



## Chemical Weed Management in Blackgram for Enhancing Productivity

S Sreenivasulu<sup>1\*</sup>, V Divya<sup>2</sup> and T Ramu Kumar<sup>3</sup>  
RASS – Krishi Vigyan Kendra, Tirupati-517501 (Andhra Pradesh)

### ABSTRACT

An On-Farm Trial was conducted during the *Rabi* seasons of 2020 and 2021 in Nindra mandal, Chittoor district, Andhra Pradesh and evaluated the efficacy of pre- and post-emergence herbicides on blackgram productivity. The assessment revealed that the most effective treatment, pre-emergence application of Pendimethalin 30% EC (2.5 lt/ha) followed by post-emergence application of Sodium Acifluorfen 16.5% + Cladinafop propargyl 8% EC (1.0 lt/ha) at 15-20 days after sowing (DAS), significantly suppressed weed density (23.30 and 8.80) and weed dry matter (8.95 gm/m<sup>2</sup> and 8.35 gm/m<sup>2</sup>) at 20 and 50 DAS, respectively, resulting in high weed control efficiency (71.33% and 27.37%) compared to the farmer's practice of hand weeding at 25-30 DAS. This treatment also led to significantly higher average plant height (31.6 cm), number of pods per plant (52.8), and yield (1020 kg/ha), resulting in a higher net return (Rs. 41,825/ha) and benefit-cost ratio (2.59) with a lower cost of cultivation (Rs.24,877/ha) compared to the farmer's practice. The increased yield was attributed to effective weed control at critical growth stages, promoting better crop growth, development, and ultimately, a good number of pods.

**Key Words:** Blackgram, Herbicide, Weed density, Weed control efficiency and Yield

### INTRODUCTION

India, the world's largest blackgram producer and consumer, accounts for approximately 29% of the nation's total pulse acreage and contributes 10.25% of its pulse production. With an annual production of about 2.84 Mt from 4.76 million ha., India's average blackgram productivity is 596 kg/ha (Crop Outlook Reports of Andhra Pradesh, 2022). In Andhra Pradesh, blackgram is cultivated on 0.345 million hectares, yielding 0.431 million tonnes at an average of 1249 kg/ha. Within the state, Chittoor district cultivates blackgram in 684 ha, producing 586 t with an average yield of 857 kg/ha (Season and Crop Report, Govt of Andhra Pradesh, 2022-23). While Chittoor's productivity slightly exceeds the national average, it remains significantly lower than the state average, highlighting the potential for increased yields through improved practices. A major constraint to blackgram production during the *Rabi* season is

weed infestation, exacerbated by the coinciding North East Monsoon and the crop's slow initial growth, compact habit, and early maturity. Traditional weed control methods like hand weeding and inter-cultivation are costly, often delayed by labor shortages, and further hampered by monsoon rains during early growth stages. Therefore, chemical weed management offers a promising approach to enhance blackgram productivity, prompting On-Farm Trials (OFTs) to assess the efficacy of pre- and post-emergence herbicides.

### MATERIALS AND METHODS

RASS-Krishi Vigyan Kendra has conducted an On-Farm Trial (OFT) in Agarampeta village, Nindra mandal, Chittoor district, Andhra Pradesh, during the *Rabi* seasons of 2020 and 2021 to evaluate chemical weed management in blackgram. Using a randomized block design across eight locations, the trial compared two

Corresponding Author's Email - nivassakamuri@gmail.com

\*1Senior Scientist & Head, 2Subject Matter Specialist, Agronomy and 3Subject Matter Specialist, Agricultural Extension

**Table 1. Effect of weed management practices on weed density, weed dry matter and weed control efficiency.**

Partic ulars	weed density (Number/m <sup>2</sup> )						weed dry matter (g/m <sup>2</sup> )						weed control efficiency (%)					
	20 DAS			50 DAS			20 DAS			50 DAS			20 DAS			50 DAS		
	A	B	X	A	B	X	A	B	X	A	B	X	A	B	X	A	B	X
Trial	21.0	25	23	9.	8.	8.	8.5	9.3	8.9	8.9	7.7	8.3	73.	69	71.	25.	29.	27.
	.7	.3	.3	6	0	80	8	3	5	6	5	5	26	.4	33	43	32	37
FP	39	37	38	16	15	15	32.	30.	31.	12.	11.	11.	-	-	-	-	-	-
	.0	.6	.3	.6	.0	.8	34	52	43	16	12	64						
t-cal value	8.8**			7.12**			25.6**			4.3**								

*A means Year 2020; B means Year 2021; X means Mean Value*

treatments: the farmer's practice of hand weeding at 25-30 days after sowing (DAS), and a pre- and post-emergence herbicide application in the trial. The trial treatment consisted of pre-emergence application of Pendimethalin 30% EC (2.5 lt/ha) followed by post-emergence application Sodium Acifluorfen 16.5% + Cladinofof propargyl 8% EC (1.0 lt/ha) at 15-20 DAS, using the Yellow Mosaic Virus resistant variety TBG-104. Both in the farmer's practice and in the trial plots sowing occurred in the last week of October, with harvesting in the first week of January. The trial followed package of practices recommended by Acharya N.G Ranga Agricultural University. Data collected included weed density (number of weeds per square meter), weed biomass (weed dry matter), and weed control efficiency at 20 and 50 DAS, along with yield attributes at crop maturity. Economic analysis was performed using current market prices for inputs and blackgram yield. Statistical analysis of the data was conducted using a two-sample t-test.

## RESULTS AND DISCUSSION

The data (Table 1) revealed that the significant impact of chemical weed management on weed parameters. The chemical treatment, consisting of pre-emergence application of Pendimethalin followed by post-emergence application of Sodium Acifluorfen + Cladinofof propargyl at 15-20 DAS, consistently resulted in lower average weed density (23.3 and 8.8) and weed dry matter (8.95 and 8.35) at both 20 and 50 DAS across both years, compared to the farmer's practice. This effective suppression of weed

density and dry matter led to high weed control efficiency (71.33% and 27.37%) during both years. This likely stems from the targeted action of both the pre- and post-emergence herbicides at critical crop growth stages, minimizing weed presence and biomass. These results corroborate findings by Jagadesh *et al* (2019), who also observed the lowest weed density (17.3 No/m<sup>2</sup>) and biomass (14.4 g/m<sup>2</sup>) at 20 and 40 DAS in blackgram with a similar treatment of Pendimethalin (1 kg/ha at 3 DAS) followed by Acifluorfen Sodium (16.5%) + Cladinofof propargyl (8% EC) at 187.5 g/ha at 20 DAS.

The two years' data (Table 2) clearly showed that the chemical weed management, resulted in significantly higher average plant height (31.6 cm), average number of pods per plant (52.8), and average yield (10.20 q/ha) compared to the farmer's practice. This improvement is attributed to the effective weed control achieved through pre- and post-emergence herbicide application at crucial growth stages, promoting increased blackgram growth. This effective weed control facilitated better crop growth and development, leading to a good number of pods and ultimately a higher yield. The trial plot recorded approximately 22.0% yield increase over the farmer's practice. These findings align with those reported by Ram Mohan Reddy *et al* (2023).

The data (Table 3) revealed that the pre-emergence application of Pendimethalin followed by post-emergence application of Sodium Acifluorfen + Cladinofof propargyl at 15-20 DAS

## Chemical Weed Management in Blackgram

**Table 2. Effect of weed management practices on plant height, number of pods and yield of blackgram.**

Particular	Plant height (cm)			No of pods per plant			Yield q per ha		
	2020	2021	Mean	2020	2021	Mean	2020	2021	Mean
Trial	29.9	33.3	31.6	47.6	58	52.8	9.85	10.56	10.20
Farmers Practice	29.3	29.0	29.1	27.2	38.3	32.8	8.45	8.28	8.36
t-cal value	2.35**			6.26**			7.92**		

\*\*Significant at 0.01 level of probability

**Table 3. Effect of weed management practices on the economics of blackgram.**

Particulars	Cost of cultivation (Rs/ha)			Gross returns (Rs/ha)			Net Returns (Rs/ha)			BC Ratio		
	2020	2021	Mean	2020	2021	Mean	2020	2021	Mean	2020	2021	Mean
Trial	21882	27872	24877	61195	73967	67581	39213	44432	41825	2.79	2.65	2.59
Farmers' Practice	23793	28809	26301	52390	57960	55175	28597	29150	28874	2.20	2.00	2.10

resulted in significantly higher net returns (Rs. 41,825/ha) and a benefit-cost ratio of 2.59, achieved with a lower cost of cultivation (Rs. 24,877/ha) compared to the farmer's practice. These findings are consistent with Jagadesh *et al* (2019), who also reported greater profitability, in terms of net returns and benefit-cost ratio with lower expenditure, using a similar treatment of pendimethalin (1 kg/ha at 3 DAS) followed by Acifluorfen Sodium (16.5%) + Cladinafop propargyl (8% EC) at 187.5 g/ha at 20 DAS.

### CONCLUSION

This study concludes that pre-emergence application of Pendimethalin 30% EC (2.5 lt/ha at 3 DAS) followed by post-emergence application of Sodium Acifluorfen 16.5% + Cladinafop propargyl 8% EC (1.0 lt/ha at 15-20 DAS) effectively controls weeds in blackgram, leading to significant improvements in growth, yield, and economic returns compared to the farmer's practice.

### REFERENCES

- Crop Outlook Reports of Andhra Pradesh, Blackgram, January to December (2022). Centre for Agriculture and Rural Development Policy Research (CARP), ANGRAU, Lam, Guntur.
- Jagadesh M, Raju M and Sharmila Rahale C (2019). Influence of different weed management practices on growth and yield attributes of irrigated blackgram under Cauvery delta zone of Tamil Nadu. *J Pharmacog and Phytochem* **8**(3): 608-611.
- Ram Mohan Reddy N, Subramanyam D, Sumathi V and Karuna Sagar G (2023). Weed management in blackgram with pre- and post-emergence herbicides. *Indian J Weed Sci* **55**(4): 461-463.
- Season and Crop Report, Andhra Pradesh (2022-23). *Directorate of Economics and Statistics*, Government of Andhra Pradesh, Gollapudi. Pp 38.

Received on 25/11/2024 Accepted on 16/02/2025