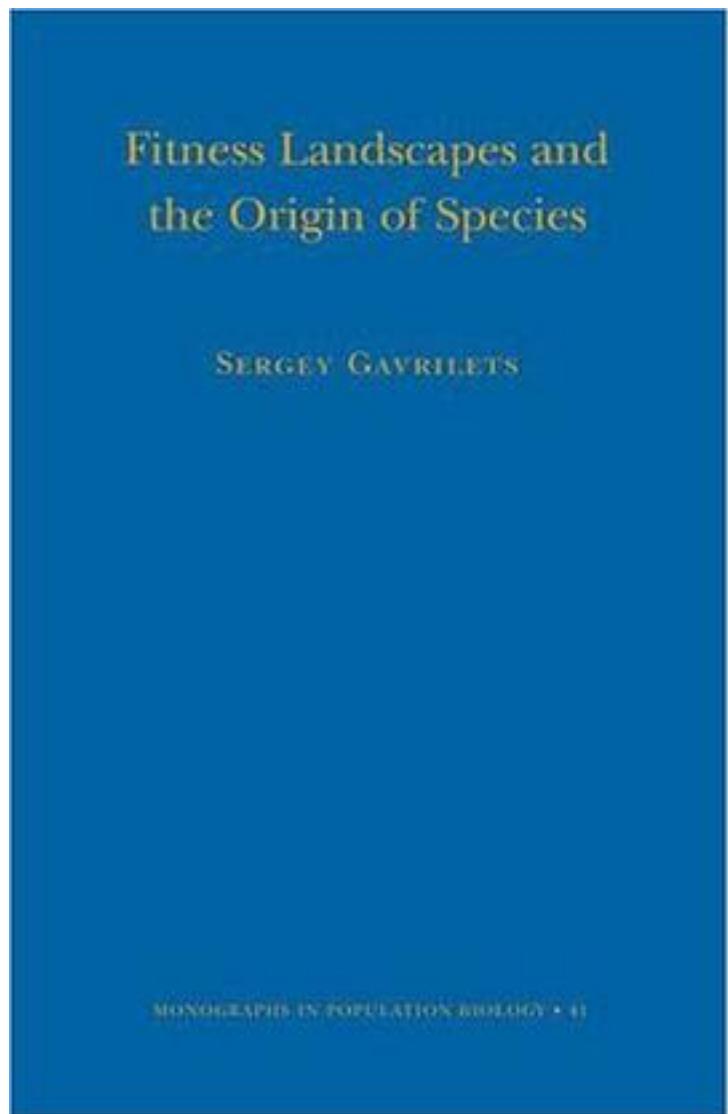


Fitness Landscapes and the Origin of Species



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The origin of species has fascinated both biologists and the general public since the publication of Darwin's *Origin of Species* in 1859. Significant progress in understanding the process was achieved in the "modern synthesis," when Theodosius Dobzhansky, Ernst Mayr, and others reconciled Mendelian genetics with Darwin's natural selection. Although evolutionary biologists have developed significant new theory and data about speciation in the years since the modern synthesis, this book represents the first systematic attempt to summarize and generalize what mathematical models tell us about the dynamics of speciation.

Fitness Landscapes and the Origin of Species presents both an overview of the forty years of previous theoretical research and the author's new results. Sergey Gavrilets uses a unified framework based on the notion of fitness landscapes introduced by Sewall Wright in 1932, generalizing this notion to explore the consequences of the huge dimensionality of fitness landscapes that correspond to biological systems.

In contrast to previous theoretical work, which was based largely on numerical simulations, Gavrilets develops simple mathematical models that allow for analytical investigation and clear interpretation in biological terms. Covering controversial topics, including sympatric speciation and the effects of sexual conflict on speciation, this book builds for the first time a general, quantitative theory for the origin of species.

作者介绍:

Endorsements

"A landmark work. This is the first systematic summary of the mathematical theory of speciation, and Dr. Gavrilets, whose work has changed the field in recent years, is the most qualified person to have written it. There is no comparable book."—Günter Paul Wagner, Yale University

"Undoubtedly a significant contribution. The book will be valuable not only in speciation theory but beyond the theoretical realm, to empirical scientists working on speciation, to evolutionary biologists more broadly, and to mathematicians interested in the applications. The scholarship is excellent, and the logical organization is impeccable."—Roger Butlin, University of Leeds

"This is a book that has been needed for a long time, but it required someone of Sergey Gavrilets's breadth and depth of understanding of both evolutionary biology and mathematical modeling. Gavrilets has already infused evolutionary biology with highly innovative ways of thinking about the structure of natural selection and the dynamics of evolution, using novel mathematical models to probe difficult ideas. Here he analyzes past work critically and adopts a clear viewpoint of his own, complete with a rich set of models that support that viewpoint. He does so in a way that makes the ideas accessible both to empirical evolutionary researchers and applied mathematicians."—John N. Thompson, University of California, Santa Cruz

"This is the first book I have read about speciation that actually presents the topic in an objective way, rather than carrying on the fifty-year tradition of strong opinions without critical evidence. Gavrilets does a splendid job of building all of the models and discussing their implications."—John A. Endler, University of California, Santa Barbara

目录: Preface xiii

Mathematical symbols xv

Common abbreviations xviii

1 Introduction 1

1.1 General structure of the book 7

1.2 Some biological ideas and notions 9

1.2.1 Species definition and the nature of reproductive isolation 9

1.2.2 Geographic modes of speciation 10

1.2.3 Some speciation scenarios and patterns 14

Part I

Fitness landscapes

2 Fitness landscapes 21

2.1 Working example: one-locus, two-allele model of viability selection 22

2.2 Fitness landscape as fitness of gene combinations 25

2.3 Fitness landscape as the mean fitness of populations 30

2.4 The metaphor of fitness landscapes 33

2.4.1 Wright's rugged fitness landscapes 34

2.4.2 Fisher's single-peak fitness landscapes 36

2.4.3 Kimura's flat fitness landscapes 38

2.5 Fitness landscapes for mating pairs 40

2.6 Fitness landscapes for quantitative traits 41

2.6.1 Fitness landscape as fitness of trait combinations 41

2.6.2 Fitness landscape as the mean fitness of populations 42

2.6.3 Fitness landscapes for mating pairs 45

2.7 General comment on fitness landscapes 46

2.8 Summary 47

2.9 Conclusions 48

Box 2.1. Dynamics of allele frequencies in one-locus, multiallele population 49

Box 2.2. Hill climbing on a rugged fitness landscape 50

Box 2.3. Evolution on flat landscapes 51

3 Steps toward speciation on rugged fitness landscapes 53

3.1 Stochastic transitions between isolated fitness peaks 53

3.1.1 Fixation of an underdominant mutation 54

3.1.2 Peak shift in a quantitative character 60

3.1.3 Fixation of compensatory mutations in a two-locus haploid population 62

3.2 Some consequences of spatial subdivision and density fluctuations 66

3.2.1 Spatial subdivision 66

3.2.2 Stochastic transitions in a growing population 71

3.3 Peak shifts by selection 75

3.4 Summary 76

3.5 Conclusions 77

Box 3.1. Diffusion theory: the probability of fixation 78

Box 3.2. Diffusion theory: the time to fixation 79

Box 3.3. Diffusion theory: the duration of transition 80

4 Nearly neutral networks and holey fitness landscapes 81

4.1 Simple models 82

4.1.1 Russian roulette model in two dimensions 83

4.1.2 Russian roulette model on hypercubes 86

4.1.3 Generalized Russian roulette model 89

4.1.4 Multiplicative fitnesses 90

4.1.5 Stabilizing selection on an additive trait 91

4.1.6 Models based on the Nk-model 92

4.2 Neutral networks in RNA landscapes 95

4.3 Neutral networks in protein landscapes	97
4.4 Other evidence for nearly neutral networks	99
4.5 The metaphor of holey fitness landscapes	100
4.6 Deterministic evolution on a holey landscape	105
4.6.1 Error threshold	105
4.6.2 Genetic canalization	106
4.7 Stochastic evolution on a holey landscape	108
4.7.1 Random walks	108
4.7.2 Dynamics of haploid populations	112
4.8 Summary	113
4.9 Conclusions	114
Part II	
The Bateson-Dobzhansky-Muller model	
5 Speciation in the BDM model	117
5.1 The BDM model of reproductive isolation	117
5.1.1 Fitness landscapes in the BDM model	119
5.1.2 The mechanisms of reproductive isolation in the BDM model	121
5.2 Population genetics in the BDM model	124
5.2.1 Haploid population	125
5.2.2 Diploid population	128
5.3 Dynamics of speciation in the BDM model	130
5.3.1 Allopatric speciation	131
5.3.2 Parapatric speciation	137
5.4 Summary	143
5.5 Conclusions	145
Box 5.1. Hitting probability and hitting time in discrete-time Markov chains	146
Box 5.2. Genetic barrier to gene flow	147
6 Multidimensional generalizations of the BDM model	149
6.1 One- and two-locus, multiallele models	149
6.2 Multilocus models	151
6.2.1 The Walsh model	152
6.2.2 Divergent degeneration of duplicated genes	154
6.2.3 Three- and four-locus models	155
6.2.4 Accumulation of genetic incompatibilities	158
6.2.5 Allopatric speciation	174
6.2.6 Parapatric speciation	184
6.3 Summary	192
6.4 Conclusions	194
7 Spatial patterns in the BDM model	195
7.1 Individual-based models: spread of mutually incompatible neutral genes	197
7.1.1 Model	197
7.1.2 Parameters	198
7.1.3 Numerical procedure	199
7.1.4 Results	200
7.1.5 Interpretations	205
7.2 Deme-based models: spread of mutually incompatible neutral genes	207
7.2.1 Model	207
7.2.2 Parameters and dynamic characteristics	210
7.2.3 Results	211
7.2.4 Interpretations	219
7.3 Deme-based models: spread of mutually incompatible advantageous genes	221
7.4 Comment on adaptive radiation	228
7.5 Summary	228
7.6 Conclusions	230

Part III

- Speciation via the joint action of disruptive natural selection and nonrandom mating
- 8 Maintenance of genetic variation under disruptive natural selection 233
- 8.1 Spatially heterogeneous selection 235
 - 8.1.1 The Levene model 235
 - 8.1.2 Two-locus, two-allele haploid version of the Levene model 238
 - 8.1.3 Restricted migration between two niches 240
 - 8.1.4 Spatial gradients in selection 242
 - 8.1.5 Coevolutionary clines 249
- 8.2 Spatially uniform disruptive selection 251
 - 8.2.1 Migration-selection balance: the Karlin-McGregor model 251
 - 8.2.2 Migration-selection balance: the Bazykin model 252
- 8.3 Temporal variation in selection 254
- 8.4 Frequency-dependent selection in a single population 255
 - 8.4.1 Phenomenological approach 256
 - 8.4.2 Intraspecific competition 257
 - 8.4.3 Spatially heterogeneous selection and competition 263
 - 8.4.4 Adaptive dynamics approach 265
- 8.5 Summary 277
- 8.6 Conclusions 278
- 9 Evolution of nonrandom mating 279
 - 9.1 A general framework for modeling nonrandom mating and fertilization 280
 - 9.1.1 Random mating within mating pools joined preferentially 282
 - 9.1.2 Preferential mating within mating pools joined randomly 284
 - 9.2 Similarity-based nonrandom mating 287
 - 9.2.1 Single locus 287
 - 9.2.2 Multiple loci 299
 - 9.2.3 General conclusions on similarity-based nonrandom mating 309
 - 9.3 Matching-based nonrandom mating 309
 - 9.3.1 Two loci 311
 - 9.3.2 Two polygenic characters 321
 - 9.3.3 One locus, one character 325
 - 9.3.4 General conclusions on matching-based nonrandom mating 326
 - 9.4 Nonrandom mating controlled by a culturally transmitted trait 327
- 9.5 Summary 328
- 9.6 Conclusions 330
- 10 Interaction of disruptive selection and nonrandom mating 331
 - 10.1 Disruptive selection and similarity-based nonrandom mating 332
 - 10.1.1 Single locus 333
 - 10.1.2 Single quantitative character 352
 - 10.1.3 Sympatric speciation with culturally transmitted mating preferences 356
 - 10.2 Disruptive selection and matching-based nonrandom mating 359
 - 10.2.1 Two loci 359
 - 10.2.2 Two polygenic characters 364
 - 10.3 "Magic trait" models 368
 - 10.3.1 Single locus 369
 - 10.3.2 Two loci: speciation by sexual conflict 370
 - 10.3.3 Single polygenic character 374
 - 10.3.4 Two polygenic characters: speciation by sexual selection 384
 - 10.4 Disruptive selection and modifiers of mating 387
- 10.5 Summary 396
- 10.6 Conclusions 398
- 11 General conclusions 399
 - 11.1 The structure of fitness landscapes and speciation 399

11.2 Allopatric speciation 401
11.3 Parapatric speciation 401
11.4 Sympatric speciation 403
11.5 Some speciation scenarios and patterns 406
11.6 General rules of evolutionary diversification 412
11.7 Why species? 414
11.8 Some open theoretical questions 416
11.9 Final thoughts 417
References 419
Index 457
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