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FERTILITY DYNAMICS OF SEEDS OF FOOD PLANTS GROWING IN THE DESERTS

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Abstract:

The article provides information on the study of the dynamics of germination of seeds of desert forage plant varieties. It was found that the seeds of olabuta species have the property of hardness, and their germination can be sharply increased by cold stratification.

Keywords: pastures of desert, yield, forage plant varieties, seeds, fertility, crop qualities, stratification

INTRODUCTION.

The main source of fodder for desert livestock is pastures, which can be used throughout the year in pasture livestock. However, the current state of karakul pastures does not meet the requirements of sustainable development of the industry. Because the productivity of pastures is low - no more than 1.5-3.0 quintals per hectare due to dry matter. In addition, desert pasture productivity is directly related to weather conditions and fluctuates sharply throughout the seasons. In many years, the amount of rainfall per hectare of desert pastures provides twice as much fodder as the average year, while in dry years this figure decreases to 3-5 times. Therefore, a number of varieties of forage plants have been created, which allow to dramatically increase the productivity of pastures, and the study of their ecological and biological properties, the crop qualities of their seeds is of great practical importance.

Existing varieties of desert forage plants are derived from wild species, and many of their biological properties, including seed viability, germination biology, and seed-forming processes, are relatively little studied. In particular, the scientific basis for assessing the crop quality of seeds has not yet been developed.

The aim of the research was to determine the optimal timing for assessing the germination of seeds of desert forage plant varieties.

The object of research was the seeds of promising varieties of desert forage plants: izen "Otavnyy", teresken "Tolqin", olabuta "Yagona" and black saxaul "Nortuya".

RESEARCH METHODS.

In the study of seed germination in the laboratory, generally accepted methods in seed production were used (Kuleshov, 1963; Firsova, 1953; Gritsenko, 1959; Kaloshina, 1976), as well as methods of biostatistical analysis of the obtained data (B.A. Dospekhov, 1979).

Research results. Studies have shown that the seeds of desert edible plant species have a dormancy period at certain times. Good knowledge of this property of seeds allows you to accurately assess their quality. This is because the germination of seeds during the dormancy period is very low. The study of seed germination dynamics of desert forage plant varieties was conducted in January-July. Experimental data showed that the highest fertility was observed in February and March, and this figure was 86.0–87.2% in different varieties (Table 1). By April, seed germination decreased significantly, reaching 4.0-24.0% in different varieties, 1.0-20.0% in May, and 3-7% in June.

Table 1

Dynamics of fertility of seeds of desert forage plants in laboratory conditions

Type, variety	Fertility, %						
	January	February	March	April	May	June	July
"Otavnyy" variety of Izen	72,0	87,2	86,0	24,0	20,0	7,0	-
"Tolqin" variety of Teresken	31,0	36,0	4,0	14,0	12,0	4,0	-

"Yagona" variety of Olabuta	12,0	8,6	4,0	4,0	1,0	3,0	-
"Nortuya" variety of black saxaul	92,6	68,0	62,0	34,0	36,0	7,0	5,3

In the experimental black saxophone variety "Nortuya", the highest fertility rates were in January, ie 92.6%, in February - 68.0%, and in March - 62.0%. As of June, the figure was 7.0%. In July, forgetfulness was only -5.0%. Teresken's Tolqin variety yielded 31.0% in January, 36.0% in February and 14.0% in April. As of June, the figure was 4.0%. In Olabuta's "Single" variety, these figures were much lower. Fertility rates were 12.0% in January, 8.6% in February, and 4.0% in March-April. The seeds of the Atriplex canescens and Atriplex undulata species of olabuta are wrapped in a hard, woody shell, making it more difficult for water to penetrate the seed core. Usually such seeds are called hard seeds and various methods are used to increase their germination (cold stratification, mechanical scarification, chemical scarification, etc.). In our experiments, we used 2 methods of cold stratification: soaking the seeds in cold water and storing them in the dark at 7–12^{0}C for 30 days and in the outdoor environment for 30 days in moist sand in January-February.

Table 2

Fertility of seeds of desert forage plants in laboratory conditions, %

Plant species	**Number of seeds sown, pcs**	**Number of germinated seeds, M±m**	**Fertility, %**	**Duration of the experiment, days**
2020				
Izen	100	64,0 ± 2,8	64,0	15
Chugon	100	22,6 ± 2,2	22,6	15
Atriplex canescens	100	18,5 ± 3,2	18,5	30
Atriplex undulata	100	14,0 ±2,4	14,0	30
2021				
Izen	100	37,5 ± 1,2	37,6	15
Chugon	100	26,3 ± 1,4	26,3	15
Atriplex canescens	100	12,4 ± 1,3	12,4	30
Atriplex undulata	100			30

When we studied the germination of seeds in the laboratory using such stratification methods, it was found that using both methods can dramatically increase the fertility of seeds. In particular, 82.6% of Atriplex canescens seeds and 60.8% of Atriplex undulata seeds were germinated in 17 days when the seeds were first soaked in water for 2 days and stored in dark conditions at 7–12^{0}C for 30 days (Table 3). Cold stratification of seeds in sand for 30 days also yielded good results, with 64.6% germination of Atriplex canescens seeds and 52.4% germination of Atriplex undulata seeds in 17 days.

Table 3

Fertility of seeds Atriplex canescens and Atriplex undulata in laboratory conditions in cold stratification, %.

(Samarkand, 2020)

Plant species	**Control**	**Store outdoors (January-February) in moist sand for 30 days**	**Soak in water for 2 days and store in dark conditions at 7–12°C for 30 days**
Atriplex canescens	12,4 ± 1,3	64,6 ± 2,1	82,6 ± 1,9
Atriplex undulata	13,6 ± 0,9	52,4 ± 2,3	60,8 ± 2,6

$t = 30,5 > t_{0,05}$ (1,96) and $> t_{0,01}$ (2,58)

The data from the experiment are reliable at the 5% and 1% levels. The data from these experiments show that the assessment of sowing qualities of all types of plant seeds based on generally accepted methods is not methodologically accurate and requires an individual approach to the issue.

The use of generally accepted methods in seed production in assessing the sowing qualities of seeds of Atriplex canescens and Atriplex undulata plants does not always achieve the desired results. Atriplex canescens and Atriplex undulata seeds are wrapped in a hard and mature shell, and experiments to determine their fertility under laboratory conditions require long periods of time.

Determination of laboratory germination of Atriplex canescens and Atriplex undulata seeds requires cold stratification in January-February in sufficiently moist sand for 30 days or soaking in water for 2 days and soaking for 30 days in the dark at 7–12°C.

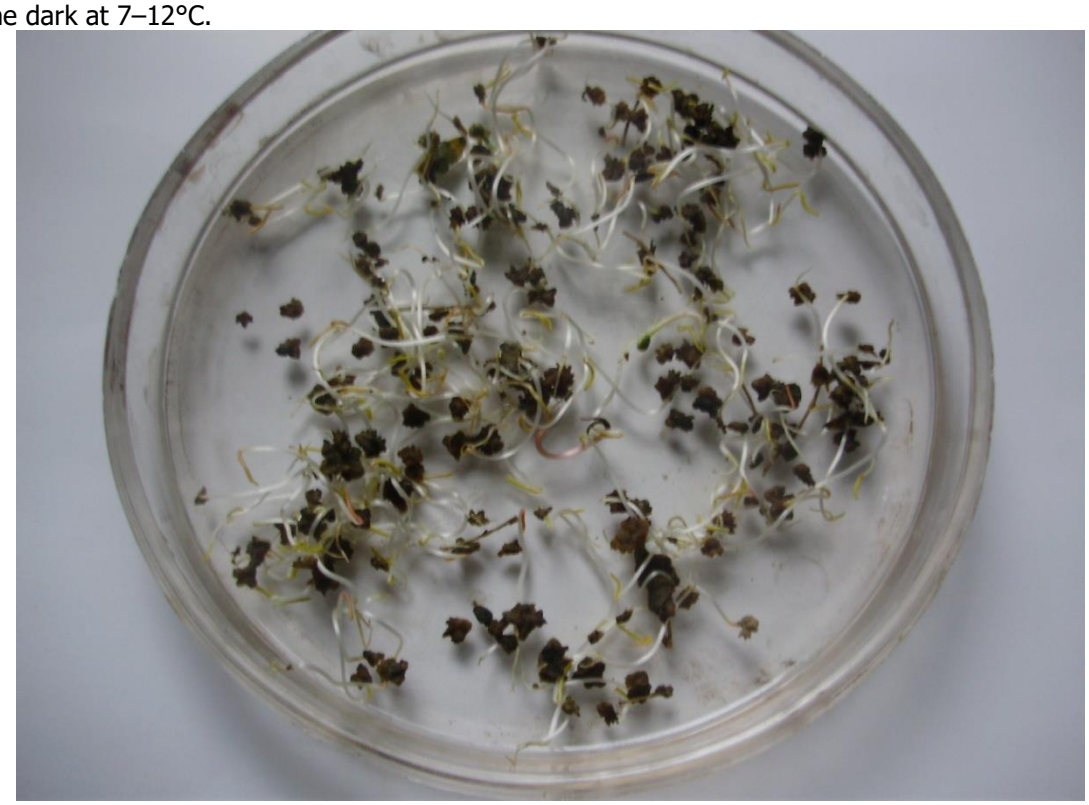

Figure 1. Germination of stratified Atriplex undulata seeds

CONCLUSION.

Seeds of the studied plant species have a dormancy period at certain times, and this feature should be taken into account when evaluating their quality indicators;

The maximum germination of seeds of most species is observed in February, and it is advisable to study their quality indicators during these periods;

Before assessing the quality of Olabuta's "Single" seeds, it is necessary to stratify them at certain intervals.

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