

Sustainable Development and Biodiversity

Volume 7

Series editor

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Editors

Genetic Diversity and Erosion in Plants

Indicators and Prevention

Volume 1

 Springer

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Preface

The term erosion implies a gradual loss of something important that will eventually undermine the health or stability of dependent individuals or communities. As applied to genetic diversity, erosion is the loss of genetic diversity within a species. It can happen fairly quickly, as with a catastrophic event, or change in land use that removes large numbers of individuals and their habitat. Similarly, it can also occur more gradually and go unnoticed for a long time. Genetic erosion represents the loss of entire populations genetically differentiated from others, or the loss or change in frequency of specific alleles within a population, or the species as a whole, or the loss of allelic combinations in plants, trees, and animals.

Until the 1940s, the centers of origin of crop species and woody plants were considered limitless sources of genetic variability. After World War II, agriculture in developing countries suffered great changes. The expanded use of improved varieties resulted in the reduction of traditional varieties, a process called genetic erosion. The expansion of the agricultural frontiers also contributed to the risk of loss of the wild relatives of crop species. Some 10,000 different plant species have been used by humans for food and fodder production since the dawn of agriculture 10,000 years ago.

Yet today just 150 crops feed most humans on the planet, and just 12 crops provide 80 % of food energy, while wheat, rice, maize, and potato alone provide 60 % of staple food. Reduction of agricultural biodiversity means fewer options for ensuring more diverse nutrition, enhancing food production, raising incomes, coping with environmental constraints, and sustainably managing ecosystems. Recognizing, safeguarding, and using the potential and diversity of nature are critical for food security and sustainable agriculture. Biodiversity conservation targets three interdependent levels: ecosystems, species, and genes. Genetic erosion can represent the loss of entire populations genetically differentiated from others, the loss or change in frequency of specific alleles (i.e., different forms of a gene) within populations or over the species as a whole, or the loss of allelic combinations. Genetically eroded populations may be less competitive with introduced, new, invasive species. Genetic diversity is important to a species' fitness, long-term viability, and ability to adapt to changing environmental conditions. Genetic erosion can

be addressed at several levels in the spectrum of management activities. This book deals with a broad spectrum of topics on genetic erosion and biodiversity in crop plants, and trees.

We believe that this book will be useful to botanists, geneticists, molecular biologists, environmentalists, policy makers, conservationists, and NGOs working for the protection conservation of species in a changing environment.

M.R. Ahuja
S. Mohan Jain

Contents

1	Genetic Erosion: Context Is Key	1
	Deborah Rogers and Patrick McGuire	
2	Indicators of Genetic Diversity, Genetic Erosion, and Genetic Vulnerability for Plant Genetic Resources	25
	Anthony H.D. Brown and Toby Hodgkin	
3	Genetic Diversity and Modern Plant Breeding	55
	Stephen Smith, David Bubeck, Barry Nelson, Jason Stanek and Justin Gerke	
4	Genetic Erosion Under Modern Plant Breeding: Case Studies in Canadian Crop Gene Pools	89
	Yong-Bi Fu and Yi-Bo Dong	
5	Molecular Marker Based Assessment of Genetic Diversity in Rye	105
	Hanna Bolibok-Bragoszewska and Monika Rakoczy-Trojanowska	
6	Using Molecular Techniques to Dissect Plant Genetic Diversity	125
	Linda Mondini and Mario A. Pagnotta	
7	Erosion and Prevention of Crop Genetic Diversity Landraces of Georgia (South Caucasus)	159
	Maia Akhalkatsi	
8	Genetic Diversity and Heavy Metal Stress in Plants	189
	Shilpi Srivastava and Atul Bhargava	
9	Diversity and Erosion in Genetic Resources of Spices	225
	K. Nirmal Babu, E.V.D. Sastry, K.V. Saji, Minoo Divakaran, H.J. Akshitha, S. Aarthi, A. Sharon, P.N. Ravindran and K.V. Peter	
10	Genetic Diversity and Erosion—A Global Perspective	263
	Imke Thormann and Johannes M.M. Engels	

**11 Diversity Arrays Technology (DArT) Markers
for Genetic Diversity 295**
Dariusz Grzebelus

**12 Exploring the Potential of Genetic Diversity via Proteomics:
Past, Present, and Future Perspectives for Banana 311**
S. Carpentier

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