Special Issue on Basis of Applied Sciences and Its Development in the Contemporary World
Published in Association with
Department of Technology and Organization of Construction, Samarkand State Architectural and Civil Engineering Institute, Uzbekistan
Department of Mechanization of livestock, Samarkand Institute of Veterinary Medicine, Uzbekistan
Novateur Publication India's International Journal of Innovations in Engineering Research and Technology [IJIERT]
ISSN: 2394-3696, Website: www.ijiert.org, 15th June, 2020

ANALYSIS OF TECHNOLOGIES FOR PHYTOMELIORATION OF ARID PASTURES

Ergashev I. T.

Doctor of Technical Sciences, Prof.

Tashtemirov B.R.

Applicant,

Islomov Yo. I. (PhD),

Pardaev X. K.

Applicant,

ABSTRACT

The article provides a brief analysis of the state of arid pastures in the world, an analysis of previously conducted studies of technologies to improve arid pastures and a comparative analysis of technologies for improving pastures by sowing seeds and planting seedlings (saplings) of phytomeliorative plants.

Keywords: pastures, degradation, improvement, restoration, vegetation cover, phytomelioration, sowing, planting of phytomeliorants.

Introduction

In the world, arid territories occupy about 1/3 of the earth's surface area. Today, these territories occupy about 145 million hectares of irrigated, 170 million hectares of non-irrigated arable and 3.6 billion hectares of pasture lands, where more than 2.5 billion people live [1, 2]. In solving the food problem and providing industry with raw materials, the products of the livestock sector of agriculture play an important role. However, the issues of further intensification of this industry are associated mainly with the creation of a solid forage base.

In the world, research is underway aimed at developing new scientific and technical foundations of resource-saving, environmental technologies based on strip (minimum) tillage

and planting seedlings or seedlings of phytomeliorants and technical means for their implementation. In this direction, the implementation of targeted scientific research on the development of combined tools for strip (minimum) tillage, the simultaneous planting of seedlings or seedlings of phytomeliorants and the substantiation of the technological processes of their work, ensuring resource conservation in the process of interaction of working bodies with the soil, is of great importance.

Analysis of earlier studies

The productivity of rangelands in Central Asia has decreased to a critical level and amounts to 1.0-1.5 c / ha of dry eaten mass. The current situation has a negative impact not only on the productivity of farm animals and the quality of their products, but also on the ecological situation in the region as a whole, which is currently characterized as close to crisis. Therefore, scientists and agricultural practitioners were faced with the urgent issues of developing ways to improve natural pastures in the desert and semi-desert zones, increasing their resistance to degradation and desertification in the context of an increasing intensification of agricultural production. [3.4].

Restoration of vegetation cover and sustainable productivity of pastures that have lost the ability to heal themselves is possible with the help of phytomelioration - improving degraded ecosystems by sowing or planting plants. In arid zones, species capable of forming a sufficiently high productivity in arid conditions are used as phytomeliorants.

A.G. Gael, Z.Sh. Shamsutdinov, V.I.Petrov, R.R.Bashirov, V.P. Voronin, V.P. Zvolinsky, Otte Annette, Cole Ian, Botter Manfred, Babaev M.Sh., Gusev A.P., Dzybov D.S., Makhmudov M.M., Khasanov O.Kh., Otakulov N.Kh., Khamroeva G. U., Vlasenko, M.V. other. The technologies they offer are based on sowing seeds of phytomeliorative plants. According to these studies, phytomelioration techniques lead to the restoration and increase in the productivity of degraded natural pastures by 2-3 times, and, accordingly, to the improvement of the ecosystem.

Sowing seeds of highly productive species of phytomeliorants (shrubs, dwarf shrubs, and grasses) in natural or old-seeded pastures can give a good result, when the seedlings

developed from the sown seeds do not meet strong competition from the improved herbage. Sowing in dense grass stands is ineffective because of the low field germination of seeds and poor survival of seedlings. In addition, with climate change, higher temperatures and insufficient precipitation, sowing seeds also do not give good results.

Based on this, in recent years, technologies of planting seedlings and seedlings of phytomeliorants have been used to improve desert and semi-desert pastures.

Bakurova KB. proposes to grow forest reclamation plantings on pastures, which will significantly reduce wind speed, improve the microclimate of pastures, protect soils from erosion, and increase the productivity of natural forage lands by 1.5-3 times [5]. In addition, favorable conditions will be created for the improvement of pastures and the introduction of pasture circulation. Particularly effective is the use of forest plantations in pasture animal husbandry in combination with the improvement of pastures by sowing and overseeding valuable forage grasses. With proper use, the cost of growing such plantings pays off 3-5 years after planting or 2-3 years after the start of their operation [6].

Zh.V. Kuzmin at the bottom of the Aral Sea conducted experimental research on the creation of artificial pastures by sowing shrubs (Haloxylon aphyllum, Salsola richteri, Calligonum caput-medusae), perennial grass (Ceratoides papposa) and annual grasses (Kochia iranica, Climacoptera lanata). During the growing season, the plants were watered (1-2 times) with saline water. The growing of halophytes coincided with the beginning of the period of atypical precipitation. He found that planting Salsola richteri and Haloxylon aphyllum on salt marshes in the dried part of the Aral Sea is advisable to carry out one-year-old cuttings. [7,8,9].

In recent years, foreign scientists have carried out many scientific studies on the improvement of protective zones [10] and the use of protective zones [11] in arid zones. Zhu et al. [12] propose to create windbreak strips to reduce the wind speed, consisting of one or two rows of tree plantations and forest belts of several rads, which will lead to a change in the microclimate of the region and suppress the movement of the speed of snow, dust and sand. This technology is most widely used in Australia, New Zealand, Russia, China and the United States.

Metwally S.A. and others believe that technologies for controlling sand mobility can be divided into two groups: planting woody shrubs; and the use of barriers made from wheat straw, bamboos, reeds, sorghum stalks, clay, petroleum chemicals and so on. [13] In Africa, to reduce wind speed and sand mobility, tree shrubs are recommended to be sown perpendicular to the wind [14].

For most plants in sandy deserts, planting is usually done by hand in small areas and on rough or steep slopes, as well as in aggregates on large, flatter areas [15]. F.Wilcock suggests planting depth and timing to vary according to geographic regions and desert plant species. In general, the depth should usually be 20-30 centimeters, and the planting time depends on favorable conditions and soil moisture [16]. It is also important to consider the landing spacing and pattern. Close distance is more costly, and too long distance will usually not give positive results [17]. Distance should be determined by site conditions and planting goals. In general, plants should be spaced about 18 inches (4.57 m) apart and also in a strip with 36 inches (9.15 m) between rows [18].

Recently, trees and shrubs have been used to combat quicksand [19, 20]. For example: Populus euphratica, Populus alba, Callegonum spp, Tamaix spp Artemisia arenaria, Zygophllum xanthoxylum, Atraphaxis bracteates, etc. These species, selected from many years of practical experience, have a relatively strong adaptive ability and have been used in desert areas.

Elsiddig et al., Having studied previous studies on the effect of protective bands, proposed this technology to be applied in the conditions of Sudan. They stressed that the application of this technology in terms of improving the environment, saving irrigation water and increasing crop production will come from wider local use. [21,22].

In regions where the annual rainfall exceeds 200 mm, shrubs and grasses can be planted to further improve the quality of fastening windbreaks and sand dunes. This technology is widely used in arid and semi-arid regions of China [23]. It is used to prevent sanding of railways and highways. In order for afforestation to play its role in sand stabilization as soon as possible, trees can be planted with a density of 2m x 2m (spaces between plants and

rows). The planting site should be approximately 50-60 cm from the leeward side of the barriers, and no tree should be planted in the center of the barriers.

In Kazakhstan, saxaul and kandym, or zhuzgun, are mainly used for fixing mobile sandy massifs by planting seedlings or seedlings grown in nurseries and in natural conditions. Landing should be carried out around settlements, wells. Planting is carried out by seedlings and two-year-old seedlings, the distance between the rows should be 3 m, and between the seedlings 2. [24].

In Turkmenistan, in the conditions of the Karakum, phyto-melioration works are carried out to fix the sands by planting shrubs - sand-fortifiers of saxaul, cherkez and kandym on the lower parts of the dune, and the upper 1/3 of the dune is left bare and fixed by mechanical protection after the natural leveling of dunes [25]. On a leveled surface in the spring-winter season, it is recommended to install mechanical protection with sowing and planting psammophytes. [26]. In Turkmenistan, planting is carried out in winter and spring [27], and in Kazakhstan - in late autumn and early spring. When planting, seedlings or two-year-old seedlings are used. In this case, the first year, up to 15 safety waterings are carried out.

When creating pasture belts by planting, seedlings are placed in the middle of the soil cultivation belts every 1 m in a row. Planting of seedlings should be carried out by annuals, but with their weak development, two or three-year plants can be used. To create a pasture of protective zones, numerous studies have shown that the best plants are black or white saxaul, Cherkez and Juzgun, which have a height of the aboveground part of more than 25 cm, a stem diameter at the root collar of more than 3 mm and a root length of 35 cm. Seedlings of desert plants can be planted both in autumn and early spring when the topsoil is moistened to the planting depth. Moreover, after plowing to a depth of 25-27 cm, a strip width of 2.8-3.15 cm in the center of the strips, it is necessary to cut furrows 30-35 cm deep, which during the summer will be covered with sand by the wind. In the spring of next year, black saxaul seedlings are planted on the filled furrows [28].

Scientists of the Kalmyk Research Institute of Agriculture propose planting a leafless juzgun, a prunus and Siberian wheatgrass along the axes of the tape, while the soil cultivation should be carried out to a depth of 35-40 cm with tapes 1.4 m wide, the distance between the axes of

the tapes should be 5 m. To protect the juzgun saplings from falling asleep with sand, use roll curtains made of common reed, laid on the soil surface along the rows of the juzgun and secured from wind drift with wire pins [29].

Uzbekistan has also accumulated a lot of experience in improving pastures by planting seedlings and saplings [30]. To increase the productivity of pastures in the wormwood-ephemeral Karnabchul desert, G. Khamroeva, A. Rabbimov, T. Mukimov consider Atriplex canescens a promising fodder plant. Atriplex canescens is recommended by planting pre-grown seedlings in plastic bags. They suggest that when growing seedlings, the seeds of Atriplex canescens should be kept soaked in dense cotton bags at a temperature of 10-12 ° C for 25-30 days before sowing. The swollen seeds are transferred into specially plastic bags and sown. The term for planting annual seedlings when creating agrophytocenoses should be carried out directly in February and March. [31].

In recent years, cuttings have been widely used for planting. B. Bekchanov and others suggest planting tamarix cuttings harvested in February from stems 1.5-2 cm thick. In this case, the length of standard tamarix cuttings should not be less than 50 cm. The prepared cuttings are planted, leaving 7-10 cm above the soil surface. After planting, the first furrow irrigation is carried out. The number of waterings depends on weather conditions and the physical and mechanical properties of the substrate. The results of the study showed that in the first year, each cuttings developed 3-4 shoots, which at the end of the growing season reached a height of 75-85 cm.In the second and third years of life, plants grown from cuttings show a powerful development of aboveground phytomass, reaching a height of up to 100-120 cm. This method can be widely used in phytomeliorative measures carried out in the development of the soils of the drained bottom of the Aral Sea, as well as in the selection process of various directions: when breeding varieties with a low tannin content, intended for cultivation in order to improve pastures, as well as to create decorative varieties, etc. [32].

Conclusion

Thus, it can be concluded that the improvement of pastures by planting seedlings and seedlings of desert plants gives satisfactory results when improving pastures in relation to

sowing with seeds. In addition, to stop the desertification of pastures and reduce labor costs and resources, the most promising direction is phytomelioration based on strip tillage and planting seedlings with wide aisles in one pass. For this, it is necessary to develop a combined tool that performs strip tillage, planting seedlings (seedlings) and their reliable fixation by compacting the soil around the plants.

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