Indian Journal of Weed Science 40 (1&2) : 102-103, 2008 **Short comunication**

Studies on persistence of herbicides in soil under gram-mustard intercropping system

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Use of herbicides for weed control has increased with advent of modern crop management practices. Pendimethalin and metolachlor are rapidly becoming the potential pre-emergence herbicides for gram. Soil is the major sink for these herbicides. The persistence of herbicides under field conditions depends on meteorological factors, soil properties and crop management practices. Since the information on the persistence of pendimethalin and metolachlor applied in gram-mustard intercropping system under sandy clay loam soil is meager, hence, this study was undertaken to detect the persistence of these herbicides by using bioassay technique.

A field experiment was conducted during *rabi* season 2005-06 and 2006-07 at research farm, College of Agriculture, Gwalior (M.P.) to study the persistence of herbicides in soil under gram-mustard intercropping system. The soil was sandy clay loam (55.2% sand, 19.4% silt and 25.4% clay) with 0.54% organic carbon and 7.2 pH. Gram and mustard were sown in 4:1 row proportion. The treatments comprised of four herbicide treatments *viz.,* pendimethalin 1.5 and 0.75 kg/ha, metolachlor 1.0 and 0.5 kg/ha and untreated weed free control. The replicated soil samples were collected at 0, 15, 30, 45, 60 and 75 days after application of herbicide (DAA) and after harvest of crops. The samples were used to study the persistence of herbicides in soil. Herbicide residue in soil was studied through bioassay technique using maize as indicator plant. Observations on plant height, fresh weight and dry weight of maize plants were recorded 21 days after sowing.

Plant height, fresh weight and dry weight of maize were significantly affected up to 75 days (Table 1). All the herbicides significantly affected the growth of maize plant up to 30 DAA. At 45 days, plant height and dry weight were significantly reduced by both the levels of pendimethalin and metolachlor while at 60 and 75 DAA, only pendimethalin 1.5 kg/ha could reduce the growth. Fresh weight at 45 to 75 days was reduced significantly by pendimethalin at 1.5 kg/ha only. Sharma and Angiras (1998) reported that the residues of pendimethalin applied

Table 1. Effect of herbicides applied in gram-mustard intercropping on plant height, fresh weight and dry weight of maize (mean of two years)

Treatment	0 DAA	15 DAA	30 DAA	45 DAA	60 DAA	75 DAA*	After harvest
Herbicides(kg/ha)			**Plant height (cm)**				
Pendimethalin 1.5 kg/ha	19.85	18.26	14.59	15.75	15.96	22.79	23.05
Pendimethalin 0.75 kg/ha	21.90	19.57	16.54	19.86	18.27	26.73	23.37
Metolachlor 1.0 kg/ha	20.29	19.27	16.46	21.72	18.96	27.00	22.42
Metolachlor 0.5 kg/ha	23.67	22.48	18.55	23.14	18.99	27.07	22.09
Control	32.74	27.17	23.47	23.88	19.29	28.14	22.16
LSD (P=0.05)	1.94	1.34	1.35	1.43	1.38	2.44	NS
Herbicides(kg/ha)			**Fresh weight (g/plant)**				
Pendimethalin 1.5 kg/ha	0.570	0.561	0.451	0.800	0.575	0.984	0.894
Pendimethalin 0.75 kg/ha	0.690	0.643	0.583	0.873	0.679	1.120	0.833
Metolachlor 1.0 kg/ha	0.526	0.622	0.585	0.900	0.695	1.102	0.877
Metolachlor 0.5 kg/ha	0.645	0.797	0.691	0.940	0.694	1.048	0.870
Control	0.952	0.970	0.795	0.971	0.716	1.092	0.874
LSD (P=0.05)	0.071	0.077	0.058	0.108	0.047	0.078	NS
Herbicides(kg/ha)			**Dry weight (g/plant)**				
Pendimethalin 1.5 kg/ha	78	68	53	74	65	80	86
Pendimethalin 0.75 kg/ha	82	71	65	79	79	95	84
Metolachlor 1.0 kg/ha	81	73	64	87	81	93	84
Metolachlor 0.5 kg/ha	83	85	71	98	81	92	84
Control	122	114	85	105	72	95	85
LSD (P=0.05)	6	7	8	8	6	8	NS

*One year data

at 1.5 kg/ha (pre.) in wheat + mustard intercropping system was only 0.001 ppm in soil after harvest of these crops. Arora and Tomar (2008) reported that pendimethalin 1.5 to 2.5 kg/ha persisted in pot soil up to 75 days. Devi *et al.* (2000) revealed that metolachlor and pendimethalin did not persist for more than 40 and 60 days, respectively, in the soybean soil.

The results of the present investigation showed that pendimethalin 1.5 and 0.75 kg/ha persisted in soil up to 75 days, while metolachlor 1.0 and 0.50 kg/ha persisted up to 45 and 30 days, respectively under gram-mustard intercropping. No residues of herbicides were left in soil after the harvest of crops.

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