IMPACT OF FOLIAR APPLICATION OF NUTRIENT ON GROWTH AND YIELD CHARACTERS OF BLACK GRAM Cv. VBN 8

Prakash, V[1], S. Malarvannan[2] and G. Vaidehi[3]

[1-3]Associate Professor

School of Agriculture, Bharath Institute of Higher Education and Research, Selaiyur, Tambaram, Chennai-600073.

Corresponding Author: prakash.agri@bharathuniv.ac.in

ABSTRACT

The field experiment was conducted, during *Kharif* season (March to May. 2024), to find out the suitable combination foliar nutrient for obtained higher yield of black gram production. The experiment was laid out in Randomized Block Design consists of nine treatments *viz.,* T_1 - Control, T_2 - 100% RDF (10:20:10 NPK kg/acre), T_3 - Foliar spray Nano urea 250 ml/acre @ 35 DAS, T_4 - 75% N RDF + Foliar spray Nano urea 62 ml/acre @ 35 DAS, T_5 - 50% N RDF + Foliar spray Nano urea 125 ml/acre @ 35 DAS, T_6 - T_2 + Foliar spray of pulse wonder @ 2 kg/acre, T_7 - T_3 + Foliar spray of pulse wonder @ 2 kg/acre, T_8 - T_4 + Foliar spray of pulse wonder @ 2 kg/acre and T_9 - T_5 + Foliar spray of pulse wonder @ 2 kg/acre with three replication. The seeds of black gram variety Cv. VBN 8 were sown with a spacing of 30×10 cm, with duration 65 - 70 days. The growth character and yield of black gram were favourably influenced by the treatment, T_8 - T_4 + Foliar spray of pulse wonder @ 2 kg/acre. The results clearly proved that 75% N RDF, Foliar spray Nano urea 62 ml/acre @ 35 DAS and pulse wonder @ 2 kg/acre (T_8) might be a suitable nutrient management practice for achieve higher black gram yield with due to care on the soil physical condition.

Key words: - *Black gram, Nano Urea and Pulse Wonder*

I. INTRODUCTION

In an entire country like India, pulses are vital and constitute a substantial portion of the diet for the poor people. Because the population consume comparatively little dairy and animal goods, they are known as the "poor man's meat." In addition, they provide a significant source of fibre, minerals and protein. Black gram, scientifically known as Vigna mungo, is a highly prized legume in worldwide and hence its holds a significant role in various foods and cultures. With over 70% of the world's production, India is currently the leading producer of black gram and is mainly cultivated in Asian countries including Pakistan, Myanmar and parts of southern Asia.

Low soil fertility can indeed to reduce the yield of black gram (*Vigna mungo*). Soil fertility refers to the soil's ability to provide essential nutrients and other favourable conditions for plant growth. When soil fertility is low, black gram plants may struggle to obtain the necessary nutrients, resulting in stunted growth, poor development and ultimately reduced yield.

Foliar spraying in black gram involves the application of nutrients or other substances directly onto the leaves of the plant. The application of foliar nutrient is used to supplement soil-applied fertilizers and provide nutrients directly to the plant's foliage, facilitating rapid absorption and utilization. While foliar spraying can be beneficial in certain situations, it's

important to use proper techniques and timing to maximize its effectiveness (Ramesh, *et al.,* 2020)

Foliar application of Pulse wonder nutrient may also help to beneficial activities, such as organic matter, bio-stimulants or microbial inoculants, to promote soil health, improve nutrient uptake efficiency and enhance crop resilience to environmental stressors. The application of Pulse wonder nutrient formulations can contribute to increased yields, improved crop quality and enhanced nutrient content in pulse crops, thereby benefiting both farmers and consumers alike (Mondal *et al.,* 2011). While Nano-fertilizers hold promise for enhancing black gram yield and improving nutrient management in agriculture, their practical application and efficacy in real-world farming scenarios (Marimuthu *et al*., 2024). Hence the present investigation was carried out to studies effect of foliar spray of Nano fertilizers on the growth and yield enhancement of rice fallow black gram.

II. MATERIALS AND METHODS

The experiment was conducted in Randomized Block Design consists of nine treatments *viz.,* T_1 - Control, T_2 - 100% RDF (10:20:10 NPK kg/acre), T_3 - Foliar spray Nano urea 250 ml/acre @ 35 DAS, T_4 - 75% N RDF + Foliar spray Nano urea 62 ml/acre @ 35 DAS, T_5 - 50% N RDF + Foliar spray Nano urea 125 ml/acre @ 35 DAS, T_6 - T_2 + Foliar spray of pulse wonder @ 2 kg/acre, T_7 - T_3 + Foliar spray of pulse wonder @ 2 kg/acre, T_8 - T_4 + Foliar spray of pulse wonder @ 2 kg/acre and T_9 - T_5 + Foliar spray of pulse wonder @ 2 kg/acre with three replication. The seeds of black gram variety "Cv. VBN 8" were sown with a spacing of 30×10 cm with duration of 65-70 days. The fertilizer was applied to the experiment field @ 25 kg/ha N, 50 kg/ha P_2O_5 and 25 kg/ha K_2O and 20 kg/ha S to the crop of black gram. Half of the recommended nitrogen, entire dose of phosphorus and half dose of potassium were applied as basal after sowing. The remaining half dose of nitrogen and potassium were applied in two equal splits at 35 and 45 DAS. In addition as per the treatment schedule the prescribed quantities of the above inorganic, Nano urea 250 ml/acre and pulse wonder 2 kg/acre.

III. RESULT AND DISCUSSION

Growth character (Table 1)

Plant height

The plant height was significantly influenced by the various treatments in the present study. The treatment, T_8 – T_4 + Foliar spray of pulse wonder @ 2 kg/acre recorded the highest plant height of 45.96 cm and 49.62 cm at 45 DAS and at harvest respectively. This may be due to the combination of nutrients and growth regulators present in pulse wonder. The nutrient and growth regulator present in the foliar spray play a major role in growth development and metabolism of black gram. This was in conformity with findings of (Marimuthu and Surendran, 2015). The treatment, control (T_1) recorded the least plant height of 34.73 cm and 35.36 cm at 45 DAS and at harvest respectively. This could be because the plant received less nutrition at crucial growth stages, lead to in lesser growth characteristics under this treatment. Similar findings were reported by Sapthagiri *et al.* (2020).

Dry matter production (DMP)

The different treatments comprising in black gram at various nutrient registered a significant influence of black gram DMP. The treatment, T_4 + Foliar spray of pulse wonder @

2 kg/acre (T_8) recorded the highest DMP of 2564 and 3101 kg ha^{-1} at 45 DAS and at harvest respectively. Encouraging a leaf area through physiological processes in the plant thought to be essential for plant growth and development, as well as continuously providing the

Treatments	Plant height	DMP (kg ha^{-1})	LAI

nutrients throughout the crop growth period, may have been achieved by applying the proper amount of nutrients. The findings of the present study is in accordance with the earlier reports of (Surender Kumar and Kuldeep, 2024). The lowest DMP of 1894 and 2034 kg ha^{-1} at 45 DAS and at harvest respectively were recorded in the treatment, T_1 - Control.

Leaf area index (LAI)

The LAI was significantly influenced by all the treatments. The treatment, the highest leaf area index was observed under (T_8) by recording of 2.24 and 3.94 at 30 and 45 DAS respectively. The beneficial effect of foliar spray of pulse wonder and Nano urea on leaf area index may be an effect of increased chlorophyll and the synthesis of specific phytohormones, vitamins and other nutrients, that obtained the leaf area index in black gram. The leaf area index is a measure of translocation and photosynthetic capacity. Furthermore, it provides a balanced supply of nutrients to encourage root growth and growth, which leads to increase the plant height. This was confirmed in the present study with the findings of Nandhakumar *et al*., 2023. The lowest leaf area index of 1.70 and 3.06 at 30 and 45 DAS respectively was recorded in control (T_1)

Yield (Table 2)

Grain yield

The among the different treatments T_4 + Foliar spray of pulse wonder @ 2 kg/acre (T_8) significantly registered higher seed yield of 865 kg ha^{-1}. A higher biological yield was obtained under this application, as a result of increased photosynthetic efficiency and nutrient accumulation induced by an adequate supply of macro and micronutrients throughout the growth period. The similar findings were reported by Velmurugan *et al*., 2022. The least seed yield of 514 kg ha^{-1} was recorded in the control (T_1).

Haulm yield

Among the treatments, the application of T_4 + Foliar spray of pulse wonder @ 2 kg/acre (T_8) significantly registered higher haulm yield of 2872 kg ha^{-1}. The increase in haulm yield was brought due to the constant nutrient supply, which raised leaf area and dry matter production, ultimately leading to a higher haulm yield (Hayyawi *et al*., 2020). The least haulm yield of 2121 kg ha^{-1} was recorded in the control (T_1).

Conclusions

Based on the field experiment results, it can be concluded that the foliar application of Nano urea and pulse wonder spray significantly influenced the growth character, seed and haulm yield of black gram. Increasing the yield in black gram can be effectively achieved through this practice.

Table 1. Effect of foliar nutrient on growth character of black gram

	45 DAS	At harvest	45 DAS	At harvest	30 DAS	45 DAS
T_1 – Control	34.73	35.36	1894	2034	1.70	3.06
T_2 – 100% RDF (10:20:10 NPK kg/acre)	37.32	37.52	2016	2197	1.82	3.21
T_3 – Foliar spray Nano urea 250 ml/acre @ 35 DAS	37.78	38.16	2080	2274	1.86	3.27
T_4 – 75% N (RDF) + Foliar spray Nano urea 62 ml/acre @ 35 DAS	40.52	41.87	2242	2653	1.93	3.48
T_5 – 50% N (RDF) + Foliar spray Nano urea 125 ml/acre @ 35 DAS	40.09	41.12	2195	2519	1.91	3.43
T_6 – T_2 + Foliar spray of pulse wonder @ 2 kg/acre	43.01	45.21	2356	2859	2.04	3.67
T_7 – T_3 + Foliar spray of pulse wonder @ 2 kg/acre	43.25	45.97	2397	2886	2.08	3.71
T_8 – T_4 + Foliar spray of pulse wonder @ 2 kg/acre	45.96	49.62	2564	3101	2.24	3.94
T_9 – T_5 + Foliar spray of pulse wonder @ 2 kg/acre	45.71	49.13	2547	3078	2.21	3.89
SEd	1.02	1.29	53.09	68.81	0.10	0.19
CD (p = 0.05)	2.16	2.73	112.56	145.87	0.21	0.42

Table 2. Effect of foliar nutrient on yield of black gram

Treatments	Seed yield (kg ha^{-1})	Haulm yield (kg ha^{-1})
T_1 – Control	514	2121
T_2 – 100% RDF (10:20:10 NPK kg/acre)	578	2258
T_3 – Foliar spray Nano urea 250 ml/acre @ 35 DAS	611	2381
T_4 – 75% N (RDF) + Foliar spray Nano urea 62 ml/acre @ 35 DAS	697	2578
T_5 – 50% N (RDF) + Foliar spray Nano urea 125 ml/acre @ 35 DAS	668	2480
T_6 – T_2 + Foliar spray of pulse wonder @ 2 kg/acre	759	2686
T_7 – T_3 + Foliar spray of pulse wonder @ 2 kg/acre	769	2709
T_8 – T_4 + Foliar spray of pulse wonder @ 2 kg/acre	865	2872
T_9 – T_5 + Foliar spray of pulse wonder @ 2 kg/acre	856	2853
SEd	25.79	50.11
CD (p = 0.05)	54.68	106.24

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