fungal genus, *Glomus* spp was present in soils of all the ten places (Table 2). Further it was observed that *Gigaspora calospora* was present only in Coimbatore, Mettupalayam, Tambaram, Perundurai and *Acaulospora* sp. was present only in Kanyakumari, Rameshwaram, Cuddalore and Kayalpattanam.

Root length, shoot length and total dry weight were higher in *Casuarina* seedlings grow in soil of Kanyakumari followed by Cuddalore and it was lower in Tambaram soil. AM fungi spore and AM fungi infection percentage was more in *Casuarina* seedling grown in soil of cuddalore and it was less in perundurai. AM infection percentage was found to decrease after 60 days of planting. This may be due to on set of sporulation of AM fungi. Abott and Robson (1981) found that the infectivity of *Acaulospora laevis* from fresh root pieces declined rapidly with on set of sporulation.

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EFFECT OF LAND MANAGEMENT, IRRIGATION SCHEDULE AND ORGANIC AMENDMENTS ON PRODUCTIVITY OF IRRIGATED GROUNDNUT

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ABSTRACT

A field experiments was carried out during summer 1996 and 1997 at Vamban to study the productivity of irrigated Groundnut (*Arachis hypogaea* L.) as influenced by land management using organic amendments under varying irrigation regimes. Adopting land management of ridges and furrows and providing irrigation at 0.8 IW/CPE resulted in higher groundnut pod yield of 1588 kg/ha and benefit cost ratio of Rs. 2.75 under red lateritic soils of Vamban. Application of enriched FYM registered significant increase in plant height, number of pods per plant, pod yield WUE and benefit cost ratio over bio-digested slurry and pressmud in both the years.

KEY WORDS: Groudnut, Productivity, Land management, Irrigation regimes, Organic amendments.

Groundnut (*Arachis hypogaea* L.) is one of the important oilseed crops of Tamil Nadu. Land management systems play a major role in increasing the infiltration, minimizing soil erosion

and improving water use efficiency. The yield of groundnut is highly influenced by moisture availability at critical growth stages of the crop. The irrigation scheduling techniques are one of the means of attaining this goal. Further the surface crusting impede the peg penetration of groundnut which prevails upon almost all the red lateritic soils. Application of organic amendments is one of the ways to overcome this surface crustation. The present investigation was taken up to study the effect of land management, irrigation schedule and organic amendments on productivity of irrigated groundnut.

MATERIALS AND METHODS

Field experiments were conducted at National Pulses Research Centre, Vamban during summer 1996 and 1997. The experiment was conducted in split plot design with two irrigation regimes (0.6

Table 1. Effect of land management, irrigation regimes and organic amendments productivity and WUE of irrigated groundnut.

Treatments	Plant height (Cm)		Number of pods per plant		Pod yield (kg/ha)		Pooled mean pod yield (kg/ha)	Net return (Rs/ha)		B.C. ratio		Water use efficiency (kg/ha/mm)	
	1996	1997	1996	1997	1996	1997		1996	1997	1996	1997	1996	1997
Irrigation regimes and land management system													
Irrigation at 0.6 IW/CPE + Ridges and furrows	56.4	46.3	39.5	24.6	1494	1309	1402	5883	4479	2.43	2.12	2.93	2.77
Irrigation at 0.6 IW/CPE + Check basin	40.6	38.9	20.8	16.3	1049	1047	1048	3875	3762	1.67	1.67	2.06	2.09
Irrigation at 0.6 IW/CPE + Corrugated furrows	50.7	42.8	28.7	23.0	1251	1218	1235	4246	4070	1.91	1.85	2.46	2.43
Irrigation at 0.8 IW/CPE + Ridges and furrows	59.2	62.4	46.4	38.7	1633	1542	1588	6215	5910	2.62	2.47	2.80	2.69
Irrigation at 0.8 IW/CPE + Check basin	47.8	42.9	23.9	19.1	1145	1101	1123	3900	3875	1.78	1.71	1.97	1.93
Irrigation at 0.8 IW/CPE + Corrugated furrows	53.6	53.8	33.7	25.6	1367	1292	1330	4277	4210	2.06	1.95	2.35	2.26
SEd	0.21	2.54	0.29	0.61	5.7	29.0	18.7	-	-	-	-	0.009	0.056
CD (P=0.05)	0.43	5.66	0.63	1.36	12.7	64.6	40.6	-	-	-	-	0.022	0.125
Organic amendments													
Bio digested slurry	51.3	47.6	31.9	24.1	1323	1235	1279	4300	4060	1.98	1.84	2.43	2.34
Enriched FYM	54.3	50.5	53.9	25.8	1363	1336	1350	4512	4375	2.17	2.12	2.49	2.50
Pressmud	48.6	45.4	30.5	22.7	1284	1183	1234	4230	4200	2.08	1.91	2.35	2.24
SEd	0.19	0.38	0.22	0.22	5.9	5.9	6.1	-	-	-	-	0.011	0.010
CD (P=0.05)	0.39	0.78	0.45	0.44	12.2	12.2	15.3	-	-	-	-	0.023	0.021
Interaction effect													
SEd	0.49	0.92	0.54	0.53	14.7	14.5	18.2	-	-	-	-	0.027	0.025
CD (P=0.05)	0.98	1.90	1.11	1.09	NS	29.8	NS	-	-	-	-	NS	0.051

and 0.8 IW/CPE) and three land management system of ridges and furrows (RF), Check basin (cb) and corrugated furrows (CF) in main plots and three organic amendments (bio-digested slurry (BDS) at 5 t/ha, enriched FYM at 750 kg + recommended dose of P_2O_5 and K_2O kg/ha and pressmud at 5 t/ha) in sub-plots replicated three times. The fertility status of the soil was 142, 5.38 and 300 kg of available N, P and K/ha respectively. The soil of the experimental field was red lateritic, having pH of 5.2 and EC of 0.22.

The crop of groundnut var. TMV 7 was sown by adopting a inter row spacing of 30 cm and inter plant spacing of 10 cm. A fertilizer schedule of 17:35:54 kg of N, P_2O_5 and K_2O/ha respectively was followed. All the fertilisers were applied basally.

RESULTS AND DISCUSSION

Different land management systems, irrigation regimes and organic amendments brought about significant variations on plant height, number of pods per plant and pod yield (Table 1). Ridges and furrows system scheduling irrigation at 0.8 IW/CPE enhanced the plant height (59.2 and 62.4 cm during 1996 and 1997 respectively) and number of pods per plant (46.4 and 38.7 during summer 1996 and 1997 respectively) and it ultimately reflected on higher pod yield of 1633 and 1542 kg/ha during summer 1996 and 1997 respectively over rest of the treatments. Better conservation of soil moisture (Jagatap et al., 1986) and efficient utilization of stored soil moisture (Sankara Reddy et al., 1991) in ridges and furrows favourably influenced the pod number per plant as well as pod yield. Scheduling irrigation at 0.8 IW/CPE resulted in higher number of pods probably due to better accumulation and translocation of assimilate due to prolonged seed filling period. Similar observations were also reported by Thompson (1984). The increased number of pods per plant and pod yield obtained due to enriched FYM application might be attributed to improved soil physical condition which might have facilitated vigorous crop growth through higher availability of soil moisture. The net returns and benefit cost ratio was higher in I2L1A2 (Irrigation at 0.8 IW/CPE and Ridges and furrows system combined with Enriched FYM application) compared to other treatment combinations in both the years studied.

Table 2. Seasonal total water consumption (mm)

	1996		1997	
	I_1	I_2	I_1	I_2
	(0.6)	(0.8)	(0.6)	(0.8)
Number of irrigations	9	11	7	9
Seasonal irrigation (mm)	450	550	350	450
Soil moisture + effective rainfall (mm)	59.1	32.5	151	121.5
Seasonal total water (mm)	509.1	582.5	501	571.5
Irrigation intervals (days)	12.3	10.1	15.6	12.1
Daily wateruse (mm day-1)	4.59	5.25	4.59	5.24

* Data not statistically analysed

Seasonal consumptive use of water increased markedly with an increase in frequency of irrigation upto 0.8 IW/CPE (Table 2) while the water use efficiency was maximum at 0.6 IW/CPE (Table 1). The finding confirms the results of Tiwari et al., (1997).

The combined effect of irrigating the groundnut crop at ten to twelve days interval, ridges and furrows method of land management and application of enriched FYM was more promising in obtaining increased groundnut yield under red lateritic soils of Vamban.

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