

On Agrotechnical Methods for Creating Cultivated Pastures

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Annotation: The article presents the results of a study to determine the area of plant nutrition, one of the most important agrotechnical techniques used in the creation of cultivated pastures with desert wheatgrass and Khorasan sainfoin, which are considered nutritious feed for livestock. When creating cultivated pastures using wheatgrass and sainfoin, an important role is played by the correct determination of the area of plant nutrition, which allows increasing pasture yields several times, enriching the vegetation cover of pastures with new species with high feed qualities, and creating conditions for guaranteed hay harvesting for wintering.

Keywords: wheatgrass, sainfoin, nutrient, hay, feeding area, yield, seed yield, adyr, cultivated pasture.

Introduction. Of the 20.6 million hectares of land in the Republic of Uzbekistan, a significant portion is natural pastures, which play a vital role in the development of animal husbandry, one of the key sectors of the national economy. In particular, pastures in desert and foothill regions are used almost all year round for breeding karakul sheep, camels and goats. About 95% of the annual need for livestock feed is covered by natural pasture vegetation. Despite the fact that such pastures are cheap, convenient and accessible for year-round use, their fodder reserves are very low (only 1.5–3.5 centners per hectare) and vary greatly from year to year and from season to season. Another disadvantage of natural pastures is the gradual decrease in the nutritional value of feed

from spring to winter [1,2]. In addition, failure to comply with the rules of pasture use - excessive and disorderly grazing of livestock, ruthless cutting of shrubs and subshrubs for economic needs, geological exploration, mining, construction of power lines, highways, etc. - leads to a reduction in the number of valuable forage plants. In their place, species with low nutritional value and productivity appear, that is, pastures degrade [3]. Such negative phenomena are especially pronounced in the foothill areas, where the largest number of people live.

Pastures of foothill areas (adyr) are located at an altitude of 400 to 1200 (1400) meters above sea level and are foothill areas that in spring serve as a source of nutritious green grass for livestock weakened over the winter. However, due to the lack of shrubs and the scarcity of subshrubs on the pastures of the Adyr region, the autumn-winter months are not provided with fodder reserves. This, in turn, requires the cultivation and introduction into production of fodder and hay plants adapted to the conditions of the foothill zone. Among such plants, desert wheatgrass and Khorasan sainfoin occupy a special place.

Research on ryegrass was mainly conducted in the Russian Federation [4], and also partially in Kazakhstan and Kyrgyzstan. Sainfoin samples were tested in Kazakhstan [5], where the most promising forms were identified. Since ryegrass does not grow naturally in our republic, imported species and samples were tested at the Karakul experimental site "Nurota", and it was found that ryegrass is a suitable plant for the mountainous regions of our republic [6]. Research on Khorasan sainfoin was conducted mainly in natural conditions (in the environment where they grow naturally) [7]. Considering that ryegrass and Khorasan sainfoin are nutritious forage plants with valuable food properties, and also that little research has been conducted on them, scientific research has been conducted on the cultivation of these plants. Growing forage grasses in dry conditions (snow farming) requires the use of a system of special agrotechnical measures. One of the most important agrotechnical measures is determining the area of plant nutrition. The correct choice of this indicator ensures the full development of plants and obtaining high yields for many years.

Source and methods of the study. Desert wheatgrass and Khorasan sainfoin were chosen as the object of the study, the seeds of which were sown in order to determine the optimal area of plant nutrition. The planned field experiments, biometric measurements, as well as observations of growth, development, viability of plants and hay yield were carried out on the basis of generally accepted methods in plant growing and plant introduction [8,9]. In the experiments, the seeds of desert wheatgrass and Khorasan sainfoin were sown in a square-nest way with a distance between plants of 30x30 cm; 45x45 cm; 60-60 cm; 75x75 cm; (in triplicate). To ensure normal development of germinated seedlings in April, 1 plant was left in each nest and thinned out. As a result, the planned number of plants was achieved in the experimental plots.

Results of the research and their analysis. The research was conducted on the experimental plot of the Navoi branch of the Academy of Sciences of the Republic of Uzbekistan, located in the Nurata district of the Navoi region. The location of the research is the foothills of the Nurata mountain range, at an altitude of 660-680 m above sea level. The soil type is light gray soil, according to the mechanical composition - loamy soil [10].

The experiments studied the survival, growth, development and dependence of the yield of hay and seeds of wheatgrass and Khorasan sainfoin on the area of plant nutrition. One of the most important economic characteristics of pasture forage crops is their survival. The experiments found that the plants died mainly in the first year of vegetation and partly in the second year. In the third year of plant vegetation, the number of plants in the fields remained unchanged. In the first year of vegetation, i.e. when the plants were herbaceous and not highly branched, the death of plants in all plots was almost the same. In the following year of vegetation, it was observed that the smaller the feeding area (30x30 cm), the higher the death of plants (survival of wheatgrass - 80.2%, Khorasan sainfoin - 83.8%), and, conversely, with an increase in the feeding area (75x75 cm), the death of plants decreased (survival of wheatgrass - 94.8%, sainfoin - 92.6%). These

indicators are high for forage plants grown in dryland farming conditions and indicate good adaptation of the selected species to the conditions of the foothill steppes.

The height of plants and the formation of lateral shoots depend on their feeding area, and if it is normal, the plants develop well. Growth rates also depend on environmental factors, including the amount of precipitation. Due to the large amount of precipitation in 2024, both species grew and developed well.

Despite the insufficient amount of precipitation in 2025, the growth and development of plants were observed in accordance with expectations. In desert wheatgrass, depending on the feeding area, the height of plants ranged from 62.7 to 69.2 cm. It should be noted that the highest stage of growth, development, as well as the collection of hay and seeds in pasture forage plants occurs in the third year of their vegetation, and it is known from previous studies that their growth and yield in subsequent years may be higher or lower than expected depending on weather conditions.

The hay yield was determined depending on the plant feeding area. In the first year of vegetation, it was found that the smaller the feeding area, i.e. the higher the plant density in a given area, the higher the yield. In the second year of vegetation, regardless of differences in the feeding area, the hay yield leveled off. According to the table, in the third year of vegetation, when the plants reached their maximum growth rates, the highest yield of desert wheatgrass was recorded with a feeding area of 60×60 cm and amounted to 12.6 centners per hectare. The highest yield of Khorasan sainfoin was obtained with a feeding area of 45×45 cm and amounted to 17.6 centners per hectare. Thus, the optimal feeding area is 60×60 cm (0.36 m²) for desert wheatgrass and 45×45 cm (0.20 m²) for Khorasan sainfoin. Desert wheatgrass and Khorasan sainfoin are perennial grasses that grow and develop in the spring, their yield in subsequent years of vegetation largely depends on spring precipitation and moderate temperatures, as well as on weather conditions in general.

Economically valuable characteristics of desert wheatgrass and Khorasan sainfoin (third year of vegetation - 2025)

Food area	Survival rate, in the numerator the number of plants, thousand pcs/ha; in the denominator - %)	Plant height, cm	Hay yield, c/ha	Seed yield, kg/ha
Desert wheatgrass				
30x30	$\frac{89,3 \pm 3,1}{80,2}$	62,7±2,4	9,2±0,4	71,3±2,5
45x45	$\frac{41,6 \pm 1,7}{85,9}$	69,3±2,7	11,7±0,5	81,6±2,7
60x60	$\frac{26,7 \pm 0,9}{92,3}$	75,6±2,6	12,6±0,4	92,4±3,1
75x75	$\frac{16,7 \pm 0,6}{94,8}$	76,1±2,9	7,3±0,3	63,2±2,3
Khorasan sainfoin				
30x30	$\frac{91,3 \pm 3,5}{83,8}$	61,3±2,5	15,2±0,6	74,6±2,4
45x45	$\frac{44,1 \pm 1,8}{91,1}$	67,9±2,3	17,6±0,5	142,7±4,5
60x60	$\frac{26,5 \pm 0,8}{91,6}$	68,3±2,6	14,1±0,6	109,3±4,1
75x75	$\frac{16,3 \pm 0,5}{92,6}$	69,2±2,8	12,5±0,3	71,4±3,2

To improve the condition of degraded areas of natural pastures, high-quality seeds of promising phytomeliorants are needed. The quality indicators of seeds of plants common in natural pastures do not fully meet the requirements for the creation of cultural pastures. In addition, the studied desert wheatgrass does not occur in our Republic in its natural state, and the possibility of collecting seeds of Khorasan sainfoin is limited due to its consumption and spread by cattle. Therefore, it is advisable to grow seeds of desert wheatgrass and Khorasan sainfoin in specially protected areas with the implementation of the necessary agrotechnical measures. Experiments have shown that the yield of plant seeds is closely related to the area of their nutrition. Both desert wheatgrass and Khorasan sainfoin partially entered the generative phase in the second year of vegetation. According to the table data, in the third year of vegetation, when the plants reached their maximum growth, the highest seed yield was observed in wheatgrass with a feeding area of 60×60 cm, and in sainfoin with 45×45 cm. Thus, to achieve the highest seed productivity, the optimal feeding area is 60×60 cm (0.36 m²) for desert wheatgrass and 45×45 cm (0.20 m²) for Khorasan sainfoin.

Conclusion. When creating pastures and hayfields with wheatgrass and sainfoin in the Adyr region, determining the area of plant nutrition and creating appropriate crops will create conditions for a multiple increase in pasture yields, enriching their plant cover with new species valuable in terms of food value, as well as creating conditions for guaranteed hay harvesting for wintering.

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