Response of lentil varieties to sowing time in the plains of West Bengal

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ABSTRACT

The response of promising lentil varieties viz. PL 639, B 77 (Asha), WBL 58 (Subrata) and WBL 77 (Moitree) to varying sowing dates viz. Oct. 20, Nov. 01, Nov. 10 and Nov. 20 was studied in a factorial randomized block design with three replications at the Pulses and Oilseeds Research Station, Berhampore, West Bengal during two consecutive rabi seasons of 2004-06. Among the varieties, Moitree (WBL 77) yielded the highest (1332.71 kg ha^{-1}), exhibiting yield advantages to the tune of about 49-70% over the others and its superiority could be explained on the basis of higher podding potentiality (110.63 pods plant^{-1}). Irrespective of the varieties, sowing on November 01 and 10 were found to be advantageous and any advancement or delay in sowing caused yield reduction. As the higher yields were achieved with WBL 77 and B 77 in sowing on Nov. 01, and that too with WBL 58 and PL 639 in sowing on Nov. 10, the first week of November might be considered as the optimum time of sowing these varieties in West Bengal.

***Key words*:** Advanced sowing, delayed sowing, lentil and yield reduction

Lentil (*Lens culinaris* Medik.) is not only grown as an important *rabi* pulse in West Bengal, it is a potential crop in the adjoining provinces of India (Bihar, Jharkhand and Uttaranchal) as well as abroad (Nepal, Pakistan and Bangladesh) because of consumer's preference. In large areas of India, though lentil is grown on residual soil moisture of the rainy (*kharif*) season, its sowing during *rabi* becomes delayed by a fortnight to the end of November in rice-based cropping sequence. Delay in sowing causes reduction in yield of lentil (Aziz, 1992, Sekhon *et al*., 1986). Moreover, it is important to study the varietal responses to sowing dates since varieties differ in their growth and development (Singh and Ram, 1986). Thus, an attempt was made to determine the most suitable sowing time for the promising varieties of lentil in West Bengal.

MATERIALS AND METHODS

A two-year field experiment was conducted during *rabi*, 2004-05 and 2005-06 at the Pulses and Oilseeds Research Station (PORS), Berhampore, West Bengal (India), located at $24^0 50^/$ N latitude and $88^0 13^/$ E longitude. Four different dates of sowing *viz.* Oct. 20, Nov. 01, Nov. 10 and Nov. 20, and four promising varieties of lentil *viz.* PL 639, B 77 (Asha), WBL 58 (Subrata) and WBL 77 (Moitree) were tested in a factorial randomized block design with three replications. The first three varieties are presently under cultivation in the state, whereas WBL 77 (Moitree) developed at the PORS, Berhampore (W.B.) from a cross between ILL 7723 x BLX 84176 has recently been identified for release by the CVRC (Central Variety Release Committee), ICAR. The individual plot size was 4m x 3m. The experimental soil was clay loam in texture with pH of 7.4, organic carbon 0.42%, available P_2O_5 90 kg ha $^{-1}$ and available K_2O 92 kg ha $^{-1}$. A uniform seed rate of 30 kg ha^{-1} was used for each plot. A basal dose of 20: 40: 20 kg N: P_2O_5: K_2O ha^{-1} was given to each plot at the time of sowing (Anon., 1997). All the varieties matured in close range of 120-125 days during both the years and belonged to the medium maturity group. Data on seed yield (kg ha^{-1}) and yield attributes (pods plant^{-1}, seeds pod^{-1} and 100-seed weight) were recorded after crop harvest.

RESULTS AND DISCUSSION

Effect of sowing time

Sowing dates had a pronounced effect on seed yield along with yield attributes during both the years of experimentation. Irrespective of the varieties, significantly the highest seed yield was obtained in sowing on November 10 (1046.67 kg ha $^{-1}$) in the first year of experimentation, whereas, in the second year, the crop yielded the highest when sown on November 01 (1099.33 kg ha $^{-1}$). The crop sown on November 01 and 10 recorded the higher mean seed yields of 1067.17 and 1032.42 kg ha^{-1}, respectively. Earlier sown crops had more podding, whereas the crop sown on November 20 produced comparatively lesser number of pods plant^{-1} during both the years (Table 1). These results were in consonance with the earlier findings of Aziz (1992). A similar trend was also observed in case of number of seeds pod^{-1} and 100-seed weight (Table 1). Finally, the trend of contribution of all these yield attributes was reflected on the seed yield (Table 2). The crop sown on 1st and 10th November produced significantly the higher seed yields as compared with the sowing either on Oct. 20 or on Nov. 20 during both the years.

Yield reductions occurred both in case of advanced (before Nov. 01) and delayed (after Nov. 10) sowings. Sinha and Chowdhury (1984) opined

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that sowing between middle of October to early November was the ideal and any deviation from this caused yield reduction. Sekhon *et al.* (1986) reported that the best time of sowing was in between October 20 and November 10. There was yield penalty (reduction) of 15.41-21.16% for every 10-day advancement or delay in sowing from the ideal span period of November 01-10. Higher seed yields under sowing on November 01-10 (1030.42-1067.17 kg ha^{-1}) were attributed to increased number of pods (98.13-101.88) $plant^{-1}$ and 100-seed weight (2.06-2.07 g). These results corroborated the earlier findings of Ahlawat *et al.* (1982), Singh *et al.* (1990) and Ali *et al*. (1993). Based on these findings, the first week of November might be considered as the optimum sowing time for all the test varieties.

Effect of variety

The varietal effect on seed yield was significant. The variety WBL 77 (Moitree) significantly surpassed all the others by registering a mean seed yield of 1332.71 kg ha^{-1} and yield advantages of about 48.78-69.84% over the other varieties could be obtained due to the highest number of pods (110.63) $plant^{-1}$. Next high-yielders in order were B 77 (895.75 kg ha^{-1}) and WBL 58 (798.29 kg ha^{-1}) owing to more number of seeds (1.54) pod^{-1} and the highest 100-seed weight (2.47 g), respectively. Comparatively poor performance was recorded in case of PL 639, yielding a mean of 784.67 kg ha^{-1} (Table 2).

Effect of interaction

The interaction effects due to various treatments were significant for seed yield (Table 2) of lentil in both the years. The varieties WBL 77 and B 77 significantly yielded the highest when sown on Nov. 01, whereas the remaining others (WBL 58 and PL 639) recorded the highest yield in sowing on Nov. 10. Again, in case of WBL 58, no significant yield difference was noted under sowing on Nov. 01 and 10. Maximum yield reduction occurred in all the varieties under delayed sowing on Nov. 20 and was followed by advanced sowing on Oct. 20.

Results of the present investigation showed that amongst the varieties, Moitree (WBL 77) proved its superiority to the others. All the varieties sown on November 01 and 10 registered higher seed yields. Delaying planting after November 10 or advancing planting before November 01 caused reduction in seed yield. Thus, the first week of November might be chosen as the optimum time of sowing these varieties in West Bengal.

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Table 1. Effect of sowing time on yield attributes of different lentil varieties

Treatments	Pods plant^{-1}			Seeds pod^{-1}			100-seed weight (g)		
	2004-05	2005-06	Pooled	2004-05	2005-06	Pooled	2004-05	2005-06	Pooled
Sowing time(T)									
Oct.20	84.58	81.25	82.92	1.60	1.63	1.61	1.95	1.95	1.95
Nov.01	97.92	98.33	98.13	1.45	1.41	1.43	2.07	2.06	2.07
Nov.10	98.75	105.00	101.88	1.44	1.33	1.38	2.07	2.04	2.06
Nov.20	80.83	81.25	81.04	1.59	1.61	1.60	1.88	1.88	1.88
SEm(±)	**1.11**	**1.49**	**1.30**	**0.10**	**0.09**	**0.09**	**0.01**	**0.01**	**0.01**
LSD (0.05)	**3.19**	**4.30**	**3.75**	**NS**	**0.26**	**NS**	**0.03**	**0.04**	**0.04**
Variety (V)									
PL 639	77.92	77.08	77.50	1.50	1.52	1.51	1.73	1.74	1.74
B 77	85.42	86.67	86.05	1.54	1.47	1.50	1.65	1.64	1.65
WBL 58	89.58	90.00	89.79	1.43	1.39	1.41	2.47	2.47	2.47
WBL 77	109.17	112.08	110.63	1.59	1.53	1.56	2.11	2.08	2.10
SEm(±)	**1.11**	**1.49**	**1.30**	**0.10**	**0.09**	**0.09**	**0.01**	**0.01**	**0.01**
LSD (0.05)	**3.19**	**4.30**	**3.75**	**NS**	**NS**	**0.26**	**0.03**	**0.04**	**0.04**
CV(%)	**4.23**	**5.64**	**4.94**	**2.53**	**2.37**	**2.45**	**1.77**	**2.56**	**2.17**

Table 2. Effect of sowing time on seed yield (kg ha^{-1}) of different lentil varieties

Sowing time	Variety												Mean		
	PL 639			B 77			WBL 58			WBL 77					
	2004-05	2005-06	Pooled	2004-05	2005-06	Pooled	2004-05	2005-06	Pooled	2004-05	2005-06	Pooled	2004-05	2005-06	Pooled
Oct.20	845.00	706.67	775.84	920.00	700.00	810.00	808.00	733.33	770.67	1293.33	1193.33	1243.33	966.58	833.33	899.96
Nov.01	871.67	765.67	818.67	966.67	1103.33	1035.00	851.67	836.67	844.17	1450.00	1619.67	1534.84	1035.00	1099.33	1067.17
Nov.10	906.67	810.00	858.34	948.33	1016.67	982.50	913.33	825.00	869.17	1418.33	1405.00	1411.67	1046.67	1014.17	1030.42
Nov.20	800.00	571.67	685.84	901.67	609.33	755.50	773.33	645.00	709.17	1213.33	996.67	1105.00	922.08	705.67	813.88
Mean	855.83	713.50	784.67	934.17	857.33	895.75	836.58	760.00	798.29	1343.75	1321.67	1332.71	992.58	913.13	952.86

	Sowing time (T)			Variety(V)			Interaction (T x V)		
	2004-05	2005-06	Pooled	2004-05	2005-06	Pooled	2004-05	2005-06	Pooled
SEm(±)	**5.07**	**4.98**	**5.03**	**5.07**	**4.98**	**5.03**	**10.13**	**9.96**	**10.05**
LSD (0.05)	**14.63**	**14.38**	**14.51**	**14.63**	**14.38**	**14.51**	**29.26**	**28.77**	**29.02**
CV(%)	**-**	**-**	**-**	**-**	**-**	**-**	**1.77**	**1.89**	**1.83**