

## Comparative Efficacy of MON 8793, Paraquat and Glyphosate for Weed Control under Non-cropped Situations

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The control of obnoxious weeds needs special measures through non-selective translocative herbicides when the field is free from the crop and/or non-cropped situations. In this experiment, comparative efficacy of MON 8793, paraquat and glyphosate has been studied under non-cropped situations.

An experiment was conducted during **rabi**, summer and **kharif** season of 1998-99 consecutively at Gujarat Agricultural University, Junagadh. In **rabi** and summer season, a piece of fallow land of about 40 x 28 m<sup>2</sup> was cultivated and uniformly irrigated through flood irrigation for the germination of weeds. The plot was irrigated periodically until active growth stage of weeds. During **kharif** season, rainfall was sufficient for germination and growth of the weeds. When the plot was uniformly covered with different weeds, it was divided into six strips of 28 x 5 m<sup>2</sup> leaving a gap of 1 m between two strips. Each strip was divided into five plots of 5 x 5 m<sup>2</sup> gross plot size keeping 0.5 m space between two plots. Thus, there were total 30 plots. Total 10 treatments (MON 8793 at 0.6, 0.9, 1.2, 1.8, 2.4 and 3.2, paraquat at 0.3 and 0.6 and glyphosate at 1.23 kg ha<sup>-1</sup>) were assigned randomly in a randomized block design with three replications. Species-wise weed density was recorded from a fixed quadrat of 0.6 m x 0.6 m before spray. Then, on the next day, herbicides were applied as per the treatments. The spraying was done manually with a knapsack sprayer fitted with flood jet nozzle keeping a spray volume of 250 l ha<sup>-1</sup>. Species-wise weed density was recorded at 60 days after spray (DASP) and sun dry weight of weeds was recorded. After **kharif** season experiment, re-growth study on *Cyperus rotundus* was carried out at 75 DASP.

All the doses of MON 8793 (Table 1) significantly reduced the density of *Echinochloa*

*colona* and *Dactyloctenium aegyptium* in **rabi** season, *Eluopus villosus* and *D. aegyptium* in summer season and *Digera arvensis* and *Chorchorus olitorus* in **kharif** season over control. The density of *Commelina nudiflora* significantly reduced by MON 8793 at 1.8 to 3.2 kg ha<sup>-1</sup> in summer season and *Cyperus rotundus* at 0.9 to 3.2 kg ha<sup>-1</sup> in **kharif** season over control. Both the doses of paraquat significantly reduced the density of *D. aegyptium* in **rabi** season, *C. nudiflora* and *D. aegyptium* in summer season and *D. arvensis* and *C. olitorus* in **kharif** season over control. Density of *E. villosus* was significantly reduced over control with paraquat 0.6 kg ha<sup>-1</sup> in summer season. Paraquat was not found effective to control *E. colona* in **rabi** season and *C. rotundus* in **kharif** season. Glyphosate significantly reduced the density of *E. colona* and *D. aegyptium* in **rabi** season, *E. villosus* in summer season and *D. arvensis* and *C. olitorus* in **kharif** season. Glyphosate failed to control *C. nudiflora* in summer season.

All the treatments significantly reduced the total dry weight of weeds during **rabi**, summer and **kharif** seasons. However, MON 8793 at 0.9 to 3.2 kg ha<sup>-1</sup> in **rabi** season, at 1.2 to 3.2 kg ha<sup>-1</sup> in summer season and at 0.9, 2.4 and 3.2 kg ha<sup>-1</sup> in **kharif** season proved its superiority over rest of the treatments. When the results over three different seasons pooled, it indicated that all the treatments remained at par with each other and proved significantly superior over control to reduce dry weight of weeds.

The results on re-growth study of *C. rotundus* indicated that increasing the dose of MON 8793 from 0.6 to 1.2 kg ha<sup>-1</sup> attained reduction from 70 to 99% in *C. rotundus* population. This indicates 99% permanent control of *C. rotundus*. Exceeding the level of MON 8793 above 1.2 kg ha<sup>-1</sup> did not give

Table 1. Effect of different treatments on weed density, dry weight of weeds and re-growth of *Cyperus rotundus*

Treatment	Dose (kg ha <sup>-1</sup> )	Density (No. m <sup>-2</sup> )*						Total dry weight of weeds (g m <sup>-2</sup> )				% Reduction over density recorded before spray**		
		Rabi		Summer		Kharif		Rabi	Summer	Kharif	Pooled			
		<i>E. colona</i>	<i>D. aegyptium</i>	<i>E. villosus</i>	<i>C. nudiflora</i>	<i>D. rotundus</i>	<i>C. arvensis</i>	<i>C. rotundus</i>	<i>C. arvensis</i>	<i>C. olitorius</i>				
Control	-	5.45 (31.0)	2.63 (6)	4.63 (21)	3.97 (16)	3.08 (9)	10.04 (108)	7.71 (36.0)	3.02 (9)	311	1480	660	817	0.0 (0)
MON 8793	0.6	0.71 (0)	0.71 (0)	1.74 (5)	2.80 (9)	1.08 (1)	9.89 (103)	1.08 (0)	1.66 (3)	182	643	523	449	58.4 (70)
MON 8793	0.9	1.08 (0)	1.08 (1)	0.71 (0)	2.86 (8)	0.71 (0)	3.37 (25)	2.56 (8)	1.44 (2)	104	450	302	286	72.1 (78)
MON 8793	1.2	0.71 (0)	0.71 (0)	1.44 (2)	3.75 (16)	1.08 (1)	1.61 (3)	2.80 (14)	0.71 (0)	103	397	446	315	87.3 (99)
MON 8793	1.8	0.71 (0)	0.71 (0)	0.71 (0)	2.19 (6)	0.71 (0)	3.00 (14)	2.99 (19)	0.71 (0)	99	297	350	248	81.9 (96)
MON 8793	2.4	1.08 (0)	0.71 (0)	0.71 (0)	1.29 (2)	0.71 (0)	3.67 (14)	2.73 (11)	0.71 (0)	97	253	302	218	74.4 (92)
MON 8793	3.2	0.71 (0)	0.71 (0)	0.71 (0)	2.19 (6)	0.71 (0)	2.55 (8)	1.83 (6)	0.71 (0)	77	177	224	159	83.0 (98)
Paraquat	0.3	6.31 (39)	1.46 (3)	4.01 (16)	1.08 (1)	1.29 (2)	11.74 (153)	4.02 (17)	1.29 (2)	256	700	344	433	10.6 (5)
Paraquat	0.6	4.32 (19)	1.08 (1)	2.69 (7)	1.66 (3)	1.29 (2)	10.88 (145)	3.33 (14)	1.08 (1)	192	507	427	375	7.6 (5)
Glyphosate	1.23	1.08 (0)	1.08 (1)	1.29 (2)	3.20 (12)	0.71 (0)	6.50 (44)	1.98 (8)	1.08 (1)	145	627	531	435	65.0 (80)
LSD (P=0.05)	-	1.20	0.95	1.28	1.64	1.01	5.32	2.46	0.81	56	236	112	292	21.2

\*Square root transformed data, \*\*Angular transformed data. Original values are furnished in parentheses.

any additional advantage and therefore need not extravagant. Glyphosate at 1.23 kg ha<sup>-1</sup> attained about 80% control. While paraquat at either 0.3 or 0.6 kg ha<sup>-1</sup> recorded only about 5% control of this obnoxious weed and remained at par with control. Thus, overall results indicated that MON 8793 at

1.2 kg ha<sup>-1</sup> was found superior over rest of the treatments to control all the weeds including permanent control of perennial weed especially *C. rotundus*.