Indian Journal of Agronomy **46** (2) : 314–318 (June 2001)

Impact of seeding time on yield components and yield of soybean (*Glycine max*) genotypes in Southern Telangana zone of Andhra Pradesh

V. RADHAKRISHNA MURTHY, V. SATYANARAYANA AND SHAIK MOHAMMAD

Department of Agronomy, College of Agriculture, Acharya N.G. Ranga Agricultural University, Hyderabad, Andhra Pradesh 000 000

Received : December 1998

ABSTRACT

A field experiment was conducted during the winter seasons of 1996–97 and 1997–98 and summer season of 1997 on Alfisols of Hyderabad, to study the impact of seeding time on the performance of different genotypes of soybean [*Glycine max* (L.) Merr.]. Genotypes differed significantly in expressing their yield potential under different dates of seeding in both winter and summer. The long-duration genotype 'MACS 201' (120 days duration) proved superior to all other genotypes in terms of yield components and seed yield. Genotype 'MACS 330' (72 days duration) performed poor, with lowest seed yield in both the seasons. The effect of seeding time was pronounced in both the seasons but the seed yields decreased with delay in the time of seeding soybean genotypes. The seed yield was high during winter season when sown on 15 October and 25 January in summer season.

Key words : Soybean genotypes, Seeding time, Yield

A wide range of soybean varieties suitable for Andhra Pradesh are now available. The seeding time determines the expression of high seed potential of any genotype. Information available on the optimum seeding time of different soybean genotypes in the state during the winter season is meagre. Hence the present investigation was carried out during winter season of 1996–97 and 1997–98 to study the performance of different genotypes of soybean to varying times of seeding. For comparison purpose, the experiment was also repeated once in summer 1997 in continuation of winter season.

MATERIALS AND METHODS

A field investigation was carried out at the Students Farm of the College of Agriculture, Rajendranagar, Hyderabad, during the winter season 1996–97 and 1997–98, and summer 1997. The soil of the experimental site was Alfisol with pH 7.25, low electrical conductivity (0.13 dS/m),

low in available nitrogen (150 kg/ha), medium in available phosphorus (40 kg P_2O_5/ha) and available potassium (210 kg K_2O/ha). The experiment was laid out in randomized block design with 3 replications. The treatments, 20 in all, comprised the combination of 5 genotypes of different durations and morphological groups (MACS 201', 'MACS 58', 'PK 472', 'MACS 13' and 'MACS 330' with 120, 110, 100, 90 and 72 days duration respectively) and 4 dates of seeding, i.e. 15 October, 4 November, 24 November and 14 December in winter season, 5 and 26 January, 14 February and 6 March in summer season. All the genotypes are thermosensitive, bushy and determinate. A total of 135 and 129 mm rain was received in 7 and 9 rainy days during winter season 1996–97 and 1997–98 respectively. The monthly mean maximum and minimum temperatures prevailed during winter seasons were 29.5 and 15.0°C and during summer the corresponding figures were 34.5 and 18.2°C. The crop was sown at 30 cm × 10 cm spacing and fertilized with 30, 40, 30 kg N, P_2O_5 and K_2O/ha, in each season.

RESULTS AND DISCUSSION

Effect of genotype

The genotypes differed significantly in expressing their yield potential and yield components in both winter and summer (Table 1). However, their performance was superior in winter than in summer. The genotype 'MACS 2001' yielded higher than all other genotypes. The next superior genotypes in terms of yield and yield components were 'MACS 58', 'PK 472' and 'MACS 13'. The genotype 'MACS 330', shorter in duration, performed least by recording lowest seed yield and yield components. 'MACS 58' and 'PK 472' produced comparable yields but being inferior to 'MACS 201'.

The highest seed yield produced by 'MACS 201' in winter as well as summer could be attributed to its more number of pods/plants, seeds/pod and 100-seed weight.

Effect of seeding time

Seeding time had significant influence on yield components and yield (Table 1). All the yield components, i.e pods/plant, seeds/pod and 100-seed weight, were higher in winter in both years under study at early seeding, i.e. 15 October, thus contributing to higher seed yield at the same time. The reduction in yield and yield components beyond this date in winter might be due to prevailing low temperatures during reproductive phase. Pramilarani (1997) also reported higher seed yield of soybean with early sowing in October than November in Andhra Pradesh. Even in summer 1997, crop sown on 25 January gave higher seed yield and yield components than the crop sown on earlier and later dates. Prevalence of higher mean and maximum temperature coupled with low relative humidity at earlier and reproductive phase might be the reason for poor performance when seeding was delayed beyond 25 January (Raut *et al.*, 1992). However, 15 October seeding was found superior to 25 January seeding in terms of yield and yield components, owing to congenial cumulative weather

Table 1. Effect of seeding time and season on yield and yield components of soybean

Treatment	Winter								Summer			
	1996–97				1997–98				1997			
	Pods/ plant	No. of seeds/pod	100-seed weight (g)	Yield (kg/ha)	Pods/ plant	No. of seeds/pod	100-seed weight (g)	Yield (kg/ha)	Pods/ plant	No. of seeds/pod	100-seed weight (g)	Yield (kg/ha)
Genotype												
'MACS 201'	51.20	2.93	14.65	2,551	55.00	2.93	14.70	2,571	32.50	2.61	12.60	1,525
'MACS 58'	47.30	47.30	13.94	2,471	50.50	2.74	14.00	2,487	29.20	2.51	12.10	1,475
'PK 472'	45.30	45.30	13.83	2,450	48.30	2.70	13.80	2,465	28.10	2.49	12.00	1,463
'MACS 13'	41.70	41.70	13.37	2,351	43.50	2.52	13.40	2,364	26.50	2.38	11.60	1,385
'MACS 330'	26.80	26.80	11.00	1,563	29.70	2.33	11.00	1,574	17.20	2.28	9.80	9.1
CD (P = 0.05)	3.42	3.42	0.45	76	4.11	0.16	0.48	81	1.5	0.07	0.35	46
Time of seeding												
15 October	52.70	52.70	13.84	2563	54.81	2.83	13.94	2584	28.20	2.49	11.70	1425
4 November	45.10	45.10	13.52	2391	48.63	2.70	13.55	2401	34.70	2.59	12.00	1538
24 November	39.90	39.90	13.29	21.86	42.92	2.65	13.36	2200	24.70	2.41	11.40	1295
14 December	32.20	32.20	12.76	1968	35.32	2.53	12.83	1983	19.20	2.33	11.10	1141
CD (P = 0.05)	5.51	5.51	0.28	102	5.61	0.10	0.33	104	3.31	0.08	0.20	105

Table 2. Effect of interaction between genotypes and seeding time on seed yield of soybean

Treatment	Seeding time			
	15 October	4 November	24 November	14 December
	Winter season 1996–97			
Genotype				
'MACS 201'	2,895	2,682	2,427	2,200
'MACS 58'	2,790	2,605	2,375	2,115
'PK 472'	2,765	2,585	2,350	2,100
'MACS 13'	2,609	2,461	2,280	2,035
'MACS 330'	1,760	1,305	1,500	1,390
CD (P=0.05)	100			
	Winter season 1997–98			
Genotype				
'MACS 201'	2,918	2,696	2,445	2,223
'MACS 58'	2,809	2,618	2,389	2,130
'PK 472'	2,787	2,598	2,365	2,113
'MACS 13'	2,625	2,495	2,290	2,047
'MACS 330'	1,779	1,600	1,515	1,400
CD (P=0.05)	106			
	Summer 1997–98			
	5 January	25 January	14 February	6 March
Genotype				
'MACS 201'	1,609	1,737	1,456	1,300
'MACS 58'	1,558	1,670	1,415	1,260
'PK 472'	1,545	1,655	1,496	1,248
'MACS 13'	1,455	1,560	1,345	1,180
'MACS 330'	960	1,070	855	720
CD (P=0.05)	88			

parameters. These results corroborate those of Nagesh (1994) that sowing the crop in October is the ideal time of seeding in Andhra Pradesh to reap high yield.

Interaction effect

The interaction between genotypes and seeding time, was found significant for seed yield in both winter and summer season under study (Table 2). The genotype 'MACS 201' recorded the maximum seed in all the times of seeding and it gradually declined with delayed seeding times. All the genotypes behaved in similar pattern while the 'MACS 330' performed poor at all the seeding times with seed yield obtained under 4 and 24 November seeding, being at par with each other.

The present study therefore indicates that for achieving higher seed production of soybean, seeding of genotypes 'MACS 201' must be done on or around 15 December in winter season in southern Telangana zone of Andhra Pradesh.

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