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Strategies for enhancing the growth and economics of Greengram

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Abstract
A field experiment was conducted during *rabi* season of 2023 in Experimental Farm, Department of Agronomy, Faculty of Agriculture, Annamalai University, Annamalai Nagar, Tamil Nadu, India to evaluate the strategies for enhancing the growth and economics of greengram. The experiment was laid out in Randomized Block Design (RBD) with eight treatments and three replications comprising of T_1-100 percent RDF (25:50:25 NPK kg ha^{-1}), T_2-2 percent DAP as foliar application on flowering stage, T_3- 2 percent fish amino acid as foliar application on flowering stage, T_4-2 percent TNAU pulse wonder as foliar application on flowering stage, T_5-2 percent panchagavya as foliar application on flowering stage, T_6 –5 percent cow urine as foliar application on flowering stage, T_7-5 percent vermiwash as foliar application on flowering stage, T_8 - 0.5 percent egg extract as foliar application on flowering stage. The higher growth attributes such as plant height, LAI, number of branches, dry matter production (kg ha^{-1}), number of effective root nodules were recorded in 2 percent TNAU pulse wonder as foliar application on flowering stage (T_4), This treatment has recorded the highest gross return (Rs.62,480), net return (Rs.31,880) and BCR (2.04) compared to 100 percent RDF. Hence, it is concluded that 2 percent TNAU pulse wonder as foliar application on flowering stage, could be recommended to improve growth and economics of greengram.

Keywords: Economics, foliar application, greengram, growth, TNAU pulse wonder

Introduction
Belonging to the Fabaceae family, greengram is a legume that is widely cultivated and holds significant value in terms of global food and nutritional security. In India, greengram, sometimes called mung or moong, is a staple food that is high in protein. It is referred to as the "Queen of Pulses" since its 25 percent protein content is about three times higher than that of cereals. (Kunjammal and Sukumar, 2019) [7]. It's an annual pulse crop that's usually cultivated in a rice fallow or rainfed environment. It fixes atmospheric nitrogen, enriching soil nitrogen over a comparatively short period of time (Ramesh *et al.*, 2020) [9].

The Food and Agriculture Organisation of the United Nations (FAO) projects that 13.7 million hectares will be cultivated worldwide in greengrams by 2023. India is the world's largest producer of greengrams, making up more than 70 percent of the world's production area. In 2022-2023, the estimated area under greengram cultivation was 40.38 lakh hectares, with an estimated 31.5 lakh tonnes of production and 783 kg/ha of productivity. Tamil Nadu has 1.95 lakh hectares of greengram cultivated, producing 0.89 lakh tonnes and 444 kg ha^{-1} of productivity. The crop's potential yield is incredibly low because greengram is mostly grown under rainfed conditions with inadequate management practices. Furthermore, a number of factors, including pest and disease, insufficient assimilate partitioning, poor pod setting due to flower abscission, and a shortage of nutrients during crucial crop growth phases, contribute to the crop's low yield (Anandha Krishnaveni *et al.*, 2021) [1]. The extensive use of synthetic chemicals in agriculture over the last forty years has degraded soil, water resources, and food quality in addition to weakening the ecological supporting. Liquid manure is a crucial component in modern farming as it helps boost productivity while minimising fertilizer dosage.

Fertilizers applied to the soil experience a number of losses, such as fixing, volatilization, and leaching. When applied in tandem with soil amendment, foliar fertilizer offers several benefits for enhancing crop nutritional needs. Nutrients sprayed on the foliage have a higher efficacy than soil applied fertilizers. Foliar feeding is a popular technique for mitigating nutrient shortages in crop plants at critical growth phases. (El-Hady *et al.,* 2020) [5]. Given the aforementioned information, a field experiment was conducted to ascertain the growth and economics of greengram.

Materials and Methods

The field experiment was conducted in the Experimental Farm, Department of Agronomy, Faculty of Agriculture, Annamalai Nagar, Tamil Nadu, India to study the strategies for enhancing the growth and economics of greengram. The experimental field is geographically located at 11º 24' N latitude and 79 º44' E longitude and at an altitude of ± 5.79 m above the mean sea level (MSL). During the cropping period weekly mean maximum temperature ranged from 30.5 ºC to 36.4 ºC and weekly minimum temperature ranged from 16.8 º C to 22.6 º C. The relative humidity ranged from 69.85% to 77.28%. The soil of the experimental field is clay loam in texture with low in available nitrogen, medium in available phosphorus and high in available potassium. The pH of the soil is 7.7 with EC 0.64 dS m^{-1}.

The experiment was laid out in Randomized Block Design (RBD) with eight treatments and three replications. The treatment comprised of T_1-100 percent RDF (25:50:25 NPK kg ha^{-1}), T_2- 2 percent DAP as foliar application on flowering stage, T_3- 2 percent fish amino acid as foliar application on flowering stage, T_4- 2 percent TNAU pulse wonder as foliar application on flowering stage, T_5- 2 percent panchagavya as foliar application on flowering stage,T_6 –5 percent cow urine as foliar application on flowering stage, T_7–5 percent vermiwash as foliar application on flowering stage, T_8 - 0.5 percent egg extract as foliar application on flowering stage. Measurements of various plant growth attributes were taken at 30 days after sowing, 45 days after sowing, and at harvest.

Results and Discussion

Growth attributes

Foliar application of 2 percent TNAU pulse wonder at flowering stages had a significant impact on several growth parameters like plant height, leaf area, dry matter production, number of branches, and number of effective root nodule. This treatment (T_4) resulted in the highest recorded values for these growth parameters, followed by foliar application of 2 percent DAP at the flowering stages (T_2).

The availability of iron, boron, and plant growth hormones could have been rendered likely by the prescription of a recommended dose of NPK in conjunction with the foliar application of TNAU pulse wonder. This, in turn, may have led to vigorous root, cell wall, and plasma membrane development, as well as enhanced cell division, tissue differentiation, and metabolism of nucleic acid, carbohydrates, and shoot initiation, all of which reflect upon enhanced crop growth and establishment in terms of plant height. The foliar application of TNAU pulse wonder has provided growth regulator and nutrients that are essential for healthy growth and development. The additional supply of growth hormones and major micronutrients supplied by the foliar application of pulse wonder might be contributing factor of the plant's height. This was in conformity with the findings of Balaji *et al.* (2019) [4] and Vinodhini *et al.* (2022) [10]. The application of nitrogen directly may have contributed to the longer vegetative phase and higher photosynthetic rate of the greengram. Similarly, the foliar application of TNAU pulse wonder may have facilitated the supply of photosynthates for the development of pods and grains, intensified metabolic activity, and enhanced the efficient utilisation of nitrogen. This finding was well supported by the work of Rajes kumar *et al*., (2017) [8].

The presence of growth-promoting hormones (IAA, IBA, and cytokinin), trace elements (Fe, Cu, Zn, Co, Mo, Mn, and Ni), vitamins, and amino acids boosted the LAI, which may be the reason for the higher growth parameters observed in the foliar nutrients. Similar results were reported by Amalesh Ghosh *et al.* (2020) [2]. The nitrogenase enzyme, phytohormones, and nutrients may be more readily available in nodule counts that have increased due to TNAU pulse wonder's foliar application. These results are supported by the findings of Kavya *et al.* (2021) [6].

Economics

The economics of greengram was higher with the application of foliar nutrition. Among the treatments, foliar application of TNAU pulse wonder @ 2 percent on flowering stages (T_4) resulted in higher gross income, net income and B: C ratio over rest of the treatments. As a result of the increased seed yield and haulm yield increments obtained with this treatment combination, the foliar application of TNAU pulse wonder produced a higher gross return, net income ha^{-1}, and B:C ratio. These findings are in line with those of Babu (2017) [3] and Anandha Krishnaveni *et al.* (2021) [1].

Table 1: Influence of foliar application of nutrients on the growth of greengram

Treatments	Plant height (cm)			LAI		DMP			No. of branches	No. of effective root nodules
	30 DAS	45 DAS	Harvest	30 DAS	45 DAS	30 DAS	45 DAS	Harvest		
T_1-100% RDF	32.26	33.21	37.09	2.34	2.19	1128	1961	2752	5.54	20.44
T_2 - 2 percent DAP as foliar application on flowering stage	34.10	47.0	55.50	2.45	3.79	1142	2720	3836	8.20	28.49
T_3- 2% fish amino acid as foliar application on flowering stage	33.30	40.47	46.82	2.39	3.04	1135	2292	3312	6.92	24.57
T_4- 2% TNAU pulse wonder as foliar application on flowering stage	34.28	49.36	58.52	2.46	4.08	1144	2830	3997	8.43	29.54
T_5- 2% panchagavya as foliar application on flowering stage	33.78	44.73	52.48	2.43	3.50	1140	2512	3661	7.85	27.04
T_6- 5% cow urine as foliar application on flowering stage	33.52	42.69	49.60	2.41	3.25	1137	2402	3491	7.38	25.98
T_7- 5% vermiwash as foliar application on flowering stage	32.95	36.39	41.0	2.36	2.50	1130	2071	2948	6.0	21.57
T_8- 0.5% egg extract as foliar application on flowering stage	32.96	38.43	44.0	2.38	2.83	1133	2182	3133	6.46	23.28
S.Ed±	0.98	0.94	1.29	0.02	0.09	48.76	48.59	74.97	0.09	0.42
CD (p = 0.5)	NS	2.03	2.77	NS	0.20	NS	104.0	160.44	0.21	0.92

Table 2: Influence of foliar application of nutrients on the economics of greengram

Treatments	Total cost of cultivation (Rs ha^{-1})	Gross Income (Rs ha^{-1})	Net Income (Rs ha^{-1})	BCR
T_1- 100% RDF	28,577	36,920	8,343	1.29
T_2- 2% DAP as foliar application on flowering stage	30,250	61,273	31,023	2.02
T_3 2% fish amino acid as foliar application on flowering stage	33,077	48,848	15,771	1.47
T_4- 2% TNAU pulse wonder as foliar application on flowering stage	30,600	62,480	31,880	2.04
T_5- 2% panchagavya as foliar application on flowering stage	31,877	56,800	24,923	1.78
T_6- 5% cow urine as foliar application on flowering stage	31,777	52,753	20,976	1.66
T_7- 5% vermiwash as foliar application on flowering stage	31,877	40,825	8,948	1.28
T_8- 0.5% egg extract as foliar application on flowering stage	32,377	44,943	12,566	1.38

Conclusion

The results of this investigation showed that the plant height, LAI, number of branches, dry matter production (kg ha^{-1}), and number of effective root nodules of greengram were all increased by applying the recommended dosage of fertilizer in combination with foliar application of 2 percent TNAU pulse wonder on flowering stage. Given the aforementioned information, it is possible to draw the conclusion that foliar application of the recommended fertilizer dose, combined with 2 percent TNAU pulse wonder on flowering stage, represents an economically feasible, ecologically sound, and agronomically effective method of enhancing greengram growth and economics.

Reference

1. Anandha Krishnaveni S, Supriya C, Sridhar SM. Impact of foliar nutrition on the yield and economics of greengram (*Vigna radiata*). Int J Chem Stud. 2021;9(2):11-13.
2. Ghosh A, Shankar T, Malik GC, Banerjee M, Ghosh A. Effect of Seaweed extracts on the growth, yield and nutrient uptake of blackgram (*Vigna mungo* L.) in the red and lateritic belt of West Bengal. Int J Chem Stud. 2020;8(3):799-802.
3. Babu S. Enhancement of blackgram productivity through soil and foliar application of nutrients. In: Proceedings of the IRES International Conference. Kuala Lumpur, Malaysia; c2017.
4. Balaji P, Vinod Kumar SR, Srinivasan G, Mrunalini K. Effect of foliar nutrient on yield maximization strategies for irrigated blackgram cv. ADT 3. J Pharmacogn Phytochem. 2019;8(3):2884-2886.
5. El-Hady ES, Merwad MA, Shahin MF, Hagagg LF. Influence of foliar spray with some calcium sources on flowering, fruit set, yield and fruit quality of olive Kalmata and Manzanillo cultivars under salt stress. Bull Natl Res Cent. 2020;44:1-6.
6. Kavya P, Singh S, Hinduja N, Tiwari D, Sruthi S. Effect of foliar application of micronutrients on growth and yield of greengram (*Vigna radiata* L.). Legume Res - Int J. 2021;44(12):1460-1464.
7. Kunjammal P, Sukumar J. Effect of foliar application of nutrients and growth regulator on growth and yield of greengram (*Vigna radiata* L.). Madras Agric J. 2019;106(10-12):600-603.
8. Rajesh Kumar S, Nalliah Dura raj S, Kannan V. Effect of Crop Geometry and Foliar Nutrition on Growth and Yield of Irrigated Blackgram (*Vigna mungo* L.). Int J Curr Microbiol Appl Sci. 2017;6(11):4084-4094.
9. Ramesh T, Rathika S, Sangeetha S, Satheesh S, Ponpradeepa M, Pavithra A. Enhancement of black gram productivity through foliar spray of nutrients and growth hormones-A review. Int. J Curr Microbiol Appl Sci. 2020;9(12):1-11.
10. Vinodhini P, Albert Arokiasamy A, Selvamuthukumaran S. Effect of foliar application of nutrients on the yield enhancement of green gram (*Vigna radiata* L.). Pharma Innov J. 2022;11(12):761-762.