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Thomas R. Sinclair
Editor

Water-Conservation Traits to Increase Crop Yields in Water-deficit Environments

Case Studies

 Springer

Editor

Thomas R. Sinclair
Crop and Soil Sciences Department
North Carolina State University
Raleigh, NC, USA

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Preface

Water deficit is the major cause of crop yield loss in virtually all areas of the globe that are not irrigated. Until very recently, there has been little progress in improving specific physiological traits in crop plants to decrease the impact of drought on yield. Two physiological traits have been recently identified that result in early-season, limited water use so that more water is available to support later-season reproductive growth. These water-conservation traits are early, partial stomata closure with soil drying and partial stomata closure under elevated vapor pressure deficit. This book reviews the mechanistic activity of both of these traits.

The initial chapters (Chaps. 1, 2, and 3) present the physiological basis of each of the water-conservation traits. These chapters provide readers with a full introduction and description of the functioning of these traits to result in putative yield increases. The remainder of the book (Chaps. 4, 5, 6, 7, 8, 9, 10, and 11) is devoted to reviews of the research on the two water-conservation traits in individual crop species. An important part of the reviews is the progress in understanding the traits so that they can be developed in each species leading to improved, higher-yielding cultivars. Commercial cultivars are already on the market for maize and soybean resulting in yield increase under water-deficit conditions. The progress in developing the water-conservation trait presented in this book would be of interest to all that are concerned about increasing future crop yields as water deficits are anticipated to become more prevalent.

Raleigh, NC, USA

Thomas R. Sinclair

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Contributors

Sunita Choudhary Multi-Crop Research Center, Pioneer Hi-Bred Private Limited, Hyderabad, India

M. Jyostna Devi Crop and Soil Sciences Department, North Carolina State University, Raleigh, NC, USA

Michel Edmond Ghanem International Center for Agricultural Research in the Dry Areas (ICARDA), Crop Physiology Laboratory, North-Africa Platform, Rabat, Morocco

Julie Guiguitant International Center for Agricultural Research in the Dry Areas (ICARDA), Crop Physiology Laboratory, North-Africa Platform, Rabat, Morocco
UMR-SYTEM, Montpellier SupAgro, Montpellier, France

Jana Kholová International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Greater Hyderabad, Telangana, India

Fatima ez-zahra Kibbou International Center for Agricultural Research in the Dry Areas (ICARDA), Crop Physiology Laboratory, North-Africa Platform, Rabat, Morocco

Hélène Marrou UMR-SYTEM, Montpellier SupAgro, Montpellier, France

Walid Sadok Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul, MN, USA

Avat Shekoofa Department of Plant Sciences, University of Tennessee Knoxville, Jackson, TN, USA

Thomas R. Sinclair Crop and Soil Sciences Department, North Carolina State University, Raleigh, NC, USA

Kaliamoorthy Sivasakthi Bharathidasan University, Tiruchirappalli, Tamil Nadu, India

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Greater Hyderabad, Telangana, India

Murugesan Tharanya Bharathidasan University, Tiruchirappalli, Tamil Nadu, India

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Greater Hyderabad, Telangana, India

Thiyagarajan Thirunalasundari Bharathidasan University, Tiruchirappalli, Tamil Nadu, India

Vincent Vadez International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Greater Hyderabad, Telangana, India

Mainassara Zaman-Allah International Center for Maize and Wheat Improvement (CIMMYT), Mount Pleasant, Harare, Zimbabwe