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Response of new mungbean genotypes to sowing time during spring-summer in West Bengal

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ABSTRACT

Field trials were conducted at the Pulses and Oilseeds Research Sub-station, Beldanga,Murshidabad (West Bengal) during pre-*kharif* season of 2004 and 2005 to optimize sowing time suitable for growing new mungbean genotypes WBM 4-34-1-1 (Bireshwar) and WBM 29 (Sukumar) in West Bengal. Though the genotype WBM 29 significantly yielded the highest (983.28 kg ha^{-1}) and was followed by WBM 4-34-1-1(869.90 kg ha^{-1}), the latter matured earlier than the others including B 1 (state check) and PDM 54 (national check). Sowing on second week of March resulted in higher growth and yields of all the genotypes excepting PDM 54, which performed better under sowing on first week of March.

Key Words : Crop growth, mungbean, seed yield, sowing time and spring-summer.

Development of short duration varieties of pulses offers tremendous scope for crop diversification (Mishra and Muthaiah, 2004) besides restoring soil health. Mungbean [*Vigna radiata* (L.) Wilczek] is an important pulse crop mainly grown during spring-summer season of West Bengal. Timely sowing of this crop is of paramount importance to obtain the best out of the varieties. Any delay in sowing not only reduces the yield but creates problem for harvesting of the same if caught by pre-monsoon showers or otherwise for sowing of subsequent *kharif* crops (Jeswani and Baldev, 1997; Yadav,1992). As varieties may differ in respect of growth and maturity, thereby influencing the seed yield, optimum time of sowing may also vary with different varieties of mungbean (Singh and Sekhon, 2007). With the evolvement of new genotypes WBM 4-34-1-1 (BDYR 2 x B 1) and WBM 29 (T 1 x K 441-01), the foremost information on time of sowing, therefore, needs to be specified. With this view, the present study has been initiated.

MATERIALS AND METHODS

A two-year field trial was conducted during two consecutive pre-*kharif* seasons of 2004 and 2005 at the Pulses and Oilseeds Research Sub-station, Beldanga, Murshidabad (West Bengal), situated at 23°55¢ N latitude and 88°15¢ E longitude. The experimental site had sandy loam soil with pH 7.5, organic carbon 0.25%, available P_2O_5 70 kg ha^{-1} and available K_2O 49 kg ha^{-1}. The treatments comprised of four genotypes *viz.* WBM 4-34-1-1 (Bireshwar), WBM 29 (Sukumar), B 1 (Sonali) and PDM 54, and three different sowing times *viz.* last week of February, 1st and 2nd weeks of March. In all, twelve treatment combinations were tested in factorial RBD with 3 replications. Individual plot size was 4m x 3m. Treatment-wise sowing and harvesting dates have been presented in Table 1. A seed rate of 30-40 kg ha^{-1} was used depending upon seed size. A basal dose of 20-40-20 kg N: P_2O_5: K_2O ha^{-1} was given through urea, single super phosphate and muriate of potash, respectively. The crop was raised under irrigated condition. The previous crop in the experimental site was rapeseed-mustard during both the years of study. The trial was conducted meticulously with recommended package of practices. Observations were taken on plant height (cm) at 30 days after sowing (DAS) and at harvest, seed yield (kg ha^{-1}) and its attributes.

RESULTS AND DISCUSSION

Effect of genotype

Genotypes showed significant variations in respect of seed yield (Table 3) and growth as well as yield attributes debarring number of seeds pod^{-1} (Table 2). Amongst the four genotypes, WBM 29 significantly yielded the highest (983.28 kg ha^{-1}) and was followed by WBM 4-34-1-1 (869.90 kg ha^{-1}). Best performance of WBM 29 was attributed to the highest number of productive pods plant^{-1} (10.68) and seeds pod^{-1} (9.13), whereas WBM 4-34-1-1 had the highest test weight (48.73 g) in comparison to the others. Both the new genotypes WBM 4-34-1-1 and WBM 29 showed yield advantages to the tune of 2.74 and 16.13 %, respectively, over the national check PDM 54. Regarding days to maturity (mean of two-year data), the genotype WBM 4-34-1-1

Table 1. Time of sowing and harvesting of mungbean genotypes under varying sowing treatments

Time of sowing and harvesting	February sowing (last week)		March sowing (1st week)		March sowing (2nd week)	
	2004	2005	2004	2005	2004	2005
Sowing dates (All genotypes)	Feb. 26	Feb. 24	Mar. 05	Mar. 02	Mar. 12	Mar. 09
Harvesting dates (Genotype-wise)						
WBM 4-34-1-1	Apr.28	Apr. 28	May 10	May 06	May 17	May 12
WBM 29	May 10	May 06	May 20	May 16	May 25	May 23
B 1	May 03	May 02	May 12	May 12	May 17	May 16
PDM 54	May 06	May 06	May 14	May 12	May 19	May 16

Table 2. Effect of treatments on growth and yield attributes of mungbean

Treatments	Plant height (cm)				Branches plant^{-1}		Productive pods plant^{-1}		Seeds pod^{-1}		1000-seed wt. (g)	
	30 DAS		Harvest									
	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
Genotype(G)												
WBM 4-34-1-1	19.68	22.93	31.73	31.92	3.78	3.80	9.41	6.93	8.46	9.31	47.98	49.47
WBM 29	17.34	20.37	43.85	43.95	4.44	4.29	11.21	10.15	8.79	9.46	34.15	27.43
B 1	19.50	22.13	45.51	43.98	4.22	3.75	9.36	9.76	8.35	9.40	25.63	23.51
PDM 54	20.26	19.80	53.13	50.38	4.67	4.29	10.07	9.77	8.45	9.34	33.83	29.79
S.E.m±	0.50	0.53	0.95	0.87	0.14	0.13	0.37	0.24	0.19	0.13	1.00	0.49
CD(P=0.05)	1.46	1.57	2.78	2.54	0.41	0.39	1.08	0.71	NS	NS	2.92	1.42
Time of sowing(T)												
Last week of Feb.	16.26	15.70	40.61	32.49	4.15	3.64	9.31	8.25	8.29	9.18	34.28	32.30
1st week of Mar.	19.10	19.81	44.87	43.94	4.33	4.14	10.41	9.35	8.58	9.12	35.53	32.62
2nd week of Mar.	22.22	28.42	45.19	51.24	4.36	4.31	10.32	9.86	8.67	9.84	36.37	32.73
S.E.m±	0.43	0.46	0.82	0.75	0.12	0.12	0.32	0.21	0.17	0.12	0.86	0.42
CD(P=0.05)	1.26	1.36	2.41	2.20	NS	0.34	0.93	0.61	NS	0.34	NS	NS
Interaction(GxT)												
S.E.m±	0.86	0.93	1.64	1.50	0.25	0.23	0.64	0.42	0.33	0.23	1.72	0.84
CD(P=0.05)	2.53	2.72	4.81	4.39	NS	NS	NS	1.22	NS	0.68	NS	NS
CV (%)	7.78	7.53	6.53	6.10	9.92	9.91	11.07	7.88	6.75	4.29	8.44	4.47

NS: Not significant.

Table 3. Effect of interaction between genotype and sowing time on seed yield (kg ha^{-1}) of mungbean

Genotype	Time of sowing							
	Last week of February		First week of March		Second week of March		Mean	
	2004	2005	2004	2005	2004	2005	2004	2005
WBM 4-34-1-1	812.67	731.67	874.67	871.67	930.00	998.67	872.45	867.34
WBM 29	915.33	801.67	1076.00	983.33	1090.67	1032.67	1027.33	939.22
B 1	604.00	571.00	693.33	659.00	762.00	799.00	686.44	676.33
PDM 54	834.67	761.67	901.33	910.33	798.67	873.67	844.89	848.56
Mean	791.67	716.50	886.33	856.08	895.34	926.00	857.78	832.86

Statistic	Genotype(G)		Time of sowing (T)		Interaction (GxT)	
	2004	2005	2004	2005	2004	2005
S.E.m±	21.90	21.56	18.97	18.67	37.93	37.34
CD(P=0.05)	64.23	63.22	55.62	54.75	NS	NS
CV(%)	-	-	-	-	7.66	7.76

matured earlier (64 days) than B 1 (68 days), PDM 54 (70 days) and WBM 29 (74 days), irrespective of sowing dates (Table 1). Bhowmick *et al.* (2006) observed the superiority of these two genotypes over the check variety Pant Mung 4 in respect of earliness and seed yield during *kharif.*

Effect of sowing time

Sowing on second week of March gave the highest mean seed yield (910.67 kg ha^{-1}) in case of all the genotypes excepting PDM 54 which performed better in sowing on first week of March (905.83 kg ha^{-1}). Dhanjal *et al.* (2000) were also of the opinion that crop sown on March 15 recorded significantly higher seed yield over sowing on March 31 and April 16. Higher yields under sowing on second week of March were attributed to better crop growth, higher number of productive pods and seed weight $plant^{-1}$ (Table 2). Singh and Vashit (2005) reported in the same way. In early sowing (last week of February), PDM 54 also recorded higher yield (798.17 kg ha^{-1}) than WBM 4-34-1-1 (772.17 kg ha^{-1}),whereas reverse was the trend when sown in second week of March (Table 3).

Effect of interaction

Though the individual effect of genotype and sowing time was significant, their interactive effect remained non-significant in influencing the seed yield during both the years of experimentation. However, the genotype WBM 29 maintained its superiority over the others in all the sowing dates. Furthermore, the genotypes WBM 4-34-1-1, WBM 29 and B 1 seemed to undergo yield reduction in early sowing by the end of February (Table 3).

Based on two-year data, it might be inferred that both the new genotypes WBM 29 and WBM 4-34-1-1 proved to be superior to the state check B 1 and national check PDM 54 in respect of seed yield. All the genotypes excepting PDM 54, however, yielded higher in sowing on second week of March. Better performance of PDM 54 was registered in sowing on first week of March.

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