AMERICAN JOURNAL OF BIOLOGY AND NATURAL SCIENCES
https://biojournals.us/index.php/AJBNS
ISSN: 2997-7185

Article

Development of Saxaul Cultivation in Uzbekistan

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Citation: Aminqulovich, F. U., & Gulom qizi, M. L.. Development of saxaul cultivation in Uzbekistan. American Journal of Biology and Natural Sciences (2025), 2(1), 104–108 .

Received: 10th Jan 2025
Revised: 11th Jan 2025
Accepted: 14th Jan 2025
Published: 21th Jan 2025

Abstract: Among the plants, saxaul sand is better than all strengthens. Saxaul sand with strongly developed root networks ggrabs its masses and stops its course, where other plants and bushes grow and develop from trees and shrubs ggrow outside deserts the saxaul makes a sharp faq White saxaul barbed shells that are on the stems not counting (cheshuyek) they do not have leaves. For this reason organic matter in plants is fresh it accumulates on overgrown branches (like some desert plants).

Keywords: Saxaul, cheshuyek, island, Nortuya variety, salty lands, typical psammophyte, timber reserves, forest farms, black forest, saxaul fields are being built, use as fuel.

Introduction

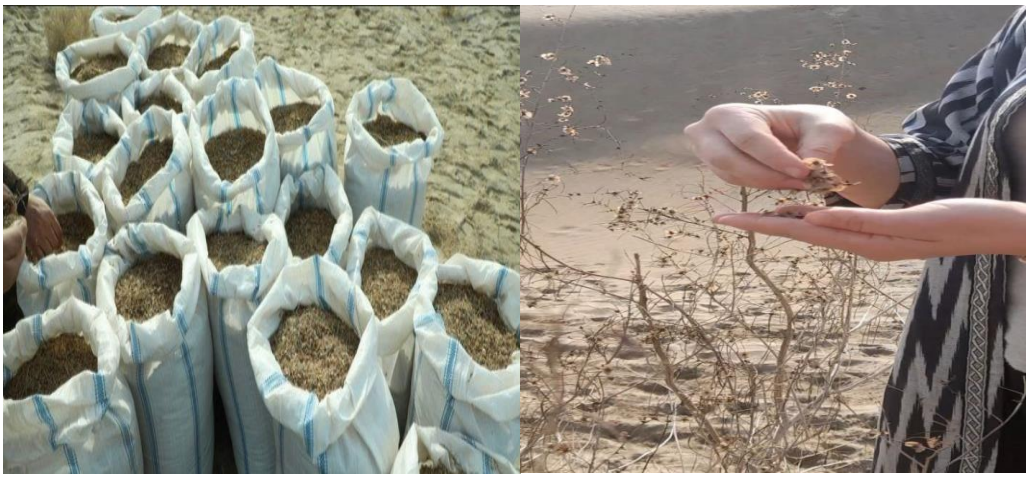
Saxaul is a desert plant. Its growth area is associated with the boundaries of deserts and semi-deserts. The total area of saxaul forests in Central Asia and Kazakhstan reaches 20 million hectares. Approximately half of this area is in Kazakhstan, while Turkmenistan and Uzbekistan each account for about a quarter. In Turkmenistan, saxaul forests make up 94.1% of the total forest area, whereas in Uzbekistan, this figure is 64%. In terms of wood reserves, saxaul forests rank second after juniper forests. Currently, in forestry, the age of saxaul is determined through branch separations using equations developed by V.M. Arikhovskiy and A.V. Gvozdikov. Saxaul wood stands out not only for its structure but also for many other characteristics. It has a high specific gravity of 1.02, sinks in water, is extremely hard, and at the same time very brittle. The brittleness of saxaul wood is due to its short fibers and cells saturated with mineral salts. Cutting and sawing saxaul wood is difficult, but it breaks easily. Saxaul wood is rarely used in construction because its stems are crooked, hard, brittle, and yield very little usable wood (5%). However, due to its excellent heat-generating properties, saxaul is considered the best wood fuel and is also used as charcoal.

Materials and Methods

Saxaul charcoal is highly valued for its high calorific value and long-burning properties. Saxaul blooms in March and April for 5-7 days. In the scorching summer heat that follows, no fruiting occurs. Only by September do fruits begin to form, and by the end of September, saxaul produces abundant fruit. Saxaul is a desert plant. Its growth area is associated with the boundaries of deserts and semi-deserts. The total area of saxaul forests in Central Asia and Kazakhstan reaches 20 million hectares.

Results

Approximately half of this area is in Kazakhstan, while Turkmenistan and Uzbekistan each account for about a quarter. In Turkmenistan, saxaul forests make up 94.1% of the total forest area, whereas in Uzbekistan, this figure is 64%. In terms of wood reserves, saxaul forests rank second after juniper forests. Saxaul plays a significant role in the national economy. It is mainly used as firewood (fuel), a nutritious feed for sheep and camels, a means of stabilizing sand, and as a windbreak. Saxaul forests are crucial for protecting soil from erosion. In Uzbekistan, saxaul forests cover 1.229 million hectares, including 976,000 hectares of white saxaul and 253,000 hectares of black saxaul. In Uzbekistan, the Nortuya variety was zoned for planting in deserts and pastures in 1991. In recent years, several forestry enterprises have been established to increase saxaul cultivation, and artificial saxaul plantations are being created.



Saxaul Seeds

Black Saxaul

Black saxaul is a tree or shrub that can grow up to 12 meters in height. Among desert plants, it is one of the largest. Its trunk is crooked and knotty, with black bark and a wide, lattice-like branching structure. The desert zone comprises 61.66% of Uzbekistan's territory, including the Ustyurt plateau in Karakalpakstan. The desert zone encompasses areas at altitudes ranging from 500 to 600 meters above sea level. These regions primarily cover most of the Kyzylkum Desert in western Uzbekistan, all areas of the Amu Darya basin, the Ustyurt plateau, Kemirikum, and the Qarshi and Surkhan deserts.

The vegetation here predominantly consists of xerophytes (from the Greek xeros – dry, phyton – plant), plants adapted to dry and hot summer conditions. The desert soils are classified into three types:

Saline desert soils (salt deposits, moist saline areas, barren salt flats, and raised saline lands).

Sandy desert soils (sands, sandy soils, white sands, and shifting dunes).

Gypsum desert soils (carbonate soils mixed with fine stones).

Occasionally, a fourth type, silty soils, can also be found.

Discussion

Growth and Characteristics of Black Saxaul

Black saxaul grows rapidly in its early stages. Seedlings grow 25–30 cm (sometimes up to 120 cm) in the first year, while shoots from stumps can reach up to 1 meter. At 6–10 years old, it can grow 5–7 meters tall, with a trunk diameter of 25–30 cm. By 25–30 years, black saxaul reaches 4–5 meters in height, with a trunk diameter of 40–50 cm. It has a lifespan of 50–60 years.

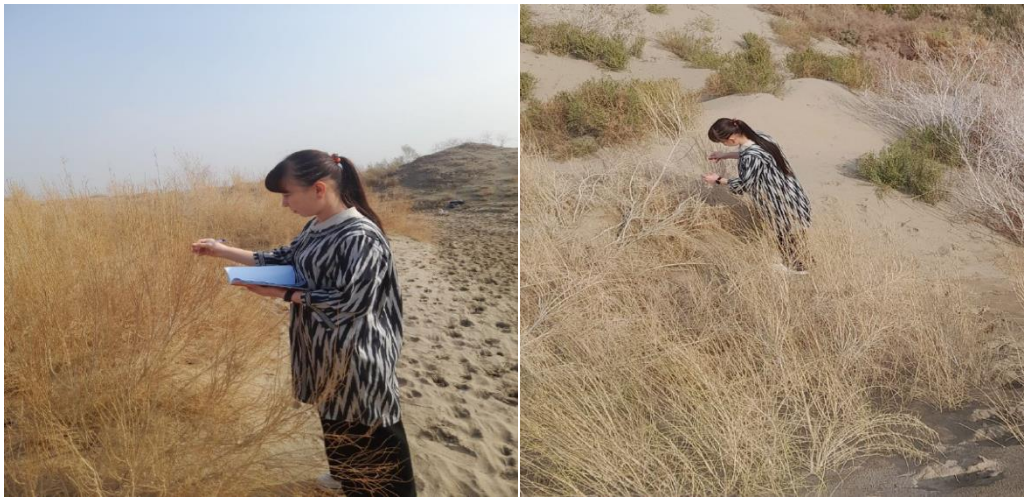
Black saxaul is not demanding on soil conditions and can grow in heavily saline areas. It occupies small areas in valleys and between sand dunes. Black saxaul forests, often called "black forests," create a unique contrast among other desert plants. They are highly heat- and light-tolerant and extremely drought-resistant.

Reproduction

Black saxaul reproduces mainly through seeds and root suckers. Root sucker reproduction begins at 18–20 years of age in mixed black saxaul forests. Most reproduction occurs through seeds. While seed germination is uneven, the species has excellent reproduction potential. Seeds sown in autumn sprout in spring. Black saxaul does not propagate through cuttings.

Importance and Forestry Efforts

In the deserts of Central Asia, forestry enterprises annually establish large-scale plantations (several thousand hectares), stabilize sand around valleys, and protect populated areas, industrial facilities, railways, and agricultural fields from moving sands. Black saxaul plays a leading role in these desert forestry efforts.



Saxaul Forests in Large Sand Masses

Black and White Saxaul

Black Saxaul (Haloxylon aphyllum (Minkv) Iljin)

Black saxaul grows in clay deserts, yellow-saline soils, saline sandy, and loamy soils. It can grow as a tree or shrub, reaching heights of up to 12 meters. It grows rapidly in its early stages. Seedlings grow 25–30 cm (sometimes up to 120 cm) in the first year, while shoots from stumps can reach 1 meter. At 6–10 years old, it can grow 5–7 meters tall, with a trunk diameter of 25–30 cm. At 25–30 years old, black saxaul can reach 4–5 meters in height, with a trunk diameter of 40–50 cm. It has a lifespan of 50–60 years. Black saxaul is undemanding of soil and can thrive even in highly saline areas.

White Saxaul (Haloxylon persicum Bge)

White saxaul is typically found on the slopes and inclines of sand dunes, low hills, and, in some cases, in depressions or low-lying areas between dunes. It is more widespread than black saxaul. White saxaul grows as a shrub or small tree, typically 2–3 meters tall, but occasionally reaching 5–6 meters. Its branching starts at the base, with a trunk covered in whitish or light gray bark. Its branches are segmented, dry, and bluish-green in color. Its fruit consists of flat wings with a diameter of up to 1 cm, featuring five semi-transparent fan-shaped wings, ripening in October. The wood is grayish and primarily used as fuel. White saxaul is a typical psammophyte, adapted to sandy environments.

White saxaul can survive in relative humidity as low as 1%. It belongs to the category of fast-growing plants. Its root system is not dependent on groundwater, with most roots located at a depth of 2.5 meters, while the main root can reach up to 6 meters. White saxaul shrubs transform their surrounding environment, stabilizing sand with their well-developed root system.

During the scorching summer heat, up to 50% of the young (photosynthetic) shoots fall off, leading to the compaction of sand beneath the shrubs. Over the years, the accumulated fallen branches contribute to soil renewal. Additionally, the shrubs provide shade, which facilitates the growth of other plants beneath and around them, playing a vital role in developing desert pastures.

White saxaul's natural reproduction is challenging. It can be propagated through seeds and seedlings. Alongside black and white saxaul, another species, Zaysan or Shrub Saxaul (Haloxylon ammodendron Bge), is also found in Central Asia. This species is significant for stabilizing shifting sands.

Conservation Efforts

In the northern part of the Republic of Karakalpakstan, employees of the "Orolkum" National Nature Park are actively engaged in saxaul protection. The dried bed of the Aral Sea has turned into a desert. Harsh climatic conditions and low natural moisture levels have significantly reduced plant diversity in the region. Despite these challenges, many plants adapted to the local environment continue to grow. Their cells contain moisture-retaining substances, essential oils, alkaloids, tannins, and water-soluble salts, which enable them to survive in extreme conditions.

Saxaul Forests in the "Orolkum" National Nature Park

Conclusion

The established shelterbelts create a microclimate that increases the productivity of desert pastures by 2.3 to 3.0 times, making it possible to develop pastures suitable for year-round use by livestock.

Approximately 30 species of trees and shrubs grow in these areas, mainly xerophytic shrubs and small-sized trees. Despite their modest size, desert forests play a crucial role in fulfilling important national economic functions, such as soil protection and stabilizing shifting sand masses. The trunks of tree-like plants reduce wind strength, while their extensive root systems stabilize the sand and promote the growth of grass and other plants.

This, in turn, prevents sand encroachment into cultivated oases and has a significant positive impact on the microclimate of the areas where these plants grow. Desert forests thus contribute not only to ecological stability but also to agricultural sustainability and environmental protection.

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