

Theme 7: Lakes, rivers, estuaries: water quality, biotic resources, sustainable management

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AGRICULTURAL TRANSGENIC: ENVIRONMENTAL AND BIOLOGICAL RISKS

Abduljawad Ahmad Mohamad Ali

Tissue culture and Molecular lab, Genetic and Plant Breeding Dept. University of Agricultural Sciences, Bangalore, India

Email: aljawadmali@yahoo.com

While the possible advantages of bioremediation and phytoremediation, by both recombinant microbes and plants, have been extensively reviewed, the biosafety concerns have been less extensively treated. Transgenic crops (GMCs: genetically modified crops), main products of agricultural biotechnology, are increasingly becoming a dominant feature of the agricultural landscapes of the USA and other countries such as China, Argentina, Mexico and Canada and recently India. Transgenic technology is developing rapidly; the areas planted to transgenic crops jumped from one million hectare to 44.6 million hectare. In the USA, Argentina and Canada, over half of the average for major crops such as soybean, corn and canola are planted in transgenic varieties. Herbicide resistant crops (HRCs) and insect resistant crops (Bt crops) accounted respectively for 59 and 15 percent of the total global area of all transgenic crops in 2000. However, consumers and environmentalists remain wary of its safety for use in agriculture. This goal is best accomplished by using a thorough, unbiased examination of risks associated with agricultural biotechnology. In discussion on risk and extend our approach to predict risk, and also distinguish between the risk and hazard of transgenic organisms in natural environments. transgene risk defined as the probability a transgene will spread into natural nonspecific populations and define hazard as the probability of species extinction, displacement, or ecosystem disruption given that the transgene has spread. Risk relative can be addressed to two types of hazards: extinction which has a high hazard, and invasion which has an unknown level of hazard, similar to that of an introduced exotic species. Based on the fact that more than 500 species of pests have already evolved resistance to conventional insecticides, pests can also evolve resistance to Bt toxins present in transgenic crops. GMCs may have unintended victims, such as the monarch butterfly or lacewing. The insecticidal toxin produced by Bt remain active in the soil, where it binds rapidly and tightly to clays and humic acids and more risks. The long-term impacts of GMCs are not yet known. Biotechnology may someday be considered a safe agricultural tool but studies suggest it may have harmful ecological consequences, such as: Spreading genetically-engineered genes to indigenous plants, increasing toxicity and this may move through the food chain, disrupting nature's system of pest control, and creating new weeds or virus strains.