

SPECIAL SECTION

Plant-Microbe Interactions

INTRODUCTION

- 741 What's Bugging Plants?

PERSPECTIVES

- 742 Innate Immunity in Plants: An Arms Race Between Pattern Recognition Receptors in Plants and Effectors in Microbial Pathogens
T. Boller and S. Y. He
- 744 To Nibble at Plant Resistance Proteins
F. L. W. Takken and W. I. L. Tameling
- 746 Plant-Microbe Interactions: Chemical Diversity in Plant Defense
P. Bednarek and A. Osbourn

- 748 Terrific Protein Traffic: The Mystery of Effector Protein Delivery by Filamentous Plant Pathogens
R. Panstruga and P. N. Dodds
- 750 Hormone (Dis)harmony Moulds Plant Health and Disease
M. R. Grant and J. D. G. Jones
- 753 Reprogramming Plant Cells for Endosymbiosis
G. E. D. Oldroyd et al.
- 755 Coevolution of Plants and Their Pathogens in Natural Habitats
J. J. Burdon and P. H. Thrall

>> See also related Editorial on p. 691

EDITORIAL

- 691 Next-Generation Communication
Ton Bisseling et al.
>> Plant-Microbe Interactions section p. 741

NEWS OF THE WEEK

- 700 Out of Mexico? Scientists Ponder Swine Flu's Origins
- 702 Devilish Dilemmas Surround Pandemic Flu Vaccine
- 703 From the *Science* Policy Blog
- 705 What Role for Antiviral Drugs?
- 706 Newsmaker Interview: Corey Goodman, Post-Pfizer, on the Allure of Enterprise
- 707 Army Bans Pathogen Work at Lab After Security Lapse
- 708 DOE Commits \$777 Million to Apply Basic Science to Urgent Problems
- 709 Fermi Data Dim Dark-Matter Claim
- 709 From *Science's* Online Daily News Site

NEWS FOCUS

- 710 The Famine Fighter's Last Battle
- 713 Wenchuan Earthquake: A Deeply Scarred Land
Some Unwelcome Questions About Big Dams
- 715 One Year After a Devastating Cyclone, a Bitter Harvest
- 717 Going the Distance to Uncover the Roots of Trade in the Near East
- 718 Shuttle Crew Set to Prepare Hubble for a Star-Studded Grand Finale
A Reprieve—and Risk

LETTERS

- 721 The Spread of Grapevine Trunk Disease
C. Bertsch et al.
Eutrophication: More Nitrogen Data Needed
D. W. Schindler and R. E. Hecky
Eutrophication: Focus on Phosphorus
C. L. Schelske
Eutrophication: Model Before Acting
A. C. Bryhn and L. Håkanson



page 710

Eutrophication:
Time to Adjust Expectations
C. A. Jacoby and T. K. Frazer
Response
D. J. Conley et al.

BOOKS ET AL.

- 726 Cruelty
K. Taylor, reviewed by P. Ak

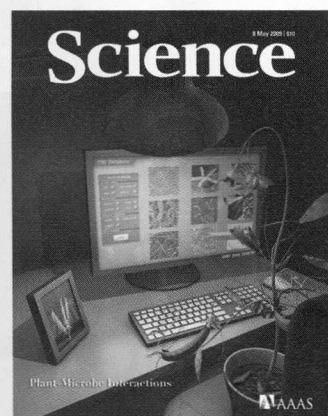
POLICY FORUM

- 727 A History Lesson for Stem Cells
J. M. Wilson

PERSPECTIVES

- 729 The Origin of Plasmaspheric Hiss
O. Santolik and J. Chum
>> Report p. 775
- 730 Origins of Agriculture in East Asia
M. K. Jones and X. Liu
- 731 The Sources of Human Volition
P. Haggard
>> Report p. 811
- 733 Some Like It Cold
C. H. Greene et al.
>> Report p. 791
- 734 An Invasive Plant Paradox
M. E. Rout and R. M. Callaway

CONTENTS continued >>



COVER

Interactions between microbes and plants can vary widely, depending upon the context and the partners of the interaction. An Editorial on page 691 and a collection of Perspectives starting on page 742 discuss recent advances in our understanding of the biochemistry, signaling, and ecosystem dynamics that reflect how microbes and plants interact.

Illustration: Chris Bickel

DEPARTMENTS

- 687 This Week in *Science*
- 693 Editors' Choice
- 696 *Science* Staff
- 699 Random Samples
- 818 New Products
- 819 *Science* Careers

REVIEW

- 736 **Elemental Composition of the Martian Crust**
H. Y. McSween Jr. et al.

BREVIA

- 758 **A Gene Necessary for Reproductive Suppression in Termites**
J. Korb et al.
Knocking out the *Neofem2* gene in queen termites illicit pre-reproductive behavior in workers.

RESEARCH ARTICLE

- 759 **Representation of Confidence Associated with a Decision by Neurons in the Parietal Cortex**
R. Kiani and M. N. Shadlen
Neurons in the primate parietal cortex encode information required to make a decision and also the certainty of that choice.

REPORTS

- 764 **Characterization of Multipartite Entanglement for One Photon Shared Among Four Optical Modes**
S. B. Papp et al.
Sharing a single photon between four optical modes creates entangled states that could be used in quantum information processing.
- 768 **N-Doping of Graphene Through Electrothermal Reactions with Ammonia**
X. Wang et al.
The edges of graphene nanoribbons incorporate nitrogen atoms after heating in an atmosphere of ammonia.
- 772 **An Experimental Design Method Leading to Chemical Turing Patterns**
J. Horváth et al.
Three design criteria were used to create sustained stationary patterns in the thiourea-iodate-sulfite reaction system.
- 775 **An Observation Linking the Origin of Plasmaspheric Hiss to Discrete Chorus Emissions**
J. Bortnik et al.
The radio waves that remove energetic electrons from Earth's radiation belts originate outside the plasmasphere.
>> *Perspective p. 729*
- 778 **The Role of Aerosols in the Evolution of Tropical North Atlantic Ocean Temperature Anomalies**
A. T. Evan et al.
Changes in tropical North Atlantic sea surface temperatures are caused by variability in atmospheric aerosol abundances.

- 781 **UV Absorption Cross Sections of CIOOCl Are Consistent with Ozone Degradation Models**
H.-Y. Chen et al.
Measurements of how well CIOOCl molecules absorb ultraviolet light support standard models of chlorine-induced ozone degradation.

- 784 **Host Inhibition of a Bacterial Virulence Effector Triggers Immunity to Infection**
V. Ntoukakis et al.
An enzyme in tomato targets bacterial virulence to change the outcome of infection from susceptibility to immunity.

- 787 **Development of a Second-Generation Antiandrogen for Treatment of Advanced Prostate Cancer**
C. Tran et al.
A drug that binds to the androgen receptor acts by disrupting its activity in the cell nucleus.

- 791 **Basin-Scale Coherence in Phenology of Shrimps and Phytoplankton in the North Atlantic Ocean**
P. Koeller et al.
Shrimp reproduction is primed by bottom temperature and not directly by cues from the spring phytoplankton bloom.
>> *Perspective p. 733*

- 794 **Apicomplexan Parasites Co-Opt Host Calpains to Facilitate Their Escape from Infected Cells**
R. Chandramohanadas et al.
A host protease helps newly replicated microbial parasites escape from incubator cells.

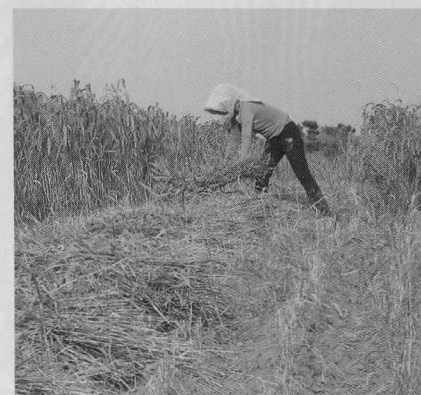
- 797 **Human Induced Pluripotent Stem Cells Free of Vector and Transgene Sequences**
J. Yu et al.
Human induced pluripotent stem cells can be generated without integration of exogenous DNA into their genomes.

- 801 **Benzothiazinones Kill *Mycobacterium tuberculosis* by Blocking Arabinan Synthesis**
V. Makarov et al.
An isomerase required for cell-wall synthesis is a target for an alternative drug lead for tuberculosis treatment.

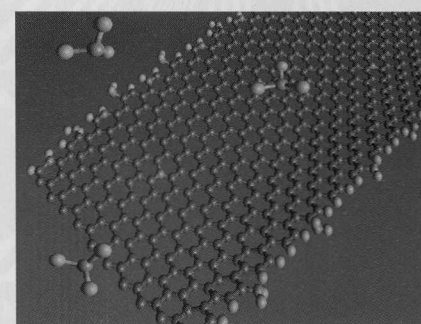
- 804 **Mammalian Expression of Infrared Fluorescent Proteins Engineered from a Bacterial Phytochrome**
X. Shu et al.

- An engineered infrared fluorescent protein derived from an extremophile bacterium gives a strong signal in mammalian cells.
>> *Science Podcast*

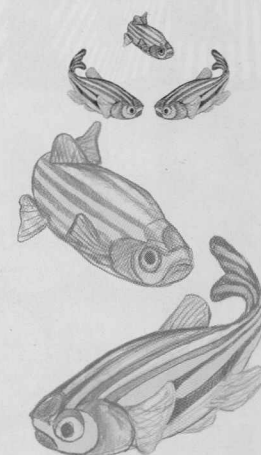
- 807 **High-Throughput Sequencing of the Zebrafish Antibody Repertoire**
J. A. Weinstein et al.
Sequencing of immunoglobulin messenger RNA characterizes the diversity of the antibody repertoire in individual zebrafish.



page 730



page 768



page 807

- 811 **Movement Intention After Parietal Cortex Stimulation in Humans**
M. Desmurget et al.
Stimulation of the parietal cortex causes subjects to report having moved, even in the absence of actual motor responses.
>> *Perspective p. 731*

CONTENTS continued >>