

Effect of Foliar Nutrition on Horsegram Productivity

M. Punithavathi

ICAR-Krishi Vigyan Kendra, Valikadapuram, Perambalur-621115. T.N. India

Abstract-The experiment was conducted at ICAR Krishi Vigyan Kendra, Perambalur during summer season of 2023-24 to study the effect of foliar nutrition on the productivity of Horsegram. The experiment was laid out in Randomized Block Design and replicated thrice with eight treatments comprising of T₁- Control + T₂- Foliar spray of Nano Urea 1% + T₃- Foliar spray of KCl 2% + T₄-Foliar spray of Pulse wonder @ 2 kg ac⁻¹ + T₅- Foliar spray of Panchakavya 5% + T₆- Foliar spray of NPK (19:19:19) 1%+ T₇- Vermiwash 5% + T₈-Foliarspray of NAA 50 ppm. The highest growth parameters, plant height, number of branches per plant, leaf Area Index and dry matter production (g/plant⁻¹) were recorded with the foliar application of TNAU Pulse wonder @ 2 kg ac⁻¹. The same treatment had significantly recorded higher grain yield of 807.37 kg ha⁻¹. It was followed by the application Panchakavya 5% registered 802.55 kg ha⁻¹. From the above results, it has been concluded that foliar spray of TNAU Pulse wonder @ 2 kg ac⁻¹ to enhance the productivity and higher profitability in Horsegram.

Key words: Horsegram, Crop, Plant height, productivity and yield

I. INTRODUCTION

Horsegram (*Macrotyloma uniflorum* (L.) Verdc.) is an important legume crop for human and livestock feed because it is a cheap source of protein. When compared to other grain legumes Horsegram is highly resistant to low fertility because of its remarkable nitrogen-fixing ability, well organized symbiosis with mycorrhizae and ability to thrive in soil with a wider range of Ph. Excessive or immoderate yield, uplifted or decreased development of crop and physiological changes of the crop are all brought about by variation in nutrient availability of the crop. The productivity of Horsegram in India is deprived, so there is a necessity to allocate several agronomic strategies to elevate the output of the crop. Under existing scenarios, foliar application of mineral nutrients has become an inevitable agricultural practice for sustainable crop production worldwide (Chaudhary

et al., 2023) which fully puts to use the genetic potential of the crop. Foliar application of nutrients has several benefits easy and effective absorption of nutrients, avoidance of nutrient loss through leaching and volatilization, fixation and regulating plant nutrient uptake.

II. MATERIALS AND METHODS

The experiments were laid out in B block of ICAR Krishi Vigyan Kendra Farm. The Experimental farm is located in Tamil Nadu between 10° 53' and 11°31' N latitude and 73° 38' and 79° 31' E longitude. The temperature ranges from 23 °C - 38 °C with mean annual rainfall of 908 mm. North East monsoon period receives comparatively more rainfall *i.e.* 496 mm followed by 328 mm during South West monsoon, 93 mm during summer and 28 mm during winter season. The experimental soil is clay and moderately drained. The experiment was laid out in Randomized Block Design (RBD) with eight treatments and three replications.

Eight foliar nutrients treatment combinations were performed in a randomized block design. The treatments consisted of control foliar application of water spray (T₁), Nano Urea @ 1 % (T₂), KCl @ 2% (T₃), TNAU Pulse wonder @ 2 kg/ac (T₄), Panchagavya @ 5% (T₅), Foliar spray of NPK (19:19:19) 1% + (T₆), Vermiwash 5% (T₇), NAA 50 ppm (T₈) 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. The crop was fertilized with a recommended fertilizer dosage of 25 kg N, 50 kg P₂O₅, 25kg K₂O ha⁻¹ which was applied through urea, SSP and MOP in lines, incorporated at the time of sowing. The experimental plots were measured at 4 m× 5m (20m²). For this field experiment, Horsegram variety CO1 was used, and it was adapted with 30 cm ×10 cm to maintain optimum plant population. Biometric observations were recorded by five plants from each

net plot area were chosen randomly and tagged. These plants were used for recording all biometric observations of crop growth at different stages. Observations are recorded on plant height (cm), number of branches per plant, LAI and dry matter plant (g), grain yield, and Haulm yield (kg ha^{-1}). Recommended plant protection measures and other management practices were followed as per the Crop Production Guide. The biometric observations were taken and analyzed the data statistically.

III. RESULTS AND DISCUSSION

Growth parameters

Growth attributing characters viz., plant height (cm), number of branches per plant, LAI and dry matter plant (g) were influenced significantly due to different treatments (Table1). The highest plant height (35.59 cm), number of branches plant^{-1} (5), LAI (1.58) and Dry matter production (12.25 g/plant), were observed under the foliar application of TNAU Pulse wonder at 2 kg ac^{-1} (T4) significantly, which was followed by the application of Panchagavya 5% (T5). Lowest plant height (26.49 cm), Number of branches per plant (2), LAI (0.56) and Dry matter production (9.22g/plant) was recorded with control plot (T1) 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 Dixit *et al.*, (2008)

and Anandhakrishnaveni *et al.*, 2004. The higher leaf area index and number of branches per plant 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 Horsegram 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 Rajes Kumar *et al.*, (2017) and Arun Raj *et al.*, 2018. The significant increase of dry matter accumulation was due to the fact that nitrogen helps in maintaining higher auxin level.

Yield

TNAU Pulse wonder @ 2 kg ac^{-1} (T4) produced significantly highest grain yield ($807.37 \text{ kg ha}^{-1}$) and haulm yield ($1342.70 \text{ kg ha}^{-1}$). Followed by Panchagavya 5% (T5) ($802.55 \text{ kg ha}^{-1}$) and ($1232.09 \text{ kg ha}^{-1}$). 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 Elayaraja and Angayarkanni (2005) and (Hemalath and Sreemathi (2018). The lowest grain yield was obtained in without foliar spray (control plot) ($653.96 \text{ kg ha}^{-1}$). These findings were well supported by the work of Ghosh and Joseph (2008) and Kumar *et al.*, (2011) (Table 2).

Table.1 Effect of foliar spray on growth parameters of Horsegram

	Treatment	Plant Height(cm)	Number of branches per plant	Leaf area index (LAI)	Dry Matter Production (g/plant)
T ₁	Control plot	26.49	2	0.56	9.22
T ₂	Nano Urea 1 %	32.93	3	1.33	11.38
T ₃	KCL 2%	29.80	3	0.93	10.75
T ₄	TNAU Pulse Wonder @2 kg/ac	35.59	5	1.58	12.25
T ₅	Panchagavya 5%	33.83	4	1.51	11.75
T ₆	NPK (19:19:19) 1%	30.36	2	0.66	9.75
T ₇	Vermiwash 5%	31.83	3	1.25	10.45
T ₈	NAA 50 ppm	33.15	3	1.27	10.93
	SEd	0.62	0.41	0.25	0.49
	CD(5%)	1.36	0.89	0.44	0.98

Table.2 Effect of foliar spray on yield parameters of Horse gram

	Treatment	Seed yield (Kg/ha ⁻¹)	Haulm yield (Kg/ha ⁻¹)
T ₁	Control plot	653.96	912.12
T ₂	Nano Urea 1 %	799.73	1136.79
T ₃	KCL 2%	750.42	1083.57
T ₄	TNAU Pulse Wonder @2 kg/ac	807.37	1342.70
T ₅	Panchagavya 5%	802.55	1232.09
T ₆	NPK (19:19:19) 1%	755.57	1099.27
T ₇	Vermiwash 5%	766.73	1131.63
T ₈	NAA 50 ppm	789.91	1134.32
	SEd	13.65	27.90
	CD(5%)	29.45	56.67

IV. CONCLUSION

From the above results, it has been concluded that TNAU Pulse Wonder @ 2 kg/ac at flowering enhances the productivity in Horsegram. 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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