

Original Research Article

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## Productivity Enhancement through Foliar Nutrition in Green Gram (*Vigna radiata*)

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### ABSTRACT

The experiment was conducted at Anbil Dharmalingam Agricultural College and Research Institute, Trichy during summer season of 2018-19 to study the effect of foliar nutrition on the productivity of green gram. The experiment was laid out in Randomized Block Design and replicated thrice with eight treatments comprising of T<sub>1</sub>- Control + T<sub>2</sub>- Foliar spray of DAP 2% + T<sub>3</sub>- Foliar spray of KCl 2% + T<sub>4</sub>- Foliar spray of Pulse wonder @ 2 kg ac<sup>-1</sup> + T<sub>5</sub>- Foliar spray of Panchakavya 5% + T<sub>6</sub>- Foliar spray of Cow urine 5% + T<sub>7</sub>- Foliar spray of Vermiwash 5% + T<sub>8</sub> – Foliar spray of PPFM 2%. The highest growth parameters, plant height, number of branches per plant, leaf Area Index and dry matter production (kg ha<sup>-1</sup>) were recorded with the foliar application of TNAU Pulse wonder @ 2 kg ac<sup>-1</sup> at 15, 30, 45 and 60 DAS. The same treatment had significantly recorded higher grain yield of 839 kg ha<sup>-1</sup>. It was followed by the application Panchakavya 5% registered 834 kg ha<sup>-1</sup>. From the above results, it has been concluded that foliar spray of TNAU Pulse wonder @ 2 kg ac<sup>-1</sup> to enhance the productivity and higher profitability in green gram.

#### Keywords

Foliar spray,  
Pulse wonder,  
Panchakavya

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### Introduction

The production of pulse crops in India in general and especially green gram in particular is not enough to meet the domestic demand of the ever growing population. The potential yield of green gram is very low because of the fact that the crop is mainly grown in rainfed conditions with poor management practices and also due to various

physiological, biochemical as well as inherent factors associated with the crop. Apart from the genetic makeup, the physiological factor viz, insufficient partitioning of assimilates, poor pod setting due to the flower abscission and lack of nutrients during critical stages of crop growth, coupled with a number of diseases and pests were the reasons for the poor yield. Foliar feeding is often the most effective and economical way to improve

plant nutrient deficiency in green gram (Dixit and Elamathi, 2007). Supplement nutrition plays a crucial role in increasing seed yield of pulses (Chandrasekar and Bangarusamy, 2003). In addition, foliar application increases photosynthetic rate and nutrient translocation from the leaves to the developing seeds (Manonmani and Srimathi, 2009). Under rainfed condition when the availability of moisture becomes scarce the application of fertilizers as foliar spray resulted in efficient absorption and utilization of nutrients.

Foliar spray is not a substitute to the soil application but it certainly being considered as a supplement to the soil application. Among the different methods of fertilizer applications, foliar nutrition is recognized as an important method of fertilization, since foliar nutrients usually penetrate the leaf cuticle or stomata and enters the cell facilitating easy and rapid utilization of nutrients (Latha and Nadanassababady, 2003). Nutrient availability to plant is very low in soil application. In this circumstance application of nutrients through foliar spray may be beneficial to Green gram to enhance the productivity.

### **Materials and Methods**

The field experiment was conducted at AnbilDharmalingam Agricultural College and Research Institute, Tiruchirapalli during summer season 2018-19 to study the effect of foliar application of nutrients on green gram variety (VBN 2) under sodic soil. The farm is situated at 10° 45' latitude, 78° 36', longitude at an altitude of 85 m above mean sea level. The experimental soil is clay and moderately drained.

The experiment was laid out in Randomized Block Design (RBD) with eight treatments and three replications. The entire dose of recommended dose of fertilizer of

20:40:20:20 kg ha<sup>-1</sup> N: P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O: S is applied as basal. Urea, Di-ammonium phosphate, Murate of potash and Phosphogypsum were used as sources of nitrogen, phosphorous, potassium and sulphur, respectively. The treatments consisted of control foliar application of water spray (T<sub>1</sub>), DAP @ 2 % (T<sub>2</sub>), KCl @ 2% (T<sub>3</sub>), TNAU Pulse wonder @ 2 kg/ac (T<sub>4</sub>), Panchagavya @ 5% (T<sub>5</sub>), Cow urine @ 5% (T<sub>6</sub>), Vermiwash @ 5 % (T<sub>7</sub>), PPFM 2 % (T<sub>8</sub>) was given.

First spray was given at flower initiation and second spray at 15 days after the first spray. As per the schedule the treatments were imposed. Recommended plant protection measures and other management practices were followed as per the Crop Production Guide. The biometric observations were taken and analysed the data statistically.

### **Results and Discussion**

#### **Growth parameters**

The observation on growth character was taken before first spray, after first spray, after second spray and at harvest stage (Table 1). The highest plant height (30.60cm, 32.20cm and 33.17 cm), number of branches plant<sup>-1</sup>, LAI (0.58, 1.01, 2.23 and 1.56) and Dry matter production (2.57, 3.31, 5.24 g plant<sup>-1</sup> and 11.27 g plant<sup>-1</sup>) were observed under the foliar application of TNAU Pulse wonder at 2 kg ac<sup>-1</sup> (T<sub>4</sub>) significantly, which was followed by the application of Panchagavya 5% (T<sub>5</sub>). Lowest plant height (26.27cm, 26.7cm, 25.4cm), Number of branches plant, LAI and Dry matter production (1.99 g plant<sup>-1</sup>, 2.45 g plant<sup>-1</sup>, 4.51 g plant<sup>-1</sup> and 9.81 g plant<sup>-1</sup>) was recorded with control plot (T<sub>1</sub>) except first spray remaining all stages of observation.

The plant height might be due to the additional supply of major, micronutrients and growth hormones through foliar spray of

pulse wonder. These findings were well supported by the work of Altab Hossain *et al.*, (2008) and Dixit *et al.*, (2008).

The higher leaf area index might be due to the foliar application of nitrogen enhancing the accumulation and translocation of nutrients which resulted in prolonged vegetative phase and better photosynthetic rate of the green gram foliar application of TNAU Pulse wonder aided in the supply of photosynthates for the development of pods and grains and also intensification of metabolic activity and efficient utilization of N.

These findings were well supported by the work of Rajeskumar *et al.*, (2017). The significant increase of dry matter

accumulation was due to the fact that nitrogen helps in maintaining higher auxin level.

### Yield

TNAU Pulse wonder @ 2kg ac<sup>-1</sup> (T<sub>4</sub>) produced significantly highest grain yield (839 kg ha<sup>-1</sup>) and haulm yield (1358 kg ha<sup>-1</sup>). Followed by Panchagavya 5% (T<sub>5</sub>) (834 kg ha<sup>-1</sup>) and (1236 kg ha<sup>-1</sup>). This might be due to reduce the flower droppings, improved the pod formation and seed setting percentage leading to increased yield attributes. The findings in the present study are in conformity with Muhammad Hamayun (2011) and (Mir *et al.*, 2010). The lowest grain yield was obtained in without foliar spray (absolute control) (949 kg ha<sup>-1</sup>) (Table 2).

**Table.1** Effect of foliar spray on growth parameters of green gram

	Treatment	Plant Height (cm)	Number of branches per plant	Leaf area index (LAI)	Dry Matter Production (g/plant)
T <sub>1</sub>	Absolute control	25.40	2	0.43	9.81
T <sub>2</sub>	DAP 2%	31.17	3	1.14	10.08
T <sub>3</sub>	KCL 2%	28.20	3	0.77	9.94
T <sub>4</sub>	TNAU Pulse Wonder @ 2 kg/ac	33.17	4	1.56	11.27
T <sub>5</sub>	Panchagavya 5%	32.13	3	1.21	10.18
T <sub>6</sub>	Cow urine 5%	28.40	2	0.52	10.02
T <sub>7</sub>	Vermiwash 5%	30.23	3	1.07	9.71
T <sub>8</sub>	PPFM	31.83	3	1.09	10.10
	<b>SEd</b>	0.58	0.41	0.14	0.44
	<b>CD (5%)</b>	<b>1.25</b>	<b>0.89</b>	<b>0.31</b>	<b>0.91</b>

**Table.2** Effect of foliar spray on yield of Green gram

	<b>Treatment</b>	<b>Seed yield (Kg ha<sup>-1</sup>)</b>	<b>Haulm yield (Kg ha<sup>-1</sup>)</b>
<b>T<sub>1</sub></b>	Absolute control	757	949
<b>T<sub>2</sub></b>	DAP 2%	820	1122
<b>T<sub>3</sub></b>	KCL 2%	779	969
<b>T<sub>4</sub></b>	TNAU Pulse Wonder @ 2 kg/ac	839	1358
<b>T<sub>5</sub></b>	Panchagavya 5%	834	1236
<b>T<sub>6</sub></b>	Cow urine 5%	782	1051
<b>T<sub>7</sub></b>	Vermiwash 5%	795	1119
<b>T<sub>8</sub></b>	PPFM	831	1143
	<b>SEd</b>	15.9	31.6
	<b>CD (5%)</b>	34.3	66

From the above results, it has been concluded that TNAU Pulse Wonder @ 2 kg ac<sup>-1</sup> at flowering enhances the productivity in green gram. Moreover, this study gives the option to the farmers *i.e.*, if the farmer likes inorganic foliar nutrition (TNAU pulse wonder) and Organic nutrition (Panchgavya @ 5 %) would be adopted.

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