The Pharma Innovation Journal 2022; 11(10): 1653-1655

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(10): 1653-1655
© 2022 TPI
www.thepharmajournal.com
Received: 07-09-2022
Accepted: 04-10-2022

Mukeshkumar VT
Department of Agronomy, Faculty of Agriculture, Annamalai University, Tamil Nadu, India

P Sudhakar
Department of Agronomy, Faculty of Agriculture, Annamalai University, Tamil Nadu, India

K Arivukkarasu
Department of Agronomy, Faculty of Agriculture, Annamalai University, Tamil Nadu, India

A Kamaraj
Department of Genetics and Plant breeding, Faculty of Agriculture, Annamalai University, Tamil Nadu, India

Corresponding Author:
P Sudhakar
Department of Agronomy, Faculty of Agriculture, Annamalai University, Tamil Nadu, India

Studies on influence of INM practices on growth and economics of Blackgram

Mukeshkumar VT, P Sudhakar, K Arivukkarasu and A Kamaraj

Abstract
A field experiment was conducted at kasthambadi village, Polur taluk at Tiruvannamalai district to study the effect of different levels of N and foliar application of nutrients on growth and economics of irrigated Blackgram during July – September 2021. The experiment was laid out in randomized block design (RBD) consist of nine treatments *viz.*, Control (T_1), 100 % RDN (T_2), 75 % RDN (T_3), 100% RDN + Foliar application of 2 % KNO_3 on 30 and 45 DAS (T_4), 100 % RDN + foliar application of 2 % Humic acid on 30 and 45 DAS (T_5), 100 % RDN + foliar application of 2 % DAP on 30 and 45 DAS (T_6), 75 % RDN + foliar application of 2 % KNO_3 on 30 and 45 DAS (T_7), 75 % RDN + foliar application of 2 % Humic acid on 30 and 45 DAS (T_8), 75 % RDN + foliar application of 2 % DAP on 30 and 45 DAS (T_9) and replicated thrice. The higher growth attributes were recorded in (T_6) 100 % RDN + foliar application of 2 % DAP on 30 and 45 DAS and lowest were recorded under control plot (T_1) and also maximum gross income, net income and benefit-cost ratio was observed in (T_6) 100 % RDN + foliar application of 2 % DAP on 30 and 45 DAS and lowest gross income, net income and benefit-cost ratio were achieved in control plot (T_1).

Keywords: Blackgram, DAP, economics, growth, humic acid, nitrogen

Introduction
Pulses are generally rich in protein, fibre, vitamins, and minerals, are the main source of protein for most individuals. After cereals, it ranks as the second crucial component of the Indian diet. Pulses can withstand harsh weather and they also increase soil fertility by fixing atmospheric nitrogen. It is also known as "poor man's meat" because they are rich in nutrients and low in cost. So, most of the low-income populations can use this nutritious crop as their staple food. Keeping in view many benefits of pulses for human health, United Nations has proclaimed 2016 as the International Year of Pulses (IYP). Blackgram (*Vigna mungo* L.) is one of the important pulse crops grown in India which belong to the family "Leguminosae". It is an ancient and native crop of India with high economic value than other pulses. Blackgram seeds are a good source of minerals and energy. It is rich in proteins (24 %), carbohydrates (60 %), fat (1-5 %), amino acids, vitamins and minerals and much richer than other grains. In India, Blackgram occupies an area of 9.85 M ha having total production of 11.99 M tones with productivity 1,217 kg ha^{-1} (Agri. Stat, 2021) [1]. The growth phase of Blackgram is often obstructed by the slow translocation of assimilates with in the crop, insufficient partitioning of assimilates, poor pod setting due to flower abscission and lack of nutrient during critical stages of crop growth play a vital role in Blackgram production (Mahala *et al*. 2001) [5]. A number of technology have been tested to increase black gram's production. One of them is the foliar application of organic and inorganic fertilizer sources to maximize the crop's yield potential. This is thought to be an effective and affordable way to supplement some of the nutritional needs at crucial moments of crop growth. Keeping in view of this,an research was conducted to evaluate various levels of N with foliar nutrition on growth parameters and economics in Blackgram.

Materials and methods
A field experiment was conducted at kasthambadi village, Polur taluk at Tiruvannamalai district to study the effect of different levels of N and foliar application of nutrients on growth and yield of irrigated Blackgram during July – September 2021. The experimental field was geographically situated at 12° 35´ North latitude and 79°12´ East longitude at an altitude of ± 171 meters (561 Ft) above mean sea level. The soil of the experimental field was sandy clay loam.

The soil was low in available nitrogen and phosphorus and medium in available potassium. The promising black gram variety VBN 8 chosen for the study. The experiment was laid out in a Randomized block design with the three replications and it was sown with a spacing of 30 cm X 10 cm. Treatments which involves Control (T_1), 100 % RDN (T_2), 75 % RDN (T_3), 100 % RDN + Foliar application of 2 % KNO_3 on 30 and 45 DAS (T_4), 100 % RDN + foliar application of 2 % Humic acid on 30 and 45 DAS (T_5), 100% RDN + foliar application of 2 % DAP on 30 and 45 DAS (T_6), 75% RDN + foliar application of 2 % KNO_3 on 30 and 45 DAS (T_7), 75 % RDN + foliar application of 2 % Humic acid on 30 and 45 DAS (T_8), 75% RDN + foliar application of 2 % DAP on 30 and 45 DAS (T_9) were sprayed as foliar nutrition at flower initiation. The recommended dose of P & K were applied to all the plots and nutrient N was applied as per the treatment schedule. The data on growth attributes were statistically analyzed and interpreted. The economic feasibility of the study were also determined.

Results and Discussion

The results of the field experiment on black gram revealed that the growth characters were conspicuously influenced by the application of graded levels of N along with foliar application of inorganic nutrients. Among the different treatments tried, the application of 100 % N along with foliar spray of 2 % DAP on 30 and 45 DAS (T_6) registered the maximum values of plant height (32.17 cm), LAI (5.11) and DMP (3181 kg ha^{-1}).

Nitrogen is the prime element for growth of crop which is responsible for developing good vegetative frame. Nitrogen is an essential constituent of protein and also plays a vital role in plant metabolism (Ndakidemi and Dakora, 2007) [7]. Improvement in growth attributes due to application of 100% N enhanced the availability of nitrogen which is mainly responsible for vegetative growth and lead to increased growth activity. The results confirm the finding of Khandelwal *et al.* (2013) [4]. Leaf area was significantly increased by application of nitrogen, possibly because of nitrogen helps in greater assimilation of food material by the plant which resulted in greater meristematic activities of cells and consequently the number of leaves, length and width of leaf of plant. These findings are in agreement with the result reported by Adeoye *et al.* (2011) [8]. Application of major nutrients through chemical fertilizers, increased the photosynthetic activity, nutrient metabolism and auxin content in the plants which ultimately improved the plant height, number of leaves and leaf area index and dry matter accumulation. The similar findings were reported by Uma Maheswari and Karthik (2017) [6], positive effect of foliar application of DAP on an enhanced branching in pulses is mainly attributed to promotion of growth parameters and bud development which ultimately increased the availability of other nutrients and accelerated the translocation of photo assimilates.

Economics

Among the different treatments, the plots with 100 % RDN + Foliar application of 2 % DAP on 30 and 45 DAS (T_6) recorded maximum gross return of Rs.71764 ha^{-1}, net return of Rs. 41951 ha^{-1} in the present investigation. This was followed by T_5 (100% RDN + foliar application of 2 % Humic acid on 30 and 45 DAS) which exerted higher gross returns. The lower values of gross returns of Rs. 30275 ha^{-1} and net returns of Rs. 4736 ha^{-1} were recorded under control plot (T_1). Concerning BCR, the treatment T_6 (100 % RDN + foliar application of 2 % DAP on 30 and 45 DAS) registered higher BCR value of 2.40 which was followed by the treatment T_5 (100% RDN + Foliar application of 2 % Humic acid on 30 and 45 DAS) with the value of 2.19. The lower BCR of 1.39 was observed with T_1 (control). The highest gross income and net income obtained in T_6 treatment might be due to higher grain yield and haulm yield recorded with this treatment. Despite the additional input cost involved, the substantial yield increment obtained with this treatment might have resulted in increased return $rupee^{-1}$. The least return $rupee^{-1}$ invested was observed under control (T_1). This might be due to reduced grain yield which resulted least gross income and net return. The present results are in accordance with earlier findings of Lakshhmi *et al.*, (2018) [9].

Table 1: Effect of graded level of N and foliar application on growth components and economics of Blackgram

Treatments	Plant height (cm)	Leaf area index (LAI)	Dry matter production (DMP)	Gross income (Rs.ha^{-1})	Net income (Rs.ha^{-1})	BCR
T_1	20.79	3.26	1526	30,275	4,736	1.18
T_2	25.96	3.89	2160	43,924	14,611	1.49
T_3	22.68	3.51	1795	36,225	7,017	1.24
T_4	28.26	4.41	2482	52,589	19,276	1.57
T_5	30.39	4.86	2860	63,323	29,010	1.84
T_6	32.17	5.11	3181	71,764	41,951	2.40
T_7	24.62	3.79	2047	42,041	8,833	1.26
T_8	27.88	4.21	2382	50,755	16,547	1.48
T_9	30.04	4.66	2802	60,492	30,784	2.03
S.E.D±	0.56	0.08	51.45			
CD(P=0.05)	1.70	0.25	154.35			

T_1 - Control
T_6 - 100% RDN + Foliar application of 2 % DAP on 30 and 45 DAS
T_2- 100% RDN
T_7- 75% RDN + Foliar application of 2% KNO_3 on 30 and 45 DAS
T_3- 75% RDN
T_8- 75% RDN + Foliar application of 2 % humic acid on 30 and 45 DAS
T_4- 100% RDN +Foliar application of 2% KNO_3 on 30 and 45 DAS
T_9 - 75% RDN + Foliar application of 2 % DAP on 30 and 45 DAS
T_5- 100% RDN + Foliar application of 2% humic acid on 30 and 45 DAS

Conclusion

Application of the foliar nutrition and with graded levels of N registered the maximum values for most of the growth parameters like plant height, leaf area index and DMP of Blackgram over control.

In the light of the above experimental results, application of 100 percent RDN along with foliar application of 2 percent DAP on 30 and 45 DAS is an effective method for producing higher growth parameters and also realize higher economic returns in irrigated Blackgram, according to the aforementioned experimental data. This strategy also has the potential to be an agronomically sound, environmentally safe and cost-effective option for farmers.

References

1. Agricultural Statistics. Department of Agricultural and cooperation. Ministry of Agriculture, Govt. of India; c2021.
2. GOI. All India area, production and productivity of pulses. Directorate of Economics and Statistics. Dept. of Agriculture and Cooperation, Ministry of Agriculture, Government of India; c2019.
3. Gomez KA, Gomez AA. Statistical Procedure for Agriculture Research, 2nd Ed., John Willey and Sons, New York; c1984.
4. Khandelwal SK, Choudhary SS, Khangarot Jat MK, Singh P. Effect of inorganic and bio-fertilizers on productivity and nutrients uptake in cowpea [*Vigna unguiculata* (L.) Walp]. Legume Res. 2012 Sep 1;35(3):235-238.
5. Mahala CPS, Dadheech RC, Kulhari RK. Effect of plant growth regulators and yield of Black gram at varying levels of phosphorus. Crop Res. 2001;18(1):163-165.
6. Uma Maheswari M, Karthik A, Ajay Kumar R. Effect of foliar nutrition on growth, yield attributes and seed yield of pulse crops. Int. J Curr. Microbiol. App. Sci. 2017;6(11):4134-4139.
7. Ndakidemi PA, Dakora FD. Yield components of nodulated cowpea (Vigna unguiculata) and maize (Zea mays) plants grown with exogenous phosphorus in different cropping systems. Australian Journal of Experimental Agriculture. 2007 Apr 13;47(5):583-9.
8. Adeoye O, Hornung R, Khatri P, Kleindorfer D. Recombinant tissue-type plasminogen activator use for ischemic stroke in the United States: a doubling of treatment rates over the course of 5 years. Stroke. 2011 Jul;42(7):1952-5.
9. Rajeshkumar S, Kumar SV, Ramaiah A, Agarwal H, Lakshmi T, Roopan SM. Biosynthesis of zinc oxide nanoparticles using Mangifera indicia leaves and evaluation of their antioxidant and cytotoxic properties in lung cancer (A549) cells. Enzyme and microbial technology. 2018 Oct 1;117:91-5.