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EFFECT OF FAST GROWING LEGUMINOUS INTERCROPS AND NITROGEN LEVELS ON COTTON

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ABSTRACT

A field experinment was conducted at the Tamil Nadu Agricultural University, Coimbatore, during the winter seasons of 1988-89 and 1989-90 to study the effect of fast growing leguminous green manures *viz.*, sunnhemp, lucerne, cowpea and clitoria with three levels of nitrogen (40, 60 & 80 kg ha^{-1}) in cotton under irrigagted conditions. The results revealed that growing and incorporation of all the green manures on 40 days after sowing increased seed cotton yield. Added levels of N also increased the seed cotton yield. It was also observed from the yield data that 25 per cent of the chemical N fertiliser can be reduced if the green manures are grown and incorporated in the cotton field.

The nitrogen use efficiency in most of crops including cotton ranges from 30-40 per cent when chemical fertilisers are applied. A combination of green manure lagumes and chemical fertilisers may greatly influence the steady availity of N. Fast growing legumes as intercrops in early period and incorporation as green manure may greatly influence the growth of the cotton and this may even reduce the requirement of chemical N fertiliser. Economic advantage is found if legume intercropping is practiced with any row crop like cotton (Verma and Rao, 1969; Nagre, 1979). Information on these lines are lacking and hence a field experiment was conducted to study the influence of fast growing legumes as intercrop on the N economy of cotton.

MATERIALS AND METHODS

Field experiments were conducted during winter seasons of 1988-89 and 1989-90 at the Tamil Nadu Agricultural University, Coimbatore, under All India Coordinated Cotton Improvement Project to find out the influence of fast growing legumes as intercrops on the nitrogen economy of cotton. The soil was clay loam type with 182 kg ha^{-1} available N, 20 kg ha^{-1} available P_2O_5 and 640 kg ha^{-1} available K_2O.The treatments consisted of four legumes *viz.*, sunnhem plucerne, cowpea and clitoria and three levels of nitorgen 100, 75, and 50 per cent of the recommended dose of 80 Kg. N/ha. Along with above combinations, three controls were added (without intercrop) with 100 75 and 50 per cent of recommended N. There were totally 15 treatments. The trial was laid out in a randomised block design with three replications. The sowings were taken on 31 Auguest 1988 and 12 September 1989. A common dose of 40 kg P_2O_5 and 40 kg K_2O ha^{-1} was applied to all the treatments. Nitrogen was applied to the plots as per the treatments schedule from the recommended level of 80kg N ha^{-1} at two splits: one at the time of sowing and the second at 45 days after sowing. Irrigations were given based on the necessity and required plant protection measures were taken based on the recommendations.

RESULTS AND DISCUSSION

Intercropping of fast growing leguminous green manures *viz.*, sunnhemp, lucerne, cowpea and clitoria in cotton crop significantly increased seed cotton yield over raising of pure cropping of cotton in both the years (Table 1). However, much difference in yield could not be observed among the four green manures tried. Increased levels of N application increased the seed cotton yield in both years. The rate of increase in yield is higher at medium N level (60 kg ha^{-1}) than at higher N level (80 kg ha^{-1}).

From the yield data, it can be also observed that any one of the green manure with 75 percent of recommended N (60 kg ha^{-1}) recorded similar yield with 100 per cent of the recommended level without intercropping. The enhanced yield would have been due to release of fixed nitrogen by the leguminous green manures after in corporation at a seady rate Palaniappan *et al*, (1976) reported that cowpea grown as an intercrop with sorghum and

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