HERBICIDAL CONTROL OF WEED IN MUSTARD FIELD

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ABSTRACT

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A field experiment was conducted at the Bangladesh Agricultural Research Institute Joydebpur, during rabi season of 2006-07 to find out the appropriate herbicide for successful control of weed in Mustard field. Five treatment viz. T_1 = No weeding; T_2 = Hand weeding (weed free). T_3 = Dual gold 960 EC @1.0 l/ha, T_4 = Dual gold @1.5 L/ha; T_5 = Ronstar @ 2.0 L/ha. The height (1245.00kg) grain yield was recorded in hand weeding plot which is statistically at per with Dual Gold 960 EC @ 1.0L/ha treated plot. The lowest (1009.5kg) grain yield was recorded in no weeding check plots.

Keywords: Herbicide, Weeds, Mustard, Yield

INTRODUCTION

The amount of edible oil produced from oilseed mustard does not meet the current requirement of the growing population of Bangladesh. Most of the common people of this country are traditionally fond of mustard oils. The country is deficit of about 90,000 metric tons of edible oil annually (Lutfur Rahman *et al* 1993). For bridging the gap between demand and supply, productivity needs to be enhanced. Weed competition in Mustard is more serious in early stage, because crop growth during winter (rabi) sea-son remains slow during the first 4-6 weeks after sowing. However, during later stage it grows vigorously and has suppressing effect on weeds. As this crop is grown in poor soil with poor management practices, weed infestation is one of the major causes of low productivity. Among the factors responsible for the low productivity of the mustard, weeds alone cause 20-30% yield reduction, which may go up to 62% (Singh, 1992). Weeds being injurious, harmful or poisonous are a constant source of trouble for the successful growth and development of crops. Weeds compete with crops for light, moisture, space and plant nutrients and other environmental requirements and consequently interfere with the normal growth of crops. Weeds pose severe problem for crop husbandry, reducing the soil fertility and moisture, act as alternate host for insect & pest and develop a potential threat to the succeeding crops. At present, hand-hoeing is the only method employed for controlling weeds in this crop. Due to rise in labour wages and their non – availability a peak season, herbicides could be a more economical and efficient alternative to hand-weeding for checking early competition (Gill et al., 1984). In view of the importance of the problem, the present study was undertaken to find out the performance of Dual Gold 960EC against major weeds of mustard and also its effect on yield.

MATERIALS AND METHODS:

The experiment was conducted at the Bangladesh Agricultural Research Institute, Joydebpur during rabi 2006-07 to find out the optimum rate of herbicide and time of application against mixed weed in mustard field. The layout of experiment was in randomized complete block (RCB) design with three replications. The unit plot size was 5 x 4m^{-2} There were five treatments namely, T1: No weeding (check); T_2: Hand weeding (weed free); T_3: Dual Gold 960EC @ 1.0L/ha; T4: Dual Gold 960EC @ 1.5L/ha; T5: Ronstar @ 2.0L/ha, in each replication. The crop was planted on November 6, 2006 at Joydebpur with maintains the spacing of 30 cm x 10 cm. Herbicidal treatments were done just after seed sowing with hand sprayer.The crop was fertilized with 55-15-35-10-1-1 kg N-P-K-S-Zn-B/ha. Weed samples were collected using 50cm X 50cm quadrate from randomly selected two places from each plot at 25 and 45 days of planting. Number and dry weight of weeds were recorded. Weed control efficiency (WCE) was calculated using following formula: WCE (%) = (A-B/A) x 100 where A = Dry weight of weeds in no weeding plots and B = Dry weight of weeds in treated plots. Yield and yield contributing characters were recorded and analyzed statistically and mean separations were done by LSD tests were used (Cochran and Cox, 1957) to determine differences among sowing dates using Mstat-C statistical software.

RESULTS AND DISCUSSION

Date indicated that numbers of weeds m^{-2} were significantly affected by different herbicide in mustard (Table 1). It could be inferred from the data that maximum number of weeds (167 and 190) were found from no weeding check plot. The best treatments were statistically comparable with the hand weeded check. Minimum number of weeds were found in Dual Gold 960EC @ 1.5L/ha treated plot which is statistically similar to Dual Gold 960EC @ 1.0L/ha treated plot and Ronostar treated plot. Dual Gold 960EC treated plots effectively controlled *Digitaria*

sanguinalis, Amaranthus sp, Echinochloa colonum, Eleusine indica, Portulaca oleracia and Rumex maritimus but only 63-67% control was found in case of *Chenopodium album*. Statistical analysis of the data presented in table 2 indicated that the weed biomass was significantly affected by various herbicides in mustard. Maximum dry wt. 130.72 and 142.2g m^{-2} was found in no weeded plot and minimum 12.25 and 10.95g m^{-2} was observed in Dual Gold 960EC @ 1.5L/ha treated plot although there was no significant difference among the herbicidal treatments in case of weed biomass.These results confirm the finding of Tomar and Namdeo (1991). Statistical analysis of the data revealed that different treatments had a significant ($p \leq 0.05$) effect on plant height (Table 3). The highest plant height 124.7 cm was recorded in hand weeding (weed free) treated plot and the lowest (110.5) was observed in no weeding check plot. The difference in plant height is attributed to the various intensities of weed competition with mustard crop. Number of pods $plant^{-1}$ was significantly different among the treatments but pod length was non significant (Table 3). It could be inferred from the data that highest ((142.5) number of pods $plant^{-1}$ was observed in hand weeding (weed free) treated plot which was statistically similar to other treatment of Dual Gold 960EC @ 1.0L/ha (Table 3) and the lowest (118.5) was in no weeding check plot. It indicated that the weed control treatments improved the number of pods $plant^{-1}$. Statistical analysis of the data revealed that 1000 seed weight (g) was significantly affected by different treatments (Table 3). Maximum 1000 seed weight of 2.58 (g) was observed in hand weeding (weed free) treated plot which was statistically similar to other treatment of Dual Gold 960EC @ 1.0L/ha (Table 3) and minimum 2.35 (g) was in control plot. It could be inferred from the data (Table 3) that maximum (1245.00kg) grain yield was recorded in hand weeding plot which is statistically at per with Dual Gold 960 EC @ 1.0L/ha treated plot.This result confirm the finding of Singh et al (1989). The minimum (1009.5kg) grain yield was recorded in no weeding check plots. Statistical analysis of the data revealed that harvest index (HI) was non-significantly affected by different treatments (Table 3). Similar results were also reported by Yadev *et al.* (1999).

Table 1. Number of weeds at 25 and 45 days after application (DAA) and plant population as affected by different treatments

Treatments	**No of weeds m^{-2}**																	
	Digitaria sanguinalis		*Cyperus esculantus*		Echinocloa colonum		*Amaranthus* sp		Eleusine indica		Portulaca oleracia		Rumex maritimus (Bon palong)		Chenopodium album		**Total no of weeds m^{-2}**	
DAA	**25**	**45**	**25**	**45**	**25**	**45**	**25**	**45**	**25**	**45**	**25**	**45**	**25**	**45**	**25**	**45**	**25**	**45**
T_1: No weeding control	17	24	19	27	25	30	15	20	14	16	5	12	60	45	12	16	167	190
T_2: Hand weeding (Weed free)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)
T_3: Dual Gold 960EC @ 1L/ha	1.7 (90)	2 (92)	2 (89)	5 (81)	2.0 (92)	2 (95)	1.5 (90)	3 (85)	2.0 (86)	2 (88)	1.0 (80)	2 (82)	3.0 (95)	3 (93)	4.5 (63)	2 (88)	17.7 (89)	21 (89)
T_4:Dual Gold 960EC @ 1.5L/ha	1.3 (92)	4 (83)	1.5 (92)	3 (89)	1.3 (95)	1 (97)	1.0 (93)	1 (95)	1.5 (89)	1 (94)	0.3 (94)	3 (79)	2.7 (96)	4 (91)	4.0 (67)	3 (82)	13.6 (91)	20 (98)
T_5: Ronostar	3.0 (82)	5 (79)	3 (84)	6 (78)	4.3 (83)	5 (85)	2.7 (82)	4 (80)	2.0 (86)	3 (81)	1.3 (74)	3 (75)	15.0 (75)	10 (78)	1.0 (92)	3 (82)	32.3 (80)	39 (80)

(DAA= Days After Application), (Figure in parenthesis is the percent reduction value)

Table 2. Weed biomass (g m^{-2}) at 25 and 45 days after application (DAA) as affected by different treatments

Treatments	No of weeds m-2																	
	Digitaria sanguinalis		*Cyperus esculantus*		Echinocloa colonum		*Amaranthus* sp		Eleusine indica		Portulaca oleracia		Rumex maritimus (Bon palong)		Chenopodium album		Total no of weeds m-2	
DAA	**25**	**45**	**25**	**45**	**25**	**45**	**25**	**45**	**25**	**45**	**25**	**45**	**25**	**45**	**25**	**45**	**25**	**45**
T_1: No weeding control	21.14	15.90	14.12	15.40	17.90	11.10	17.72	13.09	4.78	13.00	2.97	8.21	40.35	49.60	11.74	15.90	130.72	142.2
T_2: Hand weeding (Weed free)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)
.T_3: Dual Gold 960EC @ 1L/ha	2.10 (90)	2.14 (87)	1.64 (88)	2.78 (82)	1.54 (91)	0.79 (93)	2.61 (85)	2.19 (83)	0.59 (88)	1.60 (88)	0.41 (86)	1.02 (88)	2.40 (94)	3.16 (92)	3.40 (71)	3.45 (78)	14.79 (85)	17.73 (88)
T_4:Dual Gold 960EC @ 1.5L/ha	1.24 (94)	1.25 (92)	1.16 (96)	1.04 (93)	1.10 (94)	0.42 (96)	2.31 (87)	0.69 (45)	0.48 (90)	0.97 (95)	0.16 (95)	0.95 (88)	2.30 (94)	2.51 (98)	3.50 (70)	3.12 (80)	12.25 (91)	10.95 (92)
T_5: Ronostar	3.50 (83)	2.64 (83)	2.13 (85)	2.49 (84)	2.60 (85)	0.85 (92)	2.67 (85)	2.07 (84)	0.60 (87)	2.12 (84)	0.68 (77)	1.34 (84)	10.12 (75)	7.2 (85)	2.10 (82)	2.89 (81)	24.40 (91)	21.6 (85)

(DAA= Days After Application), (Figure in parenthesis is the percent reduction value)

Table 3. Data regarding yield and yield components of mustard as by different treatments

Treatment	Plant height (cm)	Pods/plant	Pod length (cm)	Seeds /pod	1000 seed wt (g)	Seed yield (kg/ha)	Straw yield (kg/ha)	HI %
T_1: No weeding check	110.5c	118.5c	3.65	79.1b	2.35b	1009.5c	3759.5	23.90
T_2: Hand weeding	124.7a	142.5a	3.85	85.3a	2.58a	1245.00a	3843.5	24.47
T_3:Dual Gold 960EC @ 1L/ha	123.6a	140.5a	3.89	84.9a	2.55a	1229.50b	3819.6	24.35
T_4: Dual Gold 960EC@ 1.5L/ha	119.3b	135.5b	3.80	80.2b	2.39b	1197.5b	3773.1	24.09
T_5: Ronstar	117.8b	129.5b	3.81	80.3b	2.41b	1191.00b	3841.7	23.67
LSD (0.05)	9.41	6.69	NS	5.65	0.89	7.89	NS	NS
CV(%)	12.35	24.27	4.36	10.36	6.56	8.69	13.69	7.56

CONCLUSION

In conclusions, hand weeding is the best method for controlling weeds and getting higher yield but shortage of labor and higher cost are great hurdles for adoption this method. In Dual Gold 960 EC @ 1.0L/ha treated plot gave the second highest yield which is statistically similar to hand weeding plot could be the suitable for adoption of weed control in mustard.

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