

Efficacy of Herbicides on Weeds and Relay Crop of Blackgram

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In Krishna-Godavari Zone of A. P., blackgram is mostly grown as a relay crop, wherein sprouted seeds of blackgram are broadcasted in standing rice crop two to three days before its harvest. The crop sown in this system survives entirely on residual moisture and fertility only. As there is no field preparation, weed growth particularly *Echinochloa* spp. effectively compete with crop for residual moisture and fertility and reduce yields upto 53% (Appanna *et al.*, 1998). As hand weeding and normal pre-emergence application of herbicides are difficult to practise because of crop trampling and injury, use of selective post-emergence herbicides is the only option under this system of cultivation. The information available on use of post-emergence herbicides in rice-fallow blackgram is very limited (Rao and Rao, 2003). Keeping this in view, the present investigation was undertaken in order to evaluate the efficacy of imazethapyr, fenoxaprop-ethyl, clodinafop-propargyl and cyhalofop-butyl in comparison with the thiobencarb in rice-fallow blackgram.

A field experiment was conducted during rabi 2002-03 at Agricultural College Farm, Bapatla. The soil of the experimental field was sandy clay loam in texture with pH of 7.9 and was low in available nitrogen (206 kg ha⁻¹), available phosphorus (21.0 kg ha⁻¹) and high in available potassium (391 kg ha⁻¹). The experiment consisting of seven treatments (Table 1) was laid out in a randomized block design with four replications. The sprouted seeds of blackgram (LBG 645) were broadcasted in the standing rice crop two days before its harvest. Sandmix (50 kg ha⁻¹) application of benthocarb was done seven days after sowing (DAS) of blackgram and followed by water spray (500 l ha⁻¹) after the removal of paddy sheaves as pre-emergence

application. The post-emergence herbicides were applied at 15 DAS using a spray volume of 500 l ha⁻¹. The crop did not receive any irrigation and survived entirely on residual moisture and fertility only. Whereas the preceding rice crop received 120 : 60 : 60 kg ha⁻¹ of N, P₂O₅ and K₂O, respectively. The data on weed dry weight were recorded group-wise i. e. grasses, sedges and broad-leaved weeds (BLW) at 60 DAS using a quadrat.

The weed flora of experimental field consisted of *Echinochloa colonum*, *Echinochloa crusgalli*, *Leersia hexandra*, *Panicum repens*, *Cyperus rotundus*, *Cyperus kyllinga*, *Eclipta alba*, *Grangea maderaspatana*, *Cardanthera uliginosa*, *Xanthium strumarium*, *Ammannia baccifera* and *Commelina benghalensis*.

All the herbicidal treatments recorded significantly lower dry weight of weeds over unweeded check (Table 1). Among the herbicides, imazethapyr at 63 g ha⁻¹ resulted in minimum dry weight of sedges and BLW and also on par with fenoxaprop-ethyl at 56 g ha⁻¹ in case of grasses dry weight. In case of grasses, all the herbicides were on par in reducing the dry weight. Sedges were not controlled by fenoxaprop-ethyl, clodinafop-propargyl and cyhalofop-butyl. Broadleaf weeds were not controlled by any herbicide. Hand weeding at 15 and 30 DAS remained significantly superior by reducing the dry weight of all the weeds. Imazethapyr at 63 g ha⁻¹ caused slight injury to blackgram but these symptoms vanished gradually.

All the herbicide treatments recorded significantly higher number of pods per plant and seed yield over unweeded check (Table 1). Among the herbicide treatments, highest grain yield (930 kg ha⁻¹) was obtained with imazethapyr closely followed by thiobencarb (922 kg ha⁻¹), cyhalofop-butyl (876

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Table 1. Effect of treatments on weeds, yield and yield components of blackgram

Treatment	Dose (g ha ⁻¹)	Weed dry weight (kg ha ⁻¹)		No. of pods plant ⁻¹	No. of seeds pod ⁻¹	100-seed weight (g)	Seed yield (kg ha ⁻¹)	IBCR	
		Grasses	Sedges						BLW
Weedy	-	5.85 (350)	4.39 (82)	4.88 (156)	06.5	5.5	5.43	550	-
Hand weeding 15 & 30 DAS	-	2.06 (8)	2.37 (13)	3.13 (26)	12.2	6.0	5.56	1126	0.92
Thiobencarb	2000	3.25 (26)	3.43 (34)	4.51 (129)	10.6	5.7	5.50	922	3.21
Imazethapyr	63	2.93 (20)	3.12 (23)	4.47 (116)	11.3	5.9	5.55	930	3.64
Fenoxaprop-p-ethyl	56	2.77 (16)	4.34 (78)	4.68 (133)	10.3	5.7	5.46	832	2.49
Clodinafop-propargyl	52	2.87 (19)	4.32 (77)	4.76 (141)	10.1	5.7	5.48	827	2.21
Cyhalofop-butyl	100	2.80 (17)	4.26 (73)	4.67 (132)	10.5	5.8	5.49	876	2.01
LSD (P=0.05)	-	0.44	0.59	0.47	02.0	NS	NS	165	-

Weed dry weight data were transformed to log y+1 transformation. The figures in parentheses are original values.
IBCR-Incremental benefit cost ratio. NS-Not Significant.

kg ha⁻¹), fenoxaprop-ethyl (832 kg ha⁻¹) and clodinafop-propargyl (827 kg ha⁻¹). The increased seed yield in these treatments might be due to lower weed dry weight and better weed control. Hand weeding recorded significantly the highest yield (1120 kg ha⁻¹). The highest incremental benefit : cost ratio (IBCR) of 3.64 was obtained with imazethapyr followed by thiobencarb (3.21).

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