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Efficacy of pre and post emergence of herbicide on weed flora of blackgram (*Phaseolus mungo* L.) under the soil typic Haplustepts

Bal Manohar, Rama Bharti, Rajeev Singh, Parmeswar Dayal, Mani Bhushan and Santosh Kumar Pandit

Abstract
A Field experiment was carried out at the experimental site of Bihar Agricultural College Farm, Bihar Agricultural University, Sabour during kharif season, 2018, with blackgram (cv 'IPU 2-43') to study the efficacy of pre and post emergence of herbicide on weed flora of blackgram (*Phaseolus mungo* L.) under the soil typic Haplustepts. The experiment was laid out in a randomized block design with three replications and eleven treatments. From the investigation it revealed that *Cynodon dactylon* among the grasses; *Cypres rotundus* among the sedges and *Phyllanthus niruri, Solanum nigrum, Mimosa pudica* among the broadleaved weeds were predominant maximum in number throughout the cropping period. Among herbicide weed treatments, the highest growth, yield parameters and minimum number of weed flora, weed density as well as weed biomass were obtained in weed free followed by intercultural operation at 20 & 40 DAS and it was statistically at par with Pendimethalin (PE) 30 EC @ 0.75 kg a.i /ha *fb* Imazethapyr (POE) @ 0.060 kg a.i /ha and Oxyfluorfen (PE) @ 0.125 kg a.i /ha *fb* Imazethapyr (POE) @ 0.060 kg a.i/ha. All chemical treatments increased the growth, seed yield and lowest in weed density, weed biomass compared to weedy check. Weedy check registered with lowest seed yield and maximum number in weed flora and weed density.

Keywords: Pre- emergence, Post emergence, weed flora, weed dry weight, Weed control efficiency (%)

Introduction
Blackgram (*Phaseolus mungo* L.) is one of the important pulse crop which belongs to the family "Leguminoseae". The lower productivity is mainly due to unawareness and improper weed management practices. It had ability to fix the atmospheric nitrogen, and maintain the sustainability of soil productivity. Blackgram, which is also known as urd bean, contains about 26 per cent protein, 1.2 per cent oil, 56 per cent carbohydrates and has significant quantities of vitamin B_1, B_2 and niacin. Weeds being the major problem which provide opportunities for sheltering insects, pests and infestation of diseases and result in drastically yield reduction. They reduce the crop yield and deteriorate the quality of produce and hence, reduce the market value of crop yield. Farmers didnot follow chemical weed weed management in pulses, except some farmers who used pre-emergence herbicides followed by one or two hand weedings. Singh *et al*. (2014) [9] raised a need of post-emergence herbicide to control the of weeds in pulses and to decrease in number of human labour. Some of the post-emergence herbicides such as Imazethapyr Quizalofop, and Fenoxaprop-p-ethyl have been found effective in controlling weeds in pulses. The highest weed control efficiency was recorded with two hand weeding at 20 and 40 DAS followed by application of imazethapyr @ 0.025 kg a.i./ha (POE) post emergence at 20 DAS. Reported by Gupta *et al*. (2013) [5]. At present, the farmers are demanding post-emergence herbicides for managing weeds. The present investigation was planned and implemented taking into account the pre- as well as post-emergence herbicides so that weeds can be controlled throughout the crop growth period for this short duration legume and ultimately improving the productivity of the crop

Materials and Methods
The experiments was conducted during (*Kharif*) season 2018 at Bihar Agricultural University (B.A.U) Sabour, Bhagalpur, Bihar (25º23'N Latitude and 87º07'E longitude with an altitude of 37.19 m above mean sea level). The experiment site was situated in the south Bihar region, Agro climatic zone III A.

The soil of the experimental site was well-drained sandy loam soil in texture include 47.4% sand, 32.6% silt and 19.6% clay [(international pipette method, piper (1950)]. Before the start of the experiment the initial reading of the soil pH is neutral (pH 7.4), low in organic carbon (0.46%), low available nitrogen (206.30 kg/ ha), medium available phosphorous (19.25 kg/ha) and potassium (168.4 kg/ha) with electrical conductivity of 0.030 dS/m. Cumulative rainfall recorded was 248.7mm during experiment period from 13-19August to 19-25 November, 2018 which was 916.3mm less than the normal rainfall (1165 mm) of this locality. Eleven treatments as listed in (Table 1) were assigned in a Randomized Block Design with three replications. Treatments included: -

Table 1: Details of treatment

Treatment notation	Details of treatment for blackgram (kharif Season)
T1	Pendimethalin (PE) 30 EC@ 0.75 kg a.i/ha within 24 hrs
T2	Oxyfluorfen (PE) 23.5 EC @ 0.125 kg a.i/ha within 24 hrs
T3	Pendimethalin (PE) fb Imazethapyr (POE) 10 SL @ 0.060 kg a.i/ha 23 DAS
T4	Pendimethalin (PE) fb Fenoxaprop-p-ethyl (POE) 10 EC @ 0.10 kg a.i/ha 23 DAS
T5	Pendimethalin (PE) fb Quizalofop-p-ethyl (POE) 5 EC @ 0.05 kg a.i/ha 23 DAS
T6	Oxyfluorfen (PE) fb Imazethapyr (POE) 10 SL @ 0.060 kg a.i ha/ 23 DAS
T7	Oxyfluorfen (PE) fb Fenoxaprop-p-ethyl (POE) 10 EC @ 0.10 kg a.i/ha 23 DAS
T8	Oxyfluorfen (PE) fb Quizalofop-p-ethyl (POE) 5 EC @ 0.05 kg a.i/ha 23 DAS
T9	Intercultural operation @ 20 and 40 DAS with hand weeding
T10	Weedy check.
T11	Weed free.

Pendimethalin (PE) 30 EC @ 0.75 kg a.i/ha and oxyflurofen (PE) 23.5 EC @ 0.125 kg a.i/ha were sprayed at with in 24 hrs of sowing. Imazethapyr (POE) 10 SL @ 0.060 kg a.i/ha, Fenoxaprop p-ethyl 10 EC @ 0.010 kg a.i/ha and Quizalofop-p-ethyl (POE) 5 EC @ 0.05 kg a.i/ha were sprayed at 23 DAS using 500 liter of water per hectare with a knapsack sprayer fitted with a flat fan nozzle. In case of Interculture operation were removed manually with a khurpi at 20 and 40 DAS. In case of weedy check plots, weed were allowed and weed free plots, weeds were removed with a hand tool khurpi during the whole crop growing season.

Seed of blackgram variety "*IPU 2-43*" were sown in lines at the rate of 22-25 kg/ha and a depth of 2-3 cm maintaining spacing between plant to plant and row to row was 30 x 10 cm. The area of gross plot was 4.2 x 3.6 m^2, while net plot was (4m x 3m). The crop was fertilized with 20-60-40 kg N-P-K/ha through Urea, Single super phosphate and Muriate of potash respectively. The crop was sown 18th August and harvest at 20th November 2018.

Data on weeds were counted separately with in a random quadrat (50 x 50) cm in each net plot at 30 and 60 DAS and expressed as number of no./m^2. Weeds were cut close to the ground level with in a quadrat in each net plot and dried at 65^0 C for 48 hrs till a constant weight was obtained. Species wise number of weeds were recorded from two randomly selected spots with in the net plot was recorded at 30 and 60 DAS. The average of the two counts was taken and expressed as weed count per m^2. Species wise (grass, sedge and Broadleaf), weed biomass at 30 and 60 DAS and weed control efficiency (%) at 30 and 60 DAS subjected to square root transformation before statistical analysis to normalize their distribution. grain yield were recorded on the basis of whole plot area and converted into (q/ha).

$$\text{WCE (\%)} = \frac{\text{Dry matter of weed in unweeded plot} - \text{Dry matter of weeds in treated plot}}{\text{Dry matter of weed in unweeded plot}} \text{ X } 100$$

Yield of weed free plot

Net returns as well as benefit: cost (B: C) ratio were also worked out. The data obtained on weed count, weed density were tabulated and subjected to statistical analysis by using a Randomised block design (RBD) with three replications. Two – way ANOVA was performed to assess the variability of treatments and its spatial variability with depth Gomez and Gomez (1984). The standard error of mean (S.Em±) and the value of LSD (p=0.05) were indicated in the tables to compare the difference between the mean value.

Result and discussion

Weed flora

The common weeds at the experimental site were C*ypres rotundus* (sedges), while among the grasses, *Cynodon dactylon* and *Echinochloa spp.* were more in numbers. Many kinds of broadleaf weeds were also recorded during the growing period of the crop and prominent broadleaf weeds were *Trianthema portulacastrum*, *Phyllanthus niruri*, *Solanum nigrum*, *Mimosa pudica* (Smell Melon), *Cucumis melo*, and C*leome gynandra*. Similar types of weed flora were also reported by Pankaj and Dewangan (2017) [7] in their experiment. All the herbicide combination was found effective in supressing the different weeds flora as compare to the weedy check at different stages of the crop. Maximum numbers of weeds were observed in weedy check (T_{10}) followed by Intercultural operation at 20 and 40 DAS (T_9) at 30 and 60 days after sowing (Table 2 and Table 3.) respectively.

Table 2: Major weed flora (Number/m^2) at 30 DAS as influenced by weed control treatment in blackgram

Treatment	Sedge	Grasses		Broad leaved						Total
	CR	CD	EC	TP	PN	SN	MP	CM	CG	
T_1	5.96 (35)	3.29(10.0)	2.12(4)	0.89(0.3)	2.61(6.3)	1.45(1.6)	0.89(0.3)	0.71(0)	1.73(2.5)	7.79(60.3)
T_2	6.15(37.33)	3.94(15)	2.19(4.3)	0.71(0)	2.86(7.7)	1.34(1.3)	0.71(0)	1.79(2.7)	1.52(1.8)	8.40(70.13)
T_3	3.98 (15.33)	2.97(8.33)	1.34(1.3)	1.22(1)	1.58(2)	0.71(0)	0.89(0.3)	0.71(0)	1.10(0.7)	5.43(28.96)
T_4	4.95(24)	2.91(8)	1.87(3)	1.00(0.5)	1.95(3.3)	0.71(0)	1.22(1)	1.22(1)	0.89(0.3)	6.45(41.1)
T_5	5.84 (33.67)	2.93(8.1)	2.34(5)	0.95(0.4)	2.34(5)	0.95(0.4)	0.71(0)	1.10(0.7)	1.22(1)	7.40(54.27)
T_6	4.02(15.67)	3.00(8.53)	1.67(2.3)	0.89(0.3)	1.87(3)	0.71(0)	1.34(1.3)	0.71(0)	0.71(0)	5.62(31.1)
T_7	4.24(17.5)	2.97(8.3)	1.87(3)	1.00(0.5)	2.12(4)	0.89(0.3)	1.22(1)	1.10(0.7)	0.71(0)	6.80(35.3)
T_8	4.74(22)	3.08(9)	2.74(7)	0.71(0)	2.55(6)	0.71(0)	1.14(0.8)	0.71(0)	1.22(1)	6.21(45.8)
T_9	3.72 (13.33)	3.08(9)	2.91(8)	0.71(0)	2.37(5.1)	0.71(0)	1.71(0)	1.10(0.7)	1.22(1)	9.90(38.13)
T_{10}	7.36 (53.67)	4.38(18.67)	3.24(10)	1.34(1.3)	3.35(10.7)	1.55(1.9)	1.14(0.8)	1.30(1.2)	2.19(4.3)	7.49(97.54)
T_{11}	0.71(0)	0.71(0)	0.71(0)	0.71(0)	0.71(0)	0.71(0)	0.71(0)	0.71(0)	0.71(0)	0.71(0)
S.Em ±	0.09	0.06	0.04	0.01	0.04	0.01	0.01	0.01	0.02	0.13
LSD (P=0.05)	0.28	0.17	0.11	0.03	0.12	0.03	0.03	0.04	0.05	0.38

Cyperus rotundus(CR), *Cynodon dactylon (*CD), *Echinochloa spp (*EC), *Trianthema portulacastrum* (TP), *Phyllanthus niruri* (PN), *Solanum nigrum* (SN), *Mimosa pudica* (MP), *Cucumis melo* (CM), *Cleome gynandra* (CG) T_1 = Pendimethalin (PE) 30 EC @ 0.75 kg a.i/ha within 24 hrs, T_2 = Oxyfluorfen (PE) 23.5 EC @ 0.125 kg a.i/ha within 24 hrs, T_3 = Pendimethalin (PE) 30 EC @ 0.75 *fb* Imazethapyr (POE) 10 SL @ 0.060 kg a.i/ha 23 DAS, T_4 =Pendimethalin (PE) 30 EC @ 0.75 *fb* Fenoxaprop-p-ethyl (POE) 10 EC @ 0.10kg a.i/ha 23 DAS, T_5 = Pendimethalin (PE) 30 EC @ 0.75 *fb* Quizalofop-p-ethyl (POE) 5 EC @ 0.05 kg a.i/ha 23 DAS, T_6 = Oxyfluorfen (PE) 23.5 EC @ 0.125 *fb* Imazethapyr (POE) 10 SL @ 0.060 kg a.i/ha 23 DAS, T_7 = Oxyfluorfen (PE) 23.5 EC @ 0.125 *fb* Fenoxaprop-p-ethyl (POE) 10 EC @ 0.10 kg a.i/ha 23 DAS,T_8= Oxyfluorfen (PE) 23.5 EC @ 0.125 *fb* Quizalofop-p-ethyl (POE) 5 EC @ 0.05 kg a.i/ha 23 DAS, T_9=Intercultural operation @ 20 and 40 DAS with hand weeding, T_{10}=Weedy check, T_{11}=Weed free. *fb* = followed by, PE = pre emergence, POE = post emergence, S.Em(±) = Standard error of mean; LSD = Least significant difference, Note*: values in parenthesis are square root (x+0.5) transformed

Out of these weeds sedges were found in higher number followed by broadleaved weeds. In different herbicidal treatment higher weed flora were observed with the application of (PE) Oxyfluorfen 23.5 EC @ 0.125 kg a.i./ha (T_2) followed by (PE) Pendimethalin 30 EC @ 0.75 kg a.i./ha (T_1). At 30 and 60 DAS among herbicides treatments (Table 2 and Table 3) respectively. total lowest numbers of different weed flora were recorded Pendimethalin (PE) 30 EC @ 0.75 kg a.i/ha *fb* Imazethapyr (POE) @ 0.060 kg a.i /ha (T_3) which was statistically at par with treatment (T_6). Similar findings was reported by Balyan *et al.* (2016) [1].

Table 3: Major weed flora (Number/m^2) at 60 DAS as influenced by weed control treatment in blackgram

Treatment	Sedge	Grasses		Broad leaved						Total
	CR	CD	EC	TP	PN	SN	MP	CM	CG	
T_1	5.65 (31.50)	2.70(6.80)	1.00(0.50)	0.92(0.35)	1.68(2.32)	2.26(4.63)	1.95(3.31)	1.23(1.02)	1.43(1.55)	7.24(51.98)
T_2	5.86(33.83)	3.46(11.50)	1.14(0.80)	1.14(0.81)	1.87(3.00)	2.20(4.34)	1.22(1.00)	1.49(1.73)	1.16(0.84)	7.70(58.84)
T_3	3.51 (11.83)	2.31(4.83)	0.71(0.00)	1.24(1.04)	1.61(2.08)	0.71(0)	1.35(1.33)	0.71(0)	0.71(0)	4.65(21.11)
T_4	4.58(20.50)	2.24(4.50)	1.50(1.75)	0.92(0.35)	1.77(2.62)	1.23(1.02)	0.71(0)	1.23(1.02)	0.89(0.3)	5.71(32.07)
T_5	5.54 (30.17)	2.26(4.60)	1.41(1.50)	1.24(1.04)	1.76(2.59)	1.71(2.42)	0.71(0)	1.10(0.72)	0.71(0)	6.60(43.04)
T_6	3.56(12.17)	2.35(5.03)	1.26(1.10)	1.26(1.08)	1.70(2.40)	0.71(0)	1.35(1.33)	0.71(0)	0.71(0)	4.86(23.11)
T_7	3.81(14.00)	2.30(4.80)	1.50(1.75)	1.61(2.08)	1.26(1.08)	1.35(1.31)	1.01(0.53)	1.10(0.71)	0.71(0)	5.17(26.26)
T_8	4.36(18.50)	2.45(5.50)	2.00(3.50)	0.92(0.35)	1.91(3.16)	1.58(2.00)	1.16(0.84)	1.11(0.73)	0.71(0)	5.92(34.58)
T_9	2.87 (7.75)	2.06(3.75)	1.50(1.75)	1.10(0.70)	1.84(2.90)	1.73(2.50)	0.71(0)	1.10(0.70)	1.12(0.75)	4.61(20.80)
T_{10}	6.75(45.12)	4.18(17.00)	3.00(8.50)	1.14(0.81)	3.15(9.45)	2.33(4.93)	2.12(4.00)	1.65(2.24)	1.35(1.33)	9.69(93.38)
T_{11}	0.71(0)	0.71(0)	0.71(0)	0.71(0.00)	0.71(0)	0.71(0)	0.71(0)	0.71(0)	0.71(0)	0.71(0)
S.Em ±	0.09	0.05	0.05	0.01	0.03	0.02	0.02	0.01	0.01	0.12
LSD (P=0.05)	0.28	0.14	0.14	0.04	0.09	0.07	0.05	0.04	0.03	0.34

Cyperus rotundus(CR), *Cynodon dactylon (*CD), *Echinochloa spp (*EC), *Trianthema portulacastrum* (TP), *Phyllanthus niruri* (PN), *Solanum nigrum* (SN), *Mimosa pudica* (MP), *Cucumis melo* (CM), *Cleome gynandra* (CG) T_1 = Pendimethalin (PE) 30 EC @ 0.75 kg a.i/ha within 24 hrs, T_2 = Oxyfluorfen (PE) 23.5 EC @ 0.125 kg a.i/ha within 24 hrs, T_3 = Pendimethalin (PE) 30 EC @ 0.75 *fb* Imazethapyr (POE) 10 SL @ 0.060 kg a.i/ha 23 DAS, T_4 =Pendimethalin (PE) 30 EC @ 0.75 *fb* Fenoxaprop-p-ethyl (POE) 10 EC @ 0.10kg a.i/ha 23 DAS, T_5 = Pendimethalin (PE) 30 EC @ 0.75 *fb* Quizalofop-p-ethyl (POE) 5 EC @ 0.05 kg a.i/ha 23 DAS, T_6 = Oxyfluorfen (PE) 23.5 EC @ 0.125 *fb* Imazethapyr (POE) 10 SL @ 0.060 kg a.i/ha 23 DAS, T_7 = Oxyfluorfen (PE) 23.5 EC @ 0.125 *fb* Fenoxaprop-p-ethyl (POE) 10 EC @ 0.10 kg a.i/ha 23 DAS,T_8= Oxyfluorfen (PE) 23.5 EC @ 0.125 *fb* Quizalofop-p-ethyl (POE) 5 EC @ 0.05 kg a.i/ha 23 DAS, T_9=Intercultural operation @ 20 and 40 DAS with hand weeding, T_{10}=Weedy check, T_{11}=Weed free. *fb* = followed by, PE = pre emergence, POE = post emergence, SEm(±) = Standard error of mean; LSD = Least significant difference, Note*: values in parenthesis are square root (x+0.5) transformed

Weed biomass (g/m^2)

The data pertaining to influence of chemical weed management practices on total weed biomass (g/m^2) of sedges, grasses, broad leaved weeds at 30 and 60 days after sowing (DAS) are furnished in (Table 4). The weed biomass was found to be varied significantly due to different herbicide combinations at 30 and 60 days after sowing (DAS). At 30 days after sowing, significantly higher dry weight was noted in (T_{10}) weedy check (81.69 g/m^2) which was followed by (T_2) Oxyfluorfen (PE) @ 0.125 kg a.i /ha (61.58 g/m^2).Whereas, minimum dry weight was found in (T_{11}) weed free followed by(T_9) Intercultural operation @ 20 and 40 DAS and (T_3) Pendimethalin (PE) 30 EC @ 0.75 kg a.i/ha *fb* Imazethapyr (POE) @ 0.060 kg a.i/ha(24.27 g/m^2).

At 60 DAS also, significantly maximum dry weight was observed in (T_{10}) weedy check (143.26 g/m^2) which was followed by application of (T_2) Oxyfluorfen (PE) @ 0.125 kg a.i/ha (110.03) as pre emergence. The minimum dry weight was found in (T_{11}) Weed free followed by (T_9)Intercultural operation @ 20 and 40 DAS (35.61g/m^2) and (T_3)Pendimethalin (PE) 30 EC @ 0.75 kg a.i/ha *fb* Imazethapyr (POE) (41.24g/m^2). Similarly, highest total weed biomass was obtained in (T_{10}) weedy check (224.95 g/m^2) followed by application of (T_2) Oxyfluorfen (PE) @ 0.125 kg a.i/ha (171.61 g/m^2). Similar finding were also reported by Mundra and Maliwal (2012) [6].

Weed control efficiency

Weed control efficiency observed at 30 and 60 days after sowing of the crop are furnished in (Table 4). From the data observed at 30 days after sowing (DAS) it is clear that maximum weed control efficiency was recorded in weed free treatment (T_{11}) i.e. about 100 percent followed by (T_9) intercultural operation at 20 and 40 DAS (71.07%). Among different chemical treatments, The maximum weed control efficiency was registered with the application of and (T_3) Pendimethalin (PE) 30 EC@ 0.75 kga.i/ha *fb* Imazethapyr (POE) (70.29%) &(T_6) Oxyfluorfen (PE) @ 0.125 kg a.i/ha *fb* Imazethapyr (POE) @ 0.060 kg a.i/ha (67.32%) respectively. The lowest WCE was recorded under weedy check (0%) whereas, as among different chemical treatments the lowest WCE was recorded with (T_2) Oxyfluorfen (PE) @ 0.125 kg a.i/ha application (24.62%). Similar type of result has been reported by Chaudhary *et al*. (2011) [3] and Charanteja *et al*. (2016) [2].

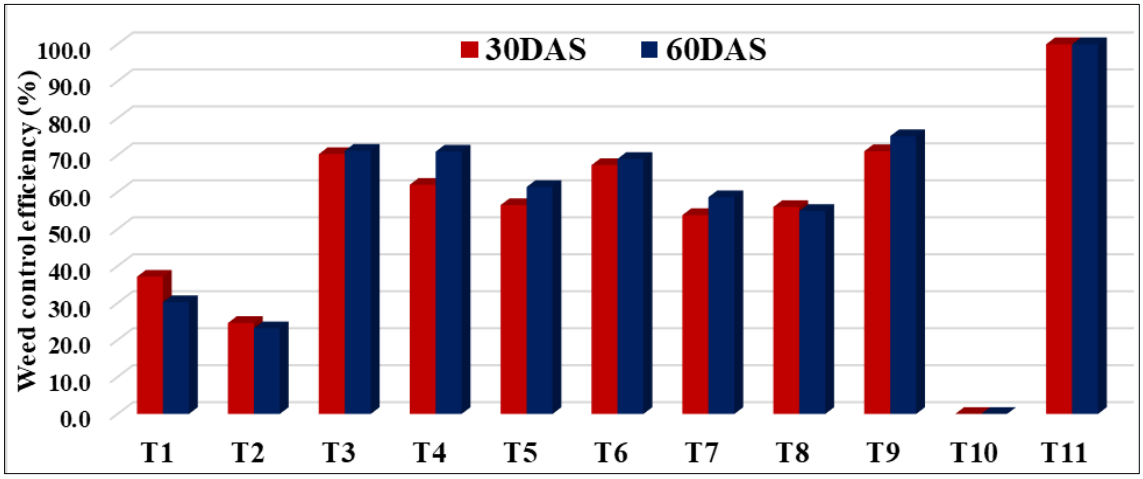

Fig 1: Weed control efficiency (%) at 30 and 60 DAS in blackgram as influenced by weed management practices.

Production Economics

Maximum net return (Rs 48549/ha) with benefit cost ratio (BCR) of 2.65 was obtained under treatment Pendimethalin (PE) 30 EC @ 0.75 kg a.i/ha fb Imazethapyr (POE) @ 0.060 kg a.i /ha which is at par with Oxyfluorfen (PE) @ 0.125 kg a.i /ha fb Imazethapyr (POE) @ 0.060 kg a.i/ha with net retrun of (Rs 45686 /ha) and BCR 2.37 as compared to interculture operation @ 20 and 40 DAS (BCR of 1.86) (Table 4). Weedy check recorded the lowest net return (Rs 14509 /ha) with minimum BCR(0.89), which might be due to least yield obtained in this treatment because of severe weed competition. These result were in harmony with the finding of Sakthi *et al*. (2018) [8]. Among herbicide treatments, application of Pendimethalin (PE) *fb* Imazethapyr (POE) gave higher grain yield (9.25 q/ha), maximum net return (Rs 48549/ha) with benefit cost ratio (BCR) of 2.65 which is at par with Oxyfluorfen (PE) @ 0.125 kg a.i /ha fb Imazethapyr (POE) @ 0.060 kg a.i/ha with net return of (Rs 45686 /ha) and BCR 2.37 as compared to interculture operation @ 20 and 40 DAS (BCR of 1.86) This might be due to better growth and yield attributes of the crop. These findings were in conformity with Pankaj and Dewangan (2017) [7].

Table 4: Influence of weed management practices on weed biomass at 30 & 60 DAS, seed yield (q/ha), net return (Rs.ha^{-1}), B: C ratio in blackgram

Treatment	Weed biomass (g/m^2)			Seed yield (q/ha)	Net return (Rs. ha-1)	B:C ratio
	30 DAS	60 DAS	Total			
T_1	7.20 (51.35)	10.02 (99.93)	12.32 (151.28)	5.60	25692	1.51
T_2	7.88 (61.58)	10.51 (110.03)	13.12 (171.61)	5.58	24162	1.34
T_3	4.98 (24.27)	6.46 (41.24)	8.12 (65.51)	9.25	48549	2.65
T_4	5.62 (31.04)	6.49 (41.60)	8.55 (72.64)	8.85	44799	2.32
T_5	6.00 (35.54)	7.47 (55.27)	9.56 (90.81)	8.60	43549	2.27
T_6	5.22 (26.70)	6.70 (44.42)	8.46 (71.12)	8.92	45686	2.37
T_7	6.18 (37.75)	7.73 (59.28)	9.88 (97.03)	8.65	42715	2.10
T_8	6.04 (35.96)	8.07 (64.61)	10.05 (100.57)	8.14	40056	1.99
T_9	4.91 (23.63)	6.01 (35.61)	7.73 (59.24)	9.50	44517	1.86
T_{10}	9.07 (81.69)	11.99 (143.26)	15.01 (224.95)	3.99	14509	0.89
T_{11}	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)	10.24	46786	1.77
S.Em ±	0.21	0.27	0.34	0.31	2294	0.11
LSD(P=0.05)	0.61	0.79	1.00	0.93	6768	0.34

Conclusion

Based on the experiment conducted for one year it might be concluded that among chemical weed management application of Pendimethalin (PE) *fb* Imazethapyr (POE) resulted in lower number of weed density and weed biomass followed by Oxyfluorfen (PE)@ 0.125 kg a.i /ha *fb* Imazethapyr (POE)@ 0.060 kg a.i /ha (T6) Also it was found economically viable as compare to weed free &Intercultural operation @ 20 and 40 DAS.

References

1. Balyan JK, Choudhary RS, Kumpawat BS, Choudhary R. Weed management in blackgram under rainfed conditions Indian Journal of Weed Science. 2016;48(2):173-177.
2. Charanteja K, Duary B, Dash S, Bhowmick MK, Mallikarjun M. Efficacy of imazethapyr and other herbicides on weed growth and yield of *kharif* blackgram International Journal of Agriculture. Environment and Biotechnology Citation: IJAEB. 2016;9(6):967-971.
3. Chaudhary SU, Iqbal J, Hussain M, Wajid A. Economical weed control in lentil crop. The Journal Animal and Plant Science. 2011;21(4):734-737.
4. Gomez KA, Gomez AA. Statistical Procedures for Agricultural Research (2nd edition). A Wiley-Interscience Publication, John Wiley and Sons, New York, USA; c1984.
5. Gupta V, Singh M, Kumar A, Sharma BC, Kher D. Influence of weed management practices on weed dynamics and yield of urd bean (*Vigna mungo*) under rainfed conditions of Jammu. Indian Journal Weed Science. 2013;58(2):220-225.
6. Mundra SL, Maliwal PL. Influence of quizalofopethyl on narrow-leaved weeds in blackgram and its residual effect on succeeding crops. Indian Journal of Weed Science. 2012;44(4):231-234.
7. Pankaj SC, Dewangan PK, Weed Management in Black Gram (*Vigna mungo* L.) and Residual Effect of Herbicides on Succeeding Mustard (*Brasica juncea* L.) Crop International Journal of Current Microbiology and Applied Sciences; c2017. p. 865-881.
8. Sakthi J, Velayutham A, Hemalatha M, Vasanthi D. Economics of herbicides against weeds of blackgram under irrigated condition. International Journal of Advances in Agriculture Science and Technology. 2018;5(7):133-143.
9. Singh RP, Verma SK, Singh RK, Idnani LK. Influence of sowing dates and weed management on weed growth and nutrients depletion by weeds and uptake by chickpea (*Cicer arietinum*) under rainfed condition. Indian Journal of Agricultural Sciences. 2014;84(4):468-472.