

Effect of fluoride toxicity on germination of seeds and seedling growth of hybrid rice (*Oryza sativa* L.)

VIBHA SINGH, R.K. SHARMA AND K.P.S. ARYA

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SUMMARY

The effect of fluoride toxicity was studied on germination of seeds and seedling growth *i.e.* height, number of leaves and leaf area of hybrid rice (*Oryza sativa* L.) of two varieties- Pragathi 1111 and Diamond 22. The experiments were conducted at S.S.V. (P.G.) College, Hapur (Ghaziabad) U.P. in the year 2008. Simple Randomized Block Design was followed with five conc. of sodium fluoride such as 10, 25, 50, 100 and 200 ppm along with control and four replications. The results were found significant. 100-200 ppm doses of sodium fluoride were found toxic for both the varieties of hybrid rice.

Key words : Fluoride toxicity, Sodium fluoride (NaF), *Oryza sativa* L. Pragathi 1111, Diamond 22.

Rice (*Oryza sativa* L.) ranks first in area and production in India. The yield of rice varies from 14.68 to 20.00 q/ha in India, which is low. A number of factors are responsible for the low productivity of rice. Poor nutrition supply is one of the major factors responsible for low yield of rice in India. Thus, with the help of advanced hybrid rice cultivars and improved methods, farmer can increase the yield to the great extent. Since seed is the carrier of production technology adequate quantity of good quality seed should be made available to the farmers for realizing the impact of hybrid seed technology on agricultural production. The impact of seed quality includes rural aspects like germination, vigour, seed health etc. with ultimate purpose of obtaining optimum plant stand for good economic yield.

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.*, 1959). 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.

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 S.S.V. (P.G.) College, Hapur (Ghaziabd) during the year 2008. After sowing hybrid rice crop seeds in nursery of varieties Pragathi 1111 and Diamond 22, all agronomic practices such as weeding, irrigation, spraying of pesticides were done properly at required time. The seeds of hybrid rice varieties were obtained from Chandigarh (Punjab). After 40 days of sowing the seedlings were treated with different concentrations of NaF. The spraying was done at 10 days interval. The solutions were sprayed on the plants with the help of Knap sac sprayer.

Simple Randomised Block Design was followed with four replications. Six treatments of sodium fluoride along with control were taken. The doses were recorded as 10, 25, 50, 100 and 200 ppm. The main characters were studied as seed germination, height of seedlings/plant (cm), number of leaves per plant and leaf area per plant.

The observations were recorded from 5 plants and then averaged for each treatment. The height was recorded with the help of meter scale and leaf area was measured with the help of planimeter. Statistical analysis

Correspondence to:

VIBHA SINGH, Department of Botany, S.S.V. (P.G.) College, Hapur, GHAZIABAD (U.P.) INDIA

Authors' affiliations:

R.K. SHARMA, Department of Botany, S.S.V. (P.G.) College, Hapur, GHAZIABAD (U.P.) INDIA

K.P.S. ARYA, Department of Agricultural Botany, R.M.P. (P.G.) College, Narsan, HARDWAR (UTTRAKHAND) INDIA