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EFFECT OF INTERCROPS ON NUTRIENT UPTAKE AND PRODUCTIVITY OF CHILLI-BASED CROPPING SYSTEM

Recently intercropping has been recognized as a potentially beneficial system of crop production. This cropping system increased total productivity per unit land per unit time and helps to utilize equally and judiciously the land and other resources on farm. The interspaces of crops like chilli could be best utilized for growing short duration vegetables like frenchbean (Kadali *et al.*, 1988). Particularly the chilli cv. Jwalamukhi which is an erect, medium tall and compact plant with moderate branching habit could be ideal for growing inter crops. The morphology, growth habit, duration and wider spacing recommended for this variety enables to grow some short duration vegetable crops along with it without much adverse effect on the main crop. To assess the effect of the intercrops like frenchbean and amaranth on the nutrient uptake and productivity of green chilli, the present study was conducted

The experiment was conducted in the summer rice fallows of Onattukara in Alappuzha district of Kerala during 1993-94. The soil of the experimental site was Entisols with a pH of 5.8. The soil had available N 177.8 kg ha^{-1}, P_2O_5 31.8 kg ha^{-1} and K_2O 124 kg ha^{-1}. The experiment was laid out in randomized block design with three replications. Chilli cv Jwalamukhi was the base crop. Frenchbean cv Contender and amaranth cv Arun were intercropped with chilli under normal (45 x 30 cm) and paired (30/60 x 30 cm) row planting. The canopy and root spread of Jwalamukhi were about 25 cm. So, a spacing of (45 x 30 cm) was used in the present study instead of the recommended spacing (45 x 45 cm). For both the main and intercrop nutrient doses of 100, 75 and 50 per cent of the recommended doses of nutrients as per package of practices of the Kerala Agricultural University were given. Pure crop of chilli, frenchbean and amaranth were grown with the recommended doses of nutrients as control.

Nutrient uptake of chilli with frenchbean as intercrop was significantly superior to that of chilli with amaranth as intercrop and pure crop of chilli (Table 1). The uptake of N, P and K of chilli-frenchbean system was 86, 86 and 117 per cent more than the nutrient uptake of chilli in chilli-amaranth system. Better uptake of nutrients by chilli in chilli-frenchbean system is due to poor competition for nutrients between chilli and frenchbean because of the difference in duration and variation in the rooting habit of chilli and frenchbean. Baker (1975) reported that to have yield advantages in a cropping system, there should be minimum 25 per cent difference in duration of crops. In the present study also, there is about 25 per cent difference in the duration of chilli and intercrop. The competition between chilli and frenchbean for resources is much less probably because chilli is a transplanted crop and frenchbean is a direct sown crop. Poor nutrient uptake of chilli in chilli-amaranth intercropping system might be due to the aggressive nature of amaranth compared with frenchbean and in chilli-amaranth system both chilli and amaranth are transplanted crops. Similar results were reported by Olasantan (1991). Nutrient uptake of pure crop of chilli was 30, 27 and 21 per cent less than the respective N, P and K uptake by intercropped chilli in chilli-frenchbean system.

Chilli cv Jwalamukhi in association with frenchbean cv Contender recorded 84 per cent more yield than the yield realized by chilli in association with amaranth cv Arun (Table 1). Intercrop yield of chilli in chilli-frenchbean system was not only higher than intercrop yield of chilli-amaranth system but also higher than the pure crop yield of chilli. Hosmani (1990) had reported higher yield for chilli when intercropped with onion. The growth performance of intercropped chilli was superior in chilli-frenchbean system. This better performance in growth characters might be due to the higher uptake of nutrients by intercropped chilli in chilli-frenchbean system. Chilli in chilli-frenchbean system produced more number of leaves (50%), leaf area (78%) and branches (40%) than chilli-amaranth system (Table 2). Better branching of chilli coupled with higher leaf area helped in tapping more photosynthetically active radiation and that has resulted in better dry matter production in chilli by intercropping with frenchbean. All these growth parameters were positively

Table 1. Effect of intercrop on nutrient uptake and yield of chilli

Sl No.	Treatment	Nutrient uptake of chilli, kg ha^{-1}			Yield, kg ha^{-1}
		N	P	K	
1	Chilli + frenchbean	38.70	13.10	23.10	8,371.00
2	Chilli + amaranth	20.80	7.10	10.70	4,550.00
3	Chilli (pure crop)	26.90	9.50	18.20	6,718.00
	CD (0.05)	7.67	2.51	4.22	1,204.52

Table 2. Growth performance of intercrop and pure crop of chilli

Sl. No.	Treatment	Number of leaves	Leaf area, m^2	Number of branches	Dry matter production, kg ha^{-1}
1	Chilli + frenchbean	124	1529	8.0	1202.00
2	Chilli + amaranth	81	859	6.7	637.00
3	Chilli (pure crop)	137	1422	7.4	933.00
	CD (0.05)	13.09	265.29	0.89	217.00

and significantly correlated with yield. From the result, it can be concluded that intercropping chilli with frenchbean increased the nutrient uptake and yield of chilli.

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