



Homestead Azolla Cultivation

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Introduction

Azolla (water fern) is a Nitrogen fixing biofertilizer especially in rice field. Nitrogen is symbiotically fixed by nitrogen fixing blue green algae, *Anabaena azollae*, found at the cavities of dorsal leaves of azolla. Though, azolla is considered as an invasive plant in wetlands, it provides nutrients including nitrogen, potassium, phosphorus, Calcium, Magnesium and Iron. It is rich in proteins, Vitamins-Vitamin A, Vitamin B12 and other growth promoters.. It consists of 7 species including *Azolla pinnata*, *Azolla microphylla*, *Azolla rubra*, *Azolla filiculoides*, *Azolla nilotica*, *Azolla caroliniana*, *Azolla mexicana*. Among this, *Azolla pinnata* is the most common and is widely cultivated in Asia and Africa . Azolla is highly productive and can double its biomass in every 6 days. Azolla is used a feed because of its high protein and amino acid content. 40-60 tones of biomass of azolla can fix nitrogen of about 100-150 kg Nitrogen / ha/ year.



Conditions needed for cultivation

Azolla, like any other plants requires all essential plant nutrients for its optimum growth.

- Temperature: 20-35 degree Celsius
- pH : 5-7
- Relative Humidity : 80-90%
- Solution salt content: 0.3%
- Free from pest and diseases

Preparation

At home, Azolla can be cultivated at a feasible and profitable manner.

Steps of Azolla cultivation.

- Prepare a small plot of about 2 m length and 1 m width by layering the bricks.
- Old plastic sheets or plastic gunnies are laid above it to prevent the intrusion of nearby tree roots.
- Cover the plot using 150 gauge durable plastic sheet or a silpaulin Sheets without any folding and keep

- the sides of the plot intact.
- About 15-20 kg fertile soil is spread uniformly over the plot.
- A mixture of 5 kg cow dung and 30 g rajphos/ super phosphate is mixed with water and made into slurry and spread
- uniformly over the sheet.
- Water is maintained at a height of 10 cm throughout the growth.
- Pure azolla culture is inoculated over the slurry at the rate of 500 gram- 1 kg/ square meter.
- Azolla covers the entire plot by about 1-2 weeks.
- Harvesting can be done daily by sieving. An average of about 1 kg azolla/ day can be obtained.



Care and maintenance of azolla

- Pure and diseases free culture should be used for inoculation.
- Should be harvested regularly before overcrowding.
- Periodically Apply 1 kg cow dung and 20 g rajphos every fortnight.
- Remove and refill 5 kg fresh fertile every month
- Empty the plot once in every 6 months and restart the culture again.
- Refresh the water by gently removing and refilling about 3 cm every fortnight.

Nutritional Status of Azolla(dry weight %)

- C:N ratio- 14:1
- Protein – 25-35%
- Nitrogen- 4-5%
- Potassium -2-4%
- Phosphorus-0.5-1%
- Calcium – 0.4-1%
- Magnesium-0.5-0.6%
- Iron – 0.06%

Uses of azolla

- Reduces the weed infestation up to 70% by entirely covering the water surface thus reducing the weed germination.
- Improves yield by 15-20%.
- Used as green manure.
- Used as human feed, animal feed and biological.

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- Used in biogas production
 - Reduces the evaporation rate from the wetland rice field.
 - Improves soil reaction and soil fertility.

Method of application in rice field

As green manure, azolla is inoculated in main field at 15-20 days before transplanting the rice, so that the fern can be incorporated into the field during puddling. Thus increases the yield by about 25-30%. As dual crop, it is inoculated about one week after transplanting the rice seedlings. By raising bunds and maintaining a water level of 5-10 cm up to 20-25 days after inoculation so as to form a thick azolla cover. After the thick cover is formed, it is then incorporated into the soil while weeding.

Conclusion

In summary, azolla is an easily available and cultivable green manure and biofertilizer. It enhances the yield of crop even by reducing the usage of fertilizers by its biological nitrogen fixation. Azolla grown at optimum conditions are rich source of fats, proteins and amino acids and fiber which are highly nutritious and are edible. It can be used as a sustainable biomass resource for bioenergy, livestock feed, and green manure .