



BIOECOLOGICAL FEATURES AND ECONOMIC SIGNIFICANCE OF HIPPOPHAE L. UNDER THE CONDITIONS OF THE SOUTH ARAL SEA

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ABSTRACT

The article presents ecological and biomorphological features, the history of the introduction of sea buckthorn in the conditions of Karakalpakstan, its possibility of propagation by seeds, and also economic significance. Sea-buckthorn as a fruiting and medicinal plant has become widespread relatively recently and has proved that it is an important industrial plant. The fruits of sea buckthorn are distinguished by the content of high-quality sea buckthorn oil and are a multivitamin raw material.

KEYWORDS: *introduction, history, ecology, Hippophae L, family, sort, biomorphology, particularity, seed duplication, economic importance.*

INTRODUCTION

Sea buckthorn (*Hippophae L.*) is a genus of plants of the Sucker family (*Elaeagnaceae*) shrubs or small trees, their height reaches 6-8 m, and diameter is 20-30 cm. One of the species of the family Buckthorn buckthorn (*Hippophae rhamnoides*) is widely distributed in the CIS flora.

The Latin name of the genus is the Latinized form of the Greek name for the plant *hippophaes*, which comes from *hippos* - horse and *phaos* - shine. It was believed that horses fed with sea buckthorn leaves had a particularly shiny skin. The species epithet *rhamnoides* comes from the name buckthorn (*Rhamnos*) and *oides* is similar. The Russian name "sea buckthorn" is associated with a large number of berries on the branches, which, under the favorable conditions for the existence of plants, literally "stick around" the branches [2, pp. 19-23].

The bark of the trunk is yellow-brown or almost black, the bark of the branches is brown. Shortened shoots are covered with numerous thorns.

Natural thickets of sea buckthorn are common in Siberia, Central Asia, Kazakhstan, the Caucasus, the Baltic coast. There are different types of sea buckthorn, which vary in size, shape and color of the fruit, in

chemical composition, prickly, frost resistance and other signs. The local plantations are used not only for harvesting fruits, but are also custodians of the gene pool. Therefore, among the diverse and rich gene pool, there are specimens valuable in economic importance and used for breeding purposes.

Sea buckthorn gained wide popularity due to its fruits. They have high healing properties, determined by the content of vitamins, trace elements and organic acids, which are extremely important for the prevention and treatment of many diseases [7, pp. 76-79].

In Karakalpakstan, sea buckthorn as a fruiting and medicinal plant has gained distribution relatively recently and has proved that it is an important industrial plant. The fruits of sea buckthorn are distinguished by the content of high-quality sea buckthorn oil and are a multivitamin raw material.

In the conditions of Karakalpakstan, sea buckthorn in the wild does not grow. For the first time in the botanical garden of the Karakalpak branch of the Academy of Sciences of the Republic of Uzbekistan in 1963, sea buckthorn was grown, seedlings from the Tashkent Botanical Garden were brought for these purposes. After that, in 1980, prickly varieties of sea buckthorn from the botanical garden of the Academy of



Sciences of the Republic of Kyrgyzstan (Bishkek) were brought for planting [5, 192 p.].

In 1981-1983, seedlings of non-short varieties Dar Katun, Vitamin, Orange, Golden Coil, Altai News, Ussuri, Chui, Oilseed, Superior, Abundant, Nugget and Shcherbinka from the Scientific Research Institute named after them were brought. M.A. Lisavenko, Altai Territory, as well as from the state farm "Flora" of Biysk District.

RESULTS OF THE RESEARCH

As a result of many years of research in the botanical garden, sea buckthorn has become widespread in private household plots. It was also introduced into the Karakalpak agricultural industry for industrial purposes. The landing area of sea buckthorn is 15.5 hectares. Of these hectares, 10 hectares belong to the Ornek farm of the Nukus region, 4.5 hectares to the Azatlyk farm of the Khojeyli district, 0.5 hectares of Madaniyat and A. Dosnazarov farms of the Karauzyak district [4, pp. 23-24].

The observations showed that at present, sea buckthorn has been preserved only in the collection of the botanical garden, as well as in personal plots of people who love gardening and nature. One of the reasons for the decrease in area is that people have not yet understood the values and values of this plant.

The sea buckthorn introduced in the conditions of the South Aral coast is a shrub or tree with a height of 3-4.5 m, shoots are dark green, leaves are covered with silver, star-like pubescence. The shoots are covered on top with silvery, bottom brown coin-like scales. The leaves are arranged alternately, narrow, lanceolate, the length reaches up to 8cm. The edges are solid, but slightly concave. The surface of the leaf blade is dark green, silvery bottom from densely covering star-shaped scales.

In Karakalpakstan, sea buckthorn begins to bloom in early spring (April-May), flowers appear earlier than leaves or simultaneously. The flowers are heterosexual, dioecious, collected in spike-shaped inflorescences. False fruit (drupes).

Wind-pollinated sea buckthorn plants (anemophilous). Flower buds are mixed, vegetative-generative, laid on the growth of last year, that is, in the year preceding fruiting. The beginning of bud blooming is observed in the phase of the end of the intensive growth of annual shoots in length, in mid-July - early August.

Male (staminate) flowers develop one at a time, their number in the generative zone of the shoot reaches 4-6 or more. The flower has a unisexual (cup-shaped), bifid, round-elliptical perianth of greenish-gray color with four free stamens. The flowering period of male bushes depends on the weather and lasts 6-12 days. Flowers on the axis of a growing shoot do not open in

the direction from bottom to top at the same time. They are revealed when the daily temperature is above 6-10C, they emit a large number of pollen.

Pistillate flowers, like stamen flowers, develop in the sinus of the covering sheet singly, less often in the form of a small-flowered umbrella with 2-3 flowers. Stamen and pistillate flowers do not have nectaries; therefore, they are not visited by bees and other insects.

The plate of the leaf changes the direction of the air stream, while pollen settling is observed on the stigma of the pestle [3, p. 57-59; 12, p.30-32].

After pollination and fertilization, the ovule turns into a kidney, and the ovary and hypanthium becomes a fetus. The color of the seeds is from gray-brown to dark brown, almost black.

The fruits of sea buckthorn are false, juicy achenes. From the beginning of flowering until the fruit fully ripens, 84-105 days pass. The duration of their formation depends on the genotype and weather conditions of the growing season.

Under optimal conditions, fruit setting is 30-90% of the total number of pistil flowers. Consumer ripening of fruits in time occurs on average 15-30 days after the end of pericarp growth and the appearance of seeds.

Phenological observations conducted in the conditions of Karakalpakstan showed that the biological processes occurring in sea buckthorn change every year. In these places, the beginning of the growing season comes on March 4-20, sea buckthorn begins to bloom on April 2-18, April 8-23, the interval is 6-12 days. The growth of the annual shoot begins after flowering and ends in the first half of September. Fruit ripening begins on June 15-17 and ends on July 1-15. Fallen leaves begin in November-December. Some leaves hang until hard frosts.

The growing season of sea buckthorn in our conditions from the moment of bud swelling to leaf decay is 256 days, that is, in comparison with the Altai Territory (Biysk city), it is longer by 40-45 days. This circumstance can be explained by the fact that in our country spring begins earlier than in the homeland of sea buckthorn, and autumn comes late.

The distribution of sea buckthorn in natural conditions in floodplains, as a rule, with a high standing groundwater indicates its high demands on the conditions of soil moisture. A moisture deficit in the root layer of the soil negatively affects the condition of the plant. During the period of summer droughts, it can be observed that the leaves at the base of the shoots dry out and fall more, the growth process ends early and the growth of annual shoots is weak.

Given the demandingness of sea buckthorn to soil moisture, it is necessary when growing, especially in the years of drought, it is enough to water. Achieving the normal development of the plant and a high yield of



fruits from the tree is possible with optimal soil moisture.

Sea buckthorn, as an ancient representative of the Sucker family, is a thermophilic plant; it loves heat especially in the early stages of its development. Proof of this is the temperature needed for seed germination. For example, the seeds of apples, thorns, cherries germinate after the end of the period of physiological dormancy of the embryo at a temperature of 1-30C, and the seeds of sea buckthorn at a temperature of 10-12C.

Frost tolerance of sea buckthorn arose in the process of evolution and in some way details the appearance of sea buckthorn in the environment. Frost resistance of fruit trees, especially sea buckthorn, is more dependent on the length of the dormant period and on the time of its end [12, p.30-32].

Sea buckthorn fruits contain up to 40% fatty oil, a lot of vitamin C, provitamin A, sugar, provitamin D, there are organic acids - malic, tartaric, nicotinic, B vitamins, tannins, a lot of proteins [10, p.102-103; 11, p. 182-183; 13, p. 50-52; 14, p. 101-106; 15, p.16-21]. The calcium content in fruits is 0.8853-1.0057% - [14, pp. 101-106]. In addition to it, potassium, sodium, iron, phosphorus are determined - [6, p.65-66]. Also identified in the fruits are linoleic (34.2%), palmitoleic (21.37%), palmitic (17.2%), oleic (12.8%), linolenic (5.37%), stearic (1.67%) acids - [16, p. 368].

Seeds contain fatty oil, proteins, tannin, vitamins E, B1, B2, linoleic (42.36%), linolenic (21.27%), oleic (21.34%), palmitic (6.54%), stearin (2.54%) acids - [16, p.366-368]. The fruits of sea buckthorn are used fresh and in processed form, juices, compotes, preserves, pastas, etc. are prepared from berries. Sea buckthorn oil obtained from fruits and seeds is widely used in medicine.

From the pulp of seeds, peel and seeds get a thick oil. It is used in the treatment of various skin diseases and mucous membranes, in the prevention of certain diseases, in case of burns, frostbite, radiation injuries of the skin, in the treatment of mucous membranes, gastric and duodenal ulcers, in the prevention of digestive system diseases, in various radiation therapies for cancer, etc. [9, pp.11-13].

In folk medicine, the fresh fruits of sea buckthorn are used for stomach pains, its juice is used externally for bleeding. The gruel of the fruits is used externally for wounds to remove pigmentation after burns. A decoction of the fruit is drunk in case of gastric ulcer. It bathes children for the prevention of skin diseases. A decoction of fruits and branches is used topically and internally for skin diseases, itching, and hair loss.

Pulp of dried flowers of sea buckthorn is locally used as a wound healing, anti-inflammatory, cleansing agent. Tea from the leaves is drunk with rheumatism, as an anti-zingotic agent, with anemia, gout, inflammation

of the stomach and intestines. A decoction of seeds is used as a laxative [8, p.347-348].

In Tibetan traditional medicine, the fruits of sea buckthorn are used for heart and blood diseases, purulent pleurisy, intoxication, and diseases of the gastrointestinal tract. In Mongolian folk medicine, sea buckthorn berries are prescribed for tuberculosis, cough, acute pneumonia, and biliary tract abnormalities [1, p.67-69].

The leaves contain tannins, flavonic substances, ascorbic acid and volatile. A hippophone (a substance against edema (tumors) was found in the peel. The fruits of sea buckthorn are also used in the food industry, from which juice, jam, marmalade are made, jam, jelly are boiled, and added to sweets. All its products contain valuable vitamins. Tasty young shoots from ancient times are used as a feed product and for the treatment of animals.

Sea buckthorn has a meliorative value. It is able to form in a large number of root offspring that are easily separated from the mother bush. Root offsets depart from the main root in the upper layers of the soil, creating the opportunity to combat soil erosion. Due to this feature, sea buckthorn performs a large hydrological role in strengthening dams. The root offspring of sea buckthorn are also actively involved in the development of sandy soils affected by wind erosion. For these reasons, in the fight against erosion it will be advisable to include sea buckthorn in a number of forest trees.

Sea buckthorn deserves a wide study with a view to its use in landscaping settlements. Also, sea buckthorn due to the decorativeness of its fruits and leaves can serve as an adornment of our cities and villages, health resorts, forest parks, squares, school districts.

REFERENCES

1. Batorova SM, Ledneva IP, Tsend-ayush D. *Phytocorrection for 55 disorders of digestion and metabolism in Tibetan medicine // Siberian Medical Journal.* - Irkutsk: 2003. - No. 41 (6), - P.67-69
2. Bogolyubov A.S., Kravchenko M.V. *"Ecosystem".* - Moscow, 2017. - S.19-23
3. Grokhovatsky I.A., Otenov T.O., Otenova F.T. *Buckthorn buckthorn (Hippophae rhamnoides L.) of the Altai variation in the conditions of the southern Aral Sea region // Materials of the XI International scientific-practical conference "Problems of botany of Southern Siberia and Mongolia" - Barnaul (Russia), 2012. - P.57-59*
4. Dudkin GI, *Introduction to the culture in the South Aral Sea buckthorn buckwheat as a promising fruit and medicinal plant. // Materials of the scientific-practical conference «Plant introduction, problems and prospects» - Khiva, 2003. - P.23-24*



5. *The results of the introduction of plants in the Karakalpak botanical garden.-Tashkent: "FAN", 1970. 192s.*
6. *Karanyan I.K. The fruits of sea buckthorn - the most valuable source of biologically active substances // Agrarian Russia, 2001. - No. 6. - S.65-66*
7. *Karomatov I.D. Sea buckthorn - a therapeutic and prophylactic agent of folk and scientific medicine // Electronic scientific journal "Biology and Integrative Medicine". - M.: 2017. - No. 8. - S.76-79*
8. *Karomatov I.D. Simple medicines. - Bukhara: 2012, p. 347-348*
9. *Kosnazarov K.A., Halmuratova R.P. and others. On the history and significance of the plant Sea buckthorn with a wooden body (Hippophoe rhamnoides L.) // J.: Science and society - Nukus, 2010. No. 3-4, - S.11-13*
10. *Kusova R.D. Medicinal plants of the North Ossetia family Elaeagnaceae: prospects for the use of Vladikavkaz. - V.: 2015, - Chapter 6. - S.102-103*
11. *Lovkova M.Ya., Rabinovich A.M. and others. Why plants are treated. - M.: Nauka, 1990. - S.182-183*
12. *Otenov T.O., Grokhovatsky I.A., Otenova F.T., et al. Introduction of buckthorn buckthorn (Hippophoe rhamnoides L.) in Karakalpakstan and its bioecological features // J.: Bulletin KCOANRUz - Nukus, 2013. №1, - S.30-32*
13. *Prichko T.G., Chalaya L.D., Droficheva N.V., Podorozhny V.N. Sea buckthorn - a valuable source of biologically active substances // Bulletin of the Russian Agricultural Science. - M.: 2012, No. 4. - S.50-52*
14. *Trineeva O.V., Slivkin A.I. Determination of calcium in the fruits of sea buckthorn (Hippophaes Rhamnoides L.) // Chemistry of plant materials. 2015. No. 1, - S.101-106*
15. *Trineeva O.V., Shikunova N.S., Slivkin A.I. Studies on the determination of tannins in the fruits of buckthorn buckthorn // Pharmacy. 2016, No. 65 (3). - S.16-21*
16. *Saeidi K., Alirezalu A., Akbari Z. Evaluation of chemical constitute, fatty acids and antioxidant activity of the fruit and seed of sea buckthorn (Hippophae rhamnoides L.) grown wild in Iran - Nat. Prod. Res. - 2016, 30 (3). - P.366-368*