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Environmental Risk Assessment in GMO Analysis

Abstract. Genetically modified or engineered organisms (GMOs, GEOs) are utilised in agriculture, expressing traits of interest, such as insect or herbicide resistance. Soybean, maize, cotton and oilseed rape are the GM crops with the largest acreage in the world. The distribution of GM acreage in the different countries is related with the different positions concerning labelling of GMO products: based on the principle of substantial equivalence, or rather based on the precautionary principle. The paper provides an overview on how the risks associated with release of GMO in the environments can be analysed and predicted, in view of a possible coexistence of GM and non-GM organisms in agriculture. Risk assessment procedures, both qualitative and quantitative, are compared in the context of application to GMOs considering also legislation requirements (Directive 2001/18/EC). Criteria and measurable properties to assess harm for human health and environmental safety are listed, and the possible consequences are evaluated in terms of significance. Finally, a mapping of the possible risks deriving from GMO release is reported, focusing on gene transfer to related species, horizontal gene transfer, direct and indirect effects on non target organisms, development of resistance in target organisms, and effects on biodiversity.