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ECOLOGICAL ADAPTATION AND PHYSIOLOGICAL CHARACTERISTICS OF LEMNA MINOR

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Abstract: In this scientific article, the mechanisms of ecological adaptation and physiological characteristics of the plant Lemna minor (water lentil) were studied. In the study, the adaptation of the plant to the water environment, the efficiency of the use of nutrients, the intensity of photosynthesis and the resistance to stress factors were analyzed. The results showed that Lemna minor is a hydrophytic plant with high adaptability. This plant is important in ecological monitoring and biotechnological processes.

Key words: Lemna minor, ecological adaptation, photosynthesis, hydrophyte, physiology, aquatic plants.

Introduction

Aquatic plants are an important component of the biosphere, and they play a key role in ensuring the stability of aquatic ecosystems. Lemna minor is a small floating plant belonging to the Lemnaceae family. It is widespread in almost all temperate and tropical regions of the world.

Lemna minor is a medicinal aquatic plant that grows in any pond 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. Lemna minor has leaves and rhizomes and reproduces mainly vegetatively. The size of the plant is 5-6 mm. Ryaska produces a large amount of oxygen during photosynthesis, and it can also be used in wastewater treatment. In addition, ryaska contains useful organic substances, up to 30% of ryaska grown and dried in natural conditions, and up to 45% of protein when grown in special conditions. Currently, this plant has been successfully introduced to the conditions of Uzbekistan and is expanding its range in open water bodies. Lemna minor L. is a perennial aquatic plant that floats on the water surface. Lemna minor is a medicinal aquatic plant that grows in any pond rich in organic matter and is resistant to cold and hot weather. Lemna minor reproduces mainly vegetatively. It is used for animal feed, bioremediator, nutrient recovery from wastewater and other properties. A single-rooted floating freshwater plant with one, two, three or four leaves. As more leaves grow, the plants divide and separate from each other.

Lemna minor is distinguished by its fast growth, high adaptability and resistance to various environmental conditions. Therefore he:

a) as a bioindicator in assessing the level of water pollution,

b) in the biological treatment of waste water,

c) and is used as a raw material in biotechnology.

The purpose of this study is to comprehensively study the ecological adaptation strategies and physiological processes of Lemna minor.

Materials and methods

Samples of Lemna minor collected from natural water bodies were used as research object. The samples were grown in laboratory conditions based on the following parameters: temperature: 20–28°C, light: 12–16 h photoperiod, pH: 6.5–7.5, medium supplied with mineral nutrient solutions

The following methods were used:

1) Biometric analysis - determination of growth rate

2) Measurement of photosynthesis intensity - through oxygen release

3) Analysis of pigments - determination of the amount of chlorophyll a and b

Stress tests - assessment of the effects of heavy metals and salts

The ability of Lemna minor to float on the water surface is through aerenchyma tissues, rapid vegetative reproduction is through budding. A minimal root system has adaptations to obtain nutrients directly from water.

According to the research results, Lemna minor has high photosynthesis intensity. The amount of chlorophyll is high, which increases energy efficiency. Photosynthesis continues even in low light conditions

Lemna minor is resistant to factors such as heavy metals (for example, cadmium, lead), salinity, organic pollution. However, growth slows down at higher concentrations.

Discussion

The obtained results confirm the high ecological adaptability of Lemna minor. Its rapid growth, high photosynthetic activity and direct absorption of nutrients from water make it an important organism in aquatic ecosystems.

Lemna minor plays an important role in the purification of water bodies (phytoremediation), as a biological indicator and in the carbon cycle. It is used for wastewater treatment, livestock feed, and biofuel production. When it grows too quickly, it blocks the surface of the water. This can have a negative effect on other organisms

Conclusion

According to the research results: Lemna minor is a highly adaptable hydrophytic plant. Its physiological processes (photosynthesis, nutrient metabolism) are very efficient. It is a promising object in environmental monitoring and biotechnology. In the future, it is important to study its characteristics at the genetic and molecular level.

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