Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2019; 8(3): 781-784
Received: 16-03-2019
Accepted: 18-04-2019

Ravinder Pal Singh
College of Agriculture, Guru Kashi University, Talwandi Sabo, Punjab, India

Balwinder Singh Dhillon
Assistant Professor (Agronomy), College of Agriculture, Guru Kashi University, Talwandi Sabo, Punjab, India

Ajmer Singh Sidhu
College of Agriculture, Guru Kashi University, Talwandi Sabo, Punjab, India

Correspondence
Balwinder Singh Dhillon
Assistant Professor (Agronomy), College of Agriculture, Guru Kashi University, Talwandi Sabo, Punjab, India

Productivity of summer moong (*Vigna radiata* L.) as influenced by different sowing dates and varieties

Ravinder Pal Singh, Balwinder Singh Dhillon and Ajmer Singh Sidhu

Abstract
A field experiment entitled "Effect of sowing dates and varieties on growth and yield of summer moong (*Vigna radiata* L.)" was conducted at the Research Farm of Guru Kashi University, Talwandi Sabo during *Zaid kharif* season 2016-17 and 2017-18. The experiment was laid out in split plot design comprising three sowing dates (April 1, April 15 and April 30) in main plot and three varieties (SML 668, SML 832 and MH 421) in sub-plot. The treatment was replicated four times. Sowing crop on April 1 recorded significantly higher plant height, number of primary branches/plant, days taken to 50% flowering, number of pods/plant, pod length, number of grains/pod, test weight, seed yield and stover yield. Summer moong variety MH 421 gave significantly higher plant height, days taken to 50% flowering, number of primary and secondary branches/plant, number of pods/plant, pod length, test weight, seed yield and stover yield. The variety MH 421 sown at April 1 recorded similar seed yield as given by variety SML 668 sown at April 1. Summer moong crop can be grown successfully on April 1 using variety MH 421 and SML 668.

Keywords: Summer moong, date of sowing, flowering, seed rate and seed yield

Introduction
Green gram (*Vigna radiata* L. Wilkzek) commonly known as "MUNG BEAN" is a principal important short duration and drought tolerent pulse crop in India. It belongs to the family leguminosae and sub family papilionaceae. It cover the annual world production area about 5.5 million hectare. In India, its rank third after Bengal gram and red gram in area, production and productivity. India contributes 75% of world's production in green gram (Taunk *et al.*, 2012) [16]. The major green gram states in India are Bihar, UP, Punjab, Rajasthan, MP and Gujarat. In Punjab, it was grown on area of 3.5 thousand hectares with a production of 3.0 thousand tonnes during 2015-16. The average yield of green gram was 8.38 quintals per hectare. Green gram seed contains 24.7% protein, 0.5% fat, 0.9% fibre, 57.6% carbohydrates and 3.7% ash (Choudhary *et al.* 2010) [7] and adequate amount of phosphorous, calcium and key vitamins. Its protein is rich in lysine making it an excellent complement to rice.

Moongbean is the major *kharif* pulse crop in India covering 34.5 lakh hectare of area with total production of 14 lakh tonnes and productivity of 1415.7 kilogram per hectare. It is commonly grown in summer season in India. Green gram is leguminous crop and improves soil fertility through symbiotic nitrogen fixation. It improves the soil fertility by fixing 36 kg nitrogen per hectare per annum from atmosphere. Moong bean is also a green manure crop and incorporated in soil prior to rice transplanting.

Green gram also improves the soil physical properties. Moong bean having low productivity because cultivation of this crop on marginal and submarginal lands with inadequate fertilization and poor management practices. Moong bean gave low yield at farmers field due to less awareness of farmers about optimum date of sowing, effective weed control, balance use of fertilizers, pest management practices and proper planting pattern. Moongbean in delay planting results reduction in number of pods/plant, number of grains/pod, grain weight and ultimately grain yield. The time of sowing is the most important agronomic factor for realizing the yield potential of improved varieties, it helps in achieving complete harmony between vegetative and reproductive stages of the crop. Therefore sowing of the crop at optimum time plays a key role in obtaining the high seed yields (Rathore *et al.* 2010) [13]. Optimum time of sowing ensures better harmony between the plant and weather which ultimately results in higher seed yield. Growth behavior of moongbean differs due to large variations among varieties with respect to growth habit, maturity duration, seed colour and size and yield performance (Dodwadiya and Sharma, 2012).

In view of above consideration the present investigation was planned to evaluate the effect

of different sowing dates and varieties on the growth parameters and grain yield of summer moong.

Materials and methods

The present investigation "Effect of date of sowing and varieties on growth and yield of summer moong" was conducted at Research Farm of Guru Kashi University Talwandi Sabo, Bathinda during *Zaid kharif* season 2016-17 and 2017-18. Talwandi Sabo is situated at $29^0$57'N latitude and $75^0$7'E longitude at a height of 213 meters above the sea level. The climate of the experimental site is characterized by semi-arid type with hot and dry summer from April to June, hot and humid from July to September and cold winter from November to January. The maximum temperature 24.8^0C was recorded in the month of June and minimum temperature 18.4^0C recorded in the month of April. Maximum relative humidity (morning) (90.7%) was recorded during the month of January. Maximum rainfall (14.0mm) was recorded in the month of November. The soil of the experimental plot was sandy loam with a pH of 7.8, low in organic carbon (0.34%), low in available N (125.4 kg ha^{-1}), medium in available P (13.9 kg ha^{-1}) and high in available K (245.6 kg ha^{-1}). The experiment was laid out in split plot design. The experiment was conducted in split plot design with combinations of three date of sowing *viz*., April 1st, 15th and 30th in main plots and three varieties SML 668, SML 832 and MH 421 in sub plots, replicated four times.

The plant height of five randomly selected plants was measured at the maturity. The total number of branches (primary and secondary) were counted from the five randomly selected plants in each plot at maturity stage and the average value was worked out. The time taken to 50% flowering was recorded from ten tagged plants in each plot and then mean of these was calculated. The total number of pods per plant was recorded from the ten randomly selected plants from each plot. Measured the average pod length from randomly selected ten plants from each plot and calculated the mean length. The number of seeds was counted from ten pods from each selected plant from each plot. The weight of 1000-grain weight was recorded from each plot and expressed in gram. Number of days taken to maturity days were counted from each plot after the colour of the plant and pod turned yellow. After threshing of crop, the data on seed and stover yields was recorded from each plot and expressed as kg/ha. Harvest index (HI) was calculated by using following formula:

$$\text{Harvest Index (\%)} = \frac{\text{Seed yield}}{\text{Biological yield}} \text{ x } 100$$

The collected data were statistically analyzed by using Fisher's ANOVA technique and least significant difference (LSD) test at 5% probability level was used to compare differences among treatment means (Steel *et al.* 1997).

Results and Discussions

Growth parameters

Sowing of summer moong on 1st April resulted in significantly higher plant height (68.8), number of primary branches per plant (4.8) and number of secondary branches per plant (1.8) as compared to crop sown on 15th and 30th April (Table 1). The variety MH 421 recorded significantly higher plant height (65.2), number of primary branches per plant (5.2) and number of secondary branches per plant (2.4) as compared to variety SML 668 and SML 832. Similar results were also reported by Bhowmick *et al.* (2008) [1], Rahman *et al.* (2009) [12], Goswami *et al.* (2010) [7] and Verma *et al.* (2011) [17].

Table 1: Effect of sowing date and varieties on growth parameters of summer moong.

Treatment	Plant height (cm)	No. of primary branches/plant	No. of secondary branches/plant
Sowing date			
1st April	68.8	4.8	1.8
15th April	59.0	4.5	1.6
30th April	52.3	3.4	1.5
LSD (P=0.05)	4.2	0.5	0.2
Varieties			
SML 668	58.3	4.2	1.3
SML 832	56.5	3.4	1.2
MH 421	65.2	5.1	2.4
LSD (P=0.05)	1.8	0.7	0.1

Phenology

The data revealed that summer moong sown on April 1st took more time to flowering as compared to other sowing dates i.e. April 15th and 30th (Table 2). The data further revealed that variety MH 421 took significant more time to 50% flowering than variety SML 668 and SML 832. Similar results were also reported by Rahman *et al.* (2009) [12].

Table 2: Effect of date of sowing and varieties on phonological parameters of summer moong.

Treatment	Days taken to 50% flowering	Days taken to maturity
Sowing date		
1st April	42.2	64.3
15th April	41.2	62.4
30th April	39.0	60.2
LSD (P=0.05)	0.8	0.8
Varieties		
SML 668	40.6	62.1
SML 832	40.0	61.8
MH 421	41.7	63.0
LSD (P=0.05)	0.4	0.2

Yield attributes

The significantly higher number of pods per plant were recorded when the sowing was done on 1st April followed by the 15th April and 30th April sown crops (Table 3). The maximum number of pods/plant were recorded in variety MH 421 followed by variety SML 668 and variety SML 832 having minimum number of pods/plant. The significantly maximum pod length was observed in plots of 1st April sowing and at par with 15th April sowing and lowest pod length was observed in plots sown on 30th April. The variety MH 421 has significantly more length of pod and at par with variety SML 668 and minimum pod length was observed in variety SML 832. The data indicated that sowing of summer moong on 1st April resulted in significantly more number of seeds/pod followed by sowing 15th April and at par with sowing on 30th April. More number of seeds/pod was observed in case of variety MH 421 followed by variety SML 668 and at par with variety SML 832.

The significantly maximum test weight was observed in sowing date 1st April followed by 15th April date of sowing and 30th April sown crop having minimum test weight. The variety MH 421 having the highest test weight of 1000 grains followed by variety SML 668 and the minimum test weight is observed in variety SML 832. The interaction effect between different dates of sowing and varieties on test weight (1000 grain weight) was significant.

Table 3: Effect of date of sowing and varieties on yield and yield attributes of summer moong.

Treatment	No. of pods per plant	Pod Length (cm)	No. of seeds per pod	1000-grain weight (g)	Grain yield (kg/ha)	Stover yield (kg/ha)	Harvest index (%)
Sowing date							
1st April	24.5	8.0	10.4	40.0	862.6	1841.7	31.9
15th April	23.3	7.5	9.0	37.3	759.6	1744.2	30.3
30th April	19.7	6.7	8.7	32.8	650.6	1607.5	28.8
LSD (P=0.05)	1.0	0.4	1.3	1.2	101.2	80.5	0.9
Varieties							
SML 668	22.7	7.4	9.3	36.4	755.5	1744.6	30.2
SML 832	21.0	7.0	8.6	34.6	673.8	1663.7	28.8
MH 421	23.8	7.9	10.2	38.6	843.5	1785.2	32.1
LSD (P=0.05)	0.8	0.6	0.8	0.8	68.2	20.1	0.8

Yield of summer moong

The 1st April sown crop gave significantly higher seed yield followed by 15th April sown crop and the minimum grain yield was obtained from 30th April sown crop. The variety MH 421 gave significantly higher seed yield followed by variety SML 668 and the variety SML 832 had minimum grain yield. The 1st April sown crop gave maximum stover yield followed by sowing date 15th April and minimum stover yield was recorded in sowing on 30th April. The variety MH 421 had significantly higher stover yield than variety SML 668 and minimum stover yield was recorded in variety SML 832. Kumar *et al.* (2009) [10] reported that variety SML '668' gave the highest grain yield (1332kg/ha) which was significantly higher than the 'Pusa vishal' (1229kg/ha) and 'Samrat' (1227kg/ha). On the perusal of data, it is clear that for obtaining higher seed yield of summer moong, sowing of summer moong done on 1st April with variety MH 421. The yield reduction under late sowing dates have been similar results were also reported earlier by also Fraz *et al.* (2006) [5], Bhowmick *et al.* (2008) [1], Miah *et al.* (2009) [11], Jahan and Adam (2012) [8] and Kumar *et al.* (2013) [9].

Harvest index

The 1st April sown crop having maximum harvest index followed by 15th and 30th April sown crop. The variety MH 421 have maximum harvest index followed by variety SML 668 and variety SML 832 having minimum harvest index.

Conclusion

Sowing of summer moong on 1st April recorded significantly higher seed yield, whereas, variety MH 421 gave higher seed yield as compared to variety SML 668 and SML 832. Sowing of summer moong on 1st April is the optimum time of sowing with variety MH 421 for obtaining higher seed yield.

References

1. Bhowmick MK, Sandhukhan R, Saha PK. Response of new mungbean genotypes to sowing time during spring summer in West Bengal. Journal of Crop and Weed. 2008; 4(1):1-3.
2. Chudhary R, Sandhu AC, Gagiya KM. Effect of fertility levels and fertilizers on growth, yield and economics of Summer green gram (*Vigna radiate* L Wilczek). Haryana Journal of Agronomy. 2010; 26:41-44.
3. Dodwadia KS, Sharma AR. Effect of tillage and methods of sowing on performance of greengram (*Vigna radiata*) varieties during summer and rainy season. Indian J. Agric. Sci. 2012; 82(5):462-475.
4. Flores M, Madriz CM, Warnock IPM, de Parrra R, Trujillo de Leal A. Plant height and yield components of six genotypes of the *Vigna* genus in two locations of Venezuela. Revista de la Faculted de Agronomia. Universideddel Zulia. 2005; 22(4):351-364.
5. Fraz AZ, Iqbal J, Baksh MA. Effect of Sowing Dates and Planting Patterens on Growth and Yield of Mungbean (*Vigna radiate* L) cv.M-6. Int. J Agri. Biol. 2006; 8(3):363-365.
6. Gosami RK, Hiramath SM, Chetti MB, Koti RV, Saimath PM. Genotypic variation for physiological traits in relation to seed yield in greengram. Annals of Plant Physiology. 2009; 23(1):12-16.
7. Goswami KR, Choudhary H, Sharma MK, Sharma D, Bhuyan J. Evaluation of greengram genotypes for morphological, physiological traits and seed yield. Annals Plant of Physiology. 2010; 24(2):115-120.
8. Jahan N, Adam GAMM. Growth and yield performance of bari mung-5 under different time of sowing. Journal of Bangladesh Academy of Sciences. 2012; 36(2):227-231.
9. Kumar A, Singh NP, Lumar S. Effect of planting dates and genotypes on root characteristics and yield of mungbean and urdbean during spring season. International Journal of Agricultural Sciences. 2013; 9(1):270-274.
10. Kumar R, Nandan R, Prasad VK, Singh D. Response of summer mungbean (*Vigna radiata*) cultivars to sowing time and seed rate. Indian Journal of Agricultural Science. 2009; 79(4):309-312.
11. Miah MAK, Anwar MAP, Begum M, Juraimi AS, Islam MA. Influence of Sowing Date on Growth and Yield of Summer Mungbean Varieties. J Agric. Soc. Sci. 2009; 5:73-76.
12. Rahman A, Khalil SK, Nigar S, Rehman S, Haq I, Akhtar A *et al.*. Phenology, Plant height and Yield of mungbean varieties in response to planting date. Sarhad J Agric. 2009; 25(2):147-152.
13. Rathore SS, Dshora LN, Kaushik MK. Effect of sowing time and fertilization on productivity and economic of urdbean genotypes. J Food Legumes. 2010; 23:154-155.
14. Singh J, Mathur N, Bohra S, Bohra A, Yyas A. Comparative performance of mung bean (*Vigna radiata* L. Wilczek) varieties under rainfed condition in India. Thar Desert. American-Eurapian Journal of Agricultural and Enviromental Science. 2006; 1(1):48-50.
15. Steel RGD, Torrie JH. Principles and procedures of statistics: A biometrical approach. 2nd Ed. McGraw-Hill, Singapore, 1981.
16. Taunk J, Yadev NR, Yadev RC, Kumar R. Genetic diversity among greengram (*Vigna radiata* (L) Wilczek) genotypes varying in micronutrients (Fe and Zn) content using RAPd markers. Indian Journal of biochemistry. 2012; 11(1):48-53.

17. Verma CK, Yadav D, Singh V. Effect of yield and quality of green gram varieties by foliar spray of urea and seed rate. Plant Archives. 2011; 11(1):289-291.