

Original Research Article

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Assessing the Effects of Foliar Application of Various Agro Chemicals on Growth and Yield of Blackgram

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ABSTRACT

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A field experiment was conducted at Experimental Farm, Department of Agronomy, Imayam Institute of Agriculture and Technology to study the Effect of Foliar Application of Various Agro Chemicals on Growth and Yield of Black gram (VBN 8) during April – July 2023. The field experiment was laid out in Randomised block design with three replications. The treatments comprised of T₁- Foliar application of Panchagavya @ 3% 2 times, T₂- foliar application of Effective microorganism @ 0.5% 2 times, T₃- foliar application of Fish amino acid @ 0.5% 2 times, T₄- foliar application of Humic acid 18% @0.3% 2 times, T₅- foliar application of Alginic acid 5% @ 0.3% 2 times, T₆- foliar application of Vermi wash @ 5% 2 times and T₇- control were no foliar application were followed. The result indicated that T₁-foliar application of Panchagavya @ 3 % recorded higher growth parameters and yield parameters it was on Par with foliar application of Effective microorganism 2 per cent.

Introduction

Black gram (*Vigna mungo* L.) belongs to the family leguminaceae. It thrives best in rainfed environments with high temperatures (27–30°C), low humidity, and moderate rainfall (60–80 cm). In short-duration crops, where soil moisture becomes a limiting issue and soil-applied fertilizer may not become fully available before crop maturity, foliar spray has been demonstrated to be beneficial.

In India, fertilizers are essential to the cultivation of pulses. Nonetheless, there is a great deal of interest in finding alternative plant nutrition sources due to the

rising expense of chemical fertilizers, growing environmental concerns, and the energy crisis. In addition, there has been significant concern in recent years regarding the long-term detrimental effects of the ongoing, careless use of inorganic fertilizers on the degradation of soil health, structure and pollution of the environment. Applying nutrients to the soil alone is not sufficient to meet the growing crop demand, especially for short-duration crops like black gram, which is essentially indeterminate in its flowering and fruiting habits.

Throughout the growth period, vegetative and reproductive sinks compete continuously for the limited

assimilates. Since there is less assimilation transfer to the developing reproductive organs, the source is extremely constrained. In order to achieve increased assimilation output, leaf area is crucial. It also affects light interception and is a key factor in determining plant productivity.

Using both foliar and soil application of nutrients is the best way to get around this and take advantage of the genetic potential. Foliar application, therefore, is also seen to be a cost-effective and efficient way to supplement some of the nutrients needed at important phases (Sharma Sardana and Sukhvinder Singh, 2013).

Materials and Methods

The field experiment was carried out at Experimental Farm, Department of Agronomy, IAT to study the Effect of foliar application of Various Agro Chemicals on Growth and Yield of Blackgram. The soil of the experimental field was red soil. This soil is low in nitrogen, high in phosphorus and low in potash. The experiment followed a Randomized Block Design (RBD) with eight treatment combinations with three replications.

The treatments comprise of T₁ - foliar application of Panchagavya @3% on 30 and 45 DAS, T₂ - foliar application of Effective microorganism @0.5% on 30 and 45 DAS, T₃ - foliar application of Fish Amino acid @0.5% on 30 and 45 DAS, T₄-foliar application of Humic acid 18% @0.3% on 30 and 45 DAS, T₅- foliar application of Alginic acid 5% @0.3% on 30 and 45 DAS, T₆- foliar application of Vermi wash @5% on 30 and 45 DAS, T₇-Control.All the treatments were significantly enhanced the growth parameters, yield attributes and yield of black gram.

Results and Discussion

All treatments were similar up until the flowering stage, with the exception of the absolute control (T₇), which emphasized the significance of nutrition. After administering foliar nutrition, notable variations were seen in all of the treatments. Among the treatments T₁ - foliar application of panchagavya @ 3 per cent at 30 and 45 DAS significantly enhanced the growth components viz., plant height, LAI, No. of branches per plant as compared to other treatments. It was statistically on par with foliar application of Effective microorganism 2% 30 and 45 DAS this might be due to the Panchagavya

contains N, P, K, S, Fe and Zn. Consequently, vigorous growth and improved development may have been the outcome of balanced nutrition. Panchagavya is also known to contain beneficial micro-organisms such as *Azospirillum*, *Azotobactor*, *Phosphobacteria* and *Pseudomonas* besides *Lactobacillus* which enhance the plant height and leaf area, which leads to higher dry matter accumulation of crops. Similar observation of dry matter production, Similar findings were reported earlier by Yadav and Lourduraj (2006) and Kulkarni *et al.*, (2016).

By applying foliar nutrition, the yield components such as number of pods per plant and number of grains per pod, were greatly enhanced. T₁- foliar spray of panchagavya 3% on 30 and 45 DAS was the treatment that produced the greatest number of pods per plant and number of grains per pod among the other treatments it was on par with Effective microorganism 2% on 30 and 45 DAS. More pods might result from this, and their development could be attributed to an enhanced availability of nearly all plant-essential nutrients, which promote healthy vegetative growth and in turn boost photosynthetic activity, translocation, and accumulation of photosynthates in sinks. The results accord with Yadav and Tripathi (2013) findings.

The grain yield was significantly improved by the application of foliar nutrition. Among the treatments (T₁) foliar application of panchagavya 3 per cent on 30 and 45 DAS recorded higher yield due to higher number of pods per plant and number of grains per pod. The presence of IAA and GA in panchagavya might have played a role to a higher seed yield.

Foliar spray of panchagavya may have stimulated the plant system, increasing the production of growth regulators in the cell system. These growth regulators in the plant system then stimulated the necessary growth and development, and improved photosynthate translocation and accumulation from source to sink increased grain yield. This results are similar with the findings of Jadhav and Kulkarni (2016).

From the results of this investigation, it can be observed that the foliar application of panchagavya @ 3 per cent was recommended to obtain a more profitable yield in blackgram. It is also recommended that Effective microorganism @ 2 per cent may be the alternate for foliar application of 3 per cent panchagavya, in order to achieve maximum yield and returns in Blackgram.

Table.1 Plant Growth Details

Treatments	Plant height (cm)	Number of branchesplant ⁻¹	Number of pods plant ⁻¹	Number of seeds pod ⁻¹	Grain yield (kg ha ⁻¹)	Haulm yield (kg ha ⁻¹)
T ₁ - Foliar application of Panchagavya@3% on 30 and 45 DAS.	32.17	6.10	16.70	5.64	935	2921
T ₂ – Foliar application of Effective microorganisms @2% on 30 and 45DAS	31.89	5.85	16.47	5.51	921	2878
T ₃ - Foliar application of Fish amino acid @0.5% on 30 and 45 DAS.	30.29	4.34	13.66	4.80	775	2489
T ₄ –Foliar application of Humic acid 18% @ 0.3% on 30 and 45 DAS.	30.61	5.19	15.49	4.76	849	2559
T ₅ –Foliar application of Alginic acid 5% @ 0.3% on 30 and 45 DAS.	28.98	4.97	15.13	4.72	858	2709
T ₆ –Foliar application of Vermiwash @ 5% on 30 and 45DAS.	28.22	4.23	13.07	4.25	791	2510
T ₇ –Control	27.05	3.26	10.24	4.15	654	2316
CD (p=0.05)	1.68	0.28	0.76	0.27	55	149

Author Contributions

S. Selvamuthukumar: Investigation, formal analysis, writing—original draft. R. Rajavarthini: Validation, methodology, writing—reviewing.

Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethical Approval Not applicable.

Consent to Participate Not applicable.

Consent to Publish Not applicable.

Conflict of Interest The authors declare no competing interests.

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