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Weed management in chickpea (*Cicer arietinum* L.)

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Abstract

A field investigation on herbicide efficacy in chickpea (*Cicer arietinum* L.) as influenced by different sprayers was conducted at experimental Farm, Department of Agronomy, College of Agriculture, VNMKV, Parbhani during *rabi* season 2022-23 with objective to study the effect of treatments on growth and yield of chickpea and to assess the efficacy of herbicide spray through knapsack and boom sprayers on weed dynamics. The experiment was laid out in randomized block design with eight (8) treatments which was replicated thrice. The treatment details are (T₁) PoE application of Imazethapyr 10% with knapsack sprayer @ 60 g a.i. ha⁻¹ in 500 litre of water, (T₂) PoE application of Imazethapyr 10% with boom sprayer @ 60 g a.i. ha⁻¹ in 500 litre of water, (T₃) PoE application of Imazethapyr 10% + Quizalofop ethyl 5% (tank mix) with knapsack @ 60 g a.i. + 50 g a.i. ha⁻¹ in 500 litre of water, (T₄) PoE application of Imazethapyr 10% + Quizalofop ethyl 5% (tank mix) with boom sprayer @ 60 g a.i. + 50 g a.i. ha⁻¹ in 500 litre water, (T₅) PoE application of Propaquizafop 2.5% + Imazethapyr 3.75% with knapsack @ 100 g a.i. ha⁻¹ in 500 litre water, (T₆) PoE application of Propaquizafop 2.5% + Imazethapyr 3.75% with boom sprayer @ 100 g a.i. ha⁻¹ in 500 litre water, (T₇) Weed free and (T₈) Weed check. The findings indicate that, the growth parameters viz., plant height, number of branches, number of leaves and leaf area recorded higher values with treatment (T₇) weed free and were found to be at par with (T₄), (T₃), (T₆) and (T₅). Whereas the lowest values were recorded in weedy check treatment (T₈). Lowest mean number of monocot and dicot weed count were observed in weed free treatment (T₇) i.e., 1 hoeing + 1 hand weeding.

Keywords: Chickpea, weed, post-emergence herbicide, knapsack sprayer, boom sprayer, herbicide efficacy

Introduction

As Chickpea crop is preferably grown in *rabi* season, adequate moisture favours weed population to a greater extent. Chickpea is assumed as a poor competitor of weeds due to slow growth during seedling stage, short stature, open canopy and relatively sparse optimum plant population density, which resulted in excessive weed competition (Campbell, 2016) [4]. The major weed flora observed in field during *rabi* season was *Agemone mexicana*, *Melilotus alba*, *Portulaca oleraceae*, *Euphorbia hirta*, *Digera arvensis*, *Phasalis minima*, *Cyperus rotundus*, *Convolvus arvensis*, *Amaranthus viridis* etc (Bhutada and Bhale 2013) [3]. The yield reduction depending upon levels of weed competition in chickpea crop may vary from 30-70 per cent (Bankoti *et al.* 2021) [2]. Thus, management of weeds is nowadays observed most remunerative practice to get maximum yield and high quality grains in Chickpea. Although different methods are available for controlling weeds in chickpea cultivation, chemical control method due to its easy handling, more efficiency and quick application has attracted attention (Chavada *et al.* 2017) [5]. At present, different categories of sprayers and weeders that are manually operated, animal drawn, tractor mounted, and self-propelled types are available (Ambaliya *et al.* 2022) [1]. For herbicide application different sprayers can be used to test their efficacy to control weeds. Knapsack sprayers are used for spraying herbicides on small shrubs and row crops upto 2.5 m height. It allows specific treatment to individual weed plant without risk of damaging neighbour crops. Tractor or bullock mounted boom sprayer is most common type for herbicide application in broad scale farming. It allows spraying closer to the ground as a result of which it is less affected by wind and reduces chemical drift. To estimate the higher working efficiency of these sprayers, there is a need to conduct a comparative study of knapsack sprayer and boom sprayer.

Materials and Methods

A field experiment entitled, herbicide efficacy in chickpea (*Cicer arietinum* L.) as influenced by different sprayers was conducted at experimental Farm, Department of Agronomy, College of Agriculture, VNMKV, Parbhani during *rabi* season 2022-23. The experimental field was fairly leveled and well drained, the soil of experimental plot was clay in texture. The experiment was laid out in randomized block design with eight (8) treatments which was replicated thrice. The treatment details are (T₁) PoE application of Imazethapyr 10% with knapsack sprayer @ 60 g a.i. ha⁻¹ in 500 litre of water, (T₂) PoE application of Imazethapyr 10% with boom sprayer @ 60 g a.i. ha⁻¹ in 500 litre of water, (T₃) PoE application of Imazethapyr 10% + Quizalofop ethyl 5% (tank mix) with knapsack @ 60 g a.i. + 50 g a.i. ha⁻¹ in 500 litre of water, (T₄) PoE application of Imazethapyr 10% + Quizalofop ethyl 5% (tank mix) with boom sprayer @ 60 g a.i. + 50 g a.i. ha⁻¹ in 500 litre water, (T₅) PoE application of Propaquizafop 2.5% + Imazethapyr 3.75% with knapsack @ 100 g a.i. ha⁻¹ in 500 litre water, (T₆) PoE application of Propaquizafop 2.5% + Imazethapyr 3.75% with boom sprayer @ 100 g a.i. ha⁻¹ in 500 litre water, (T₇) Weed free and (T₈) Weed check. The size of the gross plot and net plot was 7.2 m x 6 m and 6 m x 4.8 m, respectively. The weeds were counted at 40 and 65 DAS. The quadrat of 0.25 square meter (0.5m x 0.5m) was randomly placed once in each plot and then the weed count was recorded according to the weed flora.

Results and Discussion

Growth attributes

The various growth parameters of chickpea viz., plant height, number of branches plant⁻¹, number of functional leaves plant⁻¹, leaf area plant⁻¹ and dry matter accumulation plant⁻¹ were

significantly influenced due to different treatments are recorded and results are provided in the Table 1.

Data regarding the mean plant height of chickpea was influenced by different weed management treatments. From the data it was observed that, weed free treatment (T₇) significantly recorded highest plant height which was found at par with treatment (T₄) PoE application of Imazethapyr 10% + Quizalofop ethyl 5% (tank mix) with boom sprayer @ 60 g a.i. + 50 g a.i. ha⁻¹ in 500 litre water, (T₃) PoE application of Imazethapyr 10% + Quizalofop ethyl 5% (tank mix) with knapsack sprayer @ 60 g a.i. + 50 g a.i. ha⁻¹ in 500 litre of water, (T₆) PoE application of Propaquizafop 2.5% + Imazethapyr 3.75% with boom sprayer @ 100 g a.i. ha⁻¹ in 500 litre water and (T₅) PoE application of Propaquizafop 2.5% + Imazethapyr 3.75% with knapsack sprayer @ 100 g a.i. ha⁻¹ in 500 litre water. The lowest plant height was recorded with weedy check treatment (T₈).

Similar trend was observed with the number of branches plant⁻¹, number of functional leaves plant⁻¹, leaf area plant⁻¹ and dry matter accumulation plant⁻¹.

Weed free treatment (T₇) recorded the highest growth of plants, because the weed density in the treatment was the lowest which enabled the better plant growth along with more height, more number of branches and more number of leaves resulting to higher dry matter weight. The lowest dry matter weight plant⁻¹ was found in weedy check plot (T₈) due to maximum and uninterrupted growth of weeds which made best utilization of resources. And among the herbicidal treatments T₄, T₃, T₆ and T₅ were next to weed free treatment where the herbicides effectively suppressed the weeds growth and favoured the crop with better growth resources.

These results were conformity with the finding of Kundu *et al.* (2009) [7], Kaushik *et al.* (2014) [6] and Shaktawat (2020) [8].

Table 1: Growth attributing characters of chickpea as influenced by different treatments

Sr. No	Treatments	Plant height (cm)	Number of branches plant ⁻¹	Number of functional leaves plant ⁻¹	Leaf area plant ⁻¹ (dm ²)	Dry matter accumulation plant ⁻¹ (g)	Seed yield (kg ha ⁻¹)
T ₁	PoE application of Imazethapyr 10% with knapsack sprayer @ 60 g a.i. ha ⁻¹ in 500 litre of water.	37.11	8.2	230.33	2.39	18.33	1022
T ₂	PoE application of Imazethapyr 10% with boom sprayer @ 60 g a.i. ha ⁻¹ in 500 litre of water.	37.16	8.4	231.01	2.47	18.38	1049
T ₃	PoE application of Imazethapyr 10% + Quizalofop ethyl 5% (tank mix) with knapsack sprayer @ 60 g a.i. + 50 g a.i. ha ⁻¹ in 500 litre of water.	47.49	12.0	266.33	3.08	22.09	1396
T ₄	PoE application of Imazethapyr 10% + Quizalofop ethyl 5% (tank mix) with boom sprayer @ 60 g a.i. + 50 g a.i. ha ⁻¹ in 500 litre water.	47.79	12.3	266.86	3.09	22.13	1416
T ₅	PoE application of Propaquizafop 2.5% + Imazethapyr 3.75% with knapsack sprayer @ 100 g a.i. ha ⁻¹ in 500 litre water.	44.46	11.8	262.99	2.96	21.41	1304
T ₆	PoE application of Propaquizafop 2.5% + Imazethapyr 3.75% with boom sprayer @ 100 g a.i. ha ⁻¹ in 500 litre water.	44.96	11.9	263.30	3.00	21.43	1327
T ₇	Weed free.	50.84	12.9	271.66	3.25	24.30	1439
T ₈	Weedy check.	30.03	6.8	197.67	1.98	15.00	753
	SE(m) ±	1.90	0.55	10.40	0.12	0.93	53
	C.D at 5%	5.72	1.67	31.40	0.36	2.80	159
	GM	42.56	10.53	248.77	2.78	20.37	1279

Weed count

Data on mean number of monocot and dicot weeds (m⁻²) at various stages as influenced by different treatments is presented in Table 2.

Monocot weeds (m⁻²)

From the table, it was confirmed that the number of monocot weeds (m⁻²) were significantly influenced at both periodical intervals due to different treatments.

At 40 DAS, significantly lowest mean number of monocot weed count were observed in weed free treatment (T₇) i.e., 1 hoeing + 1 hand weeding which was followed by treatment (T₄) PoE application of Imazethapyr 10% + Quizalofop ethyl 5% (tank mix) with boom sprayer @ 60 g a.i. + 50 g a.i. ha⁻¹ in 500 litre water, (T₃) PoE application of Imazethapyr 10% + Quizalofop ethyl 5% (tank mix) with knapsack @ 60 g a.i. + 50 g a.i. ha⁻¹ in 500 litre of water, (T₆) PoE application of Propaquizafop 2.5% + Imazethapyr 3.75% with boom sprayer @ 100 g a.i. ha⁻¹ in 500

litre water, (T₅) PoE application of Propaquizafop 2.5% + Imazethapyr 3.75% with knapsack @ 100 g a.i. ha⁻¹ in 500 litre water, (T₂) PoE application of Imazethapyr 10% with boom sprayer @ 60 g a.i. ha⁻¹ in 500 litre of water, (T₁) PoE application of Imazethapyr 10% with knapsack sprayer @ 60 g a.i. ha⁻¹ in 500 litre of water, whereas the maximum mean number of monocot weed count m⁻² was observed in weedy check treatment (T₈). Similar trend was observed at 65 DAS.

Dicot weeds (m⁻²)

From the table, it was confirmed that the number of dicot weeds (m⁻²) were significantly influenced at both periodical intervals due to different treatments.

At 40 DAS, significantly lowest mean number of dicot weeds

were observed in weed free treatment (T₇) i.e., 1 hoeing + 1 hand weeding followed by (T₄) PoE application of Imazethapyr 10% + Quizalofop ethyl 5% (tank mix) with boom sprayer @ 60 g a.i. + 50 g a.i. ha⁻¹ in 500 litre water, (T₃) PoE application of Imazethapyr 10% + Quizalofop ethyl 5% (tank mix) with knapsack @ 60 g a.i. + 50 g a.i. ha⁻¹ in 500 litre of water, (T₆) PoE application of Propaquizafop 2.5% + Imazethapyr 3.75% with boom sprayer @ 100 g a.i. ha⁻¹ in 500 litre water, (T₅) PoE application of Propaquizafop 2.5% + Imazethapyr 3.75% with knapsack @ 100 g a.i. ha⁻¹ in 500 litre water, (T₂) PoE application of Imazethapyr 10% with boom sprayer @ 60 g a.i. ha⁻¹ in 500 litre of water, (T₁) PoE application of Imazethapyr 10% with knapsack sprayer @ 60 g a.i. ha⁻¹ in 500 litre of

Table 2: Weed count for monocot and dicot weeds (m⁻²) in chickpea at different growth stages as influenced by different treatments.

Sr. No	Treatments	Weed count of monocot (m ⁻²)		Weed count of dicot (m ⁻²)	
		40 DAS	65 DAS	40 DAS	65 DAS
T ₁	PoE application of Imazethapyr 10% with knapsack sprayer @ 60 g a.i. ha ⁻¹ in 500 litre of water.	3.21 (7.33)	3.85 (11.24)	2.76 (5.11)	3.27 (7.67)
T ₂	PoE application of Imazethapyr 10% with boom sprayer @ 60 g a.i. ha ⁻¹ in 500 litre of water.	3.02 (6.33)	3.56 (9.33)	2.74 (5.02)	3.13 (6.90)
T ₃	PoE application of Imazethapyr 10% + Quizalofop ethyl 5% (tank mix) with knapsack sprayer @ 60 g a.i. + 50 g a.i. ha ⁻¹ in 500 litre of water.	2.42 (3.67)	2.81 (5.33)	2.46 (3.86)	2.66 (4.67)
T ₄	PoE application of Imazethapyr 10% + Quizalofop ethyl 5% (tank mix) with boom sprayer @ 60 g a.i. + 50 g a.i. ha ⁻¹ in 500 litre water.	2.32 (3.33)	2.52 (4.00)	1.95 (2.11)	2.32 (3.33)
T ₅	PoE application of Propaquizafop 2.5% + Imazethapyr 3.75% with knapsack sprayer @ 100 g a.i. ha ⁻¹ in 500 litre water.	2.74 (5.00)	3.08 (6.67)	2.66 (4.67)	2.95 (6.00)
T ₆	PoE application of Propaquizafop 2.5% + Imazethapyr 3.75% with boom sprayer @ 100 g a.i. ha ⁻¹ in 500 litre water.	2.58 (4.33)	3.02 (6.33)	2.50 (4.02)	2.81 (5.33)
T ₇	Weed free.	1.79 (1.66)	2.09 (2.53)	1.75 (1.56)	2.03 (2.33)
T ₈	Weedy check.	4.11 (13.0)	4.70 (17.67)	3.61 (19.66)	3.77 (10.67)
	S.E.	0.14	0.16	0.12	0.15
	C.D @ 5%	0.43	0.48	0.35	0.46

DAS: Days After Sowing, PoE: Post emergence, a.i: Active ingredient Values in the parenthesis are the original values. Weed count data were transformed to ($\sqrt{x} + 0.5$)

water, whereas the maximum mean number of dicot weed count m⁻² was observed in weedy check treatment (T₈). Similar trend was observed at 65 DAS.

Weed free treatment (T₇) recorded the lowest number of both monocot and dicot weeds, this might be due to the elimination of weeds at its initial stages, 1st by hoeing at 14 to 16 DAS and 2nd by hand weeding at 22 to 24 DAS which favoured luxurious growth and development of crop without competing for the growth resources.

Conclusion

Among different herbicidal treatments weed management through treatment (T₄) PoE application of Imazethapyr 10% + Quizalofop ethyl 5% (tank mix) with boom sprayer @ 60 g a.i. + 50 g a.i. ha⁻¹ in 500 litre water, (T₃) PoE application of Imazethapyr 10% + Quizalofop ethyl 5% (tank mix) with knapsack sprayer @ 60 g a.i. + 50 g a.i. ha⁻¹ in 500 litre of water, (T₆) PoE application of Propaquizafop 2.5% + Imazethapyr 3.75% with boom sprayer @ 100 g a.i. ha⁻¹ in 500 litre water and (T₅) PoE application of Propaquizafop 2.5% + Imazethapyr 3.75% with knapsack @ 100 g a.i. ha⁻¹ in 500 litre water showed effective control of weeds resulting in increased growth and yield of chickpea compared to rest of the treatments.

References

- Ambaliya PS, Tiwari VK, Jalu MV. Development and performance evaluation of mini tractor operated sprayer cum weeder. International Journal of Agriculture
- Innovations and Research. 2022;11(1):39-48.
- Bankoti P, Muang M, Kumar A, Sharma V. Response of weed management strategies on growth, yield and economics of chickpea (*Cicer arietinum* L.), yield and yield attributes. Journal of Pharmacognosy and Phytochemistry. 2021;10(1):1714-1716.
- Bhutada PO, Bhale VM. Efficacy of herbicides and cultural management on weed control in gram (*Cicer arietinum*). IOSR Journal of Agriculture and Veterinary Science. 2013;4(5):01-02.
- Campbell J. Controlling weeds in Pacific Northwest pulse crops. Crops and Soils. 2016;49(2):24-26.
- Chavada JN, Patel CK, Patel SB, Panchal PP, Patel GN. Weed management in chickpea (*Cicer arietinum* L.) under North Gujarat conditions. International Journal of Science, Environment and Technology. 2017;6(3):2018-2025.
- Kaushik SS, Rai AK, Sirothia P, Sharma AK, Shukla AK. Growth, yield and economics of rainfed chickpea (*Cicer arietinum* L.) as influenced by integrated weed management. Indian Journal of Natural Products and Resources. 2014;5(3):282-285.
- Kundu R, Bera PS, Brahmachari K. Effect of different weed management practices in summer mungbean (*Vigna radiata* L.) under new alluvial zone of West Bengal. Journal of Crop and Weed. 2009;5(2):117-121.
- Shaktawat RPS. Integrated weed management in blackgram. Indian Journal of Weed Science. 2020;52(3):290-291.