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Effect of foliar application enhancing the growth characters in blackgram

Naveen Prasath P[1*], S Manimaran[2], G Baradhan[2], P Stalin[3]
[1] Research Scholar, Department of Agronomy, Annmalai University, Annamalai Nagar, Tamil Nadu, India
[2] Associate Professor, Department of Agronomy, Annmalai University, Annamalai Nagar, Tamil Nadu, India
[3] Assistant Professor, Department of Agronomy, Annmalai University, Annamalai Nagar, Tamil Nadu, India

Abstract
During the 2019 kharif season, the current study was conducted at Annamalai University's Experimental Field, Department of Agronomy, to investigate the influence of foliar treatment on blackgram growth and characteristics. Control, Panchagavya @ 2 %, Vermiwash @ 5 %, Fish aminoacid @ 0.5 %, Egg extract @ 0.5 %, Seaweed extract @ 5 %, TNAU pulsewonder @ 1 % @ pre flowering stage, and Humic and Fulvic acid @ 2 % were the eight treatments of foliar sprays used in the study. At 30 and 45 DAS, foliar sprays were administered. The growth characteristics and qualities of blackgram vary dramatically depending on the foliar application treatments of different nutrients, according to studies. Vermiwash @ 5 % had the highest values among the different foliar treatments, which were comparable to panchagavya, followed by TNAU pulse wonder 1 % @ pre flowering stage. Over all other foliar spray treatments, the treatment had the highest plant height (32.17 cm), leaf area index (5.13), dry mater production (2550 kg ha^{-1}), crop growth rate (0.131 g m^{-2} day^{-1}), number of branches per plant (6.10), and the lowest value reported at control.

Keywords: foliar application enhancing, characters, blackgram

Introduction
Pulses were widely planted under rainfed environments and were grown all over India. These plants are leguminous plants that can be used as a source of protein for livestock and are also consumed by humans in the form of "Dal." Blackgram, also known as "Urd bean" in India, was an important rainfed crop. Pulses are the main source of nutrients in dietary proteins in both developed and developing countries. Blackgram has a protein content of 22.96 % on average. Apart from growing as a solo crop or main crop, this crop was commonly planted as a mixed crop, intercrop, rice fallow crop, and rainfed crop. The average productivity and output of blackgram are insufficient to meet the population's domestic demand in our country. As a result, suitable agronomic techniques are required to ensure long-term output and productivity. Several tactics were implemented to increase production and productivity, with foliar application of both organic and inorganic types of nutrients playing a vital role in crop growth and enhancement. In recent years, foliar fertiliser spray has become a generally established practise in crop growth and development, but soil nutrient application remains the primary method (Alam *et al.*, 2010) [1]. In recent years, foliar fertilizer application as a possible means of providing required nutrients for enhanced crop yield and productivity has gotten a lot of attention (Malarmathi and Thomas Abraham, 2003) [4].

Materials and Methods
The field experiment was done to study the effect of foliar application of nutrients on productivity blackgram was conducted during the seasons of kharif 2019 at Experimental field, Department of Agronomy, Annamalai university. The soil of the experimental field was having soil pH – 7.4, available N -224 kg ha^{-1}, available P_2O_5 13.89 kg ha^{-1} and available K_2O - 287 kg ha^{-1}. Eight treatments comprising of foliar application of panchagavya (2%), vermiwash (5%), fish aminoacid (0.5%), egg extract (0.5%), seaweed extract (5%), TNAU pulse wonder (1%), humic and fulvic acid (2%), and control were laid out in a randomised block design with three replications. The variety VBN - 6 was sown with spacing of 30 cm X 10 cm. The recommended nutrient levels of 12.5 kg N and 25 Kg P_2O_5 per ha were applied to all the plots. Panchagavya, fish aminoacid and egg extract were prepared as per the standard procedure. Foliar spray was carried out at flower initiation. The data on growth and its attributes were statistically analysed and interpreted.

Results and Discussion
The foliar application of nutrients considerably boosted growth metrics such as plant height, leaf area index, dry mater production, and crop growth rate, according to the pooled data. The foliar application of vermiwash resulted in significantly higher plant height (32.17 cm), leaf area index (5.13), dry mater production (2550 kg ha^{-1}), crop growth rate (0.131 g m^{-2} day^{-1}) and number of branches per plant (6.10) (Table 1), and was comparable

to the foliar application of panchagavya 2%, which was followed by the foliar application of TNAU pulse wonder 1% @ pre flowering stage. Similar results were discovered in the French dwarf bean by (Ayyobi *et al.*, 2014) [2].

The foliar application of vermiwash has a massive effect on the crop's growth and development. Vermiwash is a coelomic fluid extraction including enzymes such as protease, amylase, and phosphatase, as well as plant growth hormones such as cytokinin and gabardine, as well as various micro-macro nutrients. As a result, the crop's growth rate improves, and its disease resistance improves as well (Esakkiammal *et al.*, 2015 and Rajan and Murugesan, 2012) [3, 6]. Plants can absorb nutrients directly from the shoot part of the plant using vermiwash, which boosts growth factors. According to Sundarasu and Jayasankar (2014) and Mynyuchi *et al.* (2013) [5], high levels of micro and macro nutrients in the soil cause considerable increases in plant growth, leaf area index, and dry mater output. This could be attributed to greater LAI, chlorophyll content, and enzymes, all of which could contribute to a higher photosynthetic rate and crop growth rate. Sahay *et al.* (2016) [8].

Conclusion

The current study clearly demonstrates that nutrients found in vermiwash @ 5 % given as a foliar application were most efficient in enhancing the growth and development of the blackgram, and it is also readily available in the local area. Furthermore, it is economically viable for blackgram growers.

Table 1: Effect of foliar application plant height, leaf are index, dry mater production, crop growth rate and number of branches plant^{-1} of blackgram

Treatments	Plant height (cm)	LAI	DMP (kg ha^{-1})	CGR (kg ha^{-1})	Number of branches plant^{-1}
T_1 – Control.	27.05	2.87	1623	0.070	3.26
T_2 – Foliar application of Panchagavya spray 2% @ 30 and 45 DAS.	31.89	4.95	2503	0.127	5.85
T_3– Foliar application of Vermiwash spray 5% @ 30 and 45 DAS.	32.17	5.13	2550	0.131	6.10
T_4 – Foliar application of Fish Aminoacid 0.5% @ 30 and 45 DAS.	28.64	3.69	2039	0.102	4.23
T_5 – Foliar application of Egg Extract 0.5% @ 30 and 45 DAS.	28.22	3.48	1956	0.101	3.95
T_6 – Foliar application of Seaweed Extract 5% @ 30 and 45 DAS.	28.98	3.85	2101	0.107	4.34
T_7 – Foliar application of TNAU Pulse Wonder 2.5% @ 30 and 45 DAS.	30.61	4.56	2360	0.121	5.19
T_8 – Foliar application of Humic and Fulvic acid 2% @ 30 and 45 DAS.	30.29	4.37	2265	0.115	4.97
S.Ed	0.79	0.12	54.45	0.002	0.13
CD (p=0.05)	1.68	0.26	116.53	0.006	0.28

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