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Studies on Integrated Nutrient Management on Economic Parameter of Blackgram (*Vigna mungo* L.) in Chhattisgarh Plain

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A field experiment was conducted at Instructional Farm, BTC College of Agriculture and Reseach Station, Bilaspur (C.G.). During the *Kharif* season of the year 2021 with a view to study the "Studies on integrated nutrient management on economic parameter of black gram (*Vigna mungo L.*) in Chhattisgarh plain". The Black gram variety Indira Urad Pratham used to grown and treatment was replicated three times in Randomized block design. The soil of experimental site was alfisol belonging to textural clay loam. The investigation there were the uniform dose of 20 kg N_2, 40 kg P_2O_5 and 20 kg K_2O were applied through Urea, SSP and MOP, respectively in black gram in seven treatments *viz.*, T_1: - 20:40:20 RDF, T_2: -125%RDF, T_3:- 150% RDF, T_4:- RDF + FYM@5t ha^{-1}, T_5:- 125% of RDF + FYM@5t ha^{-1}, T_6:- 150% of RDF + FYM@5t ha^{-1} andT_7: - Control. The economic parameters *i.e.*, cost of cultivation (Rs ha^{-1}), Gross return (Rs ha^{-1}), Net return (Rs ha^{-1}) and Benefit: Cost ratio were significantly superior in the treatment T_3(150% RDF). On the basis of above findings, treatment T_6(150% of RDF+FYM@5tha^{-1}) stand could be better performance first in position for cost of cultivation, net and gross return. However, But economically better performance in first in position treatment T_3(150% RDF). Therefore, it may be concluded that treatment T_3(150% RDF) may be prefer for higher economics in blackgram.

Introduction

Black gram [*Vigna mungo* (L.) Hepper], is one of the most important pulse crops among the various grain legumes. According to Vavilov (1951) it is native to India, belongs to the family Leguminaceae. It is consumed in the form of 'dal' (whole or split, husked and un-husked) or perched. It is used as nutritive fodder especially for milch animals. It fits well in various multiple cropping and intercropping systems. After picking of pods, black gram plants may be used as green fodder for livestock or green manuring to increase fertility of soil. Besides these, the black gram crop also enriches soil by fixing the atmospheric nitrogen. Blackgram is spread in Indian subcontinent and popularly known as “Uraddal”. It is cultivated in Bangladesh, Afghanistan, Myanmar and Pakistan (Ghanshyam Kumar, *et al*., 2010).

Most suitable climate for blackgram is 27- 30 ^{0}C, moderate rainfall and loamy soil with high water holding capability. Blackgram is third most important pulse crop grown under rain fed, rice fallow, irrigated conditions and during *kharif*, *rabi* and summer seasons, which matures in 90-100 days and it, enriches soil with nitrogen. India is major producer and consumer of blackgram (Raju, 2019). It is used for preparation of different food preparations like *Idli*, *Dosa* and non-fermented foods (Masu *et al*., 2013; Sivasubramanian *et al*., 2015), Black gram is a self-pollinated leguminous crop which is grown during *kharif* as well as summer in seasons in arid and semi-arid regions of India. It is tolerant to drought and can be grown successfully on all types of soils (Kumawat, *et al*., 2013; Krishnaprabhu *et al*., 2018).

Black gram is the most important legume crop and India alone produce more than two- third of the world’s production (Saini and Jaiwal, 2002) as food, feed and industrial raw material and ranks as the third important pulse crop in India (Selvakumar *et al*., 2012). Total black gram production was 3280 thousand tonnes; of which percentage share in 13.48% during 2017-18 (Anonymous, 2018). The total blackgram production in India was 2.89 million tonnes from an area of 3.56 million hectare (Ministry of Agriculture and Farmer’s welfare annual report 2016-17). In Chhattisgarh during 2019-2020 total area has 134.13 thousand hectare and productivity of 371 kgha^{-1}. In Madhya Pradesh, total area was 9.32 lakh hectares with total production of 515 million tonnes and productivity of 553 kg ha^{-1} (Shashikumar *et al*., 2013).

Materials and Methods

The field experiment was conducted at Instructional farm, Barrister Thakur Chhedilal College of Agriculture and Research Station, Bilaspur (Chhattisgarh) university of Indira Gandhi Krishi Vishwavidyalaya, Raipur (Chhattisgarh) during *Kharif* season 2021. The Research Farm is situated at 22.09˚N latitude, 82.15˚E longitude and at an altitude of 292.3 m above mean sea level. The region falls under the Eastern plateau and hill region (Agro-climatic zone-VII) of India. Chhattisgarh state is classified into three agro-climatic zones, in which Bilaspur falls under the Chhattisgarh plains zone of the state. The experimental field was well drained with uniform topography. The soil of experimental site was alfisol belonging to textural clay loam.

The full dose of fertilizers was applied according to the treatments by manually in previously open furrows before sowing the seeds. The uniform dose of 20 kg N_2, 40 kg $P_2O_5$and 20 kg K_2O were applied through Urea, SSP and MOP, respectively in all the treatments. These were drilled by hand in the open furrows during sowing of seed in all the treatments.

FYM dose was applied as par the treatment. Five plants of each plot were randomly selected and tagged for recording the observations at different stages of growth. The observations on economic parameters were calculated by different treatments.

Results and Discussion

Data pertaining to cost of cultivation (Rs. ha^{-1}), gross return (Rs. ha^{-1}), net return (Rs. ha^{-1}) and B:C ratio influenced by various treatments has been given in table.1 and fig.1.

The highest cost of cultivation (33794.00 Rs.ha^{-1}) was recorded in treatment T_6 (150% of RDF + FYM@5t ha^{-1}) followed by T_5 (125% of RDF + FYM@5t ha^{-1}). The lowest cost of cultivation (23874.00 Rs. ha^{-1}) was recorded in the treatment T_7 (Control).

The highest gross returns (88365.00 Rs. ha^{-1}) was recorded in treatment T_6 (150% of RDF + FYM@5t ha^{-1}) followed by T_5 (125% of RDF + FYM@5t ha^{-1}). The lowest gross return (53100.00 Rs. ha-1) was recorded in the treatment T_7 (Control).

Table.1 Effect of integrated nutrient management on economics of Blackgram

Tr.No.	Treatment Details	Total cost of cultivation (Rs. / ha)	Gross returns (Rs. / ha)	Net returns (Rs. / ha)	B: C
T1	**20:40:20 RDF**	27154.00	70350.00	43196.00	1.59
T2	**125%RDF**	27974.00	73612.50	45638.50	1.63
T3	**150% RDF**	28794.00	81960.00	53166.00	1.85
T4	**RDF + FYM@5t ha^{-1}**	32154.00	77467.50	45313.50	1.41
T5	**125% of RDF + FYM@5t ha^{-1}**	32974.00	85170.00	52196.00	1.58
T6	**150% of RDF + FYM@5t ha^{-1}**	33794.00	88365.00	54571.00	1.61
T7	**Control**	23874.00	53100.00	29226.00	1.22

*Selling price of blackgram = 6300 Rs/q.and Straw = 150/q.

Fig.1 B: C ratio of Blackgram

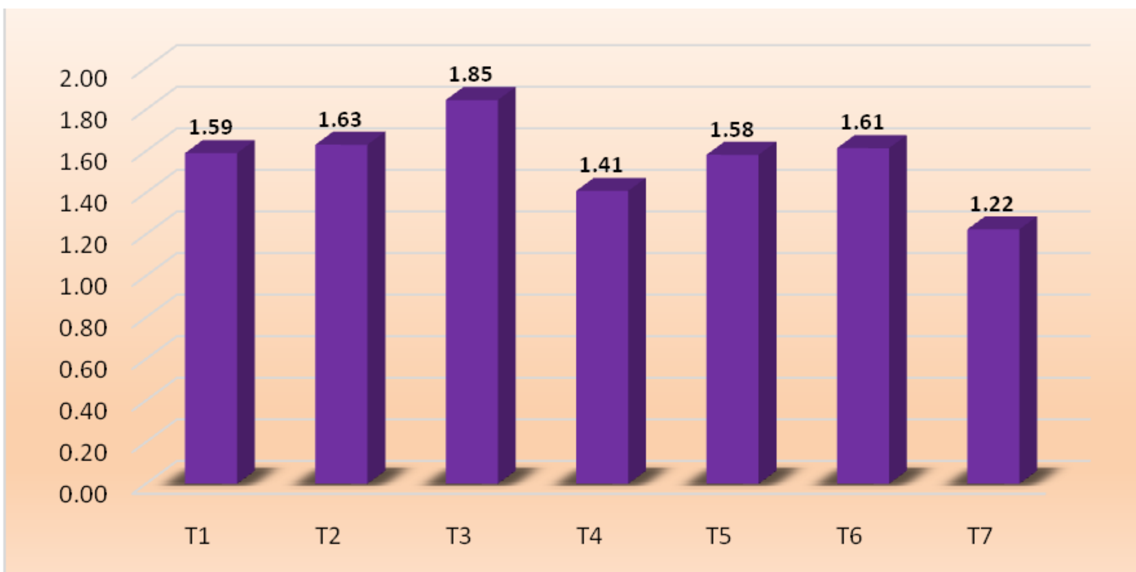

Plate.1 Field view of experiment

The highest net returns (54571.00 Rs.ha^{-1}) was recorded in treatment T_6(150% of RDF + FYM@5t ha^{-1}) followed by T_5(125% of RDF + FYM@5t ha^{-1}). The lowest net return (29226.00 Rs. ha-1) was recorded in the treatment T_7 (Control).

The highest Benefit: Cost ratio (1.85) was recorded in treatment T_3(150% RDF) followed by T_2(125% RDF) (1.63), T_6(150% of RDF + FYM@ 5t ha^{-1}) (1.61) and T_1 (20:40:20 RDF) (1.59). The lowest Benefit: Cost ratio (1.22) was recorded in the treatment T_7 (Control).

The findings are also supported by some earlier workers such as Tiwari *et al.*, (2011) and Paikra and Dwivedi (2012).

The economics parameters like cost of cultivation (Rs ha^{-1}), Gross income (Rs ha^{-1}), Net income (Rs ha^{-1}), B: C ratio were significantly superior in the treatment T_3 (150% RDF).

However, economically better performance in first in position treatment T_3(150% RDF). Therefore, it may be concluded that treatment T_3(150% RDF) may be prefer for higher economics in blackgram.

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