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Assessment and Impact studies of sowing methods in pulses production

[1] Krishnakumar S, [2] Chelvi Ramessh, [3] Balaji T, [4] Selvi J, [5]Arul Arasu P, [6] Jegadeesan M and [7] Krishna Surendar K

[1, 3]Assistant Professor, ICAR - Krishi Vigyan Kendra, Virudhunagar, Tamil Nadu, India

[2] Programme Coordinator, ICAR -Krishi Vigyan Kendra, Virudhunagar, Tamil Nadu, India

[4, 5]Assistant Professor, ICAR -Krishi Vigyan Kendra, Madurai, Tamil Nadu, India

[6]Assistant Professor, ICAR -Krishi Vigyan Kendra, Ramanathapuram, Tamil Nadu, India

[7]Assistant Professor, Regional Research Station, Virudhunagar, Tamil Nadu, India

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Corresponding Author: Balaji T

Abstract

The United Nations, declared 2016 as "International Year of Pulses" (IYP) to enhance public understanding of the nutritional benefits of pulses as part of sustainable food production and productivity aimed at food security and nutrition. The trial was taken up during Rabi 2019 under irrigated condition in Melavalavu and Keelaiyur villages of Kottampatti and Melur blocks respectively. Soil type is sandy clay loam with a seasonal rainfall of 380 mm in 16 rainy days. The soil was inclay loam with a pH of 7.6 (neutral pH), EC of 0.56 dS/m (Normal soil) and organic carbon percentage is 0.31 (low status). The soil fertility status of available nitrogen is low (205 kg /ha), available phosphorus is medium (16 kg / ha) and available potassium is high (300 kg / ha). Micronutrients such as Fe and Zn deficiency commonly occurred in all pulses grown soils of Virudhunagar District. Totally ten farmers were selected for conducting Front Line Demonstration (FLD). TO1: Farmers' practice - Broadcasting; TO_2: Dibbling; TO_3: Seed drill sowing. Integrated crop management technologies Maximum yield (848.6 kg/ha) was obtained in Technology option 2 (Seed drill sowing) with higher cost benefit ratio of 3.20 as compared to Dibbling method of sowing (BCR ratio -2.64). The yield was minimum (620 kg/ha) with the BCR of 2.19 in broad cast method of sowing at Melavalavu village, Kottampatti Block (2019-20). Maximum yield (785.4 kg/ha) was obtained in Technology option 2 (Seed drill sowing) with higher cost benefit ratio of 2.96 as compared to Dibbling method of sowing (BCR ratio - 2.59). The yield was minimum (630 kg/ha) with the BCR of 2.23 in broad cast method of sowing at at Keelaiyur village, Melur Block (2019-20).

Keywords: Blackgram, dibbling, seed drill sowing, yield, economics

Introduction

Pulses are an included part to many diets across the globe and they have great potential to get better human strength, conserve our soil, protect the environment and contribute to global food security. Blackgram is scientifically known as *Vigna mungo* (L.) and commonly known as urd in India. It is a tropical leguminous plant. Blackgram (*Vigna mungo* L.) Vamban 8 (VBN 8) is an significant variety in Tamil Nadu. This crop has a short duration (65-70 days) and self pollinated legume crop cultivated in almost all parts of Tamil Nadu growing in all season. It contain protein 21.9% and Arabinose 7.5%. It is mostly grown as rainfed cropin Tamil Nadu. India has the largest production and consumption of blackgram in the world. In India, blackgram is cultivated in 4.83 m ha with a production of 3.36 mt in Tamil Nadu, It is cultivated in 4.30 lakh ha with a production of 3.11 lakh t. (Annual report, 2019) [1]. It has protein (25 – 26%), carbohydrates (60%), fat (1.5%), minerals, amino acids and vitamins (Archana *et al*., 2018; Rambabu *et al*., 2018) [3]. Mungbean Yellow Mosaic Virus (MYMV) is the most prevalent and destructive viral pathogen in blackgram. It causes yield loss of 80 to 100% and also reduces the seed quality as reported. Manual sowing of pulses requires high cost and also the area coverage is less. Besides, due to suboptimal plant population in manual sowing method is the main reason for reduced yield. In order to assess the different sowing methods in pulses, this OFT was laid out.

Materials and methods

Madurai district comes under Periyar Vaigai Command area. Tank and canal water are the main source of irrigation. Pulse is cultivated throughout year both under irrigated and rainfed condition. The trial was taken up during Rabi 2019 under irrigated condition in Melavalavu and Keelaiyur villages of Kottampatti and Melur blocks respectively. Soil type is sandy clay loam with a seasonal rainfall of 380 mm in 16 rainy days. The soil was inclay loam with a pH of 7.6 (neutral pH), EC of 0.56 dS/m (Normal soil) and organic carbon percentage is 0.31 (low status). The soil fertility status of available nitrogen is low (205 kg /ha), available phosphorus is medium (16 kg / ha) and available potassium is high (300 kg / ha). Micronutrients such as Fe and Zn deficiency commonly occurred in all pulses grown soils of Virudhunagar District. Totally ten farmers were selected for conducting Front Line Demonstration (FLD). TO1:

Farmers' practice - Broadcasting; TO2: Dibbling; TO3: Seed drill sowing. Integrated crop management technologies *viz.*, seed treatment with biofertilizers, foliar spray of pulse wonder during flowering stage, Integrated pest and disease management were followed. Blackgram variety VBN 11 released during 2020 and it was used for this trial. The duration of the variety is 70 - 75 days. It is resistant to yellow mosaic virus and leaf curl virus diseases.

Results and Discussion

Maximum yield (848.6 kg/ha) was obtained in Technology option 2 (Seed drill sowing) with higher cost benefit ratio of 3.20 as compared to Dibbling method of sowing (BCR ratio -2.64). The yield was minimum (620 kg/ha) with the BCR of 2.19 in broad cast method of sowing at Melavalavu village, Kottampatti Block (2019-20). Maximum yield (785.4 kg/ha) was obtained in Technology option 2 (Seed drill sowing) with higher cost benefit ratio of 2.96 as compared to Dibbling method of sowing (BCR ratio - 2.59). The yield was minimum (630 kg/ha) with the BCR of 2.23 in broad cast method of sowing at at Keelaiyur village, Melur Block (2019-20) presented in Table 1 & 2. Similar kind of results obtained by Singh *et al*., 2017 [4]. The detailed farmers list and their results were shown in Table 3 & 4. The average Number of pods /plant, Number of seeds /pod and Grain yield (kg/ha) is 21.4, 6.3 and 848.6 respectively at Melavalavu village, Kottampatti Blcok. The average Number of pods /plant, Number of seeds /pod and Grain yield (kg/ha) is 21.6, 6.2 and 785.4 respectively at Keelaiyur villag, Melur Block. VBN 8 recorded a highly resistant reaction to Mungbean Yellow Mosaic Virus disease, Urdbean Leaf Crinkle Virus disease and it showed a moderate resistance to powdery mildew disease.

Impact of specific technologies

Pulses are cultivated in 9290 ha in Madurai District in which black gram (1225 ha) and Green gram (2738 ha) occupy an area of 3953 hectares. In pulse cultivation, delayed sowing and sub optimal plant population are observed as the major problems. In order to overcome these problems, tractor drawn seed drill was popularized among the farmers of Madurai District to enhance the productivity by maintaining optimum plant population and taking up timely sowing. Moreover, by using the tractor drawn seed drill the seed rate for pulses is reduced which results in reduction in cost of cultivation. Krishi Vigyan Kendra, Madurai popularized the tractor drawn seed drill among the farmers of Madurai District in convergence with the State Department of Agriculture under Seed Hub scheme. A total area of 137 ha pulse sowing is covered in the KVK adopted villages. Yield under normal sowing method (Check) is recorded as 7.1 quintols/ ha whereas the yield in pulses using tractor drawn seed drill (Demo) was recorded as 8.6 quintols/ ha. Hence, an additional yield of 1.5 quintols/ ha was recorded by using this tractor drawn seed drill with 21.13 percentage yield increase A total amount of Rs.3500/ha - is reduced in the seed cost using this seed drill. Net return obtained through manual sowing of pulses was Rs 10925/ha where as it was Rs. 18075/ha in pulse sowing by tractor drawn seed drill with an additional net return of Rs.7150/ha. Benefit cost ratio recorded in check was 1:1.44 while B:C ratio in mechanized sowing of pulses was 1: 1.88. Due to the advantages of mechanized pulse sowing, In Madurai District, tractor drawn seed drill sowing was adopted in 949 hectares in convergence with State Department of Agriculture.

Feedback from the farmers

Seed drill sowing ensures uniform germination and optimum population. Weeding operation becomes easy in view of line sowing. Area coverage (2ha/day) is more when compared to dibbling method. Seed drill sowing is effective for pulse cultivation as it requires less labour and time.

Table 1: Performance of the technology at Melavalavu village, Kottampatti Block (2019-20)

Technology Option	No. of trials	Yield (kg/ha)	Net Returns (Rs./ha)	B:C ratio
FP: Farmers' Practice (Broadcasting)	5	620.0	21900	2.19
TO 1: Technology 1(Dibbling)		724.0	29260	2.64
TO 2: Technology 2(Seed Drill sowing)		848.6	37909	3.20

Table 2: Performance of the technology at Keelaiyur village, Melur Block (2019-20)

Technology Option	No. of trials	Yield (kg/ha)	Net Returns (Rs./ha)	B:C ratio
FP: Farmers' Practice (Broadcasting)	5	630.0	22550	2.23
TO 1: Technology 1(Dibbling)		710.0	28350	2.59
TO 2: Technology 2(Seed Drill sowing)		785.4	33801	2.96

Table 3: FLD farmer's details and economic analysis of Blackgram at Melavalavu village, Kottampatti Block (2019-20)

S No.	Name of Farmer	Village	Dist.	Variety	Crop	Area (ha)	Number of pods /plant	Number of seeds /pod	Grain yield (kg /ha)	B:C ratio
1	Nataraj. G	Melavalavu	Madurai	Vamban 8	Blackgram	0.4	20.5	5.7	851.5	3.03
2	Rajaram. V	Melavalavu	Madurai	Vamban 8	Blackgram	0.4	21.5	6.4	894.4	3.19
3	Pitchai. R	Melavalavu	Madurai	Vamban 8	Blackgram	0.4	20.3	6.1	873.7	3.11
4	Selvaraj. V	Melavalavu	Madurai	Vamban 8	Blackgram	0.4	18.8	5.4	822.6	2.93
5	Ayyavur. T	Melavalavu	Madurai	Vamban 8	Blackgram	0.4	22.0	6.5	801.1	2.85
	Mean					0.4	21.4	6.3	848.6	3.02

Table 4: FLD farmer's details and economic analysis of Blackgram at Keelaiyur village, Melur Block (2019-20)

S. No.	Name of Farmer	Village	Dist.	Variety	Crop	Area (ha)	Number of pods /plant	Number of seeds /pod	Grain yield (kg /ha)	B:C ratio
1	Paulraj. B	Keelaiyur	Madurai	Vamban 8	Blackgram	0.4	20.8	5.8	739.0	2.63
2	Pandi. A	Keelaiyur	Madurai	Vamban 8	Blackgram	0.4	21.9	6.5	781.9	2.78
3	Meenakshi. S	Keelaiyur	Madurai	Vamban 8	Blackgram	0.4	20.4	5.9	754.2	2.69
4	Gurusami. A	Keelaiyur	Madurai	Vamban 8	Blackgram	0.4	19.2	5.8	750.5	2.67
5	Ramasami. C	Keelaiyur	Madurai	Vamban 8	Blackgram	0.4	22.1	6.4	788.6	2.81
	Mean					0.4	21.6	6.2	785.4	2.80

Conclusion

The trials in Melavalavu and Keelaiyur villages showed that seed drill sowing (Technology Option 2) for blackgram significantly outperformed broadcasting and dibbling methods. Seed drill sowing achieved the highest yields and benefit-cost ratios: 848.6 kg/ha and 3.20 in Melavalavu, and 785.4 kg/ha and 2.96 in Keelaiyur. This method improved plant population, reduced seed rates, and lowered cultivation costs, resulting in higher net returns. Farmers noted benefits like uniform germination and easier weeding. Thus, seed drill sowing is recommended for enhancing productivity and profitability in blackgram cultivation.

References

1. Directorate of Pulses Development, Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India. Annual Report - 2018-19; c2019.
2. Archana SV, Padmaja AS, Nagaraju N, Manjunatha N. Management of yellow mosaic disease (YMD) of blackgram (*Vigna mungo* L.) in Southern dry zone of Karnataka. Journal of Entomology and Zoology Studies. 2018;6(3):860-863.
3. Rambabu E, Anuradha C, Sridhar V, Sokka Reddy S. Identification of molecular markers linked to yellow mosaic virus resistance in blackgram (*Vigna mungo* (L.) Hepper). International Journal of Current Microbiology and Applied Sciences. 2018;7(2):3810-3817.
4. Singh RK, Dawson J, Srivastava N. Effect of sources of nutrients on growth and yield of blackgram (*Vigna mungo* L.) varieties in NEPZ of India. Journal of Pharmacognosy and Phytochemistry. 2017;6(4):1064-1066.
5. Bandekar PA, Putman B, Thoma G, Matlock M. Cradle-to-grave life cycle assessment of production and consumption of pulses in the United States. Journal of Environmental Management. 2022 Jan 15;302:114062.