

## Effect of sulphur dioxide on the growth, yield and chlorophyll content of hybrid rice (*Oryza sativa* L.)

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### SUMMARY

The effect of sulphur dioxide was studied on height, productive tillers, number of leaves, leaf area, fresh weight per plant, dry weight per plant, yield of seed per plant and chlorophyll content of hybrid rice (*Oryza sativa* L.). Two varieties – Pragathi-1111 and Diamond-22 were selected for the study. The present experiment was conducted at S.S.V. (P.G.) College, Hapur (Ghaziabad), U.P. in the year 2008. Simple Randomized Block Design was followed with five concentrations of sulphur dioxide such as 1mg/m<sup>3</sup>, 2mg/m<sup>3</sup>, 4mg/m<sup>3</sup>, 6mg/m<sup>3</sup> and 8mg/m<sup>3</sup> along with control and four replications. The results were found significant. Fumigation with 6mg/m<sup>3</sup> and 8mg/m<sup>3</sup> doses of SO<sub>2</sub> were found toxic for both the varieties of hybrid rice. The chlorophyll content in green leaves of hybrid rice was studied on 60<sup>th</sup> day of transplanting of seedlings.

**Key words :** Sulphur dioxide (SO<sub>2</sub>), *Oryza sativa*, Pragathi-1111, Diamond-22, Chlorophyll and Chlorosis

Rice (*Oryza sativa* L.) (2n = 24) is an Asian cultivated species. Rice is one of the most important cereal food crop of the world with occupying first place in world agriculture. Especially grown in tropics, it is the staple food for more than 60 per cent world population. In Asia, 90 per cent of world rice is produced and consumed, where it contributes 45 to 60 per cent of dietary energy.

In respect of area India ranks first followed by China. In annual production India ranks second after China. China contributes (185.6 m. tonnes followed by India 136.8 m. tonnes) in 2006. In U.P. total area in lakh hectares was 62.35 and total production in lakh m tonnes was 125.40 in 2005-2006 (Kushwah and Nigar, 2006).

By recognizing the potential of hybrid rice as a proven means to enhance production and productivity, Indian Council of Agriculture Research (I.C.A.R.), has initiated the national programme on hybrid rice breeding in 1989 in collaboration with IRRI, Philippines.

G.B. Pant University of Agriculture and Technology has developed and released rice hybrid (Pant Shankar Dhan-1) in 1997. It was a first public sector hybrid of entire Northern India.

Man's industrial activities, space programmes and aviation are altering the chemical composition of the atmosphere, upper atmosphere and inner atmosphere. The latest danger to threaten the mankind is the rising radioactivity which may go beyond the safe level. Nuclear tests

carried out by the advanced countries may be responsible for this. Unrelenting pollution of the earth resulting from rapidly growing population and industry, is one of the most serious problems confronting mankind. We must now deal with a wide array of toxic substances, including gases, particulates and radioactive materials, which affect our food supply, health and economy. In particular the yields of practically all crop plants and structure of natural ecosystems are adversely affected by atmospheric pollutants. Woodwell (1970) showed that accumulation of toxic substances in the biosphere is causing serious changes in the structure and function of natural ecosystem.

Among the various air pollutants, the oxides of sulphur (SO<sub>x</sub>) are probably the most widespread and intensively studied. They include sulphur monoxide (SO), sulphur dioxide (SO<sub>2</sub>), sulphur trioxide (SO<sub>3</sub>), sulphur tetraoxide (SO<sub>4</sub>), sulphur sesquioxide (S<sub>2</sub>O<sub>3</sub>) and sulphur heptoxide (S<sub>2</sub>O<sub>7</sub>) which is produced mainly from burning of inorganic sulphides and sulphur bearing organic compounds in coal and oil. Of these, sulphur dioxide (SO<sub>2</sub>) is one of the principal contaminants of air.

In the atmosphere, sulphurous acid is easily converted to sulphuric acid which is the major acidic component of "acid rain". SO<sub>2</sub> is acidic in nature and acts as an oxidizing agent, reducing agent and wet bleaching agent with temporary effect. Sulphur dioxide is emitted mainly from stationary sources that burn fossil fuels (coal, oil) such as power plants and refineries, or in the production of materials from sulphur bearing ores, such as copper smelting, sulphuric acid plants, fertilizer and paper industries. Wood, natural gas, propane, and other common fuels used for home heating do not contain significant quantities of sulphur and, therefore, are not

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