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Effect of Organic, Inorganic Sources of Nutrients and Integrated Nutrient Management on Yield and Economic of Blackgram (*Vigna mungo* L.)

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ABSTRACT

Nitrogen is an essential nutrient for plant growth and development but is unavailable in its most prevalent form as atmospheric nitrogen. Legumes are play the major role of natural nitrogen fixation in soil. Legumes are N-fixing systems that have long been used for biological nitrogen fixation in agriculture.The field experiment was conducted during *kharif* 2018 on "Effect of organic, inorganic sources of nutrients and integrated nutrient management on yield and economic of blackgram". The treatment comprised nine organic and inorganic sources of nutrients. The experiment was laid out in Randomized Block Design with three replication.The experimental results revealed that the application of 100% N through 20 q/ha compost recorded significantly higher grain yield (8.93 q ha^{-1}) over the remaining treatments except in case of 50% inorganic + 50% compost + *Rhizobium* which yielded 8.64 q/ha grain. The maximum gross monetary returns (Rs 46542 ha^{-1}), net monetary returns (Rs 20582 ha^{-1}) and B:C ratio (1.79) were recorded under treatment 100% N through 20 q/ha compost as compared to rest of the treatments.

Keywords Organic, Inorganic sources, Integrated Nutrient, Yield and economic, Blackgram.

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INTRODUCTION

Blackgram (*Vigna mungo* L.) belongs to the family Fabaceae sub-family Papilionaceae is being grown as one of the principal pulse crops. It is the perfect combination of all the nutrients, which includes proteins (25-26%), carbohydrates (60%), fat (1.5%), minerals, amino-acids and vitamins. The dry seeds are good source of phosphorus. It also has very high calorie content. The 100 g seeds of blackgram has 347 calories. India is the world's largest producer as well as consumer of blackgram. It produces about 1.5 to 1.9 million tons of urad annually from about 3.5 million hectares of area, with an average productivity of 500 kg ha^{-1}. India annually produces around 1.3-1.5 million tonnes of blackgram, which is approximately

10% of India's total pulse production (Anonymous 2018).

Integrated nutrient management (INM) is an integral part of the sustainable agriculture which requires the management of resources in a way to fulfill the changing human needs without deteriorating the quality of environment and conserving vital natural resources. It comprises of application of organic manures, green manures, blue-green algae, biofertilizers and crop rotation with legumes along with minimum use of chemical fertilizers to produce optimum crop yield without deteriorating the soil health.

MATERIALS AND METHODS

The field experiment was conducted during *kharif* season 2018 at the Research Farm, College of Agriculture, Rewa, Madhya Pradesh. The soil of experimental field was sand clay loam in texture, medium in organic corban, available N, P and K and neutral in soil reaction. The experiment was laid out in Randomized Block Design with three replications. The treatment comprised nine organic and inorganic sources of nutrients. T_1 - Control, T_2 - 100% N (inorganic) 20 kg N ha^{-1}, T_3 - 100% N (compost) 20 q ha^{-1},T_4 - 50% N (inorganic) + 50% N (compost), T_5 - 50% N (inorganic) + 25% N (compost), T_6 - 25% N (inorganic) + 50% N (compost), T_7 - 50% N (inorganic) + 25% N (compost) + *Rhizobium*, T_8 - 25% N (inorganic) + 50% N (compost) + *Rhizobium*, T_9 - 50% N (inorganic) + 50% N (compost) + *Rhizobium*.

Blackgram variety "Uttara" were raised in experimental field on 20 July 2018 pretreated seeds was sown at the crop geometry of 30 cm × 5-8 cm in all the plot. A package and practiced were adopted as recommended by College of Agriculture, Rewa.

RESULTS AND DISCUSSION

Effect on yield

The data of *kharif* season 2018 pertaining to yield as influenced by different treatment is presented Table 1.

Among the treatment, highest grain yield (8.93 q ha^{-1}) recorded under application 100% N through 20 q ha^{-1} compost and it was at par with treatment 50% inorganic + 50% compost + *Rhizobium*, whereas control plots produced the lowest grain yield (4.88 q ha^{-1}). Saket *et al.* (2014) recorded that amongst the organic sources of nutrients, 5 t ha^{-1} FYM recorded maximum yield and yield attributes over remaining treatments. This finding is also similar with Chandrakar *et al.* (2018), whom found that integrated use of organic manure, inorganic and biofertilizer had significant effect on yield and yield-attributes of blackgram over local check.

Effect on economics

Data given in Table 1 indicated that effectiveness of any production system is ultimately evaluated on the basis of its economics. Economic analysis is the basic

Table 1.Yield and economic of blackgram as influenced by organic, inorganic sources of nutrients and integrated nutrient management. COC – Cost of cultivation, GMR – Gross monetary returns, NMR – Net monetary returns.

Treatments	Grain yield (q ha^{-1})	Stover yield (q ha^{-1})	COC (Rs ha^{-1})	GMR (Rs ha^{-1})	NMR (Rs ha^{-1})	B:C ratio
T_1 – Control	4.88	13.46	24290	25746	1456	1.06
T_2 - 100% N (inorganic) 20 kg N/ha	6.41	19.87	24630	34037	9407	1.38
T_3 - 100% N (compost) 20 q/ha	8.93	18.92	25960	46542	20582	1.79
T_4 - 50% N (inorganic) + 50% N (compost)	6.78	18.98	25460	35798	10338	1.41
T_5 - 50% N (inorganic) + 25% N (compost)	5.68	15.33	24960	29933	4973	1.20
T_6 - 25% N (inorganic) + 50% N (compost)	5.82	15.23	25375	30623	5248	1.21
T_7 - 50% N (inorganic) + 25% N (compost) + *Rhizobium*	7.19	17.97	25460	37747	12287	1.48
T_8 - 25% N (inorganic) + 50% N (compost) + *Rhizobium*	7.64	18.33	25875	40033	14158	1.55
T_9 - 50% N (inorganic) + 50% N (compost) + *Rhizobium*	8.64	18.14	26290	45014	18724	1.71
SEm+	0.84	1.31				
CD (p=0.05)	2.43	3.81				

consideration in determining that which treatment gives the highest return. All treatment gives higher net benefit over control. Economic analysis promised that maximum net return and B:C ratio (Rs 20582 ha^{-1} and 1.79, respectively) were obtained from application 100% N through 20 q ha^{-1} compost.The lowest net return with B:C ratio was observed under control plot (Rs 1456 ha^{-1} with 1.06).These observations were supported with the findings of Quddus *et al.* (2012), Chaudhary *et al.* (2018).

CONCLUSIONS

On the basis of findings of present investigation, it can be concluded that the application of 100% N through 20 q ha^{-1} compost found maximum grain yield, net return and B:C ratio over rest of the treatments.

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