BioOne COMPLETE

The Birds And The Bees, From The Flower's Point Of View

Author: Kramer, Elena M.

Source: BioScience, 58(11) : 1089-1090

Published By: American Institute of Biological Sciences

URL: https://doi.org/10.1641/B581114

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Downloaded From: https://bioone.org/journals/BioScience on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

fying such a framework would entail revisions so radical as to either be unpalatable to proponents of ID creationism or render a completely neutered (and thus harmless) version of ID creationism. ID creationists must either argue that the designer is accessible by naturalistic means or reject methodological naturalism altogether. Sarkar has effectively taken just what ID creationists identify as being distinctive of their work and rendered it unscientific—all the while rejecting a hard line of demarcation. Creationists may object that excluding the possibility of the supernatural directing evolution is itself a roadblock to progress in science—if they were to be so forthright in front of school boards and responsible media, then Sarkar will have accomplished his goal.

Although Sarkar's book overall is extremely well written and carefully rendered, I found some shortcomings. If his goal is to reach an interested lay public, a primer on assigning probabilities would be helpful. This is especially the case given how much of Sarkar's criticism of Dembski turns on the incoherence of trying to assign probabilities without a reference class. These are technical arguments, and more help should be offered to the reader. Sarkar can also get a bit carried away in rhetorical flourish, producing fuel for the fire. Describing Alfred Wallace's panselectionism as "heresy," for example, plays into the ID creationist ploy to characterize evolutionary theory simply as Darwinism, and is all too easily exploited or misunderstood. That this occurs a page after Sarkar (rightfully) argues, "ID creationists misrepresent the practice of evolutionary biology when they present it as Darwinism, as if it were a doctrine based on a prophet like their own theologies of revelation," is that much more striking (p. 29).

I would strongly recommend *Doubting Darwin? Creationist Designs on Evolution* to anyone interested in why biologists find ID creationism objectionable. It would make a wonderful textbook for an undergraduate course in either biology or philosophy, and could also be effectively used as a jumping-off point into a deeper exploration of a host of topics. My copy will be close at hand on my bookshelf when ID creationists present themselves at my door.

MATT HABER
Matt Haber (e-mail: mhaber @philosophy.utah.edu) is an assistant professor in the department of philosophy at the University of Utah in Salt Lake City.

doi:10.1641/B581113
Include this information when citing this material.

THE BIRDS AND THE BEES, FROM THE FLOWER'S POINT OF VIEW

Understanding Flowers and Flowering: An Integrated Approach. Beverly Glover. Oxford University Press, New York, 2007. 256 pp., illus. $75.00 (ISBN 9780198565963 paper).

Understanding Flowers and Flowering has the ambitious goal of unifying molecular genetic and ecological viewpoints on floral production, development, and morphology—and it largely succeeds in that aim. Author Beverly Glover, of the University of Cambridge, is a specialist in floral color and epidermal cell morphology, and therefore has particular insight into aspects of floral biology that link ecology with genetics. The book covers topics ranging from angiosperm evolution to floral genetics to the ecological interactions of pollinators and floral form. As might be expected, some sections are stronger than others, but on the whole, this work fills a considerable gap among available texts by integrating evolutionary, ecological, and developmental genetic materials.

The 19 chapters are logically divided into three sections that can be described generally as evolution, developmental genetics, and ecology. The first section is perhaps the weakest (it is also the shortest), highlighting several questionable or out-of-date hypotheses and results. Among these, the most problematic is the assertion that the "mostly male" hypothesis is the "currently favored" model for the evolution of the hermaphroditic floral axis. This hypothesis holds that an important gene for promoting floral meristem identity, called *LEAFY,* was duplicated in the ancestor of all seed plants (angiosperms and gymosperms). The resulting two types of *LEAFY* evolved sex-specific functions—one primarily controlling male reproductive identity, and the other, female. These two flavors of *LEAFY* function are posited still to be present in extant gymnosperms, whereas in angiosperms, only the "male" *LEAFY* function persists. The explanation for this condition is that somehow the genes responsible for promoting ovule development came under the control of the male *LEAFY* in the ancestor of angiosperms, producing ectopic ovules on some male reproductive organs that ultimately evolved into carpels.

Although this hypothesis represented an important transition in models of angiosperm evolution by invoking simple changes in gene expression as potential mechanisms for evolutionary change, it cannot be considered viable at this point because substantial contradictory data also exist (i.e., the two gymnosperm *LEAFY* homologs are not, in fact, male and female specific). Of much greater importance are the homeotic models for flower evolution, which Glover references in subsequent chapters but incorrectly suggests are equivalent to "mostly male." Aside from this point, I particularly missed the presence of any kind of angiosperm phylogeny figure, even a simplified one that glosses over the controversial points. This absence is also felt in later chapters that, to the author's credit, do an admirable job of including data from taxa other than the standard *Arabidopsis.* At least one angiosperm phylogeny would have been useful to help readers orient themselves in an evolutionary context when these different taxa are discussed.

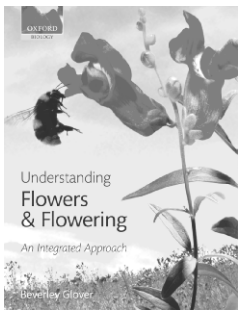
The second section encompasses the developmental genetics of flowering time and floral development from a relatively broad perspective, with some consideration of the evolution of these

Downloaded From: https://bioone.org/journals/BioScience on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

genetic pathways. This section begins with a useful introduction to *Arabidopsis* biology and genetic manipulation as well as to the often confusing terminology used in flowering time control. Glover defines three major pathways—autonomous, photoperiodic, and vernalization—which feed into the floral pathway integrators that actually promote flowering. In this regard, Glover does not do herself any favors by using atypical terminology when discussing the flowering-repressor gene *FLC* (*FLOWERING LOCUS C*), included as part of the "autonomous inhibition" pathway. The odd point here is the use of the term "autonomous" in relation to *FLC*. There is also a well-characterized floral induction pathway that is more commonly referred to simply as the "autonomous" pathway. These autonomous loci act through several different genetic mechanisms to deactivate the floral repressor *FLC* and thereby allow flowering to occur. This is the first time I have seen *FLC* termed an "autonomous inhibitor," and I can understand Glover's logic, but, as a rule, *FLC* is discussed in the literature as a component of the vernalization pathway.

One can always quibble about terminology, but I found the use of autonomous inhibition versus autonomous induction to be tricky in two regards. First, readers have to pay very close attention to catch which pathway is being discussed at any particular time (not necessarily a bad thing), and second—and more problematically—it may lead to confusion when readers go to the primary literature and do not see the same usage. This being said, the complexities of flowering time control in *Arabidopsis* make it one of the hardest subjects to explain clearly. Glover has achieved that quite well, and the data covered are very up to date, which will extend the shelf life of this text.

The latter part of the molecular genetic section focuses on the genetic control of floral meristem and floral organ identity. This subject is the one area that has been thoroughly covered in many other texts and literature reviews, so it is hard to add much that is new, but Glover does an excellent job of explaining the work from first principles. In particular, she gives full coverage to the fact that the A-class component of the ABC model of floral organ identity, which is often considered essential to the development of sepals, does not actually appear to be well conserved. This point often gets short shrift in other reviews, but it is very important for students to grasp as early as possible.



The last section, covering variation in floral form, represents the most integrative material. What is the ecological value of zygomorphy (bilateral floral symmetry), and how is it genetically generated? What are the biochemical, genetic, and morphological bases for floral color, and how do the components interact with floral ecology? These questions are among the best-addressed points in this section and are very useful for students coming from both sides of the genetics/ecology divide. (The first half of the section could benefit from labeled illustrations of the genetic models, and the figures throughout the book are of variable quality.) The second half of the section focuses more on evolutionary- and ecological-minded questions concerning the role of pollination interactions in plant fitness. In particular, Glover takes on some of the controversy concerning "pollinator syndromes," and she presents both sides evenhandedly.

Flowers and Flowering is a well-written text that would well serve undergraduates, early graduate students, or anyone with a solid biology background who is interested in floral biology. Although I found some points to criticize, I would still recommend the book, especially for those from an ecology perspective who want to learn more about floral genetics. I do think that further integration is needed among the disciplines of evolution, genetics, and ecology—both in this text and in others to follow—but this work will initiate that important process.

ELENA M. KRAMER
Elena M. Kramer (e-mail: ekramer @oeb.harvard.edu) is a professor of biology in the department of organismic and evolutionary biology at Harvard University.

doi:10.1641/B581114
Include this information when citing this material.

NEW TITLES

Bears: A Brief History. Bernd Brunner. Trans. Lori Lantz. Yale University Press, New Haven, CT, 2007. 272 pp., illus. $15.00 (ISBN 9780300143126 paper).

CO_2 Rising: The World's Greatest Environmental Challenge. Tyler Volk. MIT Press, Cambridge, MA, 2008. 223 pp., illus. $22.95 (ISBN 9780262220835 cloth).

Design with Constructal Theory. Adrian Bejan and Sylvie Lorente. Wiley, Hoboken, NJ, 2008. 552 pp., illus. $135.00 (ISBN 9780471998167 cloth).

Disappearing Desert: The Growth of Phoenix and the Culture of Sprawl. Janine Schipper. University of Oklahoma Press, Norman, 2008. 160 pp., illus. $19.95 (ISBN 9780806139555 cloth).

Echoes of Life: What Fossil Molecules Reveal about Earth History. Susan M. Gaines, Geoffrey Eglinton, and Jürgen Rullkötter. Oxford University Press, New York, 2008. 357 pp., illus. $35.00 (ISBN 9780195176193 cloth).

Downloaded From: https://bioone.org/journals/BioScience on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

Emerald City: An Environmental History of Seattle. Matthew Klingle. Yale University Press, New Haven, CT, 2009. 384 pp., illus. $20.00 (ISBN 9780300143195 paper).

Future Bioethics: Overcoming Taboos, Myths, and Dogmas. Ronald A. Lindsay. Prometheus Books, Amherst, NY, 2008. 313 pp. $28.95 (ISBN 9781591026242 cloth).

Genomes and What to Make of Them. Barry Barnes and John Dupré. University of Chicago Press, Chicago, 2008. 288 pp. $25.00 (ISBN 9780226172958 cloth).

The Little Owl: Conservation, Ecology, and Behavior of *Athene noctua*. Dries Van Nieuwenhuyse, Jean-Claude Génot, and David H. Johnson. Cambridge University Press, New York, 2008. 596 pp., illus. $80.00 (ISBN 9780521886789 cloth).

The Marie Selby Botanical Gardens Illustrated Dictionary of Orchid Genera. Peggy Alrich and Wesley Higgins. Cornell University Press, Ithaca, NY, 2008. 512 pp., illus. $49.95 (ISBN 9780801447372 cloth).

Metal Contamination in Aquatic Environments: Science and Lateral Management. Samuel N. Luoma and Philip S. Rainbow. Cambridge University Press, New York, 2008. 588 pp., illus. $120.00 (ISBN 9780521860574 cloth).

Salmonid Spawning Habitat in Rivers: Physical Controls, Biological Responses, and Approaches to Remediation. David Sear and Paul DeVries, eds. American Fisheries Society, Bethesda, MD, 2008. 376 pp., illus. $69.00 (ISBN 9781934874035 paper).

Science and Conservation in African Forests: The Benefits of Long-term Research. Richard Wrangham and Elizabeth Ross, eds. Cambridge University Press, New York, 2008. 280 pp., illus. $130.00 (ISBN 9780521896016 cloth).

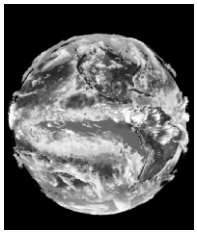
Seedling Ecology and Evolution. Mary Allessio Leck, V. Thomas Parker, and Robert L. Simpson, eds. Cambridge University Press, New York, 2008. 536 pp., illus. $70.00 (ISBN 9780521694667 paper).

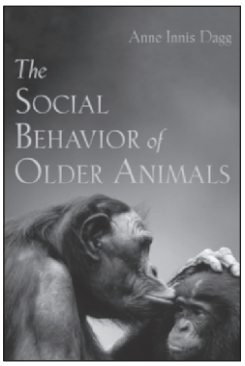
Six-Legged Soldiers: Using Insects as Weapons of War. Jeffrey A. Lockwood. Oxford University Press, New York, 2008. 377 pp., illus. $27.95 (ISBN 9780195333053 cloth).

Urban and Community Fisheries Programs: Development, Management, and Evaluation. Richard T. Eades, J. Wesley Neal, Thomas J. Lang, Kevin M. Hunt, and Paul Pajak, eds. American Fisheries Society, Bethesda, MD, 2008. 463 pp., illus. $69.00 (ISBN 9781934874042 cloth).

Urban Ants of North America and Europe: Identification, Biology, and Management. John Klotz, Laurel Hansen, Reiner Pospischil, and Michael Rust. Cornell University Press, Ithaca, NY, 2008. 212 pp., illus. $27.95 (ISBN 9780801474736 paper).

Wildlife and Society: The Science of Human Dimensions. Michael J. Manfredo, Jerry J. Vaske, Perry J. Brown, Daniel J. Decker, and Esther A. Duke, eds. Island Press, Washington, DC, 2008. 368 pp., illus. $49.50 (ISBN 9781597264082 paper).



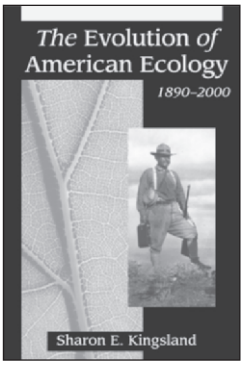


THE SOCIAL BEHAVIOR OF OLDER ANIMALS
Anne Innis Dagg

How do young and old social animals view each other? Are aged animals perceived by others as weaker? Or wiser? What is the relationship between age and power among social animals?

Dagg explores how aging affects the lives and behavior of animals ranging from orcas and mice to parrots and song sparrows. At once instructive and compelling, this species- and theme-spanning study reveals the complex nature of maturity in social animals.

$35.00 hardcover



THE EVOLUTION OF AMERICAN ECOLOGY, 1890–2000
Sharon E. Kingsland

"A new approach to ecology . . . well worth consideration by ecologists, science historians, and anyone interested in how human ecology should be integrated with the biological sciences."—*Science*

"Kingsland does a masterful job weaving together the history of ecology in the United States."—*Bioscience*

$25.00 paperback

THE JOHNS HOPKINS UNIVERSITY PRESS
1-800-537-5487 • www.press.jhu.edu

Downloaded From: https://bioone.org/journals/BioScience on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use