

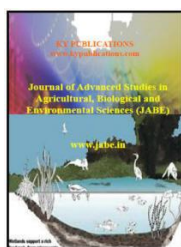


WEED MANAGEMENT IN IRRIGATED BLACK GRAM (*Vigna Mungo* L) IN SOUTHERN ZONE OF TAMILNADU

B.DEVARAJU¹ and Dr.T.SENTHIVEL²

¹Research Scholar, School of Agriculture and Animal Sciences,
Gandhigram Rural Institute – (Deemed to be University), Gandhigram, Dindigul Dist.Tamilnadu
Email–devarajubommu@gmail.com

²Professor, Dept. of Agronomy, School of Agriculture and Animal Sciences,
Gandhigram Rural Institute - Deemed to be University, Dindigul Dist. Tamilnadu
Email: senthivel_t@yahoo.com



ABSTRACT

Field investigation was carried out during Kharif seasons of 2016 and 2017 at farmer field of Melakottai in Athoor block, Dindigul District, Tamilnadu, India to evaluate the different chemical herbicides applications and effectiveness of weed control practices for higher grain yield and income of blackgram. The dominated weed species among monocot weeds are *Cynodan dactylon*, *Cyperus rotantus*, *Dactyloctenium aegyptium* and *Chloris barbata*. Among dicot weed species *Trianthema Portulacastrum*, *Parthenium hysterophorus*, *Phyllanthus amarus* and *Cleome viscosa* were observed during growing seasons in the fields. The results revealed that the weed density of monocot and dicot weeds were lowest in application of Pendimethalin 1 kg/ha f.b Imazethapyr (50 g/ha). The treatment also recorded maximum weed control efficiency of 85.1 per cent and also recorded the higher yield attributes and grain yield and haulms yield. The treatment with the application of herbicides Pendimethalin and Imazethapyr gave maximum net monetary returns (Rs 32,160/-) and B:C ratio is Rs 2.39/ha.

Keywords: Black gram, Grain Yield, Herbicides, Weeds.

Introduction

Blackgram is usually accompanied by luxuriant weed growth during the kharif season owing to abundant rainfall received during monsoons leading to serious crop losses. The crop is not a very good competitor against weeds (Choudhary et al., 2012) and therefore, weed control initiatives are essential to ensure proper crop growth, particularly in the early growth period. Depending on the nature, density and period of occurrence, weeds can cause losses of grain yield of blackgram varying from 41.6 to 64.1 per cent (Chand et al., 2004; Rathi et al., 2004; Singh, 2011).

Blackgram is called as king of pulses crop and it is one of the most important pulse crop cultivated all over India. Blackgram is rich protein pulse crop with 26 per cent protein which is almost three times that of the cereals. Globally pulse are grown in more than 171 countries. The pulse crop occupied 72.3 million hectare area and contributed 64.4 million tons of grains and with a productivity of 890 kg/ ha in the biennium ending 2010 -2011. Among the pulses blackgram is the third important pulse contributes 17 per cent of the global production. It is cultivated throughout India and it contributes 13 per cent of the total area and 10 per cent of the total production of pulses. Blackgram need weed free condition upto 40 – 45 days, due to improper weed management practices yield of blackgram is drastically reduced.

The critical period of crop- weed competition in blackgram usually fall between 15 and 45 days after sowing DAS (Vivek et al., 2008) and many a times, labour is not available, particularly when critical period of



crop weed completion is sets in. Moreover, monsoon rains make it impossible to go for hand weeding due to excess moisture and wet field conditions. Under these situations use of pre and post-emergence herbicides offers an alternative for effective weed management in blackgram.

By keeping this in view an investigation was carried out in the farmer field by involving one pre-emergence Pendimethalin and two early post emergence herbicide Imazethapyr and Quizalofop-p-ethyl. As farmers are presently using grassy herbicides, broad leaf weeds become a problem. To increase the spectrum of weed control, the present study was undertaken to find out effective herbicide combination in irrigated blackgram for performing good weed management and realizing the potential yields.

Objectives:

1. To analyse the effect of different weed management practices on growth and yield attributes of Blackgram
2. To work out the economics of different weed management practices of Blackgram and find out best among the various treatments.

Materials and Methods

The experiment was conducted at farmer field of Melakottai village in Athoor block, during 2016 and 2017. The soil of the experimental field was clay loam having 7.9 PH. The available NPK 256,14.2,340 kg/ha, respectively. The treatment was laid out in a randomized block design with three replications. There were eight treatments as follows:

T₁ = Pre-emergence application of Pendimethalin 1.0 kg/ha+one hand weeding on 25 DAS.

T₂ = Early post emergence (EPOE) Imazethapyr @ 50 g/ha on 15 – 20 DAS.

T₃ = EPOE Quizalofop –p-ethyl @ 50g/ha on 15 – 20 DAS.

T₄ = Pre-emergence Pendimethalin + EPOE Imazethapyr

T₅ = Pre-emergence Pendimethalin + EPOE Quizalofop – p –ethyl.

T₆ = Hand weeding twice on 15 and 30 DAS

T₇ = Weed Free check

T₈ = Weedy check as control

The seeds were placed in Furrows at depth of 2–3 cm from soil surface. Row to row distance was maintained at 30 cm and plant to plant distance was 10 cm. The gross plot size was 4 x 5 m. NPK at the rate of 25:50:0 kg/ha was applied in the form of urea, single super phosphate and murate of Potash during the field land preparation. Pre-emergence and early post emergence herbicides were done with the help of a hand operated knapsack sprayer fitted with flat fan nozzle.

The growth and yield attributes were recorded from five selected plants in each plot. Observations on weeds were recorded with the help of quadrant of 0.5 m x 0.5 m size placed randomly at two spots in each plot at 25 and 50 DAS. Weeds were cut at ground level, washed with tap water, sun dried for a few days and then oven drying at 65^o C for 48 hours and then weighed. Total dry matter was determined by the summing up the dry weight of each plant. Weed control efficiency and weed index was calculated using weed dry weight data at 50 DAS which was maximum during weed growth period irrespective of treatments. The N, P and K removal by weeds were recorded at 50 DAS. Economics was calculated as per the existing price of input and output at local market. The data for different parameters were statistically analysed and the mean difference were computed at 5 per cent level of significance.



Results and Findings

Effect on Weeds

The predominant weed flora of the experimental field were *Triaianthema Portulacostrum*, *Parthenium hysterophorus*, *Phyllanthus amarus* and *Cleome viscosa* and all were broad leaved weeds. The weed density and dry weight recorded at 25 DAS, indicated that all the treatments significantly reduced the weed density and dry weight compared to un-weeded check. Pre and Post-emergence application of Pendimethalin and Imazethapyr recorded significantly lower weed density and dry weight comparative to the rest of the treatments. Almost similar effect was observed at 50 DAS.

Table 1 : Effect of Different Weed Management practices on growth and yield attributes of Black Gram (2016 -2017)

Treatments		Plant Height (cm)	Branches/plant	Leaf Area Index	drymatter of weeds (g/m ²)	Pod/Plant	Seeds/ Pod	Seed Yield (t/ha)	biological yield t/ha	Harvest Index	weed control efficiency
T ₁	Pre-emergence application of Pendimethalin 1.0kg/ha + 1 hand weeding on 25 DAS	55.50	6.00	5.40	161.00	24.60	6.30	0.82	3.98	0.21	39.70
T ₂	Early post emergence Imazethapyr @50g/ha on 15 -20 DAS	61.80	5.70	5.50	123.00	26.1	6.08	0.92	4.45	0.22	54.10
T ₃	Early post emergence Quizalopop-p-ethyl @50g/ha on 15 -20 DAS	55.40	5.40	5.20	126.00	24.6	6.24	0.98	4.18	0.24	52.70
T ₄	Pre emergence Pendimethalin+ EPOE Imazethapyr	65.80	6.70	6.90	40.00	31.6	6.28	1.14	4.56	0.25	85.10
T ₅	Pre emergence Pendimethalin+ EPOE Quizalofop-p-ethyl	64.50	6.40	6.20	119.00	28.4	6.30	1.08	4.46	0.25	55.50
T ₆	Hand Weeding Twice on 15 and 30 DAS	63.20	6.00	5.50	84.00	28.5	6.15	1.07	4.51	0.26	68.60
T ₇	Weed free	66.10	7.30	7.60	73.00	31.7	6.08	1.15	4.87	0.22	72.60
T ₈	Weed check	53.90	4.60	4.20	267.00	21.4	5.55	0.71	3.34		
	SEd	3.30	0.24	0.18	11.00	0.80	0.17	0.07	0.26		
	CD (P=0.05)	7.90	0.68	0.49	25.00	1.90	0.41	0.15	0.66		



Source: Source: Field experiment data

The application of Pendimethalin 1 kg/ha + Imazethapyr 50g/ha (T₄), which was at par with Pendimethalin 1Kg/ha + Quizalofop - p- ethyl 50 g/ha(T₅). The poor performance of Quizalofop - p- ethyl (T₃) might be due to absence of grassy weeds in crop weed competition.

Effect on Growth and Yield Attributes

Different weed management practices improved plant growth and yield attributes of blackgram over the un weeded control. Pendimethalin 1.0 kg/ha + Imazethapyr 50 g /ha (T₄) resulted in the highest plant height, more number of branches, number of pod/plant and seed/pod compared to all other weed control treatments experimented.

Nirala., et al (2012) also reported that post emergence application of Imazethapyr at 25 g/ha significantly increased yield of Blackgram over unweeded control.

Ram et al.,(2013) and Nirala., et al (2012) also observed that, pre and post emergence application of Pendimethalin and Imazethapyr can be used effectively in reducing the weed intensity and dry-matter production of weeds in Soyabean and Blackgram.

Weed control efficiency was highest in application of Pendimethalin + Imazethapyr which was on par with the Pendimethalin and Quizalofop – p- ethyl treatment.

Effect on Growth and Yield Attributes

Different weed management practices improved plant growth and yield attributes of blackgram over the un weeded control. Pendimethalin 1.0 kg/ha + Imazethapyr 50 g /ha (T₄) resulted in the highest plant height, more number of branches, number of pod/plant and seed/pod compared to all other weed control treatments experimented.

Table 2: Economics of Different Weed Management practices of Blackgram (2016 -2017)

Treatments		ECONOMICS		
		Gross return	Net returns	Benefit cost ratio
T ₁	Pre-emergence application of Pendimethalin 1.0kg/ha + 1 hand weeding on 25 DAS	29.50	18.60	1.69
T ₂	Early post emergence Imazethapyr @50g/ha on 15 -20 DAS	33.10	22.30	2.04
T ₃	Early post emergence Quizalofop-p-ethyl @50g/ha on 15 -20 DAS	35.10	23.90	2.14
T ₄	Pre emergence Pendimethalin+ EPOE Imazethapyr	41.41	27.90	2.39
T ₅	Pre emergence Pendimethalin+ EPOE Quizalofop-p-ethyl	33.70	27.30	2.34
T ₆	Hand Weeding Twice on 15 and 30 DAS	33.30	26.90	1.86
T ₇	Weed free	41.40	29.80	2.57
T ₈	Weed check	25.60	15.60	1.56
	SEd	2.10	1.70	0.18
	CD (P=0.05)	5.20	4.20	0.45

Source: Field experiment data



Nirala., et al (2012) also reported that post emergence application of Imazethapyr at 25 g/ha significantly increased yield of Blackgram over unweeded control.

Ram et al.,(2013) and Nirala., et al (2012) also observed that, pre and post emergence application of Pendimethalin and Imazethapyr can be used effectively in reducing the weed intensity and dry-matter production of weeds in Soyabean and Blackgram.

Weed control efficiency was highest in application of Pendimethalin + Imazethapyr which was on par with the Pendimethalin and Quizalofop – p- ethyl treatment.

Conclusion

The results of the study revealed that the weed density of monocot and dicot weeds were lowest in pre emergence application of Pendimethalin 1 kg/ha f.b early post emergence of Imazethapyr (50 g/ha). Maximum weed control efficiency of 85.1 per cent was observed with the application of Pendimethalin and Imazethapyr and also recorded the higher yield attributes resulted in more grain yield and haulm yield. The treatment (T₄) with application of herbicides Pendimethalin and Imazethapyr gave maximum net monetary returns and B:C ratio of Rs 2.39/ha (Table 2). Hence it is concluded that the pre emergence application of Pendimethalin + early post emergence of Imazethapyr at 15- 20 DAS was found most effective for the control of weeds and resulted in higher grain yields and net returns.

Abbreviations used

a.i – active ingredient

DAS – Days after sowing

EPOE- Early Post Emergence

Ha – Hectare

NPK – Nitrogen, Prosperous and Potash

REFERENCES

- [1]. Chand, R Singh, N-P and Singh, V.K.2004. Effect of weed control treatments on weeds and grain yield of late planted Urdbean during Kharif season. Indian Journal of Pulses Research 16 163- 164.
- [2]. Choudhary.U.K., Kumar,S.P and Bhagawati.,R. 2012. Integrated weed management in Blackgram (*Vigna mungo* L) under mid hills of Arunachal Pradesh, Indian Journal of Agronomy 57:382-385.
- [3]. Nirala,H.,Choubey,N.K and Bhoi,S.2012. Preference of post emergence herbicides and hand weeding with respect to their effects on weed dynamics and yield of Blackgram (*Vigna mungo* L).International Agricultural Statistics Sciences 8:679-689.
- [4]. Ram,H.,Singh,h., Agarwal, N., Buttar, G-5 and Singh,O.2013. Standardization of rate and time of application of Imazethapyr Weedicide in soybean. Indian Journal of Plant protection 41: 33-37.
- [5]. Rathi, J.P: S., Tewari, A N and Kumar, M.2004. Integrated weed management in blackgram (*Vigna mungo* L.) Indian Journal of Weed Science 56:218-220.
- [6]. Singh.G.2011.Weed Management in Summer and Kharif Season Blackgram (*Vigna Mungo*.L.Hepper). Indian Journal of Weed science 43: 77-80.
- [7]. Vivek Rana, N.S Singh. R and Tomar,S.S.2008. Effect of Weed inference on weeds and productivity of black gram (*Phascolis mungo*) Indian Journal of Weed science 40:65-67.