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Madras Agric. J., 81(7): 390-391 July, 1994

https://doi.org/10.29321/MAJ.10.A01544

AZOLLA BIOMASS PRODUCTION IN CAUVERY DELTA ZONE

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ABSTRACT

Azolla, the water fern grows luxuriantly in cooler periods and the optium temperature ranges from 25 - 30°C. Due to the hot summer preceding the kharif season rice raised in the Cauvery Delta Zone, raising *Azolla* as dual crop in rice is not in vogue. Among the *Azolla* species, *A. microphylla* adopted itself to this environment at Aduthurai. The biomass production was adequate in summer to provide supply of inoculum for the ensuing *Kuruvai* crop. *Azolla* production ranged from 42 g/m^2/day to 164 g/m^2/day with a 60 day mean production of 92 g/m^2/day during April-June, 1990. Despite a water temperature of 42°C attained at 2 PM, *A. microphylla* established well.

Modern day agriculture is extremely dependent upon commercial fertilizer nitrogen to maintain high crop productivity. But the diminishing availability and questionable stability of energy sources and the increasing costs of the raw materials imported necessarily have an impact on its price. Due to this there has been a world wide stimulation of research on biological nitrogen fixation for alleviating the dependence on fertilizer nitrogen. The *Azolla* Anabaena association has significant potential as an alternative N source in rice culture (Moore, 1969; Lumpkin and Plucknett, 1980). Various environmental factors influence the biomass production and the N_2 fixation of the *Azolla-Anabaena* symbiosis (Backing, 1978). The temperature is the most critical factor because the use of azolla as biofertilizer in the tropics is sometimes restricted by its low tolerance to high temperature (Watanabe and Berja, 1983). As the optimum temperature for *Azolla* growth was 25 - 30°C and RH 80 - 90% it was thought that this fern might not thrive in Cauvery Delta zone where the summer temperature goes beyond 40°C. A study was carried out to select an ideal type of *Azolla* to suit the local conditions.

MATERIALS AND METHODS

A. microphylla was used for the study and the biomass production was recorded in one cent nursery. The field selected was thoroughly puddled and levelled uniformly. One cent plot (8 x 5 m) was formed by providing suitable bunds and irrigation channels. Water was maintained to a depth of 10 cm. Ten kilos of cattle dung slurried in 20 l of water was sprinkled in each plot and followed by 100 g super phosphate and 10 kg of fresh fronds of *A. microphylla.* The biomass was recorded periodically. The same plot was again reinoculated with 10 kg of fronds and spread well. Ten kg of cowdung slurried in 20 1 water and 100 g super phosphate were applied. The water and field temperature were also noted every day.

RESULTS AND DISCUSSION

During the period under report the *A.microphylla* biomass production ranged from 42 g/m2/day to 164 g/m2/day with a mean production of 91.8 g/m2/day. Although the average water temperature of azolla nursery during this period was around 38°C, which was above the optimum of 20 - 30°C for *Azolla* , the growth was normal. During early April, a biomass production of 47.5 kg/cent was obtained in 8 days, that accounted for 117 g/m^2/day. The production was 89.0 kg/cent in 12 days during mid April when the average water temperature was 37°c. A biomass production of 66.0 kg/cent (66 g/m^2/day) in 21 days was recorded

Table 1. Azolla biomass production in summer

Date of inoculation	Date of harvest	Period (days)	Mean water temperature(°C)	Biomass Kg/cent	Biomass g/m²/day
3.4.92	10.4.92	8	37	47.5	117
10.4.92	21.4.92	12	37	89.0	164
21.4.92	11.5.92	21	39	66.0	66
11.5.92	22.5.92	12	36	30.0	42
1.6.92	8.6.92	7	40	29.5	70

during late April to early May when the average water temperature was around 39°c. During the mid period of May the production was 300 kg/cent for a period of 12 days at an average water temperature of 36°C. In early June, the mean temperature of water was 40°C and the *Azolla* production 29.5 kg/cent in 7 days.

The present study revealed that *A.microphylla* was tolerant to high temperature and had adopted to the conditions prevailing in the Cauvery Delta zone. This was evident from the normal production of biomass, eventhough the average water temperature was around 38°C. The most favourable temperature for growth and nitrogen fixation by *A. pinnata* was reported to be between 20 and 30°C (Lumpkin and Plucknett, 1980). But here in Aduthurai conditions despite a water temperature of 40°C at 2 PM, *A. microphylla* establishedwell and this indicated that this species of *Azolla* can be used under rice field conditions in Cauvery Delta zone. Sporulation was also observed at this temperature lending space for utilisation of sporocarps.

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Madras Agric. J., 81(7): 391-392 July, 1994

RESEARCH NOTES

A NOTE ON AN ECOTYPE OF BLOU BUFFEL GRASS

Blou buffel (*Cenchrus glaucus* Mudaliar & Sundararaj) is one of the dominant perennial grasses producing good quality forage in pastures and range lands of arid and semi-arid areas. It is more palatable than most of other perennial grasses owing to its broader and long leaves and provides excellent protection against soil erosion. Blou buffel grass has a high degree of drought resistance and is adapted to a wide range of soil and climatic conditions. This species was first identified by Mudaliar and Sundararaj in Tamil Nadu and Karnataka during 1956. It is also amenable to cutting and grazing of animals once the clumps are strongly established. In spite of its being highly suited for pastures, very little taxonomic study or systematic breeding and isolation of ecologically adapted genotypes have been made to improve the forage production potential of this important pasture species. It is worth further studying the genetic potential of blou buffel for the development of pasture land. Jatasra and Thakral (1986) had studied the forage potential of *Cenchrus ciliaris*L., and their results showed that plant height, tillering, leaf weight and stem weight are the important forage yield components. Gupta (1978) also found

Table 1. Comparative performance of *Cenchrus* genotypes

Genotype	Green fodder yield t/ha/year 1977-78	1978-79	1980-81	Average
FS 210	44.60	27.28	2.00	24.63
FS 283	37.40	27.33	24.80	29.84
FS 297	35.80	32.19	9.20	25.46
FS 343	28.40	22.19	34.40	28.33
FS 348	31.21	24.16	4.00	19.79
FS 354	24.00	22.52	28.00	24.84
FS 356	21.00	19.95	41.00	26.98
FS 374	39.40	17.95	9.00	22.12
FS 391	50.00	40.42	50.00	46.81
FS 403	40.00	30.66	30.00	33.55
FS 404	73.60	25.05	24.00	40.88
S.E.	1.41	1.07	0.85	1.11
C.D. 5%	3.24	2.78	2.38	2.80