

## Integrated Weed Management in Blackgram (*Vigna mungo* L.)

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### ABSTRACT

Field investigation was carried out for two consecutive years (2001 and 2002) to develop an eco-friendly integrated weed management technology for blackgram (*Vigna mungo* L.) grown under rainfed eco-system of Central Uttar Pradesh. Results revealed that low dose of pendimethalin (0.5 kg ha<sup>-1</sup>) followed by one hand weeding done at 60 days after sowing demonstrated intended weed control (67.80% WCE), enhanced higher grain yield (379 kg ha<sup>-1</sup> or 119.49%) and fetched net monetary return (Rs.3611 ha<sup>-1</sup>) due to weed control.

### INTRODUCTION

Blackgram is an important pulse crop being grown during summer/rainy season throughout northern India. The productivity of this crop is adversely affected due to varying biotic and abiotic stresses. In field experiments conducted at 12 locations during **kharif** season of 1985-87 under All India Coordinated Pulse Improvement Project, results revealed that weed management to be most critical contributed significantly (109.7%) followed by appeared fertilizer use (56.5%) and insect-pest and disease control (34.7%) in blackgram yield (Ali and Lal, 1989). With this background, the basal investigation was undertaken to develop and perfect labour saving and eco-friendly integrated weed management technology in blackgram grown under rainfed ecosystem of Uttar Pradesh.

### MATERIALS AND METHODS

Field experiment was conducted for two consecutive rainy seasons (2001 and 2002) at Students' Instructional Farm of this university. The soil was sandy loam in texture, low in organic carbon (0.45%), medium in available phosphorus (14.4 kg ha<sup>-1</sup>) and available potassium (135 kg ha<sup>-1</sup>) with 7.9 pH. Ten treatments were assigned in randomized block design replicated four times. The crop cultivar T9 was sown at a row spacing of 40 cm on August

3, 2001 and July 29, 2002 behind country plough using seed rate of 15 kg ha<sup>-1</sup>. Pendimethalin 30 EC was dissolved in 800 l of water ha<sup>-1</sup> and sprayed second day after sowing as pre-emergence through knapsack sprayer. Manual weeding twice was done at 20 and 45 days after sowing with the help of Khurpi, a hand tool. Hoeing was done with the help of weed density and dry matter of weeds was recorded at 60 days after sowing using 50 cm x 50 cm quadrat in each plot. The crop was harvested on October 3 and 20 during 2001 and 2002, respectively.

### RESULTS AND DISCUSSION

#### Effect on Weeds

The major weed flora were *Cyperus rotundus*, *Parthenium hysterophorus*, *Trianthema monogyna*, *Phyllanthus niruri* and manual weeding twice registered on an average 63.21, 90.68, 84.92 and 79.76% reductions in *C. rotundus*, *P. hysterophorus*, *T. monogyna* and *P. niruri* population resulting in heavy decline in weed weight (76.24% WCE). Manual weeding either followed by hoeing once or hoeing twice regardless of tools used did not vary with respect to *C. rotundus*, *P. hysterophorus* and *T. monogyna* control. Similarly, no significant advantages could be realized in reducing the weed population when

Table 1. Effect of treatments on weed density (No. m<sup>-2</sup>) and dry matter of weeds (kg ha<sup>-1</sup>)

Treatment	C. <i>rotundus</i>		P. <i>hysterothorus</i>		T. <i>monogyna</i>		P. <i>niruri</i>		Dry matter of weeds (kg ha <sup>-1</sup> )	
	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002
Weedy	433 (20.82)	176 (13.28)	75 (8.69)	86 (9.30)	189 (13.76)	156 (12.51)	50 (7.11)	34 (5.87)	3535	806
Weeding 20 and 45 DAS	130 (11.42)	94 (9.72)	3 (1.87)	12 (3.53)	6 (2.55)	46 (6.82)	6 (2.55)	11 (3.39)	588	444
Weeding 20 DAS fb hoeing 45 DAS	180 (13.43)	118 (10.88)	4 (2.12)	19 (4.41)	31 (5.61)	60 (7.78)	8 (2.91)	18 (4.30)	1171	667
Weeding 20 DAS fb hoeing (5 tined hoeing) 45 DAS	275 (16.60)	107 (10.42)	19 (4.41)	28 (5.34)	44 (6.67)	64 (8.03)	3 (1.87)	27 (5.24)	1142	597
Hoeing 20 and 45 DAS (5 tined hoeing)	288 (16.98)	132 (11.51)	75 (8.69)	20 (4.53)	58 (7.65)	74 (8.63)	3 (1.87)	27 (5.24)	1143	625
Hoeing 20 and 45 DAS	205 (14.33)	133 (10.65)	28 (5.34)	44 (6.67)	33 (5.79)	78 (8.86)	22 (4.74)	28 (5.34)	2305	667
Pendimethalin at 1.0 kg ha <sup>-1</sup>	294 (17.16)	110 (10.51)	64 (8.03)	58 (7.65)	8 (2.91)	20 (4.53)	11 (2.12)	20 (4.53)	2338	653
Pendimethalin at 0.5 kg ha <sup>-1</sup> +weeding 30 DAS	297 (17.25)	90 (9.51)	11 (3.39)	33 (5.79)	8 (2.91)	14 (3.81)	3 (1.87)	12 (3.53)	870	528
Pedimethalin at 0.5 kg ha <sup>-1</sup> +hoeing 30 DAS	211 (14.54)	106 (10.32)	100 (10.02)	8 (2.91)	22 (4.74)	28 (5.34)	6 (2.55)	28 (5.34)	2180	583
Pendimethalin at 0.5 kg ha <sup>-1</sup> +hoeing (5 tined) 30 DAS	202 (14.23)	104 (10.22)	111 (10.56)	8 (2.91)	31 (5.61)	8 (2.91)	6 (2.55)	26 (5.15)	2042	581
LSD (P=0.05)	(2.26)	(2.21)	(2.54)	(2.82)	(2.69)	(3.45)	(2.50)	(2.35)	707	54

DAS—Days after sowing. Figures in parentheses show transformed values  $\sqrt{X+0.5}$ .

Table 2. Effect of treatments on yield of blackgram and economics

Treatment	Grain yield (kg ha <sup>-1</sup> )		Cost of treatments (Rs. ha <sup>-1</sup> )	Net return due to weed control (Rs. ha <sup>-1</sup> )
	2001	2002		
Weedy	198	445	-	-
Weeding 20 and 45 DAS	552	1093	2900	4585
Weeding 20 DAS fb hoeing 45 DAS	458	993	2146	3509
Weeding 20 DAS fb hoeing (5 tined hoeing) 45 DAS	416	913	2146	3044
Hoeing 20 and 45 DAS (5 tined hoeing)	338	874	986	3326
Hoeing 20 and 45 DAS	300	887	986	3139
Pendimethalin at 1.0 kg ha <sup>-1</sup>	394	750	1652	2143
Pendimethalin at 0.5 kg ha <sup>-1</sup> +weeding 30 DAS	460	936	2074	3611
Pendimethalin at 0.5 kg ha <sup>-1</sup> +hoeing 30 DAS	347	757	1320	2175
Pendimethalin at 0.5 kg ha <sup>-1</sup> +hoeing (5 tined) 30 DAS	351	912	1320	3375
LSD (P=0.05)	27	76	-	-

merely hoeing operations were exercised either once or twice. Pendimethalin (0.5 kg ha<sup>-1</sup>) followed by one hand weeding extended the desirable control of all the associated weeds resulting in 67.81% WCE. Pendimethalin (0.5 kg ha<sup>-1</sup>) followed by hoeing either through Sharma hoe or five tined hoe was at par with respect to weed mortality (Table 1).

#### Effect on Grain Yield and Economics

Highest yield was obtained under weeded plot (817 kg ha<sup>-1</sup>) followed by pendimethalin (0.5 kg ha<sup>-1</sup>+one hand weeding) (698 kg ha<sup>-1</sup>), and the difference was found significant (Table 2). The remaining weed control treatments had pronounced effect on grain yield but could not be comparable to manual weeding twice. Manual weeding once followed by one hoeing and pendimethalin (0.5 kg ha<sup>-1</sup>+one hoeing through five tined hoe reported

similar grain yield. Results of Jain *et al.* (1997) and Chopra *et al.* (2001) also substantiated the present findings. Net monetary return was maximized under manual weeding twice (Rs. 4585 ha<sup>-1</sup>). Pendimethalin (0.5 kg ha<sup>-1</sup>)+one hand weeding proved next alternative in terms of monetary income (Rs. 3611 ha<sup>-1</sup>).

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