

Niche Meaning In Biology

Niche Meaning in Biology: Understanding the Ecological Role of Specialization

Introduction:

Ever wonder how so many different species can coexist in a single environment? The answer, in large part, lies in the concept of a "niche." This isn't just a cozy corner of the habitat; in biology, a niche represents a species' complete role within its ecosystem. This in-depth guide will unravel the intricate meaning of "niche" in biology, exploring its various components, its importance in understanding biodiversity, and the implications of niche overlap and competition. We'll delve into real-world examples and address common misconceptions, equipping you with a comprehensive understanding of this fundamental ecological concept.

What is a Niche in Biology? Beyond Habitat:

The term "niche" often gets conflated with "habitat," but they are distinctly different. Habitat refers to where an organism lives – its physical location. A niche, however, describes how an organism lives within its habitat. It encompasses the entire range of physical, chemical, and biological conditions and resources that a species needs to survive and reproduce. Think of it as the organism's "profession" within its environment.

Key Components of a Niche:

Several factors contribute to defining a species' niche:

Fundamental Niche: This represents the full range of environmental conditions and resources a species could potentially occupy in the absence of competition or other limiting factors. It's the theoretical maximum.

Realized Niche: This is the actual niche a species occupies, considering the constraints imposed by biotic factors like competition, predation, and disease. It's often smaller than the fundamental niche.

Niche Dimensions: These are the specific environmental factors influencing a species' survival and reproduction. Examples include temperature tolerance, food preferences, breeding season, and interactions with other species.

Resource Partitioning: This occurs when competing species utilize different aspects of a shared resource, effectively dividing the niche to minimize direct competition. For instance, different bird species might feed on insects from different parts of a tree.

Niche Overlap and Competition:

When two or more species have overlapping niches – using the same resources in the same ways – competition arises. This competition can lead to several outcomes:

Competitive Exclusion: One species outcompetes the other, leading to the local extinction or displacement of the less competitive species.

Niche Differentiation: Species evolve to utilize slightly different resources or occupy different parts of the habitat, minimizing competition. This is a driver of natural selection.

Coexistence: Species find a way to coexist even with some degree of niche overlap, often through mechanisms like resource partitioning or temporal separation (e.g., being active at different times of day).

Examples of Niches in Action:

Let's look at some real-world examples to illustrate the concept:

Giant Pandas: Their niche is highly specialized. They primarily feed on bamboo, requiring specific bamboo species and exhibiting adaptations for efficient bamboo digestion. Their habitat is also restricted to mountainous regions with suitable bamboo forests.

Galapagos Finches: These famously illustrate adaptive radiation and niche differentiation. Different finch species on the Galapagos Islands have evolved different beak shapes and sizes, allowing them to exploit different food sources (seeds, insects, etc.), minimizing competition.

African Savanna Herbivores: Various herbivores coexist by specializing on different plant parts or types. For example, zebras graze on grasses, wildebeest prefer shorter grasses, and giraffes feed on leaves high in trees.

The Importance of Niche Understanding:

Understanding species' niches is crucial for various reasons:

Conservation Biology: Identifying a species' niche is fundamental for effective conservation strategies. Knowing its resource requirements and interactions with other species helps determine suitable habitat and manage threats.

Predicting Ecosystem Changes: Niche modeling can help predict how species will respond to environmental changes, such as climate change or habitat fragmentation.

Invasive Species Management: Understanding the niche of an invasive species can help in developing strategies to control its spread and minimize its impact on native ecosystems.

Understanding Biodiversity: The diversity of niches within an ecosystem is a key indicator of its overall biodiversity and stability.

Conclusion:

The concept of a niche is far more than a simple location; it represents a species' multifaceted role within its ecosystem. By understanding the components of a niche, the dynamics of niche overlap and competition, and the importance of niche specialization, we gain profound insights into the complex tapestry of life on Earth. This knowledge is essential for effective conservation efforts,

predicting ecological changes, and appreciating the intricacies of biodiversity.

Article Outline: Niche Meaning in Biology

- I. Introduction: Hooking the reader, providing an overview of the article's content.
- II. What is a Niche in Biology? Beyond Habitat: Defining the niche and differentiating it from habitat.
- III. Key Components of a Niche: Exploring fundamental niche, realized niche, niche dimensions, and resource partitioning.
- IV. Niche Overlap and Competition: Discussing competitive exclusion, niche differentiation, and coexistence.
- V. Examples of Niches in Action: Providing real-world examples to illustrate niche concepts.
- VI. The Importance of Niche Understanding: Highlighting the significance of niche understanding in various fields.
- VII. Conclusion: Summarizing key points and reinforcing the importance of niche understanding.
- VIII. FAQs: Answering frequently asked questions about niche concepts.
- IX. Related Articles: Listing and describing related articles.

(The content above already fulfills points I-VII of the outline.)

VIII. FAQs:

1. What's the difference between a fundamental and realized niche? The fundamental niche represents the potential niche a species could occupy, while the realized niche is the actual niche it occupies due to biotic interactions.
2. Can two species occupy the exact same niche? No, according to the competitive exclusion principle, two species cannot coexist indefinitely if they occupy the exact same niche.
3. How does niche partitioning contribute to biodiversity? Niche partitioning allows multiple species to coexist by utilizing different resources or aspects of a habitat, increasing biodiversity.
4. What role does predation play in shaping a species' niche? Predation can significantly limit a species' realized niche by restricting its habitat use and foraging behavior.
5. How does climate change affect species' niches? Climate change can alter the abiotic conditions within a niche, forcing species to adapt, migrate, or face extinction.
6. What is niche construction? Niche construction refers to the process by which organisms modify their environment, influencing their own niches and those of other species.

7. How is niche modeling used in conservation? Niche modeling predicts suitable habitat for a species, aiding in conservation planning and management.

8. Can a species' niche change over time? Yes, a species' niche can change due to evolution, environmental changes, or interactions with other species.

9. What is the relationship between niche breadth and specialization? A narrow niche breadth indicates high specialization, while a broad niche breadth suggests greater generalism.

IX. Related Articles:

1. Competitive Exclusion Principle: A detailed explanation of the principle and its implications for species coexistence.

2. Adaptive Radiation: Exploring the process by which a single ancestral species diversifies into multiple species occupying different niches.

3. Resource Partitioning in Communities: Examining different mechanisms of resource partitioning and their effects on community structure.

4. Niche Construction Theory: A deeper dive into how organisms actively shape their environments and their own niches.

5. Invasive Species and Niche Overlap: Analyzing the role of niche overlap in the success of invasive species.

6. Climate Change and Niche Shifts: Investigating the impacts of climate change on species' niches and distributions.

7. Species Distribution Modeling: Explaining the use of models to predict species distributions based on their niche requirements.

8. Biodiversity Hotspots and Niche Diversity: Connecting niche diversity to the identification and conservation of biodiversity hotspots.

9. The Role of Competition in Shaping Ecological Communities: A broader overview of the importance of competition in structuring ecological communities and shaping species niches.

niche meaning in biology: Ecological Niches and Geographic Distributions (MPB-49) A. Townsend Peterson, 2011-11-20 Terminology, conceptual overview, biogeography, modeling.

niche meaning in biology: Encyclopedia of Ecology Brian D. Fath, 2014-11-03 The groundbreaking Encyclopedia of Ecology provides an authoritative and comprehensive coverage of the complete field of ecology, from general to applied. It includes over 500 detailed entries, structured to provide the user with complete coverage of the core knowledge, accessed as intuitively as possible, and heavily cross-referenced. Written by an international team of leading experts, this revolutionary encyclopedia will serve as a one-stop-shop to concise, stand-alone articles to be used as a point of entry for undergraduate students, or as a tool for active researchers looking for the latest information in the field. Entries cover a range of topics, including: Behavioral Ecology Ecological Processes Ecological Modeling Ecological Engineering Ecological Indicators Ecological

Informatics Ecosystems Ecotoxicology Evolutionary Ecology General Ecology Global Ecology Human Ecology System Ecology The first reference work to cover all aspects of ecology, from basic to applied Over 500 concise, stand-alone articles are written by prominent leaders in the field Article text is supported by full-color photos, drawings, tables, and other visual material Fully indexed and cross referenced with detailed references for further study Writing level is suited to both the expert and non-expert Available electronically on ScienceDirect shortly upon publication

niche meaning in biology: Niche Construction F. John Odling-Smee, Kevin N. Lala, Marcus Feldman, 2013-02-15 The seemingly innocent observation that the activities of organisms bring about changes in environments is so obvious that it seems an unlikely focus for a new line of thinking about evolution. Yet niche construction--as this process of organism-driven environmental modification is known--has hidden complexities. By transforming biotic and abiotic sources of natural selection in external environments, niche construction generates feedback in evolution on a scale hitherto underestimated--and in a manner that transforms the evolutionary dynamic. It also plays a critical role in ecology, supporting ecosystem engineering and influencing the flow of energy and nutrients through ecosystems. Despite this, niche construction has been given short shrift in theoretical biology, in part because it cannot be fully understood within the framework of standard evolutionary theory. Wedding evolution and ecology, this book extends evolutionary theory by formally including niche construction and ecological inheritance as additional evolutionary processes. The authors support their historic move with empirical data, theoretical population genetics, and conceptual models. They also describe new research methods capable of testing the theory. They demonstrate how their theory can resolve long-standing problems in ecology, particularly by advancing the sorely needed synthesis of ecology and evolution, and how it offers an evolutionary basis for the human sciences. Already hailed as a pioneering work by some of the world's most influential biologists, this is a rare, potentially field-changing contribution to the biological sciences.

niche meaning in biology: The Princeton Guide to Ecology Simon A. Levin, Stephen R. Carpenter, H. Charles J. Godfray, Ann P. Kinzig, Michel Loreau, Jonathan B. Losos, Brian Walker, David S. Wilcove, 2012-09-30 The Princeton Guide to Ecology is a concise, authoritative one-volume reference to the field's major subjects and key concepts. Edited by eminent ecologist Simon Levin, with contributions from an international team of leading ecologists, the book contains more than ninety clear, accurate, and up-to-date articles on the most important topics within seven major areas: autecology, population ecology, communities and ecosystems, landscapes and the biosphere, conservation biology, ecosystem services, and biosphere management. Complete with more than 200 illustrations (including sixteen pages in color), a glossary of key terms, a chronology of milestones in the field, suggestions for further reading on each topic, and an index, this is an essential volume for undergraduate and graduate students, research ecologists, scientists in related fields, policymakers, and anyone else with a serious interest in ecology. Explains key topics in one concise and authoritative volume Features more than ninety articles written by an international team of leading ecologists Contains more than 200 illustrations, including sixteen pages in color Includes glossary, chronology, suggestions for further reading, and index Covers autecology, population ecology, communities and ecosystems, landscapes and the biosphere, conservation biology, ecosystem services, and biosphere management

niche meaning in biology: Handbook of Evolutionary Thinking in the Sciences Thomas Heams, Philippe Huneman, Guillaume Lecointre, Marc Silberstein, 2014-11-23 The Darwinian theory of evolution is itself evolving and this book presents the details of the core of modern Darwinism and its latest developmental directions. The authors present current scientific work addressing theoretical problems and challenges in four sections, beginning with the concepts of evolution theory, its processes of variation, heredity, selection, adaptation and function, and its patterns of character, species, descent and life. The second part of this book scrutinizes Darwinism in the philosophy of science and its usefulness in understanding ecosystems, whilst the third section deals with its application in disciplines beyond the biological sciences, including evolutionary psychology

and evolutionary economics, Darwinian morality and phylolinguistics. The final section addresses anti-Darwinism, the creationist view and issues around teaching evolution in secondary schools. The reader learns how current experimental biology is opening important perspectives on the sources of variation, and thus of the very power of natural selection. This work examines numerous examples of the extension of the principle of natural selection and provides the opportunity to critically reflect on a rich theory, on the methodological rigour that presides in its extensions and exportations, and on the necessity to measure its advantages and also its limits. Scholars interested in modern Darwinism and scientific research, its concepts, research programs and controversies will find this book an excellent read, and those considering how Darwinism might evolve, how it can apply to the human sciences and other disciplines beyond its origins will find it particularly valuable. Originally produced in French (*Les Mondes Darwiniens*), the scope and usefulness of the book have led to the production of this English text, to reach a wider audience. This book is a milestone in the impressive penetration by Francophone scholars into the world of Darwinian science, its historiography and philosophy over the last two decades. Alex Rosenberg, R. Taylor Cole Professor of Philosophy, Duke University Until now this useful and comprehensive handbook has only been available to francophones. Thanks to this invaluable new translation, this collection of insightful and original essays can reach the global audience it deserves. Tim Lewens, University of Cambridge

niche meaning in biology: *Treatise on Estuarine and Coastal Science* , 2012-03-06 The study of estuaries and coasts has seen enormous growth in recent years, since changes in these areas have a large effect on the food chain, as well as on the physics and chemistry of the ocean. As the coasts and river banks around the world become more densely populated, the pressure on these ecosystems intensifies, putting a new focus on environmental, socio-economic and policy issues. Written by a team of international expert scientists, under the guidance of Chief Editors Eric Wolanski and Donald McClusky, the *Treatise on Estuarine and Coastal Science*, Ten Volume Set examines topics in depth, and aims to provide a comprehensive scientific resource for all professionals and students in the area of estuarine and coastal science Most up-to-date reference for system-based coastal and estuarine science and management, from the inland watershed to the ocean shelf Chief editors have assembled a world-class team of volume editors and contributing authors Approach focuses on the physical, biological, chemistry, ecosystem, human, ecological and economics processes, to show how to best use multidisciplinary science to ensure earth's sustainability Provides a comprehensive scientific resource for all professionals and students in the area of estuarine and coastal science Features up-to-date chapters covering a full range of topics

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niche meaning in biology: *Food Not Lawns* H. C. Flores, 2006 Combines practical wisdom on ecological design and community-building with a fresh, green perspective on an age-old subject. Activist and urban gardener Heather Flores shares her nine-step permaculture design to help

farmsteads and city dwellers alike build fertile soil, promote biodiversity, and increase natural habitat in their own paradise gardens. This joyful lifestyle manual inspires readers to apply the principles of the paradise garden--simplicity, resourcefulness, creativity, mindfulness, and community--to all aspects of life. Plant guerrilla gardens in barren intersections and medians; organize community meals; start a street theater troupe or host a local art swap; free your kitchen from refrigeration and enjoy truly fresh, nourishing foods from your own plot of land; work with children to create garden play spaces. Flores cares passionately about the damaged state of our environment and our throwaway society. Here, she shows us how to reclaim the earth, one garden at a time.--From publisher description.

niche meaning in biology: From Habitability to Life on Mars Nathalie A. Cabrol, Edmond A. Grin, 2018-06-29 From *Habitability to Life on Mars* explores the current state of knowledge and questions on the past habitability of Mars and the role that rapid environmental changes may have played in the ability of prebiotic chemistry to transition to life. It investigates the role that such changes may have played in the preservation of biosignatures in the geological record and what this means for exploration strategies. Throughout the book, the authors show how the investigation of terrestrial analogs to early Martian habitats under various climates and environmental extremes provide critical clues to understand where, what and how to search for biosignatures on Mars. The authors present an introduction to the newest developments and state-of-the-art remote and in situ detection strategies and technologies that are being currently developed to support the upcoming ExoMars and Mars 2020 missions. They show how the current orbital and ground exploration is guiding the selection for future landing sites. Finally, the book concludes by discussing the critical question of the implications and ethics of finding life on Mars. - Edited by the lead on a NASA project that searches for habitability and life on Mars leading to the Mars 2020 mission - Presents the evidence, questions and answers we have today (including a summary of the current state of knowledge in advance of the ESA ExoMars and NASA Mars 2020 missions) - Includes contributions from authors directly involved in past, current and upcoming Mars missions - Provides key information as to how Mars rovers, such as ExoMars and Mars 2020, will address the search for life on Mars with their instrumentation

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niche meaning in biology: The Ecology of Adaptive Radiation Dolph Schluter, 2000-08-31 Adaptive radiation is the evolution of diversity within a rapidly multiplying lineage. It can cause a single ancestral species to differentiate into an impressively vast array of species inhabiting a variety of environments. Much of life's diversity has arisen during adaptive radiations. Some of the most famous recent examples include the East African cichlid fishes, the Hawaiian silverswords, and of course, Darwin's Galapagos finches. This book evaluates the causes of adaptive radiation. It focuses on the 'ecological' theory of adaptive radiation, a body of ideas that began with Darwin and was developed through the early part of the 20th Century. This theory proposes that phenotypic divergence and speciation in adaptive radiation are caused ultimately by divergent natural selection arising from differences in environment and competition between species. In *The Ecology of Adaptive Radiation* the author re-evaluates the ecological theory, along with its most significant extensions and challenges, in the light of all the recent evidence. This important book is the first full exploration of the causes of adaptive radiation to be published for decades, written by

one of the world's best young evolutionary biologists.

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niche meaning in biology: The Ecosystem Concept in Natural Resource Management George Van Dyne, 2012-12-02 The Ecosystem Concept in Natural Resource Management focuses on the ecosystem concept and its application to natural resource management. It presents examples of research concepts on natural resource phenomena and discusses ecosystem implications for natural resource management. It also covers range, forest, watershed, fisheries, and wildlife resource science and management. Organized into four sections encompassing 10 chapters, this volume begins with an overview of the meaning, origin, and importance of ecosystem concepts before proceeding with a discussion of field research projects that address the ecosystem concept and the ways in which the concept has been or can be useful in both research and management in natural resource sciences. More specifically, it explores major developments in the field of ecology in relation to natural resource management, with examples from forest ecology. It also introduces the reader to procedures for studying grassland ecosystems, the watershed-ecosystem concept and studies of nutrient cycles, ecosystem concepts in forestry, ecosystem models in watershed management, and the implementation of the ecosystem concept in training in the natural resource sciences. This book is a valuable resource for scientists, educators, technicians, and training resource managers, as well as students in resource management courses.

niche meaning in biology: The Ancestor's Tale Richard Dawkins, 2004 A renowned biologist provides a sweeping chronicle of more than four billion years of life on Earth, shedding new light on evolutionary theory and history, sexual selection, speciation, extinction, and genetics.

niche meaning in biology: Species Coexistence M. Tokeshi, 2009-06-22 As a novel endeavour in ecological science, this book focuses on a major issue in organismal life on Earth: species coexistence. The book crosses the usual disciplinary boundaries between palaeobiology, ecology and evolutionary biology and provides a timely overview of the patterns and processes of species diversity and coexistence on a range of spatio-temporal scales. In this unique synthesis, the author offers a critical and penetrating examination of the concepts and models of coexistence and community structure, thus making a valuable contribution to the field of community ecology. There is an emphasis on clarity and accessibility without sacrificing scientific rigour, making this book suitable for both advanced students and individual researchers in ecology, palaeobiology and environmental and evolutionary biology. Comprehensive and contemporary synthesis. Pulls together the aggregate influence of evolution and ecology on patterns in communities. Balanced mix of theory and empirical work. Clearly structured chapters with short introduction and summary.

niche meaning in biology: Keywords in Evolutionary Biology Evelyn Fox Keller, Elisabeth Anne Lloyd, 1992 In science, more than elsewhere, a word is expected to mean what it says, nothing more, nothing less. But scientific discourse is neither different nor separable from ordinary language--meanings are multiple, ambiguities ubiquitous. *Keywords in Evolutionary Biology* grapples with this problem in a field especially prone to the confusion engendered by semantic imprecision. Written by historians, philosophers, and biologists--including, among others, Stephen Jay Gould, Diane Paul, John Beatty, Robert Richards, Richard Lewontin, David Sloan Wilson, Peter Bowler, and Richard Dawkins--these essays identify and explicate those terms in evolutionary biology which, though commonly used, are plagued by multiple concurrent and historically varying meanings. By clarifying these terms in their many guises, the editors Evelyn Fox Keller and Elisabeth Lloyd hope

to focus attention on major scholarly problems in the field--problems sometimes obscured, sometimes reveals, and sometimes even created by the use of such equivocal words. Competition, adaptation, and fitness, for instance, are among the terms whose multiple meaning have led to more than merely semantic debates in evolutionary biology. Exploring the complexity of keywords and clarifying their role in prominent issues in the field, this book will prove invaluable to scientists and philosophers trying to come to terms with evolutionary theory; it will also serve as a useful guide to future research into the way in which scientific language works.

niche meaning in biology: Life at the Limits David A. Wharton, 2007-07-23 We are fascinated by the seemingly impossible places in which organisms can live. There are frogs that freeze solid, worms that dry out and bacteria that survive temperatures over 100°C. What seems extreme to us is, however, not extreme to these organisms. In this captivating account, the reader is taken on a tour of extreme environments, and shown the remarkable abilities of organisms to survive a range of extreme conditions, such as high and low temperatures and desiccation. This book considers how organisms survive major stresses and what extreme organisms can tell us about the origin of life and the possibilities of extraterrestrial life. These organisms have an extreme biology, which involves many aspects of their physiology, ecology and evolution.

niche meaning in biology: Bird Species Dieter Thomas Tietze, 2018-11-19 The average person can name more bird species than they think, but do we really know what a bird "species" is? This open access book takes up several fascinating aspects of bird life to elucidate this basic concept in biology. From genetic and physiological basics to the phenomena of bird song and bird migration, it analyzes various interactions of birds - with their environment and other birds. Lastly, it shows imminent threats to birds in the Anthropocene, the era of global human impact. Although it seemed to be easy to define bird species, the advent of modern methods has challenged species definition and led to a multidisciplinary approach to classifying birds. One outstanding new toolbox comes with the more and more reasonably priced acquisition of whole-genome sequences that allow causative analyses of how bird species diversify. Speciation has reached a final stage when daughter species are reproductively isolated, but this stage is not easily detectable from the phenotype we observe. Culturally transmitted traits such as bird song seem to speed up speciation processes, while another behavioral trait, migration, helps birds to find food resources, and also coincides with higher chances of reaching new, inhabitable areas. In general, distribution is a major key to understanding speciation in birds. Examples of ecological speciation can be found in birds, and the constant interaction of birds with their biotic environment also contributes to evolutionary changes. In the Anthropocene, birds are confronted with rapid changes that are highly threatening for some species. Climate change forces birds to move their ranges, but may also disrupt well-established interactions between climate, vegetation, and food sources. This book brings together various disciplines involved in observing bird species come into existence, modify, and vanish. It is a rich resource for bird enthusiasts who want to understand various processes at the cutting edge of current research in more detail. At the same time it offers students the opportunity to see primarily unconnected, but booming big-data approaches such as genomics and biogeography meet in a topic of broad interest. Lastly, the book enables conservationists to better understand the uncertainties surrounding "species" as entities of protection.

niche meaning in biology: Ecological Niches Jonathan M. Chase, Mathew A. Leibold, 2003-07 Why do species live where they live? What determines the abundance and diversity of species in a given area? What role do species play in the functioning of entire ecosystems? All of these questions share a single core concept--the ecological niche. Although the niche concept has fallen into disfavor among ecologists in recent years, Jonathan M. Chase and Mathew A. Leibold argue that the niche is an ideal tool with which to unify disparate research and theoretical approaches in contemporary ecology. Chase and Leibold define the niche as including both what an organism needs from its environment and how that organism's activities shape its environment. Drawing on the theory of consumer-resource interactions, as well as its graphical analysis, they develop a framework for understanding niches that is flexible enough to include a variety of small- and

large-scale processes, from resource competition, predation, and stress to community structure, biodiversity, and ecosystem function. Chase and Leibold's synthetic approach will interest ecologists from a wide range of subdisciplines.

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niche meaning in biology: *Vignettes from Nature* Grant Allen, 1881

niche meaning in biology: *The Love Hypothesis* Ali Hazelwood, 2021-09-14 The Instant New York Times Bestseller and TikTok Sensation! As seen on THE VIEW! A BuzzFeed Best Summer Read of 2021 When a fake relationship between scientists meets the irresistible force of attraction, it throws one woman's carefully calculated theories on love into chaos. As a third-year Ph.D. candidate, Olive Smith doesn't believe in lasting romantic relationships--but her best friend does, and that's what got her into this situation. Convincing Anh that Olive is dating and well on her way to a happily ever after was always going to take more than hand-wavy Jedi mind tricks: Scientists require proof. So, like any self-respecting biologist, Olive panics and kisses the first man she sees. That man is none other than Adam Carlsen, a young hotshot professor--and well-known ass. Which is why Olive is positively floored when Stanford's reigning lab tyrant agrees to keep her charade a secret and be her fake boyfriend. But when a big science conference goes haywire, putting Olive's career on the Bunsen burner, Adam surprises her again with his unyielding support and even more unyielding...six-pack abs. Suddenly their little experiment feels dangerously close to combustion. And Olive discovers that the only thing more complicated than a hypothesis on love is putting her own heart under the microscope.

niche meaning in biology: *Foundations of Ecology* Leslie A. Real, James H. Brown, 2012-12-20 Assembled here for the first time in one volume are forty classic papers that have laid the foundations of modern ecology. Whether by posing new problems, demonstrating important effects, or stimulating new research, these papers have made substantial contributions to an understanding of ecological processes, and they continue to influence the field today. The papers span nearly nine decades of ecological research, from 1887 on, and are organized in six sections: foundational papers, theoretical advances, synthetic statements, methodological developments, field studies, and ecological experiments. Selections range from Connell's elegant account of experiments with barnacles to Watt's encyclopedic natural history, from a visionary exposition by Grinnell of the concept of niche to a seminal essay by Hutchinson on diversity. Six original essays by contemporary ecologists and a historian of ecology place the selections in context and discuss their continued relevance to current research. This combination of classic papers and fresh commentaries makes *Foundations of Ecology* both a convenient reference to papers often cited today and an essential guide to the intellectual and conceptual roots of the field. Published with the Ecological Society of America.

niche meaning in biology: *Ecology: The Economy of Nature* Robert Ricklefs, Rick Relyea, 2018-02-23 Now in its seventh edition, this landmark textbook has helped to define introductory ecology courses for over four decades. With a dramatic transformation from previous editions, this text helps lecturers embrace the challenges and opportunities of teaching ecology in a contemporary lecture hall. The text maintains its signature evolutionary perspective and emphasis on the quantitative aspects of the field, but it has been completely rewritten for today's undergraduates. Modernised in a new streamlined format, from 27 to 23 chapters, it is manageable now for a one-term course. Chapters are organised around four to six key concepts that are repeated as major headings and repeated again in streamlined summaries. *Ecology: The Economy of Nature* is available with SaplingPlus. An online solution that combines an e-book of the text, Ricklefs's powerful multimedia resources, and the robust problem bank of Sapling Learning. Every problem entered by a student will be answered with targeted feedback, allowing your students to learn with every question they answer.

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niche meaning in biology: Strategic Management of Market Niches Gorazd Ocvirk, 2017-11-22 Gorazd Ocvirk creates a comprehensive model for the strategic management of market niches, and provides a framework for the construction of a strategic management theory of market niches. Based on the current state of research on the niche topic within, strategic management has many niche typologies but no clear common methodological and theoretical framework on which to lean on. This model has remained absent from the market niche research in the field of strategic management and has led to a state of conceptual ambiguity of the field.

niche meaning in biology: The Theory of Island Biogeography Robert H. MacArthur, Edward O. Wilson, 2001 Population theory.

niche meaning in biology: Linking Species & Ecosystems Clive G. Jones, John H. Lawton, 2012-12-06 I was asked to introduce this volume by examining why a knowledge of ecosystem functioning can contribute to understanding species activities, dynamics, and assemblages. I have found it surprisingly difficult to address this topic. On the one hand, the answer is very simple and general: because all species live in ecosystems, they are part of and dependent on ecosystem processes. It is impossible to understand the abundance and distribution of populations and the species diversity and composition of communities without a knowledge of their abiotic and biotic environments and of the fluxes of energy and matter through the ecosystems of which they are a part. But everyone knows this. It is what ecology is all about (e.g., Likens, 1992). It is why the discipline has retained its integrity and thrived, despite a sometimes distressing degree of bickering and chauvinism among its various subdisciplines: physiological, behavioral, population, community, and ecosystem ecology.

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addresses this challenge, with several chapters devoted entirely to applied topics, and examples of how ecological principles have been applied to problems facing us highlighted throughout the remaining nineteen chapters. Nonetheless, the authors remain wedded to the belief that environmental action can only ever be as sound as the ecological principles on which it is based. Hence, while trying harder than ever to help improve preparedness for addressing the environmental problems of the years ahead, the book remains, in its essence, an exposition of the science of ecology. This new edition incorporates the results from more than a thousand recent studies into a fully up-to-date text. Written for students of ecology, researchers and practitioners, the fifth edition of *Ecology: From Individuals to Ecosystems* is an essential reference to all aspects of ecology and addresses environmental problems of the future.

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niche meaning in biology: Habitat Structure S.S. Bell, Earl D. McCoy, H.R. Mushinsky, 2012-12-06 We conceived the idea for this book after teaching a graduate seminar on 'Habitat Complexity' at The University of South Florida. Discussions during the seminar led us to conclude that similar goals were to be found in studies of the topic that spanned the breadth of ecological research. Yet, the exact meaning of 'habitat structure', and the way in which it was measured, seemed to differ widely among subdisciplines. Our own research, which involves several sorts of ecology, convinced us that the differences among subdisciplines were indeed real ones, and that they did inhibit communication. We decided that interchange of ideas among researchers working in marine ecology, plant-animal interactions, physiological ecology, and other more-or-less independent fields would be worthwhile, in that it might lead to useful generalizations about 'habitat structure'. To foster this interchange of ideas, we organized a symposium to attract researchers working with a wide variety of organisms living in many habitats, but united in their interest in the topic of 'habitat structure'. The symposium was held at The University of South Florida's Chinsegut Hill Conference Center, in May, 1988. We asked participants to think about 'habitat structure' in new ways; to synthesize important, but fragmented, information; and, perhaps, to consider ways of translating ideas across systems. The chapters contained in this book reflect the participants' attempts to do so. The book is divided into four parts, by major themes that we have found useful categorizations.

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Bäck, Joost N. Kok, 2012-07-09 Natural Computing is the field of research that investigates both human-designed computing inspired by nature and computing taking place in nature, i.e., it investigates models and computational techniques inspired by nature and also it investigates phenomena taking place in nature in terms of information processing. Examples of the first strand of research covered by the handbook include neural computation inspired by the functioning of the brain; evolutionary computation inspired by Darwinian evolution of species; cellular automata inspired by intercellular communication; swarm intelligence inspired by the behavior of groups of organisms; artificial immune systems inspired by the natural immune system; artificial life systems inspired by the properties of natural life in general; membrane computing inspired by the compartmentalized ways in which cells process information; and amorphous computing inspired by morphogenesis. Other examples of natural-computing paradigms are molecular computing and quantum computing, where the goal is to replace traditional electronic hardware, e.g., by bioware in molecular computing. In molecular computing, data are encoded as biomolecules and then molecular biology tools are used to transform the data, thus performing computations. In quantum computing, one exploits quantum-mechanical phenomena to perform computations and secure communications more efficiently than classical physics and, hence, traditional hardware allows. The second strand of research covered by the handbook, computation taking place in nature, is represented by investigations into, among others, the computational nature of self-assembly, which lies at the core of nanoscience, the computational nature of developmental processes, the computational nature of biochemical reactions, the computational nature of bacterial communication, the computational nature of brain processes, and the systems biology approach to bionetworks where cellular processes are treated in terms of communication and interaction, and, hence, in terms of computation. We are now witnessing exciting interaction between computer science and the natural sciences. While the natural sciences are rapidly absorbing notions, techniques and methodologies intrinsic to information processing, computer science is adapting and extending its traditional notion of computation, and computational techniques, to account for computation taking place in nature around us. Natural Computing is an important catalyst for this two-way interaction, and this handbook is a major record of this important development.

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