

Suitability of rainy-season crops for late-sown rainfed conditions

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ABSTRACT

A field experiment was conducted during the rainy seasons of 1987-89 at Durgapura to find out suitability of crops for late (August) sowing under rainfed conditions. The results varied with pattern of rainfall. The data showed stability of clusterbean [*Cyamopsis tetragonoloba* (L.) Taubert] across the season irrespective of rainfall situation, as it gave the maximum grain yield under late planting during all the 3 years. Under low rainfall as in 1987 and under unevenly distributed rainfall as in 1989, pearl millet [*Pennisetum glaucum* (L.) R. Br. emend. Stuntz] did not produce grain but yielded precious fodder. Under good rainfall as in 1988, pearl millet was the most useful and productive crop. Late sowing in August reduced the yield drastically.

The zone IIIA of Rajasthan offers a semi-arid climate. The normal rainfall of the zone is 500-700 mm. About 65% of the cultivated area of the zone is rainfed (Gupta and Pareek, 1989). The area receives highly erratic rainfall with monsoon often bursting as late as mid-July or even later. Many a time even if the monsoon commences timely, there are long dry spells during the grain-formation stage of the crop. In semi-arid tropics, a strategy of stabilizing yields rather than maximizing yield is preferred. Keeping in view the frequent delays in the break of monsoon and utilization of fallow land under such a situation, an experiment under dry-farming situation of coarse-textured soil was conducted to work out the suitability of crops for August (late) sowing.

MATERIALS AND METHODS

A study was carried out during the rainy seasons of 1987-89 at Durgapura. Five

crops, viz. 'RCB 2' pearl millet [*Pennisetum glaucum* (L.) R. Br. emend. Stuntz], 'Durgajay' clusterbean [*Cyamopsis tetragonoloba* (L.) Taubert], 'RC 19' cowpea [*Vigna unguiculata* (L.) Walp.], 'K 851' greengram [*Phaseolus radiatus* L.] mothbean [*Vigna aconitifolia* (Jacq.) Marechal] and 'Jwala' mothbean [*Vigna aconitifolia* L.), were tried under 2 dates of sowing, i.e. first fortnight and second fortnight of August. The experiment was laid out in randomized block design with 4 replications. The soil of experimental site was loamy sand in texture with pH 8.0, organic carbon 0.18%, and available P_2O_5 60 kg/ha and K_2O 240 kg/ha. The moisture constants of the soil at 0.1, 0.33 and 15 bars were 8.90, 3.47 and 2.41% respectively. All the crops were grown as per treatments using their recommended doses of fertilizers and harvested as per maturity. The rainfall received during the crop season

Table 1. Rainfall pattern in 3 years during crop period

Period	Rainfall (mm)		
	1987	1988	1989
<i>August</i>			
I	9.2 (2)	12.0 (1)	3.3 (2)
II	56.2 (2)	57.0 (3)	60.8 (3)
III	24.8 (1)	32.0 (1)	22.2 (3)
IV	40.2 (4)	116.5 (2)	264.4 (6)
<i>September</i>			
I	0.0	0.0	0.0
II	0.0	0.0	0.0
III	22.1 (1)	19.6 (1)	0.0
IV	0.0	11.4 (2)	0.0
Total rainfall (Aug–Oct)	152.6 (10)	248.5 (10)	305.7 (14)
Total rainfall (Jun–Oct)	203.8 (12)	445.9 (27)	420.0 (19)
Commencement of monsoon	17 Jul	30 Jun	16 Jul

No rains were received during October

Figures in parentheses indicate number of rainy days

(August–October) was 152.6, 248.5 and 305.7 mm during 1987, 1988 and 1989 respectively (Table 1).

RESULTS AND DISCUSSION

Effect of sowing date on yield

During 1987, though total rainfall was very low (204 mm), there was 130.4 mm rain received during August which helped to mature crops and yielding reasonable yields of grain and fodder. Pearl millet, however, failed to give any grain.

In 1988, all the 5 crops sown on 1 and 15 August reached maturity successfully due to higher rainfall of 446 mm and its well distribution during the season. Pearl millet yielded 1,544 kg/ha grain and 4,213 kg/ha dry fodder when planted on 1 August, but when its sowing was done on 15 August the yield decreased drastically (474 kg/ha grain and 2,688 kg/ha dry fodder). Clusterbean performed better under both dates of sowing. In 1989, out of very high total rainfall of 420

Table 2. Yield (kg/ha) of different crops under late-sown (August), dry-farming situations

Treatment	Yield (kg/ha)					
	1987*		1988**		1989***	
	Grain	Fodder	Grain	Fodder	Grain	Fodder
<i>1–11 August</i>						
Pearl millet	0	15,510 (g)	1,544	4,213 (d)	0	10,370 (g)
Clusterbean	454	2,080 (d)	833	2,222 (d)	220	882 (d)
Cowpea	58	1,110 (d)	398	667 (d)	0	2,778 (g)
Greengram	116	560 (d)	190	333 (d)	27	1,574 (g)
Mothbean	274	1,010 (d)	368	737 (d)	10	993 (d)
<i>15–23 August</i>						
Pearl millet	0	7,640 (g)	474	2,688 (d)	0	4,815 (g)
Clusterbean	356	1,270 (d)	694	1,759 (d)	0	1,204 (g)
Cowpea	0	4,860 (g)	105	463 (d)	0	1,130 (g)
Greengram	0	1,970 (g)	97	159 (d)	0	833 (g)
Mothbean	172	640 (d)	281	546 (d)	0	1,389 (g)

g, Green fodder; d, dry fodder

* Rainfall 152.6 mm (since 1 Aug); ** rainfall 248.5 mm (since 1 Aug); *** rainfall 305.7 mm (since 1 Aug)

Table 3. Combined effect of crops and dates of sowing on monetary returns (Rs/ha) of different crops

Crop	Date of sowing					
	1987		1988		1989	
	8 Aug	22 Aug	1 Aug	15 Aug	11 Aug	23 Aug
Pearlmillet	4,653	2,292	3,159	1,250	3,111	1,445
Clusterbean	5,144	4,111	3,265	2,700	1,145	361
Cowpea	1,292	1,458	1,681	517	833	339
Greengram	1,081	590	1,261	646	653	250
Mothbean	2,080	1,437	2,028	1,546	398	417
SEd $\pm$	339		171		100	
CD ($P = 0.05$)	971		496		291	
CV (%)	21.34		18.94		22.41	
	Grain*	Fodder*	Grain*	Fodder*	Grain*	Fodder*
Pearlmillet	220	90 (dry) 30 (green)	150	25 (dry)		35 (dry)
Clusterbean	780		325		380	
Cowpea	500					
Greengram	500		620		670	
Mothbean	500		500		500	

* Value of produce (Rs/ha)

mm, a rainfall of 305.7 mm was received during August only, which enabled the crops to attain the good vegetative growth. There was no rainfall after August. Three crops (clusterbean, greengram and mothbean) sown on 11 August reached the grain-formation stage, but these crops gave very low yields due to severe moisture stress during their reproductive phase. Pearlmillet and cowpea were harvested for green fodder and produced 10,370 and 2,778 kg/ha green fodder respectively. All the crops sown on 23 August were harvested for green fodder. The highest green fodder (4,815 kg/ha) was recorded in pearlmillet (Table 2).

Thus clusterbean gave grain under varied situation. Pearlmillet, though failed to give grain, provided precious fodder for the cattle crop.

Effect of sowing date on monetary returns

In terms of monetary returns (Table 3) during 1987, clusterbean gave significantly higher monetary returns (Rs 5,144/ha in 8 August and Rs 4,111/ha in 22 August sowing) under both dates of sowing except pearlmillet (Rs 4,653/ha in 8 August sowing). During the rainy season of 1988 also, more or less similar results were noticed. In the rainy season of 1989, the maximum monetary returns of Rs 3,111 and 1,445/ha were recorded with pearlmillet under 11 August and 23 August sowing respectively.

REFERENCE

- Gupta, O. P. and Pareek, S. N. 1989. *Status report NARP (ICAR-IBRD), Semi-arid Eastern Plain zone*, Rajasthan Agriculture University, pp. 40-48.