



INFLUENCE OF PULSE MAGIC APPLICATION ON YIELD AND ECONOMICS OF TRANSPLANTED PIGEONPEA

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ABSTRACT

Pigeon pea is most important pulse crop in Kalaburagi district of Karnataka. Yield of pigeon pea is decreasing due to flower drop and pod setting in climatic vulnerability situation. Krishi Vigyan Kendra, Kalaburagi has made 40 demonstrations in farmers field of Kalaburagi district from 2014-15 to enhance the yield of transplanted pigeon pea (BSMR-736 variety) through pulse magic spray and improved production technology to convincing the farmers for enhancing the productivity of pigeon pea. The results noticed that due to front line demonstration on pulse magic spray on transplanted pigeon pea (BSMR-736) on an average yield was recorded 28.57 q/ ha under demo plots (T₁: pulse magic sprayed field) as compared check 25.14 q/ha (T₂: no pulse magic spray) which was 13.64 % higher yield over the check plot. On an average the T₁ recorded higher yield parameter like no. of pods/plant (1365), No. of seeds/ pod (3.5 seeds/pod), pod 100 seed weight (11.34 g), seed yield per plant (220 g/plant) and litter yield per ha (20 q/ha) and higher net returns compared to check (T₂).

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

INTRODUCTION

Pigeon pea is the second most important pulse crop in the country after bengalgram in India. The ability of pigeon pea to produce high economic yields under irrigated condition. It has good nutritive value like protein 22.3 % and fat 1.7 % and dried leaves and grains of pigeon pea are used as fodder for animals. In Karnataka, pigeon pea is largely grown in northern parts, especially in Gulbarga, Bijapur and Bidar districts. District of Kalaburagi, pigeon pea occupies an area of 3.75 lakh ha with average productivity of 560 kg ha⁻¹ (Anon, 2013). The level of productivity of pulses in India lies between 550-650 kg/ha, which is far below when compared to average productivity of the world.

Pulse magic is new product developed in the year of 2014 from KVK Kalaburagi, University of Agricultural Science Raichur, Karnataka state which contains the mixture of nitrogen 10 %, phosphorus 40 %, micro nutrients 03 % and PGR 20 ppm. Supplying pulse magic nutrients at reproductive stage of crop will helpful to reduce the flower drop and getting higher yield. Transplanting method of pigeon pea cultivation is one of the recently adopted technique in the Gulbarga and gaining importance in pigeon pea growing farming community as it is said to improves both production and productivity. Keeping this in view, front line demonstrations of transplanted pigeonpea with pulse magic spray were conducted, to demonstrate the productivity potential and economic benefit of improved technologies under real farmer's conditions.

MATERIALS & METHODS

Participatory Rural Appraisal (PRA) method and group discussions were held by the team of Krishi Vigyan

Kendra (KVK), Kalaburagi, Karnataka scientists to identify the various problems like use of local varieties, method of sowing, nutrient supply, flower drop and pod setting at the field level. Finally, the problems were prioritized and improved production technologies were designed by involving farmers and scientists of KVK. Front line demonstrations (40) on improved production technologies in pigeon pea were conducted at 40 farmer's fields of different villages in Gulbarga district during *Kharif* season of 2014-15 under transplanting with irrigated condition on heavy soils under Pigeon pea - Chickpea cropping system. Initial status of available N, P and K in soil of different farmers field were 188-276, 13-34 and 240-389 kg/ha, respectively with 6.8-7.9 pH. Each demonstration was conducted in an area of 0.4 ha adjacent to the plots of check. There were two treatments, one is recommended practices with pulse magic spray comprising varieties of pigeon pea (BSMR-736), 25:50:00:15 NPK,Zn kg/ha + Rhizobium + PSB @ 20 g/kg seed and integrated pest management (deep ploughing + seed treatment with *Trichoderma viride* @ 5 g/kg seed + pheromone trap @ 10/ha + Bird perches @ 50/ha + spray of Acephate @ 1 g/l) were tested under demonstrations. Seeds were sown in plastic bag in month of may 2nd week and transplanted seedlings to main field in last week of june with a spacing of 6 feet × 2.5 feet and seed rate was 2.5 kg/ha. An entire dose of N and P through diammonium phosphate and Zn was applied as basal before sowing. Fields were irrigated two times, one at prior to sowing and anther at pre-flowering stage. Nipping at 30 days after transplanting followed. Pulse magic sprayed two times to crop. The pulse magic contains 10 % of nitrogen, 40 % of phosphorus, 3 % of micronutrients and 20 ppm PGR. 10 g of nutrient mixture and 0.5 ml of

tonic mixed in one liter water sprayed two times in pigeon pea, first spray at 50 % flowering stage and 2 nd spray at 15 days after first spray of pulse magic.

T2: second treatment consist of all the practices of treatment one (T1) except pulse magic spray. The yield data were collected from both the demonstration (T1) and (T2) check by random crop cutting method. Five plants were tagged at random in net plot area for recording various yield components like number of pods per plant, number of seeds per pod, seed yield per plant (g), 100-seed weight (g), seed yield (kg ha⁻¹) was computed by threshing pods from net plot, cleaned and the seeds weight was recorded. From this seed yield per hectare was computed. The net return (Rs. ha⁻¹) was calculated by deducting cost of cultivation (Rs. ha⁻¹) from gross returns and B: C was worked out as a ratio of gross returns (Rs. ha⁻¹) to cost of cultivation (Rs. ha⁻¹).

RESULTS & DISCUSSION

The data on yield components, seed yield, stalk yield, litter yield, net returns and B: C are presented in table (1) and (2). The average seed yield (T₁: 2857 kg ha⁻¹) and stalk yield (T₁: 4365 kg ha⁻¹) of pigeon pea (BSMR-736) under pulse magic sprayed plot was found to be higher seed yield compared to check plot (T₂: 2514 kg ha⁻¹) and (T₂: 4113 kg ha⁻¹) respectively. The demonstrated plot was 13.64 % higher seed yield over the check plot. Increased seed and stalk yield in pulse magic sprayed plot due to supplemental irrigation and supplying nutrients to plants at reproductive stages will increase the pod setting and reduce the flower drop of pigeon pea. This was due to the higher in yield components viz., number of pods per plant, number of seeds per pod, seed yield per plant, 100-seed weight. Prakash *et al.* (2003) reported that combined foliar application of NAA @ 30 ppm and mepiquat chloride @ 120 ppm recorded increased yield by 25 per cent. Foliar application of micronutrients at flowering and 20 days after first spray would have helped for reducing flower drop and contributed more for reproductive parts resulting in increased number of pods plant⁻¹. The results are in agreement with those of Chittapur *et al.* (1994).

Increased seed yield of pigeon pea due yield parameters like number of pods per plant, number of seeds per pod, seed weight per plant and also 100-seed weight presented in table 2. The higher number of pods per plant (1365), number of seeds per pod (3.5), seed weight per plant (535.65 g) and also 100-seed weight (11.34 g) noticed in demonstrated plot compared to check plot (T₂: 1294, 3.2 g, 461.87 g and 11.10 g, respectively). The seed weight per plant is governed by yield components like number of pods per plant, number of seeds per pod and also 100-seed weight. 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 in soybean (Jayabal *et al.* 1999). Foliar application of nutrient and growth regulator at pre flowering and flowering stage was seen on reduction in flower drop percentage in green gram. Number of flowers plant⁻¹ was greater with the foliar application of 50 ppm salicylic acid at 24DAS (Pramod Kumar *et al.*, 1999). Sharma *et al.* (1993) reported that salicylic acid enhanced the seed yield of soybean through early floral bud initiation, more flowers and pods plant.

Data in table (2) noticed that the cost involved in the adoption of improved technology (pulse magic spray) in transplanted pigeonpea (BSMR-736) varied and was more profitable. The cultivation of pigeon pea with foliar application of pulse magic spray gave higher. An average net return of Rs. 98919 per ha as compared to control plot (Rs 84584 per ha) in 2014-15. The B:C of demonstration field is 4.74 as compared to check plot practice 3.85. Similar findings were reported by Singh *et al.* (2014). The benefit cost ratio of transplanted pigeon pea (BSMR-763) cultivation under improved and cultivation practices higher than farmer's practices in that year and this may be due to higher yield obtained under improved technologies compared to farmers practice. Yadav *et al.* (1997) reported that Foliar application of 1.0% WSF at both peak flowering and pod development stages recorded higher gross returns (68,049 ha⁻¹) and net returns (46,299 ha⁻¹). Foliar application of nutrients has shown significant effect on nutrient uptake by the crop. Foliar spray of 1.0% WSF increased the nutrient uptake of N, P and K followed by 0.75% WSF. Lower uptake of nutrients was recorded with control.

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TABLE 1: Effect of pulse magic on yield attributes and yield of transplanted pigeon pea

Year	No of Demons trations	Area (Ha)	No of (pods/plant)		seed yield (g/plant)		No of (seeds / pod)		100 seed weight (g)		seed yield (q / ha)		% increase yield over check	litter yield (q/ha)		stalk yield (q / ha)	
			T ₁	T ₂	T ₁	T ₂	T ₁	T ₂	T ₁	T ₂	T ₁	T ₂		T ₁	T ₂	T ₁	T ₂
2014-15	40	16	1365	1294	538.45	461.87	3.5	3.2	11.34	11.1	28.57	25.14	13.64	20.64	19.38	43.65	41.13

T₁ : All practices as per package of practice with pulse magic application in transplanted pigeon pea

T₂ : Only package of practice and no pulse magic spray

TABLE 2: Effect of pulse magic on economics of transplanted pigeon pea

Year	No of Demonstrations	Area (Ha)	Cost of cultivation (Rs./ha)		Gross return (Rs./ha)		net return (Rs./ha)		B:C	
			T ₁	T ₂	T ₁	T ₂	T ₁	T ₂		
2014-15	40	16	29646	28546	128565	113130	98919	84584	4.34	3.96

T₁ : All practices as per package of practice with pulse magic application in transplanted pigeon pea

T₂ : Only package of practice and no pulse magic spray