

Study of fluoride toxicity on the growth and yield of wheat (*Triticum aestivum* L.)

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The effect of fluoride toxicity has been studied on growth and yield characters *viz.* plant height, tillers number, leaves, leaf area, number of ears/ plant, dry wt./m², Test wt. of 1000 seeds and yield/m² of wheat (*Triticum aestivum* L.) of two varieties, WL75 and UP2003. The experiments were conducted at C.C.R. (P.G.) College Muzaffarnagar in the year 2002 and 2003. Simple Randomized Blocks Design was followed with five conc. of Sodium fluoride such as 10, 25, 50, 100 and 200 ppm along with control for four replications. The results were found significant. 100-200 ppm doses of sodium fluoride were found toxic for both the varieties of wheat.

Key words : Fluoride toxicity, Wheat, *Triticum aestivum*, Growth, Yield

INTRODUCTION

Wheat (*Triticum aestivum* L.) ranks second in area and production in India. The yield of wheat varies from 20-32 q/ha in India which is very low. In National demonstration yield trials an average on whole India basis varies from 35-54 q/ha. Thus, with the help of advanced cultural practices and improved methods, farmer can increase yield to the great extent. The production of wheat at Shahjahanpur was recorded 50 q/ha, which is approximately 2.5 times more than the average yield in Uttar Pradesh, Bihar, M.P., Punjab, Haryana and Rajasthan.

The rapid progress in industries has certain disadvantages arising from injury to plant and animal life in industrial area caused by release of noxious gases from industrial plants in to the air. Industrial pollution of air is becoming an important agricultural hazard. Many investigators have shown that certain air pollutants can cause injury to vegetation (Zimmerman and Hitchcock 1956; Darley *et al.*, 1958, Daines *et al.*, 1967). It causes damages including growth suppression, hidden injury effects, genetic differences, necrotic lesions and chlorosis of foliage (Gillette, 1969).

Odum (1971) has given the review of fundamental concepts related to energy. In the ecosystem the ratio of total community respiration to the total community biomass (R/B) can be considered as the maintenance to structure ratio or as a thermodynamic order function. Ethirington (1975) discussed "energy exchange and productivity".

Soam and Agrawal (1990) reported the reduction of nodulation in *Vicia faba* due to application of NaF. The decrease in nodules was associated with gradual increase

in NaF concentration. The simultaneous reduction in biomass and productivity was the direct result of continuous increase of NaF. The similar observations have been made by Sunita Kumari and Agrawal (1980) and Rthore and Agrawal (1989). Brennan and Rhoads (1976) observed the loss due to air pollution on growth of woody vegetation. Treshow and Harmer (1968) reported the growth response of pinto bean and alfalafa to fluoride concentration. Zimmerman (1952) has observed the similar response of HF and NaF in soil and on plants.

Yamazoe (1962) studied the response of HF on growth and yield of various crops. According to him 25 ppm HF is enough to cause significant reduction in paddy and barley while 50 ppm HF is enough for wheat production cut. Rice (1974) and Mc Cune *et al.* (1976) also supported the theory of reduction of yield of crop plants due to fluoride application. Reduction in growth and yield was reported by Malik (1997), Arya (1997) and Kumar (2000) in various crops.

MATERIALS AND METHODS

The experiment was conducted at the research farm of C.C.R. (P.G.) College Muzaffarnagar during the years 2002-03. Simple randomized block design was followed with four replications. The seeds of wheat varieties were obtained from IARI, New Delhi. The row to row distance was kept 30 cm and plant to plant 10 cm. After sowing wheat varieties WL 75 and UP 2003, all agronomic practices and spraying of pesticides were done properly at required time. Five concentrations of sodium fluoride *viz.* 10 ppm, 25 ppm, 50 ppm, 100 ppm and 200 ppm were

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