WEB OF SCIENTIST: INTERNATIONAL SCIENTIFIC RESEARCH JOURNAL
ISSN: 2776-0979 (Volume 2, Issue 8, August, 2021

USE OF MICROBIOLOGICAL PREPARATIONS AND MICROFERTILIZERS FOR PRE-SEEDING TREATMENT OF FOREST SAKSAUL

Fayzullaeva A. G.
Karakalpak Scientific Research Institute of Natural Sciences of the Karakalpak Branch of the Academy of Sciences of the Republic of Uzbekistan

Doszhanov K. Zh.
Nukus branch of Tashkent State Agrarian University

Aimuratov D. A.
Nukus branch of Tashkent State Agrarian University

ABSTRACT
The results of studies on the influence of the microbiological preparation "Ecobacter" and micronutrient fertilizer "Nanoplant" on the growth and development of seedlings of white (Haloxylon persicum) and black (Haloxylon aphyllum) saxaul are presented.

Keywords: seeds, seeds, seedlings, pre-sowing treatment, microbiological preparation, biometric indicators.

INTRODUCTION
Forest plantations can be created by two methods: sowing seeds and planting seedlings. However, as scientific studies have shown, the effectiveness of work from sowing seeds, as a rule, is low, and also leads to a greater consumption of seeds. It all depends on the germination of seeds, the susceptibility of the soil to deflationary processes and the water availability of the year. Unlike sowing seeds, annual good results can be obtained from planting seedlings. Scientists of the Republican Scientific and Production Center of Ornamental Horticulture and Forestry, who have been conducting research on the drained bottom of the Aral Sea for more than 30 years, have established that it is necessary to gradually move from sowing seeds to planting seedlings. Sowing seeds should be carried out in the autumn-winter period, and planting seedlings in early spring. The negative side of planting in the fall is the drying of the planted plants in the winter, especially when the moisture supply of the year is low.

It is important to properly prepare the seeds for sowing. For saxaul seeds, sanding for 3-4 days or one day soaking in running water is advisable. The seeding rate of seeds of the first quality class is 67 kg / ha, the second class - 83 kg / ha and the third class 100 kg / ha. Seeds are sown with a laboratory germination rate of at least 70%.

The seed sowing technology is differentiated depending on the type of soil. The seeding depth of black saxaul seeds on sandy loam soil is 1.5-2.0 cm, on sandy soil 2-3 cm.

The optimal time for sowing seeds of sand-strengthening rocks is the period of transition of the average daily air temperature above 5 degrees. For the northern regions of Uzbekstan it is the end of February - the beginning of March, for Karakalpakstan - the end of March - the beginning of April, for Aralsk - the end of April [1, 2].

MATERIAL AND METHODS

For the cultivation of standard planting material in forest nurseries, pre-sowing seed preparation is of great importance. For pre-sowing treatment of acorns of white saxaul (Haloxylon persicum) and black (Haloxylon aphyllum) seeds, Nanoplant (MN) microfertilizers and Ecobacter microbiological preparation (MPE) were used. The research was carried out in two permanent forest nurseries of the Nukus Experimental Forestry Enterprise and the Beruniy Forestry Enterprise of the Republic of Karakalpakstan. Nanoparticles of micronutrient fertilizer "Nanoplant" have a unique property of superpermeability through protective cell membranes, which makes it possible to reduce the consumption of microelements by hundreds of times, to ensure high efficiency of enzyme synthesis that accelerates plant growth and development, and increases resistance to stress and diseases.

Microbiological preparation "Ecobacter" is an aqueous solution containing a symbiotic complex of specially selected natural living microorganisms, lactic acid and photosynthetic bacteria that fix nitrogen, saccharomycetes and culture liquid.

RESULTS AND DISCUSSIONS

The study of the formation of mycorrhiza on the root systems of saxaul seedlings according to the variants of the experiment was carried out according to the generally accepted methods: Selivanova I.A. [3]; Veselkina F.V. [4]; Eropkina K.I. [5]. The study of the characteristics of the root systems of seedlings was carried out by counting on one plant; roots of I, II and III orders, the total number of roots per plant; the lengths of the roots of the I, II and III orders, the total length of the lateral roots. The density of mycorrhiza was calculated according to I.A. Selivanov. [3].

The obtained results of field studies were processed by the method of mathematical statistics using the Statistica 7.0 software [6].

The conducted studies on the influence of the pre-sowing preparation of forest seeds on the biometric parameters of white saxaul (Haloxylon persicum) and black (Haloxylon aphyllum) seedlings are presented in Table 1.

Table 1 Influence of pre-sowing seed treatment on biometric parameters and yield of standard seedlings of white saxaul (Haloxylon persicum) and black (Haloxylon aphyllum)

Experimental variants	Height of the aboveground part, cm	Diameter of the root collar, mm	Length of the main root, cm	Yield of standard planting material, thous. pieces / ha
Seedlings of white saxaul (Haloxylon persicum)				
Control	12,2±0,5	3,1±0,3	46,4±6,5	445,0
MN	14,8±0,6	3,5±0,4	49,3±6,7	467,0
MPE	16,1±0,7	3,6±0,5	53,2±6,9	520,0
Seedlings of black saxaul (Haloxylon aphyllum)				
Control	19,7±0,8	2,7±0,6	52,6±6,0	470,0
MN	25,6±0,9	3,2±0,7	56,3±7,1	562,0
MPE	26,4±1,0	3,4±0,8	59,8±7,5	578,0

As can be seen from the old table, the height of the aboveground part of white saxaul (Haloxylon persicum) in the MPE variant exceeds the control variant of the experiment by 32%, and the seedlings of black saxaul (Haloxylon aphyllum) - by 34%. The use of MPE for pre-sowing treatment of seeds contributed to an increase in the diameter of the root collar in seedlings of white saxaul (Haloxylon persicum) and black saxaul (Haloxylon aphyllum) exceeded the control by 16 and 30%, respectively. The main criterion for determining the effectiveness of pre-sowing seed treatment is the yield of standard seedlings per hectare. When growing seedlings of white saxaul (Haloxylon persicum) on the MPE variant, an increase in the yield of standard seedlings of white saxaul (Haloxylon persicum) by 37% was recorded, and when growing seedlings of black saxaul (Haloxylon aphyllum) by 23%.

On the variants of the experiment with the use of new preparations for the pre-sowing preparation of forest seeds, an increase in the mass of both the aboveground and underground mass of seedlings was noted in comparison with the control by 1.3-2.0 times.

The dynamics of the formation of root systems and the formation of mycorrhiza on them in seedlings of white saxaul (Haloxylon persicum) have been studied. In the variant of the experiment with pre-sowing treatment of MPE, the seedlings had a more developed root system, which was characterized by an increase in the number

of roots of I, II, and III orders. The highest indices of the development of roots of the third order, on which the bulk of mycorrhizal endings are formed, were noted in plants with the use of MPE.

An analysis of the development of root systems and the formation of mycorrhiza on them showed that, both in the control and according to the variants of the experiment, the development of three forms of mycorrhizal endings is noted: clavate, forked, and coral. However, in the MBE variant, the percentage of the development of a complex coral form of mycorrhiza was 1.3 times higher than this indicator as compared with the control. Moreover, coral mycorrhiza was observed on the roots of I, II and III orders. Consequently, an increase in the number of roots and their length on the root systems of seedlings influenced the formation of developed (coral) forms of mycorrhizal endings and led to an increase in the degree of mycorrhizal content of plants.

The indicators of various forms of mycorrhiza on the root systems of annual seedlings of white saxaul (Haloxylon persicum) were studied. In the control variant of the experiment, 72.5% of mycorrhiza were represented by a simple clavate form and an insignificant amount (7.9%) by a forked form. Presowing seed treatment contributes to a change in the ratio of the mycorrhizal shape and increases the amount of complex coral shape. On the MBE variant on the root systems of white saxaul seedlings, the amount of simple clavate mycorrhiza was 38.6%, forked - 32.8% and complex coral - 28.6% (Table 2).

Table 2 Indicators of the occurrence of mycorrhizal forms on the root systems of white saxaul (Haloxylon persicum) seedlings

Variants	Forms of mycorrhiza on the roots of seedlings,%		
	Clavate	forked	coral
Control	72,5±6,3	19,6±1,4	7,9±0,6
MN	72,5±6,3	35,1±2,6	24,5±1,7
MPE	38,6±4,2	32,8±2,2	28,6±1,9

Studies have shown that the use of new drugs contributes to an increase in the root systems of pedunculate oak seedlings of a complex coral form of mycorrhiza by 3.6 times and a forked one by more than 1.6 times.

A close correlation was revealed between the degree of mycorrhiza of the root systems of seedlings and the height of the aboveground part. According to many authors 5-7, the development of more complex forms of mycorrhiza on the root systems of seedlings contributes to an increase in plant resistance to many environmental factors.

When growing seedlings of white saxaul in forest nurseries to obtain a more fibrous root system, some scientists recommend pruning the stem root. Seedlings with such a root system take root better, but according to Maly L.P. [10], the taproot is not restored in 4-year-old crops. With such a root system, they suffer more from droughts, soil compaction and other adverse factors.

Our research has shown that the main root of annual seedlings of white saxaul on the experimental site. Nukus experimental forestry enterprise dominates over other roots. Its average length by the end of the growing season is 27.4 cm, and the diameter of the root collar is 3.6 mm. Roots of the 1st order are located along the entire length of the main root and have a thickness of 1 mm, and a length of 1.6 cm. Roots of the 2nd order during this period have a small length of 0.4 cm.

In the Beruni forest nursery, when growing seedlings of black saxaul (Haloxylon aphyllum) in open ground conditions, seeds of the 1st quality class were used at a seeding rate of 67 kg / ha with pre-sowing treatment with micronutrient fertilizer "Nanoplant" and microbiological preparation "Ecobacter".

CONCLUSIONS

Thus, the studies carried out show that in order to obtain a standard planting material for seedlings of white saxaul (Haloxylon persicum) and black saxaul (Haloxylon aphyllum), it is necessary to carry out pre-sowing seed treatment with Nanoplant micronutrient fertilizer and Ekobacter microbiological preparation. On the variants of the experiment with the use of new preparations for the pre-sowing preparation of forest seeds, an increase in the aboveground and underground mass of seedlings was noted in comparison with the control by 1.3-2.0 times.

The height of the aboveground part of the seedlings of white saxaul (Haloxylon persicum) in the variant with the use of the microbiological preparation "Ecobacter" exceeds the control variant of the experiment by 32%, and the seedlings of black saxaul (Haloxylon aphyllum) - by 34%. The use of the microbiological preparation "Ecobacter" for pre-sowing treatment of seeds contributed to an increase in the diameter of the root collar in seedlings of white saxaul (Haloxylon persicum) and black (Haloxylon aphyllum) exceeded the control by 16 and 30%, respectively. The main criterion for determining the effectiveness of the use of new drugs is the yield of standard seedlings. When growing English oak seedlings on the MBE variant, an increase in the yield of standard white saxaul seedlings by 37% was recorded, and when growing black saxaul seedlings by 23%.

Presowing treatment of forest seeds contributes to a change in the ratio of mycorrhizal forms and increases the amount of complex coral-shaped forms. On the variant with

the use of the microbiological preparation "Ecobacter". On the root systems of white saxaul (Haloxylon persicum) seedlings, the amount of simple clavate mycorrhiza was 38.6%, forked - 32.8% and complex coral - 28.6%

REFERENCES

1) Cultivation of saxaul seedlings in forest nurseries [Electronic resource] / Novitskiy ZB, Fimkin VP, Borovkov AV, Tairbergen Yu.A. 2014. Access mode: 16.03.2018 http://agronews.uz/ru/information/rastenievodstvo / sadovodstvo / 538-vyrashchivanie-seyantsev-saksaula-v-lesnykh-pitomnikakh
2) Shamsutdinov Z.Sh., Ubaydullaev Sh.R., Shamsutdinov N.Z., Nasiev B.N. The productivity of herbaceous plants in the phytogenic field of black saxaul in the Karnabchul desert / Arid ecosystems, 2014, volume 20, No. 3 (60), - p. 48-58.
3) Selivanov I.A. Mycosymbiotophism as a form of consortium ties in the vegetation cover of the Soviet Union. Moscow: Nauka, 1981.- 232 p.
4) Mycorrhiza formation in Scots pine and Siberian spruce in forest nurseries [Electronic resource] / D.V. Veselkin. 2007. Access mode: http://mycorrhiza.narod.ru Access date: 26.12.2019.
5) Eropkin K.I. On the relationship of the forms of mycorrhizal endings in conifers // Mycorrhiza plants: interuniversity. Sat. scientific. tr. Perm and Abakan pedagogical institutes. Perm, 1979. -P. 61-77.
6) Zaitsev G.N. Mathematical statistics in experimental botany. Moscow: Nauka, 1984, - 424 p.
7) Kopytkov V.V. New composite polymeric compositions for forest growing in the natural and climatic conditions of Belarus and Kazakhstan / V.V. Kopytkov, V.S. Kaverin, A.V. Borovkov, V.V. Kopytkov, Yu.A. Tairbergenov (Edited by Candidate of Agricultural Sciences, Associate Professor V.V. Kopytkov). Minsk: RUE Izdat. House "Belarusian Science", 2014. - 509 p.
8) Redko G.I. Biological bases of growing pine and spruce seedlings in nurseries / G.I. Redko, D.V. Ogievsky, E.N. Nakvasina, E.M. Romanov. Moscow: Lesnaya promyshlennost, 1983. - 64 p.
9) Markina Z.N., Mileshina A.V. Influence of soil and biometric indicators of Scots pine seedlings // Fruit growing, seed production, introduction of woody plants: Proceedings of the X International Scientific Conference on October 18-19, 2007 Krasnoyarsk: SibSTU, 2007. - P. 52-54.
10) Maly L.P., Barsukova T.L. The reasons for the degradation of oak forests // Problems of forestry and forestry: Collection of scientific works of the IL NAS of Belarus. Issue 69. Gomel: IL NAS Belarus, 2009. - p. 81-88.