Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2018; 7(1): 2754-2756
Received: 19-11-2017
Accepted: 20-12-2017

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Response of mungbean genotypes to dates of sowing under changed climate

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Abstract
The experiment was conducted at MARS, UAS, Dharwad during the rainy seasons of 2012 and 2013 under rainfed condition. The treatments comprised of 3 genotypes (DGGV-2, IPM-02-14 and Sel-4) and 3 dates of sowing (Ist Fort Night (FN) of June, IInd Fort Night of June and Ist Fort Night of July).Pooled data indicated that yield of I and II FN of June sown mungbean were on par with each other (1025 and 866 kg/ha) and were significantly superior over I FN of July (513 kg/ha). About fifty percent (50%) reduction in yield was observed in I FN of July sown crop compared to I FN of June sown crop. Varieties did not differ significantly.

Keywords: dates of sowing, mungbean, genotypes, yield

Introduction
In India mungbean is grown on an area of 3.54 m ha with a total production of 1.22 m t and average productivity of 345 kg per hactare. In Karnataka it occupies an area of 0.37 m ha with a production of 0.042 m t and an average productivity of only 231 kg/ha. Even though genotypes with yield potential of 10-12 q/ha are available, their potential has not been harnessed due to the constraints like moisture stress, harsh weather, unfertile soils *etc*. Among the different agronomic practices, time of sowing plays an important role to exploit genetic potentiality of a genotype as it provides optimum growing condition such as temperature, light, humidity and rain fall. Sowing date determines the time available for vegetative phase before the onset of flowering which is mainly influenced by photoperiod. Sowing at optimum time is an important non-cash input that results in considerable increase in the yield. This means that a favorable soil and climatic conditions are made available to the crop for the expression of their genetic potentiality. Hence study was conducted to find out the suitable time of sowing for mungbean genotypes under changed climate and to study the yield and yield parameters of mungbean genotypes under different sowing dates

Materials and Methods
The experiment was conducted at Main Agricultural Research Station (MARS), University of Agricultural Sciences, Dharwad during the rainy seasons of 2012 and 2013 under rainfed condition. The geographical co-ordinates of Dharwad are 15°26' N latitude and 75°7' E longitude with an altitude of 678 m above mean sea level. It is located in the Northern Transition Zone of Karnataka which has semi-arid climate. The soil of the experimental site was clayey in nature and had available N, P and K of 213, 21.5 and 325.8 kg/ha, respectively. Organic carbon (%) and pH of the soil were, respectively, 0.52% and 7.2.The treatments comprised of 3 genotypes (DGGV-2, IPM-02-14 and Sel-4) and 3 dates of sowing (Ist fort night of June, IInd fort night of June and Ist fort night of July).

Results and Discussion
The annual rainfall received during 2012 and 2013 was 540.1 and 740 mm distributed over 47 and 63 rainy days, respectively. The rainfall during cropping period (June-september) during 2012 and 2013 was 334 and 484 mm, respectively which was 28.6 and 3.2 percent less and higher, respectively than the normal average rainfall (469 mm). The rainfall received in the month June ensured adequate stored moisture for germination, emergence and early establishment of seedlings at first two dates of sowing (I FN of June and II FN of June). However, the late sown (first fort night July) crop did not get adequate moisture during crop growth stage for both the years even though the maximum rainfall was received in the month of July followed by August. The distribution of rainfall was erratic, hence crop suffered in delayed sowing date (I FN of July) due to moisture stress during early growth stage of crop. The higher seed yield obtained in early sown crop is attributed to higher soil moisture

during cropping period due to receipt of 112.2 and 178 mm rainfall during July, respectively during 2012 and 2013. This coincides with the flowering and pod formation stage of early sown crop.

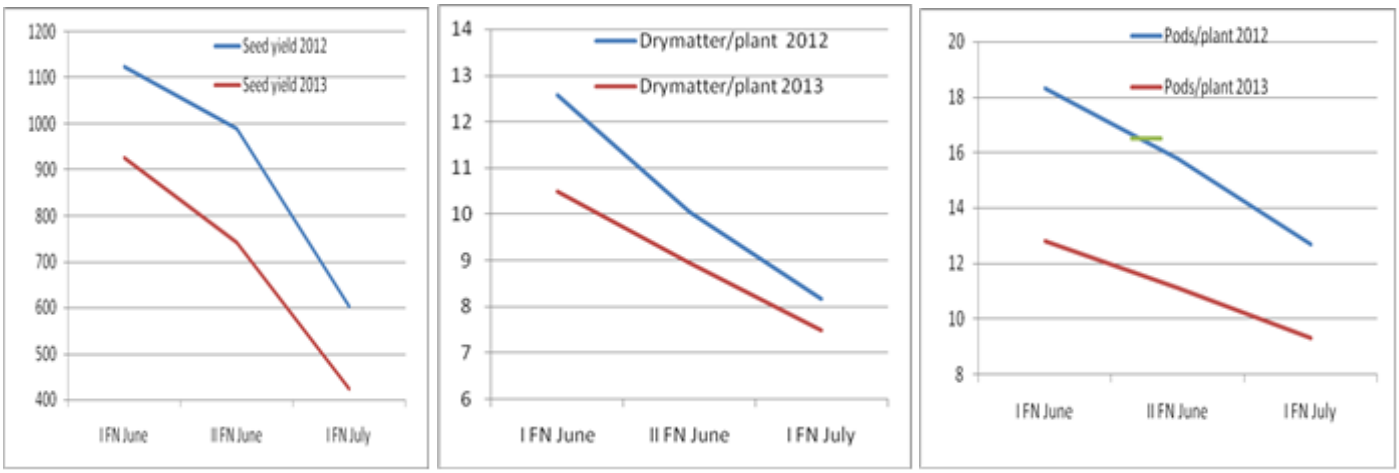
If we consider rainfall data of last 10 years, it clearly indicates that rainfall from 2010 is erratic, uneven and there is less rainfall at the end of August (Graph 1)

Pooled data of 2012 and 2013 (Table 1) indicated that yield of I and II fortnight of June sown mungbean were on par with each other (1025 and 866 kg/ha) and were significantly superior over late sown mungbean *viz.*, I fortnight of July (513 kg/ha). About fifty percent (50%) reduction in yield was observed in I fortnight of July sown crop compared to I fortnight of June sown crop. Yield and growth parameters like No. of pods/plant and total drymatter/plant were also significantly low in I fortnight of July (11.0 and 8.23 g, respectively) compared to I fortnight of June (15.6 and 11.5 g, respectively) and II fortnight of June (13.4 and 9.83 g, respectively) sown mungbean crop (graph 2).This was mainly due to less rainfall during flowering period and high pest and disease infestation (graph 3) in I fortnight of July sown crop. Singh *etal* (1999) [2] at Pantanagar during *kharif* season also observed normal sowing (3rd week of July) recorded higher number of pods/plant and seed yield (kg/ha) compared to late sowing (3 weeks after normal). Singh and Singh (2000) [3] observed similar results in blackgram.

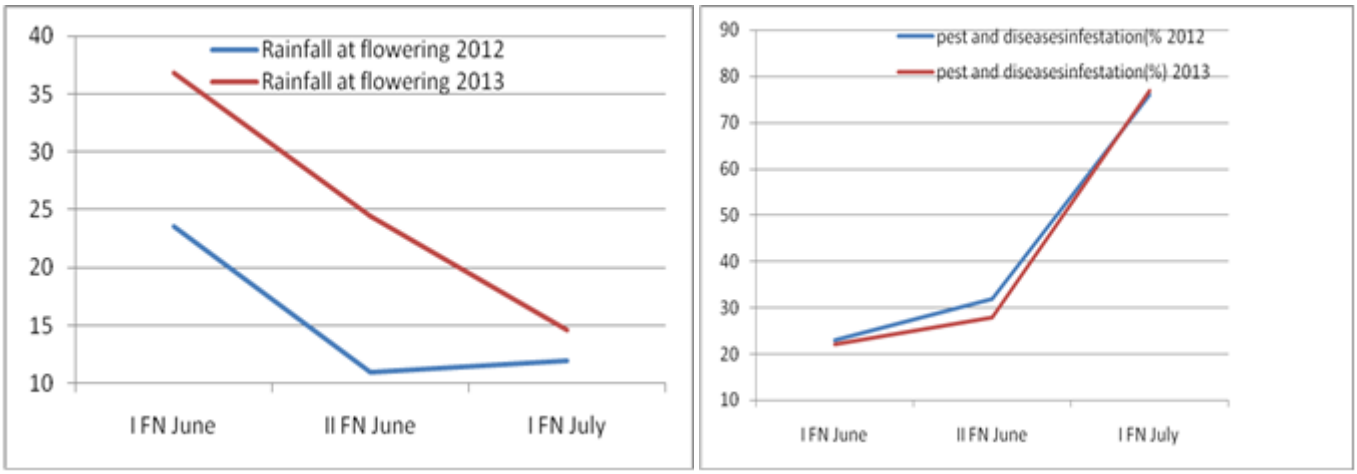
In the present study varieties did not differ significantly across the dates of sowing. Interaction effect was significant and all three varieties sown during I and II fortnight of June recorded on par yield and were significantly superior over Ist fortnight of July sown crop. These results were in similar line as that of Guriqbal Singh *etal* (2010) [1].

Table 1: Seed yield, No.of pods/plant and dry weight/plant as influenced by genotypes and dates of sowing in mungbean (pooled)

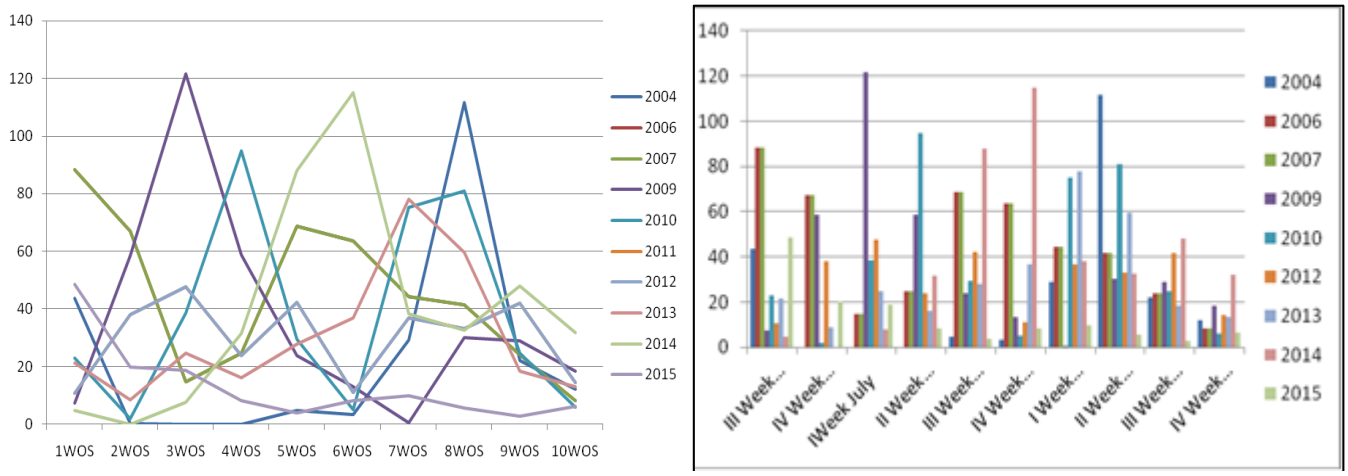
Time of sowing	Seed yield (kg/ha)				No. of pods/plant				Dry weight/plant(g)			
	DGGV-2	IPM-02-14	SEL-4	Mean	DGGV-2	IPM-02-14	SEL-4	Mean	DGGV-2	IPM-02-14	SEL-4	Mean
I FN June	1048	1041	986	1025	16.9	14	15.8	15.6	12.3	10.8	11.4	11.5
II IFN June	908	858	831	866	13.5	12.6	14.2	13.4	10.8	8.96	9.69	9.83
IFN July	479	555	505	513	10.7	11.3	11.1	11	9.31	7.62	7.75	8.23
Mean	812	818	774		13.7	12.6	13.8		10.8	9.1	9.6	
	D	V	DXV		D	V	DXV		D	V	DXV	
SEm±	31	27	56		0.8	1.1	2.4		0.31	0.3	0.8	
CD	93	NS	224		2.4	NS	NS		0.93	0.9	3.04	



Graph 1: Yield, growth and yield parameters and rainfall at flowering of mungbean as influenced by dates of sowing



Graph 2: Rainfall at flowering and pest and disease infestation of mungbean as influenced by dates of sowing



Graph 3: Distribution of rainfall during cropping season of mungbean over the years (2004-2015)

Conclusion

Hence it can be concluded that improved varieties *viz.*, DGGV-2, IPM-2-14 and Sel-4 can be sown before the end of June in Northern Transition Zone of Karnataka to harness their potential yield.

References

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