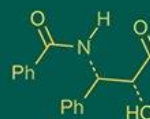


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Ashish Meena
Department of Agronomy,
School of Agriculture, SGVU,
Jaipur, Rajasthan, India

Hansraj Shivran
Department of Agronomy,
School of Agriculture, SGVU,
Jaipur, Rajasthan, India

Anil Jakhar
Department of Agronomy,
School of Agriculture, SGVU,
Jaipur, Rajasthan, India

Vaishali Chaturdevi
Department of Agronomy,
School of Agriculture, SGVU,
Jaipur, Rajasthan, India

Corresponding Author:
Ashish Meena
Department of Agronomy,
School of Agriculture, SGVU,
Jaipur, Rajasthan, India

Effect of weed control measures on growth and yield of chickpea (*Cicer arietinum* L.) in western Rajasthan

Ashish Meena, Hansraj Shivran, Anil Jakhar and Vaishali Chaturdevi

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Abstract

A field experiment was conducted during *Rabi*, 2025-26 at Research Farm, School of Agriculture, Suresh Gyan Vihar University, Jaipur. The experiment comprising eight treatment combinations with three replications and was laid out in randomized block design with combination of weedy check (control), weed free, Pendimethalin @ 1.0 kg ha⁻¹, Pendimethalin + Imazethapyr @ 800 g ha⁻¹ PPI, Diclosulam @ 20 g ha⁻¹ PE, Flumioxazin @ 75 g ha⁻¹ PE, Sodium Acefluorfen 16.5 + clodinafop 8% = @ 240 g ha⁻¹ POE and Fomesafen 11.1 + Fluzifop 11.1 = @ 220 g ha⁻¹ POE.

Application of fomesafen 11.1% + fluzifop-P-butyl 11.1% @ 220 g ha⁻¹ POE significantly increased the number of pods per plant, seeds per pod, seed, stover, biological yield, net return and B : C ratio over the weedy check, diclosulam @ 20 g ha⁻¹ PE and flumioxazin @ 75 g ha⁻¹ PE, and remained statistically at par with sodium acefluorfen 16.5% + clodinafop 8% @ 240 g ha⁻¹ POE, pendimethalin + imazethapyr @ 800 g ha⁻¹ PPI and pendimethalin @ 1.0 kg ha⁻¹.

Keywords: Imazethapyr, grain, straw and yield

Introduction

Pulses are the major source of protein for the predominantly vegetarian society of India. Chickpea (*Cicer arietinum*), often referred to as the queen of pulses, is a key crop grown worldwide due to its nutritional value and environmental benefits. It is an excellent source of protein, fibre, vitamins, and minerals, making it a staple food in many countries, especially in regions where animal protein is scarce. Beyond its nutritional value, chickpea plays a vital role in crop rotation and sustainable agriculture by fixing nitrogen in the soil, thus improving soil fertility (Kumar *et al.*, 2021) [4].

India is the world's largest producer of chickpeas, which are cultivated across the world. It is cultivated in an area of 9.61 million ha around the world, with a total production of 11.34 million tons and annual production of 1180 kg/ha. In Rajasthan total production of chickpea (2023-24) was 1.92 million tons from 1.78 million ha area with an annual production 1081 kg/ha.

In general weed cause field crop yield losses about 45 percent. Increase in labour cost and scarcity of labour, manual weed control has become a difficult task. Suitable herbicide for effective control of mixed weed flora is required for better adoption of the crop. Pendimethalin is a selective dinitroaniline herbicide used for control of most annual grasses and certain broadleaf weeds in maize, oil seeds, pulses and vegetables etc. Imazethapyr, an Imidazolinone herbicide, kills weeds by inhibiting the enzyme acetohydroxy acid synthase (AHAS), which is involved in the synthesis of three branches chain aliphatic amino acids, leucine, isoleucine and valine. This inhibition causes a disruption in protein synthesis, which leads to an interference in DNA synthesis and cell growth. Use of herbicides for weed control in legumes and especially in chickpea has certainly contributed to the increased yield and improved quality. In the legumes especially in case of chickpea Pendimethalin at 1000 g ha⁻¹ applied as pre-emergence is a very common herbicide which is used to take care of all type of weeds, but there is no herbicide available to applied pre-emergence as well as post-emergence to control the emerging BLWs effectively.

Methods and Materials

The experiment was conducted during *rabi* 2025-26 at Agronomy farm, School of Agriculture, Suresh Gyan Vihar University, Jaipur.

Geographically, the study area is located at 75°48'84" E longitude and 26°82'47" N latitude and this region falls under agro-climatic zone III A (Semi-arid Eastern Plain Zone) of Rajasthan. The experiment comprising eight treatment combinations with three replications and was laid out in randomized block design with combination of weedy check (control), weed free, Pendimethalin @ 1.0 kg ha⁻¹, Pendimethalin + Imazethapyr @ 800 g ha⁻¹ PPI, Diclosulam @ 20 g ha⁻¹ PE, Flumioxazin @ 75 g ha⁻¹ PE, Sodium Acefluorfen 16.5 + clodinafop 8% = @ 240 g ha⁻¹ POE and Fomesafen 11.1 + Fluzifop 11.1 = @ 220 g ha⁻¹ POE.

Results and Discussion

Weed management

Among the herbicidal treatments, application of fomesafen 11.1% + fluazifop-P-butyl 11.1% @ 220 g ha⁻¹ POE significantly increased the seed, straw and biological yield over the weedy check, diclosulam @ 20 g ha⁻¹ PE and flumioxazin @ 75 g ha⁻¹ PE, and remained statistically at par with sodium acefluorfen 16.5% + clodinafop 8% @ 240 g ha⁻¹ POE, pendimethalin + imazethapyr @ 800 g ha⁻¹ PPI and pendimethalin @ 1.0 kg ha⁻¹. However, sodium acefluorfen 16.5% + clodinafop 8% @ 240 g ha⁻¹ POE also significantly increased the seed yield over the weedy check, diclosulam @ 20 g ha⁻¹ PE and flumioxazin @ 75 g ha⁻¹ PE, and remained statistically at par with pendimethalin + imazethapyr @ 800 g ha⁻¹ PPI and pendimethalin @ 1.0 kg ha⁻¹. The better yield performance of these effective weed management treatments could be due to improved crop growth and yield attributes, particularly pods per plant and seeds per pod, resulting from reduced weed interference.

Thus, effective post-emergence herbicide combinations, particularly Fomesafen + Fluazifop-P-butyl and Sodium Acefluorfen + Clodinafop, proved effective in improving chickpea productivity through efficient weed suppression (Nagar *et al.* 2025) [6]. Rao and Kumar (2025) reported that Sodium Acefluorfen + Clodinafop Propargyl effectively controlled weeds and increased chickpea yield over the weedy check.

Among the herbicidal treatments, Fomesafen 11.1% + Fluazifop-P-butyl 11.1% @ 220 g ha⁻¹ POE recorded the highest gross return (₹1,03,803 ha⁻¹) and net return (₹71,953 ha⁻¹), followed by Sodium acefluorfen 16.5% + Clodinafop 8% @ 240 g ha⁻¹ POE, which recorded a gross return of ₹1,01,522 ha⁻¹ and net return of ₹69,722 ha⁻¹. Pendimethalin + Imazethapyr @ 800 g ha⁻¹ PPI recorded ₹ 95,279 ha⁻¹ gross return and ₹62,979 ha⁻¹ net return, while Pendimethalin @ 1.0 kg ha⁻¹ recorded ₹93,909 and ₹61,709 ha⁻¹, respectively. The higher economic returns under effective weed management treatments were mainly due to higher seed yield resulting from better weed suppression and reduced crop-weed competition (Jeetarwal *et al.* 2026) [3]. The higher B:C ratio under these treatments may be attributed to their effective weed suppression, resulting in higher seed yield and returns relative to the cost of weed management. Although weed-free treatment achieved the maximum B:C ratio, the post-emergence herbicide combinations provided a favourable economic alternative because of their effective weed control with comparatively lower labour requirements. Similar findings have been reported by Kurnool *et al.* (2025) [5].

Table 1: Effect of weed control measures on yields

Treatments	Yields (kg/ha)			HI (%)
	Seed	Stover	Biological	
Weedy check	967	1760	2727	35.40
Weed free	1830	3321	5151	35.52
Pendimethalin @ 1.0kg ha ⁻¹	1483	2720	4203	35.26
Pendimethalin + Imazethapyr @ 800 g ha ⁻¹ PPI	1503	2782	4285	35.03
Diclosulam @ 20 g ha ⁻¹ PE	1410	2610	4020	35.05
Flumioxazin @ 75 g ha ⁻¹ PE	1340	2481	3821	35.08
Sodium Acefluorfen 16.5 + clodinafop 8% = @ 240 g ha ⁻¹ POE	1605	2906	4511	35.58
Fomesafen 11.1 + Fluzifop 11.1 = @ 220 g ha ⁻¹ POE	1640	2991	4631	35.43
SEm±	79	138	216	0.35
CD 0.05%	241	419	655	NS

Table 2: Effect of weed control measures on economics

Treatments	Return (Rs/ha)		
	Gross return	Net return	B : C ratio
Weedy check	61173	30173	0.97
Weed free	115763	80263	2.38
Pendimethalin @ 1.0kg ha ⁻¹	93909	61709	1.94
Pendimethalin + Imazethapyr @ 800 g ha ⁻¹ PPI	95279	62979	1.97
Diclosulam @ 20 g ha ⁻¹ PE	89399	57499	1.82
Flumioxazin @ 75 g ha ⁻¹ PE	84965	52965	1.67
Sodium Acefluorfen 16.5 + clodinafop 8% = @ 240 g ha ⁻¹ POE	101522	69722	2.21
Fomesafen 11.1 + Fluzifop 11.1 = @ 220 g ha ⁻¹ POE	103803	71953	2.28
SEm±	4985	4985	0.17
CD 0.05%	15120	15120	0.53

References

- Government of India. At a glance of agriculture 2024-25. Ministry of Agriculture and Farmers Welfare; 2025.
- Government of India. Agricultural statistics at a glance 2024-25. Ministry of Agriculture and Farmers Welfare; 2025.
- Jeetarwal V, Singh SP, Rahul S, Saini S, Yadav M, Jeetarwal P, *et al.* Effect of pre-and post-emergence herbicides on crop growth, yield and profitability of greengram under western arid region of Rajasthan. Ann Agric Res New Series. 2026;47(1):79-84.

4. Kumar PR, Mali SS, Singh AK, Bhatt BP. Impact of irrigation methods, irrigation scheduling and mulching on seed yield and water productivity of chickpea (*Cicer arietinum*). Legume Research. 2021;44(10):1247-1253.
5. Kurnool SK, Sunil Kumar M, Mrudhula A, Sridhar TV. Response of chickpea cultivars to post-emergence herbicides: growth, yield and economic performance. International Journal of Advanced Biochemistry Research. 2025;9(10S):555-564.
6. Nagar R, Singh A, Dayma J, Sharma D, Rana BB, Choudhary R. Evaluation of herbicide efficacy on weed dynamics and yield of chickpea (*Cicer arietinum* L.). Journal of Experimental Agriculture International. 2025;47(2):34-42.