

Research Article

Efficacy of Imazethapyr and its Ready Mix on Weed Growth and Yield of Blackgram

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Abstract

A field experiment was conducted during *kharif* season of 2015 in clay loam soil at Instructional Farm, Rajasthan College of Agriculture, MPUAT, Udaipur to study on time of application of imazethapyr and its ready mix combination with imazamox against weeds in blackgram. It was concluded that post-emergence application of ready mix combination of imazethapyr + imazamox 70 g/ha at 3-4 leaf stage appeared to be a promising and effective herbicide for managing broad spectrum weed control and obtaining higher seed yield and profitability of *kharif* blackgram.

Keywords: Growth, imazamox, post emergence, profitability

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Introduction

Blackgram (*Vigna mungo* L.) is one of the most important pulse crops, which can be grown in tropical and subtropical regions. It is grown during *kharif* season in India where, weed infestation is the main reason for low productivity [1, 2]. Weed emergence in blackgram begins almost with the crop emergence leading to crop-weed competition from initial stages and reduce yields to the extent of 78 % and sometimes lead to the total crop failure [3, 4]. An initial period of crop-weed competition of 20-40 days is very critical [5] and a season long weed competition has been found to reduce blackgram yield to the extent of 87% depending upon type and intensity of weed flora [6]. Thus, it is necessary to eliminate weeds from crop at proper time with suitable methods. Chemical method of weed management offers good scope for harvesting a better crop of blackgram [7]. At present, pre-emergence herbicides are available to manage weeds in blackgram. Recently, the post emergence herbicide imazethapyr is being marketed with the assurance of selective broad spectrum weed control in blackgram. The intensity of weeds at later stage of the blackgram calls for a suitable combination of physical, chemical, cultural, mechanical, and possibly biological weed control techniques to achieve maximum benefits through minimum yield loss and reasonable weed control [2]. Development of integrated weed management that is economically viable as well as ecologically safe is of at important to control the weed effectively and improve the productivity of blackgram. Present investigation was carried to find out the efficacy of post-emergence application of imazethapyr alone and its ready mix against weed growth and yield of blackgram.

Materials and Method

Field experiment was carried out during *kharif* season of 2015 at Instructional Farm, Rajasthan College of Agriculture, MPUAT, Udaipur. Experiment was consisted of twelve treatments including weedy check which were replicated thrice in a randomised block design. Blackgram variety 'PU-31' was used under studying in which data on weed density and dry weight of weeds/m were recorded at different growth stages crop. Weed control efficiency (%) was computed using the dry weight of weeds. Seed yield of blackgram along with other yield attributes were recorded at harvest.

Results and Discussion

The experimental plot was infested with grassy, broad leaf weeds and sedges. The prominent weed species are *Echinochloa colona* (47.6%), *Commelina bengalensis* (18.4%), *Trianthama portulacastrum* (19.4%), *Digera arvensis* (3.6%), *Parthanium hysterophorus* (4.5%) and *Cyperus rotundus* (6.5%). The lowest count and dry weight of weeds was registered under hand weeding twice at 20 and 40 DAS. Among the herbicidal treatments lowest weed density and weed dry matter was observed at 45 DAS with ready mix post emergence application of imazethapyr + imazamox at 80 g/ha followed by pre emergence application of imazethapyr + pendimethalin 1000 g/ha followed by pre emergence application imazethapyr + imazamox at 70 g/ha.

Table 1 Effect of treatments on weed density and weed dry matter at 45 DAS

Treatment	Dose (g/ha)	Weed density (No./m ²)						Weed dry matter (g/m ²)
		<i>Echinochloa colona</i>	<i>Digera arvensis</i>	<i>Trianthema portulacastrum</i>	<i>Commelina benghalensis</i>	<i>Parthenium hysterophorus</i>	<i>Cyperus rotundus</i>	
Imazethapyr (Pre emergence)	70	4.8(23.3)	0.7(0.0)	1.5(2.0)	2.2(4.3)	1.3(1.3)	1.6(2.3)	18.19
Imazethapyr (Pre emergence)	80	5.0(25.0)	0.9(0.3)	1.4(1.6)	2.1(4.0)	1.7(2.6)	1.5(2.0)	18.56
Imazethapyr (3-4 leaf stage)	70	4.5(20.3)	0.9(0.3)	1.2(1.0)	1.6(2.3)	1.4(1.6)	1.0(0.6)	12.56
Imazethapyr (3-4 leaf stage)	80	4.6(21.0)	0.7(0.0)	1.2(1.0)	2.6(6.6)	1.2(1.0)	1.4(1.6)	13.98
Imazethapyr + Imazamox (RM) (Pre emergence)	70	4.5(20.3)	1.0(0.6)	1.3(1.3)	1.8(3.0)	1.5(2.0)	1.5(2.0)	15.20
Imazethapyr + Imazamox (RM) (Pre emergence)	80	5.4(29.0)	0.7(0.0)	0.8(0.3)	2.4(5.6)	1.2(1.0)	1.7(2.6)	13.37
Imazethapyr + Imazamox (RM) (3-4 leaf stage)	70	1.0(0.6)	0.7(0.0)	0.7(0.0)	1.3(1.3)	0.7(0.0)	0.7(0.0)	1.63
Imazethapyr + Imazamox (RM) (3-4 leaf stage)	80	2.6(6.3)	0.7(0.0)	1.2(1.0)	1.0(0.6)	0.7(0.0)	0.7(0.0)	1.35
Pendimethalin	1000	2.4(5.3)	0.9(0.3)	0.7(0.0)	2.0(3.6)	1.0(0.6)	0.7(0.0)	7.98
Imazethapyr + Pendimethalin (RM)	1000	0.8(0.3)	0.7(0.0)	0.8(0.3)	0.7(0.0)	0.7(0.0)	1.0(0.6)	1.98
Two hoeing at 20 & 40 DAS	-	3.0(8.6)	0.9(0.3)	1.4(1.6)	1.2(1.0)	0.7(0.0)	1.0(0.6)	5.62
Weedy check	-	5.6(32.0)	1.6(2.3)	3.6(13.0)	3.5(12.3)	1.8(3.0)	2.2(4.3)	28.00
LSD (P = 0.05)		0.45	0.09	0.28	0.38	0.16	0.20	1.09

Table 2 Effect of treatments on yield attributing parameters and yield of black gram

Treatment	Dose (g/ha)	Branches per plant	Seeds per pod	Pods per plant	Test weight (g)	Seed Yield (kg/ha)
Imazethapyr (Pre emergence)	70	4.7	4.7	34.1	47.6	593
Imazethapyr (Pre emergence)	80	5.2	5.7	35.8	47.7	584
Imazethapyr (3-4 leaf stage)	70	4.6	4.9	34.4	48.7	618
Imazethapyr (3-4 leaf stage)	80	4.7	4.2	31.6	47.1	683
Imazethapyr + Imazamox (RM) (Pre emergence)	70	4.9	5.0	33.6	48.3	674
Imazethapyr + Imazamox (RM) (Pre emergence)	80	4.2	5.6	30.4	48.0	652
Imazethapyr + Imazamox (RM) (3-4 leaf stage)	70	5.2	4.9	32.8	49.4	808
Imazethapyr + Imazamox (RM) (3-4 leaf stage)	80	4.7	4.7	32.2	48.7	794
Pendimethalin	1000	4.8	3.6	31.6	47.5	575
Imazethapyr + Pendimethalin (RM)	1000	5.6	4.5	34.9	48.6	774
Two hoeing at 20 & 40 DAS	-	5.6	4.3	40.1	48.2	742
Weedy check	-	3.3	4.7	26.0	44.2	366
LSD (P = 0.05)		1.19	0.71	6.42	2.31	164.5

These three treatments of ready mix herbicides were superior to rest of the treatments. Similar findings were also reported by [8, 9]. This clearly indicated that weeds were controlled effectively under imazethapyr at 75 g/ha. The highest seed yield (1036 kg/ha) was recorded with ready mix combination of imazethapyr + imazamox 70 g/ha. Effective and timely management of broad spectrum weeds by these treatments facilitated better crop growth and

increased seed yield in blackgram. Post-emergence application of ready mix combination of imazethapyr + imazamox 70 g/ha recorded the maximum seed yield (808 kg/ha) and it was statistically at par with ready mix of imazethapyr + imazamox 80 g/ha as pre and post emergence, pre emergence application of ready mix imazethapyr + pendimethalin 1000 g/ha and two hoeing operations (**Table 1**) because of control of weeds throughout the crop growth period. The lowest yield was recorded in weedy check. Among the herbicidal weed control treatments pre emergence application of pendimethalin 1000 g/ha recorded lowest seed yield (575 kg/ha), while it was significantly higher over weedy check. Similar trends of results were also observed with haulm yield. Post emergence application of ready mix imazethapyr + imazamox 80 g/ha or 70 g/ha showed mild phytotoxicity on black gram.



Figure 1 Response of post emergence application of imazethapyr 70 g/ha and imazethapyr + imazamox (RM) 70 g/ha 3-4 leaf stage (20 DAS)

Conclusion

The above stated review results reveals that, weeds have to be controlled for successful crop production. Significant crop losses due to weeds are simply not acceptable in a world where two billions more people will have to be fed in the next 40 years. Post-emergence application of ready mix combination of imazethapyr + imazamox 70 g/ha at 3-4 leaf stage appeared to be a promising and effective herbicide for managing broad spectrum weed control and obtaining higher seed yield and profitability of *kharif* blackgram.

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