

BURLEIGH DODDS SERIES IN AGRICULTURAL SCIENCE

Achieving sustainable cultivation of cocoa

Edited by Professor Pathmanathan Umaharan
Cocoa Research Centre - The University of the West Indies,
Trinidad and Tobago



bd burleigh dodds
SCIENCE PUBLISHING

NOW AVAILABLE

About the book

Part 1 of this book discusses genetics and breeding. The following parts then review cultivation techniques, disease and pest management. The final sections in the book assess safety and sensory quality, as well as broader aspects of environmental sustainability.

About the editor

Professor Pathmanathan

Umaharan is Director of the Cocoa Research Centre and Professor of Genetics at the University of the West Indies, Trinidad and Tobago. Professor Umaharan has published extensively in the areas of plant genetic resources, genetic analysis and cocoa crop improvement.

Achieving sustainable cultivation of cocoa

Available in print and digital formats:

ISBN - print	978-1-78676-168-2
Pages	588
Pub. Date	August 2018
Price	£230/\$300/€275/C\$390
Series No	AS43

Order via our online bookshop at www.bdspublishing.com, your usual book supplier, or pass to your librarian.

Enquiries to info@bdspublishing.com

For a complete list of titles visit www.bdspublishing.com

T (UK): +44 (0)1223 839365

T (US): +1 215-928-9112

www.bdspublishing.com

E: info@bdspublishing.com

 [@bdspublishing](https://twitter.com/bdspublishing)

 Burleigh Dodds Science Publishing

bd burleigh dodds
SCIENCE PUBLISHING

Achieving sustainable cultivation of cocoa

Edited by: Pathmanathan Umaharan, The University of the West Indies, Trinidad and Tobago

Part 1 Genetic resources and breeding

1. Taxonomy and classification of cacao: *Ranjana Bhattacharjee, International Institute of Tropical Agriculture (IITA), Nigeria; and Malachy Akoroda, Cocoa Research Institute of Nigeria, Nigeria*
2. Conserving and exploiting cocoa genetic resources: the key challenges: *Brigitte Laliberté, Bioversity International, Italy; Michelle End, INGENIC (The International Group for Genetic Improvement of Cocoa), UK; Nicholas Cryer, Mondelez International, UK; Andrew Daymond, University of Reading, UK; Jan Engels, Bioversity International, France; Albertus Bernardus Eskes, formerly CIRAD and Bioversity International, France; Martin Gilmour, MARS Global Chocolate, UK; Philippe Lachenaud, Centre de coopération internationale en recherche agronomique pour le développement, France; Wilbert Phillips-Mora, Center for Tropical Agriculture Research and Education, Costa Rica; Chris Turnbull, Cocoa Research Association Ltd., UK; Pathmanathan Umaharan, Cocoa Research Centre, The University of the West Indies, Trinidad and Tobago; Dapeng Zhang, USDA-ARS, USA; and Stephan Weise, Bioversity International, Italy*
3. The role of gene banks in preserving the genetic diversity of cacao: *Lambert A. Motilal, The University of the West Indies, Trinidad and Tobago*
4. Safe handling and movement of cocoa germplasm for breeding: *Andrew Daymond, University of Reading, UK*
5. Developments in cacao breeding programmes in Africa and the Americas: *Dário Ahnert, Universidade Estadual de Santa Cruz, Brazil; and Albertus Bernardus Eskes, formerly CIRAD and Bioversity International, France*

Part 2 Cultivation techniques

6. Cocoa plant propagation techniques to supply farmers with improved planting materials: *Michelle End, INGENIC (The International Group for Genetic Improvement of Cocoa), UK; Brigitte Laliberté, Bioversity International, Italy; Rob Lockwood, Consultant, UK; Augusto Roberto Sena Gomes, Consultant, Brazil; George Andrade Sodré, CEPLAC/CEPEC, Brazil; and Mark Guiltinan and Siela Maximova, The Pennsylvania State University, USA*
7. The potential of somatic embryogenesis for commercial-scale propagation of elite cacao varieties: *Siela N. Maximova and Mark J. Guiltinan, The Pennsylvania State University, USA*
8. Good agronomic practices in cocoa cultivation: rehabilitating cocoa farms: *Richard Asare, International Institute of Tropical Agriculture (IITA), Ghana; Victor Afari-Sefa, World Vegetable Center, Benin; Sander Mulerman, Wageningen University, The Netherlands; and Gilbert J. Anim-Kwapong, Cocoa Research Institute of Ghana, Ghana*
9. Improving soil and nutrient management for cacao cultivation: *Didier Snoeck and Bernard Dubos, CIRAD, UR Systèmes de pérennes, France*

Part 3 Diseases and pests

10. Cocoa diseases: witches' broom: *Jorge Teodoro De Souza, Federal University of Lavras, Brazil; Fernando Pereira Monteiro, Federal University of Lavras and UNIVAG Centro Universitário, Brazil; Maria Alves Ferreira, Federal University of Lavras, Brazil; and Karina Peres Gramacho and Edna Dora Martins Newman Luz, Comissão Executiva do Plano da Lavoura Cacaueira (CEPLAC), Brazil*
11. Frosty pod rot, caused by *Monilophthora roreri*: *Ulrike Krauss, Palm Integrated Services and Solutions (PISS) Ltd., Saint Lucia*
12. Cocoa diseases: vascular-streak dieback: *David I. Guest, University of Sydney, Australia; and Philip J. Keane, LaTrobe University, Australia*
13. Insect pests affecting cacao: *Leila Bagny Beilhe, Régis Babin and Martijn ten Hoopen, CIRAD, France*
14. Nematode pests of cocoa: *Samuel Orisajo, Cocoa Research Institute of Nigeria, Nigeria*
15. Advances in pest- and disease-resistant cocoa varieties: *Christian Cilas and Olivier Soungo, CIRAD, France; Bruno Efombagn and Salomon Nyassé, Institute of Agricultural Research for Development (IRAD), Cameroon; Mathias Tah, CNRA, Côte d'Ivoire; and Sarah M. Bharath, Meridian Cacao, USA*

Part 4 Safety and sensory quality

16. Improving best practice with regard to pesticide use in cocoa: *M. A. Rutherford, J. Crozier and J. Flood, CABI, UK; and S. Sastroutomo, CABI-SEA, Malaysia*
17. Mycotoxins in cocoa: causes, detection and control: *Mary A. Egbuta, Southern Cross University, Australia*
18. Analysing sensory and processing quality of cocoa: *Darin A. Sukha and Naailah A. Ali, The University of the West Indies, Trinidad and Tobago*

Part 5 Sustainability

19. Climate change and cocoa cultivation: *Christian Bunn, Fabio Castro and Mark Lundy, International Center for Tropical Agriculture (CIAT), Colombia; and Peter Läderach, International Center for Tropical Agriculture (CIAT), Vietnam*
20. Analysis and design of the shade canopy of cocoa-based agroforestry systems: *Eduardo Somarriba, CATIE, Costa Rica; Luis Orozco-Aguilar, University of Melbourne, Australia; Rolando Cerda, CATIE, Costa Rica; and Arlene López-Sampson, James Cook University, Australia*
21. Organic cocoa cultivation: *Amanda Berlan, De Montfort University, UK*
22. Cocoa sustainability initiatives: the impacts of cocoa sustainability initiatives in West Africa: *Verina Ingram, Yuca Waarts and Fedes van Rijn, Wageningen University, The Netherlands*
23. Supporting smallholders in achieving more sustainable cocoa cultivation: the case of West Africa: *Paul Macek, World Cocoa Foundation, USA; Upoma Husain and Krystal Werner, Georgetown University, USA*