Table 3. Effect of cowpea seed treatment with different fungicides on shoot length (cm)

Fungicide	Period after treatment (months)						Mean
	5	4	3	2	1	0	
Carbendazim	26.22	25.53	25.88	22.64	25.13	21.22	24.44
Quintozene	26.12	24.22	25.82	25.54	26.95	20.25	24.82
TMTD	26.13	23.36	25.26	13.39	25.58	21.38	22.52
Control	26.40	22.38	24.97	13.93	25.59	19.19	22.08
Mean	26.22	23.87	25.48	18.88	25.82	20.51	

Seeds treated with quintozene, Carbosulfan and carbendazim had higher vigour index than that of other treatments and control.

Loss in seed vigour during storage was reported by Agarwal (1974) in maize. Increased shoot length and vigour of rice seedlings were seen in the seeds treated with TMTD (Kannaiyan *et al.*, 1975). Dhandapani and Jayaraj (1982) observed increased seedling height of chillies in Carbosulfan treatment. Venkata Rao *et al.*, (1970) reported that the seedling weight was higher in fungicide treated than in untreated seeds. Captan in the presence of aldicarb granule was conducive to seedling vigour though the vigour index values did not differ significantly from those of untreated seeds (Jayaraj, 1977).

Table 4. Effect of cowpea seed treatment with different insecticides on shoot length (cm)

Insecticides	Period after treatment (months)						Mean
	5	4	3	2	1	0	
Chlorpyriphos	25.24	24.03	24.53	18.38	25.04	18.57	22.63
Phosalone	26.01	23.73	26.48	18.92	25.99	20.85	22.66
Monocrotophos	26.16	23.77	24.83	18.40	26.59	20.98	23.45
Carbosulfan	27.27	23.98	26.32	20.38	26.43	20.98	24.23
Control	26.41	23.86	25.26	18.30	25.03	21.17	23.34
Mean	26.22	23.87	25.48	18.88	25.82	20.51	

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CLASSIFICATION OF PADDY GENOTYPES

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ABSTRACT

Paddy genotypes numbering thousand were classified based on colour and types of kernel, length/breadth ratio of grain, glume colour, grain hardness and phenol reaction. These types fell into 202 descriptor states. The most commonly (13%) occurring type was with bold grains having a L/B ratio of 2-3 and possessing straw coloured glumes. The kernels in these types were white and glutinous. The grains were medium hard and positive to phenol reaction.

As new varieties are being continuously evolved, maintenance of varietal purity becomes vital in quality seed production. There are at present about 10,000 paddy varieties in the world and identification keys have to be formulated to classify them on a scientific basis. Rosta (1975) proposed that such classification could help in two ways (1) in determination of examination methods enabling seed test institutes to apply and interpret them the same way and 2) systematisation of characteristic features on the basis of which rice varieties can be exactly described and distinguished.

Earlier attempts were made to classify the genotypes based on grain size (Rosta, 1975) and L/B ratio (Katayama, 1985). Glume colour was

also suggested as a means (Kelly, 1975); while phenol colour reaction also gained acceptance, (Jensen and Legaspi, 1979; Chauhan and Nanda, 1984) Grain hardness (Sagi *et al.*, 1980) and endosperm nature (Bhashyam *et al.* 1984) also were used to classify the genotypes.

MATERIALS AND METHODS

Seed Length by Breadth ratio: Twenty five seeds in each type were selected randomly and were then aligned along the side of a centimeter scale. The length and breadth of individual seed were measured in mm. From the mean values the L/B ratio was worked out. Based on the above values, the types were classified as slender (L/B ratio > 3); Bold (L/B ratio 2-3) and round (L/B ratio < 2)

Seed glume colour : Based on the colour of lemma and palea at maturity the types were classified into Straw, Gold, Brown spots on straw, Brown furrows, Brown, Red and Black.

Kernel type : The seeds were dehusked manually and ten kernels were selected randomly and categorised as either glutinous or non glutinous.

Phenol colour reaction : Seeds were taken in two replications of 20 seeds and placed on moist filter paper in a petridish and 3 ml of 1% phenol solution was added. The petri dishes were then placed in an incubator maintained at 30 ± 2°C for 6 hours.At the end of the period, the seeds were categorised as follows: a) negative (-) colourless b) mildly positive (+) slightly reddish c) strongly positive (++) dark brown.

Grain hardness : Ten seeds in two replications were used to measure grain hardness using hardness tester designed by Kiyasei Sakusho Ltd., Japan. The mean value of pressure exerted were used to classify the grains as 1) less hard (< 8 kgs) ii) medium hard (8- 11 kgs) iii) very hard (> 11 kgs)

Kernel colour : The kernels were categorised into two groups namely, red and white.

From the above classification, descriptor state was formed by taking a single character from each level like slender-straw-red- phenol (+ ve) - light hard - glutinous like wise 202 descriptor states were formed.

RESULTS AND DISCUSSION

Most of the types possessed bold (62.1%) grain followed by slender (29.6%) and round (8.3%) categories. Straw coloured glumes were predominant (67.2%) followed by gold coloured glumes (9.8%). Very few genotypes possessed glumes with brown spots on straw (2.0%). Forty eight per cent of the types prove to be positive phenol reaction; while 37.4% strongly positive and 24.2% negative. Kernel colour was predominantly white (69.1%); while the rest were red. The medium hard category formed 78.7% followed by very hard (15.1%) and light hard types (6.2%).Of the two descriptor states, the highest percentage of 13.5 was constituted by the descriptor state "Bold grain type, straw colour glumes, white and glutinous kernel medium hard and mildly positive to phenol reaction".

Many earlier workers have reported that most of the genotypes fell within a L/B ratio range of 2-4 as registered. White kernel type was most occurring as it is attributed to the presence of two dominant alleles; while white colour occurred when two dominant genes Rc and Rd occured with duplicate effect (Dzyuba & Smetanin, 1977).

The present study revealed that majority of the types confirmed to the mildly positive phenol reaction category. Earlier classification is an attempt to use several parameters to classify a single type. The type confirming to a particular category of desirable traits can be used for breeding purposes. For example, slender types with medium hard grains could be used to breed resistant varieties than can withstand higher stress and improve milling quality. Grains with greater pericarp thickness and very hard grains can be used to breed varieties that can withstand handling during shipment (Helm and Zuben, 1969).

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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