

# Integrated nutrient management for sustaining the productivity of irrigated blackgram

S. Krishnaprabu

Assistant Professors, Department of Agronomy, Faculty of Agriculture, Annamalai University, Annamalainagar – 608 002, Tamilnadu

## Abstract

Field experiment was conducted during March - May 2017 with a set of ten treatments comprising of organic and inorganic sources of nutrients. The organic manures treatments comprised vermicompost, farmyard manure, panchagavya, inorganic fertilizers alone and in combination with inorganic sources of nutrients was found to be superior for attaining soil and plant nutrient, yield and improve the economics of the crop. It was concluded that application recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha<sup>-1</sup> + Vermicompost @ 5 t ha<sup>-1</sup> + Four spray of panchagavya @ 4 per cent at 15, 25, 30 and 45 DAS (T<sub>10</sub>) recorded the highest seed yield and highest benefit cost ratio compared with rest of the treatments.

**Key words:** Integrated nutrient management, Vermicompost, Seed yield and Benefit cost ratio.

## Introduction

Blackgram (*Vigna mungo* (L.) Hepper) is one of the most important pulse crop in India. Blackgram is an excellent source of high-quality protein, the importance of this crop among other pulse crops is by virtue of its high nutritional value, short duration, adaptability to all seasons and suitability to various cropping systems. It can be used as a rich source of protein and mineral feed for cattle. It contains about 24 per cent protein, 67 per cent carbohydrate, 3.5 per cent fibre and 1.74 per cent fat.

It also helps in preventing soil erosion. Being a short duration crop and adaptability to off-season, it fits well in many intensive crop rotations. Blackgram is a short duration pulse crop which is grown in India in an area of 31.9 lakh hectares having the production of 19.0 lakh tonnes with productivity 596 kg ha<sup>-1</sup> (Anonymous 2014).

Use of organic manures in soil plays a vital role in the maintenance of native soil fertility. It not only increases the moisture holding capacity of the soil but also plays an important role in soil and water conservation by their binding and aggregation properties.

Singh *et al.* (2016) reported that integrated nutrient management plays a key role in modern agriculture in increasing the productivity of crops and sustained management of soil fertility. Keeping in this view the present investigation is undertaken to study the “Integrated nutrient management in blackgram under irrigated condition”.

## Materials and Methods

The field experiment was carried out during March to May 2017 at Experimental Farm, Annamalai University, Annamalainagar. The soil was clay soil having pH of 8.0, electrical conductivity 0.48 and organic carbon 0.5 per cent. The experiment was laid out in randomized block design with three replications including ten treatments. The treatment were T<sub>1</sub> - Recommended dose of fertilizer (RDF) 25:50:25 kg NPKha<sup>-1</sup>, T<sub>2</sub> - Recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha<sup>-1</sup> + FYM @ 12.5 t ha<sup>-1</sup>, T<sub>3</sub> - Recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha<sup>-1</sup> + Vermicompost @ 5 t ha<sup>-1</sup>, T<sub>4</sub> - Recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha<sup>-1</sup>+ Seed treatment of Panchagavya @ 3-4 ml kg<sup>-1</sup>, T<sub>5</sub> - Recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha<sup>-1</sup> + FYM @ 12.5 t ha<sup>-1</sup> + Two spray of Panchagavya @ 3 per cent at 15 and 30 DAS, T<sub>6</sub> - Recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha<sup>-1</sup> + FYM @ 12.5 t ha<sup>-1</sup> + Three spray of Panchagavya @ 3 per cent at 15, 30 and 45 DAS, T<sub>7</sub> - Recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha<sup>-1</sup> + FYM @ 12.5 t ha<sup>-1</sup> + Four spray of Panchagavya @ 4 per cent at 15, 25, 30 and 45DAS, T<sub>8</sub> - Recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha<sup>-1</sup> + Vermicompost @ 5 t ha<sup>-1</sup> + Two spray of Panchagavya @ 3 per cent at 15 and 30 DAS, T<sub>9</sub> - Recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha<sup>-1</sup> + Vermicompost @ 5 t ha<sup>-1</sup> + Three spray of Panchagavya @ 3 per cent at 15, 30 and 45 DAS, T<sub>10</sub> - Recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha<sup>-1</sup> + Vermicompost @ 5 t ha<sup>-1</sup> + Four spray of Panchagavya @ 4 per cent at 15, 25, 30 and 45 DAS.

## Results and Discussion

### Yield

The results showed the integrated nutrient management approach significantly influenced on yield components *viz.*, number of pods plant<sup>-1</sup>, number of seeds pod<sup>-1</sup>, hundred seed weight (g), seed yield and benefit cost ratio. Among the various treatments tested application of recommend dose of fertilizer (RDF)

25:50:25 kg NPK ha<sup>-1</sup> + Vermicompost @ 5 t ha<sup>-1</sup> + Four spray of Panchagavya @ 4 per cent at 15, 25, 30 and at 45 DAS significantly influenced the yield components compared with only application of recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha<sup>-1</sup> (Table 1). Digamber Prasad *et al.* (2014) reported that application of recommended dose of fertilizer (10 per cent N of RDF) @ 20:30:15 kg NPK ha<sup>-1</sup> and farmyard manure @ 4 t ha<sup>-1</sup> recorded higher seed yield in blackgram.

Vijayalakshmi (2005) reported that application of three per cent panchagavya at 15, 25 and 40 DAS significantly influenced the number of pods per plant, seeds per pod, test weight and increased the seed yield of blackgram under irrigated condition.

### Economics

The field studies are results indicated that application of vermicompost with inorganic fertilizer along with panchagavya spray registered the highest net return per rupees during March – May 2017.

The increased net return could be explained on the basis of increased yield under the influence of sources of inorganic nutrients in the present investigation. Further, the benefit cost ratio was decreased due to application of organic sources viz., farmyard manure and vermicompost because of the higher cost involved in applying the organic sources. Significantly increase net return and benefit cost ratio due to inorganic sources of nutrient under the present study are in close agreement with the findings of Shashikumar *et al.* (2013).

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**Table 1. Effect of integrated nutrient management practices on seed yield, 100 seed weight, no. of seeds pod<sup>-1</sup> and benefit cost ratio of irrigated blackgram**

Treatments	Seed yield (kg ha <sup>-1</sup> )	100 seed weight (g)	No. of seeds pod <sup>-1</sup>	Benefit cost ratio
T <sub>1</sub>	433	3.36	5.06	1.80
T <sub>2</sub>	565	3.56	5.46	2.27
T <sub>3</sub>	649	4.01	6.52	2.47
T <sub>4</sub>	626	3.89	6.16	2.44
T <sub>5</sub>	475	3.49	5.20	1.95
T <sub>6</sub>	601	3.67	5.88	2.37
T <sub>7</sub>	732	4.13	6.88	2.77
T <sub>8</sub>	775	4.22	7.26	2.89
T <sub>9</sub>	836	4.39	7.52	3.07
T <sub>10</sub>	895	4.52	7.89	3.25
S.E <sub>d</sub>	11.28	0.03	0.07	-
CD (p = 0.05)	22.56	0.06	0.15	-