DURABILITY AND PRODUCTIVITY CHARACTERISTICS OF SORGHUM

Juraeva Ozoda Tokhirovna
Teacher, Bukhara State University, Bukhara, Uzbekistan

Rashidova Mukhayyo Qahramonovna
Master's student, Bukhara State University, Bukhara, Uzbekistan

Today, the use of plant resources is increasing significantly. Plant raw materials are grown to provide food, including meat, dairy products and other products to the growing population. In this regard, the evaluation of the physiological, biochemical and haloaccumulating properties of new crop species, whose productivity and nutrition are not inferior to traditional species in saline and arid regions, and their introduction into agricultural practice, is of scientific and practical importance in effectively solving several agroecological problems. In the world, scientific research is being conducted on the problem of using the gene pool of plant resources, especially biodiversity in ensuring ecological stability, high nutrition and productivity of agriculture.

In this regard, to determine the valuable characteristics of sorghum (Sorghum vulgare (Pers.)) in terms of the characteristics and agroecology of growing new plants, to create new varieties, to develop new methods of cultivation by determining the physiological-biochemical and haloaccumulation characteristics of plants, to determine the growth and development characteristics of promising plants, and attention is being paid to scientific research on the development of ecologically safe technologies of cultivation in various stress regions. Oats occupy an important place in the world as a nutritious crop. Currently, about 50 types of corn are cultivated in 104 countries [1].

70 mln. of corn in the world. tons of grain are grown. This figure is 21.6 million tons in Africa, 26.5 million tons in the USA, 16.2 million tons in Asia, 6.4 million tons in Mexico and 2.5 million tons in Argentina [2].

Because the corn has a strong root system, it can be used as a phytomeliorant, or more precisely, as a phytoremediation, in soil conditions affected by heavy metals. At the same time, corn cleans the soil of heavy metals. Of course, in this case, the product obtained from corn should be used for technical purposes, for example, in the production of bioethanol [3].

A.A. Alabushev, A.U. Romanyukin and others studied the collected samples of corn, and 10 promising ones were selected from among them. When choosing promising corn samples, importance is focused on their productivity, length of the vegetation period and resistance to external environmental conditions. The growth period of early varieties was 120 days, and that of mid-ripening varieties was 123 days. In this case, the leaf length of the collected samples was 54-68 cm, the leaf width was 4.8-6.8 cm, the number of leaves was 9-12, and the amount of sugar in the stem was found to be 8.7-15.0% [4].

N.A. Kovtunova, V.V. By Kovtunov researching the vegetation period of the varieties, according to this indicator, the varieties are divided into early, medium and late ripening varieties. As a result of studying the processes of growth and development of sorghum varieties, it was recommended to give importance to the following indicators in determining the precocity of sugar, grain and grass sorghum varieties. The period from germination to maturity is set at 90 days for grain sorghum, 100 days for sugar sorghum, and 40 days for grass sorghum.

At the same time, the height of grain sorghum is up to 120 cm, 200 cm for sugar sorghum and 200 cm for grass sorghum [5].

A high result was noted in the variants of the Uzbekistan-18 variety, which gave 320-330 kg of nitrogen and 100-110 kg of phosphorus per hectare, and the leaf area was equal to 64.3 thousand m2/ha. In this case, the net productivity of photosynthesis increased from 1.81 g/m2 to 3.72 g/m2 per day, and the yield was 31.1 t/ha [6].

He also determined the effect of biological preparations on the biochemical parameters of corn. It is noted that the amount of protein in the control was 8.7%, while its indicator was 10.3% under the influence of biological preparations. As a result, grain yield increased from 1480 kg/ha to 2290 kg/ha [7].

The product of the physiological process in plants is the amount of organic matter. This indicator is evaluated with indicators such as productivity or productivity. In turn, productivity is a product of the genotype and the external environment. A positive combination of the external environment and genotype is considered high productivity. For this reason, the study of the influence of the external environment on the genotype is interesting on the one hand, and complicated on the other. If 140 t/ha of green mass was obtained from African soil in the conditions of the Tashkent region, this indicator was equal to 125 t/ha in the Jizzakh region and 120 t/ha in Karakalpakstan [8].

It has been noted that the yield of sorghum varieties is influenced by the planting scheme and rate. The following results were recorded in the options where the sorghum variety is 15-30-70 cm between rows and the planting rate is 200-250 thousand bushels per hectare. 18.7 t/ha, 17.5 t/ha at 30 cm, and 22.0 t/ha in wide rows at 70 cm [9].

It has been found that the productivity of photosynthesis is affected not only by agrotechnical measures but also by the biological characteristics of varieties. When new, old and local varieties of Marjumak (buckwheat) were compared, it was found that the net photosynthesis productivity of the new varieties was 12.3% higher than the old varieties. This is due to the increased leaf size in new varieties [10].

In world agriculture, sorghum has been considered one of the most valuable grain and fodder crops that are extremely resistant to drought. The biological feature of this crop, that is, it is not very demanding in terms of environmental conditions, has been confirmed in many years of experience. The practice of growing sorghum in arid and poorly watered regions shows that

this crop is active to soil and air dryness, optimal transpiration process and high concentration of cell sap, and easy tolerance to hot haremsel [11-13].
Sorghum consumes much less water per unit of dry matter than corn, cotton, sunflower or oats, and thus can produce higher blue mass and grain yield. For example, in experiments, it was observed that maize crop consumes 160.6, sorghum 132.3, and millet 127 water units to produce a unit of dry matter, and it is observed that sorghum is more resistant to hot weather compared to other crops [14-17].
The transpiration coefficient of sorghum is 150-200, which is much lower than that of other cereals. Sorghum conserves moisture. 1 gram of dry matter requires 132 grams of water, corn uses 161 grams, oats uses 273 grams, and sunflower uses 377 grams of water [18-20].
Observations made in recent years show that the drought resistance of sorghum is related to its productivity, which shows that the plant has valuable properties from biological and economic points of view. For example, scientists have confirmed that sorghum outperforms even corn in terms of grain and silage mass yield in years of dry weather. Adaptation of sorghum to conditions in water-scarce regions is due to the well-developed root system of this plant, the surface of the leaves and stems being covered with wax dust, as well as the special structure of the mouths on the leaves (which allows for saving water). The deep penetration of the sorghum root into the ground and other features have historically been the result of unfavourable environmental conditions. In arid regions, sorghum yields at least 48 centners of grain and 300-350 centners of green pulp and up to 120 centners of hay per hectare [21-22].
Even when the moisture reserve in the soil drops to a critical level after a dry year, sorghum tolerates such conditions and gives a higher yield than corn.
Also, sorghum can easily survive longer periods of drought than maize, and then recover and resume normal growth and development and produce abundant crops. The study of drought tolerance of sorghum is of great practical importance. It is especially important for farms located in arid zones. In such zones, water is always in short supply, and sorghum is the main source of food for livestock. To get an abundant and high-quality harvest from any crop, it is necessary to create the necessary conditions for this crop. One of the factors providing such conditions is irrigation. It was mentioned above that sorghum is extremely resistant to drought. However, to obtain high grain and silage mass, it is necessary to water it in time [23].
Development of agrotechnical measures in irrigated agricultural areas to obtain high grain, silage mass and green yield in the cultivation of local selection forms of buckwheat, biological characteristics of each cultivated plant, soil and climatic conditions, in addition to the extent to which the area is supplied with water, the water transfer of the system of irrigation stations based on good knowledge of ability. This, in turn, makes it possible to grow abundant crops with minimal water consumption. The irrigation regime (norms, periods, etc.) is developed taking into account the water demand of the cultivated crop, the order of irrigation, and the characteristics of the area. It certainly implies efficient use of irrigation water. At a time when

water scarcity is becoming more and more felt, the efficient use of water remains an important issue [24].

Experiments carried out over many years show that sorghum is a naturally drought-resistant crop, and it is possible to produce up to 400 centners of silage per hectare even with a single application of water. Therefore, wherever it is possible to create such conditions, it is recommended to include sorghum among other crops in the plan. For this purpose, first of all, the areas that are unfavourable for growing cotton and then not suitable for crops, that is, often damaged by dry heat or soil salt, as well as spring lands in the foothills and mountain zones, can be allocated for planting sorghum. According to the data, if salt resistance is considered to be 0.030-0.035 per cent of chlorine ion at the highest level, depending on the dry state of the soil, this amount is 0.038 per cent in oat. Unlike other crops, sorghum can withstand soil salinity of 0.6-0.8%.

In corn, this indicator is only 0.4 per cent. Sorghum removes sodium, calcium, and magnesium from the soil with its crop, thereby cleaning the soil. In other words, corn can reduce soil salinity by 0.6-0.8 per cent, while corn can only reduce soil salinity by 0.4 per cent. Sorghum also plays the role of phytoremediator by removing harmful salts from the soil [25].

Land that is unsuitable for other crops can be used for planting sorghum. In this type of land, the yield of blue mass of corn is reduced and it does not produce soot. Sorghum is resistant to soil salinity and gives a relatively abundant harvest due to its good resistance to surface water. Therefore, based on the above, it can be recommended to plant sorghum in areas with high soil aridity and soil salinity. By planting this plant, soil salinity can be reduced by the method of phytomelioration. In addition, there will be an opportunity to get grain, blue mass and hay.

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