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Response of Flat and Bed Planted Summer Mungbean (*Vigna radiata* L.) Sown on Different Dates to Time of Last Irrigation

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Abstract

A field experiment was conducted during the summer season of 2005 to find out the influence of termination of last irrigation on flat and bed sown mungbean (*Vigna radiata* L.) under different sowing times. The treatments consisted of two sowing times (March 30 and April 20), two planting methods (conventional flat sowing at 22.5 cm row spacing and raised planting of 2 rows/bed spaced 67.5 cm apart) and three dates of termination of last irrigation (50, 55 and 60 days after sowing). Sowing on April 20 gave significantly higher number of pods/plant, seeds/pod and final biomass/plant. It also resulted in 30.6% higher grain yield over March 30 sowing on raised beds produced significantly higher number of pods/plant (25.96), 1,000-seed weight (34.0) and final biomass/plant (19.79 g) than conventional flat sowing. Bed planting gave 63.5% significantly higher grain yield than flat sowing. Termination of last irrigation on different dates after sowing failed to significantly influence yield contributing characters or grain yield of summer mungbean. However, termination of last irrigation to bed planted mungbean 55 DAS gave significantly higher grain yield (21.31 q/ha) than either 50 or 60 DAS.

Key words : Summer Mungbean, Flat and bed planting, Sowing dates, Last irrigation.

Mungbean is an important pulse crop of India. It supplies a substantial quantity of easily digestible protein to the cereal-based diet of rural households. Mungbean's low requirement of inputs and its ability to restore soil fertility through symbiotic nitrogen fixation make it particularly important to resource poor farmers (1). Mungbean holds good promise under present day intensive cropping system as a summer season crop. In India it is predominantly grown in the states of Maharashtra, Andhra Pradesh, Orissa, Rajasthan, Tamil Nadu and Bihar. However, mungbean area and production are almost stagnant (2). The genotypes of green gram can express their full potential only when grown under optimum plant density, ensuing proper utilization of inputs (3). Thus, plant density manipulations under various planting methods can be tried to attain maximum production per unit land area. Among various agronomic requirements, optimum time of planting and irrigation application helps greatly in realizing the genetic potential of improved varieties. Due to indeterminate growth habit of green gram, termination of last irrigation is very important for synchronous maturity and partitioning of photosynthates towards economic components. Moreover, as the stored profile moisture may vary under raised planting, it may respond to different irrigation schedule than conventional flat planting. Therefore, there is a need to find out the interactive effects of time of planting, planting methods and termination of last irrigation. Efforts to augment its production would require two pronged approach ; first development of high yielding varieties and second, to achieve potential productivity of these varieties through proper agronomic practices. The present paper is focussed on the second alternative.

Methods

A field experiment was conducted at the Research Farm, Department of Agronomy, PAU, Ludhiana, during summer 2005 under irrigated conditions. The soil of experimental field was loamy sand having low organic carbon (0.31%) and available N (188 kg/ha) and medium in available P (15.6 kg/ha) and K (148 kg/ha). The soil was normal in reaction (pH 8.0) and EC (0.23 dS/m). The experiment comprised 12 treatment combinations of two planting methods (flat sowing at 22.5 cm row spacing, raised bed planting of 2 rows/bed spaced 67.5 cm apart), 2 sowing dates (March 30 and April 20) and three dates of last irrigation (50, 55 and

Table 1. Response of summer mungbean to planting methods and termination of last irrigation sown on different dates.

Treatments	Grain yield (q/ha)	Seed yield/ plant (g)	Dry matter/ plant (g)	No. of pods/ plant	No. of seeds/ pod	100-seed weight (g)
Planting Methods						
Flat (22.5 cm)	12.04	17.04	17.95	21.50	8.88	3.20
Bed (2 rows)	19.68	19.79	19.26	25.96	8.85	3.40
CD (P = 0.05)	1.09	0.91	0.56	1.08	NS	0.14
Date of Sowing						
Mar 30	13.76	17.16	17.25	22.68	8.58	3.36
Apr 20	17.97	19.67	19.95	24.78	9.14	3.23
CD (P = 0.05)	1.09	0.91	0.56	1.08	0.41	NS
Last Irrigation						
50 DAS	15.29	18.78	18.84	22.85	8.97	3.20
55 DAS	16.66	18.76	18.98	24.15	8.94	3.31
60 DAS	15.63	17.70	18.01	24.19	8.67	3.38
CD (P = 0.05)	NS	NS	0.68	NS	NS	NS

60 DAS). The experiment was laid out in randomized block design using four replications. Raised beds were made with PAU wheat bed planter by keeping inter-bed distance of 67.5 cm and 2 crop rows (variety SML 668) were sown on 37.5 cm wide bed top at a row spacing of 20 cm. The crop was sown as per treatments using seed rate of 37.5 kg/ha and harvesting of March 30 and April 20 sowing was done on 10 and 26 June, respectively. The crop was raised with recommended inputs.

Results and Discussion

Planting Methods

Sowing of crop on raised beds produced significantly higher dry matter/plant, number of pods/plant and 100-seed weight while the number of seeds/pod were statistically similar (Table 1). Bed planting also gave 16.1% significantly more seed yield per plant. Raised bed planting resulted in significantly higher grain yield (19.68 q/ha) than flat sowing Higher PAR interception and even the lower plant parts receiving more light under bed planting could have resulted in more number of pods/plant and grain yield.

Date of Sowing

April 20 sowing gave significantly more dry matter/plant, number of pods/plant, number of grains/pod than March 30 sowing while the 100-seed weight differences were non-significant (Table 1). It also gave 14.6 and 30.6% significantly higher seed yield/plant and grain yield respectively than early sowing. low yield under early sowing could be due to poor growth and less favourable environment for pod and seed setting. Jaiswal (4) and Faroda et al. (5) also reported yield differences with sowing dates.

Last Irrigation

Termination of last irrigation of any of dates failed to significantly influence any of the yield contributing characters (Table 1). Last irrigation applied on 50 or 55 DAS resulted in significantly higher dry matter/plant than applied on 60 DAS. Similarly, the seed yield/plant and grain yield differences were non-significant.

Table 2. Interaction effect of planting methods and time of last irrigation on grain yield (q/ha) of summer mungbean.CD (P = 0.05%)-1.89.

Planting method	Time of last irrigation (DAS) 50	55	60
Flat (22.5 cm)	11.18	12.02	12.93
Bed (2 rows)	19.41	21.31	18.33

Interaction of Planting Methods and Last Irrigation

Interaction among planting methods and timing of last irrigation was found to be significant (Table 2). Last irrigation to bed planted mungbean applied 55 DAS gave significantly higher grain yield than either 50 or 60 DAS. However, in flat sown crop, all dates of last irrigation were at par.

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