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Effect of levels of phosphorus and dates of sowing on the productivity of ricebean when grown as a grain legume

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ABSTRACT

Three field trials were conducted in two years (1998-2000) in both the alluvial and lateritic soil zone of West Bengal, India on the productivity of ricebean as a food legume. From the mean of the two trials it was observed that higher production of seed was recorded when the crops sown between 7 July to 20 August (2.04 to 2.25 t/ha). Sowing on 16 August produced maximum seed yield (2.25 t/ha). Similarly maximum production of seed was noticed when the crops received 80 kg P_2O_5/ha (2.25 t/ha). Variety K-1 was used in two trials. It is a photosensitive crop. Its production potentiality was around 1.0 to 2.25 t/ha. BC varieties were of short duration and photo insensitive. Among BC varieties BC-5 recorded highest seed production both in lateritic (0.72 t/ha) and alluvial soil zone (1.07 t/ha) of West Bengal, India.

***Key words*:** Level of phosphorus, dates of sowing, rice bean.

Ricebean is normally categorized as an important forage crop not only in the eastern part of India but also in other parts of the country mainly to meet the fodder requirement during the scarcity period. Ricebean can also be grown as kharif food legume (Mukherjee and Sarkar, 1991). Ricebean being a legume crop responds well to phosphorus application (Nanda *et al.*, 2000). The yield potentiality differs with cultivars and agro-climatic condition. In view of this fact, an attempt has been made to study the seed production potentiality of different cultivars when sown at different dates and level of phosphorus application in both lateritic and alluvial soil zone conditions.

MATERIALS AND METHODS

Three sets of experiments were conducted. The first set of experiment was conducted in sandy loam entisol soil in randomised block design with three replications. The soil was having a pH of 6.9, 0.04% organic carbon and 0.05% total N and medium status for both P and K. The crop was sown in rows of 30 cm apart. In this trial six dates of sowing (D_1 = 7 July, D_2 = 20 July, D_3 = 16 August, D_4 = 7 September, D_5 = 26 September, D_6 = 16 October, 1998-2000) and four levels of phosphorus (0, 40, 80 and 120 kg P_2O_5/ha) constituted 24 treatments. Crop variety was K-1. Here 20 kg N and 40 kg K_2O/ha were given as basal with other intercultural practices.

The second set of experiment was conducted at the same site, soil condition and variety. In this case four dates of sowing (D_1 = 20 July, D_2 = 6 August, D_3 = 20 August, D_4 = 3 September) and three levels of phosphorus (0, 40 and 80 kg P_2O_5/ha) were arranged in factorial randomised block design with three replications. Here also 20 kg N and 40 kg K_2O were applied per ha as basal with other intercultural practices.

The third set of experiment was conducted both at lateritic (Raghunathpur Farm) and alluvial soil zone (Gayespur) of West Bengal. In this trial six short duration photoinsensitive varieties (BC-3, BC-4, BC-5, BC-6, BC-7, BC-8) were sown under two dates of sowing (15 July and 30 July) in a factorial randomised block design with three replicates. The soil physico chemical properties of lateritic and alluvial soil zone, respectively were pH 5.3 and 6.8, total N 0.04 and 0.064%, available phosphorus 13 and 15.4 kg P_2O_5/ha and available potassium 246 and 104 kg/ha. All treatments received @ 20 kg N, 80 kg P_2O_5 and 40 kg K_2O/ha as basal dose with other intercultural practices. The crops were sown on 15 and 30 July, 1998 and 1999 and harvested on 20 November and 2 December, 1998 and 1999 respectively.

RESULTS AND DISCUSSION

Effect of Dates of Sowing

The higher rate of seed production of rice bean was recorded when the crop was sown between 7 July to 7 September (2.02 to 2.25 t/ha in Table 1, 1.01 to 1.64 t/ha in Table 2). In both cases variety K-1 was used. Chatterjee and Mukherjee (1979) also reported that 20 July sown crop produced maximum seed. The reason may be that ricebean K-1 variety being photosensitive crop starts its reproductive phase only in December and thus the early sown crop has more carbohydrate reserve leading to higher seed production as reported by Sarkar and Mukherjee (1991). Practically seed yield declined when sown beyond August.

Response to variety

Among six BC varieties, BC-5 (Table 3) produced maximum seed yield in both the locations (0.72 t/ha in lateritic and 1.07 t/ha in alluvial zone). There BC varieties were insensitive type. The yield potentialities of these varieties were lower than K-1 variety. Nanda *et al.* (2000) also reported the similar observations.

Response of Phosphorus

Application of 80 kg P_2O_5/ha produced signifciantly higher seed yield irrespective of dates of sowing in both the trials (2.25 t/ha in Table 1 and 1.40 t/ha in Table 2). Seed yield declined when P_2O_5 was applied beyond 80 kg/ha. The similar trend of observation was also recorded by Nanda *et al.* (2000).

Table 1. Grain yield (t/ha) of Ricebean as affected by dates of sowing and doses of phosphorus (Mean of 1998-99 and 1999-2000).

Dates of sowing	Doses of P_2O_5 in kg/ha				
	0	**40**	**80**	**120**	**Mean**
D_1 = 7 July	1.42	2.06	2.59	2.08	2.04
D_2 = 26 July	1.56	2.20	2.64	2.24	2.14
D_3 = 16 Aug.	1.76	2.30	2.71	2.22	2.25
D_4 = 7 Sept.	1.42	2.09	2.61	1.97	2.02
D_5 = 26 Sept.	0.36	0.50	0.61	0.47	0.48
D_6 = 16 Oct.	Nil	Nil	Nil	Nil	Nil
Mean	1.31	1.85	2.25	1.79	
	Dates of sowing (D)	**Level of Phosphorus (P)**			**D x P**
S.Em±	0.037	0.033			0.055
CD (P=0.05)	0.100	0.092			0.014

Table 2 Grain yield (t/ha) of Ricebean as affected by dates of sowing and doses of phosphorus (Mean of 1998-99 and 1999-2000).

Dates of sowing	Doses of P_2O_5 in kg/ha			
	0	40	80	Mean
D_1 = 20 July	1.35	1.57	2.00	1.64
D_2 = 6 July	0.98	1.27	1.50	1.25
D_3 = 20 Aug.	0.85	0.97	1.20	1.01
D_4 = 3 Sept.	0.53	0.75	0.90	0.73
Mean	0.93	1.14	1.40	
	Dates of sowing (D)	Level of Phosphorus (P)	D x P	
S.Em±	0.063	0.054	0.109	
CD (P=0.05)	0.184	0.160	NS	

Table 3 Grain yield (t/ha) of different varieties of Rice bean as affected by two dates of sowing in two agroclimatic zones (Mean of 1998-99 & 1999-2000)

Variety	Grain yield	
	Lateritic zone	Alluvial zone
V_1 = Bc - 3	0.55	0.80
V_2 = Bc – 4	0.28	0.46
V_3 = Bc – 5	0.72	1.07
V_4 = Bc – 6	0.59	0.90
V_5 = Bc – 7	0.52	0.81
V_6 = Bc - 8	0.48	0.72
SEm±	0.026	0.020
CD (P=0.05)	0.045	0.056
Dates of sowing		
D_1 = 15 July	0.68	0.98
D_2 = 30 July	0.37	0.61
SEm±	0.013	0.014
CD(P = 0.05)	0.037	0.041
Interaction (V x D)		
S.Em±	0.032	0.035
CD (P = 0.05)	0.101	0.099

REFERENCES

Chatterjee, B. N. and Mukherjee, A. K. (1979). A new ricebean for fodder and grain pulse. *Ind. Farmg.,* **19** : 29-31.

Mukherjee, A. K. and Sarkar, A. (1991). Ricebean – a new crop for sustaining pulse production in India. *Environment and Ecology*, **9**(1) : 207-211.

Nanda, M. K., Patra, B. and Mukherjee, A. K. (2000). Yield performance of ricebean as pulse in West Bengal. *Enivornment and Ecology*, **18**(1) : 17-19.