

Improving of irrigated blackgram yield and profitability through integrated nutrient management

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Abstract

Field experiment was conducted during March-May 2017 study the effect of productivity and nutrient uptake as influenced by integrated nutrient management. The result indicated that application of recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha⁻¹ + Vermicompost @ 5 t ha⁻¹ + Four spray of panchagavya @ 4 per cent at 15, 25, 30, 45 and DAS recorded significantly higher seed yield and nutrient uptake.

Key words: Integrated nutrient management, Nutrient uptake, Productivity and Irrigated blackgram.

Introduction

Pulses are commonly known as food legumes which are secondary to cereals in production and consumption in India. Pulses are an important source of dietary protein, energy, minerals and vitamins for the mankind. Pulses provide 25 per cent of protein requirements of predominantly vegetarian population. The World Health Organization (WHO) recommends a per capita consumption of pulses at 80 g per day and the Indian Council of Medical Research has recommended a minimum consumption of 47 g.

It occupies about 3.25 million ha area in the country producing 1.5 million tonnes of seed with the average productivity of 462 kg/ha (AICRP, 2013). Combined application of chemical fertilizers, organic manures and improved blackgram productivity.

Materials and Methods

A field experiment was conducted during March to May 2017, at Experimental Farm, Department of Agronomy, Annamalai University to study the effect of productivity and nutrient uptake as influenced by integrated nutrient management in blackgram. The soil sample was collected from clay loam; pH 8.0, electrical conductivity 0.48 and organic carbon 0.5 per cent. The experiment was laid out in randomized

block design with ten treatments and three replications. The ten treatments were T₁ - Recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha⁻¹, T₂ - Recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha⁻¹ + FYM @ 12.5 t ha⁻¹, T₃ - Recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha⁻¹ + Vermicompost @ 5 t ha⁻¹, T₄ - Recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha⁻¹ + Seed treatment of Panchagavya @ 3-4 ml kg⁻¹, T₅ - Recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha⁻¹ + FYM @ 12.5 t ha⁻¹ + Two spray of Panchagavya @ 3 per cent at 15 and 30 DAS, T₆ - Recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha⁻¹ + FYM @ 12.5 t ha⁻¹ + Three spray of Panchagavya @ 3 per cent at 15, 30 and 45 DAS, T₇ - Recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha⁻¹ + FYM @ 12.5 t ha⁻¹ + Four spray of Panchagavya @ 4 per cent at 15, 25, 30 and 45 DAS, T₈ - Recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha⁻¹ + Vermicompost @ 5 t ha⁻¹ + Two spray of Panchagavya @ 3 per cent at 15 and 30 DAS, T₉ - Recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha⁻¹ + Vermicompost @ 5 t ha⁻¹ + Three spray of Panchagavya @ 3 per cent at 15, 30 and 45 DAS, T₁₀ - Recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha⁻¹ + Vermicompost @ 5 t ha⁻¹ + Four spray of Panchagavya @ 4 per cent at 15, 25, 30 and 45 DAS.

The blackgram crop was fertilizer with 25:50:25 kg of NPK ha⁻¹ in the form of urea, single superphosphate and muriate of potash, half dose of nitrogen, full dose of P₂O₅ and K₂O were given as basal application. The remaining nitrogen were given before flowering stage as per the treatment schedule. Blackgram varieties cv. ADT 5 was shown at a spacing of 30 × 10 cm during March – May 2017. Agronomic techniques and need based plant protection measures were taken up based on the economic thresh hold level of pest and diseases, seed yield was recorded at statistically harvest analysed and nutrient uptake was analysed for plant nutrient content.

Results and Discussion

Seed yield

Application of recommended dose of fertilizer (RDF) 25:50:25 kg NPK ha⁻¹ was recorded higher seed yield. Patil *et al.* (2012) found that application of panchagavya @ 3 per cent at flower initiation and 15 days after first spray recorded significantly higher seed yield, haulm yield, number of pods per plant and 100 seed weight (20.91) compared to other treatment combination.

The highest seed and haulm yield in this treatment was mainly due to the fact that under favourable soil condition, the plant accumulates and translocation of photosynthates from source to the sink more efficiently which in turn increased all the growth and yield components. Similar results were also reported by Jadhav *et al.* (2008).

Integrated nutrient management significantly influenced on yield parameters like number of pods per plant, number of seeds per pod. Integrated nutrient management system involving organics like farmyard manure and chemical fertilizers is a better way to achieve higher seed yield and yield attributes. The growth and yield of crop plants are inter dependent and are determined by the presence of sufficient quantities of available form of nutrients in soil for plant uptake is reported by Gable *et al.* (2008).

Nutrient uptake

Application of recommended dose of fertilizer (RDF) 25:50:25 kg NPK kg⁻¹ was reward higher nutrient uptake. Paul Sebastian and Christopher Lourdraj (2007) claimed that organic foliar fertilization of panchagavya significantly recorded higher nutrient uptake of nitrogen (69.5 kg ha⁻¹), phosphorus (9.8 kg ha⁻¹) and potassium (46.5 kg ha⁻¹). The reason for higher NPK could be attributing to nutrient and plant growth regulators (Indole Acetic Acid, Gibberellic acid) content of panchagavya helped the plant for accumulation of higher dry matter production.

Kumar *et al.* (2011) reported that application of farmyard manure at 5 t ha⁻¹ significantly improved the available NPK in soil compared to no application of farmyard manure. These findings are in accordance with the reports of above the authors.

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Table 1. Effect of integrated nutrient management practices on seed yield and nutrient uptake of nitrogen, phosphorus and potassium of irrigated blackgram

Treatments	Seed yield (kg ha ⁻¹)	Nitrogen (kg ha ⁻¹)	Phosphorus (kg ha ⁻¹)	Potassium (kg ha ⁻¹)
T ₁	433	38.26	6.25	39.63
T ₂	565	41.45	7.64	45.12
T ₃	649	49.26	10.14	52.15
T ₄	626	46.77	9.02	49.35
T ₅	475	39.96	7.01	43.63
T ₆	601	43.92	8.24	47.24
T ₇	732	52.95	11.96	54.12
T ₈	775	54.91	12.24	56.65
T ₉	836	57.36	13.56	58.16
T ₁₀	895	60.24	14.16	60.05
S.Ed	11.28	0.94	0.09	0.59
CD (p= 0.05)	22.56	1.88	0.18	1.19