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Research Paper

Herbicidal weed management options for pigeonpea (*Cajanus Cajan*) grown in southeastern Rajasthan

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ABSTRACT

A field experiment was carried out during *the kharif* seasons of 2020–21, 2021–22 and 2022–23 at Kota, Rajasthan, to study the effect of post-emergence herbicides on productivity of pigeonpea [*Cajanus cajan* (L.) Millsp]. The results indicated that the minimum weed density and dry weight, and the highest yield attributes, yields, and net return of pigeonpea were obtained under weed free plot. All the herbicidal treatments significantly reduced the weed density and biomass compared to the weedy check. However, application of pendimethalin 30 EC @ 0.75 kg /ha (PE) *fb* Imazethapyr 10 SL @ 100 g/ha at 20–25 DAS + one inter-cultivation at 50 DAS recorded significantly higher plant height (1.82 m), pods/branch (22.96), pods/plant (206.3), weed control efficiency (84.39% at 60 DAS), grain yield (1,868 kg/ha), net return (₹ 87.66 x 10^3/ha) and B: C ratio (3.35) over weedy check. This leads to the 61.73% higher pigeonpea grain yield over the weedy check plot. Hence it can be inferred that the application of pendimethalin 30 EC @ 0.75 kg /ha (PE) *fb* Imazethapyr 10 SL @ 100 g/ha at 20–25 DAS + one inter-cultivation at 50 DAS is an efficient weed control method for profitable cultivation of pigeonpea in south eastern Rajasthan.

Key words: Net returns, Pigeonpea, Weed-management, Weed-control efficiency, Yield

Pigeonpea [*Cajanus cajan* (L.) Millsp] is one of the major grain legumes of the tropical and subtropical regions. India accounts for 90% of the global pigeonpea area and 85% of production. Owing to the nature of growth, pigeonpea is considered a climate-resilient pulse crop in rainfed conditions. Biotic and abiotic stresses, non-availability of suitable varieties, and inadequate transfer of technology are the major factors for the reduction of crop yield (Kumar *et al.,* 2023). Among these production constraints, heavy infestation of weeds is one of the major concerns, especially at early stage of crop growth, when crop has slow growth rate, and rapid and vigorous growth of weeds due to enough soil moisture, wider spacing, and favorable climatic condition after sowing of crops which results in heavy drain of available nutrients and moisture often smoother the tender crop and reduce the yield (Shekhawat *et al.,* 2022). Competitional stress of weeds causes a reduction in the grain yield of pigeonpea up to 80% (Padmaja *et al.*, 2013). As pigeonpea is usually grown during the rainy season, when the manual method of weed control is difficult to imply therefore, the chemical method of weed control is a more feasible, less laborious, cost-effective, and economical option. Weeds, compete with pigeonpea for nutrients and other resources and thus the yield is decreased (Bidlack *et al.*, 2006). Weed management strategies attempt to limit the deleterious effects of weeds on crop plants. In pigeonpea, the initial 6-8 weeks period is the critical period of the crop-weed competition. Effective and economical weed control may be possible through chemical means due to the unavailability of human labor at critical periods of competition and its high cost coupled with heavy and continuous rainfall in *kharif* season. Herbicide and its integration with manual and mechanical methods can prove more effective and economical (Nimbargi *et al*, 2021). The use of integrated weed management methods would make weed control more acceptable to farmers. Therefore, the present investigation was conducted to find suitable and economical weed control methods for enhancing the productivity and profitability of pigeonpea.

MATERIALS AND METHODS

The field experiment was conducted during the *Kharif* seasons of 2020–21, 2021–22 and 2022–23 at Agricultural Research Station, Kota (26º North latitude, 76º-6' East longitude and 260 m above mean sea level), Rajasthan. The

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study area falls under the humid south eastern plain zone of Rajasthan. The soil of the experimental field was vertisol having bulk density 1.50 Mg/m^3, *p*H 7.76, CEC 35 Cmol/kg, medium in organic carbon 5.4 g/kg, available N (281 kg/ha), available P (22.7 kg /ha) and high in available K (316 kg /ha). The total rainfall received during the crop season of 2020–21, 2021–22, and 2022–23 was 499.2 mm, 1370 mm, and 1119.6 mm, respectively.

The experiment was laid out in randomized block design with three replications. Treatments comprised viz; T_1, weed free; T_2, weedy check; T_3, 2 hand weeding at 20 and 40 DAS/ Inter cultivation; T_4, pendimethalin 30 EC @ 0.75 kg/ha (PE) followed by (*fb*) imazethapyr 10 SL @ 100 g/ha at 20–25 DAS + inter cultivation at 50 DAS; T_5, pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* chlorimuron ethyl 25 WP @ 9 g /ha at 20–25 DAS + inter cultivation at 50 DAS; T_6, pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* fenoxaprop ethyl 9.3 EC @ 70 g/ha at 20–25 DAS + inter cultivation at 50 DAS; T_7, pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* propaquizalop 2.5% + imazethapyr 3.7% w/w @ 50 + 75 = 125 g/ha at 20–25 DAS + inter cultivation at 50 DAS; T_8, pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* sodium acifluorfen 16.5% + clodinafop propargyl 8% @ 245 g/ha at 20–25 DAS + inter cultivation at 50 DAS; T_9, pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* chlorimuron ethyl 9 g + quizalofop ethyl 50 g/ha at 20–25 DAS + inter cultivation at 50 DAS; T_{10}, pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* chlorimuron ethyl 6 g + quizalofop ethyl 37.5 g/ha at 20–25 DAS + inter cultivation at 50 DAS; T_{11}, pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* chlorimuron ethyl 9 g + fenoxaprop ethyl 70 g /ha at 20–25 DAS + inter cultivation at 50 DAS; T_{12}, pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* chlorimuron ethyl 6 g + fenoxaprop ethyl 50 g/ha at 20–25 DAS + inter cultivation at 50 DAS and T_{13}, pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* imazethapyr + imazamox @ 100 g /ha at 20–25 DAS + inter cultivation at 50 DAS.

Pigeonpea variety ICPL 88039 was sown with the seed rate of 18 kg/ha at the spacing of 60 cm x 20 cm. The seeds were sown in the first fortnight of July during experimentation. Basal application of 20 kg N and 50 kg/ha P_2O_5 were applied through diammonium phosphate and urea for the requirement of nitrogen and phosphorus. A common basal dose of zinc sulfate (21% Zn) @ 25 kg/ha was applied uniformly to all the plots. The required quantity of herbicide as per treatment was applied with manually operated knapsack sprayer using a spray volume of 500 L/ha. Weed density (number/m^2) and weed dry weight (g/m^2) were measured from the randomly selected samples at 2 places in each plot with the help of 0.25 m^2 quadrat at 30 and 60 days after sowing. Weed control efficiency (WCE) was also calculated based on the dry-matter production of weeds. Data on weed count and weed biomass were subjected to square root transformation to reduce larger variation in original value by using the formula [$\sqrt{(x + 0.5)}$] before carrying out analysis of variance, and comparison among treatments were made on transformed values only.

The crop was harvested on 25 December 2020, 15 February 2022, and 20 January 2023. Yield-attributing traits and seed yields were recorded at the time of harvesting. The economic analysis of each treatment was done based on prevailing market prices of the inputs used and outputs obtained under each treatment. The data obtained on various observations were tabulated and statistically analyzed by using the analysis of variance (ANOVA) and the significance of the treatments was tested by F test. Critical difference (CD) at 5% level of significance was determined for each character to compare the differences among treatment means (Gomez and Gomez, 1984).

RESULTS AND DISCUSSION

Effect on weeds

The weed flora in the experimental field consisted of a mixed population viz. *Echinochloa crus-galli* (L.) Beavls, *Echinochloa colonum* (L.) Link and *Cynodon dactylon* among grassy weeds and *Eclipta alba* (L.) Hoesk, *Commelina benghalensis* L., *Amaranthus viridis* (L.), *Trianthema benghalensis* L. *Celosia argentia*, *Capsulariaarsiloris* L. *Phylenthus niruri*, *Corchorus olitorious*, *Alternethera caracasana* among the broad leaf weeds and sedges, *Cyprus rotendus* and *Cyprus iria* (L.). Analysis of the spectrum of weed flora revealed that grassy weeds are more problematic, constituting 60%, followed by sedges (25%) and broad leaf weeds (15%) among the weed population. The weedy check recorded significantly higher weed population and weed dry weight at 30 and 60 DAS than any other treatment (Table 1). All the weed control measures resulted in lower weed density and weed dry weight at 30 DAS and 60 DAS than the weedy check. However, minimum weed count at 30 and 60 DAS was observed in 2 HW at 20 & 40 DAS. Among herbicidal treatments, application of pendimethalin 30 EC @ 0.75 kg /ha (PE) *fb* Imazethapyr 10 SL @ 100 g/ha at 20-25 DAS + One inter cultivation at 50 DAS, pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* propaquizalop 2.5% + Imazethapyr 3.7% w/w @ 50+75 = 125 g/ha at 20–25 DAS + One inter cultivation at 50 DAS and pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* Imazethapyr + Imazamox @ 100 g/ha at 20–25 DAS + One inter cultivation at 50 DAS recorded significantly lower weed density and weed dry weight at 30 and 60 DAS as compared to other herbicidal treatments being statistically at par with each other about weed density and weed dry weight at both the stages.

Maximum weed control efficiency was observed at 30

Table 1. Effect of weed management on weed count, dry weight of weeds, and weed control efficiency in pigeonpea (pooled data of 3 years)

Treatment	Weed count (No./m^2)		Weed dry weight (g/m^2)		Weed control efficiency (%)	
	30 DAS	60 DAS	30 DAS	60 DAS	30 DAS	60 DAS
T_1, Weed free	0.00	0.00	0.00	0.00	100.00	100.00
T_2, Weedy check	11.4 (130.2) *	13.6 (185.6) *	5.14 (25.89) *	7.95 (63.28) *	0.00	0.00
T_3, 2 Hand Weeding at 20 and 40 DAS/ Inter cultivation	2.20 (4.86)	4.45 (19.81)	1.70 (2.42)	3.49 (12.19)	90.60	80.94
T_4, Pendimethalin 30 EC @ 0.75 kg ai/ha (PE) followed by Imazethapyr 10 SL @ 100 g ai/ha at 20–25 DAS *fb* + 1 Inter cultivation at 50 DAS.	5.49 (30.2)	7.13 (50.94)	2.90 (7.89)	3.13 (9.81)	69.46	84.39
T_5, Chlorimuron ethyl 25 WP @ 9 g ai/ha at 20–25 DAS	6.38 (40.7)	8.48 (72.06)	3.04 (8.73)	4.04 (16.31)	66.05	74.13
T_6, Fenoxaprop ethyl 9.3 EC @ 70 g ai/ha at 20–25 DAS	6.93 (48.1)	8.01 (64.30)	3.11 (9.17)	3.80 (14.46)	64.44	77.14
T_7, Propaquizalop 2.5% + Imazethapyr 3.7% w/w @ 50+75 = 125 g ai/ha at 20–25 DAS	5.31 (28.2)	7.63 (58.26)	3.02 (8.63)	3.48 (12.10)	66.52	80.90
T_8, Sodium Acifluorfen 16.5% +Clodinafop propargyl 8% @ 245 g ai/ha at 20–25 DAS	5.06 (25.7)	5.88 (34.64)	2.67 (6.62)	3.08 (9.50)	74.27	85.02
T_9, Chlorimuron ethyl 9 g + quizalofop ethyl 50 g ai/ha at 20–25 DAS	4.94 (24.5)	6.51 (42.50)	2.87 (7.74)	3.64 (13.23)	69.93	79.23
T_{10}, Chlorimuron ethyl 6 g + quizalofop ethyl 37.5 g ai/ha at 20–25 DAS	6.57 (43.2)	9.01 (81.35)	3.06 (8.86)	4.27 (18.20)	65.72	71.22
T_{11}, Chlorimuron ethyl 9 g + Fenoxaprop ethyl 70 g ai/ha at 20–25 DAS	6.26 (39.2)	7.84 (61.48)	2.96 (8.24)	3.74 (13.99)	67.90	78.00
T_{12}, Chlorimuron ethyl 6 g + Fenoxaprop ethyl 50 g ai/ha at 20–25 DAS	6.71 (45.1)	8.88 (78.99)	3.00 (8.53)	4.05 (16.42)	66.80	74.06
T_{13}, Imazethapyr + Imazamox @ 100 g ai/ha at 20–25 DAS	5.48 (30.1)	5.60 (57.76)	2.95 (8.19)	3.39 (11.46)	68.25	81.82
SEm±	1.39	1.63	0.49	0.90	1.59	1.11
CD (P=0.05)	2.34	2.74	1.39	2.55	4.48	3.14

Note: Pendimethalin 30 EC @ 0.75 kg ai/ha as pre-emergent herbicide followed by one inter-cultivation at 50 DAS is common from T_4 to T_{13}.
*Data in parentheses indicate the original value of weeds and outside square root transformed values (sq. root of x + 0.5)

DAS under two-hand weeding at 20 and 40 DAS. However, application of pendimethalin 30 EC @ 0.75 kg/ha (PE) followed by (*fb*) sodium acifluorfen 16.5% + clodinafop propargyl 8% @ 245 g/ha at 20–25 DAS + inter cultivation at 50 DAS gave significantly higher weed control efficiency at 60 DAS as compared to weedy check being on par with application of pendimethalin 30 EC @ 0.75 kg a.i./ha (PE) *fb* Imazethapyr 10 SL @ 100 g a.i./ha at 20–25 DAS + One inter cultivation at 50 DAS. The lower intensity of weeds at all the stages with these two treatments having the application of pre, and post-emergence herbicides may be due to readily absorbed through the roots and foliage, translocated in the xylem and phloem, and accumulated in growing points. It kills the weeds by inhibition of acetohydroxy acid. Results are in close conformity with the research findings of Padmaja *et al*., (2013).

Effect on crop

Growth and yield attributes

All the weed control measures significantly increased growth and yield attributes as compared to the weedy check (Table 2). Maximum plant height (2.06 m), branches/plant (10.94), pods/branch (24.22), pods/plant

(244.4), seeds/pod, and 100 seed weight were observed in weed-free plots. Among chemical weed control measures, maximum plant height was recorded with the application of pendimethalin 30 EC @ 0.75 kg a.i./ha (PE) *fb* Imazethapyr + Imazamox @ 100 g/ha at 20–25 DAS+ One inter cultivation at 50 DAS followed by application of pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* Imazethapyr 10 SL @ 100 g/ha at 20–25 DAS + One inter cultivation at 50 DAS. However, among herbicidal treatments, maximum number of branches per plant were obtained with application of pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* Imazethapyr + Imazamox @ 100 g/ha at 20–25 DAS+ One inter cultivation at 50 DAS followed by application of pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* Propaquizalop 2.5% + Imazethapyr 3.7% w/w @ 50+75 = 125 g/ha at 20–25 DAS + One inter cultivation at 50 DAS. Pods/branch (22.96), pods/plant (206.3), seeds/pod (3.71) and 100 seed weight increased significantly with the pre-emergence application of pendimethalin 30 EC @ 0.75 kg/ha *fb* Imazethapyr 10 SL @ 100 g/ha at 20–25 DAS + One inter cultivation at 50 DAS being statistically on par with pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* Propaquizalop 2.5% + Imazethapyr 3.7% w/w @ 50+75=125 g/ha at 20–25 DAS + One inter cultivation at 50 DAS and pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* Imazethapyr + Imazamox @ 100 g/ha at 20–25 DAS + One inter cultivation at 50 DAS over weedy check and other treatments. This might be owing to a significant reduction in weed density and weed dry weight. Effective control of weeds with pre and post-emergence application of herbicides might have resulted in increased growth and yield attributes of the crop, which reduces water and nutrient uptake by weeds (Shekhawat *et al.,* 2022; Singh *et al.,* 2023). Severe infestation of weed decreases the growth and yield attributes in weedy check. These results are similar to the findings of Nimbargi *et al.* (2021).

Yield

Different weed management practices had a significant influence on the seed yield, stalk, and biological yield of

Table 2. Effect of weed management on growth and yield attributes of pigeonpea (pooled data of 3 years)

Treatment	Plant height (m)	Branches/ plant	Pods/ branch	Pods/ plant	Seeds/ pod	100 seed weight (g)
T_1, Weed free	2.06	10.94	24.22	244.4	3.95	9.44
T_2, Weedy check	1.37	7.93	13.01	102.4	3.05	8.49
T_3, 2 Hand Weeding at 20 and 40 DAS/ Inter cultivation	1.95	9.35	20.91	196.8	3.65	9.23
T_4, Pendimethalin 30 EC @ 0.75 kg ai/ha (PE) followed by Imazethapyr 10 SL @ 100 g ai/ha at 20–25 DAS *fb* + 1 Inter cultivation at 50 DAS.	1.82	9.19	22.96	206.3	3.71	9.23
T_5, Chlorimuron ethyl 25 WP @ 9 g ai/ha at 20–25 DAS	1.74	9.06	20.08	181.6	3.53	8.82
T_6, Fenoxaprop ethyl 9.3 EC @ 70 g ai/ha at 20–25 DAS	1.78	8.71	21.54	186.2	3.42	8.67
T_7, Propaquizalop 2.5% + Imazethapyr 3.7 % w/w @ 50+75 = 125 g ai/ha at 20–25 DAS	1.79	10.12	22.00	207.6	3.80	9.19
T_8, Sodium Acifluorfen 16.5% + Clodinafop propargyl 8% @ 245 g ai/ha at 20–25 DAS	1.80	9.52	19.07	181.3	3.42	8.77
T_9, Chlorimuron ethyl 9 g + quizalofop ethyl 50 g ai/ha at 20–25 DAS	1.79	9.34	19.60	183.0	3.46	8.83
T_{10}, Chlorimuron ethyl 6 g + quizalofop ethyl 37.5 g ai/ha at 20–25 DAS	1.69	9.03	20.24	182.5	3.41	8.72
T_{11}, Chlorimuron ethyl 9 g + Fenoxaprop ethyl 70 g ai/ha at 20–25 DAS	1.80	9.42	18.63	175.6	3.43	8.77
T_{12}, Chlorimuron ethyl 6 g + Fenoxaprop ethyl 50 g ai/ha at 20–25 DAS	1.72	9.51	19.09	181.8	3.36	8.63
T_{13}, Imazethapyr + Imazamox @ 100 g ai/ha at 20–25 DAS	1.90	10.02	21.57	205.7	3.67	8.86
SEm±	0.05	0.34	0.71	8.46	0.13	0.13
CD (P=0.05)	0.15	0.95	2.01	23.88	0.35	0.37

Note: Pendimethalin 30 EC @ 0.75 kg ai/ha as pre-emergent herbicide followed by one inter-cultivation at 50 DAS is common from T_4 to T_{13}.

pigeonpea crop (Table 3). The highest grain (2,116 kg/ha), stalk, and biological yield were recorded with weed-free plots. Among chemical weed control measures, grain yield (1,916 kg/ha), stalk, and biological yield of pigeonpea crop were found significantly superior with the application of pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* Propaquizalop 2.5% + Imazethapyr 3.7% w/w @ 50+75 = 125 g/ha at 20–25 DAS + One inter cultivation at 50 DAS, which remained on par with that of pendimethalin 30 EC @ 0.75 kg/ha (PE) (*fb*) Imazethapyr 10 SL @ 100 g/ha at 20–25 DAS + One inter cultivation at 50 DAS and pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* Imazethapyr + Imazamox @ 100 g/ha at 20–25 DAS + One inter cultivation at 50 DAS as compared to unweeded control having lowest yields. Weed management practices did not influence the harvest index. The increase in grain, stalk, and biological yield by the application of pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* Propaquizalop 2.5% + Imazethapyr 3.7% w/w @ 50+75 = 125 g/ha at 20–25 DAS + One inter cultivation at 50 DAS were owing to reduced weed density, weed dry weight and higher weed control efficiency resulted in higher pods/plant (Table 1). The minimum yields in unweeded checks were the results of severe weed competition. This could be attributed to the effective control of weeds during critical periods of crop weed competition which in turn reduced biotic stress (due to weed competition) and thus, provided weed-free environment for better growth and yield. These results are in close conformity with the finding of Patel *et al.,* (2024)

Economics

Economic data (Table 3) revealed that weed-free treatment gave the highest net realization of ₹ 98.26 x10^3/ha. However, among all herbicidal treatments, application of pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* Imazethapyr 10 SL @ 100 g/ha at 20–25 DAS + One inter cultivation at 50 DAS gave highest net return (87.66 x 10^3/ha) and benefit-cost ratio (3.35) being on par with pendimethalin

Table 3. Effect of weed management on yield, HI, and economics of pigeonpea (pooled data of 3 years)

Treatment	Seed yield (kg/ha)	Stalk yield (kg/ha)	Biological yield (kg/ha)	HI (%)	Net return (₹ x10^3/ha)	Benefit: cost ratio
T_1, Weed free	2,116	4,777	6,892	31.09	98.26	2.65
T_2, Weedy check	1,155	2,581	3,735	31.23	45.38	1.89
T_3, 2 Hand Weeding at 20 and 40 DAS/ Inter cultivation	1,794	4,381	6,175	29.04	76.61	2.34
T_4, Pendimethalin 30 EC @ 0.75 kg ai/ha (PE) followed by Imazethapyr 10 SL @ 100 g ai/ha at 20–25 DAS *fb* + 1 Inter cultivation at 50 DAS.	1,868	4,392	6,259	30.13	87.66	3.35
T_5, Chlorimuron ethyl 25 WP @ 9 g ai/ha at 20–25 DAS	1,539	3,566	5,105	30.68	63.15	2.12
T_6, Fenoxaprop ethyl 9.3 EC @ 70 g ai/ha at 20–25 DAS	1,593	3,719	5,312	30.60	65.53	2.11
T_7, Propaquizalop 2.5% + Imazethapyr 3.7 % w/w @ 50+75 = 125 g ai/ha at 20–25 DAS	1,916	4,268	6,184	31.74	86.60	2.86
T_8, Sodium Acifluorfen 16.5 % +Clodinafop propargyl 8% @ 245 g ai/ha at 20–25 DAS	1,644	3,713	5,357	31.22	68.99	2.28
T_9, Chlorimuron ethyl 9 g + quizalofop ethyl 50 g ai/ha at 20–25 DAS	1,558	3,495	5,053	31.55	63.63	2.08
T_{10}, Chlorimuron ethyl 6 g + quizalofop ethyl 37.5 g ai/ha at 20–25 DAS	1,584	3,624	5,209	31.08	65.61	2.16
T_{11}, Chlorimuron ethyl 9 g + Fenoxaprop ethyl 70 g ai/ha at 20–25 DAS	1,507	3,498	5,005	30.79	59.57	1.90
T_{12}, Chlorimuron ethyl 6 g + Fenoxaprop ethyl 50 g ai/ha at 20–25 DAS	1,540	3,541	5,081	30.92	62.20	2.02
T_{13}, Imazethapyr + Imazamox @ 100 g ai/ha at 20-25 DAS	1,770	4,187	5,956	30.46	77.09	2.59
SEm±	70.53	129.3	164.9	0.91	4.77	0.16
CD (P=0.05)	199.12	365	466	NS	13.46	0.45

Note: Pendimethalin 30 EC @ 0.75 kg ai/ha as pre-emergent herbicide followed by one Inter cultivation at 50 DAS is common from T_4 to T_{13}.

30 EC @ 0.75 kg/ha(PE) *fb* Propaquizalop 2.5% + Imazethapyr 3.7% w/w @ 50 +75 = 125 g/ha at 20–25 DAS + One inter cultivation at 50 DAS and pendimethalin 30 EC @ 0.75 kg/ha (PE) *fb* Imazethapyr + Imazamox @ 100 g /ha at 20–25 DAS + One inter cultivation at 50 DAS than weedy check and other weed control measures. The lower net return and B: C ratio in the weedy check was due to high infestation of weeds resulting in low weed control efficiency and yield. These results conform with those reported by Singh and Sekhon (2013); Yadav *et al*. (2013) and Singh *et al*. (2016).

Thus, it can be concluded that pre-emergence application of pendimethalin 30 EC @ 0.75 kg/ha *fb* post-emergence application of Imazethapyr 10 SL @ 100 g ha at 20–25 DAS + one inter-cultivation at 50 DAS is more productive and remunerative with effective weed control in pigeonpea.

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