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Assessment of Green Gram Varieties for Better Yield in Samastipur District of Bihar

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ABSTRACT

Green gram (Vigna radiata) is commonly known as Moong an important pulse crop in India and more than 70 per cent of world's green gram production comes from India. In Samastipur, farmers sow the moong after harvesting of Toria as well as wheat crop during summer season. The present study was conducted during summer seasons of the year 2016 and 2017 in three villages of Samastipur district to assess the suitable variety of green gram. Twenty farmers' field were randomly selected and sown three high yielding improved varieties of green gram namely TMB 37, SML 668 and HUM 16 with five replications with one check variety already grown by the farmers. The data like average number of branches, pods/plant, grain/pod, disease incidence (%) and grain yield (q/ha) were recorded during investigation. Among all the varieties assessed, variety TMB37 proved to be the best with highest number of pods/plant (38.4) and minimum incidence of yellow mosaic disease of 6.2 per cent resulting in the highest yield of 16.65 q/ha followed by SML668 with disease incidence of 7.3 per cent , 34.8 pods/plant and yield of 14.95q/ha. Hence, it was inferred that TMB37 variety of green gram proved better followed by SML668.

Key Words: Extension gap, Green gram, Technology, Varieties, Yield.

INTRODUCTION

India is the largest producer, consumer and importer of pulses in the world. It accounts for 33 per cent of world area and 22 per cent of the total world production of pulses (Sandhu and Dhaliwal, 2016). Pulses are good and cheaper source of protein, which indicate the great importance of pulses in their daily food habits. Pulse crops have ability to fix the atmospheric nitrogen and addition of organic matter to soil, which are important factors to maintain soil fertility (Kumar and Singh, 2014). Green gram (*Vigna radiata*) commonly known as moong, an important pulse crop in Indiaas well as in Bihar and more than 70 per cent of the world's green gram production comes from India. It produces about 1.5 to 2 mt of moong annually from about 3-4 mha area with an average productivity of 500kg/ha and accounts for about 10-12 per cent of total pulse production.

Moong is a very important crop in Samastipur and isbeing sown after harvesting of toria as well as wheat crop during summer season. The average productivity of moong in Bihar is higher than country's average and stands 5th position with 7 per cent total cultivated area after Rajasthan (26%), Maharashtra (20%), Andhra Pradesh (10%) and Gujarat (7%). Therefore, it was considered to evaluate growth and yield parameters of three selected high yielding varieties of green gram in Samastipur district to identify the most suitable variety at the farmers' field for higher income.

MATERIALS AND METHODS

The present on farm study was conducted on the sandy loam soil during summer 2016 and 2017 in three villages of Samastipur district. Twenty farmers' field were randomly selected and sown three high yielding improved varieties of green gram namely TMB37, SML668 and HUM16 in five

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Table 1. Details of practices in Samastipur district under OFT programme.

Sr. No.	Cultural operation	Existing practice	Improved cultivation practice
1.	Variety	Local seed	TMB 37, SML 668 and HUM16
2.	Seed rate	25-30 kg/ha	30 kg/ha.
3.	Seed quality	Ungraded seed	Graded seed
4.	Seed treatment	No seed treatment	Treated with bavistin followed by Rhizobium.
5.	Method of sowing	Broadcasting	Line sowing by seed drill
6.	Fertilizer application	-	100kg DAP + 33 kg MOP + 125 Kg Phospho gypsum per ha.
7.	Plant protection measures/disease insects	-	Fenverlate 2% powder, Dimethoate 30EC, Mancozeb.

replication with one check variety already grown by the farmers. The chemical fertilizer was applied through single super phosphate, muriate of potash and urea as basal dose. The details of cultural practices were given in Table1.

The recommended weed control measuresand irrigation were applied according to requirement of the crop. Various field data like average number of nodules/plant, plant height, number of branches, number of pods/plant and yield were recorded at harvest. To estimate the technology gap, extension gap and technology index formula given by Samui *et al* (2000)was used i.e. Technology gap=Potential yield – yield obtained with improved practices; Extension gap=improved practices yield– Farmers yield and Technology Index =Technology gap/ Potential yield X 100.

RESULTS AND DISCUSSION

The data (Table2) indicated that maximum number of modules found in TMB-37 which were significantly superior over other varieties and farmers' practice. This might be due to decrease in Padsorption/fixation and enhancedphosphorus availability with application of organic manures resulting in better growth and consequently exploitation of greater soil volume for modulation as reported by Choudhary *et al* (2011). The tallest plant height was recorded in variety HUM16(47.4 cm) followed by SML668 (47.2 cm) and TMB37 (45.1cm). The varieties SML668 produced maximum number of branches per plant (9.8) followed by TMB 37 (9.5). The reason may be attributed to the genetic variability and varietal difference and environmental adaptability. Similar results were reported by Samant (2014) in green gram.

The variety TMB37 recorded maximum number of pods/plant which was significantly higher with variety SML668 (34.8). The positive effect of phosphorus application on number of pods/plant might be due to better enzymatic activities which control flowering and pod formation (Kumar and Singh, 2014).The variety SML668 recorded maximum number of grain/ pod and significantly superior to TMB37(12.9). The reason may be attributed towards the genetic variability and grain size. Farmers' check variety had minimum grain/ pods (11.2, 11.6). The data (Table2) showed that disease incidence (%) ranged between 6.2 to 8.5 per cent in three varieties whereas, the farmers' practice recorded 15.7 to 16.7 per cent during both years. Almost same trend was recorded in the subsequent years. The maximum yield of green gram was recorded in TMB37 which was significantly superior to SML668 in both the years. However, HUM16 recorded highest yield in comparison to farmers' practice. Thus, the local variety/farmers' practice may be replaced with high yielding

Table 2. Performance of varieties on growth parameters, yield attributes and yields of green gram. (Pooleddata over two years)

Treatment	Nodules		Plant height (cm)		No. of Branches		No. of pods/ plant		No. of grain/ pod		Disease incidence (%)		Yield (q/ha.)	
	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
Famers' practice	6.4	6.5	40.2	40.1	7.6	7.8	28.3	29.6	11.2	11.6	16.7	15.7	11.5	11.90
TMB37	12.6	12.4	45.1	46.4	9.5	9.8	38.4	38.4	12.9	12.9	6.4	6.2	15.9	16.65
SML668	11.4	11.5	47.2	48.5	9.8	10.3	34.8	34.8	13.1	13.1	7.8	7.3	14.4	14.95
HUM16	9.8	10.1	47.4	48.4	8.7	8.5	31.2	31.2	12.3	12.3	8.5	8.1	13.3	13.70
CD P< (0.05)	2.01	2.03	1.29	1.31	NS	NS	4.43	4.47	0.94*	0.95*	1.96	1.87	1.19	1.27

* Significant at 5% level of probability.

Table 3. Yield, technology gap, extension gap and technology index of green gram.

Year	Name of Variety	Yield (q/ha.)			Per cent increase	Technology gap (q/ha)	Extension gap (q/ha)	Technology index (%)
		Potential yield (q/ha)	Improved practices	Farmers' Practice				
			Average	Average				
2016	TMB37	20	15.9	11.5	38.26	4.10	4.40	20.5
	SML668	18	14.4	11.5	25.22	3.60	2.90	20.0
	HUM16	18	13.3	11.5	15.65	4.70	1.80	26.11
2017	TMB37	20	16.65	11.9	39.92	3.35	4.75	16.75
	SML 668	18	14.95	11.9	25.63	3.05	3.05	17.11
	HUM16	18	13.70	11.9	15.13	4.30	1.80	23.88

varieties because of higher productivity.

The technology gap ranged between 3.60 to 4.70 and 3.05 to 4.30 q/ha in 2016 and 2017, respectively. The observed technology gap was due to various constraints such as soil fertility, availability of low moisture content and climatic hazards etc. Hence, to reduce the yield gap location specific recommendations for varieties, soil testing and timely sowing appears to be necessary. A value of 1.80 to 4.40 q/ha of extension gap was found in 2016 whereas it was 1.80 to 4.75 q/ha was during 2017. There is a need to decrease this wider extension gap through latest techniques. These findings were similar to the findings of Jain (2016) and Kushwah *et al* (2016). The technology index showed the suitability of varieties at farmer's field. Lower technology values indicated that feasibility of variety among the farmers is more. The technology index ranged from 16.75 to 26.11 per cent. The finding was in accordance to finding of Sandhu and Dhaliwal (2016).

CONCLUSION

The findings of the study concluded that the yield of TMB37 was significantly higher than other varieties with recommended package and practices of green gram. Thus, the farmer'spractice variety may be replaced with high yielding varieties like TMB37 and SML668 in Samastipur district of Bihar.

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