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Integrated Production Technology in Hybrid Pearl Millet

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Effect of sources and time of application of nitrogen with and without azotobactor application on growth and yield of hybrid pearl millet (*Pennisetum typhoides* (Burm f.) stapf & C.E. Hubb.) was studied at the Regional Station, Indian Agricultural Research Institute, Coimbatore, Tamil Nadu, *kharif* seasons of 1976 and 1977. Splitting the nitrogen dose i.e. 20 kg N/ha through FYM, and 20 kg N along with 20 kg P_2O_5/ha through fertilizers was found to be the best treatment in augmenting the grain yield of hybrid pearl millet. Azotobactor application did not show any extra benefit.

The serious repercussion of energy crises on the farm front is the shortage and high price of inorganic nitrogenous fertilizers. It is imperative that not only the available quantity should be used most efficiently but we should also turn to alternate sources of the nutrient to keep crop production in the country at the highest possible level. Farm yard manure (FYM) and other organic fertilizers are considered to be the probable substitutes for inorganic fertilizers. Besides, biofertilization also has some promise. Azotobactor is capable of fixing atmospheric nitrogen and its use in cereals has been advocated by Sundara Rao *et al.* (1963), Mehrotra and Lahri (1971) and Tilak and Sharma (1977). Keeping this in view an experiment was conducted at the Regional Station, Indian Agricultural Research Institute, Coimbatore, Tamil Nadu, to determine the optimum and most economic schedule to provide balanced nutrition to hybrid bajra crop.

MATERIAL AND METHODS

The field experiment was conducted at the Regional Station, Indian Agricultural Research Institute, Coimbatore during *kharif* season of 1976 and 1977. There were in all, five treatments and their details are given below :

Control	(T_1)
40-20 0 kg N, P_2O_5 & K_2O/ha	(T_2)
20 kg/ha through FYM before sowing 20 kg/ha and 20 kg P_2O_5/ha through fertilizer at sowing	(T_3)
T_3 + Azotobactor at sowing	(T_4)
20 kg N/ha through FYM before sowing 20 kg N/ha through fertilizer 3 weeks after sowing and 20 kg P_2O_5 through fertilizer and azotobactor at sowing	(T_5)

The Azotobactor culture was supplied by the Microbiology Department, Tamil Nadu Agricultural University, Coimbatore. The fertilizers used were calcium ammonium nitrate (CAN) for

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nitrogen and single super phosphate (SSP) for phosphorus. The soil of the experimental field was medium brown loam containing 0.36% organic carbon, 38.2 kg/ha of available phosphorus and 658 kg/ha of available K_2O with 8.4 pH and E.C. of 0.22 mmhos/cm. Two light irrigations were given to the experimental crop of pearl millet in each season. Hybrid variety B.J. 104 was sown in 45 cm wide rows and a population of 1,75,000 plants/ha was maintained at the final thinning in both the seasons.

RESULTS AND DISCUSSION

Application of nitrogen and phosphorus, irrespective of its source or time of application, proved significantly superior to control, in terms of grain yield. Split application of 40 kg N/ha through FYM and fertilizer on equal nitrogen basis at the time of sowing(T_3) enhanced the grain production significantly over the treatment where the entire 40 kg N/ha was applied through fertilizer at the time of sowing (T_2). These results may be ascribed to two factors. Firstly, under rainfed conditions leaching losses of nitrogen supplied through calcium ammonium nitrate might be more as compared to nitrogen supplied through FYM. Secondly, FYM also supplied other macro and micronutrients to the crop which might have given added advantage in growth and yield of the crop. Venkataraman and Rajagopalan (1962) reported that highest yield of rainfed pearl millet was obtained by applying 40 kg N/ha as ammonium sulphate and 20 kg P/ha as single superphosphate over the basal dressing of 5 tons of FYM/ha.

Application of 20 kg N/ha three weeks after sowing (T_6) proved inferior to the same dose of nitrogen applied at the time of sowing (T_4). This might be due to the fact that nitrogen was not available to the young seedlings of pearl millet in the early stages of growth as the process of mineralization is slow in FYM. Kinra (1964) and Athwal *et al.*

TABLE. Effect of nitrogen application on yield and yield contributes of pearl millet (BJ 104)

Treatment	Grain yield (q/ha)		Stover yield (q/ha)		Days to 50% flowering		Grain weight per plant (g)		1000-grain weight(g)	
	1976	1977	1976	1977	1976	1977	1976	1977	1976	1977
T_1	10.2	23.1	48.6	75.1	47.5	46.0	8.0	7.2	6.5	6.2
T_2	11.9	28.7	51.1	87.3	45.5	42.7	9.2	8.6	6.7	7.7
T_3	15.6	33.5	55.4	105.4	44.8	43.3	11.6	9.9	6.7	7.2
T_4	14.6	32.8	54.7	105.2	44.5	43.0	11.2	10.6	7.3	7.0
T_7	12.3	30.2	49.9	98.9	45.5	42.0	10.8	9.4	7.0	7.7
SEM±	0.42	1.23	3.0	2.16	1.3	0.60	0.98	0.30	0.30	0.35
C.D. at 5%	1.23	3.61	—	6.35	—	1.79	2.88	0.88	—	1.04

(1971) also found that while splitting the nitrogen dose, half of it should be given at the time of sowing. Azotobactor application (T_4 and T_5) failed to boost the yields appreciably over other treatments. The crop in untreated plots (control) took more time for per cent flowering; however, the data were found to be significant in 1977 only. This was in conformity with the earlier findings that nitrogen fertilization hastened the reproductive phase and resulted in earlier mutation of the crop (Kinra, 1964). Stover yield was not affected much by different treatments in 1976 where as in 1977, application of nitrogen (T_3 to T_6) increased the stover yield significantly over control.

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