

Small Organisms for Big Roles in Agriculture



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Azolla: A wonderful fern

Azolla is an aquatic fern that grows on the surface of water bodies which has been discovered by Lamarck in 1783. Azolla is grouped into two sections, namely Euzozella and Rhizosperma. Euzozella includes five species of Azolla such as A.

continue their association throughout vegetative and reproductive development. Azolla is able to fix nitrogen (N_2) directly from the atmosphere due to the presence of endosymbiotic cyanobacteria. In recent years, apart from their traditional use as bio-fertilizer for rice cultivation, it is gaining much popularity as livestock feed. It is well

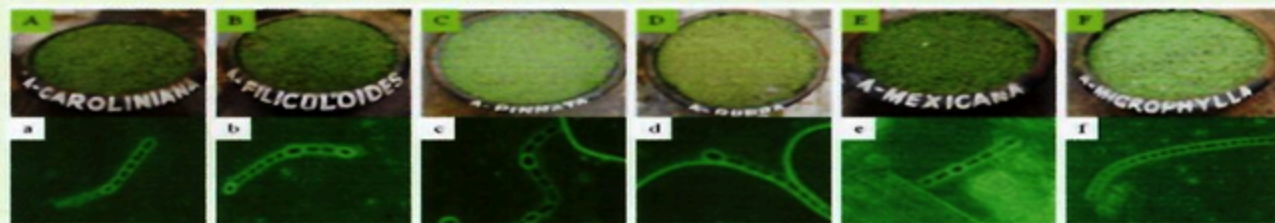


Fig. 1 Morphology of six species of Azolla (A. *A. caroliniana*; B. *A. filiculoides*; C. *A. pinnata*; D. *A. rubra*; E. *A. mexicana*; F. *A. microphylla*) and their representative cyanobacterial morphology in corresponding Azolla spp. (a. *A. caroliniana*; b. *A. filiculoides*; c. *A. pinnata*; d. *A. rubra*; e. *A. mexicana*; f. *A. microphylla*)

caroliniana, *A. filiculoides*, *A. mexicana*, *A. microphylla*, *A. rubra*, whereas section Rhizosperma includes *A. pinnata* and *A. nilotica* (Fig.1). The amazing feature of Azolla is its symbiotic association with the prokaryotic cyanobacterium which confers high rates of nitrogen fixation and biomass production; hence Azolla-cyanobiont is used as effective green manure for flooded crops including rice. In Azolla-cyanobiont symbiosis, the endosymbiont lives within specialized leaf cavities of the Azolla and two partners

proven by many researchers that Azolla is one of the best alternative sustainable feed for livestock and poultry because of their nutrient profiling; it has 16-24% protein and high concentration of other nutrients and less value of antifeedent. Having multifunctional properties, Azolla is regarded as a wonderful fern in the biosphere. A huge germplasm of Azolla (102 strains) is maintained at ICAR-NRRI.

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