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THE GERMINATION OF SALSOLA ORIENTALIS S. G. GMEL SEEDS IN THE CONTEXT OF CULTURE

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ABSTRACT

The article describes the study of the germination of Salsola orientalis S.G.Gmel seeds in the conditions of culture. The literature highlights laboratory germination - this is the percentage of the number of normally germinated seeds. Germination is the main indicator of the quality of the seeds, it is used to determine the yield of seeds, as well as their biological and economic significance. This plant is found in all deserts and semi-deserts of Central Asia. Along with it grow such forage plants as black saxaul, white saxaul, wormwood, salsola arbuscula, ephemera and ephemeroids.

KEYWORDS: *Laboratory Germination, Germination Of Seeds, Ground Germination, Phenological Observations, Growth And Development, Cotyledons, Hypocotyl, Real Leaves, Aboveground Part, Seed Viability, Branching, Growth, Seedlings, Seed Sowing Time.*

INTRODUCTION

Salsola orientalis S.G.Gmel (local name – keyreuk) belongs to the family of Chenopodiaceae. Salsola orientalis (keyreuk) is a semi-shrub plant with a height of 35-55 cm. Strong branching begins at the base and forms a bush with a dense branching in the lower part. The stem and leaves are strongly pubescent. This plant is found in all deserts and semi-deserts of Central Asia.

Together with them grow such forage plants as black saxaul, white saxaul, wormwood, salsola arbuscula, ephemera and ephemeroids.

In Uzbekistan, keyreuk is widely spread in all regions and in the Republic of Karakalpakstan (figure 1).

Figure 1. General view of Salsola orientalis (keyreuk)

On the Ustyurt plateau, keyreuk grows on gypsum-saline soils and is considered the main component of various plant layers.

Keyreuk is eaten by animals in all seasons and is a good fattening feed for sheep. The eaten part of the plants is annual shoots with leaves, flowers and fruits, and often the lower parts of the bushes are woodier. Therefore, it is difficult to find plants in grazed areas that are not damaged by animals, so Salsola orientalis is quite suitable for hay harvesting [2].

According to M. M. Sovetkin [5], the eaten mass of Salsola orientalis leaves, young twigs, and fruits contains 17.4% ash, 9.7% protein, 23.7% fiber, and no alkaloids.

Keyreuk grows in various soil conditions, having a wide adaptability to a variety of edaphic and hydrological factors [3].

In the conditions of the Karakalpak part of Kyzylkum, the biology of Salsola orientalis in culture is almost not studied. Therefore, this is our task to identify the dynamics of growth and development of the vegetative organs of Salsola orientalis.

The first experiments on the study of the biology of keyreuk were conducted in 2014 at the experimental site at the department of Biology of the Karakalpak State University named after Berdakh.

It is a semi-shrubby plant, prone mainly to overgrowth on saline and gypsum soils. In 2014, it was planted in the ground with gray-brown soil on which lichens grow, using two plowing methods (using moisture-accumulating furrows and strips) [4].

MATERIALS AND METHODS

In the field, germination varies according to seeding rates. With an increase in the seeding rate, their germination rate in the field also increases. When determining laboratory germination, all conditions are created. As for the field, the possibilities for seed growth are quite different, for example, the water regime and lighting are different from the laboratory conditions. Thus, field germination directly depends on the weather conditions in the spring, the characteristics of soil fertility, agro technical methods, physical and mechanical properties of the soil.

The formation and viability of seeds depends on several factors, in particular, on meteorological conditions.

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In our experiments, Salsola orientalis S.Gmel already had a generative phase in the first year and produces full-fledged fruits. The height of the plants by the end of the growing season reaches up to 43 cm. In the conditions of the culture in the Karakalpak part of Kyzylkum, Salsola orientalis S.Gmel passes the entire life cycle and gives seed reproduction.

RESULTS AND DISCUSSION

At the end of March 2014, there was a general germination of plants in the area with moisture-accumulating furrows. There were 360 plants per 100 square meters. In the first decade of April, the length of the leaves was 0.6-0.8 cm, and the width 0.3 cm. In mid-April, two true cylindrical leaves appear, the surface of which is covered with hairs. They are stored for 18-22 days, after which the remaining leaves begin to appear. In early May, the main shoot appears, and by the end of the month, the side shoots appear. By the end of June, the lower leaves turn yellow and dry up in early July.

By the end of the year, the height of plants in the area with moisture-accumulating grooves is 6.5-26.9 cm, and in the areas plowed by the method of dividing the field into strips 7.3-14.5 cm. The growing season of two-year-old keyreuk plants begins at the end of March and the first buds appear. In April, branches are formed, the best time of development begins in May and lasts until mid-June. The height of plants in fields plowed by the strip was 9.2-18.6 cm, and in areas with moisture-accumulating furrows 14.2-36.3 cm, the length of annual branches 3.2-22.3 cm [1].

The height of an adult keyreuk is 64.3-69.45 cm. In the third year, due to the drought, the height of the keyreuk did not reach the previous year's size, but there were many branches. In 1985, the height of the plant reached 30.0-49.0 cm.

Seed germination. The quality of the material plays an important role in increasing the feed base. The quality of the seed material includes its freshness, germination and varieties.

Laboratory germination is the percentage of the number of normally germinated seeds. Germination is the main indicator of the quality of the seed material, it is used to determine the yield of seeds, as well as their biological and economic significance.

For the experiment, plant seeds were collected from special sites.

Laboratory germination of seeds in the conditions of the Chartak hills of the Fergana region in dry years was 10% (2017) and 61.2% in 2018, and meteorological conditions had a strong impact on seed germination in the soil (table 1). According to our experiments, laboratory germination was determined at room temperature (16-18 °C) using Petri dishes, filter paper is placed in a clean Petri dish and moistened with 2-3 drops of water, then counting 100 seeds are laid out in threefold repetition. Daily observation is carried out, the seeds sprouted on the 5th day, the laboratory germination rate was 50.1%.

TABLE 1 GERMINATION OF KEYREUK SEEDS

	% in the lab	**% in the field**
2017	10	5,0
2018	61,2	29,5
2019	23,0	9,5
On average	27,7	14,5

The germination of keyreuk seeds decreases after 5 months of storage, the seeds have good germination within a month after harvesting.

TABLE 2 GERMINATION OF KEYREUK SEEDS DEPENDING ON THE PERIOD OF STORAGE

Storage period (month)	Germination %	
	Of seeds of 2017	Of seeds of 2018
1	10,2	61,2
2	23,0	27,0
3	19,0	23,0
4	30,0	33,0
5	15,0	18,0

As can be seen from table 2, the germination rate of seeds stored for one month decreases to 61.2%, and after 5 months to 18.0%, so it is advisable to use freshly harvested seeds when sowing. The field germination of the keyreuk was determined on a special area in the Berdakh farm, Amudarya district. To do this, in the fall, the field is plowed to a depth of 25-30 cm, and then the field is prepared for sowing, after it is loose and leveled with a rake and harrow.

On November 9 2017, the seeds were sown on an area of 5 to 15 m^2, these seeds were sprouted on our experimental area. To determine the optimal time of sowing, the seeds were planted in 2 terms (table 3).

TABLE 3 GERMINATION OF KEYREUK SEEDS IN THE CONDITIONS OF A VARIETY OF BERDAKH FARMS IN THE AMUDARYA REGION (2018)

Sowing date	Germination of seeds	
	The number of sprouts on an area of $1m^2$	The number of planted seeds
9.XI.2018	30	30
2.III.2019	7	7

As can be seen from table 3, the seeds planted in November gave good germination. In contrast to this, the seeds planted in the spring sprang up poorly, because the seeds have to go through a dormant period during the long wintertime.

Consequently, it will be advisable to plant the keyreuk in October and November. In the conditions of the Fergana region, the degree of germination of the keyreuk plant is much higher than in our conditions.

In the field, germination varies according to seeding rates. With an increase in the seeding rate, their germination rate in the field also increases. The reason for the low level of germination in the field compared to the indicators of laboratory germination is a sharp change in the conditions for seed growth. When determining laboratory germination, all conditions are considered. In contrast to this, in the field, the possibilities for seed growth are quite different, for example, the water regime and lighting are different from the laboratory conditions. In the field, after the seeds germinate, sprouts should appear on the ground surface. For this reason, unlike in the laboratory, field germination is very difficult to predict. As a result, field germination directly depends on the weather conditions in the spring, the characteristics of soil fertility, agro technical methods, physical and mechanical properties of the soil.

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