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QUALITATIVE INDICATORS AND YIELD OF SEEDS OF SPECIES AND VARIETIES OF DESERT FORAGE PLANTS

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Abstract:

The article presents the results of research on the study of seed yield and seed quality of edible plant species and varieties that are promising to increase the productivity of desert pastures of Uzbekistan, and identifies future tasks for research.

Keywords: desert, pasture, phytomelioration, drought, flowering, seed, productivity, germination, scarification, stratification

1.INTRODUCTION.

Desert and semi-desert regions occupy almost half of the total land area of the Republic of Uzbekistan and are used as the main source of food in pastoral livestock.Due to their continuous use for many years, harvesting of shrub and semi-shrub plant species for farm needs and other reasons, there is a decrease in biodiversity, productivity and quality of pasture fodder in pasturelands.This situation does not allow for the sustainable development of pastoralism, leading to a decline in economic performance of the industry.

Therefore, increasing the productivity of pastures through phytomelioration is one of the most topical issues for the Republic of Uzbekistan.Now, a number of promising in phytomelioration forage plant species have been identified and their local varieties have been developed.The degraded pastures cover millions of hectares and are tasked with establishing seed plantations on large areas of promising varieties.At present, the results of research in the field of seed production and seed science of desert forage plant species and varieties are important in solving the problem, and scientific data in this area are insufficient.This article analyzes the initial data of research in this field.

2.RESEARCH SOURCES AND METHODS.

In the research used seeds such promising in phytomelioration of pastureplants asKochia prostrata (L) Schrad, Ceratoides ewersmanniana Botsch, Halothamnus subaphylla Botsch, Salsola orientalis, Halaxylon aphyllum (Minkw), Astragalus agameticusandOnobrychus chorossanica. The research used common methods in botany, seed production and seed science [2; 3; 4].

Figure 1. The seed area of the Kochia prostate

3.RESEARCH RESULTS AND ANALYSIS.

i. Seed yield.

The existing extreme conditions in the desert region create unique features of seed production and seed science of edible plants.Dryness of the atmosphere and substrate, low relative humidity, high solar insulation and hot climate have a negative impact on plant flowering, pollination and seed yield, and this is also reflected in the seed yield and are reflected in its crop characteristics.The results of the research show that the seed yield of desert forage plant species and types is relatively low and ranges from 1.13 to 3.9 quintals per hectare, depending on the plant varieties and species (Table 1).Table 1

Seed yield of desert forage plant species and varieties, c/ha

Karnab, Nurata experimental fields, 2018-2020.

Species and varieties	Quantity, thousand / ha	Seed yield, c/ha			On average, in 3 years, c/ha
		2018	2019	2020	
Kochia prostrata (L) Schrad "Sakhro"	12,5	1,2 ± 0,3	1,7 ± 0,4	1,8 ± 0,2	1,56
Kochia prostrata(L) Schrad "Otavniy"	13,2	2,0 ± 0,3	2,4 ± 0,2	2,3 ± 0,2	2,23
HalothamnussubaphyllaBotsch "Djaykhun"	11,6	2,6 ± 0,4	3,6 ± 0,4	0,4±3,9	3,36
Atrilex undulata "Yagona"	10,8	3,4 ± 0,5	4,2 ± 0,4	4,1 ±0,3	3,9
Astragalus agameticus "Oktog"	13,5	0,8 ± 0,2	1,2 ± 0,3	1,4 ±0,4	1,13
Onobrychuschorossanica	24,6	1,3 ±0,3	1,5 ± 0,2	1,7 ± 0,4	1,6
SALSOLA ARBUSCULA Pall	12,4	1,6 ± 0,3	1,8 ± 0,3	1,9 ± 0,4	1,76

Figure 2. Seed area of the HalothamnussubaphyllaBotsch

Seed yield also varies to some extent depending on the climatic characteristics of the year.For example, in the relatively dry 2018, the seed yield of all species and varieties was significantly lower than in 2019 and 2020, when precipitation was relatively high, as shown in Table 1 data.

ii. The purity of the seeds.

When we say seed purity, we mean the weight of normally developed seeds in the composition of the seed mass.This indicator depends not only on the biological characteristics of the plant varieties and species, but also on the technology of seed collection and the degree of cleaning.At present, the collection of seeds of desert forage plants is carried out by hand, there are no special mechanisms. The purity of seeds collected by hand is given in Table 2.

As can be seen from the table data, the purity of the seeds was also relatively low, ranging from 27.6% to 51.3% depending on the plant species and varieties.48.7-72.4% of the seed mass is composed of non-seeded buds, leaves and other additives.It should be noted that the flowering period of most species of desert forage plants is May-July, and not all flower buds formed in arid climates produce whole seeds.For example, out of 70,600 flower buds formed in a Kochia prostrata (L) Schradsingle bush, 17,090 seeds were found, meaning that the seed yield was only 25%. [5].This is a very low figure and one of the main reasons can be explained by unfavorable climatic conditions.

iii. Seed germination.

Seed germination is one of the main indicators determining their crop qualities.Usually when determining the quality of seeds, they are obtained under laboratory and optimal conditions, which are different for each species, and their germination is determined.

Table 2

Seed purity of desert edible plant species and varieties,%

Karnab, Nurata 2018-2020

Species and varieties	Purity, %			On average, in 3 years, c/ha
	2018	2019	2020	
Kochia prostrata (L) Schrad "Sakhro"	26	28	29	27,6 ± 0,9
Kochia prostrata (L) Schrad"Otavniy"	30	33	36	33,0 ± 1,7
HalothamnussubaphyllaBotsch "Djaykhun"	48	52	54	51,3 ± 1,6
Atrilex undulata "Yagona"	36	42	44	40,6 ± 2,4
SALSOLA ARBUSCULA Pall	41	46	53	46,6 ±3,6
Onobrychuschorossanica	52	49	51	50,6 ±0,9
Astragalus agameticus"Oktog"	38	42	44	41,3±1,9

Figure 2. Seed area of the Onobrychuschorossanica

Special experiments have shown that the optimal temperature for seed production of most desert forage species is a variable temperature of 10-200C[4].The study of the germination of seeds of desert forage species and varieties in the laboratory showed that the germination of seeds of Halaxylonaphyllum (Minkw) and CeratoidesewersmannianaBotsch plants is relatively high - 85-89%, while the germination of seeds of species such as Atrilex undulata, HalothamnussubaphyllaBotsch, Salsola orientalisis around 56-66%, astragalus and the fertility of Onobrychuschorossanicaseeds was found to be very low - 4.2-36.5% (Table 3).Astragalus agameticus and Onobrychuschorossanicaspecies belong to the family of legumes (Fabaceae), and one of their distinctive biological features is the hardness of the seeds, ie these species have a long dormancy due to the impermeability of the seed coat[1].Various methods (mechanical, chemical scarification, stratification) are used to remove hard seeds from the dormancy period and increase their fertility, and desert forage species are no exception, so it is recommended to conduct special research in these areas.

Table 3

Laboratory germination of seeds of desert forage plants,%

Samarkand, 2019. Production temperature is 10-18^{0}C

(n=100)

№	**Species and varieties**	**Germination, % M±m**
1	Atrilex undulata "Yagona"	56,0 ± 1,5
2	Halaxylonaphyllum (Minkw)"Nortuya"	89,2 ± 1,4
3	Salsola orientalis "PervenetsKarnaba"	61,2 ± 1,2
4	HalothamnussubaphyllaBotsch "Djaykhun"	66,4 ± 1,7
5	CeratoidesewersmannianaBotsch	85,2 ± 1,4
6	Onobrychuschorossanica	36,5± 1,9
7	Astragalus agameticus "Oktog"	4,2 ± 0,3

4.CONCLUSION.

Uzbekistan's desert pastures are one of the main sources of food for the livestock sector and play an important role in ensuring food security in the country.The fact that almost half of the pastures are in crisis at different levels and their efficiency is significantly reduced requires increasing their productivity through phytomelioration.The importance of research in the field of selection and seed production of desert forage plants is very important, and the information presented in this article allows to determine the future tasks of research in the field of seed production and seed science. Therefore, given the relatively low seed yield and crop qualities of desert forage plant species and varieties, the hardness characteristics of seeds of some species indicate the need to develop advanced agronomic measures to increase seed yield and qualityand to create an effective method to increase seed germination.

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