

EFFECT OF DIFFERENT DOSES OF HERBICIDE (METRO 70WG) ON WEED CONTROL IN MAIZE FIELD

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Maize is the third important cereal crop in Bangladesh. Maize is valued for its diversified use. Now a days it has been considered as crop for food security. It is can be directly consumed as a nutritious food. Grains and plant are processed into other agro-industrial by-products. Increased maize production can play a vital role in alleviating food shortage in Bangladesh (Paul *et al.*, 2015). The stalk leaves of maize plant and shelled cobs can also be utilized in reducing existing fodder shortage. Though maize production is very high, but due to lack of proper management yield is decreasing compared to other developed countries. Weed infestation is one of them, which decreased the yield (Turk *et al.*, 2002). Many herbicide are used to control the weeds in maize field. A field experiment was conducted at Joydebpur, Gazipur and Regional Agricultural Research Station, Jamalpur of Bangladesh Agricultural Research Institute during the Kharif-I season of 2012 to find out the optimum dose of herbicide Metro 70WG for controlling weeds in maize field. Six treatments viz. T₁ = Metro 70WG @ 250 gm ha⁻¹ at sowing, T₂ = Metro 70WG @ 500 gm ha⁻¹ at sowing, T₃ = Metro 70WG @ 750 gm ha⁻¹ at sowing, T₄ = weed free, T₅ = Two hand weedings at 20 Days after planting (DAP) and 35 DAP and T₆ = Control (untreated) were used. Seeds were sown on 21 March 2012 in Joydebpur and 5 March 2012 in Jamalpur at 60 cm x 20 cm spacing. Crop variety used in the experiment was BARI Hybrid Maize-7. The crop was fertilized with 250-55-110-40 kg NPKS/ha. Thirty percent of N along with full amount of other fertilizers was applied as basal during final land preparation. Remaining 70% N was applied as top dressed at 8-leaf stage. Irrigation and other intercultural operations were done as and when required. The crop was harvested on 4th and 19th July, 2012 at Jamalpur and Joydebpur, respectively. Collected data were analyzed statistically and mean separation was done by LSD test. The Relative Density (RD) and weed control Efficiency (WEC) were calculated by the following formula.

$$\text{Relative Density (RD)} = \frac{\text{No of specific weed species}}{\text{Total no. of weeds}} \times 100$$

$$\text{Weed Control Efficiency (WEC)} = \frac{\text{Dry wt. of control plot} - \text{Dry wt. of specific plot}}{\text{Dry wt. of control plot}} \times 100$$

The common weeds in maize field were *Jussiaea repens* (Helencha), *Cyperus rotundus* (Mutha), *Echinochloa crusgalli* (Shama) and *Cynodon dactylon* (Durba). Herbicide reduced weed infestation in maize but none of the herbicidal dose can exceed the weed control efficiency by hand weeding plot in both the locations. At 40 DAE, among the different herbicidal treatments maximum weed control efficiency (WCE: 45.32% at Joydebpur and 20.49% at Jamalpur) was found in treatment T₂ (Metro 70WG @ 500 gm ha⁻¹) at Jamalpur and in treatment T₃ (Metro 70WG @ 500 gm ha⁻¹) at Joydebpur, respectively. Among the weed species, *Echinochloa crusgalli* (Shama) was found dominant (16-40 weeds/m²) at 20 DAE and 37-52 weeds/m² at 40 DAE. At Jamalpur, weeds in the maize field comprise helencha, mutha, durba, kalimaina, biskathali, fulka and others.

Dry weight of weeds/ m² varied at different dose of Metro 70WG (Table 1). Maximum dry weight of weeds was recorded in control plots in both the locations. Weed control efficiency (WCE) was highest in hand weeding plots at both the locations. Paul *et al.*, 2014 also observed higher WCE under two hand weeding at 20 and 40 DAS. Although maximum WCE was found in hand weeded plot but hand weeding is laborious, time consuming and expensive. Among the different herbicidal treatments T₂ (Metro 70WG @ 500 gm ha⁻¹ at sowing followed by irrigation) showed higher WCE at 20 DAE. The highest WCE (45.32%) was found in T₃ (Metro 70WG @ 750 gm ha⁻¹ at 40 DAE (Table 2).

Table 1. Dry weight of weed and weed control efficiency in maize as affected by different doses of Metro 70WG over locations

Treatments	At 20 DAE		At harvest	
	Weed dry weight/m ² (g)	WCE (%)	Weed dry weight/m ² (g)	WCE (%)
T ₁	58.63	21.11	135.5	35.29
T ₂	40.30	45.74	107.2	48.82
T ₃	40.95	44.90	171.6	17.92
T ₄	-	-	-	-
T ₅	14.60	80.35	61.30	70.73
T ₆	74.32	-	209.4	-

T₁) Metro 70WG @ 250 gm/ha, T₂) Metro 70WG @ 500 gm/ha, T₃) Metro 70WG @ 750 gm/ha, T₄) weed free, T₅) Two hand weeding at 20 DAS and 35 DAS, T₆) Control (Untreated)

The maximum grain yield was found (9.44 t/ha) in T₃ treatment (Metro 70WG @ 750 gm ha⁻¹ at sowing followed by irrigation) closely followed by treatment T₅ while lowest yield 8.19 t/ha was recorded in T₆ treatment (control). The maximum gross return was obtained from treatment T₄ which was at par with treatment T₅. Similar trend was followed in case of gross margin but higher cost was involved in this treatment. As a result, BCR was higher in T₄ which was closely followed by T₅ (Table 2).

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Table 2. Grain yield, Cost and Benefit analysis of maize as influenced by different weed control management practice (across the location)

Treatments	Grain yield (t/ha)	Gross return	Total cost	Gross margin	BCR
		(Tk. ha ⁻¹)	(Tk. ha ⁻¹)	(Tk. ha ⁻¹)	
		1	2	3	4=1/2
T ₁	8.61	107,000	92,300	14,700	1.16
T ₂	8.82	111,000	92,500	18,500	1.20
T ₃	9.44	114,400	92,700	21,700	1.23
T ₄	8.61	116,600	92,900	23,700	1.26
T ₅	9.37	118,300	95,000	23,300	1.24
T ₆	8.19	95,000	89,900	5,100	1.06
LSD (0.05)	0.48				
CV(%)	3.04				

T₁) Metro 70WG @ 250 gm/ha, T₂) Metro 70WG @ 500 gm/ha, T₃) Metro 70WG @ 750 gm/ha, T₄) weed free, T₅) Two hand weeding at 20 DAS and 35 DAS, T₆) Control (Untreated)

Among the weed species, *Echinochola crusgalli* (Shama) was found dominant in maize field. Hand weeding is the best option for controlling of weeds in maize field. But in labor scarce situation, herbicide Metro 70WG @ 750 gm ha⁻¹ (at sowing followed by irrigation) can be suggested for reasonable yield of maize with reduced weed infestation.

References

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