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PHYTOMELIORATION OF PASTURES OF THE SOUTH ARAL SEA

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ANNOTATION

In article it is considered designing of melioration actions it is impossible to carry out without forest melioration the classification of pastures reflecting all set of ecology technological aspects forest melioration of works in various areas arid of a zone, its separate areas and concrete economy.

KEYWORDS: ***Subsoil waters, horizont, soil, arid the pastures, salted, a bush, wood, wood strips, forest belt, phyto mass, phyto melioration, zonal.***

The problem of drying up of the Aral Sea is a global problem of our time. This problem is aggravated by the fact that the mobile sands of the drained bottom of the Aral Sea are highly saline, contain a huge amount of various harmful chemicals that are part of various mineral fertilizers and dust. One of the serious factors of environmental degradation in the Aral Sea region is the removal of salts and dust from the territory of these areas.

In this context, the problem of fixing saline sands of the drained bottom of the Aral Sea, the creation of strong surface structures that do not interfere with plant growth and protect against weathering due to strong aerodynamic flow, is the most urgent problem of modern polymer chemistry and ecology in general.

In the predominant territory of the arid zone, where water resources are extremely limited, phytomelioration, including forest reclamation, is an important means of stabilizing and increasing the productivity of pasture lands. The multifactorial effect of forest plantations on the environment can be used to protect the soil and vegetation cover of fragile landscapes from deflation, to reclaim the microclimate of the surface layer of air, creating a favorable environment for grass growth, as well as for the normal functioning of the animal organism on pastures and in places of detention, even with an extreme combination of weather conditions [3, 12]. To date, special types of reclamation plantings have been developed and are being put into practice for the purposes of animal husbandry: pasture protective forest strips, reclamation and fodder plantings, tree green umbrellas. Extensive production experience in various regions of the country has confirmed the importance of forest reclamation for the intensification of animal husbandry: pasture protective forest strips and reclamation - forage plantations increase the yield of phytomass by 1.5 - 2 times; green umbrellas increase the survival rate of lambs, as well as the weight gain of animals and shearing of wool by 10 - 40%. According to preliminary data, it is necessary to create about 5 million hectares of such plantations in the arid regions of the country.

However, the effectiveness of forest reclamation work on arid pastures is not yet high enough.

The main factor limiting the cultivation of woody and shrubby vegetation in desert and semi–desert areas is the lack of physiologically available moisture in the rhizosphere. Without additional humidification to atmospheric precipitation, it is impossible to grow plantings with closed crowns – striped, massive backstage [5]. Practically the only natural source of such humidification can be groundwater (GW), the availability of which for trees and shrubs depends on the depth of occurrence, chemical composition, as well as the physico–chemical properties of the aeration zone [8, 10].

In layered soils, most of the trees and shrubs cultivated in the arid zone, with a favorable combination of hydrochemical and soil – soil conditions, develop a root system with a depth of 8-12 m and take the soil from this depth. However, the depth of occurrence of GW is not the only factor determining their root availability. An important indicator of the suitability of GW for woody and shrubby vegetation is their chemical composition and mineralization. With chloride-sulfate salinization, the maximum mineralization values of GW (MGW) for

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black poplar are 4-5, white acacia is 10-15, squat elm is 15-20, and for tamarisk and black saxaul is 30-40 g/l [7]. In the Caspian lowland, the MGV under sandy territories varies within 0.1 - 40 g/l; for landscapes with full-profile zonal sandy loam and loamy soils, GW with a mineralization of 3 - 180 g/l is characteristic.

Groundwater is not used by woody and shrubby vegetation if there are horizons in the aeration zone that prevent the downward growth of roots: saline, impermacid, salt. With appropriate soil preparation and crop care, the saline and impermacid horizons gradually degrade, but the underlying salt horizons, typical of plains with zonal sandy loam and loamy soils, remain root-proof.

Thus, the forest suitability of arid pastures in the predominant territory of the SE ETC depends mainly on the salt characteristics of the MGV soil.

Pastures on areas with full-profile soils that have not survived anthropogenic deflation are especially unfavorable for strip afforestation.

Forest reclamation works with the use of black saxaul turned out to be more successful. Strip plantings on areas with MGV of 10-30 g/l did not lose viability in 10-12 years, although their growth at this age almost stopped. At places where the MGV reached 50 g/l, the current increase in height decreased sharply already in the third year of crop life [2], the shrinkage of the strips began at the age of 7-10.

A similar pattern was noted for natural saxauls of Kazakhstan [1]. Phytocenoses of class II-III, bonita with a wood reserve of 5-10 t/ha are formed in depressions of the Northern Ustyurt at a depth of 2-10 m with a mineralization of 10-30 g/ l, sparse (completeness 0.1-0.3) stunted (1.5-2.2 m) 17-27-year-old saxaul are characteristic of deep-water locations with saline and brackish soils in the Northern Aral Sea. On salt marshes-salt marshes with close (1-2 m) highly mineralized (more than 60 g / l) GW in Ustyurt, saxauls are not found. Pastures on sandy lands are much more promising for afforestation, especially desolate areas (foci of deflation) with dune sands [6], which are devoid of excess salts and have significant reserves of physiologically accessible moisture. Numerous arrays of tree and shrub plantations created 50-60 years ago in Dagestan, Chechen-Ingushetia, Kalmykia, Stavropol Krai, Rostov and Astrakhan regions, etc. have been preserved in good condition on such areas to date. However, forest reclamation of desolate pastures should be carried out differentially, taking into account the ecological and morphological heterogeneity of the foci of deflation [9].

In connection with the above, forest reclamation of arid pastures should be based on detailed soil and soil surveys of the entire profile of the aeration zone and the upper layer of the aquifer in order to map the lands according to the degree of forest suitability.

Currently, pasture protective forest strips are the most common in practice. This is a universal type of plantings that increases the productivity of natural herbage, allows carrying out measures to introduce fodder grasses into the interstitial spaces, as well as reliably protect the pasture territory from deflation, and grazing animals from strong winds and, in addition, create conditions for the organization of a rational mode of use of pasture arrays. However, the opportunity for growing economically profitable forest strips is not available everywhere. For the cultivation of strip tree plantations, only the lands with available agricultural land are suitable. On pastures with inaccessible GW, strip plantings are upset at an early age, turning into a chain of curtains or separate standing trees that are unable to perform all the functions intended for them.

The next type of plantings that has great prospects in all categories of pastures are reclamation and fodder plantings. Their peculiarity lies in the fact that they must remain viable in conditions of direct contact with animals in the bleed mode, ensuring the full use of water and thermal resources of this category of pastures for the production of fodder phytomass. For pasture-forage plantations, as well as for pasture protective forest strips, additional moisture is important, since their productivity is directly dependent on the available moisture reserves in the rhizosphere. Nevertheless, the peculiarity of their operation (periodic partial alienation of transpiration organs) allows us to count on the possibility of long-term functioning even with very limited additional humidification, including through the use of vaporous moisture deposited on the roots during its daily and seasonal movement. This source of moisture can be of practical importance in areas with a deep occurrence of GW, when the rhizosphere capacity exceeds 4-5m [4].

Reclamation and forage plantations on pastures with sandy soils are very promising. Wide-row (8-10 m) juzgun crops not only stop deflation in the centers of desertification, allow natural grass to settle in the aisles or introduce fodder grasses into them, but they themselves are a source of feed. On the sands of the Caspian Sea, pastures restored with the help of juzgun reclamation and forage plantations accumulate 45-50 c/ha of raw aboveground phytomass, including about 15 c/ha of edible shrub phytomass.

On soils resistant to deflation, it is possible to design the creation of pasture protective forest strips and reclamation and forage plantations by continuous plowing for the entire width of the strips

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and wings, which will ensure the best growth of plantings in the first years of their life.

On soils subject to deflation, it is necessary to create ribbons of different widths, depending on the anti-deflationary properties of the soil and the nature of natural vegetation. In the latter case, the use of the MPP-I machine, which plants crops with simultaneous soil preparation, is very promising.

On desert pastures in the dune areas of deflation foci, special soil preparation is not required, and in destructive ones, deep belt loosening of the soil along the axes of the rows is effective immediately before planting [6].

When selecting species for pasture protective forest strips on pastures with accessible in depth, but mineralized soils, it is necessary to proceed from salt-resistant plants, estimated by the maximum weighted average salinity in the capillary border. With chloride-sulfate and sulfate-chloride salinization, this indicator for black poplar, white acacia, pedunculate oak, squat elm, black saxaul and tamarisk is 0.25, 0.35, 0.50, 0.50-0.80 and 1.2-1.5%, respectively. Juzgun withstands salinity in the capillary border up to 0.2-0.3, and teresken-0.4-0.6%.

The consumption of tree and shrub vegetation by various animal species varies in different natural and climatic zones. To a large extent, it depends on the availability of herbaceous feed varies by season. On worn-out pastures, sheep can eat almost all currently used species of woody and shrubby plants, and not only leaves and thin shoots, but also lignified organs, with the exception of ailanthus, quince and in some cases tamarisk. Plants that are satisfactorily eaten in summer include teresken, juzgun, saxaul, sea buckthorn, elm, white acacia are readily eaten.

Thus, the design and practical implementation of forest reclamation measures for livestock purposes should be carried out taking into account a set of factors, including the suitability of pastures for forest reclamation and the degree of its necessity, depending on the state of vegetation cover, the susceptibility of soils to deflation, etc. In accordance with this, the types of plantings, the technologies of their creation, the range of wood and shrub vegetation used are determined. In each specific case, it is necessary to determine the order of forest reclamation of various types of pasture lands, striving to ensure that their temporary exclusion from pasture turnover does not lead to a reduction in livestock production, degradation and desertification of lands that have taken an additional load [10].

Due to these features, the design of reclamation measures cannot be carried out without a forest reclamation classification of pastures, reflecting the totality of ecological and technological aspects of forest reclamation work in various areas of the arid zone, its individual districts and specific farms. The existing geobotanical classifications do not contain exhaustive information necessary for a comprehensive assessment of pastures as objects of forest reclamation. The production experience and research results of a number of scientific institutions in the country allow us to outline the next variant of the forest reclamation classification of pasture lands (at the level of forest reclamation categories) for one of the large areas of the arid zone.

1-arrays of desolate pastures with fine-grained sands and strongly fluttering sandy soils;

2-pastures with degraded vegetation cover on medium undeveloped sandy soils;

3-pastures with degraded vegetation cover on easily sandy loam zonal soils, susceptible to deflation;

4-pastures with zonal sandy loam and loamy soils resistant to deflation.

CONCLUSION

The selected categories of pastures differ from each other in terms of forest growing conditions, the degree of need for forest reclamation, the specifics of its technology, the order of forest reclamation and other features. Within each category, forest-reclamation types are distinguished, equivalent in terms of the main limiting factor of the environment, the provision of the rhizosphere with physiologically accessible moisture:

- an additional source of moisture - available for woody and shrubby vegetation by depth of occurrence, mineralization and other indicators of GW;

- GW are available in depth of occurrence and mineralization, but are shielded by an impermacid horizon;

- GW are available in depth of occurrence and mineralization, but are shielded by a salt or saline horizon;

- GW are available in depth and other indicators, but have increased mineralization;

- GW are inaccessible to woody and shrubby vegetation by all indicators, an additional source of moisture is redistributed precipitation;

- there are no additional sources of moisture.

In the considered arid region, first of all, it is necessary to concentrate work on pastures of the first forest-reclamation category, and in areas and farms where such lands are absent, on the second. Having created a reserve of reclaimed pasture territories, it is possible to start improving unproductive, but still functioning lands of the third and then fourth forest reclamation categories, carrying out this work selectively (oasis) only in areas suitable for afforestation.

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When designing at the general scheme stage for forest reclamation classification and pasture mapping, photographs from orbital stations should be used, which, as our studies have shown [5], well reflect the state of the soil and vegetation cover.

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