Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2582-2845.8245

ISSN: 2582 – 2845

Ind. J. Pure App. Biosci. (2020) *8*(4), 444-448

Indian Journal of Pure & Applied Biosciences

Peer-Reviewed, Refereed, Open Access Journal

Research Article

Performance of Varieties under Different Sowing Dates in Soybean (*Glycine max* L.)

Mangesh Dandge*, Prashant Peshattiwar, Prashant Mohod, Satish Nichal and Rajiv Ghawde

Regional Research Center, (Dr. PDKV, Akola) Amravati-444603

*Corresponding Author E-mail: msdandge@rediffmail.com

Received: 15.06.2020 | Revised: 26.07.2020 | Accepted: 31.07.2020

ABSTRACT

The field experiment was conducted in field at Regional Research Center, Amravati during kharif season 2018-19. Four soybean varieties MACS 1520, AMS MB 5-18, RSC 10-52, and check NRC 86 were sown on two sowing dates, 21st june (normal sowing) and 10th july (20 days after normal sowing). The experiment was laid out in split plot design replicated three times keeping sowing dates in main plot and varieties in sub plot using net plot size of 5.0 m x 2.7 m. The observation on dry matter was recorded at 30 DAS, 45 DAS and 60 DAS, CGR and RGR on 30-45 and 45-60 DAS. Yield attributes viz., branches per plant, pods per plant, seed index and seed yield kg/ha and straw yield kg/ha was recorded at the time of harvesting. Amongst the different date of sowing, genotype AMS MB 5-18 recorded significantly highest seed yield 1904 kg/ha under normal date of sowing. In different genotypes, none of the single genotypes proves significantly superior over others. In respect of late sowing genotype, almost all the genotypes recorded less than half seed yield than normal date of sowing.

Keywords: *Soybean, Genotypes, Sowing dates*

INTRODUCTION

Soybean has emerged as one of the major oilseed crop and revolutionized rural economy and lifted the socio economic status of soybean farmers. However, the increase in the productivity over the years did follow the same place, and it is not more than half of the world average, hence there is tremendous scope to increase soybean production by enhancing productivity. There are many factors limiting soybean production at farm. These factors are improper sowing time, climatic variability, low germination percentage, poor quality seed, irrigation shortage etc. Another possible reason of low production is the non-adoption of new developed varieties. The sowing of soybean varieties of high yield potential at optimum sowing time is considered as a hopeful approach to increase soybean production. Generally, the sowing dates vary depending on the climatic condition of the region and the varieties to be grown. Different varieties of soybean are sensitive to change in environmental conditions where the crop is being sown.

Cite this article: Dandge, M., Peshattiwar, P., Mohod, P., Nichal, S., & Ghawde, R. (2020). Performance of Varieties under Different Sowing Dates in Soybean (*Glycine max* L.), *Ind. J. Pure App. Biosci. 8*(4), 444-448. doi: http://dx.doi.org/10.18782/2582-2845.8245

Therefore, it is also necessary to study the genotype × environment interaction to identify the varieties which are stable in different environments (Calvino et al., 2003a). Sowing dates influence soybean growth stages, due to variation in photoperiod (Han et al., 2006; Kumudini et al., 2007), air temperature (Chen & Wiatrak, 2010), and rainfall distribution and amount during the crop cycle (Hu & Wiatrak, 2012). Meotti et al. (2012) observed that 77 % of soybean yield variability was associated with the climate conditions induced by the sowing dates. Sowing date is the variable with the largest effect on crop yield (Calvino et al., 2003b). Environmental conditions associated with late sowing affect crop features related to the capture of radiation and portioning of crop resources as soybean is a dicotyledonous photoperiod sensitive crop (short day) and faces thermo-sensitivity in nature. These include less vegetative growth (Board et al., 1992), shorter stems (Boquet, 1990); lower reproductive nodes and shortening of the reproductive phases (Kantolic & Slafer, 2001). Delayed sowing generally shifts reproductive growth into less favourable conditions with shorter days and lower radiation and temperature (Egli & Bruening, 2000). In vidarbha region, from last three years the productivity of soybean is consistently decreasing due to unfavorable climatic condition. The other reason behind that the near about 85% farmers are cultivated same genotype year after year i.e. JS-335. Due to increasing in pest and diseases problem and unfavorable climate, JS-335 genotype could not sustain the higher productivity. Now there is need to change/replace the variety which can perform better than existing in respect of adverse climatic condition and productivity Therefore, the present investigation was undertaken to study the performance of different genotype under different sowing dates.

MATERIALS AND METHODS

The field experiment was conducted in field at Regional Research Center, Amravati during *kharif* season 2018-19. Four soybean varieties MACS 1520, AMS MB 5-18, RSC 10-52, and check NRC 86 were sown on two sowing dates, 21st june (normal sowing) and 10th july (20 days after normal sowing). The experiment was laid out in split plot design replicated three times keeping sowing dates in main plot and varieties in sub plot using net plot size of 5.0 m x 2.7 m.

Soil type was medium black with 4.89 kg/ha organic carbon and initial status of soil was 210, 18, 345 Kg/ha NPK respectively. After seed bed preparation, sowing Soybean entries was done by dibbling. The observation on dry matter was recorded at 30 DAS, 45 DAS and 60 DAS, CGR and RGR on 30-45 and 45-60 DAS. Yield attributes *viz*., branches per plant, pods per plant, seed index and seed yield kg/ha and straw yield kg/ha was recorded at the time of harvesting. Five plants from each net plot were randomly selected and labeled for taking biometric observations at different growth stages. The same plants were harvested separately for post harvest studies. The plants from each net plot were threshed and seeds were cleaned. The cleaned seeds obtained from each net plot were weighted in kg. After separation of seeds from biological yield, remaining material (stem + pod husk) was considered as straw yield and its final weights were recorded in kg per net plot, which were then converted into straw yield (Kg/ha) by multiplying hectare factor.

RESULTS AND DISCUSSION

Effect of Sowing Date

The data from table1 revealed that, significantly highest number of branches per plant (2.27), number of pods per plant (52.92), dry weight per plant at 30, 45 and 60 DAS 1.75, 5.34 and 7.08 g respectively were recorded at normal date of sowing. The pods per plant and dry weight per plant in soybean have also been reported to differ in different sowing dates (Nath et al., 2017). The highest CGR at 30-45 DAS & RGR at 45-60 DAS was observed at normal date of sowing and decline later on. Similar reduction in CGR and RGR with delayed sowing of soybean was found by Aastha et al. (2017) and Jagtap *et al.*,

(2018). Significantly highest straw yield (2192 kg/ha) was recorded in early date of sowing. Straw yield was an augmenting effect of increased vegetative growth through plant height, number of branches and number of leaves per plant. Profound effect on straw yield per ha. was noted due to different dates of sowing (Jagtap et al., 2018). , Significantly highest grain production efficiency (17.51 kg/ha/day) and rain use efficiency (2.90 kg/ha-mm) were recorded under normal date of sowing but highest harvest index was observed in late sowing.

From table 3 reveals that, amongst the different date of sowing, genotype AMS MB 5-18 recorded significantly highest seed yield 1904 kg/ha under normal date of sowing. In different genotypes, none of the single genotypes proves significantly superior over others. In respect of late sowing genotype, almost all the genotypes recorded less than half seed yield than normal date of sowing. Shegro et al. (2010) and Shah et al. (2017) also reported the decrease in seed yield with delay in sowing period.

Effect of Varieties

Among different genotypes, significantly highest number of branches was recorded in MACS 1520 & check NRC 86 i.e. 2.27, but found at par with RSC 10-52. In respect of number of pods per plant, significantly highest number of pods was noticed in AMS MB 5-18 i.e. 52.00. Regarding seed test weight, there were no significant difference was observed. Significantly highest dry weight at 30 DAS was recorded in genotype MACS 1520 (1.93 g). At lateral growth stages, there is no significant difference was observed. Highest RGR at 30-45 DAS was recorded in genotype RSC 1052. While amongst the genotypes, significantly highest straw yield (1688 kg/ha), grain production efficiency (13.56 kg/ha/day) and rain use efficiency (2.25 kg/ha-mm) were recorded in AMS MB 5-18. Maximum harvest index 45.61% was observed in MACS 1520 (Table 2). Significantly highest seed yield was found in genotype AMS MB 5-18 (781 kg/ha) while significantly lowest yield was observed i.e. 657 kg/ha in check variety.

Table 1: Branches/plant, pods/plant, test weight (g), dry weight/plant (g), CGR (g/m2/day) and RGR (g/g/day) influence by different sowing dates

Treatment	Branches /plant	Pods/ Plant	Seed Index (g)	Dry weight/plant (g)			CGR		RGR	
				30 DAS	45 DAS	60 DAS	30-45 DAS	45-60 DAS	30-45 DAS	45-60 DAS
Sowing date										
Normal	2.48	52.92	10.73	1.75	5.34	7.08	10.76	5.22	0.09	0.022
Late	1.60	31.10	10.17	1.43	4.09	6.15	7.97	6.18	0.08	0.033
SE M+	**0.08**	**1.80**	**0.21**	**0.05**	**0.19**	**0.27**	**0.55**	**0.44**	--	--
CD (P=0.05)	**0.26**	**5.54**	**NS**	**0.16**	**0.57**	**0.82**	**1.71**	**NS**	--	--
Entry										
MACS 1520	2.27	40.93	10.69	1.93	4.55	6.81	7.86	6.77	0.068	0.033
AMS-MB 5-18	1.70	52.00	10.26	1.60	4.90	6.86	9.92	5.87	0.089	0.027
RSC 10-52	1.93	35.43	10.74	1.40	4.64	6.22	9.73	4.74	0.096	0.024
NRC 86 (C)	2.27	39.67	10.11	1.45	4.76	6.57	9.94	5.42	0.095	0.026
SE M+	***0.12***	***1.76***	***0.13***	***0.08***	***0.21***	***0.23***	***0.78***	***0.81***	--	--
CD (P=0.05)	***0.37***	***5.42***	***NS***	***0.25***	***NS***	***NS***	***NS***	***NS***	--	--
Interaction										
SE m+	**0.11**	**1.98**	**0.09**	**0.05**	**0.05**	**0.14**	**0.22**	**0.46**	--	--
CD (P=0.05)	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	--	--

Table 2: Straw yield (kg/ha), HI (%), grain production efficiency (kg/ha/day) and RUE (kg/ha-mm) as influence by different sowing dates

Treatment	Straw yield (kg/ha)	HI (%)	Grain production efficiency (kg/ha/day)	RUE (kg/ha-mm)
Sowing date				
Normal	2192	44.15	17.51	2.90
Late	826	46.58	7.26	1.20
SE m±	**105.26**	--	--	--
CD (P=0.05)	**324.28**	--	--	--
Entry				
MACS 1520	1417	45.61	11.59	1.94
AMS-MB 5-18	1688	44.81	13.56	2.25
RSC 10-52	1437	45.60	11.89	1.97
NRC 86 (C)	1493	45.45	12.48	2.05
SE m±	***179.9***	--	--	--
CD (P=0.05)	***NS***	--	--	--
Interaction				
SE m±	**83.45**	--	--	--
CD (P=0.05)	**NS**	--	--	--

Table 3: Seed yield (kg/ha) as influence by different sowing dates

Treatment	SOWING DATE		
Entries	**Normal (21-6-2018)**	**Late (10-7-2018)**	**Mean**
MACS 1520	1605	713	1159
AMS-MB 5-18	**1904**	781	1343
RSC 10-52	1633	722	1177
NRC 86 (C)	1789	657	1223
Mean	**1733**	**718**	
	SEM±	**CD (P=0.05)**	
Sowing date	84.34	259.86	
Entry	140.85	NS	
Interaction	72.41	NS	

CONCLUSION

Genotype AMS MB 5-18 recorded significantly highest seed yield 1904 kg/ha under normal date of sowing but this conclusion is drawn on the basis of only one year study. For drawing concrete conclusion, this study can be extended for another two years.

REFERENCES

Aastha & Singh, J. (2016). Effect of genotype, sowing schedule and row spacing on growth indices of soybean (*Glycine max*) under mid hill conditions of H. P. *Himachal Journal of Agricultural Research 42*(2), 131-136.

Board, J. E., Kamal, M., & Harville, B. G. (1992). Temporal importance of greater light interception to increase narrow-row soybean. *Agro. J., 84*, 575- 579

Boquet, D. J. (1990). Plant population density and row spac-ing effects on soybean at post-optimal planting dates. *Agro. J., 82*, 59-64

Calvino., P. A., Sadras, V. O., & Andrade, F. H. (2003a). Quantification of environmental and management ef-fects on the yield of late-sown soybean. *Field Crops Res*., *83*, 67-77.

Calvino, P. A., Sadras, V. O., & Andrade, F. H. (2003b). Development, growth and yield of late-sown soybean in the southern Pampas. *Europ. J. Agro*., *19*, 265-275.

Egli, D. B., & Bruening, W. P. (2000). Potential of early maturing soybean

cultivars in late plantings. *Agro. J.*, *62*, 19-29.

Han, T. F., Wu, C. X., Tong, Z., Mentreddy, R. S., Tan, K. H., & Gai, J. Y. (2006). Post flowering photoperiod regulates vegetative growth and reproductive development of soybean. *Environmental and Experimental Botany*, *55*, 120-129.

Hu, M., & Wiatrak, P. (2012). Effect of planting date on soybean growth, yield, and grain quality: Review. *Agronomy Journal*, *104*, 785-790.

Jagtap, M.P., Sangekar, Y.D. & Pawar, G.S. (2018). Evaluation of Soybean (*Glycine max* L.) Varieties in Post-monsoon for Growth and Yield Performance under Varied Weather Conditions. *Int. J. Current Microbiology and Applied Sci.*, *7*(12), 2991-2999.

Kantolic, A. G., & Slafer, G. A. (2001). Photoperiod sensitivity after flowering and seed number determination in indeterminate soybean cultivars. *Field Crops Res*., *72*, 109-118.

Kumudini, S. V., Pallikonda, P. K., & Steele, C. (2007). Photoperiod and e-genes influence the duration of the reproductive phase in soybean. *Crop Science, 47*, 1510–1517.

Meotti, G.V., Benin, G., Silva, R.R., Beche, E., & Mumaro, L.B. (2012). Épocas de semeadura e desempenho agronômico de cultivares de soja. *Pesquisa Agropecuária Brasileira, 47*, 14-21.

Nath, A., Karunakar, A. P., Kumar, A., & Nagar, R. K. (2017). Effect of sowing dates and varieties on soybean performance in Vidarbha region of Maharashtra, India. *Journal of Applied and Natural Science. 9*(1), 544-550.

Shah, T., Zaffar, N., Kalssom, Ahmad, A., Jalal, A., (2017). Yield and quality traits of soybean cultivars response to different planting windows, *Int. J. Statistic and Acturial Sci*., *1*(2), 55-59.

Shegro, A., Atilow, A., Pal, U.R., & Geleta, N. (2010). Influence of varieties and planting dates on growth and development of soybean (*Glycine max* L. Merr) in metekel zone North Western Ethiopia, *J. Agronomy*, *9*(3), 146-156.