

The Right Fight for Biologists

Author: Beardsley, Timothy M.

Source: BioScience, 58(5) : 379

Published By: American Institute of Biological Sciences

URL: <https://doi.org/10.1641/B580501>

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.

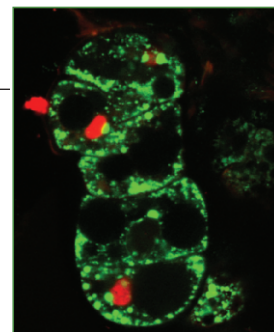
NEWS AND OPINION

- EDITORIAL
379 The Right Fight for Biologists
Timothy M. Beardsley
- VIEWPOINT
382 Biologists and Carbon Neutrality
David W. Oxtoby
- FEATURE
384 Colony Collapse Disorder: Many Suspects, No Smoking Gun
Myrna E. Watanabe
- EYE ON EDUCATION
389 Creating a New Breed of Biology Education Researchers
Brian Stagg
- WASHINGTON WATCH
390 Big Bucks for Biosecurity Research—But Who's Doing What?
Holly Menninger
- AIBSNEWS
466 Plan to Attend! AIBS Annual Meeting, 12–13 May, to Examine Linkages among Infectious Diseases and Climate Change • AIBS Testifies about Need for Increased Funding for Biological Research • AIBS, ESA Coauthor Budget Analysis • AIBS Writes to Oklahoma Senate • ActionBioscience.org Seeks Lesson Writers • NEON Completes Selection of Candidate Sites • NEON Welcomes Its Director of Procurement and Contracts • Recent Executive Director's Blog Entries Online at <http://blogs.aibs.org/richardogrady> • Recent Public Policy Reports Online at www.aibs.org
- BIOBRIEFS
472 Case for Biological Origins of Language Grows Stronger
Edmund Blair Bolles



OVERVIEW ARTICLES

- 21ST CENTURY DIRECTIONS IN BIOLOGY**
391 Engineering with Precision: Tools for the New Generation of Transgenic Crops
Lorena Moeller and Kan Wang
- 403 Freshwater Ecoregions of the World: A New Map of Biogeographic Units for Freshwater Biodiversity Conservation**
Robin Abell, Michele L. Thieme, Carmen Revenga, Mark Bryer, Maurice Kottelat, Nina Bogutskaya, Brian Coad, Nick Mandrak, Salvador Contreras Balderas, William Bussing, Melanie L. J. Stiassny, Paul Skelton, Gerald R. Allen, Peter Unmack, Alexander Naseka, Rebecca Ng, Nikolai Sindorf, James Robertson, Eric Armijo, Jonathan V. Higgins, Thomas J. Heibel, Eric Wikramanayake, David Olson, Hugo L. López, Roberto E. Reis, John G. Lundberg, Mark H. Sabaj Pérez, and Paulo Petry
- 415 Signal Cloaking by Electric Fish**
Philip K. Stoddard and Michael R. Markham
- 426 Ready or Not, Garlic Mustard Is Moving In: *Alliaria petiolata* as a Member of Eastern North American Forests**
Vikki L. Rodgers, Kristina A. Stinson, and Adrien C. Finzi
- 437 Plant Invasions in China: What Is to Be Expected in the Wake of Economic Development?**
Ewald Weber and Bo Li



DEPARTMENTS

- 445** BIOLOGIST'S TOOLBOX
Wavelets for Agriculture and Biology: A Tutorial with Applications and Outlook
Xuejun Dong, Paul Nyren, Bob Patton, Anne Nyren, Jim Richardson, and Thomas Maresca
- 454** FORUM
The Debate on Behavior in Conservation: New Zealand Integrates Theory with Practice
Jennifer A. Moore, Ben D. Bell, and Wayne L. Linklater

Officers	380
Letters	381
New Titles	464
Calendar	470
Classifieds	471

INFORMATION FOR CONTRIBUTORS

Comprehensive information for *BioScience* contributors is available online at www.aibs.org/bioscience/resources/Info_for_contribs.pdf. Authors should consult this resource before submitting manuscripts to *BioScience*.

- 460** BOOK REVIEWS
Sex, Size and Gender Roles: Evolutionary Studies of Sexual Size Dimorphism
Daphne J. Fairbairn, Wolf U. Blanckenhorn, and Tamás Székely, eds.
 Reviewed by *Hanna Kokko*
- 461** **From Embryology to Evo-Devo: A History of Developmental Evolution**
Manfred D. Laubichler and Jane Maienschein, eds.
 Reviewed by *Jessica A. Bolker*
- 463** **Six Legs Better: A Cultural History of Myrmecology.**
Charlotte Sleigh. Reviewed by *Andrew V. Suarez*

Cover: These maize callus cells have been manipulated to express green fluorescent protein fused to a bacterial signal peptide. Gold particles, coated with DNA encoding the fluorescent protein and the signal peptide, were fired into the cells using a "gene gun," or biolistic particle delivery system. Some cells that have been bombarded this way take up and express the DNA-encoded proteins, and thus the technique is widely used in plant biotechnology. The signal peptide localizes the green fluorescent protein to specific regions of interest within the cell; in this image, the red bodies within the cells are the nuclei, stained with propidium iodide. In the article that begins on p. 391, Lorena Moeller and Kan Wang discuss a variety of techniques, including biolistic particle delivery, that are used in research on the production of improved genetically engineered crops such as maize. Photograph: Lorena Moeller and Kan Wang.

Coming next month

- Governance and Marine Protection
- Forensic Biology
- Functional Genomics in Radiation Biology and Oncology
- The Dynamics of Biome-wide Bark Beetle Eruptions
- Bank Erosion as a Desirable Attribute of Rivers
- Wildfire in Alaska's Boreal Forest
- Ecological Speciation in Mimetic Butterflies
- Anecdotal Occurrence Data for Rare and Elusive Species: A Call for Evidentiary Standards
- The US Ethanol and Biofuels Boom

PUBLISHER
Richard T. O'Grady

EDITOR IN CHIEF
Timothy M. Beardsley

SENIOR EDITOR
Donna Daniels Verdier

PRODUCTION MANAGER / ART DIRECTOR
Herman Marshall

**PEER REVIEW / EXTERNAL RELATIONS
COORDINATOR**
Jennifer A. Williams

MANUSCRIPT EDITOR
Laura C. Sullivan

Editors: Eye on Education: Brian Stagg (educationoffice@aibs.org); Feature articles: Cathy Lundmark (features@aibs.org); Washington Watch: Robert E. Gropp (publicpolicy@aibs.org).

Editorial Associate: Barbara J. Orton.

Editorial Board: Agriculture: Sonny Ramaswamy; Animal Behavior: Janice Moore; Animal Development: Paula Mabee; Botany: Kathleen Donohue; Cell Biology: Randy Wayne; Ecology: Scott Collins, Daniel Simberloff; Ecotoxicology: Judith S. Weis; Education: Gordon E. Uno; Environmental Policy: Gordon Brown, J. Michael Scott; Evolutionary Biology: James Mallet; Genetics and Evolution: Martin Tracey; History and Philosophy: Richard M. Burian; Invertebrate Biology: Kirk Fitzhugh; Landscape Ecology: Monica Turner; Microbiology: Edna S. Kaneshiro; Molecular Biology: David Hillis; Molecular Evolution and Genomics: David Rand; Neurobiology: Cole Gilbert; Plant Development: Cynthia S. Jones; Policy Forum: Eric A. Fischer; Population Biology: Ben Pierce; Professional Biologist: Jean Wyld; Sensing and Computation: Geoffrey M. Henebry; Statistics: Kent E. Holsinger; Vertebrate Biology: Harvey B. Lillywhite.

Editorial Correspondence: 1444 I Street, NW, Suite 200, Washington, DC 20005; telephone: 202-628-1500; fax: 202-628-1509; e-mail: bioscience@aibs.org. Instructions for preparing a manuscript for *BioScience* can be found at www.aibs.org/bioscience/resources/Info_for_contribs.pdf.

Advertising: For information on both display and line classified advertisements and deadlines, contact John Rasanen, American Geological Institute; telephone: 703-379-2480, ext. 224; fax: 703-379-7563; e-mail: jrasanen@aibs.org.

BioScience (ISSN 0006-3568) is published monthly except July/August combined by the American Institute of Biological Sciences. To subscribe, call 1-800-992-2427, ext. 29. Individual membership: sustaining, \$90/yr; individual, \$70/yr; family, \$90/yr (includes \$36 for *BioScience*); emeritus, \$50/yr; K-12 teacher/administrator, \$45/yr (includes \$22 for *BioScience*); graduate and postdoctoral students, \$40/yr (includes \$21 for *BioScience*); undergraduate and K-12 students, \$20/yr (includes \$15 for *BioScience*); lifetime, \$1400 (one-time fee). Institutional subscriptions: domestic, \$367/yr; foreign, \$440/yr. Single copies: \$14 plus shipping and handling for up to 20 copies; volume discounts available for more than 20 (call 1-800-992-2427, ext. 29). Subscription renewal month is shown in the four-digit year-month code in the upper right corner of the mailing label.

© 2008 American Institute of Biological Sciences. All rights reserved. Periodical postage paid at Washington, DC, and additional mailing offices.

POSTMASTER: Send address changes to *BioScience* Circulation, AIBS, 1313 Dolley Madison Blvd., Suite 402, McLean, VA 22101. Printed in USA. AIBS authorizes photocopying for internal or personal use, provided the appropriate fee is paid directly to the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923; telephone: 978-750-8400; fax: 978-750-4744; Web site: www.copyright.com. To photocopy articles for classroom use, request authorization, subject to conditions thereof, from the Academic Permissions Service at CCC. Each copy must say "© [year] by the American Institute of Biological Sciences." Statements and opinions expressed in *BioScience* are those of the author(s) and do not necessarily reflect the official positions of the American Institute of Biological Sciences, the editors, the publisher, or the institutions with which the authors are affiliated. The editors, publisher, and AIBS disclaim any responsibility or liability for such material.

BioScience

Organisms from Molecules to the Environment
American Institute of Biological Sciences

The Right Fight for Biologists

Deadly food riots in Haiti and Egypt, together with recent price-related unrest in several other countries, are disturbing reminders of the vulnerability of the poorest. Just as it is impossible to ascribe any single weather event to global warming, it is impossible to attribute any one instance of unrest to worldwide ecological trends. The importance of conflict, corrupt governance, and poor trade links in causing poverty—and thus food deprivation—is widely accepted. Yet it is also inescapable that global grain price increases of 80 percent during the past year, which are contributing to the unrest and undoing gains against poverty, are a reaction to combined demographic and environmental trends affecting agriculture. Drought in some parts of the world, combined with rapidly growing demand for meat, fish, fruits, wheat, and vegetables—especially in China and India—is putting upward pressure on feed-grain prices. The concurrent surge in oil prices is persuading more farmers to produce crops for biofuels. Both trends drive up prices for staple foods. United Nations officials see no respite in the foreseeable future.

If rising food prices have a silver lining, it is that farmers should be able to invest more. Yet environmental constraints such as soil salinity, as well as the growing cost of nitrogenous fertilizers and market failures, limit growers in many places. With the world population expected to grow by a third before 2050 and climate change potentially exacerbating some threats, there is an obvious need to boost the efficiency of food production in a sustainable way.

Ideas from organic farming can help but by themselves are insufficient. New biotechnologies are critical in preventing more world hunger. Crops produced by direct manipulation of DNA, the subject of the article that begins on p. 391, have demonstrated enormous power to boost food supplies and reduce environmental damage. As authors Lorena Moeller and Kan Wang point out, such crops can provide improved resistance to stressors and pests of all sorts, as well as improved nutritional properties. More than 100 million hectares of these crops were planted worldwide in 2006 by over 10 million farmers. Most of these farmers are in developing countries, and they are chiefly cultivating pest-resistant cotton. Yet regulatory obstacles stemming from often-exaggerated fears impede the cultivation of genetically engineered food crops in much of the world.

As with any new technology, there are risks, and scientists and governments should be on the lookout for them. So far, however, careful scrutiny has found no evidence of health dangers from growing or eating approved genetically engineered crops. Certainly, any ecological or health consequences of these products need to be monitored and prudence observed. But all crops are the result of some type of manipulation of DNA, and the activists who denounce direct manipulation of crops' DNA should think hard about the human costs. They could act constructively to change particular agribusiness policies, or to respond to their pain at the loss of so much of nature, without opposing a much-needed technology. The rioters have a more physical pain, and all of science's tools are needed to alleviate it.

TIMOTHY M. BEARDSLEY
Editor in Chief

doi:10.1641/B580501
Include this information when citing this material.

2008 Officers and Board of Directors

President

Rita R. Colwell
University of Maryland

President-Elect

May Berenbaum
University of Illinois at
Urbana-Champaign

Immediate Past-President

Douglas J. Futuyma
State University of New York

Secretary

Gordon Uno
(2008–2010)
University of Oklahoma

Treasurer

Richard B. Norgaard
(2007–2009)
University of California–
Berkeley

Board Members

Charles Berry
(2008–2010)
South Dakota State University

Carol Brewer
(2008–2010)
University of Montana

Ellen J. Censky
(2008–2010)
University of Oklahoma

Robert R. Christian
(2008)
East Carolina University

Louis J. Gross
(2008–2010)
University of Tennessee–
Knoxville

Eric S. Nagy
(2006–2008)
University of Virginia

Steward T. A. Pickett
(2007–2009)
Cary Institute of Ecosystem
Studies

Alan H. Savitzky
(2007–2009)
Old Dominion University

Richard T. O'Grady
(ex-officio)
AIBS Executive Director

To find out more about
AIBS and its member
societies and organizations,
go to www.aibs.org.

Member Societies and Organizations

- Academy of Natural Sciences
American Arachnological Society
American Bryological and Lichenological Society
American Fern Society
American Fisheries Society
American Malacological Society
American Mosquito Control Association
American Museum of Natural History
American Ornithologists' Union
American Phytopathological Society
American Public Garden Association
American Society for Gravitational and Space Biology
American Society for Photobiology
American Society of Agronomy
American Society of Ichthyologists and Herpetologists
American Society of Limnology and Oceanography
American Society of Mammalogists
American Society of Naturalists
American Society of Parasitologists
American Society of Plant Biologists
American Society of Plant Taxonomists
American Type Culture Collection
Animal Behavior Society
Arkansas State University Department of Biological Sciences
Association for Politics and the Life Sciences
Association for Tropical Biology and Conservation
Association of College and University Biology Educators
Association of Ecosystem Research Centers
Association of Southeastern Biologists
Bailey-Matthews Shell Museum
Bell Museum of Natural History
Berkeley Natural History Museums
Biological Sciences Curriculum Study
BioQUEST Curriculum Consortium
Bishop Museum
Botanical Research Institute of Texas
Botanical Society of America
Brigham Young University
Brooklyn Botanic Garden
Burke Museum of Natural History
Cactus and Succulent Society of America
California Academy of Sciences
California Botanical Society
Carnegie Museum of Natural History
Cell Stress Society International
The Centennial Museum
Center for the Environment, Cornell University
Charles R. Connor Natural History Museum
Chicago Botanic Garden
Cleveland Museum of Natural History
Coastal Education and Research Foundation
Cooper Ornithological Society
Cornell University Department of Plant Biology
Council of Science Editors
Crop Science Society of America
Crowley Davis Research, Inc.
Delaware Museum of Natural History
Denver Museum of Nature and Science
Ecological Society of America
Entomological Society of America
Entomological Society of Canada
Estuarine Research Federation
Field Museum
Fish and Wildlife Research Institute
Florida Department of Agriculture and Consumer Services, Division of Plant Industry
Florida Marine Research Institute
Florida Museum of Natural History
Freshwater Mollusk Conservation Society
Friends of AIBS
Georgia Museum of Natural History
Gulf Coast Research Laboratory
Harvard Museum of Comparative Zoology
Helmintological Society of Washington
Herpetologists' League
Human Anatomy and Physiology Society
Hunt Institute for Botanical Documentation
Illinois Natural History Survey
Illinois State Museum
Instituto de Geología, UNAM
International Association for Bear Research and Management
International Association for Landscape Ecology, US Division
International Society for Ecological Modelling
International Society of Protistologists
Kansas (Central States) Entomological Society
Long Term Ecological Research Network
Lorain County Community College, Division of Science, Mathematics, and Distance Learning
Louisiana Museum of Natural Science
Louisiana State University Arthropod Museum
Louisiana State University Herbarium, Department of Biological Sciences
Miami University W. S. Turrell Herbarium
Michigan State University Museum
Milwaukee Public Museum
Mississippi Museum of Natural Science
Missouri Botanical Garden
Monte L. Bean Museum of Life Sciences
Morton Arboretum
Museum of Nature and Science
Museum of Southwestern Biology
Mycological Society of America
National Association of Biology Teachers
National Association of Marine Laboratories
National Evolutionary Synthesis Center
National Museum of Natural History
National Shellfisheries Association
National Tropical Botanical Garden
Natural Areas Association
Natural History Museum of Los Angeles County
Natural Science Collections Alliance
NatureServe
New Mexico Museum of Natural History and Science
New Mexico State University, Center for Natural History Collections
New York Botanical Garden
New York State Museum
North American Benthological Society
North American Lake Management Society
North Carolina Botanical Garden
North Carolina Museum of Natural Science
North Carolina State University Insect Collection
Northwest Missouri State University, Biological Sciences
Occidental College, Moore Laboratory of Zoology
Ohio State University Museum of Biological Diversity
Ohio University Department of Environmental and Plant Biology
Oklahoma State University
Organization for Tropical Studies
Organization of Biological Field Stations
Orthopterists' Society
Paleontological Research Institution
Peabody Museum of Natural History
Phi Sigma Biological Sciences Honor Society
Phycological Society of America
Pinellas County Department of Environmental Management, Environmental Lands Division
Poultry Science Association
Purdue University Entomology Environmental Lab
R. M. Bohart Museum of Entomology
Radiation Research Society
Sam Noble Oklahoma Museum of Natural History
San Bernardino County Museum
San Diego Natural History Museum
Santa Barbara Museum of Natural History
Sarah P. Duke Gardens
Science Museum of Minnesota
Slater Museum of Natural History
Society for Behavioral Neuroendocrinology
Society for Conservation Biology
Society for Economic Botany
Society for In Vitro Biology
Society for Industrial Microbiology
Society for Integrative and Comparative Biology
Society for Mathematical Biology
Society for Northwestern Vertebrate Biology
Society for Range Management
Society for Sedimentary Geology
Society for the Study of Amphibians and Reptiles
Society for the Study of Evolution
Society of Environmental Toxicology and Chemistry
Society of Ethnobiology
Society of Nematologists
Society of Systematic Biologists
Society of Wetland Scientists
Soil Science Society of America
South Dakota State University, Department of Wildlife and Fisheries Sciences
Southern Appalachian Botanical Society
Southern California Academy of Sciences
Southwestern Association of Naturalists
Sternberg Museum of Natural History
Texas A&M University Department of Entomology
Texas A&M University Department of Wildlife and Fisheries Sciences
Texas Memorial Museum
Texas Tech University Department of Biological Sciences
Tofino Botanical Gardens
Torrey Botanical Society
Tulane University Museum of Natural History
University of Alaska Fairbanks, Alaska Cooperative Fish and Wildlife Research Unit
University of Alaska Museum of the North
University of California–Berkeley Department of Integrative Biology
University of California–San Diego, Scripps Institution of Oceanography
University of California–Santa Barbara Center for Biodiversity and Ecological Restoration
University of Connecticut Department of Ecology and Evolutionary Biology
University of Iowa Department of Geoscience
University of Kansas Natural History Museum and Biodiversity Institute
University of Michigan Genomic Diversity Laboratory
University of Michigan Museum of Zoology
University of Nebraska State Museum
University of Wisconsin Zoology Museum
US Bureau of Reclamation, Environmental Resource Management Division
US Federation for Culture Collections
US Fish and Wildlife Service, Ecological Services and Fisheries Resource Office
US Society for Ecological Economics
Utah Museum of Natural History
Virginia Institute of Marine Science
Virginia Museum of Natural History
Washington State University
Weed Science Society of America
Western Society of Naturalists
The Wildlife Society