

**CLEANING OF SALINE AND WASTEWATER IN KHORAZM REGION WITH
THE HELP OF LEMNA MINOR AND AZOLLA PLANTS**

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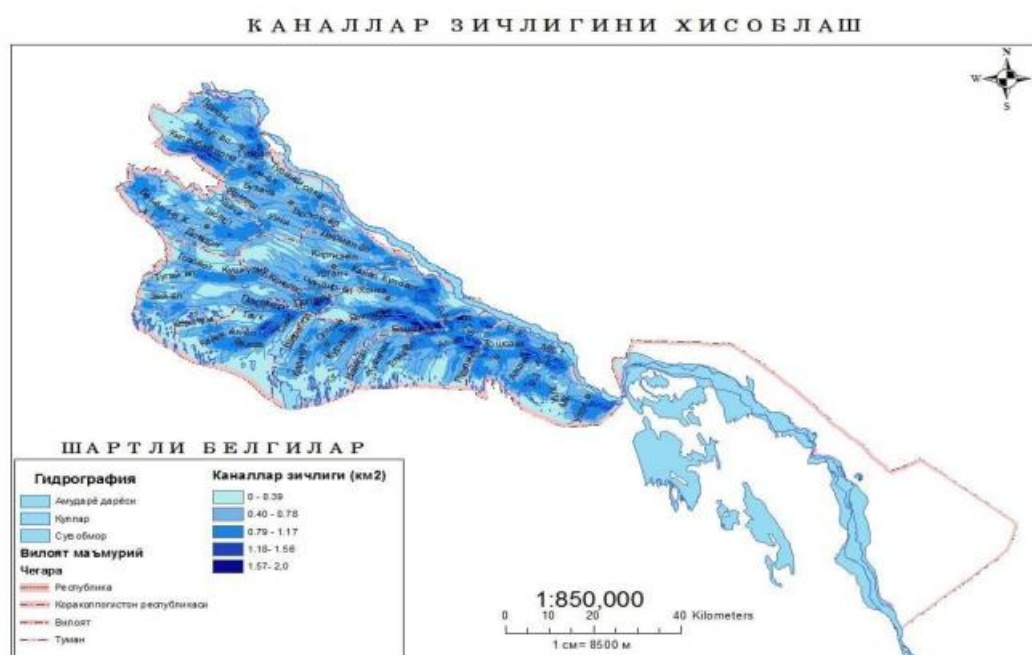
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Annation: This article is about the structure and biology of Lemna minor and Azolla plants. It is even possible to obtain valuable fertilizer from them. In traditional medicine, this plant is mainly used to prepare medicines and treat many diseases. Lemna minor extract has antioxidant, anti-radical, immunomodulatory and anti-inflammatory properties.

Key words: groundwater, saline and polluted waters, lemna minor, azolla, biological pool, biomass, agriculture and irrigated land

INTRODUCTION. The territory of Khorezm region is located in the lower part of Amudarya. Therefore, the underground water here is very close to the surface of the earth, 1-1.5 m, therefore, most of the cultivated areas of the region consist of saline areas or areas with very low productivity. Also, there is a lot of irrigated land in the region, which requires a large amount of water. A large part of the water used for irrigation every year is wasted by mixing with seepage water or turning into seepage water due to the proximity of ground water to the surface of the earth. 1.5 billion m³, or 30 percent, of the average 4 billion m³ of water used for irrigation is flowing to the territory of Turkmenistan through the drainage system. If we can use these outgoing waters, irrigating all cultivated areas of the region and engaging in farming and agriculture will bring great benefits to the region, especially to our republic. The purpose of writing the following article is about desalination of part of the sizot waters, i.e., in order to prevent water shortages, the collector-drainage system of the region and the purification of salty water containing various harmful substances using "Ryaska malaya" i.e. "Lemna minor" and "Azolla" plants.

RESEARCH MATERIALS AND METHODOLOGY. *Lemna minoris* a floating freshwater aquatic plant, with one, two, three or four leaves each having a single root hanging in the water. As more leaves grow, the plants divide and become separate individuals. The root is 1–2 cm long. Leaves are oval, 1–8 mm long and 0.6–5 mm wide, light green, with three (rarely five) veins and small air spaces to assist flotation. It reproduces mainly vegetatively by division. Flowers are rarely produced and measure about 1 mm in diameter, with a cup-shaped membranous scale containing a single ovule and two stamens. The seed is 1 mm long, ribbed with 8-15 ribs. Birds are important in dispersing *L. minor* to new sites. The sticky root enables the plant to adhere to the plumage or feet of birds and can thereby colonize new ponds *Lemna minor* (*Lemna minor*) is a perennial tall aquatic plant belonging to the Araceae family that floats on the water surface. *Lemna minor* is considered a medicinal aquatic plant that grows in any pond water rich in organic matter and is resistant to cold and hot weather. *Lemna minor* has leaves and rhizomes and reproduces mainly vegetatively. The size of the plant is 5-6 mm. *Ryaska* emits a large amount of oxygen during photosynthesis, and its role in cleaning water bodies is also high.



RESEARCH RESULTS. Use of "Ryaska malaya" i.e. "Lemna minor" plant. This plant is widely used in foreign countries for biological treatment of salty and polluted water bodies. Its growth rate is very high and it multiplies rapidly in polluted water bodies. With its help, it is possible to use the purified water of the collectors-drainage system to irrigate cultivated fields. The composition of the plant consists of oil, calcium, phosphorus, magnesium, iodine, bromine, and a number of other substances, so it is a good food for fish and various waterfowl. It has a high yield, and it is possible to collect up to 80 tons of green mass from 1 ha of land in one season. The plant can be used for cleaning sewage and waste water, as well as for many other purposes. It is also a nutritious feed for livestock.

You can even get valuable fertilizer from it. In folk medicine, medicines are mainly prepared from this plant and used to treat many diseases. Lemna minor extract has antioxidant, antiradical, immunomodulatory and anti-inflammatory properties.

Azolla. Azolla grows floating on the surface of the water and reaches a length of 0.7-1.8 cm. In the upper part of the sporophyte, 2 rows of small leaves cover the branch like coins placed on top of each other, and in the lower part of the plant body, a 2.0-2.5 cm long root is formed. According to the leaf structure, it is highly developed, that is, each leaf consists of two segments: the upper segment is green, located on the surface of the water level; and the lower segment is located at the bottom of the water and serves to attract substances dissolved in the water. The optimal period of gross reproduction of Azolla is July-September, during which it produces 250-300 g/m² biomass per day. 1500-2000 kg of wet biomass per night from 1 hectare of water surface of Azolla grown in wastewater; and lemna minor can give up to 1800-2700 kg of wet or 90-135 kg of absolute dry biomass (in June-October).

Biomasses of aquatic plants are planted as seedlings in biological ponds of wastewater treatment facilities or treated with heat (AVM-0.65, AVM-1.5) to prepare vitamin flour, as protein-vitamin and mineral feed for agriculture. It can be used as additional feed for livestock and poultry. As a result of using azolla as a "green fertilizer" in rice cultivation, the yield of rice increased by 20-25% compared to the control option, and the economic efficiency obtained from 1 hectare of rice field was 500,000 (five hundred thousand) soums in 2008. In 2012, the economic efficiency obtained by saving electricity and chlorine and its compounds used in the disinfection of wastewater as a result of wastewater treatment using Lemna minor and azolla at the "Suvokova" treatment plant in Khorezm amounted to 306 million (three hundred and six million) soums. Aquatic plants can also be used to decorate ponds to increase the diversity of ornamental plants.

DISCUSSION. The territory of Khorezm region is located in the lower part of Amudarya. Therefore, the underground water here is very close to the surface of the earth, 1-1.5 m, therefore, most of the cultivated areas of the region consist of saline areas or areas with very low productivity. Also, there is a lot of irrigated land in the region, which requires a large amount of water. A large part of the water used for irrigation every year is wasted by mixing with seepage water or turning into seepage water due to the proximity of ground water to the surface of the earth. 1.5 billion m³, or 30 percent, of the average 4 billion m³ of water used for irrigation is flowing into the territory of Turkmenistan through the drainage system. Taking this into account, this article uses Lemna minor and azolla plants to clean the region itself, in different parts of the region, by using Lemna minor and azolla plants. It can be achieved. It also provides an opportunity to clean not only salty and brackish water, but also water mixed with harmful substances from industrial enterprises in the region. As mentioned above, through Lemna minor and Azolla, it absorbs more than ten harmful substances and metals from the water and cleans the water.

CONCLUSION. In conclusion, it can be said that by using this type of plant, it is possible to achieve great results. The reason is that plants of this type can be used for many purposes, not just in one or two branches, and due to the ease of cultivation, it is possible to get a lot of profit from their wide use not only in Khorezm, but also in the whole republic. The basis of every written scientific article is the social and economic development of the country's population, and this article is one of those articles.

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