HORTICULTURE: New Technologies and Applications Preethi Kartan



Horticulture: New Technologies and Applications

Horticulture is defined as the branch of agriculture that deals with the art, science, technology, and business of growing plants. Horticulture involves in production of medicinal plants, fruits, vegetables, nuts, seeds, herbs, sprouts, mushrooms, algae, flowers, seaweeds and non-food crops such as grass and ornamental trees and plants. Plant conservation, landscape restoration, garden design, construction, and maintenance, and arboriculture are part of horticulture. Horticulture is important because of its benefits like high export value, high per unit area yield, high returns per unit area, best utilization of waste land, provision of raw material for industries and protection of environment. It also improves economic conditions of many farmers and has become means of improving livelihood of many under-privileged classes by generating employment. Recent advances in technologies such as biotechnology, genomics, various methods and techniques in cultivation, has accelerated cultivar development greatly in all plants. This book gives insight on latest technologies and their applications in the field of horticulture.



Preethi is a postgraduate in Biotechnology from University of Leeds, UK. She is currently working as a Scientific Associate at one of the CRO's in India and her interest lie in life sciences related writing.





Kartan

Horticulture: New Technologies and Applications

Editor:

Preethi Kartan



Horticulture: New Technologies and Applications

Editor: Preethi Kartan

© 2017 Delve Publishing LLC 708 3rd Avenue, 6th Floor New York, NY 10017 United States of America www.delvepublishing.com

ISBN: 978-1-68095-756-3

Library of Congress Control Number: 2016951512

This book contains information obtained from highly regarded resources. Reprinted material sources are indicated. Copyright for individual articles remains with the authors as indicated. A Wide variety of references are listed. Reasonable efforts have been made to publish reliable data and views articulated in the chapters are those of the individual contributors, and not necessarily those of the editors or publishers. Editors or publishers are not responsible for the accuracy of the information in the published chapters or consequences of their use. The publisher believes no responsibility for any damage or grievance to the persons or property arising out of the use of any materials, instructions, methods or thoughts in the book. The editors and the publisher have attempted to trace the copyright holders of all material reproduced in this publication and apologize to copyright holders if permission has not been obtained. If any copyright holder has not been acknowledged, please write to us so we may rectify.

Notice: Registered trademark of products or corporate names are used only for explanation and identification without intent of infringement.

Delve Publishing LLC publishes wide variety of books and eBooks. For more information about Delve Publishing and its products, visit our website at www.delvepublishing.com

HORTICULTURE: NEW TECHNOLOGIES AND APPLICATIONS



About the Editor Preethi Kartan

Preethi is a postgraduate in Biotechnology from University of Leeds, UK. She is currently working as a Scientific Associate at one of the CRO's in India and her interest lie in life sciences related writing.

List of Contributors

Rehman HU

Department of Fruit Science, PAU, Ludhiana-141004, India

Gill MIS

Department of Fruit Science, PAU, Ludhiana-141004, India

Melaku Tesfa

Ethiopian Sugar Corporation Research and Training Division, Biotechnology Research Team, Wonji Research Center Wonji, Ethiopia

Belayneh Admassu

National Agricultural Biotechnology Research Program Holetta Agricultural Research Center

Kassahun Bantte

Jimma University College of Agriculture and Veterinary Medicine, Jimma, Ethiopia

Hayfa Jabnoun-Khiareddine

UR13AGR09- Integrated Horticultural Production in the Tunisian Centre- East, Regional Center of Research on Horticulture and Organic Agriculture, University of Sousse, 4042, Chott-Mariem, Tunisia

Rania Aydi Ben Abdallah

UR13AGR09- Integrated Horticultural Production in the Tunisian Centre- East, Regional Center of Research on Horticulture and Organic Agriculture, University of Sousse, 4042, Chott-Mariem, Tunisia

National Agronomic Institute of Tunisia, 1082 Tunis Mahrajène, University of Carthage, Tunisia

Ayed Fakher

Technical Center of Organic Agriculture, 4042, Chott-Mariem, Tunisia

Mouna Gueddes-Chahed

UR13AGR09- Integrated Horticultural Production in the Tunisian Centre- East, Regional Center of Research on Horticulture and Organic Agriculture, University of Sousse, 4042, Chott-Mariem, Tunisia

Ahmed Hajlaoui

UR13AGR09- Integrated Horticultural Production in the Tunisian Centre- East, Regional Center of Research on Horticulture and Organic Agriculture, University of Sousse, 4042, Chott-Mariem, Tunisia

Samir Ben Salem

UR13AGR09- Integrated Horticultural Production in the Tunisian Centre- East, Regional Center of Research on Horticulture and Organic Agriculture, University of Sousse, 4042, Chott-Mariem, Tunisia

Wissem Ben Dhia

UR13AGR09- Integrated Horticultural Production in the Tunisian Centre- East, Regional Center of Research on Horticulture and Organic Agriculture, University of Sousse, 4042, Chott-Mariem, Tunisia

Mejda Daami-Remadi

UR13AGR09- Integrated Horticultural Production in the Tunisian Centre- East, Regional Center of Research on Horticulture and Organic Agriculture, University of Sousse, 4042, Chott-Mariem, Tunisia

Kisan B, Shruthi H

Department of Biotechnology, College of Agriculture, University of Agricultural Sciences, Raichur-584104, India

Sharanagouda H

Department of Biotechnology, College of Agriculture, University of Agricultural Sciences, Raichur-584104, India

Revanappa SB

Department of Biotechnology, College of Agriculture, University of Agricultural Sciences, Raichur-584104, India

Pramod NK

Department of Biotechnology, College of Agriculture, University of Agricultural Sciences, Raichur-584104, India

Elham Hassanpour

Faculty of Agriculture, Horticultural Department, University of Guilan, Rasht, Iran

Jamal-Ali Olfati

Faculty of Agriculture, Horticultural Department, University of Guilan, Rasht, Iran

Mohammad Naqashzadegan

Faculty of Engineering, Mechanic Department, University of Guilan, Rasht, Iran

El-Sharony TF

Horticultural Crops Technology Department, National Research Centre, Dokki, Giza, Egypt

El-Gioushy SF

Department of Horticulture, Faculty of Agriculture, Benha University, Moshtohor, 13736 Qaluiobia, Egypt

Amin OA

Horticultural Crops Technology Department, National Research Centre, Dokki, Giza, Egypt

MA Elhaak

Faculty of Science, Tanta University, Egypt

MZ Matter

Faculty of Science, Minufiya University, Egypt

MA Zayed

Faculty of Science, Minufiya University, Egypt

DA Gad

Faculty of Science, Minufiya University, Egypt

Nolen S

Agricultural Research Station, Virginia State University, Petersburg, Virginia, USA

Zhang B

Virginia Polytechnic Institute and State University, Blacksburg, USA

Kering MK

Agricultural Research Station, Virginia State University, Petersburg, Virginia, USA

Tekle Edossa Kubure

Department of Plant Sciences, College of Agriculture and Veterinary Sciences, PO Box 19, Ambo University, Ambo, West Shoa Zone, Ethiopia

Cherukuri V Raghavaiah

Department of Plant Sciences, College of Agriculture and Veterinary Sciences, PO Box 19, Ambo University, Ambo, West Shoa Zone, Ethiopia

Ibrahim Hamza

Department of Plant Sciences, College of Agriculture and Veterinary Sciences, PO Box 19, Ambo University, Ambo, West Shoa Zone, Ethiopia

Rivera JD

Mississippi Ag and Forestry Exp. Station.-White Sand Unit, Poplarville, MS, USA

Lemus RW

Mississippi State Univ. Dept. of Plant and Soil Sciences, Starkville MS, USA

Gipson ML

Mississippi Ag and Forestry Exp. Station.-White Sand Unit, Poplarville, MS, USA

Gipson RG

Mississippi Ag and Forestry Exp. Station.-White Sand Unit, Poplarville, MS, USA

Shrawan Singh

Vegetable Science, Division of Horticulture and Forestry, Central Agricultural Research Institute (CARI), Port Blair- 744101, Andaman and Nicobar Islands, India

Naresh Kumar Bainsla

Plant Breeding, Division of Field Crops, Central Agricultural Research Institute (CARI), Port Blair- 744101, Andaman and Nicobar Islands, India

Rediet Girma

School of Biosystems and Environmental Engineering, Hawassa University, Ethiopia

Awdenegest Moges

School of Biosystems and Environmental Engineering, Hawassa University, Ethiopia

Shoeb Quraishi

School of Natural Resource and Environmental Engineering, Haramaya University, Ethiopia

Sameh AM Abd-allah

Horticulture Research Institute, a.r.c., Egypt

Peter Hanson

AVRDC—The World Vegetable Center, Shanhua, Tainan 74199, Taiwan

Shu-Fen Lu

AVRDC—The World Vegetable Center, Shanhua, Tainan 74199, Taiwan

Jaw-Fen Wang

AVRDC—The World Vegetable Center, Shanhua, Tainan 74199, Taiwan

Wallace Chen

AVRDC—The World Vegetable Center, Shanhua, Tainan 74199, Taiwan

Lawrence Kenyon

AVRDC—The World Vegetable Center, Shanhua, Tainan 74199, Taiwan

Chee-Wee Tan

AVRDC—The World Vegetable Center, Shanhua, Tainan 74199, Taiwan

Kwee Lian Tee

Universiti Malaysia Sabah, School of Sustainable Agriculture, Sungai Batang Mile 10, 90000 Sandakan, Sabah, Malaysia

Ya-Ying Wang

AVRDC—The World Vegetable Center, Shanhua, Tainan 74199, Taiwan

Yun-Che Hsu

AVRDC—The World Vegetable Center, Shanhua, Tainan 74199, Taiwan

Roland Schafleitner

AVRDC—The World Vegetable Center, Shanhua, Tainan 74199, Taiwan

Dolores Ledesma

AVRDC—The World Vegetable Center, Shanhua, Tainan 74199, Taiwan

Ray-Yu Yang

AVRDC—The World Vegetable Center, Shanhua, Tainan 74199, Taiwan

Adewumi, I.O

Department of Agricultural Engineering, Federal College of Agriculture, I.A.R & T P.M.B 5029 Moor Plantation Ibadan, Oyo-State, Nigeria

Oluwatoyinbo, F.I

Department of Agriculture, Federal College of Agriculture, I.A.R & T P.M.B 5029 Moor Plantation Ibadan, Oyo-State, Nigeria

Ajisegiri, G.O

Department of Industrial and Production Engineering, Faculty of Technology, University of Ibadan, Nigeria

Akinsete, A.E

Department of Electrical and Electronics, Faculty of Technology, University of Ibadan, Nigeria

Preface

Horticulture is defined as the branch of agriculture that deals with the art, science, technology, and business of growing plants. Horticulture involves in production of medicinal plants, fruits, vegetables, nuts, seeds, herbs, sprouts, mushrooms, algae, flowers, seaweeds and non-food crops such as grass and ornamental trees and plants. Plant conservation, landscape restoration, garden design, construction, and maintenance, and arboriculture are part of horticulture. Horticulture is important because of its benefits like high export value, high per unit area yield, high returns per unit area, best utilization of waste land, provision of raw material for industries and protection of environment. It also improves economic conditions of many farmers and has become means of improving livelihood of many under-privileged classes by generating employment. Recent advances in technologies such as biotechnology, genomics, various methods and techniques in cultivation, has accelerated cultivar development greatly in all plants. This book gives insight on latest technologies and their applications in the field of horticulture.

Editor Preethi Kartan

Contents

	List of Contributorsxi				
	Preface	e	xvii		
Chapter 1	Micr	rografting of Fruit Crops-A Review	1		
		Abstract	1		
	1.	Introduction	1		
	2.	Review of Literature	2		
	3.	Vitrification	8		
		Conclusion	10		
		References	11		
Chapter 2	Ex Vitro Rooting of Sugarcane (Saccharum Officinarum L.) Plantlets Derived From Tissue Culture				
		Abstract			
	1.	Introduction			
	2.	Materials and Methods			
		Conclusion	21		
		Acknowledgements	21		
		References			
Chapter 3	Effec	ct of Fodder Radish (Raphanus Sativus L.) Green Manure			
	on Potato Wilt, Growth and Yield Parameters25				
		Abstract	25		
	1.	Introduction	26		
	2.	Materials and Methods	28		
	3.	Results	29		
	4.	Discussion	35		
		Conclusion	38		
		References	39		
Chapter 4		Effect of Nano-Zinc Oxide on the Leaf Physical and Nutritional Quality of Spinach45			
		Abstract	45		
	1.	Introduction	45		
	2.	Materials and Methods	46		
		References	49		

Chapter 5	Optimum Pattern of Compost Used for Reducing Energy Consumption in Mushroom Production51					
	Con	•				
		Abstract				
	1.	Introduction				
	2.	Materials and Methods				
		Conclusion				
		References	55			
Chapter 6	Effe	ct of Foliar Application with Algae and Plant Extra	cts on			
	Growth, Yield and Fruit Quality of Fruitful Mango					
	Tree	es Cv. Fagri Kalan	57			
		Abstract	57			
	1.	Introduction	58			
	2.	Materials and Methods	59			
	3.	Discussions				
		Conclusion				
		References	65			
Chapter 7	Propagation Principles in Using Indole-3-Butyric Acid for					
	Rooting Rosemary Stem Cuttings69					
		Abstract	69			
	1.	Introduction	70			
	2.	Materials and Methods	71			
	3.	Discussion	88			
		References	93			
Chapter 8	Increasing Fresh Edamame Bean Supply Through Season					
•		ension Techniques				
		Abstract	97			
	1.	Introduction	98			
	2.	Materials and Methods	98			
	3.	Results and Discussion	99			
		Conclusions	104			
		Acknowledgement	104			
		References	104			
Chapter 9	Pro	duction Potential of Faba Bean (Vicia Faba L.) Gene	otvpes			
	in Relation to Plant Densities and Phosphorus Nutrition on					
	Vertisols of Central Highlands of West Showa Zone, Ethiopia,					
	East	t Africa				
		Abstract	107			
	1.	Introduction				
	2.	Materials and Methods	109			
	3.	Results and Discussion	111			

		Conclusion	121		
		References	121		
Chapter 10	Effects of Polymicrobial Bioinoculant on Yield, Quality and in Situ Digestibility of Sorghum Sudangrass in South Mississippi125				
	1.	Introduction	125		
	2.	Materials and Methods	126		
	3.	Results and Discussion	127		
		Conclusions	131		
		Acknowledgement	131		
		References	131		
Chapter 11	Analysis of Climate Change Impacts and their Mitigation Strategies on Vegetable Sector in Tropical Islands of Andaman and Nicobar Islands, India				
		Abstract			
	1.	Introduction			
	2.	Geography Of Study Area			
	3.	Breeding Strategies			
	٠.	Conclusion			
		References			
Chapter 12	Gis Based Physical Land Suitability Evaluation for Crop Production				
	in E	astern Ethiopia: A Case Study in Jello Watershed	145		
	1.	Introduction	145		
	2.	Materials and Methods	146		
		Conclusion	155		
		Acknowledgements	155		
		References	155		
Chapter 13	Path Coefficient Analysis for Some Characters on Fruit and Seed Yields of Okra159				
	1.	Introduction	159		
	2.	Materials and Methods	160		
	3.	Results and Discussion	161		
		References	165		
Chapter 14	Conventional and Molecular Marker-Assisted Selection and Pyramiding of Genes for Multiple Disease Resistance in Tomato167				
	/	Abstract			
	1.	Introduction			
	2.	Materials and Methods			
	3.	Results			
	4.	Discussion			
	1.	D13C4331011	I ())		

		Conclusions	187		
		Acknowledgements	188		
		References	188		
Chapter 15	Genetic Algorithm: A Veritable Tool for Solving Agricultural Extension Agents Travelling Problem				
	LATE	Abstract			
	1.	Introduction			
	2.	Representation of the Problem			
		Conclusion	202		
		References	203		
	Inde	×x	205		