

CONTENTS

Contributors

ix

1. Scaling-up Trait Variation from Individuals to Ecosystems	1
Jean P. Gibert, Anthony I. Dell, John P. DeLong, and Samraat Pawar	
1. Why Is it Important to Understand Traits and Trait Variation?	2
2. Traits and Individual-Level Variation	3
3. Population-Level Effects of Trait Variation	4
4. Meta-Population Effects of Trait Variation	6
5. Community-Level Effects of Trait Variation	7
6. Ecosystem-Level Effects of Trait Variation	10
7. Concluding Remarks	13
References	14
 2. Individual Variability: The Missing Component to Our Understanding of Predator-Prey Interactions	 19
Nathalie Pettoirelli, Anne Hilborn, Clare Duncan, and Sarah M. Durant	
1. Introduction	20
2. What Shapes Predation Risk and Prey Selection?	23
3. Individual Variability and Functional Responses	28
4. Accounting for Individual Variability When Modelling Predator-Prey Interactions	30
5. Conclusions	35
Appendix	37
References	38
 3. Individual Variation Decreases Interference Competition but Increases Species Persistence	 45
Jean P. Gibert and John P. DeLong	
1. Introduction	46
2. Methods	48
3. Results	52
4. Discussion	57
5. Conclusion	60

Acknowledgements	62
References	62
4. Predictors of Individual Variation in Movement in a Natural Population of Threespine Stickleback (<i>Gasterosteus aculeatus</i>)	65
Kate L. Laskowski, Simon Pearish, Miles Bensky, and Alison M. Bell	
1. Introduction	66
2. Methods	68
3. Results	76
4. Discussion	81
Appendix. Supplementary Results with Other Behavioural Variables	83
References	87
5. Eco-Evolutionary Dynamics of Plant-Insect Communities Facing Disturbances: Implications for Community Maintenance and Agricultural Management	91
Ewen Georgelin, Grigoris Kylafis, and Nicolas Loeuille	
1. Introduction	92
2. Model and Methods	95
3. Results	100
4. Discussion	106
Acknowledgements	111
References	111
6. Population and Community Body Size Structure Across a Complex Environmental Gradient	115
Anthony I. Dell, Lei Zhao, Ulrich Brose, Richard G. Pearson, and Ross A. Alford	
1. Introduction	116
2. Field Experiment Methods	118
3. Data Processing and Analysis	125
4. Results	128
5. Discussion	136
Acknowledgements	141
Appendix	141
References	164

7. Shifts in the Diversity and Composition of Consumer Traits Constrain the Effects of Land Use on Stream Ecosystem Functioning	169
André Frainer and Brendan G. McKie	
1. Introduction	170
2. Methods	172
3. Results	180
4. Discussion	185
Acknowledgements	190
Appendix	190
References	196
8. The Role of Body Size Variation in Community Assembly	201
Samraat Pawar	
1. Introduction	202
2. Theory	203
3. Data	223
4. Discussion	234
5. Conclusions	237
Acknowledgements	238
Appendix A. The Size Scaling of Species' Equilibrium Abundances	238
Appendix B. Parameter Sensitivity	239
Appendix C. Do Sampling Biases Affect the Empirical Results?	242
References	244
9. Scaling from Traits to Ecosystems: Developing a General Trait Driver Theory via Integrating Trait-Based and Metabolic Scaling Theories	249
Brian J. Enquist, Jon Norberg, Stephen P. Bonser, Cyrille Violle, Colleen T. Webb, Amanda Henderson, Lindsey L. Sloat, and Van M. Savage	
1. Introduction	251
2. Trait Driver Theory	253
3. Predictions of TDT	258
4. Extending and Parameterizing TDT	265
5. Additional Predictions of TDT	268
6. Methods: Assessing TDT Assumptions and Predictions	271

7. Results	274
8. Discussion	282
Acknowledgements	286
Appendix	287
References	310
10. Functional Traits and Trait-Mediated Interactions: Connecting Community-Level Interactions with Ecosystem Functioning	319
Oswald J. Schmitz, Robert W. Buchkowski, Karin T. Burghardt, and Colin M. Donihue	
1. Introduction	320
2. Toward a Procedural Framework	323
3. Moving Forward	336
Acknowledgements	339
References	339
<i>Index</i>	345
<i>Cumulative List of Titles</i>	355