



Third Edition

Insect Physiology and Biochemistry

James L. Nation, Sr.



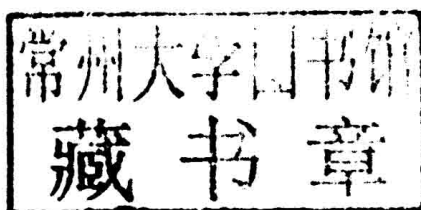
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Third Edition

Insect Physiology and Biochemistry

James L. Nation, Sr.

UNIVERSITY OF FLORIDA, GAINESVILLE, USA



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Third Edition

Insect Physiology and Biochemistry

Preface

Research work and literature in physiology and biochemistry of insects continues to expand in an explosive and exponential fashion. New journals continue to appear; the literature is very widespread. Experienced and established scientists are likely to find time constraints that make it difficult or impossible to read the general field of insect physiology, and the problem is even more acute for graduate students or undergraduates who are just getting acquainted with the physiology of insects. Even though the Internet and online journals and books offer wonderful advantages, considerable time is still required. My aim in this third edition of *Insect Physiology and Biochemistry* is to produce a book that will be useful to advanced undergraduate and graduate students who may have to take a course in insect physiology, and I hope the book will aid working scientists in a variety of disciplines who conduct research with insects but may have limited time to read general insect physiology. All the topics included in the last edition have been retained, with the addition of recent references to each chapter, more than 500 additional references to those previous chapters. Two new chapters—Biological Rhythms and Insect Symbioses—have been added, with an additional 300+ references, so the book now includes about 2600 references to the literature. Another new feature in this edition is the inclusion of Review and Self-Study Questions at the end of each chapter. I have found these helpful, both in classroom teaching and in a distance education approach with students when I could only communicate with them by e-mail.

I thank Dr. N. Krishnan for suggesting the topic of biological rhythms and for helpful comments on an early version of the chapter and pointing me to some important resources. I am indebted to Dr. Guy Bloch, who read a later version of the chapter and provided very helpful comments. The chapter on insect symbioses was read by Dr. Jiri Hulcr and Dr. Kirsten S. Pelz-Stelinski, both of whom provided very helpful suggestions. I thank again those who read and advised me on the previous editions—Glenn Hall, Marie Nation Becker, Jon Harrison, Tom Miller, and anonymous reviewers.

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Author



James L. Nation, Sr., PhD, is professor emeritus of entomology at the University of Florida, Gainesville. He holds a BSc in entomology from Mississippi State University, Starkville, and a PhD in entomology from Cornell University, Ithaca, New York. His special interest in entomology is the physiology and biochemistry of insects. Prior to retirement in 2003, he taught and conducted research at the University of Florida for 43 years. Although he sometimes taught other courses, he introduced a graduate-level course and mainly taught graduate-level insect physiology. Research activities included work in insect excretion, pheromones, cuticular hydrocarbons, and insect nutrition. He served as an asso-

ciate editor of *Florida Entomologist* from 1967 to 1969, as an editor of the *Journal of Chemical Ecology* from 1994 to 2000, and as editor of *Florida Entomologist* from 2004 to 2010. He has continued to teach a course in the Undergraduate Honors Program called *Global Environmental Issues* each fall term since retirement and introduced a graduate-level course in insect physiology at Florida A&M University in Tallahassee, Florida, in 2006 (taught by interactive television). He wrote both the first (2002) and the second (2008) edition of *Insect Physiology and Biochemistry*. He is active in volunteer activities and gardening.

Contents

Preface.....	xix
Author	xxi
Chapter 1	
Embryogenesis	1
Preview.....	1
1.1 Introduction.....	2
1.2 Morphogenesis	3
1.2.1 Egg, Fertilization, and Zygote Formation.....	3
1.2.2 Variations in Zygotic Nucleus Cleavage, Formation of Energids, and Blastoderm Formation.....	4
1.2.2.1 Apterygota.....	5
1.2.2.2 Hemimetabola	7
1.2.2.3 Holometabola	8
1.2.3 Formation of the Germ Band.....	9
1.2.4 Gastrulation.....	9
1.2.5 Germ Band Elongation	10
1.2.6 Blastokinesis and Extraembryonic Membranes.....	11
1.3 Genetic Control of Embryogenesis	15
1.3.1 Development of a Model for Patterning.....	16
1.3.1.1 <i>Bicoid</i> Gene and Anterior Determination in <i>Drosophila</i>	16
1.3.1.2 Posterior Group Genes and Posterior Pattern Formation.....	18
1.3.1.3 Genes Required in the Acron and Telson.....	18
1.3.1.4 Dorsal–Ventral Axis.....	19
1.4 Segmentation Genes.....	19
1.5 Homeotic Genes.....	20
1.5.1 Homeobox	21
1.6 Organogenesis	21
1.6.1 Neurogenesis	21
1.6.2 Development of the Gut	22
1.6.3 Malpighian Tubules	23
1.6.4 Tracheal System	23
1.6.5 Oenocytes.....	23
1.6.6 Cuticle Secretion in the Embryo.....	23
1.6.7 Cell Movements during Embryogenesis	23
1.6.8 Programmed Cell Death: Apoptosis.....	24
1.7 Hatching.....	24
1.8 Imaginal Discs	24
1.9 Review and Self-Study Questions	28
References	28

Chapter 5

Hormones and Development..... 135

Preview..... 135

5.1 Introduction..... 136

5.2 Historical Beginnings for the Concept of Hormonal Control of Molting and Metamorphosis..... 136

5.3 Interplay of PTTH, Ecdysteroids, and Juvenile Hormone Control Development..... 137

5.4 Brain Neurosecretory Cells and Prothoracicotropic Hormone..... 141

5.4.1 Source and Chemistry..... 141

5.4.2 Bioassay for PTTH Activity 141

5.4.3 Stimuli for the Secretion of PTTH 143

5.4.4 PTTH Secretion after Brain Activation by Stretch Receptors..... 143

5.4.5 Gated PTTH Secretion in Tobacco Hornworm 144

5.4.6 Secretion of PTTH after Brain Activation by Cold Exposure..... 144

5.4.7 Regulation of Tissue and Hemolymph Levels of PTTH..... 144

5.4.8 Mode of Action of PTTH..... 145

5.5 Prothoracic Glands and Ecdysteroids 146

5.5.1 Biosynthesis of Ecdysone 146

5.5.2 Conversion of Ecdysone into 20-Hydroxyecdysone 148

5.5.3 Molecular Diversity in the Structure of the Molting Hormone 148

5.5.4 *Calliphora* Assay for Ecdysteroids 151

5.5.5 Radioimmunoassay for Ecdysone and Related Ecdysteroids 151

5.5.6 Assay by Physicochemical Techniques..... 152

5.5.7 Tissues and Cell Cultures Used in Assays..... 153

5.5.8 Degradation of Ecdysone..... 153

5.5.9 Virus Degradation of Host Ecdysteroids 155

5.5.10 Dependence of Some Parasitoids on Host Ecdysteroids..... 155

5.6 Corpora Allata and Juvenile Hormones..... 155

5.6.1 Glandular Source and Chemistry 155

5.6.2 Assays for JH Activity 157

5.6.3 Regulation of the Tissue and Hemolymph Levels of JH 157

5.6.4 Insect Growth Regulators and Compounds That Are Cytotoxic to the Corpora Allata 161

5.6.5 Cellular Mode of Action and Receptors for JH 162

5.6.6 Downstream Transcription Factors..... 163

5.7 Mode of Action of Ecdysteroids at the Gene Level 164

5.7.1 Chromosomal Puffs 164

5.7.2 Isolation of an Ecdysteroid Receptor 166

5.7.3 Differential Tissue and Cell Response to Ecdysteroids..... 168

5.8 Possible Timer Gene in the Molting Process 170

5.9 Ecdysone–Gene Interaction Ideas Stimulated Vertebrate Work 170

5.10 Review and Self-Study Questions..... 171

References..... 172

Chapter 6

Biological Rhythms 181

Preview..... 181

6.1 Introduction..... 182

6.2 Characteristics of Circadian and Photoperiodic Rhythms..... 182

6.3	Molecular Basis for the Circadian Clock	183
6.4	Evidence for Clock Genes in Many Insects	186
6.5	Examples of Circadian Functions in Insects.....	186
6.5.1	Circadian Regulation of Hormone Secretion.....	186
6.5.2	Circadian Clock Influence in Peripheral Organs and Tissues	188
6.5.3	Circadian Clock Influence in Social Behavior of Honeybees.....	189
6.5.4	Circadian Clock Influence in Reproduction	190
6.6	Photoperiodic Response: One Clock, Two Clocks, or Multiple Clocks?	193
6.7	Clock Models Based on Experimental Responses of Insects to Varying Light/Dark Regimes	195
6.7.1	Hourglass Model.....	196
6.7.2	External Coincidence Model	197
6.7.3	Internal Coincidence Model	197
6.7.4	Resonance Model.....	197
6.7.5	Summary Results from Model Experiments	198
6.8	Conclusions	198
6.9	Review and Self-Study Questions.....	198
	References	199
Chapter 7		
	Diapause.....	207
	Preview.....	207
7.1	Introduction.....	207
7.2	Diapause: A Survival Strategy	208
7.3	Phases of Diapause.....	210
7.3.1	Prediapause: Induction and Preparation	210
7.3.2	Diapause: Initiation and Maintenance	211
7.3.3	Diapause Termination	212
7.4	Hormonal Control of Diapause	212
7.4.1	Embryonic Diapause.....	212
7.4.2	Larval Diapause	213
7.4.3	Pupal Diapause	213
7.4.4	Adult Diapause.....	214
7.5	Role of Daily and Seasonal Biological Clocks in Diapause	215
7.6	Diapause and Gene Expression.....	215
7.7	Nutrient Accumulation for Diapause and the Storage and Conservation of Nutrients during Diapause	216
7.8	Molecular Studies of Diapause	217
7.9	Review and Self-Study Questions.....	218
	References	219
Chapter 8		
	Intermediary Metabolism	223
	Preview.....	223
8.1	Introduction: Nutrient Stores—The Fat Body.....	224
8.2	Energy Demands for Insect Flight	225
8.3	Metabolic Stores.....	226
8.3.1	Carbohydrate Resources	226
8.3.1.1	Trehalose Resources.....	226
8.3.1.2	Glycogen: Storage and Synthesis	229

8.4 Hormones Controlling Carbohydrate Metabolism 230

8.5 Pathways of Metabolism Supporting Intense Muscular Activity, Such as Flight 230

 8.5.1 Glycolysis 230

 8.5.1.1 Glycerol-3-Phosphate Shuttle and Regeneration of NAD⁺ 232

 8.5.1.2 Significance and Control of the Glycerol-3-Phosphate Shuttle 235

 8.5.2 Krebs Cycle 235

 8.5.2.1 Control of Krebs Cycle Metabolism and the Regulation
 of Carbohydrate Metabolism in Flight Muscles 237

 8.5.3 Electron Transport System 237

 8.5.4 Proline as a Fuel for Flight 240

 8.5.5 Mobilization and the Use of Lipids for Flight Energy 243

 8.5.5.1 Transport of Lipids by Lipophorin 247

 8.5.5.2 Activation of Fatty Acids, Entry into Mitochondria, and β -Oxidation 247

8.6 Review and Self-Study Questions 249

References 249

Chapter 9

Neuroanatomy 255

Preview 255

9.1 Introduction 256

9.2 Central Nervous System 256

9.3 Brain 258

 9.3.1 Protocerebrum 259

 9.3.2 Deutocerebrum 260

 9.3.2.1 Antennal Mechanosensory and Motor Center Neuropil 261

 9.3.2.2 Antennal Lobe 261

 9.3.3 Tritocerebrum 263

9.4 Ventral Ganglia 264

 9.4.1 Abdominal Ganglia 265

 9.4.2 Lateral Nerves 266

9.5 Oxygen and Glucose Supply to the Brain and Ganglia 266

9.6 Neuropil 267

9.7 Hemolymph–Brain (CNS) Barrier 268

9.8 Neurons: Building Blocks of a Nervous System 269

 9.8.1 Afferent or Sensory Neurons 270

 9.8.2 Efferent or Motor Neurons 270

 9.8.3 Interneurons 271

 9.8.4 Glial Cells 272

9.9 Giant Axons in the Insect Central Nervous System 273

9.10 Nervous System Control of Behavior: Motor Programs 274

 9.10.1 Motor Program That Controls Walking 274

 9.10.2 Motor Pattern for Rhythmic Breathing 274

9.11 Neurosecretory Cells and Neurosecretion Products from the CNS 276

 9.11.1 Neurosecretory Cells 276

 9.11.2 Adipokinetic Hormone 278

 9.11.3 Proctolin 278

 9.11.4 FMRFamide-Related Peptides 278

 9.11.5 Tachykinins: Locustatachykinins and Leucokinins 279

 9.11.6 Pigment-Dispersing Factors 279

9.11.7	Vasopressin-Like Peptide (Locust F2 Peptide).....	279
9.11.8	Allatotropins and Allatostatins.....	280
9.11.9	Crustacean Cardioactive Peptide	280
9.11.10	Pheromone Biosynthesis Activating Neuropeptide.....	280
	Review and Self-Study Questions.....	281
	References.....	281

Chapter 10		
Neurophysiology		285
Preview.....		285
10.1	Introduction.....	286
10.2	Nerve Cell Responses to Stimuli	286
10.2.1	Graded Responses.....	287
10.2.2	Spike Potentials.....	288
10.3	Physiological Basis for Neuronal Responses to Stimuli	289
10.3.1	Membrane Ion Channels: Bioelectric Potentials.....	289
10.3.2	Resting Potential	292
10.3.3	The Action Potential: Sodium Activation	294
10.3.4	Sodium Inactivation and Repolarization	296
10.3.5	Measurement of Ion Fluxes: Voltage Clamp Technique	297
10.4	Conduction of the Action Potential: Local Circuit Theory.....	298
10.5	Physiology and Biochemistry at the Synapse: Excitatory and Inhibitory Postsynaptic Potentials.....	299
10.6	Acetylcholine-Mediated Synapses.....	301
10.6.1	Action of Acetylcholine at the Synapse.....	301
10.6.2	Nicotinic and Muscarinic Cholinergic Receptors in Insects	302
10.6.3	Acetylcholine Receptor Structure.....	303
10.7	Electric Transmission across Synapses.....	304
10.8	Neuromuscular Junctions	304
10.9	Review and Self-Study Questions	304
	References.....	305

Chapter 11		
Muscles		309
Preview.....		309
11.1	Introduction.....	310
11.2	Basic Muscle Structure and Function	310
11.2.1	Macro- and Microstructure of Muscle.....	310
11.2.2	Muscle Attachments to the Exoskeleton.....	313
11.2.3	Skeletal Muscle	314
11.2.4	Polyneuronal Innervation and Multiterminal Nerve Contacts	314
11.2.5	Transmitter Chemical at Nerve–Muscle Junctions.....	316
11.3	Synchronous and Asynchronous Muscles.....	317
11.4	Muscle Proteins and Physiology of Contraction	320
11.4.1	Active State: Binding of Myosin Heads to Actin and the Sliding of Filaments	322
11.4.2	Release of Myosin Heads from Actin	322
11.5	Muscles Involved in General Locomotion, Running, and Jumping.....	323
11.5.1	Adaptations for Running, Walking, and Survival.....	323
11.5.2	Adaptations for Jumping.....	325

11.6 Sound Production: Tymbal and Stridulatory Muscle 327

11.6.1 Tymbal Morphology and Physiology 327

11.6.2 Stridulatory Muscle Physiology 328

11.7 Morphology and Physiology of Nonskeletal Muscle 329

11.7.1 Visceral Muscles 329

11.7.2 Heart Muscle..... 329

11.7.3 Alary Muscles..... 330

11.8 Review and Self-Study Questions 330

References..... 330

Chapter 12

Flight..... 335

Preview..... 335

12.1 Introduction..... 335

12.2 Thoracic Structure, Wing Hinges, and Muscle Groups Involved in Flight 336

12.3 Wing Strokes 338

12.4 Multiple Contractions from Each Volley of Nerve Impulses to Asynchronous Muscles ... 339

12.5 Flight in Dragonflies and Damselflies 340

12.6 Aerodynamics of Lift and Drag Forces Produced by Wings..... 341

12.6.1 Lift Forces Generated by Clap and Fling Wing Movements..... 342

12.6.2 Lift Forces Derived from Drag and Delayed Stall 343

12.7 Hovering Flight 344

12.8 Control of Pitch and Twisting of Wings..... 346

12.9 Power Output of Flight Muscles..... 346

12.10 Metabolic Activity of Wing Muscles 347

12.11 Flight Behavior..... 348

12.12 Review and Self-Study Questions 348

References..... 349

Chapter 13

Sensory Systems 353

Preview..... 353

13.1 Introduction..... 353

13.2 External and Internal Receptors Monitoring the Environment 355

13.3 General Functional Classification of Sensory Receptors..... 355

13.3.1 Receptors with Multiple Pores..... 356

13.3.2 Receptors with a Single Pore 357

13.3.3 Receptors without Pores 357

13.4 Mechanoreceptors 357

13.4.1 Structure of a Simple Tactile Hair: A Mechanoreceptor Sensillum..... 357

13.4.2 Hair Plates..... 358

13.4.3 Chordotonal Sensilla..... 358

13.4.4 Subgenual Organs 359

13.4.5 Tympanal Organs: Specialized Organs for Airborne Sounds 360

13.4.6 Johnston’s Organ 364

13.4.7 Simple Chordotonal Organs..... 364

13.4.8 Thermoreceptors and Hygroreceptors 365

13.4.9 Infrared Reception 366

13.5 Chemoreceptors 368

 13.5.1 Olfactory Sensilla: Dendritic Fine Structure..... 368

 13.5.2 Contact Chemoreceptors–Gustatory Receptors..... 369

 13.5.3 Specialists versus Generalists among Chemoreceptors..... 371

 13.5.4 Stimulus–Receptor Excitation Coupling 371

13.6 Review and Self-Study Questions 372

References 372

Chapter 14

Vision 377

Preview..... 377

14.1 Introduction 377

14.2 Compound Eye Structure 379

14.3 Dioptric Structures 381

14.4 Corneal Layering 383

14.5 Retinula Cells 383

14.6 Rhabdomeres..... 384

14.7 Electrical Activity of Retinula Cells 384

14.8 Neural Connections in the Optic Lobe 384

14.9 Ocelli..... 385

14.10 Larval Eyes: Stemmata 386

14.11 Dermal Light Sense..... 387

14.12 Chemistry of Insect Vision 388

14.13 Visual Cascade..... 389

14.14 Regulation of the Visual Cascade 390

14.15 Color Vision 391

14.16 Vision Is Important in Behavior..... 394

14.17 Nutritional Need for Carotenoids in Insects 394

14.18 Detection of Plane-Polarized Light..... 395

14.19 Visual Acuity 397

14.20 Review and Self-Study Questions 400

References 400

Chapter 15

Circulatory System..... 405

Preview..... 405

15.1 Introduction: Embryonic Development of the Circulatory System and Hemocytes..... 405

15.2 Dorsal Vessel: Heart and Aorta 406

 15.2.1 Alary Muscles 409

 15.2.2 Ostia 410

 15.2.3 Heartbeat..... 410

 15.2.4 Ionic Influences on Heartbeat 411

 15.2.5 Nerve Supply to the Heart 411

 15.2.6 Cardioactive Secretions 412

15.3 Accessory Pulsatile Hearts 413

15.4 Hemocytes..... 414

 15.4.1 Functions of Hemocytes 416

 15.4.2 Hemocytopoietic Tissues and Origin of Hemocytes 417

 15.4.3 Number of Circulating Hemocytes..... 418

15.5	Hemolymph	420
15.5.1	Functions of Hemolymph and Circulation	420
15.5.2	Hemolymph Volume	422
15.5.3	Coagulation of Hemolymph	422
15.5.4	Hemolymph pH and Hemolymph Buffers	424
15.5.5	Chemical Composition of Hemolymph	425
15.5.5.1	Inorganic Ions	426
15.5.5.2	Free Amino Acids	426
15.5.5.3	Proteins	427
15.5.5.4	Other Organic Constituents	427
15.6	Rate of Circulation	428
15.7	Hemoglobin	428
15.8	Review and Self-Study Questions	429
	References	429
Chapter 16		
	Immunity	433
	Preview	433
16.1	Introduction	433
16.2	Physical Barriers to Invasion	435
16.3	Cellular Immune Reactions	436
16.4	Recognition of Nonself	437
16.5	Synthesis of Antifungal and Antibacterial Peptides	438
16.6	Toll Pathway for the Synthesis of Antimicrobial Peptides	439
16.7	IMD Pathway for the Synthesis of Antimicrobial Peptides	442
16.8	C-Type Lectins	443
16.9	Serpins	443
16.10	Ecology, Behavior, and Immunity	444
16.11	Cost of Defense	445
16.12	Coevolutionary Race between Parasitoid Escape Mechanisms and Host Defense Mechanisms	446
16.13	Autoimmune Consequences of Some Defense Reactions	447
16.14	Gender Differences in Immune Responses	447
16.15	Conclusions	447
16.16	Review and Self-Study Questions	448
	References	448
Chapter 17		
	Respiration	455
	Preview	455
17.1	Introduction	455
17.2	Structure of the Tracheal System	457
17.2.1	Tracheae and Tracheole Structure	457
17.2.2	Spiracle Structure and Function	459
17.2.3	Tracheal Epithelium	462
17.2.4	Development of New Tracheoles	462
17.2.5	Air Sacs	464
17.2.6	Molting of Tracheae	464
17.3	Tracheal Supply to Tissues and Organs	464
17.3.1	Adaptations of Tracheae to Supply Flight Muscles	465

17.4 Ventilation and Diffusion of Gases within the System.....466

17.4.1 Simple Diffusion Is Usually Not Adequate467

17.4.2 Active Ventilation of Tracheae.....467

17.4.3 Diffusion from Tracheoles to Mitochondria.....471

17.5 Discontinuous Gas Exchange.....471

17.6 Water Balance during Flight.....475

17.7 Gas Exchange in Aquatic Insects.....475

17.7.1 Compressible Gas Gills.....476

17.7.2 Incompressible Gas Gills: A Plastron.....477

17.7.3 Use of Aquatic Plants as Air Source.....477

17.7.4 Cutaneous Respiration: Closed Tracheal System in Some Aquatic Insects478

17.8 Respiration in Endoparasitic Insects.....481

17.9 Respiratory Pigments481

17.10 Respiration in Eggs and Developing Embryos.....481

17.11 Nonrespiratory Functions of the Tracheal System.....482

17.12 Review and Self-Study Questions483

References484

Chapter 18

Excretion489

Preview.....489

18.1 Introduction.....489

18.2 Malpighian Tubules.....490

18.3 Malpighian Tubule Cells493

18.4 Formation of Primary Urine in Malpighian Tubules.....494

18.5 Proton Pump as a Driving Mechanism for Urine Formation and Homeostasis495

18.6 Selective Reabsorption in the Hindgut.....499

18.6.1 Anatomical Specialization of Hindgut Epithelial Cells499

18.6.2 Secretion and Reabsorption in the Ileum.....501

18.6.3 Reabsorption in the Rectum501

18.7 Role of the Excretory System in Maintaining Homeostasis502

18.7.1 Electrolyte Homeostasis502

18.7.2 Water Homeostasis.....503

18.7.2.1 Diuretic Hormones504

18.7.2.2 Antidiuretic Hormones.....506

18.7.3 Acid–Base Homeostasis.....506

18.7.4 Nitrogen Homeostasis507

18.7.4.1 Ammonia Excretion508

18.7.4.2 Uric Acid Synthesis and Excretion.....509

18.8 Cryptonephridial Systems.....511

18.9 Self-Study and Review Questions513

References514

Chapter 19

Semiochemicals523

Preview.....523

19.1 Introduction.....524

19.2 Classes of Semiochemicals524

19.3 Importance of the Olfactory Sense in Insects.....525

19.4 Active Space Concept 528

19.5 Pheromones Classified according to Behavior Elicited 528

19.6 Pheromone Parsimony 529

19.7 Chemical Characteristics of Semiochemicals..... 529

19.8 Insect Receptors and the Detection Process 533

 19.8.1 Pheromone-Binding Proteins..... 533

 19.8.2 Signal Transduction and Receptor Response..... 535

 19.8.3 Pheromone Inactivation and Clearing of the Receptor..... 538

 19.8.4 Do Insects Smell the Blend or Just the Major Components?..... 538

19.9 Information Coding and Processing 539

 19.9.1 Structure of Odor Plumes 539

 19.9.2 Pheromone Signal Processing..... 541

19.10 Hormonal Control of Pheromone Synthesis and Release 543

 19.10.1 Mode of Action of PBAN 544

19.11 Biosynthesis of Pheromones 545

19.12 Geographical and Population Differences and Evolution of Pheromone Blends..... 547

19.13 Practical Applications of Pheromones 548

 19.13.1 Mechanisms Operating in Mating Disruption..... 549

 19.13.1.1 Sensory Fatigue 549

 19.13.1.2 False Trail Following 549

 19.13.1.3 Camouflage of Natural Pheromone Plume..... 550

 19.13.1.4 Pheromone Antagonists and Imbalanced Blends..... 550

19.14 Review and Self-Study Questions..... 550

References 551

Chapter 20

Reproduction..... 561

Preview..... 561

20.1 Introduction..... 562

20.2 Female Reproductive System..... 562

 20.2.1 Structure of Ovaries..... 562

 20.2.1.1 Panoistic Ovarioles..... 564

 20.2.1.2 Telotrophic Ovarioles 564

 20.2.1.3 Polytrophic Ovarioles..... 565

 20.2.1.4 Oviposition..... 565

 20.2.2 Nutrients for Oogenesis..... 566

 20.2.3 Hormonal Regulation of Ovary Development and Synthesis of Egg Proteins 567

20.3 Vitellogenins and Yolk Proteins..... 572

 20.3.1 Biochemical Characteristics of Vitellogenins and Yolk Proteins..... 572

 20.3.2 Yolk Proteins of Higher Diptera 573

20.4 Sequestering of Vitellogenins and Yolk Proteins by Oocytes 574

 20.4.1 Patency of Follicular Cells..... 574

 20.4.2 Egg Proteins Produced by Follicular Cells..... 576

 20.4.3 Proteins in Addition to Vitellogenin and Yolk Proteins in the Egg..... 576

20.5 Formation of the Vitelline Membrane 576

20.6 Chorion..... 576

20.7 Gas Exchange in Eggs..... 577

20.8	Male Reproductive System	577
20.8.1	Apyrene and Eupyrene Sperm of Lepidoptera	579
20.8.2	Male Accessory Glands	580
20.8.3	Transfer of Sperm	580
20.9	Gender Determination.....	581
20.10	Review and Self-Study Questions.....	582
	References	583
Chapter 21		
	Insect Symbioses.....	591
	Preview.....	591
21.1	Introduction.....	592
21.2	Symbioses among Leaf-Cutting Ants, Fungi, and Bacteria	593
21.3	Biology of Termites.....	595
21.3.1	Symbionts in Termites	596
21.3.2	Lignocellulose Structure.....	598
21.3.3	Nitrogen Metabolism	599
21.3.4	Fungal Culture	599
21.4	Bark and Ambrosia Beetles and Their Symbionts.....	599
21.4.1	Ambrosia Beetles	600
21.4.2	Bark Beetles.....	603
21.4.3	Fungal Role in Supplementing Limited Nutrients in Wood and Phloem	603
21.4.4	Evolution of Fungal Feeding in Bark Beetles.....	603
21.4.5	Bacteria as Part of the Bark Beetle Holobiont	604
21.4.6	Anthropogenic Effects upon Bark Beetles and Their Symbionts.....	605
21.5	<i>Buchnera</i> in Aphids	605
21.6	Tsetse Fly Symbionts	606
21.7	<i>Wolbachia</i>	607
21.7.1	Cytoplasmic Incompatibility Inducing the Effect of <i>Wolbachia</i>	608
21.7.2	Parthenogenesis Inducing the Effect of <i>Wolbachia</i>	609
21.7.3	Feminizing Strains of <i>Wolbachia</i>	610
21.8	Review and Self-Study Questions.....	611
	References	611
	Index	623