

Azolla – A Supplementary and sustainable protein feed for cattle

Farmers in Andhra Pradesh accept Azolla as an alternative cattle feed and reaping its benefits in the wake of the substantial decline in the availability of fodder. In order to cope up with the change in food habits sustainable farming practices and fodder security in drought-prone regions of Chittoor district in the state of Andhra Pradesh, APMAS is implementing a project, 'Padi pantalu' in two mandals viz. Kurabalakota and valmikipuram. The project is being funded by AEIN Luxembourg and aims to achieve food and fodder security through sustainable farming and alternate livelihoods for small and marginal farmers with a focus on women and youth. Under livestock, activities promoted 24 Azolla units as supplementary fodder for the cattle's

The high cost of concentrate feed was considered a significant factor which affecting milk production levels. The search for alternatives to green fodder and concentrates led to a wonderful plant Azolla, which holds the promise of providing sustainable feed for livestock. Azolla is a free-floating, rapidly growing aquatic fern on the water surface. It floats as small, flat, compact green mass. Under ideal conditions it grows exponentially, doubling its biomass in every three days. It produces more than 4 to 5 times of protein of excellent quality in comparison to lucern and hybrid napier. Azolla useful feed supplement for livestock, poultry and fish. These two parameters are very important to enhance economic livestock production to establish that Azolla is reckoned as "The Super Plant".

Azolla as cattle feed: Azolla is very rich in proteins, essential amino acids, vitamins, potassium, ferrous, copper, magnesium, zinc, etc. On a dry weight basis, Azolla consists of 25-35 percent protein 10-15 percent mineral and 7-10 percent amino acids, bio-active substances, and bio-polymers. Carbohydrate and oil content in Azolla is very low all these biochemical constitutions along with a rapid multiplication rate make Azolla ideal organic feed substitute for livestock. Livestock can easily digest Azolla due to high protein content and low lignin content. Azolla feeding also improved the health and milk quality.

Nutrition value in Azolla

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
5	Subabool	80	16	3.2
6	Sorghum	40	3.2	0.6
7	Azolla	1,000	80	24

Azolla cultivation:

1. The soil in the area is first cleared of weeds and leveled.
2. Bricks are lined horizontally in a rectangular fashion. A silpauline sheet of 2m x 2m size is uniformly spread over the bricks in such a way as to cover the margin of the rectangle made by the brick.
3. 10-15 kg of sieved soil is uniformly spread over the silpauline pit. –Slurry made of 2 kg cow dung and 30 g of super phosphate mixed in 10 litres of water, is poured onto the sheet. More water is poured on to raise the water level to about 10 cm.
4. About 0.5-1kg of pure mother Azolla culture seed material is spread uniformly over the water, after mild stirring of soil and water in the Azolla bed. Fresh water should be sprinkled over the Azolla immediately after inoculation to make the Azolla plants upright.
5. In a week's time, the Azolla spreads all over the bed and develops a thick mat like appearance.
6. 1 kg of cow dung should be added once in 5 days in order to maintain rapid multiplication of the Azolla and to maintain the daily yield of 500 g.

7. About 5 kg of bed soil should be replaced with fresh soil, once in 30 days, to avoid nitrogen build up and prevent micro-nutrient deficiency.
8. 25 to 30 per cent of the water also needs to be replaced with fresh water, once every 10 days, to prevent nitrogen buildup in the bed.
9. The bed should be cleaned, the water and soil replaced and new Azolla inoculated once every six months.
10. A fresh bed has to be prepared and inoculated with a pure culture of Azolla, when contaminated by pest and diseases.

Harvesting:

Will grow rapidly and fill the pit within 10-15 days. From then on, 500 - 600 g of Azolla can be harvested daily. –Can be done every day from the 15th day onwards with the help of a plastic sieve or tray with holes at the bottom. –The harvested Azolla should be washed in fresh water to get rid of the cow dung smell.

Environmental factors for the growth: –Temperature 20°C - 28°C. –Light 50 per cent full sunlight. –Relative humidity 65 - 80 per cent. –Water (standing in the tank) 5 - 12 cm. –pH 4-7.5.

Precaution:

- Plant should not be allowed to enter maturity stage or sporulation stage by periodic application of cow dung slurry, super phosphate and other macro and micronutrients except nitrogen.
- Temperature should be retained below 30 degree centigrade in case the temperature goes up, the light intensity should be maintained by providing shade net or other devices.
- Bio-mass should be removed every day or alternative days to avoid overcrowding. pH should be tested periodically to see that it never goes below 5.5.above 7.
- Seed stock is maintained separately treated with pesticides and fungicides.
- Azolla should be well washed with water before feeding to livestock to get rid of smell of cow dung.

- Biomass collected from the field applied with the pesticide should not be used as a feed for livestock

Conclusion:

The supplementary feed like Azolla improves the health of milch animals. Extra milk can be obtained from the milch animals by feeding them with Azolla. The cost of feeding can be decreased by the production of Azolla. So, it is necessary to promote the cultivation of Azolla as cattle feed among the Indian villagers.

“The Azolla cultivation technology is considered as an intervention to meet their dairy farmers’ needs”

Economics:

The expenditure on preparing a 6 X 4 feet pond is minimal at Rs.500 (sheet plus labour cost). A farmer can realize a net profit of over Rs. 4000 per annum from the additional milk yield and reduced usage of concentrates feeding for livestock.

Feedback:

Trials on dairy animals showed an overall increase of milk yield by 15- 20 per cent when 2-3 kg of Azolla was combined with regular feed and 15-20 per cent of commercial feed can be replaced with the same quantity of Azolla on dry weight basis, without affecting milk production



Azolla Production