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Azolla: Uses and its Production Technology

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Azolla, a free floating water fern is often considered as a good source of organic plant nutrients for a variety of crops, including rice, wheat, taro, soybean and vegetables. Azolla has a symbiotic relationship with the blue green algae, *Anabaena azollae* that provides nitrogen to the fern and the delicate fern provides nutrients and a protective leaf cavity for the *Anabaena*.This relationship is often referred to as the Perfect Marriage. Each partner gives something to the other in this Perfect Marriage.

Its application improves soil fertility by increasing total nitrogen, organic carbon, and available phosphorus in the soil. Under suitable field conditions, the symbiotic combination of the fern and the alga can double in weight every 3 to 5 days and fix atmospheric nitrogen at a rate exceeding that of the legume and *Rhizobium* symbiotic relationship. Other than providing nutrients to the crops, it is also used as a potential feed either fresh or dried for a variety of animals, including pigs, rabbits, chickens, ducks and fish. Azolla contains essential amino acids, vitamins, growth promoterand minerals like calcium, phosphorous, potassium, ferrous, copper and magnesium which make it a potential supplement for livestock. It suppresses the growth of aquatic weeds by blocking sunlight and provides a physical resistance to the emergence of weed seedling by creating a heavy interlocking Azolla mat in paddy fields.It also plays an important role in bioremediation of toxic trace metals and organic pollutants since it can act as a bio filter to remove pollutants.

It is the world's fastest growing plant and *Azolla* can double its weight every 3–5 days and fix atmospheric N_2 at a rate exceeding legumes under suitable field conditions. Azolla can accumulate up to 2 to 4 kilograms of nitrogen per hectare per day or 1.1 tonnes of nitrogen per hectare per year. That's almost three times the performance of legumes such as clover at around 400 kg of nitrogen per hectare per year.*Azolla* decomposes easily and forms humus that increases water-holding capacity, improves soil porosity (3.7–4.2%), and decreases specific gravity.

Production technology of Azolla

Azolla production can be carried out in nursery plots, ponds, ditches, canals, concrete tanks polythene lined ditches and even paddy fields.The following steps have to followed for the production of Azolla:

1. **Selection of pond location:**
- Select an area near the house to ensure regular care and monitoring of the unit.
- A suitable water source should be nearby for regular water supply.
- The production unit should be constructed under partial shade for better growth and for reducing evaporation loss of water.
- Incase polythene sheets are used for lining the Azolla pond, the floor area should be free of pointed stones, roots and thorns that can puncture the sheets and cause water leakage.

2. **Pond size and construction**
- Size of the tank depends on the requirement of Azolla to be harvested.
- For small holders, a pond of about 2m length and 1m width is sufficient. The ground is leveled and bricks are laid in required dimension.

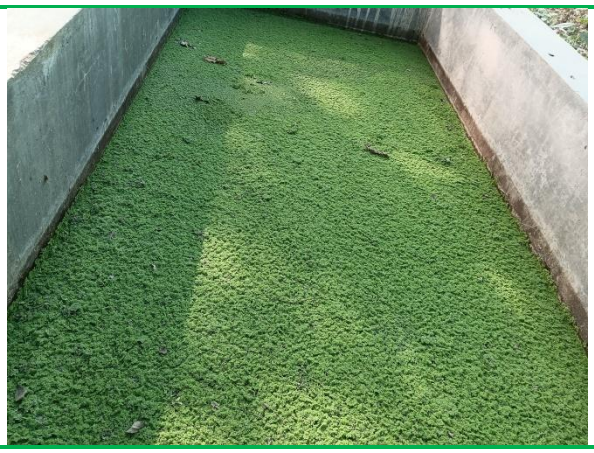
3. **Preparation of Azolla bed**
- About 25 kg of clean and fertile soil is spread uniformly across the pond/tank.
- A mixture of 5 kg cow dung and 30g of rock phosphate/single superphosphate is applied uniformly.
- Water is maintained at a depth of 10 cm in the pond.

4. **Azolla inoculation and production**
- 500 g of Azolla culture is required per square meter of the pond.
- Azolla will fully cover the pond by 1-2 weeks and harvesting can be started.

5. **Maintenance of pond**
- Azolla is a water based crop therefore one should ensure at least 5 inches/10 cm of water in the pond/tank for proper growth.
- Azolla grows well where the ideal temperature range is 20-35°C. The water should be changed or cold water added if the water temperature rises above 35°C.
- The pond should be emptied once in 6 months and cultivation of Azolla is restarted with fresh culture and soil

6. **Harvesting**
- Azolla will be ready for harvest by 2-3 weeks.
- Plastic sieves can be used for harvesting.
- One can obtain an average of 1kg Azolla per day from a pond of above mentioned dimensions.
- Harvested Azolla can be used for making compost, direct application to crops or can be fed directly or mixed with nutrients and fed to livestock like cattle, sheep, goat, poultry etc.
- Azolla can also be fed in dry forms. The leaves are to be cleaned with fresh water before feeding.

Preparation of Azolla beds



Azolla growth after 10 days

Care to be taken

1. Maintenance of pure culture free from contamination is essential for good yield.
2. Azolla should be harvested regularly to avoid overcrowding.
3. Temperature is an important factor for good growth. It should be maintained at around 35°C.
4. The pH of the medium need to be between 5.5 to 7
5. Suitable nutrients such as cow dung slurry, micronutrients should be supplemented as and when required.

Conclusion

Azolla has tremendous potential in agriculture and animal husbandry especially in organic farming. It is also becoming a major nutrient component in natural farming. If the production of *Azolla* is widely adopted and used properly, a major portion of synthetic N fertilization can be replaced.

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