ISSN-1923-7766 (Online)
Int. J. Expt. Agric. 1(1): 12-14(July 2010)

EFFICACY OF DIFFERENT HERBICIDES ON THE YIELD AND YIELD COMPONENTS OF MAIZE

M.M. KARIM[1], I.M. AHMED[1], S.M.S. HAIDER[1], M.R. SHAHEB[2] AND M. SHAHEENUZZAMN[1] AND M.H. AHMED[3]

[1]Scientific Officer, Agronomy Division, [2]Scientific Officer, Seed Technology Division, Bangladesh Agricultural Research Institute, Gazipur, [3]Additional Agriculture Officer, DAE, Khisorgonj Sadar.

Corresponding author & address: M.M. Karim Email: a_raju80@yahoo.com
Accepted for publication on 15 June 2010

ABSTRACT

Karim MM, Ahmed IM, Haider SMS, Shaheb MR, Shaheenuzzamn M, Ahmed MH (2010) Efficacy of different herbicides on the yield and yield components of maize. *Int. J. Expt. Agric.* 1(1), 12-14.

A research work 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 Maize field. Five treatments viz. T_1= No weeding; T_2= Hand weeding (weed free). T_3= Dual gold 960EC @1.0 L/ha, T_4= Dual gold @1.5 L/ha; T_5= Ronstar @ 2.0 L/ha. The maximum (8400 kg/ha) grain yield was recorded in hand weeding plot which is statistically at per with Dual Gold 960EC @ 1.0 L/ha treated plot. The minimum (6400 kg/ha) yield was recorded in no weeding check plots.

***Key words**: herbicide, weeds, maize, yield*

INTRODUCTION

Maize is well adapted to the climate and soils of Bangladesh and is now the third most important cereal crop after rice and wheat. The area of production of maize is increasing day by day due to our linear increase in demand for poultry feed and others. The feasibility to increase per unit yield is more as there is a large gap between potential and actual yield per hectare. Besides other factors, yield is greatly affected by weeds in the field. 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 and develop a potential threat to the succeeding crops. Miller and Libbey (1999) reported that maize yield generally responded positively to increased weed control. Knezevic *et al*. (1996) reported that grain yield is significantly increased by herbicides treatments in maize. Rout and Satapathy (1996) observed that highest grain yield of maize was from the herbicides treated plot. In view of the importance of the national problem, the present research was conducted to study the impact of herbicides on different weeds and also know the response of crop to such herbicides in terms of tolerance, yield and yield components of maize.

MATERIALS AND METHODS

The experiment was conducted at BARI, Gazipur in 2006-2007. Maize was used in the experiment. The layout of experiment was in randomized complete block design (RCBD) with three replications. There were five treatments namely, T_1: No weeding (check); T_2: Hand weeding; T_3: Dual Gold 960EC @ 1.0 L/ha; T_4: Dual Gold 960EC @ 1.5 L/ha; T_5: Ronstar @ 2.0 L/ha, in each replication with at plot size 5 X 4 m^{-2}. Herbicidal treatments were done after seed sowing with hand sprayer. The crop was fertilized with $N_{250}P_{55}K_{110}S_{55}$ kg ha^{-1} in the form of urea, triple super phosphate (TSP), muriate of potash (MoP) and gypsum. One third of nitrogen and full dose of other fertilizers were incorporated into the soil during final land preparation. Remaining nitrogen were top-dressed in two equal splits at 35 and 60 days after sowing (DAS) in maize rows. 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^{TM} statistical software.

RESULTS AND DISCUSSION

Data indicated that the number of weeds m^{-2} was significantly affected by different herbicide in maize (Table 1). It could be inferred from the data that maximum number of weeds were found from no weeding check plot at 25 and 45 DAA respectively and the minimum number of weeds were found in Dual Gold 960EC @ 1.0 L/ha treated plot which is statistically similar to Dual Gold 960EC @ 1.5 L/ha treated plot. Dual Gold 960EC treated plots shows satisfactory control both in 25DAA and 45DAA. Dual Gold 960EC treated plots effectively control (>80%) *Digitaria sanguinalis*, *Echinochloa colonum*, *Amaranthus* sp., *Commelina benghalensis*, *Rumex maritimus* but 50-55% control was observed in case of *Cynodon dactilon*. Statistical analysis of the data presented in table 2 indicated that the weed biomass was affected by various herbicides in maize. Maximum weed biomass was found in no weeding check both at 25 and 45DAA respectively and the minimum was observed in Dual Gold 960EC @ 1.5 L/ha

treated plot although there was no significant difference with Dual Gold 960EC @ 1.0 L/ha treated plot. The results were in agreement with Hafeezullah (2000) and Shakoor *et al.* (1986).

Table 1. Number of weeds as affected by different treatments in Maize at BARI, Joydebpur, Gazipur in 2006-2007

Treatments	Number of weeds m^{-2}												Total weed density m^{-2}	
	Digitaria sanguinalis		*Echinocloa colonum*		*Amaranthus* sp		*Commelina benghalensis*		*Rumex maritimus (Bon palong)*		*Cynodon dactylon*			
DAA*	25	45	25	45	25	45	25	45	25	45	25	45	25	45
T_1: No weeding control	20	31	9	16	18	25	11	19	40	51	18	24	116	166
T_2: Hand weeding	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 @ 1.0 L/ha	2 (90)	4 (89)	1 (89)	3 (81)	1 (94)	2 (92)	1 (88)	3 (84)	3 (93)	5 (90)	9 (50)	11 (54)	17 (85)	28 (83)
T_4: Dual Gold 960EC @ 1.5 L/ha	3 (88)	4 (87)	1 (89)	3 (81)	1 (94)	3 (88)	1 (91)	2 (89)	4 (90)	6 (88)	8 (56)	12 (50)	18 (85)	30 (82)
T_5: Ronstar	4 (80)	6 (81)	2 (83)	3 (81)	3 (83)	5 (80)	2 (82)	3 (84)	10 (75)	14 (73)	7 (61)	8 (67)	28 (76)	39 (77)

(Figure in parenthesis is the percent reduction value)
* DAA: Days after application

Table 2. Weed biomass (g m^{-2}) as affected by different treatments in maize at BARI, Joydebpur in 2006-2007

Treatments	Weed biomass (Dry wt) (g m^{-2})												Weed biomass (g m^{-2})	
	Digitaria sanguinalis		*Echinocloa colonum*		*Amaranthus* sp		*Commelina benghalensis*		*Rumex maritimus (Bon palong)*		*Cynodon dactylon*			
DAA*	25	45	25	45	25	45	25	45	25	45	25	45	25	45
T_1: No weeding control	23.40	34.56	5.94	11.19	9.73	12.09	9.16	16.76	24.61	27.64	10.62	15.27	83.5	117.5
T_2: Hand weeding	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 @ 1.0 L/ha	2.46 (89)	3.86 (89)	0.67 (89)	1.97 (82)	0.49 (95)	0.84 (93)	0.89 (90)	2.11 (87)	2.13 (91)	2.83 (90)	5.46 (49)	6.84 (55)	12.1 (86)	18.5 (84)
T_4: Dual Gold 960EC @ 1.5 L/ha	2.51 (89)	3.49 (90)	0.69 (88)	1.19 (89)	0.41 (96)	0.59 (95)	0.69 (92)	1.01 (94)	2.56 (90)	2.91 (89)	3.74 (65)	8.49 (44)	10.6 (87)	17.7 (85)
T_5: Ronstar	4.84 (79)	7.05 (80)	0.84 (86)	1.51 (87)	1.67 (83)	2.41 (80)	1.74 (81)	3.02 (82)	5.76 (77)	7.07 (74)	4.12 (61)	6.94 (55)	19.0 (77)	28.0 (76)

(Figure in parenthesis is the percent reduction value)
* DAA: Days after application

Table 3. Data regarding yield and yield components as affected by different treatments in maize at BARI, Gazipur in 2006-2007

Treatments	Plant height (cm)	Cobs/plant	Kernels/cob	100 kernels wt. (g)	Seed yield (kg/ha)
T_1: No weeding check	188.60	1.06	423.33 c	30.57	6400 c
T_2: Hand weeding	196.07	1.20	507.33 a	31.30	8400 a
T_3: Dual Gold 960EC @ 1 L/ha	192.27	1.20	504.20 a	31.17	8375 a
T_4: Dual Gold 960EC @ 1.5 L/ha	192.53	1.06	483.20 b	30.37	7850 b
T_5: Ronstar	189.47	1.06	479.60 b	29.40	7550 b
$LSD_{(0.05)}$	NS	NS	4.25	NS	12.31
Level of significance	-	-	**	-	**

**= Significant at 1% level, NS= Not Significant

Statistical analysis of the data (Table 3) revealed that different treatments had no significant effect on plant height. Mean value of the data indicted that highest plant height was observed in hand weeding plot and the lowest plant height was in no weeding check plot. The difference in plant height is attributed to the various intensities of weed competition with maize plant. Non significant differences were obtained for number of cobs per plant due to different treatments (Table 3). Number of kernels per cob was significantly affected by different treatments (Table 3). It could be inferred from the data presented that maximum kernels per cob were recorded in hand weeding plots. These were however, statistically at per with Dual Gold 960EC @ 1.0 L/ha. The minimum kernels per cob were recorded in no weeding check plot. Statistical analysis of the data revealed that 100 kernels weight was non significant among the treatments. It could be inferred from the data (Table 3) that maximum (8400kg) grain yield was recorded in hand weeding plot which is statistically at per with Dual Gold 960EC @ 1.0 L/ha treated plot. The minimum yield was recorded in no weeding check plots (Table 3). Janjic *et al.* (1983) and Knezevic *et al.* (1996) reported that best grain yield of maize was achieved with the application of Dual Gold 960EC at the rate of 4 $kgha^{-1}$.

CONCLUSION

From the outcome of this study, it can be concluded that hand weeding is the best method to control weeds and getting higher yield but shortage of labor and higher cost are great hurdles for adoption this method. In Dual Gold 960EC @ 1.0 L/ha treated plot gave the second highest yield which is statistically similar to hand weeding plot. So, using of Dual Gold 960EC @ 1.0 L/ha could be suitable for adoption of weed control in maize.

REFERENCES

Cochran W, Cox G (1957) Experimental Design John Willey & Sons Inc., New York.

Hafeezullah (2000) Effect of deferent sowing and weed control methods on the performance of sunflower. M.Sc.(Hons), thesis, Agric. Univ., Peswar, Pakistan.

Janjic V, Trifunovic M, Bogdanovic V (1983) A study on the effect of herbicide on yield and quality of maize grain. Fragments Herbologica Jugoslavica, 12, 51-58.

Knezevic M, Dukic M (1996) Effect of some agrotechnical measures upon predominant weeds spices and maize grain yield. Macedorian Agric. Review, 43, 29-32.

Miller TW, Libbey CR (1999) Response of three corn cultivars to several herbicides. Res. Prog. Report. Western Soc. Weed Sci. Colorado Springs, USA, 9-11 March, pp: 57-58.

Rout D, Satapathy MR (1996) Chemical weed control in rainfed maize (*Zea mays*). *Indian J. Agron.*, 41, 51-53.

Shakoor A, Naeem M, Ahmed CO (1986) Efficacy of different herbicides for control of weeds in maize. *Pak. J. Agric.*, 7, 44-50.