BIOECOLOGICAL PROPERTIES OF WATER PLANT OF AZOLLA (AZOLLA CAROLINIANA WILLD)

Qodirova Soxiba Ravshanbek qizi. *Urgench State University Faculty of Natural and Agricultural Sciences Phase 2 Master of Biotechnology.* sohibaazamat2015@mail.com

Xudayberganov Norbek Atabaevich. *Horazm is a senior researcher at the Department of Natural Sciences of the Mamun Academy.* xudayberganov12@mail.ru

Abdullayeva Madina Yusupboy qizi. *Urgench State University Faculty of Natural and Agricultural Sciences Level 2 Master of Biotechnology Student..*

Abdusharipova Guljonoy Qobul qizi. *Urgench State University Faculty of Natural and Agricultural Sciences Level 1 Master of Biotechnology.*

Annotation: Botanical description of the aquatic plant Azolla (Azolla caroliniana). Azolla (Azolla caroliniana) is a cycle of growth, development and reproduction methods as well as seasonal development. Distribution on Earth. Azolla's (Carolina) monetology and its importance in agriculture and public administration.

Keywords: Azolla (Azolla caroliniana), Anabaena, paporotnik, symbiosis, sporophyte, sorus, spring, summer, autumn, winter.

Introduction. Resolution of the President of the Republic on comprehensive measures to develop biotechnology and improve the system of biological safety of the country dated 26.11.2020 to set priorities for the development of biotechnology and improvement of the system of biological safety of the country, in these areas a number of events have been developed to ensure the integration of education and production, to develop the economy and social sphere on the basis of advanced biotechnologies.

Therefore, it is important to develop and implement technology for the cultivation of additional bioproducts for farm animals.

Getting food and feed proteins is one of humanity’s main problems. In the context of the constant growth of the world’s population and the lack of food and feed protein, research aimed at finding the most economical methods of detecting atmospheric nitrogen is becoming increasingly important. In this regard, the phenomena of biological fixation of atmospheric nitrogen attract great attention from scientists of different countries.

An important role in nature is the symbiotic systems that absorb nitrogen, which typically effectively absorb air nitrogen, which includes photovoltaic nitrogen-fixing organisms, such as the Azolla-Anabaena azollae system, which has long been

used in Vietnamese public farms and other countries. Southeast Asian countries fertilize rice fields and how to feed animals.

The degree to which the problem has been studied. Carolina azollasi - Azolla caroliniana Willd. The homeland – is North America and is widespread in the tropics and subropics. Azolla is a forty that forms beautiful green islands that float on the surface of the water. 25 fossil species of Azolla are known. There are currently 6 species of the Azollaceae family, which include 2 subspecies - Euazolla and Rhizosperm. They differ in the morphology of their reproductive organs.

The subspecies of euazolla includes azolla species with 3 masons of megaspora – glossodia. This subspecies includes paporotnic azolla (A. fliculoides L), carolina azollas (A. caroliniana Wild.), Mexican azollas (A. mexicana Presl.), and small-leaved azolla (A. micriphilla Kaulfuss).

The Rhizosperm subcategory includes azolla species that do not have a floating apparatus 9 – glossy. This subspecies includes the patsimon azolla (A. pinnata Brown) and the Nile azolla (A. nilotica De Caisne).

A. nilotica De Caisne is found only in Central Africa, while the remaining species are common in various contingents.

In addition to Southeast Asia and Africa, azolla species are found in the United States, Canada, Mexico, England, New Zealand, Ireland, the Czech Republic, Slovakia, Germany, Japan, and the CIS. A. filliculoides, A. caroliniana are common in CIS countries. Found in the lower reaches of the Dniester, Dnieper, and Southern Bug rivers (Dubina, Shelyag-Sosonko, 1981).

Research materials and methods. The object of the study is a plant belonging to the class Polypodiopsida, the genus Salviniales and the family Azollaceae, which is a class of Azolla caroliniana Wildd (water shear carolina azolla).

Various, organic and organomineral nutrient media were prepared and crystallizers, glass-plastic were used to grow azolla caroliniana. An increase in azole and a vegetative increase were observed in the above devices.

To determine the yield of azolla caroliniana in $1m^2$, a method of weighing its wet biomass was used.

Research results and their analysis. Carolina azole is a small, water-growing plant that floats on the surface of the water, 0.7-1.8 cm. It also shows the characteristics of growing and multiplying in water bodies in Uzbekistan. As a result, it covers the surface of the water and does not shed light on the water bodies. In a suitable ecological environment, azolla moves to rapid and rapid vegetative reproduction. Carolina azole sporophyte consists of a 25 mm long root of the royal float.

A. caroliniana can reproduce several times in a continuous vegetative way without forming reproductive organs and produces large amounts of green biomass. This has attracted a lot of scientists. Other features of azolla are currently being studied.

In Uzbekistan, carolina azole is mainly propagated by vegetative means. When the side branches of the mother plant are mature, the mother easily begins to separate from the body. Divorced side branches begin to grow independently, dispersed by a stream of water. Another distinctive feature of the vegetative reproduction of *A. caroliniana* is that the mother body (plant) is completely divided and becomes a young body (plant). Then, when the side branches form tubers, the mother root loses its character, separates from the body, and sinks to the bottom of the water, rots, and becomes an organo-mineral substance.

According to the results of experiments, azolla is a vital, i.e. seasonal development cycle, Dosmetov and b. (2000-2003) As a result, we also observed a conditional separation of 5 periods.

1.**Winter period.** Includes December, January, and February.

2.**Early spring period.** March and mid-April.

3.**Spring-summer period.** It starts at ten days for April and lasts from May to the end of June.

4.**Summer-autumn** period.July, August, September.

5.**Late fall period**. October, November.

Winter period. The slowest-lowest development of individuals in population. Unfrozen water bodies produce 50-65 g / m2 of biomass in the azolla wintering body left in the shelter areas at an air temperature of 3-6 0S. As the air temperature begins to drop, the yield of azolla also decreases. It is cold-resistant because it is a tropical country and dies with a temperature drop of 00S. However, as noted above, in water bodies where high water plants are thick, these plants are preserved in the shelter. that is, it should be noted in alox that with the onset of low-temperature days, it forms many spores in itself. These spores are submerged and kept in a state of rest until next season, i.e. until the early spring period begins.

Early period of happiness. In early March, when the average air temperature rises to 7-100S and the water starts to heat up, the start of the assimilation process leads to an increase in the number of individuals. It produces an average of 75-90 g/m2 of biomass per day during this period. Raimbekov K. According to T. et al., Azolla can be grown in open water basins from April to the end of September. During this period, the plant has the shape of a small ball (socket), 2-5 mm in diameter and light green.

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Summer-autumn period. In Uzbekistan, July-September is the period of maximum growth and development of azole. According to our data, azolla produces an average of 250-260 (July, September) g/m2 to 275-300g/m2 (August) biomass per day during this period. A. Dosmetov et al. (2001) also found that the peak of productivity would be in August. At the same time, we must note that the azolla, first brought to our Republic in the 1990s, has become more adapted to the conditions of Uzbekistan in recent years.

Most aquatic plants will move to Sernam by the end of September as the water level decreases. If the humidity decreases, the azolla dies. Thus, in July-September, the azolla will cover the water level like a carpet and have a very large biomass yield. From mid-September, the azolla green will be replaced by brown.

Late fall period. Instead of losing the green color of the plant leaves, the color of the beetle increases rapidly. There is a slowdown and loss of the assimilation process. The plant begins to dry out its roots and bodies. Only in some plots, in canals, where there is constant white water, aquatic plants survive in areas where they grow thick. Also, partially azolla lives in areas with dense, moist highs of ditch collars and aquatic plants.

References

1. Resolution of the President of the Republic of Uzbekistan No. PQ-4899 of 25.11.2020.
2. Gogotov I.N., Laurinavichene T.V. Nitrogen-fixing association Azolla-Anabaena azollae // Uspekhimicrobiologii. - M.: 1989. - No. 23. - S. 91-112.
3. Dosmetov A.T., Azolla caroliniana Willd., distributed in Tashkent and Syrdarya regions.bioecological features of: Autoref. dis. . sugar biol. science - Tashkent, 2003. - 22 p.
4. Yunusov E.E., Kochkarova M.A., Rakhimova S.T. Cultivation of Azolla in Uzbekistan // Journal ofBiology of Uzbekistan. - Tashkent, 1991. - No. 6. - P. 39-41.
5. Rao H.S. The structure and life history of Azolla pinnata R. Brown with remarks on the fossil historyof the Hydropterideae // Proc. Indian Acad. Sci., 1936. - Vol. 2. – P. 175-200.
6. Swenson H.K. The new world species of Azolla // Amer. Fran J., 1944. – Vol. 34. - P. 69-85.
7. Makhmudova S.Sh. Produktivnost perspectivnykh sortov risa v zavisimosti ot srokov poseva i sloya vody v usloviyax lugovo-bolotnoy pochvy Tashkentskoy oblasti: Avtoref. dis. .sugar. s.x. science - Tashkent, 1999. - 19 p.
8. Hills L.V., Gopal B. Azolla primaeva and its phylogenetic significance // Cand. J. Bot., 1967. - Vol. 45. – P. 1179-1191.

9. Krishtofovich A.N. Paleobotany. - L.: Gostoltekhizdat, 1957. - 650 p.
10. Moore A.W. Azolla: Biology and agronomic significance // Bot. Rev., 1969. - Vol. 35. – P. 17-34.
11. Dubina D.V., Protopopova V.V. Novye dlya floriy USSR vidy vodyanyx paporotnikovzrodiniAzollaceae // Ukrainskybotanicheskiy zurnal - Kiev, 1980. - №5. (37) -S. 20-26.
12. Dubina D.V., Protopopova V.V. Ekologo-biologicheskie osobennosti AzollacarolinianaWilld. i A.filiculoides Lam. // Rastitelnyeresursy.– L.: Nauka, 1983. – No. 4 (19). - S. 500-506.
13. Lumpkin TA, Plucknett DL. Azolla: botany, physiology and use as green manure // Econ. Bot., 1980.
14. Vol. 34. – P. 111-153.
15. Dubina D.V., Protopopova V.V., Kudryavtsev V.F. Perspektivnoe zelenoe udobrenie risa. - Kyiv: Urojai, 1982. - 23 p.
16. Dubina D.V., Shelyag-Sosonko Yu.R. Azollakaralinska i a paparotevidna-perespektivni kormovroslini // Tovarinnitstvo. - Kiev, 1982. - No. 10. - S. 15-19.
17. Dosmetov A.T. Dynamics of seasonal growth and reproduction of Carolina Azolla // Journal of Biology of Uzbekistan. - Tashkent, 2002. - No. 4. - B.
18. Kondrateva E.N., Gogotov I.N. Molecular hydrogen and microorganism metabolism. - M.: Nauka, 1981. - 340 p.
19. Application of biological treatment methods in reuse of collector and ditch water. The land of Uzbekistan Scientific-practical novatsoinjournal, 2021 issue 2.
20. Application of biotechnological treatment methods when using collector-drainage water. Scientific and practical journal of the land of Uzbekistan, issue 3, 2021.
21. Azolla caroliniana willd., eichhornia crassipes solms., pistia stratiotes L. The advantage of aquatic plants in the biological treatment of collector water.Zamini Ilmiy-amaliyinnovatsoinjournal, 2021, issue 4.