

ANCHORING AND AFFORESTATION OF DUNE SANDS UNDERLINED WITH SALT SOIL

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Abstract: The article presents the study's results on the consolidation and afforestation of dune sands underlain by saline soil in Turtkul forestry enterprise desert zone of the Republic of Karakalpakstan and Khorezm forestry enterprise. Experimental work was carried out to consolidate and afforestation the windward dune slopes by installing mechanical protection from reed with planting along them seedlings of black saxaul, Paletsky cherkez. The main goal of the work was to flatten the upper unsecured part of the dune, sand the salt marsh in order to create protective forest cultures from psammophyte shrubs on them.

Key words: dunes, salt marsh, mechanical protection, seedlings, saxaul, cherkez, survival rate, growth, crown diameter.

INTRODUCTION

When fixing and afforestation of dune sands located on salt marshes, it is in great importance to fix the smallest windward dune slopes area in order to flatten the upper non-fixed dune part under the wind influence and cover the salt marshes surface, and then plant seedlings of shrub plants on them.

Research methods. The methods of field experiment were carried out according to B.A. Dospekhov [1], laboratory analyzes were carried out in the agrochemistry laboratory and forest soil science of the Uzbek scientific research institute of forestry. Experimental work was carried out on dune sands up to 3-4 m high, located on the saline soils of Turtkul and Khorezm forestry enterprises. The depressions between the barnacles consist of saline soils, the groundwater is at 0.4-1.0 m depth, and the soil contains a significant amount of water-soluble salts. The upper aeolian sediments contain 0.18-

0.30% of the dense residue of water-soluble salts, and the underlying ones - 0.25-5.72%.

Results and review. Annually, more than 100 million salt, dust and sand tons are carried into the air from the dried bottom of the Aral Sea, which are carried away to 1000 km distance. The main sources of salt carryover are plump and partly crusty salt marsh, which area on the dry bottom is about 450 thousand hectares. Previously, the methods development for fixing and afforestation of dune sands was carried out on lands less prone to salinization. [2,3,4,5,6].

The salt content in 1 groundwater liter in Khorezm experimental site was 55.4 g/l, in Turtkul one - 4.60 g/l.

The moisture content of the sand dunes to 1 m depth in Khorezm area in the spring was in an accessible form for plants and its total reserve was 31 mm, in summer 27.5 mm and in autumn 17.2 mm, and on Turtkul area, respectively, 23.3; 15.3; and 12.2 mm.

In order to prevent soil deflation between the salt marsh dunes, as a result of which salt, dust and sand particles can rise into the atmosphere, it was necessary to close these areas with dune sand and then create protective black saxaul and other plants plantings on them.

For this purpose, we installed mechanical protection from shrubs brushwood on the dunes with 2.9-3.5 m height in the spring. The protective coverings width was 0.5-0.6 m, the height was 0.1-0.15 m, the distance between them was 3.5 m, each row length of the mechanical protection was equal to the lower part width of the windward dunes slope - 20-23 m. Four variants of experiments were laid down. In the first variant, the dunes were fixed up to

0.8-0.9 m height; on the 2nd, 3rd and 4th options, respectively, 1.0-1.4 m; 1.2-1.8 m; and 2.0-2.5 m.

In the first version, the mechanical protections were located at 0.8-0.9 m height; on the 2nd; the 3rd and 4th versions, respectively, by 1.1 m; 1.8 and 2.5 m. On the their leeward side, black saxaul and Paletsky cherkez seedlings were planted according to the scheme 1x4 m. Repetition of experiments - 4 times.

It was revealed that the survival rate of black saxaul seedlings was 3-20% higher than that of the cherkez. In cherkez seedlings it was 64-76%, and in saxaul - 48-64%. (Table 1)

Table 1. The survival rate and growth of plants - sand fixers on the dunes, underlain by salt marshes (Turtkul forestry enterprise)

Option number	Installati on height of mechanical protection, m	Plant name	May		June		September		
			Survival rate, %	Height, cm	Survival rate, %	Height, cm	Survival rate, %	Height, cm	Crown diameter, cm
1	0,9	Cherkez	83	12,5±1,0	80	20,4±1,2	70	26,2±2,0	12,7±0,9
		Saxaul	67	8,6±0,8	57	10,0±0,7	50	16,3±0,6	12,7±0,8
2	1,1	Cherkez	73	12,8±0,7	73	19,5±1,3	73	22,9±1,3	15,1±0,5
		Saxaul	60	7,7±0,5	60	11,1±0,9	50	15,8±2,0	10,8±0,5
3	1,8	Cherkez	80	10,7±0,6	73	17,4±1,0	65	24,5±0,7	17,5±0,7
		Saxaul	49	8,2±0,4	48	10,6±0,7	48	13,9±0,5	9,8±0,4
4	2,5	Cherkez	71	10,3±0,7	67	16,9±1,0	67	23,2±1,1	14,7±0,7
		Saxaul	68	7,6±0,5	66	10,1±0,6	64	15,8±0,7	10,6±0,5

Similar results were obtained on the experimental site of the Khorezm forestry enterprise; 4-year-old cherkez crops had 69.4-80.0 cm height, and black saxaul 52.5-72.2 cm (Table 2).

Table 2. Biometric indicators of 4-year-old ameliorant crops on the dunes of Khorezm forestry enterprise

Option number	Plant name	Survival rate, %	Height, cm	Crown diameter, cm
1	Cherkez	60	80,0	71,6
	Saxaul	40	77,2	71,1
2	Cherkez	63	69,4	46,9
	Saxaul	42	52,5	47,5
3	Cherkez	55	78,2	61,8

	Saxaul	38	72,2	68,1
4	Cherkez	52	75,9	40,8
	Saxaul	50	69,0	67,8

Under the active winds influence (over 4 m/s at 15 cm height), the upper unsecured dune part deflated and deposited on the inter-barn depression, covering the salt marshes surface. When fixing and afforestation of the dunes to 0.9 m for 20 m height, it was covered with sand. When fastened to 1.1; 1.8 and 2.5 m height, the salt marsh surface was covered with sand for 12, 4.5 and 1 lengths.

After sanding the salt marsh by flattening the dune, plants from yantak, akbash (Karelina Kaspik), cartilaginous hodgepodge appeared, the fodder mass stock of plants in the fall in the first variant was 21.2 kg/ha, in the second and third variants 32, and 25.0 kg/ha. The largest fodder reserves are distinguished by yantak (16.4, 20.0, and 21.8 kg/ha, respectively, according to the experiment variants).

Conclusions. Thus, having secured the windward slopes of the dunes located on salt marshes to 0.8-0.9 m height with mechanical protections from reed, tall-stemmed plants or tape coatings of binders and planting seedlings of psammophyte shrubs, under their protection it will be possible for bringing up the dunes for 2-3 years, sand the salt marsh surface. Due to their spontaneous overgrowth by psammophytes plants, planting seedlings of cherkez, kandym and saxaul, one can fight deflation of salt marshes, stop the process of raising salt particles into the atmosphere and improve the ecological conditions of the Aral Sea region.

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