

Use of ozone-tolerant cultivars can enhance India's food security

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India's bread basket, the Indo-Gangetic Plains (IGP), have been classified as a "hot spot" for air pollution. A recent study from the University of Eastern highlights the current status of ozone research in the IGP region, which is agriculturally important and densely populated.

To study adverse effects of [ozone](#), field experiments were conducted with local crop cultivars of mustard (*Brassica campestris* L.) and [rice](#) (*Oryza sativa* L.), and various growth, physiological (gas-exchange), biochemical and yield parameters were studied throughout the growing season. Ethylenediurea (EDU) was used as a chemical protectant against ozone induced damages.

The results of the study show the importance of ozone research in the IGP region of India, because both the mustard and the rice cultivars showed sensitivity to prevailing [ozone concentrations](#) suffering yield losses. Only seven out of the 18 rice cultivars tested showed a good adaptability to high-ozone environments in terms of grain yield, suggesting that the selection of ozone-tolerant cultivars is a useful strategy for food security in India.

EDU-mediated protection in plants against ozone stress was mainly due to the up-regulation of the antioxidative defense system, and its extent and timing varied with the developmental phase of the plant species and/or cultivars. The most responsive parameters in EDU treatments were lipid peroxidation, superoxide dismutase and catalase activities at the vegetative phase, and ascorbate and glutathione content at the

flowering phase, under high ambient ozone conditions. These parameters can be used as the most useful indicator [parameters](#) for practical ozone-tolerance screening in mustard and rice cultivars.

The findings were originally published in *Environmental Pollution*, *Agriculture, Ecosystems and Environment*, and *Science of the Total Environment*.

Provided by University of Eastern Finland

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