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# Effect of goal (Oxyfluorfen) on linear growth of seedlings and their anatomical characters of *Hibiscus cannabinus* Linn.

**SANJAY I. KAMBLE**

Department of Botany and Coordinator, Department of Seed Technology,
Phulsing Naik Mahavidyalaya, Pusad Dist. Yavatmal (India)

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**ABSTRACT**

In the present investigation effect of oxyfluorfen on linear growth of seedlings has been studied. The seedlings have been reported to be most sensitive to the herbicidal action. Uniform seedlings were treated with different concentration of herbicide for 24 hours. Then they were thoroughly washed with distilled water and kept for germination in petridishes containing double layered of moistened filter paper at room temperature for 72 hours. The effect of oxyfluorfen on linear growth of hypocotyl and radicle was noted. This herbicide was effective in checking the linear growth of seedlings. It inhibited the linear growth of seedlings and caused swellings. The radicle was found to be more susceptible than hypocotyl to this herbicide. The lethal dose was found to be 300 ppm for hypocotyl and 250 ppm for radicle. The anatomical changes like ruptured epidermis, disorganization of cortical cells in hypocotyl and radicle and disintegration of mesophyll cells were observed in cotyledon.

**Key words:** Herbicide, Oxyfluorfen, Linear growth, anatomical characters, *Hibiscus cannabinus Lin*n.

## MATERIAL AND METHODS

A large number of seeds of *Hibiscus cannabinus* Linn. were allowed to germinate in petridishes containing double layers of moistened filter papers at room temperature. When the seedlings attained the length of 7 to 10 mm, the seedlings of uniform length were selected for herbicidal treatment.

Each set of 10 seedlings was treated with different concentrations of herbicide ranging form 100 to 2000 ppm for 24 hours. Lower concentrations were used, where it was found to be a higher dose. After treatment the seedling were thoroughly washed with distilled water and allowed to grow for 72 hours in petridishes containing moistened filter papers. After 72 hours, the length of hypocotyls and radicles were measured separately in each seedling. The seedlings soaked in distilled water for 24 hours were used as control. Three replicates of each treatment were carried out.

To study the anatomical abnormalities induced by the herbicide, the seedlings of control and treated ones were fixed in F.A.A. (Formline-Acetic-acid-Alcohol) (5:5:90) solution. After 24 hours they were washed thoroughly with distilled water and preserved in 70% alcohol. For anatomical studies, the materials were embedded in paraffin wax following customary method (Sass, 1958). Sections were cut at 6 to 9 microns and stained with crystal violet and erythrosine and mounted in D.P.X.

The series of various sections of different concentrations of herbicide were observed and recorded the anatomical abnormalities and then microphotographs were taken.

## RESULTS

### Control

In control, hypocotyl of *Hibiscus cannabinus Lin*n. showed single layered epidermis, 5 to 6 cells thick parenchymatous cortex, which was limited on the inside by single layer of endodermis and pericycle with centrally situated diarch xylem. In centre there was 4-celled thick parenchymatous pith (Fig. 1).

The radicle showed 4 to 5 layers of parenchymatous cortex surrounded by uniseriate epiblema and immediately followed by endodermis and pericycle with centrally xylem (Fig. 2).

The cotyledons comprises of mesophyll cells with three-layered palisade and about 4 to 5 layered spongy cells with intercellular spaces. Vascular elements were bounded by upper and lower epidermis and separated from each other by parenchymatous cells (Fig. 3).

### Oxyfluorfen

Goal induced certain anatomical changes in the seedlings. In hypocotyl at 100-ppm epidermal cells lost their identity. The cortex was disorganized and desiccated due to the enlargement of cortical cells. The vascular elements were shifted. The cells of endodermis become indistinct at 100 and 150 ppm (Fig. 4). At 200 and 250 ppm, cortical cells crushed, vascular bundles lost their identity and severely destruction of pith cells was observed (Fig. 5).

The radicle was severely injured at and 150 ppm. The cells of epiblema and cortex first became flaccid and later on the liner cortical cells disorganized (Fig. 6). The epidermal cells crushed due to pressure exerted by cortex (Fig.7).

In the cotyledon at 100 ppm, the large number of palisade and spongy cells increased in number and then enlarged. At higher concentrations i.e. 200 and 250 ppm, the epidermal tissues were ruptured on upper side only (Fig. 8).

## DISCUSSION

Goal was found to be effective herbicide. It induced some anatomical changes in the seedlings of *Hibiscus Cannabinus* Linn. The enlargements of parenchymatous cells were found in the cortex of hypocotyl. The pericycle showed dividing activity and thus formed meristematic cells around vascular elements at all concentrations. The proliferation of endodermal cells in the cortex and epidermis developed bulgy mass in the hypocotyl. Gopal (1993) on *Medicago sativa* reported dividing activity of pericycle and proliferation of endodermis.

The radicle was severely injured at higher concentrations on herbicide. The cortical cells become flaccid and then they were disorganized. Pith cells also crushed and lost their identity. Gopal (1993) on *Medicago sativa* reported disorganization of cortical cells and destruction of pith.

In cotyledon, the cells of mesophyll became disorganized to develop lacunae. Dehydration and disruption of membrane in cell was observed. Ashton and Crafts (1973) found that tissue desiccation and wilting in plant was started after herbicidal treatment.

Gorske and Hopen (1978) on Cabbage reported oxyfluorfen was more injurious in regards to disorganization and disintegration of cortex forming lacunae. Deshmukh (1981) on *Malvastrum coromendelianum*, *Tridax procumbens* and *Phoseolus trilobus* reported the destructive malformation and rapid dehydration of tissues causing eventual death of plant by Tok E-25 treatment.

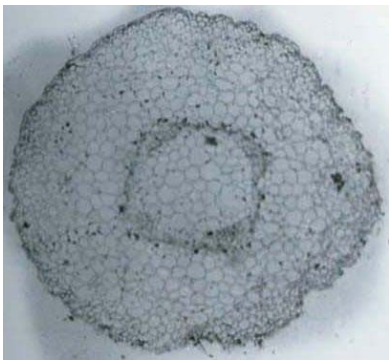

**Fig. 1: Control hypocotyl, T. S. X = 20.16**

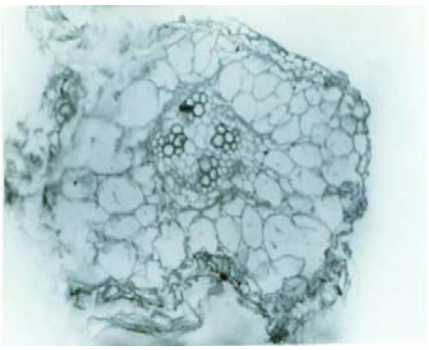

**Fig. 2: Control radicle, T. S. X = 31.5**

**Fig. 5: Hypocotyl, T. S. at 200 ppm of oxyfluorfen. X = 51.2**

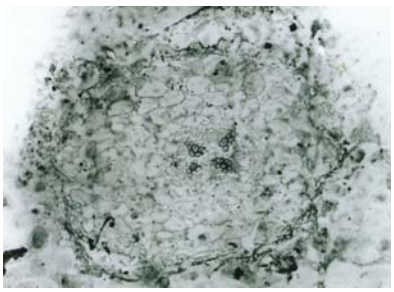

**Fig. 6: Radicle, T. S. at 100 ppm of oxyfluorfen. X = 39.69**

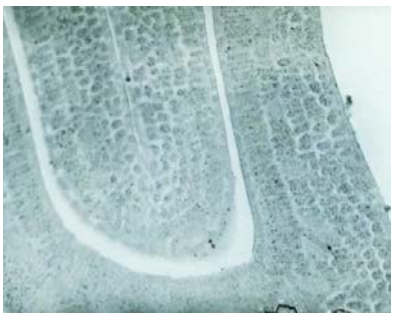

**Fig. 3: Control cotyledon, T. S. X = 20.16**

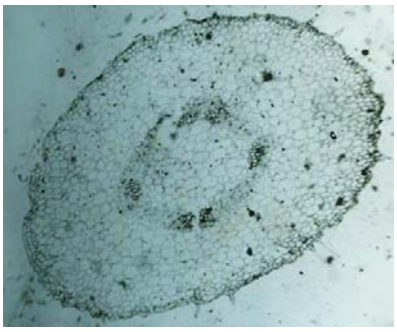

**Fig. 4: Hypocotyl, T. S. at 100 ppm of oxyfluorfen. X = 51.2**

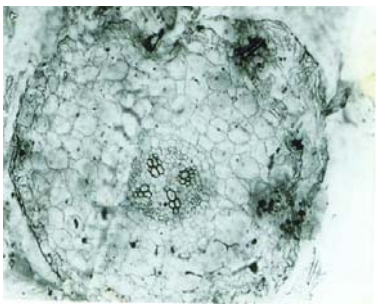

**Fig. 7: Radicle, T. S. at 200 ppm of oxyfluorfen. X = 51.2**

**Fig. 8: Cotyledon, T. S. at 150 ppm of oxyfluorfen. X = 20.16**

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