

Book Reviews

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FORAGING AND SURVIVAL IN AN OLFACTORY WORLD

Conover, Michael R. 2007. **Predator-prey dynamics: the role of olfaction**. CRC Press, Boca Raton, Florida. 248 p. \$89.95, ISBN: 978-0-8493-9270-2 (alk. paper).

Key words: airflow physics; depositional and airborne odorants; olfaction; predator-prey.

The ways prey animals hide from visual predators are well known—camouflage, mimicry, as well as simply being still. But what do we know about how prey conceal themselves from olfactory predators—significantly less. Considering that most predators rely on olfaction to track and locate their prey, the scarcity of studies examining this source of selection on prey behavior is unfortunate. In his recent book, *Predator-prey dynamics: the role of olfaction*, Michael Conover presents a systematic look at what is known about olfactory predators and their prey. Conover also puts forth an “olfactory concealment theory,” which asserts that certain elements of airflow, weather, and habitat features can affect the ability of predators to find their prey and that prey may evolve hiding behaviors that correspond with these elements.

Predator-prey dynamics starts by describing how olfactory predators find their prey using prey odorants, focusing on terrestrial predators (mammals and snakes). The second chapter is devoted to depositional odorants left by animals on the ground while the rest of the chapters mostly concentrate on airborne odorants, which are released into the air column. Conover spends several chapters explaining the physics of airflow and how turbulence and other factors affect airborne odorants. With useful illustrations, he shows how odorants move through the environment and how certain conditions and habitat characteristics enhance or detract from olfactory predators’ ability to find their prey. An example of an enhancement is that low rates of lateral turbulence increase a predator’s probability of detecting a prey animal because their odor plume will be longer. In addition, Conover describes how these aspects can provide hiding opportunities for prey animals. For instance, updrafts that disperse odor occurring on south-facing slopes, due to more direct sunlight than on north-facing slopes, may account for lower rates of predation on bird nests on south-facing slopes.

Throughout the book, Conover references domestic dog behavior, which at first may seem slightly anecdotal. However without comparable knowledge for wild predators, domestic animals do serve as a good place to start for understanding how mammals find their prey. Indeed, Conover presents several empirical studies using domestic hunting dogs that nicely demonstrate how turbulence and habitat features slow their ability to locate odorants. Perhaps due to Conover’s own research interests, most of the examples of prey behavior focus on birds, in particular where they make their nests. Conover goes over many predictions about the best nesting places, in part by taking many examples found in Tim Caro’s text *Antipredator defenses in birds and mammals* (2005. University of Chicago Press, Chicago, Illinois) and examining them from an olfactory perspective. He also goes into great detail about North American ungulate species behavior and how females

and their young can use airflow and habitat features to evade predators.

One consequence of Conover’s attempt to highlight the olfactory modality is that, occasionally, he writes about prey behavior as if the only source of selection on their behavior comes from olfactory predators. Nevertheless, he devotes a chapter to how prey animals balance the risk of olfactory and visual predators. The reader will also have to decide for her or himself whether Conover overstates the hypothesis that certain behaviors have evolved due to selection by olfactory predators when clear evidence of the origins and evolution of these behaviors await further investigation. For example, much of the empirical evidence presented by Conover addresses proximate, rather than adaptive explanations of the behavior.

Steering away from the focus on predator-prey interactions and the olfactory concealment theory, Conover includes a chapter at the end of the book that calls for ecologists to use the physics of airflow to redefine some key terms in ecology. For instance, he defines “edge habitat” as “that part of a habitat patch close enough to a habitat boundary that air flowing over it has not had time to adjust to the surface roughness of the habitat patch.” Although it remains to be seen if mainstream ecologists will take up the airflow perspective, these redefinitions were interesting in comparison to the more visual definitions ecologists typically use.

Conover writes in a style that is not too technical, even for those not familiar with airflow physics, animal behavior, or ecology. Researchers specifically interested in olfactory aspects of predators and their prey will want to read the book in its entirety, but the descriptive table of contents and the indices will aid those only interested in certain aspects of the book, such as how different habitat types (e.g., forests, prairies, or savannas) and habitat edges present varying olfactory landscapes.

Predator prey dynamics covers a subject that has not received enough attention by animal behavior and ecology researchers. Because vision is the main sensory system used by humans, research on olfaction and its role in predator-prey interactions is lacking. Although it ends with more questions than answers, Conover’s book has laid the foundation for future research on olfactory predators and their prey. Beyond testing predictions of the olfactory concealment theory, gaining a better scientific knowledge of olfaction also has conservation applications. Human alteration of an animal’s habitat may challenge its ability to hide from predators in previously unexpected ways. Similar challenges might affect predators using olfaction to locate prey in disturbed areas. This new understanding of the importance of olfaction to both predator and prey may help guide future conservation management decisions.

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SUSTAINABILITY RULE #1: LEARN FROM PAST MISTAKES

Costanza, Robert, Lisa J. Graumlich, and Will Steffen, editors. 2007. **Sustainability or collapse? An integrated history and future of people on Earth.** The MIT Press, Cambridge, Massachusetts. xxii + 495 p. \$38.00, ISBN: 978-0-262-03366-4 (alk. paper).

Key words: climate; environment; history; societies; sustainability.

Sustainability science has transitioned from qualitative, utopian ideals into a robust, quantitative discipline. Its theoretical foundation is a melting pot of ideas from many disciplines, such as ecological resilience, thermodynamics, catastrophe theory, and economic welfare maximization. Sustainability research produces assessments of current social and environmental sustainability, and identifies actions and policies that can move societies to more sustainable states. Research tools for sustainability science include data from historical case studies, spatially explicit sustainability indices (such as the Ecological Footprint), and computer simulations.

Sustainability or collapse? is the proceedings of a 2005 Dahlem series workshop, “An Integrated History and future Of People on Earth (IHOPE).” Authors of the book’s chapters study different aspects of the long-term sustainability of human-environment (or “socioecological”) systems, and represent many disciplines. The book uses a well-organized collection of historical case studies and computer models to assess the current knowledge base of sustainability science and its future needs.

The book has 22 chapters, divided into five sections. The first section begins with an introduction offering general insights gained during the workshop, followed by several chapters that touch on issues cutting across all disciplines and time scales. This section includes a good chapter by Costanza (Chapter 3) that details data quality constraints in sustainability science and how they should be addressed. The second, third, and fourth sections group historical case studies by three time scales: millennial, centurial, and decadal, respectively. A “group report” concludes each section, summarizing the material in the chapters and highlighting important insights and future research directions.

The millennial-scale case studies presented in Section 2 suggest that governments (in any form) ultimately fail if they establish elaborate, complex systems that assume cultural and environmental conditions will stay static (Redman et al., Chapter 9). Tainter and Crumley (Chapter 5) give an excellent narrative of this phenomenon, using the Roman Empire as their example. As it expanded, the Empire replaced locally adapted agricultural systems in northern Europe with more-familiar Mediterranean ones. When a climate shift brought cooler and wetter conditions to northern Europe, widespread crop failures ensued. The Empire responded to the crisis by increasing bureaucratic complexity and increasing the size of the military (to secure more resources), requiring higher taxes which starving peasants could not afford. The mistakes of the Roman Empire are numerous and universal: misjudging the scale at which human societies and their environments interact; undercutting local resource availability to support far-off governing organizations; and adding complexity instead of flexibility when trying to manage a dynamic system.

Grove (Chapter 10) starts off Section 3 with a nicely detailed description of the 1788–1795 El Niño event and its impacts on human societies across the planet. This climate event challenged newly established European colonies and their traditional agricultural practices, while crop failures in established societies stimulated revolts and revolutions. Chapter 13 (van der Leeuw) and the section’s group report (Dearing et al., Chapter 14) highlight the increasing interconnectivity (i.e., globalization) between and among societies and environments as human history progresses, and the implication that this “hypercoherence” has on the adaptability and sustainability of socioecological systems.

Mantua (Chapter 15) provides a great start to Section 4 with his description of regional climate fluctuations at the decadal scale, including El Niño and the North Atlantic Oscillation, and how these fluctuations affect interactions between hydrologic systems, ecosystems, biogeochemical cycles, and human societies. The chapter contains two very informative figures that stack the multiple, regional, and global climate cycles over time, generating wet and dry periods which impacted socioecological systems. The group report for this section (Hibbard et al., Chapter 18) reviews driving forces and feedbacks as the global socioecological system has undergone a “Great Acceleration” in the past 100 years. The chapter discusses accelerations in globalization, urbanization, and governance dynamics, as well some “decelerating” factors which may act as self-regulating mechanisms, such as declining fertility and improved environmental protection laws. The report ends with a list of factors which may indicate the current global socioecological system is on an unsustainable trajectory, including growing inequality in socioeconomic conditions and information access, increased societal sensitivity to climate fluctuations, increasingly insufficient water resources, and a slow transition to renewable energy sources.

The final section discusses the utility of computer models and scenarios to help manage socioecological systems sustainably. Costanza et al. (Chapter 21) provide a valuable review of integrated global models (IGM), “integrated” indicating that the model simulates human and natural systems and their interactions as one system. The chapter includes an excellent set of summary tables for the 10 different IGMs discussed in the chapter, including their scale, complexity, number of parameters, and the extent to which they have been calibrated and tested. The group report (Young et al., Chapter 22) summarizes not only the previous chapters on simulations, but also includes a helpful summary of what is meant by “collapse,” and why simulated socioecological systems collapse less often than what we have seen historically. The chapter ends with a series of questions to guide the use of currently available computer models and to improve future models.

While all of the chapters are written well, the contribution of individual chapters to the purpose of the book are uneven; some chapters are somewhat tangential to the main theme. The book is an admirable attempt at an interdisciplinary approach, and the summary reports do give this perspective; however, some of the chapters are written from a single discipline. Chapters written from the purely social science perspective may be difficult for ecologists to get through, due to a heavy use of jargon and theories with which ecologists may not be familiar. Some of the chapters are especially light on tables and figures, which would have made the chapters easier to follow. For example, the millennial scale group report (Redman et al.,

Chapter 9) follows eight historical societies around the world as they were affected by several global climate shifts. A table that listed the eight cases, the four periods of climate change, and the multitude of socioecological responses would have been very helpful and a valuable resource for future research.

This book is a comprehensive, quantitative follow-up to Diamond's (2005) *Collapse* (Diamond, J. 2005. *Collapse: how societies choose to fail or succeed*. Viking, New York), and would be a nice companion to *Collapse* in a graduate-level seminar. This collection does not cover the same societies as Diamond covers (or gives them brief mention), and therefore represents an important source of new material and insight. The authors have assembled an impressive number and variety of case studies and computer models. While few of the modeled

socioecological systems have failed, many real-world systems have undergone catastrophic collapse, disintegration, and in some cases reorganization. The information in this book is an overwhelming condemnation of historical ignorance, as the abundant wreckage of collapsed societies attests.

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RETROSPECTION AND INNOVATIVE CONSERVATION UNDER THE ENDANGERED SPECIES ACT

Goble, Dale D., J. Michael Scott, and Frank W. Davis, editors. 2006. **The Endangered Species Act at thirty**. Renewing the Conservation Promise. Volume 1. Island Press, Washington, D.C. xiv + 372 p. \$80.00 (cloth), ISBN: 1-59726-008-8 (alk. paper); \$35.00 (paper), ISBN: 1-59726-009-6 (alk. paper).

Key words: conservation policy; environmental legislation; habitat conservation plans; recovery; safe harbor agreements.

Since its passage in 1973, the Endangered Species Act has been admired, reviled, misrepresented, and debated. Maligned as a trespass on the rights of private property owners and perceived as a menace to job security, the act also has been adapted creatively by regulatory agencies, local governments, and landowners to plan for enduring conservation while accommodating inevitable development. For better or worse, few pieces of legislation have had a greater impact on domestic and international environmental policy.

Editors Goble, Scott, and Davis deliver a fact-filled, easily readable overview of the history, influence, and potential future application of the Endangered Species Act. The volume is suitable for virtually any audience, including those unfamiliar with ecology or policy. The preface explains that *The Endangered Species Act at thirty* initially was not conceived as a book. Instead, the publication began as a compilation of papers intended to promote dialogue among scientists, practitioners, and stakeholders affected by the act. As a result, material on major topics, such as critical habitat or safe harbor agreements, typically is distributed among chapters written by different authors rather than collated. Fortunately, an excellent index facilitates searches for a given thread. Another consequence of the book's origin is that individuals familiar with the act may be slightly frustrated by repeated explanation of terms or concepts such as "take" in multiple chapters. Moreover, depending on the author's background and thesis, those explanations range from cursory to thorough. However, inexperienced readers may be grateful for the reminders, and clearly the stand-alone potential of individual chapters benefits.

The chapters in *The Endangered Species Act at thirty* are aggregated in three parts. The six chapters in Part I ("What have we protected?") summarize "numbers and the processes that have produced them" with respect to listings, status of

listed species, regulatory opinions or decisions, and conservation agreements. The content of this section easily could form the basis for a "frequently asked questions about the Endangered Species Act." Indeed, the authors of several chapters in Part I, notably the volume's editors and contributors such as David Wilcove and Kieran Suckling, undoubtedly know exactly what questions most often are asked by policy makers and applicants for permits under the act. How does the act reflect the history of wildlife protection in the United States, and how has it been modified over time? What is the taxonomic and geographic distribution of listed species? How many species have been delisted, and under what circumstances is recovery realistic?

Part II, "Achieving on-the-ground conservation," includes nine chapters that address the effectiveness of the Endangered Species Act in different geographic regions or under different regulatory jurisdictions. Authors in this section also examine Habitat Conservation Plans, candidate conservation agreements, and other mechanisms for conserving listed species. In Chapter 7, Suckling and Martin Taylor provide a legal analysis of the nebulous concepts of recovery and jeopardy that helps to elucidate why designation and management of critical habitat has proven so contentious. In Chapter 9, Barton Thompson, Jr. neatly uses a series of case studies to illustrate the range of incentives for conservation by private landowners that are consistent with the act's prohibitions on take. The following chapter, by A. Dan Tarlock, addresses similar issues by exploring legal precedents. Much as early chapters in the volume serve as a reference to key terms in the Endangered Species Act, Chapter 10 functions as a guide to relevant case law. A chapter by Peter Kareiva et al. explains how conservation goals established by a private nongovernmental organization, The Nature Conservancy, compare with goals mandated by the Endangered Species Act. Although this chapter is instructive, it might be improved by discussion of how priorities are (or could be) translated into action on lands managed by the organization or other landowners.

The nine chapters in the third section of the book, "Prospects," focus on potential alternatives for improving the act's ability to prevent extinctions and for developing new conservation institutions and partnerships. The tone of Part III is optimistic and genuine, tempered with sufficient realism to avoid conveying false hope. Most authors recognize the inefficiencies of the Endangered Species Act while acknowledging its powerful influence on conservation processes and

outcomes. More importantly, they present diverse and practical suggestions for remedy. For example, in Chapter 17, Steven Yaffee cautions against an “unseemly rush to collaboration” without ensuring that sufficient legislative, financial, and psychological support exists. The fit of a few chapters within the section might have improved from a broader perspective. Chapter 19, “Hands-on restoration,” draws valuable lessons from but expands little beyond the experience of the Peregrine Fund. An otherwise strong chapter on the limitations of reserves (or set-asides), by Michael Rosenzweig, sometimes appears to use the act to illustrate principles or paradigms from the author’s research rather than vice versa.

Several compelling chapters anchor *The Endangered Species Act at thirty*. In “Incentive mechanisms,” Gregory Parkhurst and Jason Shogren evaluate rewards for protection of listed species by private landowners (impact fees, subsidies, tradable development rights with zoning, conservation banking, fee simple acquisition, and conservation easements) from the perspective of conservation targets, landowners, and government. Moreover, they explain concisely the legal and economic features of each strategy, with which many ecologists are unlikely to be conversant. Michael Bean outlines four sensible “second-generation approaches” to improve the conservation outcomes of the act that could be implemented by an “imaginative, results-oriented administrator . . . regardless of political party.”

Most shortcomings of *The Endangered Species Act at thirty* are relatively minor artifacts of its origin as a set of thematically related papers. Transitions between the three parts of the book are somewhat abrupt. A few chapters seem to reflect a commitment to inclusivity rather than a more critical eye toward cohesion. However, the book is laudable for its objective presentation of divisive subjects. Throughout the volume, care has been taken to differentiate between fact and opinion, data and belief. In a final chapter, “Renewing the conservation commitment,” editors Davis, Goble, and Scott succinctly review consensus recommendations for improving endangered species legislation in the United States that emerged from their three-year “Endangered Species Act at thirty” project. Too often, so-called implications for conservation are trite and offer little substantive motivation for change. The straightforward discussion of constraints and innovations presented in this chapter and book, by contrast, lives up to its promise of revitalization.

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NATURE IN THE BALANCE—AN UNBALANCED VIEW

Shugart, H. H. 2004. **How the earthquake bird got its name and other tales of an unbalanced nature**. Yale University Press, New Haven, Connecticut. xii + 227 p. \$27.50 (cloth), ISBN: 978-0-300-104578; \$17.00 (paper), ISBN: 978-0-300-12270-1.

Key words: colonization; exotics; extinction; forest mosaics; landscape.

How the earthquake bird and other tales of an unbalanced nature is about the impact of changes on terrestrial landscapes. In the “Introduction” Shugart tells the reader that he is going to present an alternative view nature. Instead of managing parks, nature areas, or conservation preserves as static balance systems, we need to recognize that ecosystems change. His objective “. . . to give insights into the dynamically changing nature of ecosystems and the implications of this dynamism for our stewardship of the planet.” Each chapter in the book is designed to highlight an ecological concept. But instead of highlighting the ecological concept in a typical scientific literature summary, H. H. Shugart enlivens each chapter. Starting with a quote from literature, historical letters, journals, or mythology, the author builds on the quote by telling a story of a particular animal(s) and its fate. The story format is used to describe plant and animal interactions (e.g., the Ivory-billed Woodpecker and snags), the impacts of landscape changes on environmental changes and vice versa (e.g., packrat middens and historical records), and connections between extinctions and population explosions (e.g., the Red-billed Quelea, *Quelea quelea* and the Passenger Pigeon, *Ectopistes migratorius*). The selections the author uses to discuss ecological concepts may be

subject to debate (he emphasizes terrestrial systems), but the selections are diverse and global in nature which emphasizes his planetary concerns.

Shugart uses the specialized feeding habits of the Ivory-billed Woodpecker to discuss forest mosaics. Penguins are the basis to revisit Grinnellian and Eltonian niche concepts. He proposes the Grinnellian theory as a basis for managing habitats for specific species and the Eltonian theory as a basis to understand the consequences of species loss and environmental change. Using examples of packrat middens, large animal extinctions at the end of the Pleistocene, and historical examinations of stoma numbers before and after the industrial revolution, the author emphasizes that change on any time scale is a natural attribute. The habitats of Bachman’s Warbler and Leadbeater’s possum are examples to emphasize his concerns about fragmentation and shrinking landscapes. He views large landscapes as being more predictable from a management viewpoint than small landscapes. The Red-billed Quelea (*Quelea quelea*) and the Passenger Pigeon *Ectopistes migratorius* are mobile organism examples used to demonstrate that vast numbers in altered environments and human pressure may or may not ensure survival. In addition to the impacts from humans, Shugart also discusses animal impacts (e.g., beavers) which can alter landscapes. Using the keystone species concept, he discusses the role of *Banksia prionotes*, a plant that although relatively uncommon supports birds called honeyeaters in Western Australia through a critical period. The demise of *B. prionotes* would eliminate honeyeaters and the flowering plants that depend on the honeyeaters for pollination outside the critical period. Colonizing Polynesians and the introduction of exotics such as the Polynesian rat (*Rattus exulans*), and the dog (*Canis familiaris*) are the basis for a discussion of colonization and extinct on islands. Shugart discusses the possible reinterpretation

tion of classical island biogeography. The role of animal domestication in the fragmentation and reduction of landscapes over the last 10 000 years is addressed. Using examples of what has already happened, Shugart raises the question of what technological societies can do to landscapes. However, he does not address the issue. In the last chapter of the book, Shugart discusses planetary stewardship. Although there is a mention of classical ideas of domination by humans versus stewardship, he leaves the topic open ended. He does acknowledge that although we know a lot, what we need to know is of even greater significance.

This book would be appropriate as supplemental reading for courses in landscape ecology, conservation, and advanced environmental courses. It could be the basis of a graduate seminar and the basis for many a lively discussion. In addition, the book should be on the bookshelf of managers of parks, conservation preserves, and natural areas as well as environmental consultants. Professionals need to consider that change

is inevitable in managed systems and they need to include dynamic changes in their management plans.

As Shugart states early in the book, "Change is an essential part of nature. Few if any, observations of ecological systems have displayed long term constancy.... A basic question is whether or not the magnitude of these changes—iterated through ecosystem feedback—decreases, as do the ripples when a rock is thrown in a pond. Or whether the ripples are amplified into waves, small changes becoming larger over time. We need to know which is the case."

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RISK ASSESSMENT IN AFRICA

Thomson, Jennifer A. 2007. **Seeds for the future: the impact of genetically modified crops on the environment.** Cornell University Press, Ithaca, New York. xviii + 158 p. \$24.95, ISBN: 978-0-8014-7368-5.

Key words: developing countries; environmental effects; genetic engineering; risk assessment; transgenic crops.

Genetically modified (GM) soybean, maize, cotton, and canola have been grown in the U.S. and elsewhere for about a decade, while their adoption in Europe has been glacially slow. Increasingly, GM crops are also being grown in developing countries. Well-funded public and private research is under way to obtain more nutritious and higher-yielding varieties of cassava, sorghum, cowpea, banana, rice, sweet potato, and other crops for tropical and sub-tropical countries. This expansion of the diversity of GM crops and traits may help undernourished populations and small-scale farmers, as described in Jennifer Thomson's 2002 book, *Genes for Africa: genetically modified crops in the developing world* (University of Cape Town Press, Cape Town, South Africa). In *Seeds for the future*, Thomson, a professor of microbiology at the University of Cape Town, discusses her views on environmental effects of these crops.

This timely, non-technical book provides a good overview of relevant topics and case studies, but the author's superficial treatment of the subject matter and pro-biotech stance detract somewhat from its overall credibility. Thomson's current research focuses on inserting genes from a drought-tolerant South African plant (*Xerophytica viscosa*) into maize, so it is no wonder that she is committed to promising uses of biotech crops. Throughout the book, she emphasizes the economic and humanitarian benefits that GM crops might offer in developing countries, interspersed with information about expected environmental benefits and risks. One of the book's strengths is its focus on problems that confront small-scale farmers—e.g., drought, infertile soils, pests and pathogens, expensive pesticides and fertilizers, dependence on manual labor, and parasitic

plants that can decimate yields in maize, sorghum, and millet. These problems, combined with poor infrastructure, inadequate health care, and unstable governments, clearly deserve more attention from wealthier nations. Thomson does a good job of showing how GM methods could be implemented to develop hardier and more nutritious cultivars of staple food crops.

An introductory chapter explains genetic engineering in the context of classical plant breeding, followed by three chapters on the current global status of crops that are resistant to insects, herbicides, and viruses. In each chapter, Thomson summarizes recent studies of economic and environmental effects of growing these crops commercially or in large-scale field trials (most of which are in developed countries). She relies heavily on three or four review papers, ignoring the findings of many other sources, such as reports from the U.S. National Research Council. Important research on the effects of insecticidal (*Bt*) maize pollen on butterfly larvae is described as "a storm in a teacup," and publications from the Farm-Scale Evaluations of ecological effects of GM crops in the United Kingdom are dismissed for having asked the wrong questions. To illustrate the benefits of herbicide-tolerant oilseed rape, Thomson quotes a farmer from Scotland who participated in the Farm-Scale Evaluations and described her experience at an industry-sponsored conference. One spring, she noticed more weeds and more bird activity in a GM oilseed rape field than in a non-GM control field. It seems odd that a single, favorable observation should be included here, when the whole data set from the Farm-Scale Evaluations tells a different story.

Additional chapters are devoted to vertical and horizontal gene flow; regulatory, legal, and trade issues; and GM products that are in the pipeline, including plant-based vaccines for Africa. Although Thomson acknowledges the inevitability of gene flow from transgenic crops, her conclusions about the consequences of this process are not entirely convincing. For example, she does not think weedy rice is capable of becoming a worse weed by inheriting transgenes, which might confer traits such as herbicide resistance, greater biomass, and greater seed production. More generally, she views transgenes as being no different than other crop genes, even though in some cases a single copy of a novel transgene (or several linked transgenes)

could have major downstream effects on wild or weedy plant populations and non-target organisms. Throughout the book, Thomson argues that GM crops are good for the environment because they require fewer pesticide applications than conventional agriculture, promote low-till cultivation that conserves topsoil and fuel, and constitute an intensive, high-yielding production system that takes pressure off natural areas for native plants and animals. Each of these conclusions has some merit, but the one-sided way in which they are presented is disappointing.

Regarding the preservation of biodiversity, Thomson argues that threats such as war, global warming, invasive species, and effects of conventional agriculture should dwarf concerns about additional environmental stresses that may be associated with novel transgenic crops. However, in some cases, new stresses that exacerbate current problems for biodiversity and ecosystem services could create much worse problems over the long term (e.g., Kareiva, P., S. Watts, R. McDonald, and T. Boucher 2007. Domesticated nature: shaping landscapes and ecosystems for human welfare. *Science* 316:1866–1869). Also, there is considerable debate over whether conventional, chemical-intensive agriculture should be the only baseline for evaluating environmental effects of GM crops. Furthermore, many academic ecologists and environmental advocates are more concerned about future uses of biotechnology than the small set of crops and traits that have been commercialized so far.

It is not easy to evaluate potential environmental effects of GM crops in developing countries, in part because baseline information about the local ecosystems where the crops will be

grown may be lacking, and the expertise for evaluating impacts is often limited. Many international efforts, not covered by Thomson, are under way to address these daunting problems, including capacity-building programs of the Convention on Biological Diversity (www.cbd.int/biosafety/issues/risk.shtml), the GMO Environmental Risk Assessment Project (www.gmo-guidelines.info/), and the International Centre for Biotechnology and Engineering (www.icgeb.org/~bsafesrv/). Concerns about inadequate evaluations of the environmental effects of GM crops in developing countries are not discussed in this book. By targeting a fairly naïve audience that has likely been exposed to anti-GMO opinions, Thomson's unequivocal enthusiasm for GM crops sometimes glosses over standard scientific questions that need to be addressed for each new trait/crop/environment combination. Nonetheless, *Seeds for the future* introduces readers to key environmental and economic issues that serve as the focus of empirical research and synthesis in this area. Finding the right balance between unacceptable risks and likely benefits of GM crops in developing countries will continue to be a major challenge.

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Spotlight

RECENT PUBLICATIONS OF PARTICULAR INTEREST

Alonso, Leanne E., and Haydi J. Berrenstein, editors. 2006. **A rapid biological assessment of the aquatic ecosystems of the Coppename River Basin, Suriname.** RAP Bulletin of Biological Assessment 39. Conservation International, Washington, D.C. 119 p. \$19.95, ISBN: 1-881173-96-8. This rapid inventory reports on the Sierra del Divisor, a group of isolated mountains in the Amazonian lowlands of Peru. This book contains lists of vascular plants, vertebrates, and human settlements, text on the geological history and biotic composition of the area, and 16 pages of color plates with numerous photographs and maps.

Carlton, James T., editor. 2007. **The Light and Smith manual: intertidal invertebrates from central California to Oregon.** Fourth edition. University of California Press, Berkeley, California. xvii + 1001 p. \$85.00, ISBN: 978-0-520-23939-5 (alk. paper). The editor reports that only 10% of the third edition was retained for the new edition. Besides taxonomic accounts there are chapters on habitats and biogeography, intertidal organisms, introduced invertebrates, molecular identification, and methods of preservation and anesthetization.