ANALYSIS OF SOME ECONOMICALLY VALUABLE TRAITS OF FORAGE CROPS

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Abstract. In the successful development of livestock industries, the feed base is of great importance. In order to improve the productivity of livestock, it is necessary to have a solid feed base. The main part of feed for livestock is grown on agricultural land. For this reason, effective use of agricultural land and achieving the highest possible yield from nutritious crops are urgent tasks.

Currently, more than half of the irrigated lands in Uzbekistan are saline to varying degrees. In addition, problems such as water shortage and abnormal heat in the summer are increasing year by year in the republic. Naturally, in water-scarce and saline lands, the possibility of obtaining high yields from agricultural crops, including nutritious crops, decreases. For this purpose, it is necessary to plant nutritious crop types and varieties suitable for the soil and climate conditions of such regions.

Among the food crops, sorghum and African millet crops are resistant to water shortage, salinity and heat. The Scientific-Research Institute of Plant Genetic Resources has a National Genebank, which stores varieties and samples of all types of agricultural crops. We took 10 samples from the sorghum crop and 10 samples from the African millet crop to be included in our experiments.

Research work was carried out on collection samples of sorghum and African millet crops obtained from the National Genebank and studied for some valuable economic traits.

This paper presents the results of studies on some valuable economic traits in nutritive crops such as sorghum and African sorghum.

Keywords: livestock, feed base, nutritious crops, variety, samples, genebank, productivity.

1. INTRODUCTION

Today's sharp changes in environmental factors on the earth have an impact on the effective use of land and water resources, as well as on increasing the productivity and quality of agricultural products. This, in turn, requires ensuring the safety of food products and improving the consumption ration, increasing soil fertility, preservation and conservation.

The research conducted in the last year shows that about 53% of the irrigated

forests in Uzbekistan are irrigated at the type level, and about 69% of the topsoil has only 0.5-1%. For information, as of October 1, 2020, 44.7% of irrigated land in Uzbekistan was shown to be of varying degrees of salinity, in particular, 31.0% was weakly saline, 11.9% was moderately saline, and 1.9% was strongly saline (https://kun.uz/kr/ 45695026). The possibility of yielding in corn and other agricultural crops may decrease to 2-4 time due to soil erosion.

The livestock sector occupies a special place in the share of the gross agricultural products of Uzbekistan, it is of great importance in providing our people with valuable food products. Due to this, further development of animal husbandry, increasing the productivity of livestock, significantly increasing the production volume of livestock products is one of the important tasks of today. For this purpose, it is important to create a solid feed base in the field, to increase the amount of feed produced per hectare depending on the soil and climatic conditions.

Improving the feed base in livestock requires obtaining as high a yield as possible from nutritious crops on agricultural land devoted to forage production. In order to obtain a high yield from nutritious crops and to increase the unit of nutrients obtained from each hectare of land, it is important to select the types and varieties of nutritious crops suitable for the soil and climatic conditions of each region, as well as to plant high-quality seeds. It is known that corn, which is an important fodder crop in livestock farming, can reduce its yield potential to a certain extent in climates with extremely high temperatures, water scarcity, and saline soils. In such conditions, it is desirable to plant sorghum and African sorghum crops, which are resistant to high temperature, heat and salinity. Cultivation of these crop types in saline soil climates is effective in increasing nutrient availability per hectare and strengthening the nutrient base.

In the creation of new high-yielding varieties of food crops, initial sources are of great importance. In order to choose the right starting materials for selection processes, it is necessary to study the starting sources thoroughly.

Experiments were carried out on collection samples of crops such as sorghum and African millet obtained from the National Genebank in the experimental field of the institute.

Literature review

Sorghum is a unique cereal plant, both in its biological characteristics and in its economic characteristics. Its main advantages are exceptional drought resistance, salt tolerance, high productivity, stable yields over the years, good forage qualities and versatility of use [1].

Sorghum occupies 70-75 million hectares in world agriculture and is in fifth place in terms of sown area after wheat, rice, corn and barley. Its crops are concentrated mainly in Asia (49-50%) and Africa (32-33%). In America they make up 15%, and in Australia and Europe – only 2-3%. Grain sorghum is the most widespread – about 60 million hectares of crops [10].

Sorghum is a crop with many uses. The grain is a valuable concentrated feed for all types of animals and poultry. Sorghum harvested in the milk-wax and wax ripeness phases is used to prepare granulated feed. The green mass of sugar sorghum is fed to animals fresh, and silage, haylage and hay are also prepared from it. 100 kg of green mass contains 24-26 feed units (f.u.), silage - 20-22, hay - 49 f.u. Sorghum grows back well after grazing and can be used to create annual pastures [10-16].

Cultivated grain sorghum is an annual plant with a spring type of development. According to its biological characteristics, sorghum belongs to heat-loving plants, its seeds begin to absorb moisture and germinate at a temperature of 8-10 ° C [16]. For early maturing sorghum varieties to undergo a normal plant development cycle (from seed to seed), the sum of active temperatures is 2000-2500 ° C, mid-early - 2500-3000 ° C, mid-season - 3000-3500 ° C and late maturing - more than 3500 ° C [13].

In order to improve the food supply on saline soils, M.I. Annaeva, F.N. Toreev, M.M. Yakubov, B.D. Allashov, N. Mavlonova conducted research on the development of agricultural technology for growing of Melilotus albus. Studies have found that on saline lands, of Melilotus albus produces a higher yield than alfalfa [12].

The article presents the data obtained from testing crotalaria samples in the Aral Sea region. The experiments were conducted on moderately saline soils and good results were obtained [3].

Experiments were conducted on combined sowing of white sweet clover with cereal crops and their effect on cattle productivity. The article presents the data obtained as a result of these experiments [5].

B.D. Allashov, M.Kh. Zulfikarov, F. Toreev conducted research on the development of agricultural technology for cultivating forage crops resistant to drought and salinity, studied crops for different varieties and rates of white sweet clover "Kibray", oats "Uzbek broadleaf", rye "Shalola", triticale "Prague silver" and corn "Uzbekistan-2018". The economic efficiency of each option was considered. An effective option for sowing white sweet clover in combination with cereals and legumes was identified [4].

Feeding animals with Korean Total Mixed Ration (TMR) technology results in increased feed efficiency and at the same time increased productivity. In this regard, research work on the application and implementation of TMR technology in cattle farms of the population of Uzbekistan is relevant [14].

In the research of B.D. Allashov, M.H. Zulfikarov, M.N. Sattarov, work was carried out on primary seed production on the varieties of fodder beet “Uzbekistan-83”, corn “Uzbekistan-2018”, oats “Uzbek broadleaf”, triticale “Prag” silver" and the varietal qualities of these varieties were improved [2].

The primary center of origin of African millet is northeastern Africa (Sudan and Ethiopia), where the greatest polymorphism of traits has been identified in 100 species; and the secondary center is other parts of Africa, India, Central and Middle Asia, Siberia, Indonesia and the USA [8].

The main countries producing Pearl millet are India (11 million hectares and 9.5 million tons of grain), as well as Central, North-Eastern and West Africa: Nigeria, Niger, Mali, Sudan, Burkina Faso, Ethiopia, Senegal, Chad (16 million hectares and 13.3 million tons of grain). The main producers of Foxtail millet are China and India, Proso millet - Russia, China, the USA and India, Barnyard millet - India, Japan, Korea and China. The main country producing millet crops is India (12 million hectares, 10.9 million tons of grain with an average yield of 0.91 t / ha); in Russia, Proso millet is sown annually on 0.3-0.7 million hectares, and 0.5-1.0 million tons of grain are harvested [18].

2. METHODS

Studies of the institute experience in the field take went, research object as Sorghum and African millet cultivars from the National Genebank varieties, samples

participated. Field experiments were carried out according to Dospekhov (1985).

3. ANALYSIS

In the experimental field of the institute, sorghum and African millet crops obtained from the National Genebank were sown in May 2024 with a row spacing of 70 cm. This variety, samples were analyzed for valuable economic traits such as average height of the plant stem, average number of leaves per plant, average leaf width and length, blue mass yield. When analyzed for plant stem height, the number of plants in the sampled row was counted, and then the stem height of each plant was measured. The obtained results were mathematically processed and the average indicator was determined. When the mean number of leaves per plant was analyzed, the number of plants in each sampled row was counted, and the number of leaves per plant was counted. The obtained results were mathematically processed and the average number of leaves per plant was determined. When leaf width and length were analyzed, the number of plants per sample was counted, and the leaf width and length of each plant were measured and averaged. Then the obtained results were mathematically processed and averaged. 1 pogonometer (linear meter) was determined in the analysis of blue mass yield. To determine the productivity of 1 square meter of land, since the row spacing is 70 cm, it was determined by dividing 1 meter by 70 cm, that is, 1÷0.7=1.43. The plants of 1.43 meters in the planted row of each sample were harvested and weighed on an electronic scale to calculate the yield per 1 square meter and the resulting yield per hectare.

4. RESULTS AND DISCUSSION

Collected samples of sorghum obtained from the national genebank were planted and studied in the experimental farm of the institute. These samples were studied for some valuable economic traits. Table 1 below shows the results obtained by measuring the plant height of the white sorghum crop samples.

Table 1. Average plant height values in sorghum samples (2024)

№	Catalog number	Sample name	Origin	n	Range of indicators	Plant height, sm
1	K-106	IS-9734 Cigoliuos	India	9	140-175	160,0±0,07
2	K-124	IS-20563 Cigoliuos	India	12	150-170	159,6±0,04
3	K-145	SAFVNIIR	Russia	14	120-150	130,6±0,05
4	K-523	JS 7211 c	USA	11	210-300	259,5±0,09
5	K-357	Juar Dalauia	India	31	260-280	274,0±0,03
6	K-652	ICSR-101	Mexico	24	125-150	141,0±0,02
7	K-684	ICSR-292	India	27	155-210	168,0±0,08
8	K-690	ICSR-89039	India	29	250-290	271,0±0,07
9	K-700	Kvobele	France	29	260-320	289,0±0,06
10	standard	Uzbekistan-5	Uzbekistan	21	250-280	262,0±0,04

It can be seen from the data of the table that the average index of plant height was higher in the French “Kvobele” sample of sorghum, collection number K-700, that is, the average index of plant height in this sample was 289 cm. Among the samples, the lowest

indicator was shown by the Russian sample of the collection number K-145, the average indicator of this sample was 130.6 cm. This indicator is 160.0 cm in the sample of collection number K-106, 159.6 cm in the sample of collection number K-124, 259.5 cm in the sample of collection number K-523, 274.0 cm in the sample of collection number K-357, The sample of serial number K-652 was 141.0 cm, the sample of serial number K-684 was 168.0 cm, and the sample of serial number K-690 was 289.0 cm. 3 of the 9 foreign samples studied in the experiments had higher values than the standard, that is, the local Uzbekistan-5 variety, while in 6 samples, this indicator, that is, the average plant height, had lower values than the standard.

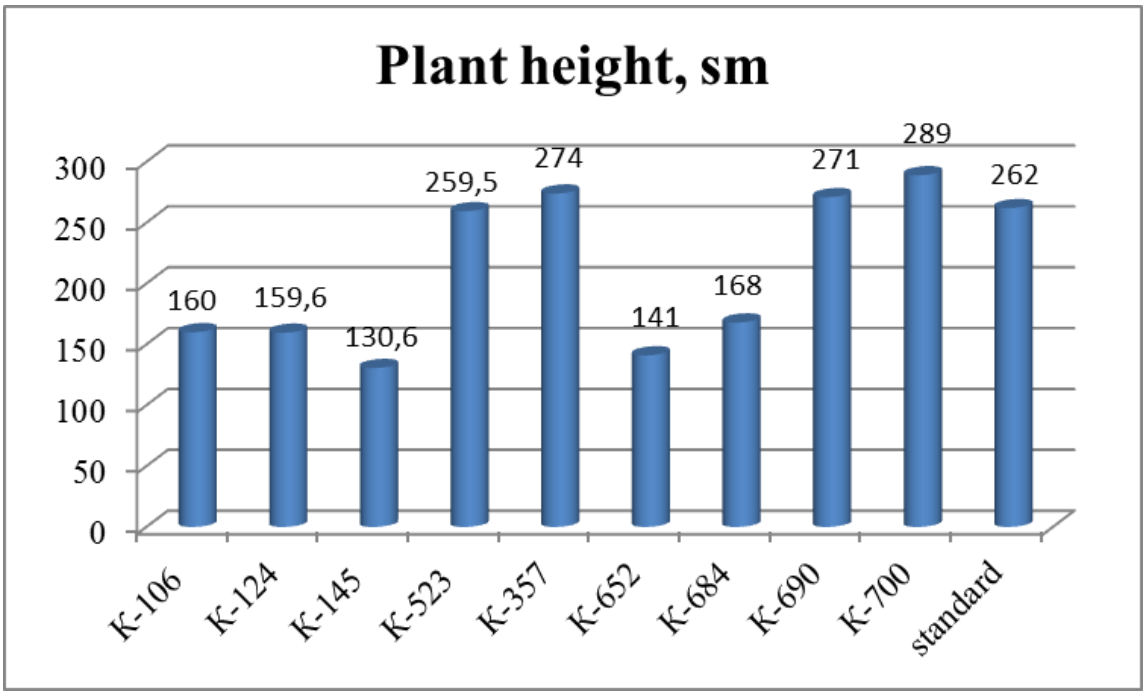

Figure 1. Average plant height values in sorghum samples (2024)

Also, the number of leaves per plant, the average values of leaf width and length of these samples were analyzed. The results of these analyzes are presented in Table 2 below.

Table 2. Average values of leaf number, leaf width and leaf length in sorghum crop samples (2024)

№	Catalog number	Sample name	Origin	n	Number of leaves, ps.	Leaf width, sm	Leaf length, sm
1	K-106	IS-9734 Cigoliuos	India	9	14,7	9,2	57,6
2	K-124	IS-20563 Cigoliuos	India	12	14,5	9,95	61,75
3	K-145	SAFVNIIR	Russia	14	7,1	6,95	77,4
4	K-523	JS 7211 c	USA	11	10,9	5,75	69,2
5	K-357	Juar Dalauia	India	31	11,0	6,4	72,85
6	K-652	ICSR-101	Mexico	24	10,9	8,05	82,1
7	K-684	ICSR-292	India	27	11,3	7,4	64,35
8	K-690	ICSR-89039	India	29	14,0	7,1	81,65
9	K-700	Kvobele	France	29	14,7	6,65	68,2

10	standard	Uzbekistan-5	Uzbekistan	21	11,9	7,85	67,1

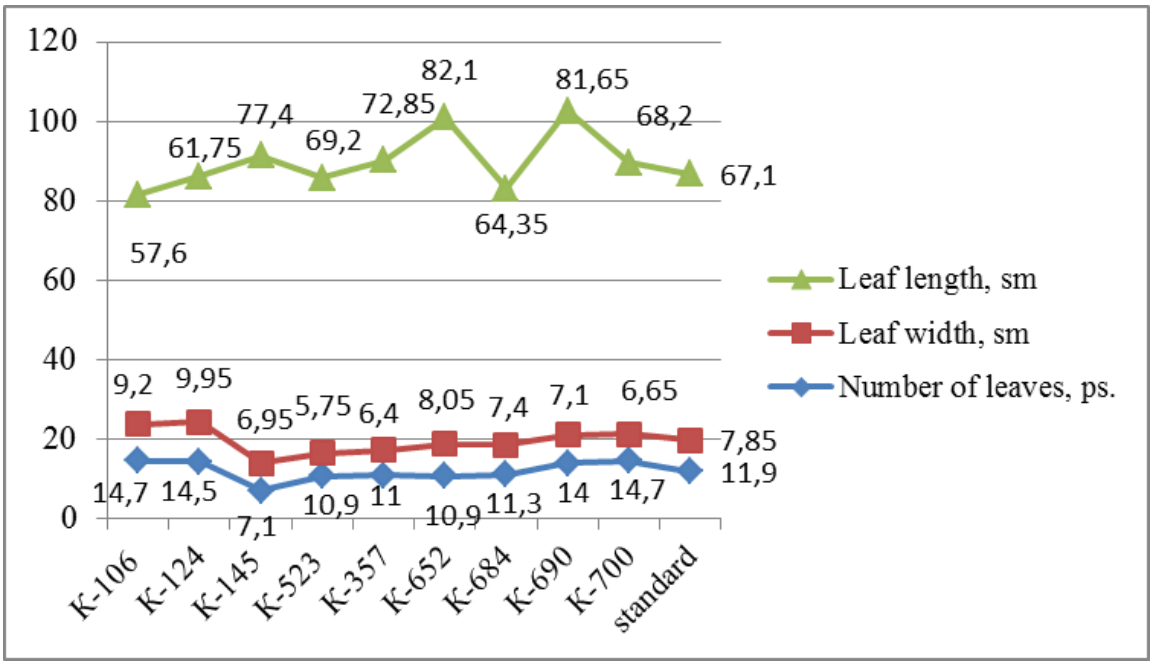

Figure 2. Average values of leaf number, leaf width and leaf length in sorghum crop samples (2024)

It can be seen from the above-mentioned table and diagram that the K- 106 and K-700 samples of sorghum had a high number of leaves, that is, the average number of leaves per plant was equal to 14.7. K-145 sample was the least in terms of this indicator, that is, the average number of leaves per plant was equal to 7.1 pieces. This indicator, that is, the average number of leaves per plant, is 14.5 pieces in sample number K-124, 10.9 pieces in sample number K-523, 11.0 pieces in sample number K-537, 10.9 pieces in sample number K-652, K It was equal to 11.3 units in the -684 sample, 14 units in the K-690 sample, and 11.9 units in the standard. The average values of leaf width were higher in K-106 and K-124 samples, which were 9.2 and 9.95 cm, respectively. The lowest indicator was in sample number K-523, that is, the average leaf width was equal to 5.75 cm. This indicator, that is, the average leaf width per plant is 6.95 cm in sample number K-145, 6.4 cm in sample number K-357, 8.05 cm in sample number K-652, 7.4 cm in sample number K-684, K- It was 7.1 cm in the 690 sample, 6.65 cm in the K-700 sample, and 7.85 cm in the standard. The average values of leaf length were higher in K-652 and K-690 samples, that is, the average value of leaf length was 82.1 and 81.65 cm, respectively. The lowest indicator was in sample number K-106, that is, the average leaf length was equal to 57.6 cm. This indicator, that is, the average leaf length per plant is 61.75 cm in sample number K-124, 77.4 cm in sample number K-145, 69.2 cm in sample number K-523, 72.85 cm in sample number K-357, K- It was 64.35 cm in the 684 sample, 68.2 cm in the K-700 sample, and 67.1 cm in the standard.

These samples were also analyzed for blue mass yield. The results of such analyzes are presented in Table 3 below.

Table 3. Green mass yield indicators of sorghum samples (2024)

№	Catalog number	Sample name	Origin	Yield, s/ha

1	K-106	IS-9734 Cigoliuos	India	540,10
2	K-124	IS-20563 Cigoliuos	India	538,88
3	K-145	SAFVNIIR	Russia	366,52
4	K-523	JS 7211 c	USA	488,97
5	K-357	Juar Dalauia	India	592,20
6	K-652	ICSR-101	Mexico	408,44
7	K-684	ICSR-292	India	493,02
8	K-690	ICSR-89039	India	565,35
9	K-700	Kvobele	France	596,37
10	standard	Uzbekistan-5	Uzbekistan	577,39

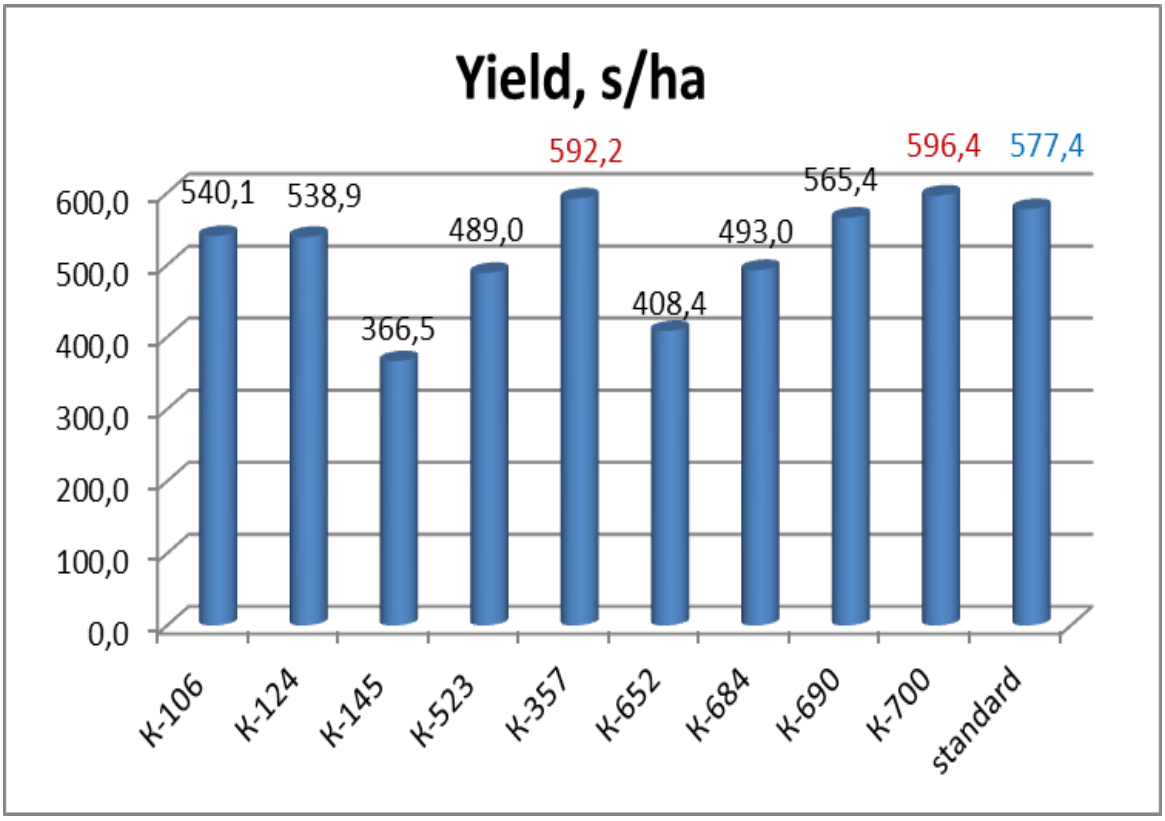

Figure 3. Green mass yield indicators of sorghum samples (2024)

It is known that the yield of nutritious crops is one of the most important indicators in animal husbandry. The higher the yield from the area planted with nutritious crops, the more improvement and strengthening of the nutrient base is achieved. The sorghum crop can be fed to livestock either in the form of green mass or in the form of hay after it has been thoroughly dried. It is also possible to make good silage from the sorghum crop by following the prescribed and recommended practices. When the sorghum samples were studied for blue pulp yield, it was found that the samples named Joar Dalauia of the collection number K-357 of Indian origin and Kvobele of the collection number K-700 of French origin were higher. That is, in these samples, the average indicators of blue mass yield were 592.2 and 596.4 to/ts, respectively. In the local Uzbekistan-5 variety of sorghum planted as a standard, the yield of green mass was equal to 577.4 centners per hectare. The low yield of blue pulp was found in the sample

named K-145 collection number SAFVNIIR from the Russian Federation . In this sample, the productivity indicator was equal to 366.5 centners per hectare. The yield of blue mass from the remaining samples ranged from 408.4 ts. to 565.4 ts.

African millet is an annual grain and fodder crop that is grown in dry climatic regions of Asia, Africa, and partly in Southern Europe. Grain can be used for food and animal feed. The leaves and stems are used to make fodder and hay for livestock. 100 kg of grain contains 89 nutrient units, 10 kg of digestible protein, 100 kg of hay contains 50 nutrient units and 8.2 kg of digestible protein. The plant is heat-loving, light-loving and resistant to drought, cold and moderate salinity, and also develops well in sandy, brown soils. This crop grows well in the climatic conditions of Uzbekistan. The average vegetation period from planting to grain ripening is 70-75 days. This crop is multi-harvested, the first and second harvest yield is on average 600-620 tons of blue mass per hectare. In the first harvest, it gives 450-460 tons of silage mass and 30-35 tons of grain per hectare. It should be said that African sorghum is a promising crop for silage use.

Figure 3. African millet varieties from the national genebank (2024)

Collection samples of African millet from the national genebank were planted and studied in the experimental farm of the institute. These samples were studied for some valuable economic traits. Table 3 below shows the results of plant height measurement of African millet crop samples.

Table 3. Average plant heights of African millet samples (2024)

№	Catalog number	Sample name	n	Range of indicators	Plant height, sm
1	K-60	00116417, 00120252 IcMv155Opm	41	220-260	239,5±0,06
2	K-73	00120243 IcTP8203	38	220-260	242,5±0,05
3	K-9	ElPN-2 (15)	58	190-260	214,5±0,09

4	K-29	CC 1085	55	235-310	265,5±0,08
5	K-4	ElPN-2/12	58	260-280	245,5±0,04
6	K-74	00120244 PCB-IC-925	67	200-300	280,0±0,13
7	K-61	00116418 SPBC	75	210-280	254,0±0,07
8	K-3	ElPN-1(20)	58	240-300	267,0±0,06
9	K-28	ElPN-2(2)	56	250-310	282,0±0,05
10	K-75	00120245 HHVBC toll	52	250-350	292,0±0,09

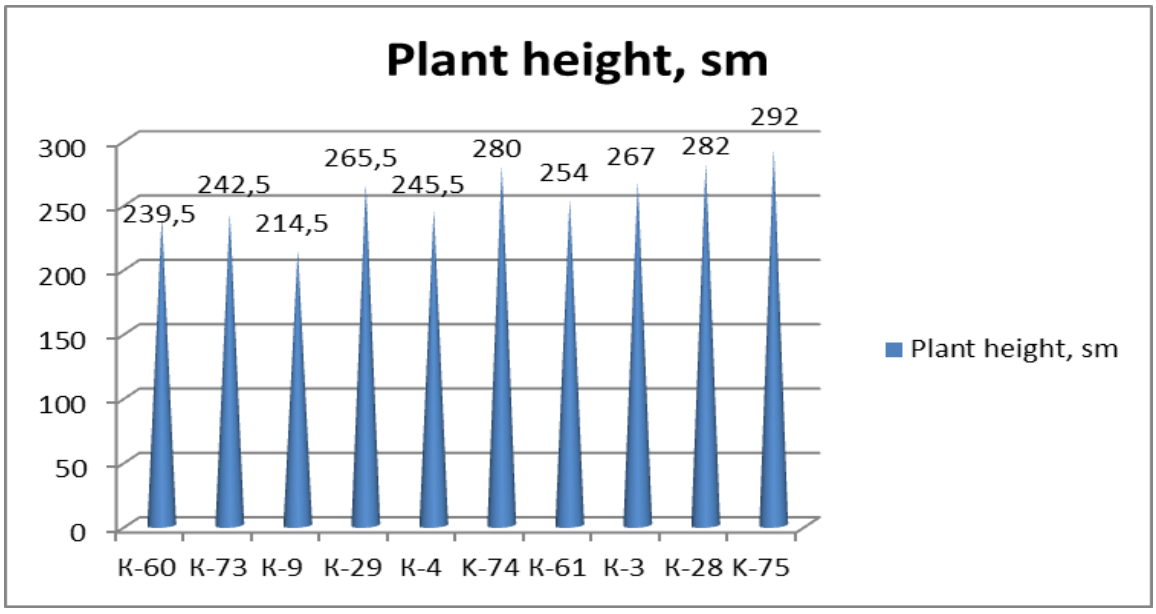

Figure 4. Average plant heights of African millet samples (2024)

From the data of Table 3 and Figure 4, it can be seen that in the K-75 sample of the African plantain crop, the height of the stem was high, that is, the average height of the plant was equal to 292 cm. The lowest indicator of stem height was in sample K-9, that is, the average number of leaves per stem height was 214.5 cm. This indicator, that is, the average indicator of the height of the stem of one plant, is 242.5 cm in sample number K-73, 239.5 cm in sample number K-60, 265.5 cm in sample number K-29, 245.5 cm in sample number K-4 , it was equal to 254 cm in the K-61 sample, 267 cm in the K-3 sample, and 282 cm in the K-28 sample.

The average parameters of the number of leaves, leaf width and length per plant were also studied in the experimental farm of the institute. Table 4 below presents the results of African millet crop samples for average number of leaves per plant, leaf width and length.

Table 4. Average values, number of leaves per plant, width and length of leaves of African millet samples (2024)

№	Catalog number	Sample name	n	Number of leaves, p.	Leaf width, sm	Leaf length, sm
1	K-60	00116417, 00120252 IcMv155Opm	41	10,7	4,5	60,4
2	K-73	00120243 IcTP8203	38	10,8	4,5	70,1

3	K-9	ElPN-2 (15)	58	10,3	3,5	67,3
4	K-29	CC 1085	55	11,9	4,1	75,2
5	K-4	ElPN-2/12	58	11,0	3,5	74,5
6	K-74	00120244 PCB-IC-925	67	10,7	4,0	75,7
7	K-61	00116418 SPBC	75	10,0	3,7	70,7
8	K-3	ElPN-1(20)	58	10,2	4,4	69,7
9	K-28	ElPN-2(2)	56	9,9	3,3	72,1
10	K-75	00120245 HHVBC toll	52	11,6	4,2	69,5

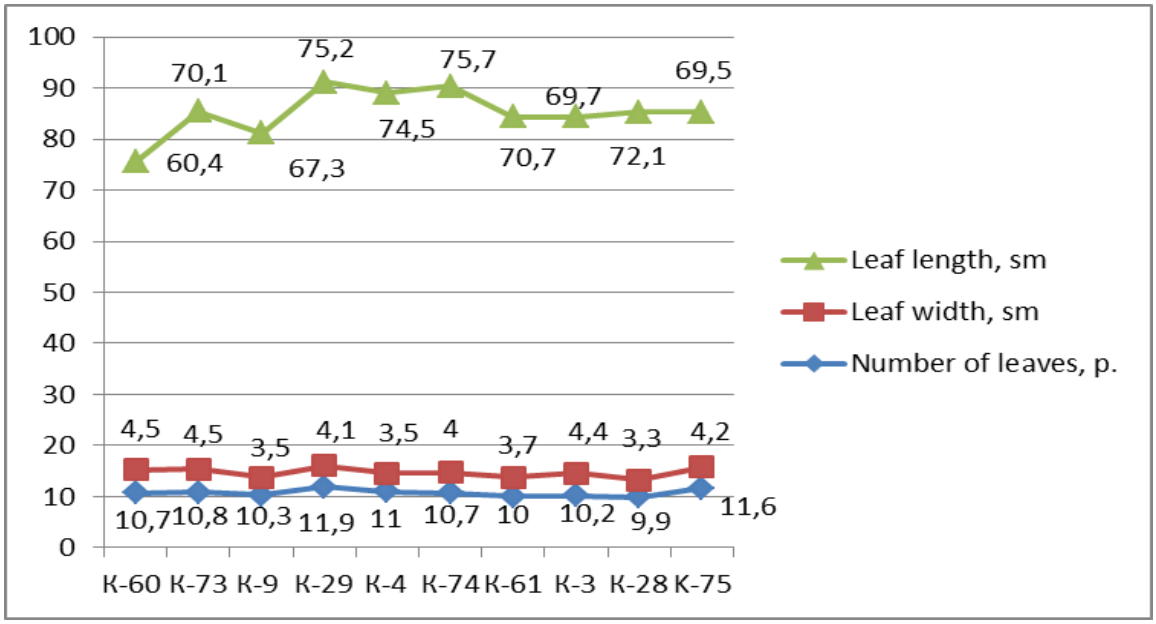

Figure 5. Average values, number of leaves per plant, width and length of leaves of African millet samples (2024)

From the above-mentioned table and diagram data, it can be seen that the K-29 sample of the African millet crop had the highest number of leaves, that is, the average number of leaves per plant was equal to 11.9. The K-28 sample was less on this indicator, that is, the average number of leaves per plant was equal to 9.9 pieces. This indicator, that is, the average number of leaves per plant, is 10.7 pieces in sample number K-60, 10.8 pieces in sample number K-73, 10.3 pieces in sample number K-9, 11 pieces in sample number K-4, K-74 it was equal to 10.7 pieces in the digital sample, 10 pieces in the K-61 digital sample, 10.2 pieces in the K-3 digital sample, and 11.6 pieces in the K-75 digital sample. The average leaf width of African millet was higher in K-60 and K-73 samples, which was equal to 4.5 cm. The lowest indicator was in sample number K-28, that is, the average leaf width was equal to 3.3 cm. This indicator, that is, the average leaf width per plant is 3.5 cm in sample number K-9, 4.1 cm in sample number K-29, 3.5 cm in sample number K-4, 4.0 cm in sample number K-74, K- It was equal to 3.7 cm in sample number 61, 4.4 cm in sample number K-3, and 4.2 cm in sample number K-75. The average leaf length of the African safflower crop was highest in K-29 and K-74 samples, with average leaf length of 75.2 and 75.7 cm, respectively. The lowest indicator was in sample number K-60, that is, the average leaf length was equal to 60.4 cm. This indicator, that is, the average leaf length per plant is 70.1 cm in sample number K-73, 67.3 cm in sample number K-9, 74.5 cm in sample number K-4, 70.7 cm in sample

number K-61, K- It was equal to 69.7 cm in sample No. 3 , 72.1 cm in sample number K-28, and 69.5 cm in sample number K-75.

5. CONCLUSION

Research work was carried out on varieties and samples of sorghum and African millet crops obtained from the National genebank, some valuable economic traits were studied. Based on the obtained results, the following conclusions can be made:

- sorghum variety, when the samples were studied according to the height of the plant stem, the average indicator of the height of the standard Uzbekistan-5 variety was 262.0 cm, of which 3 samples had high indicators, the remaining 6 samples had low indicators;

- sorghum cultivar, when the samples were studied according to the number of leaves per plant, the average indicator of the number of leaves per plant in the standard Uzbekistan-5 variety was 11.9, of which 4 samples had a high indicator, and the remaining 5 samples had low indicators;

- when studying the sorghum variety, samples in terms of leaf width and length, the standard Uzbekistan-5 variety has a leaf width of 7.85 cm and a leaf length of 67.1 cm. in terms of leaf length, 6 samples had high indicators, 3 samples had low indicators;

- it was found that the yield of sorghum crop was higher in samples of collection number K-357 and K-700. That is, in these samples, the average indicators of blue mass yield were 592.2 and 596.4 to/ts, respectively.

- When the samples of the African millet crop were studied according to the height of the plant stem, the highest indicator of the stem height was in the K-75 sample, that is, the stem height was equal to 292.0 cm in this sample, while the lower index was in the K-9 sample, that is, 214.5 was equal to cm;

- When the samples of the African millet crop were studied according to the number of leaves per plant, leaf width and length, the highest number of leaves was found in the K-29 sample, that is, the average number of leaves per plant was equal to 11.9. The K-28 sample was less on this indicator, that is, the average number of leaves per plant was equal to 9.9 pieces. The average leaf width of African millet was higher in K-60 and K-73 samples, which was equal to 4.5 cm. The lowest indicator was in sample number K-28, that is, the average leaf width was equal to 3.3 cm. The average leaf length of African millet was highest in K-29 and K-74, with average leaf length of 75.2 and 75.7 cm, respectively. The lowest indicator was in sample number K-60, that is, the average leaf length was equal to 60.4 cm.

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