

Effect of Herbicide goal (Oxyflurofen) on seed germination and early seedling growth of *Hibiscus cannabinus* Linn.

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ABSTRACT

The seeds were treated with various concentration of herbicide for 24 hours and then the seeds were washed thoroughly with distilled water and germinated in petridishes under laboratory conditions. Effect of herbicide on germination and early seedling growth was observed till the process of germination ceased.

Key words : Herbicide, Goal (oxyflourfen), seed germination, seedling growth, *Hibiscus cannabinus* Linn.

INTRODUCTION

Goal (oxyflurofen) was found to be efficient in inhibiting seed germination of weed *Hibiscus cannabinus* Linn. The lethal dose for goal was 8000ppm. The germination percentage of treated seeds at sub-lethal doses was 12.0 at 6000 ppm of herbicide as against 98.0 percent in control.

A gradual inhibition of hypocotyls and radicle elongation was observed by application of this herbicide. Besides this, they exhibited malformed seedlings with swollen hypocotyls and radicles were observed due to goal treatment.

MATERIAL AND METHODS

Seed of *Hibiscus cannabinus* Linn. were collected randomly from the naturally growing plants in Nagpur and its environs. The seeds were kept in sunlight for 48 hours and husk of dried seeds were removed by rubbing with hands. Seeds were soaked in distilled water for 24 hours. They were washed thoroughly and kept for germination in petridishes with moistened double-layered filter paper to see the germination process. One thousand ppm

of herbicide solution was used as stock solution to prepare lower concentration. The concentrations of herbicide ranging from 100 to 1000 ppm were used. Lower concentrations than 100 ppm were used where it was found to be lethal dose. Higher concentrations were tried where found to be not the lethal dose. The pH values of each concentration of herbicide were determined using Blackman's pH meter.

To study the effects of goal (oxyflurofen) on germination. One hundred seeds were immersed in 50ml of aqueous solution of each concentration of herbicide for 24 hours.

After treatment, seeds were washed thoroughly with distilled water and allowed to germinate for experiment under laboratory condition in four-inch diameter petridishes containing double layered moistened filter papers. Similarly, 100 seeds soaked in distilled water for 24 hours were used as control. The experiment was repeated for three times for each treatment.

Observations were recorded daily, till the process of germination came to case in each

concentration of herbicide. The emergence of radicle was taken as a criterion for germination. An average length of hypocotyls and radicle was taken separately using seven day old seedlings. The actual percentage of germination and length of hypocotyls and radicle has been graphically presented on the basis of mean value of three replicates.

RESULTS AND DISCUSSION

The germination percentage gradually decreased with an increase in the concentration of herbicide. The germination percentage at 1000, 2000, 4000, 6000 and 8000 ppm was 80.0, 51.0, 33.0, 12.0 and 0.0 respectively (Table 1, Fig. 3). At 8000 ppm no seed germination was observed. Therefore, 8000ppm was determined as lethal dose. The pH at control and 8000 ppm was 7.0 and 4.3, respectively. The gradual inhibition of seedlings growth was also observed.

The growth in length of hypocotyls at 1000, 2000, 4000, 6000 and 8000 ppm was 22.0, 16.33, 11.0, 5.7 and 0.0mm, respectively. Similarly, radicle length at the same concentrations i.e. 1000, 2000, 4000, 6000 and 8000 ppm was 6.7, 6.0, 3.7, 1.33 and 0.0 mm, respectively (Table 1, Fig. 4).

Morphological changes were observed in the seedlings such as swelling of radicle, chlorosis on hypocotyls and cotyledon and inhibition of lateral roots at higher concentrations. There was change in colour from green to pale yellow at each concentration of herbicide (Fig.1 & Fig 2).

This herbicide was found to be efficient in checking the germination of seeds. A search of available literature indicate than no specific data is available on the effect of goal (oxyflurofen) pertaining to be germination of seeds. Therefore, effect of the other chemical of the same group is worth considerable. The percentage of seeds germination decreased gradually form 98.0 to 12.0 percent form control to 6000 ppm of goal. Ballarad and Lipp (1967) have been reported stimulatory action of goal germination of *Trifolium suberranicum*. In present study inhibitory action of goal was noticeable to all concentration Deshmukh (1981) reported that the percentage of seeds germination was inhibited at very low concentration in *Malvastrum coromendelianum*. *Tridax procumbens* and *Phasaolus trilobus* by Tok E-25. Shahid et al. (1992) observed that there was 56% reduction in seed germination in *Intrusa* and *Paspalum cojugatum* after 14 days treatment of goal. However, this effect was more at higher concentration. Gopal K.R. (1993) on *Medicago sativa* observed the seed germination percentage decreased gradually from 500 to 2000 ppm and them there was steep decline in the percentage of seed germination at higher concentration of goal. Kumar et al. (1995) reported inhibition of seed germination in maize by oxyflorfen at 50 ppm after 6-12 hours treatment. In the present study the goal affected the linear growth of hypocotyls and radicle and it decreased gradually with an increasing in concentration of herbicide ranging from 1000 to 6000 ppm. Kulkarni (1998) also reported gradually reduction in the percentage of seed germination in *Crotalaria medicagenia* var. *luxurians*.

Table - 1: Showing percentage of seed germination and length of hypocotyl and radical (in mm) of seven days old seedlings at various concentration of goal (Oxyfluorfen)

Herbicide	Conc. in (ppm)	Germination percentage	Standard error (\pm)	Hypocotyl length (mm)	Standard error(\pm)	Radicle length (mm)	Standard error (\pm)
	Control	98.0	0.81	40.33	0.70	15.7	0.65
Goal	1000	80.0	0.81	22.0	0.81	6.7	0.55
(Oxyflourfen)	2000	51.0	1.14	16.33	1.29	6.0	0.81
	4000	33.0	1.41	11.0	0.81	3.7	0.52
	6000	12.0	1.41	5.7	0.08	1.33	0.48
	8000	00	-	00	-	00	-

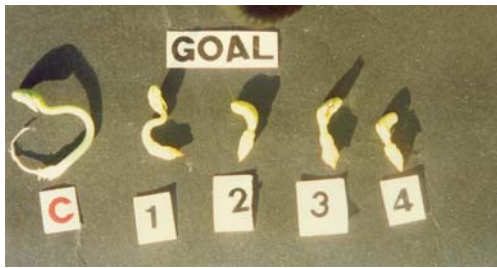


Fig. -1: C- Control seedling. 1 to 4- Seedlings at 1000, 2000, 4000 and 6000 ppm, respectively raised from seed treated with goal (oxyfluorfen)



Fig. -2: C- Control seedling. 4- Checking of cotyledon at 6000 ppm treated with goal (oxyfluorfen)

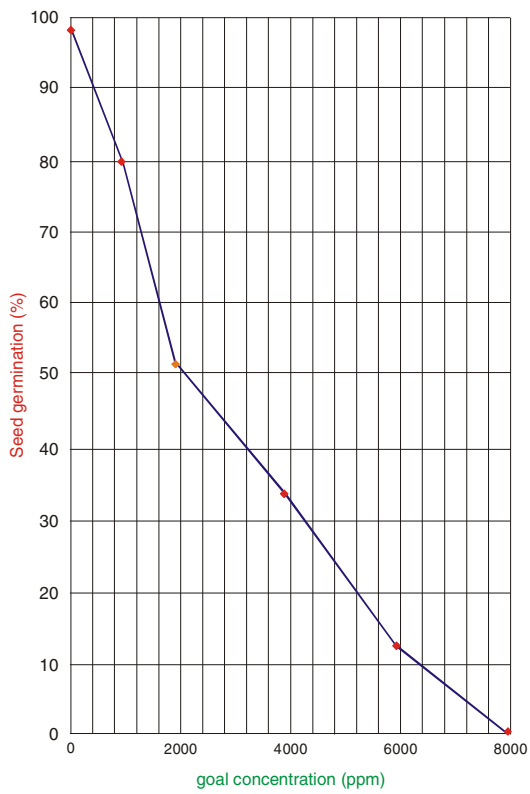


Fig. -3: Graph showing decrease in the percentage of seed germination at different concentrations of goal (Oxyfluorfen)

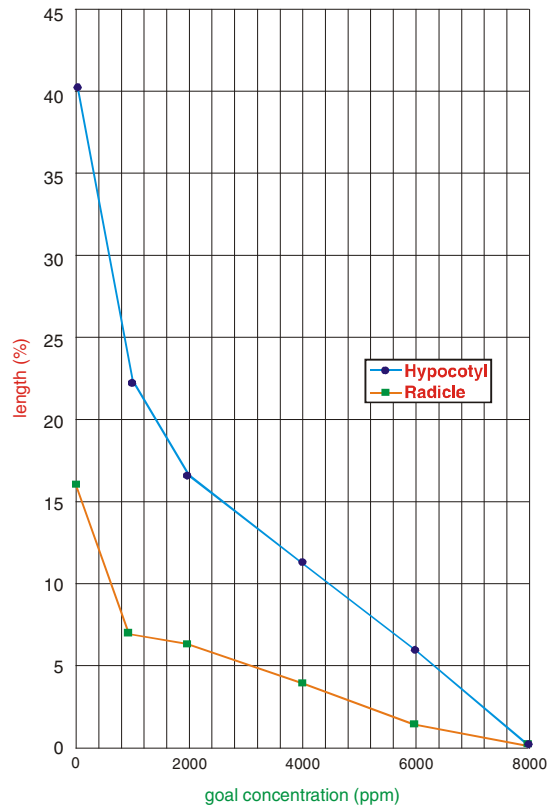


Fig. -4: Graph showing effect of goal at different concentrations on growth of hypocotyl and radicle

Cotyledons became yellow in colours as concentration of herbicide increase. This change of colour might be due to the depletion of chlorophyll pigments or break down of pigments molecules in cotyledon. Similar results are reported by Gopal K. R. (1993) on *Medicago sativa* and Kulkarni (1998) on *Crotalaria medicagenia* var. *luxurians*.

The range of pH from control to 8000ppm was 7.0 to 4.3, respectively. i.e. pH value decreasing gradually towards acidic medium. At the pH 4.3 the

seed germination growth was stunted. Similar findings were reported by Audus (1949) in *Lipidium sativum*, Gopal K.R. (1993) *Medicago sativa* and recently by Kulkarni (1993) on *Crotalaria medicagenia* var. *luxurians*.

From the present study, it was concluded that the goal (oxyflourfen) was acts as a inhibition agent on the germination percentage and seedling growth.

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