

1. Record Nr.	UNINA9910574066003321
Autore	Prasad K. V. Hari
Titolo	Insect Ecology: Concepts to Management / / by K. V. Hari Prasad
Pubbl/distr/stampa	Singapore : , : Springer Nature Singapore : , : Imprint : Springer, , 2022
ISBN	981-19-1782-5
Edizione	[1st ed. 2022.]
Descrizione fisica	1 online resource (236 pages)
Collana	Biomedical and Life Sciences Series
Disciplina	595.717
Soggetti	Invertebrates Ecology Biotic communities Population biology Invertebrate Zoology Community and Population Ecology
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Intro -- Preface -- Acknowledgments -- Contents -- About the Author -- 1: History of Ecology and Definitions -- 1.1 History -- 1.2 Definitions -- 1.3 Terminology Used -- References -- 2: Concepts of Ecology and Ecological Organization -- 2.1 Structural Concepts -- 2.1.1 Theory of Natural Selection and Role of Environment -- 2.2 Functional Concept -- 2.2.1 Concept of Feedback and Homeostasis -- 2.2.2 Concept of Energy Flow Through Ecosystem -- 2.3 Ecological Organization -- Reference -- 3: Introduction to Insect Ecology -- References -- 4: Factors Responsible for Abundance of Insects -- 4.1 Structural Perfections -- 4.2 Developmental Characters -- 4.3 Protective Adaptations -- References -- 5: Factors Affecting Growth and Metabolism of Insects -- 5.1 Effect of Abiotic Factors on Insect Population -- 5.1.1 Temperature -- 5.1.1.1 Development -- 5.1.1.1.1 Survival of Insects at Low Temperature -- 5.1.1.1.2 Survival of Insects at High Temperature -- 5.1.1.1.3 Fog-Basking Beetles -- 5.1.1.1.4 Behavioral Thermoregulation -- 5.1.1.2 Fecundity -- 5.1.1.3 Distribution, Dispersal, and Movement -- 5.1.1.3.1 Distribution -- 5.1.1.3.2 Dispersal and Movement -- 5.1.2 Moisture -- 5.1.2.1 Adaptations to Conserve Moisture -- 5.1.3 Humidity -- 5.1.4 Rainfall

-- 5.1.5 Light -- 5.1.6 Atmospheric Pressure -- 5.1.7 Wind and Air Currents -- 5.1.8 Water Currents -- 5.1.9 Edaphic (Soil) Factors -- 5.2 Biotic Factors -- 5.2.1 Food -- 5.2.2 Association with Other Organisms -- 5.2.2.1 Beneficial Associations -- 5.2.2.2 Leaf-Cutter Ant-Fungus Garden Mutualism -- 5.2.2.2.1 Harmful Associations -- 5.3 Self-regulation of Density -- 5.3.1 Balance of Life -- References -- 6: Insect-Plant Interactions and Role of Secondary Metabolites -- 6.1 Theories of Insect-Plant Associations -- 6.2 Coevolution of Insect Orders and Plants -- 6.3 Hexapod Gap.

6.4 Herbivory: Also Known as Phytophagy. Greek Word Phytion-Plant -- Phagei-To Eat -- 6.4.1 Feeding Strategies of Herbivorous Insects -- 6.4.2 Theories of Herbivore Attacks on Plant -- 6.4.2.1 Nitrogen Limitation Theory -- 6.4.2.2 Stress Hypothesis -- 6.4.2.3 The Climatic Release Hypothesis (Wellington, 1954a, 1954b) -- 6.4.2.4 Plant Vigor Hypothesis -- 6.5 Insect-Plant Mutualism -- 6.5.1 Pollination -- 6.5.1.1 Entomophily or Insect Pollinators -- 6.5.1.1.1 Cantharophily (Pollination by Beetles) -- 6.5.1.1.2 Mycophily (Pollination by Flies) -- 6.5.1.1.3 Pollination by Hymenopteran Insects -- 6.5.1.1.4 Myrmecophily (Pollination by Ants) -- 6.5.1.1.5 Melittophily (Pollination by Bees) -- 6.5.1.1.6 Psychophily (Pollination by Butterflies) -- 6.5.1.1.7 Phalaenophily (Pollination by Moths) -- 6.5.1.2 Fig-Wasp Association -- 6.5.1.3 Deceptive Pollination -- 6.5.1.3.1 Brood-Site Deception -- 6.5.1.3.2 Sexual Deception -- 6.5.2 Plants as Food and Source of Secondary Metabolites (as Defense) for Insect Herbivores -- 6.5.2.1 Terpenes -- 6.5.2.1.1 Monoterpenes(C10) -- 6.5.2.1.2 Sesquiterpenes (C15) -- Sesquiterpene Lactones -- 6.5.2.1.3 Phytojuvenile Hormone -- 6.5.2.1.4 Diterpenes (C20) -- 6.5.2.1.5 Triterpenes (C30) -- 6.5.2.1.6 Saponins -- 6.5.2.1.7 Tetraterpenoids -- 6.5.2.1.8 Polyterpenes -- 6.5.2.2 Phenols -- 6.5.2.2.1 Coumarin -- 6.5.2.2.2 Lignin -- 6.5.2.2.3 Flavonoids and Anthocyanins -- 6.5.2.2.4 Tannins -- 6.5.2.2.5 Nitrogen Containing Secondary Metabolites -- 6.5.2.3 Alkaloids -- 6.5.2.4 Cyanogenic Glucosides -- 6.5.3 Sulfur Containing Secondary Metabolites -- 6.5.3.1 Glucosinolates -- 6.5.3.2 Lectins and Phytoalexins -- 6.5.3.2.1 Lectins -- 6.5.3.2.2 Phytoalexins -- 6.5.3.3 Non-protein Amino Acids -- References -- 7: Insect Chemical Ecology -- 7.1 Introduction -- 7.2 Insect Chemical Ecology -- 7.3 Semiochemicals -- 7.3.1 Pheromones.

7.4 Classification of Pheromones Based on Their Functions -- 7.4.1 Sex Pheromones -- 7.4.1.1 Male Sex Pheromone/Attractant/Aggregate Pheromone -- 7.4.1.2 Male Sex Pheromones and Host Plant Odors -- 7.4.2 Leks and Its Significance -- 7.4.3 Epideictic or Dispersion Pheromones -- 7.4.4 Alarm Pheromones -- 7.4.5 Host Marking Pheromones -- 7.4.6 Trail Pheromones -- 7.5 Allelochemicals -- 7.5.1 Allomones -- 7.5.2 *Plutella xylostella* Diamondback Moth (DBM)-*Brassica* Plant-*Apanteles plutellae* -- 7.5.3 Allomone in Insects -- 7.5.3.1 Kairomones -- 7.5.3.2 Synomones -- 7.5.3.3 Apneumones -- 7.5.3.4 Parapheromones -- 7.6 Uses of Pheromones in IPM -- 7.6.1 Monitoring -- 7.6.2 Mating Disruption -- 7.6.3 Mass Trapping -- 7.6.4 Male Annihilation Technique or Attract-and-Kill -- 7.7 Combination of Pheromones and Kairomones -- 7.8 Push and Pull Strategy -- 7.9 Possible Use of Host Marking Pheromone in Pest Management -- 7.10 Possible Role of Using Female Annihilation Technique -- References -- 8: Seasonality in Insects -- 8.1 Homodynamic Insects or Life Cycles -- 8.2 Heterodynamic Insects or Life Cycles -- 8.3 Migration -- 8.3.1 Patterns of Migration -- 8.4 Dormancy -- 8.4.1 Difference Between Torpor and Quiescence -- 8.4.1.1 Diapause -- 8.4.1.2 Stages of Diapause -- 8.4.1.3 Classification of Diapause -- References -- 9: Characters of Population -- 9.1 Population Density -- 9.2 Natality --

9.3 Mortality -- 9.4 Population Growth -- 9.5 Survivorship Curves --
 9.6 Age Structure -- 9.7 Age Pyramids -- 9.8 Rate of Growth of a
 Population -- 9.8.1 Logistic Growth -- 9.9 Population Dispersal --
 9.9.1 Life History Strategies -- 9.9.2 Crowding -- 9.9.3 Nutritional
 Status -- 9.9.4 Habitat Condition -- 9.10 Population Structure -- 9.11
 Distribution Patterns -- 9.11.1 Distribution Parameters and Their
 Calculations -- 9.11.1.1 Species Distribution Models.
 9.12 Population Aggregation -- 9.13 Population Isolation and
 Territoriality -- 9.14 Interactions: Both Intraspecific and Interspecific --
 References -- 10: Population Dynamics -- 10.1 Extrinsic
 Factors/Density-Independent/Exogenous Process -- 10.1.1 Abiotic
 Factors -- 10.1.1.1 Direct Effect -- 10.1.1.2 Indirect Effect -- 10.1.2
 Space -- 10.2 Intrinsic Factors/Density Dependent/Endogenous
 Process/Biotic Factors -- 10.2.1 Endogenous Process -- 10.2.1.1 Host
 Plant Effect/Effect of Food -- 10.2.2 Lateral Effect -- 10.2.2.1
 Pathological Effect Due to Overcrowding -- 10.2.2.2 Aggressiveness
 and Cannibalism -- 10.2.2.2.1 Factors Affecting Cannibalism --
 10.2.2.3 Competition -- 10.2.2.3.1 Intraspecific Competition --
 10.2.2.3.2 Interference Competition/Contest Competition -- 10.2.2.3.3
 Exploitation Competition/Scramble Competition -- 10.2.2.3.4 Apparent
 Competition -- 10.2.2.3.5 Factors Affecting Competition -- 10.2.2.3.6
 Characteristics of Intraspecific Competition -- 10.2.2.3.7 Competition
 for Mate -- 10.2.2.4 Polymorphic Behavior for Dispersal -- 10.2.2.5
 Induced Defense -- 10.2.3 Natural Enemies -- 10.2.3.1 Predation --
 10.2.3.2 Parasitoids -- 10.2.3.3 Diseases -- 10.2.3.3.1 Bacteria --
 10.2.3.3.2 Viruses -- 10.2.3.3.3 Fungi -- 10.2.3.3.4 Protozoa --
 10.2.3.3.5 Acaropathogens -- 10.3 Feedback Mechanism -- 10.3.1
 Genetic Breakdown During Flush Period -- 10.3.2 Genetic Feedback --
 10.4 Life Tables and Demography -- 10.4.1 Life Table -- 10.4.2
 Construction of Horizontal Life Table -- References -- 11: Community
 Structure -- 11.1 Community Development -- 11.2 Community
 Structure -- 11.2.1 Species Diversity, Richness, and Evenness --
 11.2.1.1 Types of Species Diversity (Whittakerr, 1972) -- 11.2.1.2
 Measurement of Diversity -- 11.2.1.3 Factors that Influence the Species
 Richness -- 11.2.1.4 Theories of Diversity -- 11.2.2 Species
 Interaction.
 11.2.2.1 Interspecific Interactions -- 11.2.2.1.1 Antagonistic
 Interactions -- 11.2.2.1.2 Mutualism -- Obligatory Mutualism --
 11.2.2.2 Competition -- 11.2.2.2.1 Competition -- 11.2.2.2.2 Types of
 Competition -- 11.2.2.2.3 Interference Competition -- 11.2.2.2.4
 Exploitation Competition -- 11.2.2.2.5 Evidence for Competitive
 Exclusion -- Species Coexistence -- 11.2.2.2.6 Resource Partitioning
 -- Apparent Competition -- 11.2.2.3 Commensalism -- 11.2.2.3.1
 Phoresy -- 11.2.2.3.2 Inquilinism -- 11.2.2.3.3 Metabiosis -- 11.2.2.4
 Amensalism/Allelopathy -- 11.2.2.5 Neutralism -- 11.2.3 Predator-
 Prey Interaction -- 11.2.3.1 The Generalized Feeding Habit of Predators
 -- 11.2.3.2 Predatory Strategies -- 11.2.3.3 Functional Response --
 11.2.3.3.1 Functional Response to a Defended Prey -- 11.2.3.3.2
 Predator-Dependent Functional Response -- 11.2.3.4 Numerical
 Response -- 11.2.3.4.1 Predator-Prey Interactions -- 11.2.3.5
 Evolution of Antipredatory Strategies -- 11.2.3.5.1 Defense
 Mechanisms -- 11.2.3.6 Parasitoid-insect interaction -- 11.2.3.6.1
 Parasitism -- 11.2.3.6.2 Parasitoid-Host Interaction -- 11.2.4 Concept
 of NICHE -- 11.2.4.1 Aspects of Ecological Niche -- 11.2.4.2 Niche
 Width -- 11.2.4.2.1 Realized Niche Width -- 11.2.4.2.2 Measuring
 Niche Width -- 11.2.4.3 Niche Overlap -- 11.2.4.3.1 Shannon-Wiener
 Measure -- 11.2.4.3.2 Smith's Measure -- 11.2.4.4 Niche
 Separation/Modes of Species Coexistence -- 11.2.4.4.1 Niche

Differentiation -- Niche
Differentiation/Segregation/Partitioning/Separation -- References --
12: Community Functions/Dynamics -- 12.1 Community Dynamics --
12.1.1 Succession -- 12.1.1.1 Characters of Ecological Succession --
12.1.1.1.1 Other Useful Definitions -- 12.1.1.2 Process of Ecological
Succession -- 12.1.1.2.1 Seral Community -- 12.1.1.3 Factors
Affecting Ecological Succession -- 12.1.1.4 Ecological Climax Theories.
12.1.2 Food Chains.

Sommario/riassunto

This book presents comprehensive information on various aspects of ecology with special reference to insects, to form a platform to design an ecologically sound insect pest management. Insects are the most dominant and diverse group of living organism on earth. Owing to their smaller size, smaller space and food requirements, more number of generation per unit time, insects serves as one of the best subject matter for studies on various ecological aspects such as chemical ecology, population dynamics, predator/parasitoid-prey interactions etc. The knowledge on various aspects of insect ecology helps in formulating an effective environmentally benign insect pest management. This book is of interest and use to the post graduate students and researchers working on various aspects of insect ecology with special emphasis on population dynamics, chemical ecology, tri trophic interactions, ecological engineering and Ecological Insect pest management.
