## Contents

### Part I Introduction

1 Biological Soil Crusts as an Organizing Principle in Drylands . . . . 3  
   Jayne Belnap, Bettina Weber, and Burkhard Büdel

2 How Biological Soil Crusts Became Recognized as a Functional  
   Unit: A Selective History ............................................. 15  
   Otto L. Lange and Jayne Belnap

### Part II Morphology, Composition, and Distribution of Biological  
   Soil Crusts at Different Scales

3 Terrestrial Ecosystems in the Precambrian . . . . 37  
   Hugo Beraldi-Campesi and Gregory J. Retallack

4 Cyanobacteria and Algae of Biological Soil Crusts . . . . 55  
   Burkhard Büdel, Tamara Dulić, Tatyana Darienko, Nataliya Rybalka,  
   and Thomas Friedl

5 Bacteria and Non-lichenized Fungi Within Biological  
   Soil Crusts ......................................................... 81  
   Stefanie Maier, Lucia Muggia, Cheryl R. Kuske, and Martin Grube

6 Bryophytes Within Biological Soil Crusts . . . . 101  
   Rodney D. Seppelt, Alison J. Downing, Kirsten K. Deane-Coe,  
   Yuanming Zhang, and Jing Zhang

7 Structure, Composition, and Function of Biocrust Lichen  
   Communities .......................................................... 121  
   Roger Rosentreter, David J. Eldridge, Martin Westberg,  
   Laura Williams, and Martin Grube

8 Microfauna Within Biological Soil Crusts . . . . 139  
   Brian J. Darby and Deborah A. Neher
9 Composition and Macrostructure of Biological Soil Crusts
Claudia Colesie, Vincent John Martin Noah Linus Felde, and Burkhard Büdel

10 Controls on Distribution Patterns of Biological Soil Crusts at Micro- to Global Scales
Matthew A. Bowker, Jayne Belnap, Burkhard Büdel, Christophe Sannier, Nicole Pietrasiak, David J. Eldridge, and Víctor Rivera-Aguilar

11 Hypolithic Communities
Stephen B. Pointing

12 Remote Sensing of Biological Soil Crusts at Different Scales
Bettina Weber and Joachim Hill

Part III Functional Roles of Biological Soil Crusts

13 Microstructure and Weathering Processes Within Biological Soil Crusts
Ferran Garcia-Pichel, Vincent John Martin Noah Linus Felde, Sylvie Laureen Drahorad, and Bettina Weber

14 Patterns and Controls on Nitrogen Cycling of Biological Soil Crusts
Nichole N. Barger, Bettina Weber, Ferran Garcia-Pichel, Eli Zaady, and Jayne Belnap

15 Carbon Budgets of Biological Soil Crusts at Micro-, Meso-, and Global Scales
Leopoldo G. Sancho, Jayne Belnap, Claudia Colesie, Jose Raggio, and Bettina Weber

16 Biological Soil Crusts as Soil Stabilizers
Jayne Belnap and Burkhard Büdel

17 The Role of Biocrusts in Arid Land Hydrology
Sonia Chamizo, Jayne Belnap, David J. Eldridge, Yolanda Cantón, and Oumarou Malam Issa

18 Physiology of Photosynthetic Organisms Within Biological Soil Crusts: Their Adaptation, Flexibility, and Plasticity
T.G. Allan Green and Michael C.F. Proctor

Part IV Interactions Between Biological Soil Crusts and Vascular Plants

19 Interactions of Biological Soil Crusts with Vascular Plants
Yuanming Zhang, Asa L. Aradottir, Marcelo Serpe, and Bertrand Boeken
Contents

20 Biological Soil Crusts as a Model System in Ecology ........................................ 407
    Fernando T. Maestre, Matthew A. Bowker, David J. Eldridge,
    Jordi Cortina, Roberto Lázaro, Antonio Gallardo,
    Manuel Delgado-Baquerizo, Miguel Berdugo,
    Andrea P. Castillo-Monroy, and Enrique Valencia

Part V Threats to Biological Soil Crusts

21 Effects of Local-Scale Disturbance on Biocrusts ............................................ 429
    Eli Zaady, David J. Eldridge, and Matthew A. Bowker

22 Biocrusts in the Context of Global Change ..................................................... 451
    Sasha C. Reed, Fernando T. Maestre, Raúl Ochoa-Hueso,
    Cheryl R. Kuske, Anthony Darrouzet-Nardi, Mel Oliver, Brian Darby,
    Leopoldo G. Sancho, Robert L. Sinsabaugh, and Jayne Belnap

Part VI Natural and Enhanced Recovery and Management

23 Natural Recovery of Biological Soil Crusts After Disturbance ........................ 479
    Bettina Weber, Matt Bowker, Yuanming Zhang, and Jayne Belnap

24 Enhanced Recovery of Biological Soil Crusts After Disturbance ........................ 499
    Yunge Zhao, Matthew A. Bowker, Yuanming Zhang, and Eli Zaady

Part VII Future Research on Biological Soil Crusts

25 Synthesis on Biological Soil Crust Research ............................................... 527
    Bettina Weber, Jayne Belnap, and Burkhard Büdel

Taxonomic Index ........................................................................................................ 535

Subject Index ............................................................................................................. 543
Biological Soil Crusts: An Organizing Principle in Drylands
Weber, B.; Büdel, B.; Belnap, J. (Eds.)
2016, IX, 549 p. 130 illus., 81 illus. in color., Hardcover
ISBN: 978-3-319-30212-6