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Study Of The Amount Of Chloroplast Pigment In The Leaves Of The Soy Collection Samples Grown As A Repeated Crop In The Conditions Of The Kashkadarya Region

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Abstract: This article presents the results of the analysis of the amount of chlorophyll "a", chlorophyll "b" and total chlorophyll in plant leaves from physiological indicators in the collection samples of soybean grown as a repeated crop in the conditions of Kashkadarya region during the flowering and podding periods. In the conditions of the Kashkadarya region, an increase in the amount of chlorophyll "a", chlorophyll "b" and total carotenoids was found in some soybean collection samples, and in some, a decrease.
Key words: shade, collection, sign, flowering, legume, total chlorophyll, chlorophyll "a", chlorophyll "b, carotenoids.

Qashqadaryo Viloyati Sharoitida Takroriy Ekin Sifatida Etishtirilgan Soya Kolleksiyalari Namunalarida Barglaridagi Xloroplast Pigment Miqdorini O’rganish

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Annotatsiya: Ushbu maqolada Qashqadaryo viloyati sharoitida takroriy ekin sifatida etishtirilgan soya kolleksiya namunalarida gullash va dukkaklash davrlarida fiziologik ko’rsatgichlardan o’simlik barglaridagi xlorofill “a”, xlorofill “b” va umumiy xlorofill miqdori tahlili natijalari keltirilgan. Qashqadaryo viloyati

sharoitida ba'zi bir soya kolleksiya namunalarida xlorofill "a", xlorofill "b" va umumiy karotinoid miqdorining oshishi, ba'zilarida kamayishi aniqlangan.

Kalit so'zlar: soya, kolleksiya, belgi, gullash, dukkaklash,umumiy xlorofill, xlorofill "a", xlorofill "b, karotinoidlar.

Introduction

The role and importance of the agricultural sector in ensuring the food security of the population on a global scale is increasing day by day. In our republic, great measures are being taken to increase the productivity of crops, improve their quality, and especially to ensure the independence of grain in our country, in exchange for the wide implementation of scientific and technical achievements and advanced experience in the production of agricultural culture. Fulfilling the task of fully providing the population of the republic with food, first of all, grain products, is an important task. In our country, the expansion of the areas of soybean oil crops and the increase of the products made from them are important for fully satisfying the needs of the population for oil products and for the consistent development of animal husbandry. output and supply are among the biggest problems. In solving this problem, the importance of soybean from leguminous crops is great. Soybean is an annual plant belonging to the family of leguminous crops, native to Central Asia. Soybeans play an important role in the preparation of food, fodder and soil fertility. Soybean contains 38-52% protein, 22-25% fat, oil contains various vitamins, and husk contains 4-5% protein and up to 5% fat. Soybean grain has 2.5 times more protein than wheat grain and 3.5 times more than corn grain, and soybean protein contains more than 10 amino acids. Blue mass is food for livestock. Soybean roots, like the roots of all legumes, develop nodules that can use nitrogen from the air. Thanks to the nodules formed by rhizobial bacteria in the roots of the soybean plant, it accumulates up to 150-250 kilograms of pure nitrogen per hectare. Soybean is a very ancient plant that loves light, heat and humidity [1,4].

Today, more than 400 different products necessary for the national economy are made from soybeans. Grain is an environmentally friendly quality raw material used in the food industry. 35% of vegetable oil

consumed by the population, which does not contain harmful substances, is obtained from soybeans. After de-oiling, soy isolate is formed and its protein content reaches 75%. Baby food, bread additives, proteins for the sausage industry, products for the confectionery industry, coffee and its substitutes are made from it. In the industry, linoleums, the highest quality and most expensive car paints are obtained. [4]

It is known that about 95 percent of plant dry matter is organic matter, which occurs as a result of photosynthesis. Most of the organic matter in plants is used for the formation of reproductive parts. Usually, plant yield depends primarily on the net productivity of photosynthesis, the duration of the assimilation period on the surface of the leaf, the amount of organic matter used for respiration, and external and internal factors. depends. [7].

One of the conditions for increasing plant productivity is related to increasing the intensity of photosynthesis processes. Photosynthesis is an important biological process that forms the basis of life on Earth. All the energy necessary for life processes is obtained from the sun. It is known that soybean photosynthesis is an important process related to the life activity of soybeans, i.e. growth and development. This process is important from both physiological and biochemical points of view. is organically connected with chloroplast granules and is carried out in the presence of pigments in stroma plates. Chlorophyll pigments combine with proteins and lipids in chloroplasts to form a complex compound. In the process of photosynthesis, chlorophyll is considered not only as a substance that absorbs solar energy, but also as a participant in other biochemical processes. The first products formed in the process of photosynthesis, i.e. organic compounds, first accumulate in chloroplasts. The speed of absorption and assimilation of carbon dioxide gas from the air is related to the speed of the dark reactions of photosynthesis. The rate of assimilation depends on the supply of the cell with mineral elements, the amount of chlorophyll, the amount of water, the size and age of the leaf, the intensity of sunlight and other factors. All these external factors are of great importance in changing the quality and quantity of the activity of the shadow [9.,14].

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. Light energy absorbed by all other pigments is also delivered to chlorophyll "a" and used in photosynthesis. 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 does not absorb all light rays, but has the ability to selectively absorb them. 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 position of the spectral rays absorbed by chlorophyll appears darker, it reflects the rays. Chlorophyll appears red in reflected light. Its fluorescence ability indicates its photochemical activity. [15]

Research material, conditions and methods.

Book fog. In the northeast of the province. It was founded in September 1926. It was merged with Shahrisabz district on December 24, 1962. Reorganized on December 25, 1968. Chirakchi, Shahrisabz districts of the region, Samarkand region and border with Tajikistan. The area is 1.75 thousand km². The population is 271.2 thousand people (2022). Kitab district has 1 city (Kitob), 13 towns (Alaqoylyq, Bektemir, Beshariq, Beshterak, Obikanda, Panji, Rusqishloq, Sariosiya, Sevaz, Varganza, Yakkatut, Yangiabad), 59 neighborhoods (2022). The center is the city of Kitab. The tract of Great Uzbekistan passed through the territory of the district. Takhtaqaracha pass (altitude 1788 m) connects the south of the republic with the northern regions

A large part of its territory is occupied by high Hisar and Zarafshan mountains (4000 m) stretching along the northern and eastern borders. The climate of the district is the most moderate in the region, as the high mountains block the region from the flow of cold air. The average temperature in January is 0.8°C, in July it is 28°C. Average annual rainfall is 545 mm. 85% of precipitation falls in spring and winter. The tributaries of Kashkadarya - Kichikjar, Oksuv, Jinnidarya, Aksaryo flow through the territory of the district. The soil is typical gray in the Shahrisabz-Kitab bog, alluvial gray along the river, brown soil in the mountains.

Our experiment was conducted in Kitab District, Kashkadarya Region. The soil of this place is a typical gray soil type.

From physiological indicators, the amounts of total chlorophyll [9,12], chlorophyll "a" [9,12], and chlorophyll "b" [9,12] pigments in plant leaves were extracted from 3 leaf tissues with 96% ethanol in a spectrophotometer (Agilent) Cary 60 UV-Vis. **Germany) was observed and 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: chlorophyll content in leaves of plant F [mg/g]; V – liquid volume [ml]; C – chlorophyll concentration [mg/l]; P is the weight of the leaf, [g].

Experimental results and analysis

Gen-2, Cen-22, Gen-42, Gen-186, Gen-51, Gen-17, Gen-19, Gen-190, Gen-191, Gen-192 samples of soybean genetic collection in the conditions of Kashkadarya region. When the amount of chlorophyll "a" in the leaves was studied under conditions of optimal supply with soybean collection sample group, it reached the highest value, Gen-51 soybean collection sample in the control (2.03±0.31mg/g), and Gen-22 had the lowest values. and Gen-192 in soybean collection samples (1.25±0.18mg/g and 1.27±0.27mg/g, respectively). In the experiment (preparation), the highest indicator of soybean collection sample group was Gen-191 soybean collection sample (2.76±0.31mg/g), and the lowest indicator was Gen-17 soybean collection sample (1.82 ±0.35 mg/g) was recorded. When the amount of chlorophyll "b" in the leaves of the soybean collection samples was studied under conditions of optimal water supply during the flowering period, the highest value was found in the control, Gen-19 and Gen-190 from the soybean collection sample group (mg/g, 0 ,72±0.11mg/g, 0.71±0.58mg/g), the lowest indicator was found in Gen-192 soybean collection (0.27±0.16mg/g). The highest indicator in the experiment (preparation) was found in Gen-17 and Gen-190 collection samples from the soybean collection sample group (1.13±0.31mg/g, 1.11±0.28mg/gmg/g, respectively), the lowest It was noted that the index (Gen-191 (0.58±0.21mg/g)). In the experimental (preparation) soybean collection samples, compared to the control, it had a higher index. (Table 1.)

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Amount of pigments in plant leaves during flowering in soybean collection varieties in the conditions of Kashkadarya region

№ №	Navlar kolleksiyasi	Xlorofil "a",mg/g			Xlorofil "b",mg/g		
		Nazorat $\bar{x} \pm S_{\bar{x}}$	Tajriba (preparat)	Nazoratdagi farqi ,%	Nazorat $\bar{x} \pm S_{\bar{x}}$	Tajriba (preparat)	Nazoratdagi farqi,%
1	Gen-186	1,45±0,27	1,82±0,35	20,33	0,51±0,18	0,71±0,28	39,21
2	Gen-51	2,03±0,31	2,12±0,29	4,44	0,54±0,34	0,98±0,38	81,48
3	Gen-19	1,43±0,42	2,12±0,14	32,54	0,72±0,11	0,89±0,06	27,14
4	Gen-42	1,68±0,18	2,42±0,19	44.04	0,61±0,31	0,83±0,34	36,06
5	Gen-2	1,55±0,19	2,33±0,15	50,32	0,49±0,17	0,89±0,36	81,63
6	Gen-192	1,27±0,27	2,51±0,16	97,63	0,27±0,16	0,61±0,04	83,42
7	Gen-17	1,84±0,11	1,94±0,32	-5,15	0,66±0,16	1,13±0,31	71,21
8	Gen-190	1,97±0,32	2,12±0,22	7,61	0,71±0,58	1,11±0,28	56,33
9	Gen-22	1,25±0,18	2,43±0,11	94,4	0,53±0,21	0,87±0,06	64,15
10	Gen-191	1,64±0,16	2,76±0,31	68,29	0,55±0,11	0,58±0,21	5,45

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When the amount of carotenoids in the leaves of soybean collection samples during the general podding period under conditions of optimal water supply was studied, the highest indicator was found in Gen-19 soybean collection sample in the control (0.91±0.12mg/g), and the lowest values were in Gen- 2 soybeans were detected in the collection sample (0.49±0.19mg/g). The highest indicator in the experiment (preparation) was found in Gen-186, Gen-1, Gen-192 and Gen-22 soybean collection samples (1.09±0.14 mg/g, 1.08±0.151mg/g, respectively , 1.07±0.11mg/g, 1.07±0.13mg/g) the lowest indicator in Gen-17 and Gen-190 soybean collection samples (respectively 0.83±0.06 mg/g, 0.83±0.09mg/g) (Table 2)

№	Navlar kolleksiyasi	Karotinoidlar,mg/g			Umumiy xlorofill miqdori,mg/g		
		Nazorat $\bar{x}\pm S_{\bar{x}}$	Tajriba (preparat)	Nazoratdagi farqi,%	Nazorat $\bar{x}\pm S_{\bar{x}}$	Tajriba (preparat)	Nazoratdagi farqi,%
1	Gen-186	0,73±0,21	1,09±0,14	49, 31	2,39±0,31	2,75±0,43	15,06
2	Gen-51	0,65±0,021	0,92±0,09	41,54	2,07±0,32	2,41±0,17	16,42
3	Gen-19	0,91±0,12	0,94±0,19	3,32	2,,84±0,18	3,32±0,34	16,90
4	Gen-42	0,75±0,09	1,06±0,17	41,33	2,23±0,36	3,22±0,29	44,39
5	Gen-2	0,49±0,19	1,08±0,15	96,43	2,51±0,31	3,39±0,33	35,06
6	Gen-192	0,54±0,17	1,07±0,11	98,15	1,45±0,34	2,45±0,09	68,09
7	Gen-17	0,68±0,14	0,83±0,06	22,06	2,61±0,37	2,92±0,32	11,88
8	Gen-190	0,72±0,14	0,83±0,09	15,30	1,81±0,51	2,46±0,21	35,91
9	Gen-22	0,61±0,09	1,07±0,13	75,41	2,76±0,36	3,29±0,11	19,20
10	Gen-191	0,71±0,02	0,97±0,15	36,62	2,21±0,12	3,31±0,21	49,77

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When the amount of chlorophyll "a" in the leaves was studied in the conditions of optimal water supply in soybean collection samples in the conditions of Kashkadarya region, it reached the highest value in the control Gen-190 soybean collection sample from the soybean collection sample group (2.81±0.31mg/ g), and Gen-51 soybean collection sample had the lowest values (0.71±0.23mg/g). In the experiment (preparation), the highest indicator from the soybean collection sample group is Gen-190 soybean collection sample (3.01±0.30mg/g), and the lowest indicator is Gen-51 soybean collection sample (1.87 ±0.19 mg/g) was recorded. When the amount of chlorophyll "b" in the leaves of the soybean collection samples was studied under the conditions of optimal water supply during the general podding period, the highest indicator was in the control from the soybean collection sample group, Gen-2 (1.10±0.37mg/g). , the lowest indicator was found in Gen-17 soybean collection (0.48±0.18mg/g). The highest indicator in the experiment (preparation) was in Gen-192 collection samples from the soybean collection sample group (2.85±0.21mg/g), the lowest indicator, Gen-190 (1.03±0.44mg/g) was noted. In the experimental (preparation) soy collection samples, had a higher index compared to the control. (Table 3)

The amount of pigments in plant leaves during podding in soybean collection varieties under the conditions of Kashkadarya region

№	Navlar kolleksiyasi	Xlorofil “a”,mg/g			Xlorofil “b”,mg/g		
		Nazorat $\bar{x}\pm S_{\bar{x}}$	Tajriba (preparat)	Nazoratdagi farqi,%	Nazorat $\bar{x}\pm S_{\bar{x}}$	Tajriba (preparat)	Nazoratdagi farqi,%
1	Gen-186	1,82±0,24	2,72±0,21	49,45	0,72±0,07	1,17±0,18	62,5
2	Gen-51	0,71±0,23	1,87±0,19	-11.72	0,87±0,13	2,12±0,27	-18,39
3	Gen-19	0,86±0,07	2,01±0,27	1,99	0,92±0,19	2,05±0,14	-6,52
4	Gen-42	1,83±0,23	2,96±0,06	61,74	0,82±0,15	1,06±0,12	29,27

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5	Gen-2	0,83±0,49	2,27±0,25	13,21	1,10±0,37	2,57±0,17	-24,55
6	Gen-192	0,82±0,13	2,29±0,16	24,45	0,92±0,11	2,85±0,21	-10,87
7	Gen-17	1,27±0,15	2,32±0,33	-28,87	0,48±0,18	1,65±0,26	-48,8
8	Gen-190	2,81±0,31	3,01±0,30	7,11	0,84±0,61	1,03±0,44	22,62
9	Gen-22	2,59±0,19	2,86±0,09	-9,44	0,50±0,10	1,01±0,41	-50,5
10	Gen-191	0,82±0,16	2,06±0,12	14,56	0,93±0,09	2,36±0,13	-11,83

When the amount of carotenoids in the leaves of soybean collection samples during the general podding period under conditions of optimal water supply was studied, the highest index was found in Gen-2 soybean collection sample in the control (2.81±0.49mg/g), and the lowest values were in Gen-2 soybean collection sample. (1.67±0.33mg/g) was detected in 186 soybean collection samples. The highest indicator in the experiment (preparation) is Gen-51, in soybean collection samples (3.75±0.65mg/g), the lowest indicator is in Gen-191 soybean collection samples (1.82±0.40mg/g). was found to be (Table 4)

№	Navlar kolleksiyasi	Karotinoidlar,mg/g			Umumiy xlorofill miqdori,mg/g		
		Nazorat $\bar{x}\pm S_{\bar{x}}$	Tajriba (preparat)	Nazoratdagi farqi,%	Nazorat $\bar{x}\pm S_{\bar{x}}$	Tajriba (preparat)	Nazaratdagi farqi,%
1	Gen-186	1,67±0,33	2,58±0,46	54,49	3,89±0,11	3,91±0,53	0,51
2	Gen-51	1,96±0,43	3,75±0,65	-5,61	1,85±0,41	2,57±0,73	45,91
3	Gen-19	1,91±0,41	1,92±0,29	0,52	2,41±0,33	2,,90±0,75	-16,9

4	Gen-42	1,74±0,40	3,07±0,51	76,43	3,28±0,83	3,31±0,44	0,91
5	Gen-2	2,81±0,49	3,21±0,37	-54,44	1,28±0,34	2,39±0,63	34,31
6	Gen-192	2,10±0,43	2,82±0,39	34,28	2,67±0,72	3,39±0,05	26,97
7	Gen-17	2,11±0,45	2,75±0,47	30,33	2,45±0,36	3,92±0,89	-37,5
8	Gen-190	2,16±0,44	2,54±0,49	17,60	3,14±0,06	3,54±0,91	-11,3
9	Gen-22	2,62±0,45	2,88±0,32	9,92	2,08±0,62	3,29±0,45	58,17
10	Gen-191	1,18±0,43	1,82±0,40	52,43	2,81±0,75	3,72±0,58	60,32

Conclusions

Thus, when the amount of chlorophyll "a", chlorophyll "b" and total carotenoid was studied from soybean physiological characteristics in the conditions of Kashkadarya regions, it was found that the amount of plastid pigments in the leaves of soybean collection samples changes depending on the biological characteristics of the collection samples. Sufficient amount of plastid pigments expresses the speed of photosynthetic processes in the plant to a certain extent, ensures their growth, development and yield weight. The fact that the amount of chlorophyll "a" in the leaves of the soybean plant is higher than the amount of chlorophyll "b" indicates that the soybean plant is a light-loving plant. Compared to the control, the experiment (when treated with the drug) recorded higher values.

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