

Cambridge University Press

978-0-521-41758-7 - The Ecology of Insect Overwintering

S. R. Leather, K. F. A. Walters and J. S. Bale

Table of Contents

[More information](#)

Contents

<i>Foreword</i>	<i>Page</i> ix
1 Introduction	1
Why study overwintering?	1
What is overwintering?	2
Advantages and disadvantages of overwintering	3
2 The overwintering locale – suitability and selection	5
Introduction	5
The winter habitat – regional climate	5
Terrain and overwintering success	7
Effects of local habitat	10
Selection of the overwintering site	20
3 The stimuli controlling diapause and overwintering	25
Introduction	25
The induction of the overwintering state	26
Maintenance and termination of the overwintering state	42
Re-entry into a second period of winter diapause	59
Sex and the response to overwintering cues	60
Overwintering cues and parasitoid–host interactions	62
Overwintering cues for social insects	65
Varying responses to overwintering cues in different geographical areas	67
Synchronisation of overwintering stage with season	71
4 Insect cold-hardiness	75
Introduction	75
Concepts and definitions	76
Strategies of insect cold-hardiness	77
Ecophysiological approaches to insect cold-hardiness	143
	vii

Cambridge University Press

978-0-521-41758-7 - The Ecology of Insect Overwintering

S. R. Leather, K. F. A. Walters and J. S. Bale

Table of Contents

[More information](#)

viii	<i>Contents</i>
5	Costs and benefits of overwintering 148
	Introduction 148
	Developmental stage and overwintering success 148
	Winter inactive insects 149
	Winter active insects 156
	Winter avoidance 158
	The costs of overwintering 161
	Spreading the risk 163
	Physical costs 165
	Metabolic costs 166
	Reproductive costs 172
	Insect colour and overwintering costs 173
	Conclusions 176
6	Prediction and control 177
	Introduction 177
	Systems in use 178
	Systems in development 192
	Systems still to be developed 196
	Control 200
	Conclusion 204
	<i>Bibliography</i> 206
	<i>Index</i> 240