



Bio-efficacy of Quizalofop Ethyl on *Echinochloa colona* Control in Rice-Fallow Blackgram

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ABSTRACT

A field experiment was conducted during rabi season of 2004-05 to study the bio efficacy of quizalofop ethyl at seven rates (30, 40, 50, 60, 70, 80, and 90 g/ha) on *Echinochloa* spp. control in rice-fallow black gram in comparison with fenoxaprop ethyl 56 g/ha, hand weeding at 15 and 30 days after sowing (DAS) and weedy check in a randomized block design with three replications. Results indicated that Post emergence application of quizalofop ethyl at 30 to 90 g/ha applied at 17 DAS significantly reduced *Echinochloa* spp. growth and increased black gram yield ranging from 19 to 45 percent over weedy check without any crop injury. Among the different doses, quizalofop ethyl at 50 g/ha recorded the highest seed yield (1877 kg/ha), net monetary returns (Rs. 35,625/ha) and B:C ratio of 3.15 and was on par with hand weeding at 15 and 30 DAS, which recorded the highest seed yield of 1928 kg/ha among all the treatments. The unchecked weed growth throughout the crop growing period caused 33 percent reduction in seed yield compared to hand weeding at 15 and 30 DAS.

Key words : Quizalofop ethyl, Rice fallow black gram.

In Krishna zone black gram is mostly grown as a relay crop, where in sprouted seeds of black gram are broadcasted in standing rice crop two or 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, grassy weeds particularly *Echinochloa colona* is severe and effectively competes with the crop for residual moisture, nutrients and reduces yield up to 49 percent (Rao and Rao, 2003). Further, the normal pre emergence application of herbicides is not possible due to crop injury and hand weeding is difficult to practice because of trampling. Therefore, use of-selective post emergence herbicide is the only option, under this location specific cultivation. The information available on use of post emergence herbicides in rice fallow black gram is very limited (Appanna *et al*, 1998: Rao and Rao 2003). Keeping this in view, the present investigation was undertaken to evaluate the bioefficacy of quizalofop ethyl at different doses in comparison with fenoxaprop ethyl in rice fallow black gram.

MATERIAL AND METHODS

Field experiment was conducted during rabi 2004-05 at pulse project area of the Regional Agricultural Research Station, Lam, Guntur. The experiment consisting of ten treatments (Table1) was laid out in a randomized block design with three

applications. The soil of the experimental plot was clay loam with a P^H of 7.5 with medium in available nitrogen and available phosphorus and high in available potassium. In order to maintain uniformity in plant population, the sprouted seeds of black gram (CV. LBG17) were dibbled by adopting a spacing of 30x10 cm. immediately after removal of paddy sheaves. The crop survived entirely on residual moisture and fertility only except for a supplemental irrigation was given at 35DAS. Post emergence herbicides were sprayed at 17 DAS as per schedule using a spray volume of 500 l/ha. The data on *Echinochloa* density was recorded at 30, 60 DAS and harvest and weed dry weight at 60 DAS and harvest only.

RESULTS AND DISCUSSION

The experimental field was dominated by the natural infestation of *Echinochloa colona* which consisted of 80% of the total weed population. Other weeds like *Cyperus killinga*, *Grangia maderaspetana*, *Cleome chelidoni*, *Nasturitium indicum*, *Chrozophora rotteleri* were also present but their population was negligible.

All the weed control treatments caused significant reduction in density and dry weight of *E.colona* compared to weedy check at all stages of observation (Table1). Among the different doses, quizalofop ethyl at 50 g/ha and above gave excellent

Table1 Effect of different treatments on Echinochloa density and total weed dry weight in rice fallow black gram

Treatments	Dose (g/ha)	Time of application (DAS)	Echinochloa density (No/m ²)			WCE (%) of Echinochloa			Total weed dry wt (g/m ²)	
			30 DAS	60 DAS	Harvest	30 DAS	60 DAS	Harvest	60 DAS	Harvest
T1- Weedy check	-	-	11.02 (21.3)	11.44 (33.33)	8.84 (78.66)	-	-	-	8.57 (73.33)	8.30 (69.33)
T2- Hand Weeding	-	15&30	0.71 (0.00)	2.59 (6.60)	2.64 (6.66)	94	77	76	2.39 (5.33)	1.18 (1.33)
T3- Fenoxaprop ethyl	56	17	1.18 (1.30)	1.91 (4.00)	1.44 (2.66)	89	83	84	3.12 (9.33)	2.92 (8.00)
T4- Quizalofop ethyl	30	17	4.04 (16.00)	4.05 (17.30)	3.24 (10.66)	63	65	63	3.84 (14.33)	3.84 (12.00)
T5- Quizalofop ethyl	40	17	1.18 (1.30)	1.65 (2.66)	1.18 (1.33)	89	86	87	3.10 (10.66)	2.83 (10.00)
T6- Quizalofop ethyl	50	17	0.71 (0.00)	1.18 (1.33)	0.71 (0.00)	94	90	92	2.65 (6.66)	2.39 (5.30)
T7- Quizalofop ethyl	60	17	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)	94	94	92	2.29 (6.00)	1.91 (4.00)
T8- Quizalofop ethyl	70	17	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)	94	94	92	2.76 (7.38)	1.65 (2.80)
T9- Quizalofop ethyl	80	17	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)	94	94	92	2.29 (6.00)	1.91 (4.00)
T10- Quizalofop ethyl	90	17	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)	94	94	92	2.26 (4.66)	1.65 (2.80)
CD at 5%			0.82	1.79	0.99				1.82	0.88

Note: DAS: Days after sowing. Data transformed to $\sqrt{x+0.5}$ transformation. Figures in parentheses are original values

control of Echinochloa population with 90 to 94 percent weed control efficiency (WCE) and was found to be on par with fenoxaprop ethyl 56 g/ha and also with hand weeding at 15 and 30 DAS. Regarding weed dry weight recorded at 60DAS and harvest almost similar trend was observed.

Quizalofop ethyl treatments at all doses did not cause any injury to black gram. All the weed control treatments significantly influenced the yield and yield attributes (except hundred seed weight) over weedy check (Table2). Among the different treatments, post emergence application of quizalofop ethyl at 50 g/ha recorded the highest seed yield (1877 kg/ha) and was on par with all other treatments except with its lower dose of 30 g/ha. This treatment was also on par with other post

emergence herbicide fenoxaprop ethyl 56 g/ha (1826 kg/ha) and also with hand weeding at 15 and 30 DAS, which recorded the highest yield (1928 kg/ha). The increased yield in this treatment might be due to effective control of the dominant weed Echinochloa. Further, it was observed that though the higher doses of quizalofop ethyl (60 to 90 g/ha) were on par with its lower dose (50 g/ha) and hand weeding but the yields with higher doses of 80 and 90 g/ha were significantly lower compared to hand weeding treatment. This indicates at higher doses it had negative effect on yield without any visual injury, which needs further investigation. The uncontrolled weed growth during the crop season reduced the seed yield to the extent of 33 percent.

Table 2. Effect of different treatments on Yield and yield attributes of rice fallow black gram

Treatments	Dose (g/ha)	Time of application (DAS)	Crop dry weight (g/m ²) at harvest	No. of pods/plant	No. of seeds/pod	100 seed weight (g)	Seed yield (Kg/ha)	Gross returns (Rs/ha)	Net returns (Rs/ha)	BCR (Rs/Rupee)
T1- Weedy check	-	-	367.0	8.1	5.93	5.33	1297	32,425	22,425	2.24
T2- Hand Weeding	-	15&30	647.0	14.7	6.93	5.59	1928	48,200	35,700	2.86
T3- Fenoxaprop ethyl	56	17	433	12.0	6.96	5.84	1826	45,650	34,794	3.21
T4- Quizalofop ethyl	30	17	447	10.9	6.77	5.51	1536	38,450	27,630	2.55
T5- Quizalofop ethyl	40	17	447	11.0	6.30	6.25	1826	45,650	34,590	3.13
T6- Quizalofop ethyl	50	17	607	12.9	6.83	6.56	1877	46,925	35,625	3.15
T7- Quizalofop ethyl	60	17	520	11.7	6.16	5.70	1744	43,600	32,060	2.78
T8- Quizalofop ethyl	70	17	513	11.3	6.90	6.02	1644	41,025	29,245	2.48
T9- Quizalofop ethyl	80	17	493	11.7	6.40	5.62	1620	40,500	28,480	2.37
T10- Quizalofop ethyl	90	17	480	10.7	6.70	5.46	1620	12,260	28,240	2.30
CD at 5%			96.2	2.13	0.64	NS	303.00			

Note: Cost of black gram Rs.2,500/Q

Among the different doses of quizalofop ethyl, the highest net monetary return (Rs. 35,625 / ha) and benefit cost ratio (BCR) of 3.15 was obtained with the dose of 50 g/ha, closely followed by its lower dose of 40 g/ha with monetary return of Rs. 34,590/- and BCR of 3.13 which may be due to higher WCE. However, among all the treatments, the highest BCR (3.21) was obtained with post emergence application of fenoxaprop ethyl 56 g/ha because of lower cost of herbicide.

From the results it can be concluded that post emergence application of quizalofop ethyl 50g/ha could be an alternative to the existing post emergence herbicide fenoxaprop ethyl.

LITERATURE CITED

- Appanna G, Subrahmanyeswara Rao A, Sriharinarayana Rao R and Ravikumar A 1998.** Evaluation of herbicides for weed management in rice fallow black gram. The Andhra Agricultural Journal 45:116-118.
- Rao A S and R S N Rao 2003.** Bioefficacy of clodinafop propargyl on Echinochloa spp. in black gram. Indian Journal Weed Science 35: 251-252

(Received on 22.12.2010 and revised on 29.12.2010)