SHORT COMMUNICATION

PHYTOTOXIC EFFECT OF POST EMERGENCE HERBICIDE ON FINGER MILLET

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Abstract: Finger millet (*Eleusine coracana* L.) is an important small millet crop of tribal dominated areas and grown as rain-fed crops. Manual weed management, which is the most prevalent method for weed management in finger millet, requires a lot of labour. Now a day, due to the scarcity of labours, chemical weed management is considered as better option than the hand weeding. However, there is little work on role of post emergence herbicides in finger millet. It is evident that some of the herbicides cause phytotoxicity to the crops and make it until for use (Uludag *et al.* 1997). Thus, it is very important to know behavior and extent of phytotoxicity of different herbicides. Keeping these points in view the present investigation was carried out to evaluate the post-emergence herbicides for phytotoxicity in direct sown finger millet.

Keywords: Phytotoxicity, Fenoxaprop-p-ethyl, Metsulfuron methyl, Chlorimuron ethyl, Ethoxysulfuron, Cyhalofop-butyl

INTRODUCTION

The present investigation was carried out at Research cum Instructional Farm of College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.) India, during the *kharif* season 2012. The soil of experimental field was Clayey *(Vertisols)*. The finger millet cultivar "GPU-28" was sown and harvested on 11th July, 2012 and 20th November, 2012 respectively, at 25 cm row to row distance and gaps were maintained by thinning to obtain proper plant population. Sowing was performed manually and crop was fertilized with 60:40:40 N: P_2O_5:K_2O kg/ha. Application of herbicide was done at 20 DAS. The experiment was laid out in randomized block design (RBD) with three replications. There were thirteen treatments of post-emergence herbicides along with two hand weeding and untreated control. The treatments were T_1- Fenoxaprop-p-ethyl (37.5 g/ha), T_2- Fenoxaprop-p-ethyl (45.0 g/ha), T_3- Metsulfuron methyl + Chlorimuron ethyl, T_4- Ethoxysulfuron, T_5 – Cyhalofop-butyl, T_6- Fenoxaprop-p-ethyl (37.5 g/ha) + metsulfuron methyl + chlorimuron ethyl, T_7- Fenoxaprop-p-ethyl (45.0 g/ha) + metsulfuron methyl + chlorimuron ethyl, T_8- Fenoxaprop-p-ethyl (37.5 g/ha) + ethoxysulfuron, T_9- Fenoxaprop-p-ethyl (45.0 g/ha) + ethoxysulfuron, T_{10}- Cyhalofop-butyl + metsulfuron methyl + chlorimuron ethyl, T_{11}- Cyhalofop-butyl + ethoxysulfuron, T_{12}- Hand weeding twice and T_{13}- Weedy check. The crop was observed for phytotoxic effect of different herbicides at 7, 14 and 21 days after herbicide application. The number of live plants was counted from marked place in one m^2 net plot area. The
mortality of finger millet was calculated as per following formula:

$$\text{Mortality} \quad \% \quad = \frac{PP_i - PP_a}{PP_i} \times 100$$

PP_i = Plant population before herbicide application
PP_a = Plant population after herbicide application

Phytotoxicity observations were subjected to arc sine transformation before statistical analysis (Gomez and Gomez, 1984).

There was no mortality with application of ethoxysulfuron and metsulfuron methyl + chlorimuron ethyl alone at all the stages of observation. Thus, these two herbicides were completely safe for the crop. Bhowmick *et al*. (2002) also revealed that ethoxysulfuron did not show any phytotoxic effect. Fenoxaprop-p-ethyl at both doses were highly phytotoxic to the crop when applied alone or in combination with metsulfuron methyl + chlorimuron ethyl or ethoxysulfuron and mortalility of crop ranged between 35.88% to 67.79% at 7 days after application. The mortality of the crop was observed up to 21 days after application. At 14 days after application, the extent of mortality ranged between 46.02% to 77.76%. whereas at 21 days after application. The mortality per cent was between 71.75% to 94.38%. Cyhalofop-butyl recorded lesser degree of phytotoxicity compared to fenoxaprop-p-ethyl. The mortality of finger millet ranged between 10.78% to 15.22% at 7 day after application with application of cyhalofop-butyl alone or in combination with metsulfuron methyl + chlorimuron ethyl or ethoxysulfuron. The mortality of plants were increased up to 21 days after application the mortality ranged between 18.97% to 20.15% at 14 days after application and 36.96% to 46.14% at 21 days after application.

METHODOLOGY

The experiment comprised single application of different post-emergence herbicides either alone or in combination and hand weeding was conducted on *Vertisols* at Research cum Instructional farm of College of Agriculture, Raipur during *kharif* season of 2012. Application of metsulfuron methyl + chlorimuron ethyl and ethoxysulfuron alone was found most suitable for weed control. Application of metsulfuron methyl + chlorimuron and ethoxysulfuron ethyl alone did not exhibit any

phytotoxicity however application of fenoxaprop-p-ethyl recorded highest degree of phytotoxicity. The mortality of crop with application of herbicides was recorded up to 21 days after application. The highest mortality of finger millet was recorded between 71.75% to 94.38% at 21 days after application of fenoxaprop-p-ethyl alone or in combination with metsulfuron methyl + chlorimuron ethyl or ethoxysulfuron. Cyhalofop-butyl exhibited lesser degree of phytotoxicity and the mortality was ranged between 36.96% to 49.14% at 21 days after application.

Table : Phytotoxicity in finger millet by application of different herbicide

Treatment	**Dose (g/ha)**	**Plant population /m^2 before spraying**	**Mortality of plant %**		
			07 DAA	**14 DAA**	**21 DAA**
T_1 : Fenox	37.5	78	40.45 (42.33)	47.18 (53.57)	63.49 (79.42)
T_2 : Fenox	45.0	80	45.95 (51.60)	53.27 (64.11)	67.54 (84.79)
T_3 : MSM+CME	2.0+2.0	79	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
T_4 : Ethox	15.0	78	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
T_5 : Cyhalo	62.5	81	22.95 (15.22)	26.75 (20.15)	44.44 (49.14)
T_6 : Fenox+MSM+ CME	37.5+2.0+2.0	81	36.65 (35.88)	47.75 (55.18)	66.12 (83.81)
T_7 : Fenox+MSM+ CME	45.0+2.0+2.0	82	38.89 (39.20)	42.61 (46.02)	58.56 (71.75)
T_8 : Fenox+Ethox	37.5+15.0	80	48.70 (56.83)	60.05 (74.06)	73.56 (91.15)
T_9 : Fenox+Ethox	45.0+15.0	82	55.30 (67.79)	62.11 (77.76)	76.82 (94.38)
T_{10} : Cyhalo+MSM+ CME	62.5+2.0+2.0	80	19.48 (11.15)	24.89 (18.97)	37.16 (36.96)
T_{11} : Cyhalo+Ethox	62.5+15.0	79	19.07 (10.78)	27.62 (21.58)	41.15 (42.86)
T_{12} : Weed free (HW at 20 and 40 DAS)		78	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
T_{13}: Weedy check		80	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
SEm ±		**10.71**	**1.98**	**2.62**	**2.58**
CD at 5 %		**NS**	**5.79**	**7.65**	**7.55**

The observations are arc sine transformed. Figures in parentheses indicate the original value. Fenox = Fenoxaprop-p-ethyl, MSM = Metsulfuron methyl, CME = Chlorimuron ethyl, Ethox = Ethoxysulfuron, Cyhalo = Cyhalofop–butyl, HW = Hand weeding

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