



## YIELD IMPROVEMENT OF BLACKGRAM THROUGH FOLIAR APPLICATION OF PULSE MAGIC IN NORTH EASTERN DRY ZONE OF KARNATAKA

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### ABSTRACT

Crop productivity of blackgram being low in North eastern dry zone of Karnataka due to many reasons and one of the important reason is flower drop and poor pod setting, looking to this, front line demonstration (FLD) were conducted by Krishi Vigyan Kendra, Kalaburagi (Karnataka) in farmers field of Kalaburagi district during *kharif* 2017-18 to enhance the yield of blackgram through pulse magic spray under National Food Security Mission (NFSM). The results indicated that due to pulse magic spray to black gram on an average yield recorded is 10.6 q/ ha under demo plots (T<sub>1</sub>: pulse magic sprayed) as compared (8.75 q/ha) to check (T<sub>2</sub>: no pulse magic spray). On an average the pulse magic sprayed plots recorded higher yield parameters *viz.*, no. of pods/plant (34), no. of seeds/pod (7.1), 1000 seed weight (54.6 g) and higher net returns (Rs. 21960/ha) compared to check (24, 5, 47.4 g and Rs.15450/ha, respectively).

**KEY WORDS:** Blackgram, Economics, Front Line Demonstrations, Pulse Magic and Seed Yield.

### INTRODUCTION

Among the grain legumes, blackgram [*Vigna mungo* (L.) Hepper], commonly called as urdbean, is an ancient and well known leguminous crop. Blackgram is highly priced pulse, rich in phosphoric acid. The productivity potential of pulses is not realized and the reasons for low productivity of blackgram are large scale cultivation under rainfed and marginal lands and may be under low input conditions (Anon, 2015). The productivity of pulse crops including blackgram is not sufficient enough to meet the domestic demand of the population. Hence, there is need for enhancement of the productivity of blackgram by proper practices. Among all the yield limiting factors, fertility management is imperative to ensure better crop production on exhausted soils as nutrients play a vital role in increasing the seed yield in pulses (Chandrasekhar and Bangarusamy, 2003). Apart from the genetic makeup, the physiological factor *viz.*, insufficient portioning of assimilates, poor pod setting due to the flower abscission and lack of nutrients during critical stages of crop growth, coupled with a number of diseases and pests (Mahala *et al.*, 2001) are the reasons for the poor yield. Among several strategies to boost the productivity of blackgram, foliar application of nutrients may serve as one of the important strategy. To enhance productivity of blackgram, supply of nutrients during crop growth period is crucial. The nutrients when added in small amount by exogenous foliar application modify the natural growth regulatory system right from seed germination to senescence in several pulses. Moreover, foliar feeding practice would be more useful in early maturing crops, which could be combined with regular plant protection programmes.

Besides, foliar application is credited with the advantage of quick and efficient utilization of nutrients, elimination of losses through leaching and fixation and regulating the uptake of nutrient by plants (Manonmani and Srimathi, 2009).

Further, it is also been well established that fertilizer elements which are absorbed through roots can also be absorbed with equal efficiency through foliage (Garcia and Hanway, 1986) and can help to maintain a nutrient balance within the plant, which may not occur strictly with soil uptake (Meena *et al.*, 2007). Looking into importance of foliar nutrition in enhancing crop productivity of various field crops, a front line demonstration (FLD) was conducted by Krishi Vigyan Kendra (KVK), Kalaburagi, with the objective of enhancing blackgram productivity through use of pulse magic as foliar spray under farmer's field.

### MATERIALS & METHODS

Participatory Rural Appraisal (PRA) method and group discussions with identified progressive farmers were held by the team of scientists to identify the various problems faced by farmers in getting potential yield of important pulse crops. The problem noticed are about use of local varieties, nutrient supply, flower drop and pod setting at the field level apart from pest and diseases. Front line demonstration on usage of pulse magic were conducted at 25 farmer's fields of Tajsultanpur village in Gulbarga district during *Kharif* 2017-18 using DU-1 variety under National Food Security Mission (NFSM). There were two treatments *viz.*, recommended practices with pulse magic spray and another with check (No use of pulse magic *i.e.*,

only recommended practices). The pulse magic contains 10% of nitrogen, 40% of phosphorus, 3% of micro nutrients and 20 ppm PGR. 10 g of nutrient mixture and 0.5 ml of plant growth regulator (PGR) mixed in one liter water sprayed at 50% flowering stage and it was developed in the year 2014 from University of Agricultural Sciences, Raichur, Karnataka. Initial status of available N (218-278 kg/ha), P (17-35 kg/ha) and K (285-387 kg/ha) in soil of different farmers field with 6.9-7.8pH. Each demonstration was conducted in an area of 0.4 ha adjacent to the plots of check. Data on yield attributes and economics were collected and average data are tabulated.

## RESULTS & DISCUSSION

Seed yield is governed by number of factors which have direct or indirect impacts. The improvement in seed yield is achieved through improvement in yield attributing characters *viz.*, number of pods per plant, number of seeds per pod and test weight. In the present investigation, foliar application of pulse magic @ 10g/l has increased the yield attributing characters (table 1). The higher number of pods per plant (34) and seeds per pod (7.1) were noticed in pulse magic foliar spray compared to control (24 and 5,

respectively) and it is may be attributed due to the application of nutrients at flowering stage has helped in more translocation of photosynthates to the developing pods which in turn helped in better filing of grains, thus increasing the test weight (54.6 g) of the seeds compared to control (47.4 g). The result of present investigation is similar with the findings of Thakur *et al.* (2017) in blackgram due to foliar application of pulse magic.

Similarly, in soybean foliage applied macro and micronutrients at critical stages of the crop were effectively absorbed and translocated to the developing pods, producing more number of pods and better filling and hence these results of soybean due to foliar spray of nutrients were similar to our present outcome (Jayabel *et al.*, 1999). Presence of growth regulators in pulse magic, which are known to influence a wide array of physiological parameters like alteration of plant architecture, assimilate partitioning, promotion of photosynthesis, uptake of nutrients (mineral ions), enhancing nitrogen metabolism, promotion of flowering, uniform pod formation, increased mobilization of assimilates to defined sinks, improved seed quality, induction of synchrony in flowering and delayed senescence of leaves (Sharma *et al.*, 2013).

**TABLE 1:** Effect of pulse magic on yield attributes and yield of blackgram

Year	No. of Demonstrations	Area (Ha)	No. of (pods/plant)		No. of (seeds / pod)		1000 seed weight (g)		Seed yield (q / ha)		% increase yield over check
			T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	
2017-18	25	10	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	20
			34	23	7.1	5	54.6	47.4	10.6	8.75	

**TABLE 2:** Effect of pulse magic on economics of black gram

Year	No. of Demonstrations	Area (Ha)	Cost of cultivation (Rs./ha)		Gross return (Rs./ha)		Net return (Rs./ha)		B:C ratio	
			T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>
2017-18	25	10	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>
			26800	24800	48760	40250	21960	15450	1.81	1.62

T1: All practices as per package of practice with pulse magic application.

T2: Only package of practice and no pulse magic spray

Due to presence of PGR in pulse magic, which helped in flower drop percentage and premature shedding of reproductive structure which ultimately increases the seed yield? These results of decreasing flower drop percentage due to foliar spray of pulse magic are similar to the findings Teggelli *et al.* (2016) in pigeonpea. Our present results are in conformity with the findings of Marimuthu and Surendran (2015) in blackgram due to application of 100 percent recommended dose of nitrogen, phosphorous and potassium +foliar application of diammonium phosphate @ 2% +TNAU pulse wonder at 5.0 kg per hectare at 45 days after sowing resulted in higher number of pods per plant and grain yield. The findings of Shashikumar *et al.* (2013) in blackgram due to application of recommended dose of fertilizers + foliar spray of 40 ppm naphthalene acetic acid +0.5% chelated micro nutrient + 2 % diammonium phosphate at 30 and 50 days after sowing recorded significantly higher grain yield was similar to our present findings. Our present investigation results are also quite in line with the findings of by Kuttamani and Velayutham (2011) in greengram due to combined foliar application of 2.0% diammonium phosphate + 100 ppm salicylic acid + 0.05 % sodium

molybdate to greengram at vegetative and flowering stage helped to achieve potential yield due to presence of various nutrients and PGR. Consequent upon higher yield in pulse magic sprayed plot, ultimately there was higher net returns Rs. 21960/ha compared to check Rs.15450/ha (table 2).

## CONCLUSION

Based on above results of front line demonstrations of pulse magic spray to blackgram, it can be concluded that higher seed yield to the extent of 20% can be obtained compared to control and it is due to improvement in yield attributes *viz.*, number of pods per plant, number of seeds per pod and test weight. Further, it can also be concluded that higher net returns were obtained due to higher seed yield.

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