

## BIOECOLOGY OF SAXAUL (HALOXYLON) AND THE ESTABLISHMENT OF A GREEN COATING FROM IT ON THE DRAINED BOTTOM OF THE ARAL SEA

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**Abstract.** *The article tells about the short-term natural conditions of the Aral Sea region, that the surface of the earth began to be covered with silty soils, and that this ecological crisis in the Aral Sea region also affected the health of the population. In this regard, the necessity of carrying out forest reclamation work in the conditions of this ecological crisis and the results of studying the biological and ecological indicators of the saxaul plant growing on the dry bottom of the Aral Sea are described.*

**Keywords:** *the Aral Sea region, climate, melioration, white saxavul, black saxavul, ecology, desertification, sandy desert, end of September, winged.*

### INTRODUCTION

It is known that the drying up of the Aral Sea is not only a problem of the Republic of Uzbekistan, but also an international task, a general (global) problem. Today, in the Aral region of the Republic of Karakalpakstan, with a decrease in groundwater, the surface of the earth began to be covered with solonchak soil. The waters of the Aral Sea have retreated more than 100 km from the coastline. As a result, more than 5.5 million hectares were occupied by the Orolkum Desert. This ecological crisis, which arose in the Aral Sea region, also affected the health of the population. As a result, cardiovascular, gastrointestinal and respiratory diseases have increased among the local population. At the same time, compared with the 1960s, anemia in the region has increased 20 times. This ecological tension in the region could not but affect the nature of the Aral Bay, flora and fauna. It is true that out of more than 60 species of birds in the southern Aral Sea region, about 10 are disappearing, and more than 42 species are becoming "rare" [1, 3, 4].

Every year, up to 72 million tons of sand and dust rise from the dried bottom of the Aral Sea into the atmosphere, which causes an environmental burden in the Aral Sea region.

On average, 1 ha of land occupied by agricultural crops accounts for up to 520 kg of salt. The water level in the sea is decreasing every year, and more than 150 million tons of salt and sand particles, together with dust, rise into the atmosphere from arid and unprotected areas and are carried over distances of up to 1000 km. As a result, the process of salinization in the Aral Sea region has sharply increased, which led to the appearance of salts and dust in the air, increased environmental tension and, as we noted above, increased the spread of serious diseases among the local population. The productivity of agricultural crops has decreased, the process of desertification has begun to develop. To do this, one of the factors that reduce the processes of deflation on the dried bottom of the Aral Sea and reduce the rise of dust and salts into the air, purify the air, reduce the amount of carbon dioxide in the area, is the rapid development of forest reclamation, which ensures the stabilization of the ecological situation in the Aral Sea region.

Accordingly, making a positive impact on the environment by growing native plant species that are appropriate to the nature and ecological situation of the area is considered one of the types of work of practical importance. Indeed, the environmental burden associated with the drying up of the Aral Sea can be reduced by forest reclamation.

To do this, it is necessary to use saxaul plant species adapted to the climatic conditions of the region.

The main forest-forming species of the Kyzylkum deserts of Uzbekistan are white and black saxaul. Black saxaul (*H. aphyllum*) - leafless tree or shrub up to 4-9 (12) m high [6].

#### **Research methods**

The studies were carried out in field and laboratory conditions, using reforestation methods. According to the indicators of the recommendations "On the creation of forest plantations on the dried bottom of the Aral Sea" and "On the acceleration of the formation of vegetation by supporting the natural regeneration of the forest from seeds in the conditions of the dry bottom of the Aral Sea", in accordance with the requirements of TECHNICAL CONDITIONS GOST 13855-87 "Fruits sand-reinforcing tree species, sowing qualities" [2].

#### **RESULTS AND DISCUSSION**

As a result of many years of research, we know that xerophytes belong to a group of plants that grow on very hot, arid soils - trees and shrubs belonging to this group are mainly adapted to grow in arid areas with an arid climate and a lack of moisture. Xerophytic plants are plants that have evolved morphological, anatomical, and physiological features to adapt to these conditions.

The Chenopodiaceae family, which is part of this group, mainly includes 2 important genera - saxaul and solonchak, and the species in it are sandy-desert and desert plants.

Genus Saxaul (*Haloxyton*). Saxaul is considered a sandy-desert, desert plant, and its habitat is adjacent to the border of deserts and semi-deserts. In the conditions of our republic, saxaul blooms mainly for 5-7 days in March-April, and after flowering in hot summer, fruit (seed) nodules are not formed, only by September (this process can vary by 10-15 days depending on climatic conditions ) form winged seed concretions. At the end of September, many winged seed nodes form on saxaul. Seeds are formed in the form of winged, blue, flower species.

**Picture 1.**

Study of biomorphological parameters of saxaul.



In October, the seeds ripen and fall out, only the seeds remaining on some trees remain until the next spring. These winged seeds are dispersed by the wind. In addition, in areas where forest reclamation work was carried out, those remaining under the sand grow and develop in cultivated areas. Seedlings of these saxauls 15-20 cm high stop the movement of moving sands and bring great results in reclamation processes.

**Picture 2.**

Biomorphological parameters of saxaul seeds.



**Picture 3.**

Cultivated saxaul planted to strengthen the sands.



Plant regeneration is carried out not only from seeds, but also with the help of vegetative parts - root buds. 3 types of representatives of the group are common in Central Asia.

**Black saxaul (*Haloxylon aphyllum* (Minkw) Iljin.)** It grows in barren deserts, on yellow saline soils, on saline sandy and gray soils. It is a plant that performs important tasks in the desert, such as protecting the soil, filling sand, and caring for desert pastures. In addition, white and black saxaul are of great economic importance. Black saxaul - occurs in the form of a tree or shrub, growing up to 8-12 meters high. Seeds have an average wingspan of 1 cm, seed diameter up to 2.4 mm.

**Picture 4.**

Type of black saxaul seeds.



Saxaul is the largest plant among plants growing on sandy soil. Saxaul has no leaves, buds begin to appear in February. The flowers are small, pale yellow, bisexual, five-lobed. The root system is lateral, grows deep into moist layers of soil or sand, sprawling.

Ontogeny of black saxaul is 50-60 years. Not demanding on the soil, i.e. to edaphic factors. Heavily saline sand reclamation can grow even in difficult terrain. Occupies small patches of soil on plains and in sand dune intervals. Unlike other desert plants, black saxauls form desert arboretums. It is a plant (ultraxerophyte) that requires heat, light and is highly drought tolerant. By origin, saxaul groves are found in mixed forests, propagated by seeds and root buds. The process of reproduction of this plant from root buds occurs at the age of 18-20 years, in particular in black saxaul gardens.

Black saxaul grows from seed and loses its ability to germinate if it is kept for a year or two without sowing seeds, so it is advisable to plant them in the ground as soon as the seeds are harvested in the fall.

**White saxaul (*Haloxylon persicum* Bge)** The places of distribution (plants) of white saxaul are the slopes and escarpments of sand dunes; it grows in low-mountain areas. The type of soil on these lands is mainly simple, sandy, gray, low-humus, almost non-saline or slightly saline. As a result of our research today, even on the dry bottom of the Aral Sea, i.e. on land without water, white saxaul was almost not observed (but this anhydrous area can be located in wide sand dunes with a very narrow range, our research continues).

Information about the distribution and biology of white and black saxaul in our republic in Tashkent, Fergana, Kashkadarya, Surkhandarya, Bukhara and Karakalpakstan (Flora of Uzbekistan Tashkent 1953. Volume II 314 pages) is given [5].

It is stated in the literature that this type of saxaul does not form an array of dense saxaul, but is located in a rare form or grows singly (rarely).

White saxaul is mainly a shrub or small tree 2-3 meters high (sometimes 5-6 m), branching starts from the base of the trunk. The bark of the body is pale or light gray, the seeds are formed in the form of flat wings, they are formed at the end of October. Being a typical psammophyte plant, it is very demanding on light and heat. This is one of the most drought-resistant plants of sandy deserts, like black saxaul.

Its highly developed root system is of particular importance for strengthening the sands. White saxaul can also be propagated mainly by seeds, it is difficult to reproduce in natural conditions. Fertilizer application can be increased during land reclamation in sandy or soil conditions.

Sandy desert plants resistant to these droughts also include the **Salsola** family. In the course of our research, it was also noticed that saltworts (Circassians) grow and develop on saline soils in sand dunes and arid deserts. Solyanka plants are widely used to strengthen sand dunes, and saltwort is also used in landscaping desert and semi-desert areas, as well as in the construction of hedges and green protective arrays. Solyanka wood is brittle compared to saxaul wood. A dye is extracted from its leaves, so it is used to dye cotton fabrics.

Accordingly, it is important to grow saltwort plants from seed on a large scale in sandy desert lands. After all, it is an invaluable source of food for camels, Karakol sheep and horses. The most common among saltworts and the most important in the economy are Cherkez (Richter's saltwort), Karacherkez (Palesky's saltwort), Chogon (little-leaved saltwort) and Boyalich (tree-like saltwort).

They grow mainly as shrubs or small low trees with a white body. The branches are whole, undivided, grow straight or upward. It is a green deciduous plant with cylindrical or sinewy leaves arranged in a row. The flowers are bisexual, formed in single or spike-shaped inflorescences, drought-resistant, light-loving plant.

### **Conclusion**

In accordance with this, the efficiency of growing green spaces in the sandy-desert lands of the Aral Sea region based on 2 important species belonging to the Chenopodiaceae family - saxaul and saltwort - is high. As we mentioned above, on the territory of the Aral region, due to the high process of adaptation of black saxaul growing in natural conditions, its seeds can be widely used.

In the course of our research, it was also noted that the collection of saxaul and Circassian seeds in the winter season and their sowing with mechanical processing in sand give good results. Today, in the process of collecting seeds of saxaul, the seeds of all the species of saxaul that gave seeds are generally collected mixed. But young saxaul seedlings, which gave 3-4-year-old seeds, grow and develop on lands free from Aral waters, when collecting their seeds separately and sowing seeds of these species at the age of 3 or 4 years, rapid seeding and spreading is observed.

As a result, the natural forest cover is formed during seed dispersal based on the influence of biotic and abiotic factors. The rise of salt and sand into the air is reduced. Green covers on the dried bottom of the Aral Sea increase the volume of flora, stabilize the balance of the territory to such an extent that this creates a resource for the fauna.

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