Mitotoxic effect of 2, 4-D and endosulfan in root meristems of
*Hordeum vulgare*

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**RESULTS AND DISCUSSION**

The cytological observations revealed that increased concentration of both 2, 4-D and Endosulfan leads to a decrease in AMI% and increase in Abnormality % of *Hordeum vulgare*. The comparative cyto-toxic effects of 2, 4-D and Endosulfan on root tip cells of *Hordeum vulgare* have been presented in table-1. The extent of chromosomal abnormalities is directly related to the concentration of the herbicide and pesticide. In control sets, mitosis was found to be normal with regular arrangement of chromosomes at metaphase plate (Fig. 1A) and regular separation (14:14) at anaphase as shown in (Fig. 1B). The highest value of AMI was 12.24% recorded for the control sets. There is a sharp decline in the value of AMI along with increasing concentration of both 2, 4-D and Endosulfan suggesting that both have a dose dependent impact on mitotic index. The mitotic index values of root tips treated with 2, 4-D for different concentrations viz. 0.25%, 0.50%, 0.75%, 1.0% were 11.42%, 9.34%, 8.49%, 7.70%. While the mitotic index values of root tips treated with Endosulfan for different concentrations viz. 0.25%, 0.50%, 0.75%, 1.0% were 10.6%, 8.94%, 8.0%, 5.94% respectively. Both induced various types of chromosomal abnormalities such as precocious movement, scattering, stickiness, laggard, unorientation, bridges etc. (Fig: - A- I). A graphical representation of the comparative active mitotic index percentage and abnormality percentage induced by 2, 4-D and Endosulfan have been presented in Fig-2 and 3. In case of Endosulfan, scattering and bridges were the dominant abnormality, observed at almost all the doses of treatment while stickiness was observed only at higher concentration. Mostly single and occasionally double bridges were observed at anaphase at all the concentrations of Endosulfan. Highest frequency of bridges was observed at 1.0% and was found to be 4.13%. In case of 2, 4-D Stickiness was induced at all concentrations while laggards were observed at only higher concentration. A dose based reduction in mitotic index observed along with increasing concentration of both 2, 4-D and Endosulfan revealed that both herbicide (2, 4-D) and pesticide (Endosulfan) are mitodepressive and chromotoxic at higher concentrations.