

Effect of Herbicides on *Chromolaena odorata* (L.)

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Chromolaena odorata L. (K & R), one of the competitive weeds of the family Asteraceae, got introduced into coastal part of Maharashtra state (Konkan), India from adjacent Goa and Karnataka states. Now this weed has been recognized to be one of the most noxious weeds. The problem has become more severe in southern Sindhudurga district where large area under naturally growing and privately owned forests is being cleared off recurrently for either fuel wood or for plantation of fruit crops like mango, cashewnut, etc. with which it aggressively competes for nutrients, moisture and light. This weed has thus posed danger to the well known biodiversity of Western Ghats in this region which has been recognized to be one of the hot spots of the world's endangered biodiversity regions.

The present investigation was planned to find out suitable herbicides to control *C. odorata* during initial stages of germination and establishment under agro-climatic conditions of Konkan region. Field trials were conducted from 1997 to 1999 at Cattle Breeding Farm, Nileli, Tal, Kudal, Dist. Sindhudurga. Experiment with 13 treatments and three replications was laid out in randomized block design (Table 1) at an open place full of thickets of *C. odorata* where it had full dominance over natural vegetation. In the hand weeding treatment, germinated seedlings were removed by cleaning with the help of spade. All pre-emergence herbicides were applied as sprays immediately after commencement of monsoon and the post-emergence herbicides in the form of sprays during monsoon were applied in the month of July or August as per treatments. However, post-emergence herbicide application after monsoon was done in the month of September, October or after cessation of monsoon. Treatment-wise observations on survived weed population were recorded two months after last spray of herbicides.

Population of *C. odorata* was highest where a single post-emergence spray of glyphosate at 2 kg ha⁻¹ was done during monsoon. This was followed by treatments, namely, cleaning the infested area with spade during monsoon after germination of the weed and a single post-emergence spray of paraquat at 2 kg ha⁻¹ during monsoon. Post-emergence spraying of glyphosate or paraquat at 2 kg ha⁻¹ only once destroyed native vegetation (grass-cover) which would have exposed seeds of *C. odorata* and therefore population density of this weed seems to have been increased in these treatments.

Similarly, cleaning the land area with spade after germination of weed during monsoon would have again exposed seeds of this weed underneath leaf litter thus paving the way for its germination. Similarly, Rai (1976) reported that *C. odorata* seed remained dormant in the absence of direct sunlight and germinated in 3-4 rounds on the same patch of land during one rainy season whenever there were periodic disturbances in soil cover.

Though application of any of the pre-emergence herbicides tried (atrazine or butachlor or diuron) depressed density of *C. odorata* as compared to untreated control, their combination with glyphosate at 1 kg ha⁻¹ during post-monsoon conspicuously increased weed control efficiency showing it to be 92.60, 100 and 98.74%, respectively. So was also the case with treatments in which two post-emergence sprays of paraquat and glyphosate were done one each during and after monsoon at 1 kg ha⁻¹. In both of the cases, post-emergence spray of glyphosate or paraquat killed *Chromolaena* plants germinated and established during monsoon season.

REFERENCE

- Rai, S. N. 1976. *Eupatorium* and weedicides. *Indian Forester*, July 1976. pp. 449-454.

Table 1. Effect of herbicides on population of *Chromolaena odorata*

Treatment	Dose (kg ha ⁻¹)	Application stage	Weed count m ⁻²			
			1997	1998	1999	Pooled mean
Weedy	-	-	12 (3.40)*	14 (3.67)**	16 (3.93)	14 (3.67)*
Hand weeding	-	-	3 (1.85)	21 (4.58)	18 (4.11)	14 (3.51)
Atrazine	2.0	Pre-em.	11 (3.33)	2 (0.93)	7 (2.64)	7 (2.30)
Butachlor	2.0	Pre-em.	16 (3.89)	4 (1.73)	11 (3.34)	10 (2.99)
Diuron	2.0	Pre-em.	5 (2.34)	5 (2.16)	9 (3.03)	6 (2.51)
Atrazine+	2.0+	Pre-em.+	3 (1.73)	0 (0.71)	1 (0.97)	1 (1.14)
Glyphosate	1.0	Post-em.	0	0	0	0
Butachlor+	2.0+	Pre-em.+	0 (0.71)	1 (0.71)	0 (0.71)	0.3 (0.71)
Glyphosate	1.0	Post-em.	0	1	0	0.3
Diuron+	2.0+	Pre-em.+	0 (0.71)	1 (0.97)	0 (0.71)	0.3 (0.80)
Glyphosate	1.0	Post-em.	11	10	20	14
Paraquat	2.0	Post-em. once	17 (3.21)	20 (3.10)	19 (4.47)	19 (3.59)
Glyphosate	2.0	Post-em. once	17 (4.12)	20 (4.22)	19 (4.29)	19 (4.21)
Paraquat	1.0	Post-em. twice	0 (0.71)	2 (1.29)	0 (0.71)	0.7 (0.90)
Glyphosate	1.0	post-em. twice	0 (0.71)	1 (1.15)	2 (1.40)	1 (1.09)
Saturated brine solution	156 kg in 450 l water	Post-em. twice	3 (1.85)	9 (2.99)	9 (2.84)	7 (2.56)
LSD (P=0.05)	-	-	1.05	1.44	0.83	1.12

Figures in parentheses indicate square root transformations.