

Breeding and Seed Farming of Desert Forage Plants in Uzbekistan

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Abstract. The article provides a description of the best-zoned varieties of desert forage plants intended for the intensification of fodder production in the semi-desert and desert zones of the Republic of Uzbekistan. The features of agricultural technology for creating highly productive pasture agrophytocenoses in desert and semi-desert zones are given. In the breeding of desert fodder plants, traditional methods were widely used, which consider the biological characteristics of the reproduction of each particular species. The created local varieties of desert fodder plants contributed to the creation of highly productive pasture agrophytocenoses in the conditions of deserts and semi-deserts of Uzbekistan with fodder productivity of 19-27.0 q/ha of dry weight.

Keywords: pastures, productivity, degradation, varieties, pasture animal husbandry, productive longevity, plant harvesting, introduction, agroecological state of pastures.

1 Introduction

Deserts and semi-deserts pastures, which occupy approximately 65% of the territory of the Republic of Uzbekistan, are the main source of fodder for desert pastoral animal husbandry. They are characterized by relatively low (1.5-3.5 c/ha) fodder productivity, and sharp fluctuations in yield over the years and over the seasons of the year, depending on the amount of precipitation. In addition, due to unsystematic overgrazing, pastures of deserts and semi-deserts are currently degraded to varying degrees, and there is a sharp decrease in pasture productivity.

In recent years, measures have been taken to increase the fertility of degraded pasture lands, restore land and the environmental sustainability of natural pastures of flora and fauna, aimed to increase the efficiency of pasture use [1-3]. Irrational methods of pasture use, anthropogenic and technogenic impacts accelerated the processes of their degradation and were the reasons for the decrease in fodder productivity. The issues of improving the agroecological state of pastures, as well as the creation of productive agrophytocenoses of fodder plants on degraded soils of desert pastures, are considered an urgent task [4-8].

According to data published in recent years, the average yield of pastures has decreased by an average of 25% [9]. Due to the digression of the vegetation cover, the yield decreased by 20% on 9 million hectares of pastures, by 30% - on 5 million hectares of pastures and

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by 40% or more - on 2 million hectares of pastures [10]. In this regard, for the sustainable development of desert pastoral animal husbandry in the republic, it is extremely necessary to intensify fodder production by phytomelioration of degraded pastures using highly productive varieties of desert fodder plants. As a result of many years of introduction-breeding and seed farming, the Selection Center for Desert Forage Plants at the Research Institute of Karakul Breeding and Desert Ecology has created and released more than a dozen promising varieties designed to increase the productivity of degraded pastures. These varieties are characterized by high fodder productivity, drought and disease resistance, high fodder properties, productive longevity and good digestibility by all types of farm animals.

2 Materials and methods

The research materials were wild populations of *Kochia prostrata*, *Halothamnus subaphylla*, *Atriplex undulata*, *Ceratoides ewersmanniana*, *Salsola orientalis*. Ecotypic, mass multiple selections and the method of free hybridization of geographically distant forms were used in breeding.

3 Results and discussion

Izen variety - *Kochia prostrata* (L.) Srad. - "Otavny" was bred by the method of multiple mass selection from the wild population of the stony ecotype, common in the mountainous regions of the Osh region of the Republic of Kyrgyzstan. It presents a perennial semi-shrub 75-130 cm high. Bushiness is high (65-85 annual twigs in a bush). The growing season in the conditions of the Karnabchul desert is 260-265 days. The yield of dry fodder mass is 17.3 - 22.5 q/ha, the yield of seeds - 1.7 - 2.5 q/ha. The dry mass contains 14.9% of crude protein. 100 kg of hay contains 44.9 feed units. The productive longevity of the variety is 15-20 years. It is recommended to use Izen variety "Otavny" when creating highly productive pasture agrophytocenoses in conditions where the average annual precipitation is 160-350 mm per year [7].

Izen variety - *Kochia prostrata* (L.) Srad. "Nurota" - was bred by hybridization of two ecotypes of Izen widespread in the southern regions of Kyrgyzstan (var. *virescens* X var. *canescens*). It presents a perennial semi-shrub 100-135 cm high. Bushiness is high (75-80 annual twigs in a bush). The growing season in the foothill semi-desert Nurata is 250-255 days. The yield of dry fodder mass is 20 - 25 q/ha, the yield of seeds - 2.0 - 2.5 q/ha. The dry mass contains 15.3% of crude protein. 100 kg of hay contains 46.5 feed units. The productive longevity of the variety is 15-17 years. It is recommended to use the Izen variety "Nurata" when creating highly productive pasture agrophytocenoses in the conditions of foothill semi-deserts, where the average annual precipitation is 200 - 350 mm per year [11].



Fig. 1. Izen variety "Nurota"

Chogon variety - *Halothamnus subaphylla* (Aellen.) "Zhayhun" - was bred by the method of multiple mass selection from a wild-growing population widespread in the Mubarek district of the Kashkadarya region of the Republic of Uzbekistan. It presents a perennial semi-shrub 75-120 cm high. Bushiness is high (65-85 annual twigs in a bush). The growing season in the conditions of the Karnabchul desert is 245-250 days. The yield of dry fodder mass is 15.6 - 19.0 q/ha, the yield of seeds - 1.65 - 3.5 q/ha. The dry mass contains 14.6-16.6% of crude protein. 100 kg of hay contains 43.5 feed units. The productive longevity of the variety is 20 - 25 years. It is recommended to use the Chogon variety "Zhayhun" when creating highly productive pasture agrophytocenoses in the conditions of foothill semi-deserts and deserts, where the average annual precipitation is 160 - 350 mm per year [4].



Fig. 2. Chogon Variety "Zhayhun"

The variety of perennial atriplex - *Atriplex undulata* "Yagona" was bred by the method of multiple mass selection from a wild population introduced from Syria. It presents a perennial semi-shrub of hemispherical shape. It forms numerous generative shoots 75-125 cm long. The vegetation period in the conditions of the Karnabchul desert is 230-235 days. The yield of dry fodder mass is 25.6 - 29.0 q/ha, the yield of seeds - 2.65 - 3.5 q/ha. The dry mass contains 12.6-14.6% of crude protein.



Fig. 3. Atriplex variety "Yagona"

100 kg of hay contains 46.5 feed units. The productive longevity of the variety in the conditions of the Karnabchul desert is 5-6 years. It is recommended to use the atriplex variety "Yagona" when creating highly productive pasture agrophytocenoses in foothill semi-deserts and deserts, where the average annual precipitation is 160 - 350 mm per year. The variety reproduces well by self-sowing, the seeds remain viable for 3-6 years.

Teresken variety - *Ceratoides ewersmanniana* "Tulkin" - was bred by the method of multiple mass selection from a wild population widespread in the mountainous regions of the Republic of Kyrgyzstan. The plant is a semi-erect perennial shrub 75-85 cm high. It has a well leafy system (45%); leaves are wide, ovate, in summer, when severe drought sets in, large leaves fall off. The growing season in the conditions of the Karnabchul desert is 210-220 days. The yield of dry fodder mass is 12.0-16.0 q/ha, the yield of seeds 1.5-2.5 q/ha. 100 kg of dry teresken fodder contains 40-45 feed units and 9.1 kg of digestible protein. The productive longevity of the variety is 25 - 30 years. It is recommended to use the Teresken variety "Tulkin" when creating highly productive pasture agrophytocenoses in the conditions of foothill semi-deserts and deserts, where the average annual precipitation is 160 - 350 mm per year [12].



Fig. 4. Teresken variety "Tulkin"

Keyreuk variety - *Salsola orientalis* - "The firstborn of Karnaba" was bred by the method of multiple mass selection from a wild population harvested in Mubarekchul, Mubarek district, Kashkadarya region, Republic of Uzbekistan. The plant is a semi-erect perennial shrub, 65-70 cm high. It has a well leafy system (35%); leaves are narrow, cylindrical, and succulent. The growing season in the conditions of the Karnabchul desert is 240-260 days. The yield of dry fodder mass is 12.0 - 17.0 q/ha, the yield of seeds - 2.5 - 4.5 q/ha. 100 kg of dry keyreuk fodder contains 49-55 feed units and 8.2 kg of digestible protein. The productive longevity of the variety is 20 - 30 years. It is recommended to use the Keyreuk variety "The Firstborn of Karnaba" when creating highly productive pasture agrophytocoenoses in desert conditions, where the average annual precipitation is 160 - 200 mm per year [13-15].



Fig. 5. Keyreuka variety "The first-born of Karnaba"

The above varieties of desert fodder plants are recommended for use in the creation of multicomponent highly productive pasture agrophytocoenoses in the desert and semi-desert zones of Uzbekistan. In agrophytocoenoses created by continuous plowing of soil and sowing a mixture of seeds of these varieties, the yield in different years amounted to 19-27.3 q/ha of dry fodder mass, while the yield of natural wormwood-ephemeral pastures in good years does not exceed 5- 6 q/ha of dry matter.

Peculiarities of agrotechnology for creating highly productive pasture agrophytocoenoses in desert and semi-desert zones. When creating highly productive pasture agrophytocoenoses, areas with thinned-out herbage are selected, i.e. heavily degraded areas. In the spring, when the soil is sufficiently moistened, underwinter plowing of soil is carried out at a depth of 20-25 cm. Before sowing the seeds, it is necessary to carry out a harrowing, and then the seeds are sown manually - by the dispersion method. After sowing the seeds, in order to minimize the seeding-down, slight thinning is carried out. The optimal time for sowing seeds is the late autumn-winter period of the year (November-February). The seeding rate, depending on the type of plant, is 3.5-12 kg/ha of conditioned seeds.

4 Conclusion

The natural wild flora of the arid zones is a rich source of material for the introduction, administration into a crop, and selection of desert fodder plants.

The introduction should be conducted purposefully, and the choice of plants should not be random. In this regard, it is necessary to outline the stages in the study of the flora and the collection of fodder plants according to the planned areas of selection: harvesting plants for hay use, harvesting plants for pasture use, formation of pastures for different seasons.

In the selection of desert fodder plants, traditional methods of plant breeding can be widely used, depending on the biological characteristics of the reproduction of each particular species.

The created local varieties of desert fodder plants contribute to the formation of highly productive pasture agrophytocenoses in the conditions of deserts and semi-deserts of Uzbekistan with fodder productivity of 19-27.0 q/ha of dry weight.

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