

GENE FLOW FROM TRANSGENIC TO RED RICE IN FIELD

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Outcrossing in cultivated rice (*Oryza sativa* L. ssp. japonica), due to its reproductive biology, is usually considered negligible even if with low frequency it happens. However concerns of environmental risks arise from the possibility of flow of foreign genes inserted in cultivated varieties by genetic engineering (herbicide and parasite resistances), through pollen dispersal to other cultivars of the same species or to weed relatives as red rice (*Oryza* spp.). In particular, that would make more and more difficult the control of this weed with the use of the appropriate chemical principles. Aim of this study was the examine during several years the evolution of the red rice population following its cohabitation with a transgenic line bearing a resistance gene toward ammonium glufosinate. In the experiment the conditions adopted in herbicide transgenic rice cultivations, currently treated with the correspondent herbicide, were considered and reproduced in a crop where the red rice was interspersed with a high but not uncommon frequency: to our knowledge this is the first study performed in such situation. The evolution of the red rice population was examined during a period of five years (2001-2005) in a field cultivated in the first two years with the transgenic line A2504 derived from cultivar Ariete and bearing the resistance to the herbicide. During this period, the field was annually treated with the herbicide at the right time; in the first year the dosage of herbicide was three times higher that the producer (Basta) indication. Nevertheless a plant bearing several characteristics of the red rice was identified, in the experimental field, during 2002. The progeny of several subsequent generations were examined, molecular analysis and herbicide resistance test were carried out and the presence of the transgene was detected, demonstrating the occurrence of the outcross between A2504 and red rice. That shows that a) transgene flow to red rice can occur, b) the transgene remains stable at least for several generations, c) it is actively expressed as a dominant factor in the hybrid and in the following generations.

As a conclusion, from the crops of the transgenic rice, the appearance of red rice progeny tolerant to the herbicide is expected and, consequently, the problem of controlling the weed by chemicals will newly emerge in a relatively short time.