

## **Opportunities and Challenges for Assessing Environmental Risks of GM Crops — A Rice Case in China**

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**Abstract:** The challenge of global food security and the fast progress in transgenic biotechnology have significantly promoted the development of genetically modified (GM) crops worldwide. As a consequence a large number of GM crops have been produced and some of the GM crops have entered commercial production. The global cultivation of GM crops has brought a great benefit mainly to the developers and farmers. The successful examples can be found in the application of pest-resistant cotton, and herbicide-tolerant soybean and canola. The so-called “gene revolution” characterized by more an advanced genetic engineering technology with new generations of GM products will certainly change the current farming practices and living standard of the world. As an important cereal crop, rice provides staple food for nearly one half of the world’s population. It is the primary crop in Asia where 95% of its population lives on rice. Transgenic biotechnology has been very successfully applied in rice genetic improvement. So far, a number of GM rice varieties have been developed and are now in the pipelines waiting for commercialization in China, and this situation might be true in the other parts of the world. However, the extensive environmental release and commercial production of GM crops have aroused enormous biosafety concerns worldwide that have significantly affected the further development and wider application of GM technology. In the context of genetic engineering and GM products, biosafety usually includes food and feed biosafety, environmental biosafety, socioeconomic safety, and other concerns. Among these, is one of the more complicated and difficult issues to deal with and characterize. Environmental biosafety will have a long-term and profound impact on agricultural ecosystems and beyond. Therefore, it is urgent to have an effective assessment on environmental risks caused by the extensive cultivation of GM rice before its extensive environmental release. To meet this goal, identifying possible environmental hazard or adverse effects from GM rice is the primary step for the effective biosafety assessment, although it is challenging. This presentation will discuss the possible environmental hazards from GM rice under the Chinese circumstances. The work includes categories of impact on non-target organisms and biodiversity, gene flow and its related environmental risks, development of pest resistance to transgenes, and some indirect influences on rice ecosystems by changes of farming practices caused by GM rice cultivation.

**Keywords:** Biosafety, genetically modified rice; risk assessment; environmental hazard; transgene flow; biodiversity