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Azolla Cultivation

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In the recent past agriculture as a profession is losing its charm among the farmers. This has been attributed to several reasons; important among them are spiraling cost of inputs coupled with uncertainty in the price of the product. This has been aggravated by non-availability of assured irrigation due to depletion in ground water. This has in turn manifested as distress among the farmers in substantial areas in Andhra Pradesh, Maharashtra, Karnataka and Kerala, which are otherwise considered as agriculturally developed areas. A couple of committees have gone into the root cause of distress and suggested that alternate income generating opportunities can be a major remedy for such disappointment among the farming community. Animal husbandry is one such alternative available to such distressed farmers. Again, availability of quality fodder to the animals is the major impediment in scientific management of animals because India, having only 2.4% of the world's geographical area sustains 11% of the world's livestock population. It accounts for 55% of the world's buffalo population, 20% of the goat population and 16% of the cattle population. This has put unbearable burden on our natural vegetation. Azolla, hitherto used mainly as a green manure in paddy has tremendous potential to meet the growing demand for fodder among the small farmers taking up animal husbandry.

Advantages of Azolla

- It easily grows in wild and can grow under controlled condition also.
- It can easily be produced in large quantity required as green manure in both the seasons – Kharif and Rabi.
- It can fix atmospheric CO₂ and nitrogen to form carbohydrates and ammonia respectively and after decomposition it adds available nitrogen for crop uptake and organic carbon content to the soil.
- The oxygen released due to oxygenic photosynthesis, helps the respiration of root system of the crops as well as other soil microorganisms.
- It solubilises Zn, Fe and Mn and make them available to the rice.

Nutrition value in Azolla

Azolla is very rich in protein (25-35%), Calcium (67 mg/100g) and Iron (7.3 mg/100g). The comparative analysis of the nutrient content of azolla vis-à-vis other fodder source is depicted in the following table.

Table: Comparison of biomass and protein content of Azolla with other fodder

S. No.	Item	Annual Production of Biomass (MT/ha)	Dry Matter Content (MT/ha)	Protein Content (%)
1.	Hybrid Napier	250	50	4
2.	Kolakattao grass	40	8	0.8
3.	Lucerne	80	16	3.2
4.	Cowpea	35	7	1.4

S. No.	Item	Annual Production of Biomass (MT/ha)	Dry Matter Content (MT/ha)	Protein Content (%)
5.	Subabool	80	16	3.2
6.	Sorghum	40	3.2	0.6
7.	Azolla	1000	80	24

Source: Dr P Kamalasanan et al. 2004 "Azolla -A sustainable feed substitute for livestock", Spice India.

In addition to their farming activity, small and marginal farmers are generally capable of rearing 2 to 3 units of cow/ buffaloes. For traditional methods of rearing, the feed requirements are met out from agriculture residues and very rarely the farmers can afford to provide green fodder and oil cakes. In rare cases, green fodder is provided to the animals in the form of grass collected from the field or in few cases fodder is grown in the backyard. Even then the supply of green fodder is restricted to 5 to 6 months when water is available. Azolla fodder plot, if set up by these small farmers can cater to the fodder requirements of remaining part of the year. Azolla can be supplemented with regular feed of the animal @ 2-2.5 kg of azolla per animal. Azolla, if grown for fodder is essentially required to be grown in hygienic environment and there should be regular supply through out the year. The fodder plots should preferably be near the homestead, where the female member of the family can attend to nurturing and maintenance.

Cultivation process

The biomass production under natural condition i.e. in rice field is only 50 g/sq.m/day as against optimum production of 400 g/sq.m/day. The production efficiency can be increased by reducing contamination and competition with other algae. This can be achieved by growing Azolla in pits lined with synthetic polythene sheet in courtyard /back yard preferably in open space or on terrace where availability of sunlight is adequate. Although production of azolla is good in nursery plots, production of azolla as green manure in paddy fields; 10% area of the paddy field is cordoned off and azolla is grown. The land should be puddled and leveled so that standing water is uniform through out the field. Azolla inoculum is sprinkled in the plot and 45 kg of single super phosphate per acre is applied in the field. The land used for cultivation of azolla is not wasted because after broadcasting azolla in the transplanted paddy crop (four days after transplantation) the plot itself may be used for cultivation of paddy. Even the water bodies, ditches in the vicinity can also be used for production of azolla. Azolla cultivated for fish feed, is grown in situ in the pond. A part of the pond is earmarked and is cordoned off by rope made up of straw. Once the mat is formed azolla is released slowly to the pond by lifting the rope.



Azolla fodder plot in backyard

Precaution to be adopted

1. Maintenance of pure culture free from contamination is essential for good yield.
2. Azolla should be harvested regularly to avoid overcrowding.

Conclusion

- Azolla is a highly efficient, low cost biofertilizer and bio-feed, especially for rice cultivation and livestock.
- Its cultivation is simple, requiring minimal investment and space, making it ideal for small farmers.
- It offers a sustainable, eco-friendly solution to chemical dependency in agriculture.

- Integration into farming systems (like dual cropping with rice or as fodder) boosts productivity and reduces costs.

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