in 2019-2022 (from 23.3±1.9% to 26.3±1.7%, respectively), while the relatively low indicator was recorded in the Sparta variety, and the mark the lowest indicator during these years was from 20.6±0.07% to 23.3±0.7%. The Selekta-201 variety planted as a control recorded oil content from 20.9±1.5% to 22.1±0.5% in the period 2019-2022.

CONCLUSION

When the amount of chlorophyll "a", chlorophyll "b" and total carotenoid was studied from the physiological characteristics of domestic and foreign soybean varieties in the conditions of Navoi region, it was found that the amount of plastid pigments in the leaves of soybean varieties varies depending on the biological characteristics of the varieties. Sufficient amount of plastid pigments expresses the speed of photosynthetic processes in the plant to a certain extent, ensures their growth, development rate and yield weight. The fact that the amount of chlorophyll "a" in the leaves of the soybean is higher than the amount of chlorophyll "b" indicates that the soybean plant is a light-loving plant.

In the soil-climatic conditions of Navoi region, the bioecological and morphophysiological characteristics of various foreign and local soybean varieties were studied, and when the podding phase of the plant was studied, a high index was achieved in the foreign Sparta variety and local varieties Ustoz-MMAn-60 and Oyjamol. According to the weight of 1000 seeds, foreign Nena, Sparta variety and a high index was achieved in To'maris-MMAn-60 and Oyjamol varieties from local varieties. It was found that the content of oil in the grain of soybean varieties is higher in the foreign Nena and domestic To'maris-MMAn-60 varieties.

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