Table 1. Effect of leguminous intercrops and N levels on seed cotton yield

Treatments Cotton Lenguminous crops	1988-89 N levels Kg ha^{-1}				1990-91 N levels kg ha^{-1}			
	80	60	40	Mean	80	60	40	Mean
Cotton + Sunnhemp	1890	1780	1685	1785	1849	1816	1625	1763
Cotton + Lucerne	1860	1770	1660	1763	1805	1704	1648	1719
Cotton + Cowpea	1880	1785	1670	1778	1823	1691	1623	1712
Cotton + Clitoria	1830	1750	1640	1740	1828	1704	1675	1735
Cotton alone	1713	1690	1580	1661	1683	1592	1492	1589
Mean	1835	1755	1647		1798	1701	1613	
CD (P=0.05) L	58			L	54			
N	45			N	42			
L x N	NS			L x N	NS			

NS : Non-Significant

incorporated after six weeks recorded maximum sorghum grain yield and a saving of 20 kg of N fertiliser.

It can be concluded that growing leguminours intercrops and their incorporation at 40 days after sowing will reduce the nitrogen requirement by 25 per cent by the cotton crop.

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IRRIGATION MANAGMENT IN SUGARCANE

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ABSTRACT

The Effect of irrigation regimes, methods of irrigation and coir- pith application to soil wasstudied through a field experiment conducted at the Agricultural College and Research Insitutute, Madurai during 1984 and 1985. The results revealed that higher soil moisture regime of 0.90 IW/CPE ratio recorded higher cane yield than alternate furrow method. Under alternate furrow method of irrigation, the moisture contribution from irrigated furrow to unirrigated furrow was less resulting in low cane -yield. Application of coir pith at 15t ha^{-1} was found to be optimum. However, under contraints of irrigation water, irrigation can be scheduled at 0.75 IW/ CPE ratio adopting alternate furrow method of irrigation coupled with an application of coir pith at 15 t ha $^{-1}$ for achieving a reasonable cane yield in sugarcane.

Surgacane is an important sugar crop in India, in 3.3 m.ha with a total production of 196.7 m.t. of cane. In Tamil Nadu, the area under sugarcane is 2.1 lakh ha with a production of 21.8 m.t. Sugarcane, being a long duration crop, requires a constant supply of moisture during the entire growth period, since moisture being a limiting factor, for initial vigour, growth and other physiological activities of cane (Alvarez, 1985).

In the recent past, the release of water in the canal command areas was erratic and with inadequate quantity owing to uneven behaviour of monsoonic rains in the catchment areas. Besides the water resource potentials of both system tanks and non-system tanks are not encouraging. The ground water potential also is declining year after year owing to over-exploitation of well water. This situation warrants immediate need for maximising the use the available water economically. With this

objective, a field experiment was carried out to study the effect of irrigation regimes, methods of irrigation and coir pith application in sugarcane.

MATERIALS AND METHODS

Field experiment was conducted at the Agricultural College and Research Institute, Madurai, during special season of 1984-85. The soil was of sandy clay loam, having low status of available N (178.0 - 178.5 kg ha^{-1}) medium in available P (12.8-16.9 kg ha^{-1}) and high in available K (292.5-313 kg ha^{-1}). The organic carbon content was low (0.32) and the soil reaction was neutral (7.30-7.42). The treatments consisted of two irrigation regimes (0.75 and 0.90 IW/CPE ratio with 6.0 cm depth of water) and two methods of irrigation *viz.*, all furrow and alternate furrow irrigation which formed the main plot treatments and three levels of coir pith *viz.*, 0, 15 and 30 $t.ha^{-1}$ and two levels of N viz., 240 and 300 $kg.ha^{-1}$ formed the sub-plot treatments.

The field was prepared thoroughly and coir pith was applied basally on moisture free basis as per treatment schedule . It was incorporated well before forming ridges and furrows. The entire recommended dose of phosphorus at 60 $kg.ha^{-1}$ was applied basally; N as per treatment and the recommended K at 90 $kg.ha^{-1}$ were applied in two equal splits on 45th and 90th day after planting. Healthy two budded setts of sugarcane (CoC 671) were planted using a seed rate of 75,000 ha^{-1} on 12 July 1984 and 12 July 1985 and harvested on 8 April 1985 and 15 April 1986 respecively for the first and second year of experiment. Irrigations were given as per treatment schedule and the cane yield was calculated.

RESULTS AND DISCUSSION

Irrigation regimes

Irrigation regimes had significant effect in increasing the cane yield in both the years. The cane yield was favourably increased at higher moisture regime of 0.9 IW/CPE ratio, recording an yield of 113.6 and 119.2 $t.ha^{-1}$ as against 106.2 and 113.4 $t.ha^{-1}$ under 0.75 ratio in 1984 and 1985 respectively (Table 1) With higher soil moisture regime, the root activity might have increased enhancing the uptake of nutrients considerably (Singh *et al.*, 1987) and promoting the millable cane production and ultimately the cane yield.

Methods of irrigation

Irrigation to all-furrow method was observed to be beneficial as it has recorded a cane yield of 112.85 and 118.36 $t.ha^{-1}$ in 1984 and 1985 over alternate furrow irrigation accounting for 9.1 and 5.7 per cent respectively. Under alternate furrow irrigation the moisture contribution from irrigated furrow to the unirrigated furrow was found to be less resulting in lower yield, which might probably be due to the change in soil moisture content that would have modified the supply of the nutrients from the soil (Zende, 1988). Similar results were reported by Magisegaran *et al.* (1988), where the alternate furrow irrigation resulted some moisture stress causing the cane yield reduction.

Coir pith application

Application of coir pith showed an appreciable yield increase. Coir path at 30 $t.ha^{-1}$ recorded significant yield increase to a tune of 14.0 and 17.8 per cent in 1984 and 1985 respectively over control. However the yield increase beyond 15 $t.ha^{-1}$ of coirpith was not significant indicating that application of coir path at 15 $t.ha^{-1}$ would be optium to achieve higher cane yield.

Interaction effects

The interaction effect of irrigation regime with methods of irrigation and coir pith application and that between methods of irrigation and coir pith application were significant. Irrigation at 0.9 IW/CPE ratio under all furrow method of irrigation had registered appreciably higher cane yield and the least with 0.75 ratio under alternate furrow method. Irrigation regime of either 0.75 or 0.90 IW/CPE ratio did not make any marked impact on cane yield when scheduled through alternate method in 1984 whereas it had significant influence in 1985. The interesting observation recorded was that irrigation at 0.75 ratio through all furrow method produced the same cane yield as that under 0.90 ratio given through alternate furrow method. This indicated that under adequate supply of irrigation water, irrigation at 0.90 ratio through all furrow method would be preferable whereas under water scarcity situations, irrigation at 0.75 ratio

Table 1. Effect of irrigation regimes, methods of irrigation and coirpith application on cane yield (t. ha^{-1})

Treatments		1984	1985
Irrigation Regimes :	I_1 :0.75 WUF	106.24	113.38
	I_2 :0.90 WUF	113.64	119.19
	SE_D	0.81	0.73
	CD (5%)	1.99	1.80
Irrigation Method :	M_1 :All furrow	112.85	118.36
	M_2 :Alternate furrow	103.45	112.63
	SE_D	0.81	0.73
	CD (5%)	1.99	1.80
Coirpith Application :	C_0 :Control	100.90	104.76
	C_1 :15 t ha^{-1}	112.30	118.67
	C_2 :30 t ha^{-1}	115.02	123.37
	SE_D	0.73	0.59
	CD (5%)	1.88	1.20
Interaction : IXM :	I_1M_1	109.72	115.89
	I_1M_2	102.76	112.58
	I_2M_1	115.99	123.84
	I_2M_2	104.14	115.68
	SE_D	1.15	1.04
	CD (5%)	2.81	2.54
Interaction : IXC :	I_1C_0	97.54	103.42
	I_1C_1	109.41	115.87
	I_1C_2	111.77	119.22
	I_2C_0	106.75	106.11
	I_2C_1	117.68	121.47
	I_2C_2	120.77	127.51
	SE_D	1.22	0.86
	CD (5%)	2.82	1.99
Interaction : MXC :	M_1C_0	104.75	106.68
	M_1C_1	114.78	121.05
	M_1C_2	119.03	126.76
	M_2C_0	94.54	102.84
	M_2C_1	107.31	116.29
	M_2C_2	108.51	119.97
	SE_D	1.22	0.86
	CD (5%)	2.82	1.99

through alternate furrow method would be prefered, sacrificing a marginal yield loss.

The interaction between irrigation regime and coir pith application exhibited significant influence on cane yield. Irrigation at 0.90 IW/CPE ratio coupled with application of coir pith at 30t.ha^{-1} recorded significantly higher cane yield. This was followed by 0.90 ratio at 15 t.ha^{-1}. A closeness was observed between irrigation at 0.90 ratio with 15 t.ha^{-1} of coir pith and 0.75 ratio with 30 t.ha^{-1} of coir pith in their yielding ability. Under constraints of irrigation water, a lower regime of 0.75 with alternate furrow method of irrigation and application of coir pith at 15 t.ha^{-1} can be adopted for achieving higher yield in sugarcane. Thus, application of 15 t.ha^{-1} of coir pith had a greater impact in conserving moisture and available to the crop even under low irrigation regime of 0.75 ratio enhacing the cane yield.

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STUDIES ON THE STRATEGY OF DRIP IRRIGATION TO BANANA

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ABSTRACT

Experiments on the performance of drip irrigation with differential quantum of water to banana (Robusta) indicated that application of 16 l/tree/day was found to be the optimum.

Banana is an important fruit crop of central and pennisular India, especially in Tamil Nadu. Drip irrigation is one of the advanced methods of irrigation in areas of water scarcity and salt problems. Hedge and Srinivas (1990) reported that the water use efficiency was markedly higher in drip irrigation than under basin method. Robinson and Alberts (1987) observed 23 per cent increased yield of banana with drip irrigation than with sprinkler irrigation.

MATERIALS AND METHODS

The experiment was conducted at the Agricultural Research Station, Bhavanisagar, in sandy loam soils. The details of the treatments were as follows:

T1 : 5 cm depth of irrigation by surface method wherever the cumulative pan Evaporation reaches 50mm i.e., IW/CPE=1.0
T2 : Drip irrigation 32 l/day/tree
T3 : Drip irrigation 24 l/day/tree
T4 : Drip irrigation 16 l/day/tree
T5 : Drip irrigation 8/l/day/tree

The experiment was laid out in a randomised block/design with four replications. The drip irrigation system was laid out using drippers of 4 and 8 l capacity per hr as per the treatment details. The drippers were standardised using cans and measuring the volumes of water dripped. Two crops were raised to study the performance of the drip irrigation. Biometric observations, yield and water use efficiency (WUE) were recorded during the crop period.

RESULTS AND DISCUSSION

From the biometric observations (Table 1), it was observed that among all the treatments, the performance was superior in T2 (32 l/day/tree) drip irrigation whereas the performance was very poor in T5 (8 l/day/tree) drip irrigation. Hegde and Srinivas (1990) also indicated that there was improved growth, early flowering and higher dry matter production in plants under drip irrigation than under basin irrigation.

The total amount of water utilised by the plants and the yield particulars are presented in the table 2.

Table 1. Biometric observations on banana var. Robusta

Treatment	Mean bunch length (cm)	Mean number of hands	Mean number of fingers	Mean value of fruit (cc)	Plant height (cm)
T1	75.0	7.3	14.9	133.25	177.0
T2	75.8	7.3	15.2	135.00	186.8
T3	60.5	7.3	12.8	103.00	179.3
T4	64.0	7.3	13.6	135.00	169.3
T5	56.8	6.0	11.7	100.25	148.0
SEd	6.21	0.51	1.11	8.14	2.16
CD	13.53	NS	2.42	17.74	4.60