Internat. J. Agric. Sci. Vol.3 No.2 June, 2007 : 192-193

Effect of pearl millet (*Pennisetum glaucum*) based intercropping system on yield and economics of pearl millet on shallow soils under rainfed conditions

PREMSING P. GIRASE *, PRALHAD D. SONAWANE AND SANJIVKUMAR C. WADILE
Department of Agronomy, Bajra Research Scheme,(MPKV) College of Agriculture, DHULE (M.S.) INDIA

ABSTRACT

A field experiment was undertaken to study the intercropping of important legumes in pearl millet (*Pennisetum glaucum* (L.)R.Br.) under rainfed conditions during the *kharif* season of 2003 and 2004 at College of Agriculture, Dhule, Maharashtra. An intercropping of pearl millet + moth bean planted at 2:1 row ratio produced significantly higher pearl millet grain equivalent yield (36.62 q ha $^{-1}$) than all other intercropping systems and sole cropping, however, it was at par with pearl millet + cowpea (33.56 q ha $^{-1}$). Similarly the highest net monetary returns (Rs.14617 ha $^{-1}$) as well as benefit-cost ratio (2.98) and the LER (1.47) were recorded in pearl millet + moth bean intercropping system. On the basis of pearl millet equivalent yield, net monetary returns and LER showed that pearl millet + moth bean (2:1) or pearl millet + cowpea (2:1) appears the most productive ,efficient and profitable for rainfed conditions of scarcity zone of north Maharashtra.

Key words : Intercropping system, Pearl millet equivalent yield, LER., Rainfed conditions.

INTRODUCTION

Pearl millet (*Pennisetum glaucum*) is mostly spread in Rajasthan, Gujarat, Maharashtra, Utter pradesh, Haryana and Karnataka. As its cultivation is mostly confined to rainfed lands poor and impoverished soils, growing of pearl millet as a sole crop under this situation is rather risky and uneconomical. Intercropping can increase the production and productivity by better utilization of available resources and thereby helps to minimize the risks and brings stability under rainfed conditions. Intercropping provides stability and ensures adequate yields of one of the component crops (Rao and Willey,1983; Subba Reddy and Havangi,1986) under aberrant weather situations. Its intercropping with grain legumes such as cowpea, moth bean, horse gram is a common recommended practice. Plant population and spatial arrangement in intercropping have important effects on the balance of competition between component crop and on their productivity. To study the performance of suitable pearl millet based intercropping system, the present experiment was planned and conducted under rainfed condition.

MATERIALS AND METHODS

A field experiment was conducted during the *kharif* season of 2003 and 2004 at Bajra Research Scheme, College of Agriculture, Dhule, in randomized block design with eight treatments replicated three times. The soil of experimental site was shallow having pH 8.0, low in organic carbon (0.44 %), low in nitrogen (276 kg ha^{-1}), medium in phosphorus (18 kg ha^{-1}) and rich in potassium (462 kg ha^{-1} The recommended fertilizer schedule 40 kg N + 20 kg P_2O_5 per hectare was applied for both sole pearl millet and intercropping systems whereas, for sole moth bean, horse gram and cowpea 20 kg N + 40 kg P_2O_5 per hectare was given. The recommended cultivars like Shraddha of pearl millet, MBS-27 of moth bean, Sina of horse gram and local of cowpea were used in the experiment. The sole pearl millet was sown at the spacing of 45 cm x 15 cm while for sole moth bean, horse gram and cowpea the recommended plant spacing i.e. 30 cm x 10 cm was adopted and in intercropping systems plant spacing 30 cm x 15 cm were followed. The crops were sown in first week of July in both seasons of experimentation. The total rainfall received during crop growth period in 2003 and 2004 was 854 mm, and 778.8 mm, respectively. Both the crop seasons were normal for crop growth.

Pearl millet grain equivalent yield was calculated by converting seed yield of intercrop into pearl millet on the basis of prevailing market rates of the crop produce. Net monetary returns and benefit-cost ratio were computed by using the prevailing rates of inputs and produce.

RESULTS AND DESCUSSION

Pearl millet grain equivalent yield :

The pearl millet grain equivalent yield (Table 1) was found to be influenced by different intercropping systems. The pooled mean data showed that intercropping of pearl

* Author for correspondence.

Table 1 : Pooled data of Pearl millet , inter crop yields (q ha^{-1}) , pearl millet grain equivalent yield (q ha^{-1}), LER , net monetary returns ((Rs. ha^{-1}) and B:C ratio as influenced by intercropping of legumes in pearl millet.

S. No.	Treatments	Mean Pearl millet yield (q ha^{-1})		Mean Inter crop yield (q ha^{-1})		Pooled mean Pearl millet grain yield equivalent (q ha^{-1})	Mean LER	Pooled mean Net monetary returns (Rs.ha^{-1})	Mean B:C ratio
		Grain	Fodder	Grain	Fodder				
T_1	Sole Pearl millet	24.91	32.78	----	----	25.00	1.00	8133	2.20
T_2	Sole moth bean	--	--	9.42	20.06	25.10	1.00	7834	2.09
T_3	Sole horse gram	--	--	10.57	16.70	15.84	1.00	2402	1.34
T_4	Sole cowpea	--	--	9.70	12.77	22.62	1.00	6256	1.86
T_5	Pearl millet + moth bean (2:1)	23.47	30.89	4.94	10.59	36.62	1.47	14617	2.98
T_6	Pearl millet + horse gram (2:1)	22.36	29.62	5.01	8.14	29.88	1.37	10194	2.37
T_7	Pearl millet+ cowpea (2:1)	21.06	28.06	5.37	7.01	33.56	1.39	12250	2.56
T_8	Pearl millet + horse gram (4:2)	22.02	29.53	4.63	7.37	28.96	1.32	9773	2.29
	S.E.	----	----	--	--	1.74	----	1299	----
	C.D.at 5%	----	----	--	--	5.81	----	4343	----

millet + moth bean (2:1) produced significantly higher pearl millet equivalent yield (36.62 q ha^{-1}) followed by pearl millet + cowpea (33.56 q ha^{-1}) in 2:1 row proportion and these treatments proved statistically superior to sole crops and pearl millet + horse gram. This might be due to higher yield of pearl millet. This indicated complementary and non competitive effects of these intercrops due to differences in the temporal and spatial characteristics of the crops. Reddy and Willey (1981) reported that the yield stability was greater. Similar results were also reported by Gadhia *et al* (1993)

Land equivalent ratio (LER) :

The LER values (Table 1) for intercropping systems showed that pearl millet + moth bean planted 2:1 row ratio recorded maximum LER (1.47) followed by pearl Millet + cowpea 2:1 row ratio (1.39).

Economics:

The net monetary returns were found to be influenced by different intercropping systems (Table-1) .The intercropping of pearl millet + moth bean (2:1) recorded significantly higher net monetary return (Rs.14617 ha^{-1}) than all other intercropping systems and sole cropping except at par with pearl millet + cowpea (2:1), (Rs.12250 ha^{-1}). The mean maximum benefit-cost ratio was also recorded by pearl millet + moth bean (2.98) followed by pearl millet + cowpea (2.56). The advantage of pearl millet intercropping systems in increasing monetary returns was also reported by Yakadri *et al* (1994). The trends of pearl millet equivalent yield, net monetary returns and LER showed that pearl millet + moth bean (2:1) or pearl millet + cowpea (2:1) appears the most productive, remunerative and profitable system for rainfed conditions of scarcity zone of north Maharashtra.

REFERENCES

Gadhia, D.S., Khanpara, V. D. and Patel, J.C. (1993). Production potential and economic returns of pearl millet *(Pennisetum glaucum*) based intercropping systems with different grain legumes and oilseed crop under rainfed condition. *Indian Journal of Agronomy*, **38 :** 282-283.

Rao, M.R. and Willey, R. W. (1983). Effect of pigeonpea plant population and row arrangement in sorghum / pigeonpea intercropping. *Field crop research*, **7 :** 203-212.

Reddy, M.S. and Willey, R. W. (1981). Growth and resource use studies in an intercrop pearl millet +groundnut. *Field crop research*, **4 :** 13-24.

Subba Reddy, G. and Havangi, G.V. (1986). Planting patterns, population density and fertilizer effect in pigeonpea and finger millet intercropping systems. *Journal of Dry land Agriculture Research and Development*,**1 :** 33-47.

Yakadri, M. Gautam, R.C. and Kaushik, S. K. (1994). Effect of intercropping and fertilizer levels on yield and quality of rainfed pearl millet *(Pennisetum glaucum) Indian Journal of Agronomy*, **39 :** 528-531.

Received : August, 2006; Accepted : February, 2007