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Bio-Morphological Peculiarities Of Salsola Orientalis S. Gmel In The Conditions Of South Aral Sea Region

Baltabaev Muratbai Torebaevich
Candidate Of Biological Sciences, Docent Of The Botany, Ecology And Teaching Methods Department, Nukus State Pedagogical Institute Named After Ajiniyaz Nukus, Republic Of Karakalpakstan

Karlibayeva Miyassar Abdinasir Kizi
Master, Nukus State Pedagogical Institute Named After Ajiniyaz Nukus, Republic Of Karakalpakstan

Jabbarbergenov Asadbek
Student, Senior Teacher Nukus State Pedagogical Institute Named After Ajiniyaz Nukus, Republic Of Karakalpakstan

Djumanazarova Khalima Xodjanazarovna
Senior Teacher Nukus State Pedagogical Institute Named After Ajiniyaz Nukus, Republic Of Karakalpakstan

ABSTRACT

The article is devoted to the study of the growth and development of Salsola orientalis S. Gmel in a culture. In the literature, the growth and development of Salsola orientalis S. Gmel is readily eaten by animals in all seasons and is a good fatty food for sheep. The eaten part of the plants is annual shoots with leaves; flowers and fruits, often more lignified lower parts of the bushes. Therefore, it is difficult to find plants in grazed areas that are not damaged by animals, which makes Salsola orientalis quite suitable for making hay.

Despite the practical value of this species and great attention from researchers, the growth and development of Salsola orientalis, taking into account the influence of the ecological conditions of the Karakalpak part of the Kyzyl-Kum Desert, have been little studied.

KEYWORDS

Growth and development, cotyledons, hypocotyl, true leaves, flowering and fruiting, lateral roots, first-order shoots, second-order shoots, number of internodes, aerial part, lateral roots, branching, growth, seedlings, generative shoot.

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INTRODUCTION

Keyreuk – Salsola orientalis S. Gmel belongs to the family of cimaceae, a subshrub, a halophilic plant with good forage properties, high productivity of the eaten mass and stability of systematic grazing in the harsh climatic conditions of deserts.

Keyreuk is readily 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, often more lignified lower parts of the bushes. Therefore, it is difficult to find plants in grazed areas that are not damaged by animals [1], which makes Salsola orientalis quite suitable for making hay.

According to M. M. Sovetkin [6], the eaten mass of Salsola orientalis leaves, young twigs, fruits contains 17.4% ash, 9.7% protein, 23.7% fiber, no alkaloids were found.

Keyreuk grows in various soil conditions, possessing a wide adaptability to a variety of edaphic and hydrological factors [4].

In the conditions of the Karakalpak part of the Kyzyl-Kum in culture, the biology of Salsola orientalis has hardly been studied. Therefore, we set ourselves the task of identifying the dynamics of growth and development of the vegetative organs of Salsola orientalis.

THE DISCUSSION OF THE RESULTS.

We carried out the first experiments to study the biology of Salsola orientalis in 2014 at the experimental site at the Department of Biology of the Karakalpak State University named after Berdakh.

In our experiments, Salsola orientalis S. Gmel showed a generative phase and full fruits already in the first year. By the end of the growing season, the height of plants reached 43 cm. Under the conditions of the culture of the Karakalpak part of the Kyzyl-Kum, Salsola orientalis S. Gmel went through the entire life cycle and gave seed reproduction.

In 2014, the first shoots of Salsola orientalis appeared in the third decade of March. The cotyledons were narrow oval on the upper side, yellow-green, not lowered, slightly lowered at the base. The length of the cotyledon leaf was 7 mm, the width was 2 mm, and the length of the hypocotyl was 6-8 mm. Seedlings of Salsola orientalis were characterized by intensive growth of the root system, which lead to better survival of juvenile plants in arid conditions.

In the second decade of April, the first true leaves appeared. The first true leaf was 1.5 mm long and 2 mm wide. The shape of this leaf was cylindrical; the apex was pointed, petiolate, and alternate in location. At this time, the plant height was 10 cm, the number of internodes was 11, and the number of shoots was 16. In the third decade of May, shoots of the first order appeared. The number of leaves in one bush was 96 pcs.

The beginning of the growing season in the two-year-old Salsola orientalis was observed from the first ten days of April. Active growth was observed in April, May, until the first ten days of June. Leaf blooming began from the lower part of the main shoot, the upper part of the shoot, new leaves sprouted at a height of 15-20 cm from the last years dried branches. In the third decade of May, Salsola orientalis had a flowering phase (Table 1). The number of

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internodes on the main shoot was 38, crown diameter was 45 cm, and branches were soft. Shoots of the V1 order appeared, their length had reached 2.5 cm, with a diameter of 6 mm. The number of shoots of the first order was 14; the number of shoots of the second order – 20. In the third decade of September, the upper part of the branches died off by 10-25 cm.

According to our observations in culture in favorable weather conditions, intensive development of plants was noted, i.e. in 2014, then the annual precipitation was 194.5 mm, the plants grew by 43 cm, and in 1983, when the annual precipitation was 105 mm. The growth and development slowed down somewhat, the growth of Salsola orientalis did not exceed 19 cm in height. Salsola orientalis with a height of 22 cm, its crown reached 44 cm in diameter. The budding phase was in the first decade of May (table-1) at this time the length of the generative shoot is 14.5 cm, the number of buds in it was 24, and the buds were located in the leaf axils.

Some generative shoots had small shoots, their length was 1.5 cm. The length of the vegetative shoot was 15.5 cm, the number of shoots in it – 13, their length – 1.5 cm. Mass flowering was noted on July 15. The maximum length of a generative shoot was 40 cm, the number of flowers in it – 81, these shoots were well branched, the length of the second order shoots was 5 cm, the length of the third order shoots was 1 cm. In the lower part of the shoot, flowers were rarely located, and in the upper part, they were closer to each other. The number of shoots on one annual shoot was 18, their length – 11 cm. Most of the branches dried out.

Plant height was 55 cm, and crown was 80 cm in diameter. The length of the annual shoot reached a maximum of 41 cm; the wings appeared in September. Many Salsola orientalis bushes did not give full fruit due to the high summer temperature (July 42°-43°C). In the fifth year of life, the keyreuk began growing in the first ten days of April. Most of the bush dried out, the length of the annual shoot was 11.6 cm, it had 15 shoots, their length was 1.5 cm, the number of leaves was 66, the length of leaves was 6 mm, the shoots were reddish in the annual shoot, the upper parts of the branches and leaves were located closer to each other.

In our experiments, the generative phase was observed in Salsola orientalis S. Gmel already in the first year. The budding phase of Salsola orientalis under the conditions of the Kyzyl-Kum Desert of Karakalpakstan began at the end of June. The flowering phase began in the second decade of July [1, 2].

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Table 1.

Dates of the onset of the main phenological phases of Salsola orientalis

S. Gmel of the first (2014), second (2015), third (2016), fourth years of vegetation in culture.

Vegetation years	Kind	Vegetation		Budding		Flowering		Fruiting	
		beginning	end	beginning	end	beginning	end	beginning	end
2014	Salsola orientalis S. Gmel	4.03	10/XI	15.05	20.08	15.06	10.09	20.08	10.X
2015	-/-	15.04	10.XI	13.05	25.08	10.06	15.06	20.07	05.X
2016	-/-	1.03	8.X	7.05	30.08	8.06	10.09	23.07	05.X

Mass flowering and the beginning of fruit set were observed at the end of July. Individual bushes of Salsola orientalis bloomed until the end of September. The fruiting phase began in August. The leaves of the lower part of the main shoot dried out. Growth was slowing down.

Fruit ripening was noted at the end of October. The number of seeds in a large bush was on average 232 pieces, an average bush 70 pieces in a small bush –10 pieces. The onset of the flowering and fruiting phase in the first year of life was noted by A. Allaniyazov in the conditions of Ustyurt and R. Nigmanova (1930) in the conditions of Southwestern Kyzyl-Kum [5].

The fruiting phase of Salsola orientalis occurred in the third decade of June (1982). The number of fruits on one branch ranged from 12 to 40. At this time, the leaves changed their color to orange. The wings were not fully formed; they usually started from the bottom of the branch. Individual bushes of Salsola orientalis at the end of the second year of life gave up to 3000-9000 seeds.

In a three-year-old keyreuk, the budding phase was noted in the first decade of May, at this time, the length of the generative shoot was 8 cm; the number of buds in it was 8-29 pieces. The buds appeared in the axils of the seventh leaf of the generative shoot, flowering in the second decade of June (Table 1). The length of the generative shoot was 19 cm. Many shoots dried up, the upper parts of all the shoots died; the size of the dead shoots was 7-16 cm. The productivity of the green mass was 1.3 kg/ha.

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The seed productivity of the keyreuk on the furrow under the culture conditions varied from 40 to 60 grams per bush, it depended on the habitat and the amount of precipitation.

Thus, in culture in different years of observation, the values of various degrees of growth and fruiting changed with the change in meteorological factors.

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