

Sustainable Development and Biodiversity

Volume 4

Series Editor

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This book series provides complete, comprehensive and broad subject based reviews about existing biodiversity of different habitats and conservation strategies in the framework of different technologies, ecosystem diversity, and genetic diversity. The ways by which these resources are used with sustainable management and replenishment are also dealt with. The topics of interest include but are not restricted only to sustainable development of various ecosystems and conservation of hotspots, traditional methods and role of local people, threatened and endangered species, global climate change and effect on biodiversity, invasive species, impact of various activities on biodiversity, biodiversity conservation in sustaining livelihoods and reducing poverty, and technologies available and required. The books in this series will be useful to botanists, environmentalists, marine biologists, policy makers, conservationists, and NGOs working for environment protection.

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Biotechnology and Biodiversity

 Springer

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Preface

Biodiversity is a contraction of the term ‘biological diversity’, and refers to the diversity of ‘life’. The purpose of this book is to assess the potential effects of biotechnological approaches particularly genetic modification on biodiversity and the environment. All aspects of biodiversity such as ecological diversity, species diversity and genetic diversity are considered.

With the introduction of genetically modified crops, monoculture of transgenic crops in a large area, and heavy use of chemical fertilizers and pesticides have been shown to have impacts on biodiversity. The introduction of a new trait in a genetically modified plant will depend on many other factors, including whether the introduced gene (transgene) responsible for the trait is turned on (expressed) or off, in the specific cells, and how the transgene expression, and the gene product(s) interact with environmental factors. The main issue in plant biotechnology which concerns us is that genetic manipulation has a direct impact on biodiversity at the genetic level. By these genetic manipulations, novel genes or gene fragments can be introduced into organisms (creating transgenics), or existing genes within an organism can be altered. Transgenics are a major area of concern, which effectively combine genes from different species to effectively create novel organisms. Current rates of disappearance of biological and cultural diversity in the world are unprecedented. Intensive resource exploitation due to social and economic factors has led to the destruction, conversion or degradation of ecosystems. Reversing these trends requires from time to time assessment of loss of biodiversity, and forces us to integrate conservation strategies. Biotechnological tools, particularly micropropagation technique has been helpful in developing protocols for multiplication of economically important plants, as well as endangered and threatened species. Chapters in this volume are written by leading scientists in their fields of specialization that include Impact of transgenic crops on biodiversity, impact of transgenes on non-target species, biotechnological applications to threatened and endangered species, pteridophytes, conifers, non-conifer species of gymnosperms, tree species, genetically modified crops, cryopreservation of diverse species, conservation of forest resources, agricultural biotechnology relevant to health and the environment, and prospects of next generation biotechnology for the production of biopharmaceuticals, biofuels, bioplastics, and biofortification of staple food crops.

We believe that biotechnology can affectively solve the problems related to biodiversity management, protection and conservation. The field in plant biotechnology has been kept wide and general to accommodate a wide ranging topics. This book provides complete, comprehensive and broad subject-based reviews useful for students, teachers, researchers, policy makers, conservationists and NGOs for environmental protection, and others interested in the field of biotechnology and biodiversity.

Prof. M.R. Ahuja
Prof. K.G. Ramawat

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