

ASPP NEWS

PRESIDENT'S LETTER



Milestones

This past December was special. On the 14th, the completion of the Arabidopsis genome sequencing effort was announced, timed to the publication of a series of articles in *Nature* and *Science* and a special issue of *Plant Physiology* concerning this milestone. This is a tremendous resource for our community, a treasure trove of data providing many molecular starting points for studies about how plants work their magic. The completed genome links formerly disparate fields of study, painting heretofore invisible paths between all areas of biology. To be sure, this inventory of parts does not (yet) tell us how the plant works, and figuring out the detailed dynamics of physiological and developmental processes promises to be a much greater challenge than obtaining the genome sequence. Moreover, this lowly weed, Arabidopsis, lacks many of the particular characteristics that make other plants so useful to humankind. Nonetheless, whether one works on Arabidopsis or another plant, the sequencing of the first plant genome is an achievement worth celebrating. So, I offer a toast: To the Arabidopsis genome—may it be the first of many.

Another December milestone was the ASPP membership's vote in favor of changing the Society's name to the **American Society of Plant Biologists**. This vote was taken after more than a year of discussion and debate about the virtues and drawbacks of such a change. For me, the final count (about 70 percent for, 30 percent against) gives a fair reflection of this discussion—the new name is not without its problems, but on balance it is a better, more inclusive name that reflects what our members are already doing and where our future

lies. And what better time to adopt a broader name and mission than at the start of a new millennium, with the just-completed sequence of the first plant genome sitting in our collective pockets? The Society's staff and leadership will be busy in the next six months, preparing the transition to the new name. I anticipate that the new name will make us more effective in our outreach to the public and to government bodies (do you know how often "physiologists" is mistaken for "pathologists" or, worse, "psychologists"?) and will provide a more attractive rubric to the many newcomers who have been drawn to the study of plants in the past decade.

Plant biotechnology continues to be in the news, and our Public Affairs Committee has been active in promoting a science-based evaluation of the genetically modified organisms (GMO) issue. Not all of the issues are scientific, however, and I believe that the deeper issues fueling this debate are ideological and sociological, rather than scientific. Thus, ASPP can only address some of the societal concerns. The GMO debate has raised many fears and passions. Take a look at recent issues of the *ASPP NEWS*, and you will see a range of views from our own members. Please note that viewpoints expressed by individuals in the newsletter are just that—personal views—and ASPP as an organization has tried to steer a balanced course that reflects the views of the membership at large. At the annual meeting in San Diego last summer, the president of the Rockefeller Foundation, Dr. Gordon Conway, presented his own compelling view of the GMO issue. If you missed it, take a look at the recorded version of his presentation at <http://www.cellwall.bio.psu.edu/aspp/index.htm> (you'll

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**Deadline for March/April 2001 ASPP NEWS:
February 10, 2001**

Future ASPP Annual Meetings

2001

Saturday, July 21, through
Wednesday, July 25
Providence, Rhode Island

2002

Saturday, August 3, through
Wednesday, August 7
Denver, Colorado

2003

Saturday, July 26, through
Wednesday, July 30
Honolulu, Hawaii



ASPP NEWS

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Contact: Nancy A. Winchester, Editor, ASPP NEWS, 15501 Monona Drive, Rockville, MD 20855-2768 USA; e-mail nancyw@aspp.org; telephone 301-251-0560, ext. 117.

ASPP OFFICERS & STAFF

<i>President</i>	
Daniel J. Cosgrove	814-863-3892
<i>President-Elect</i>	
Vicki L. Chandler	520-676-8725
<i>Immediate Past President</i>	
Deborah P. Delmer	530-752-7561
<i>Secretary</i>	
Daniel R. Bush	217-333-6109
<i>Treasurer</i>	
Mark R. Brodl	309-341-7477
<i>Chair, Board of Trustees</i>	
Donald R. Ort	217-333-2093
<i>Chair, Publications Committee</i>	
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<i>Chair, Committee on the Status of Women in Plant Physiology</i>	
Ann M. Hirsch	310-206-8673
<i>Chair, Committee on Minority Affairs</i>	
Robert Vellanoweth	323-343-2148
<i>Elected Members</i>	
Rebecca S. Boston	919-515-2727
Joe Chappell	606-257-4624
Roger Hangarter	812-855-5456
<i>Sectional Representatives</i>	
<i>Midwestern</i>	
Steven Rodermel	515-294-8890
<i>Northeastern</i>	
Carol Reiss	401-863-3075
<i>Southern</i>	
Joyce G. Foster	304-256-2809
<i>Washington, DC</i>	
Janet P. Slovin	301-504-5629
<i>Western</i>	
Dina Mandoli	206-543-4335

Headquarters Office
15501 Monona Drive
Rockville, MD 20855-2768 USA
Phone: 301-251-0560
Fax: 301-279-2996

<i>Executive director,</i>	
John Lisack, Jr., ext. 115	jlisack@aspp.org
<i>Executive assistant,</i>	
Donna Gordon, ext. 131	dgordon@aspp.org
<i>Director of finance and administration,</i>	
Susan K. Chambers, ext. 111	chambers@aspp.org
<i>Accountant,</i>	
Sandra A. Giancoli, ext. 140	giancoli@ospp.org
<i>Network administrator/Webmaster,</i>	
Burton Nicodemus, ext. 146	burton@aspp.org
<i>Membership and marketing manager,</i>	
Kelley Noone, ext. 142	knoone@aspp.org
<i>Subscription and fulfillment assistant,</i>	
Mary Bush, ext. 141	morybush@aspp.org
<i>Accounts receivable specialist,</i>	
Stephanie Liu-Kuan, ext. 143	sliu@ospp.org
<i>Administrative assistant</i>	
Carolyn Freed, ext. 122	cfreed@aspp.org
<i>Director of public affairs,</i>	
Brian M. Hyps, ext. 114	bhypps@ospp.org
<i>Foundation assistant,</i>	
Janice Jordan, ext. 129	jjordan@aspp.org
<i>Director of publications,</i>	
Nancy A. Winchester, ext. 117	nancyw@aspp.org
<i>Publications assistant,</i>	
Sylvia Braxton Lee, ext. 133	sbraxton@aspp.org
<i>Managing editor, Plant Physiology,</i>	
Melissa Junior, ext. 118	mjunior@ospp.org
<i>Science writer, Plant Physiology,</i>	
Peter Minorsky, 914-437-7438	peminorsky@aspp.org
<i>Production manager, Plant Physiology,</i>	
Lauren A. Ransome, ext. 130	lransome@aspp.org
<i>Manuscript coordinator, Plant Physiology,</i>	
Kimberly A. Davis, ext. 124	kimdavis@ospp.org
<i>Manuscript coordinator, Plant Physiology,</i>	
Stephanie M. Butto, ext. 125	butto@aspp.org
<i>Managing editor, The Plant Cell,</i>	
Beth Staehle, ext. 121	beths@aspp.org
<i>News and reviews editor, The Plant Cell,</i>	
Nancy Eckardt, 970-495-9918	neckardt@aspp.org
<i>Production coordinator, The Plant Cell,</i>	
Jennifer Fleet, ext. 119	jfleet@ospp.org
<i>Senior manuscript coordinator, The Plant Cell,</i>	
Annette Kessler, ext. 120	akessler@ospp.org

New NABT Teaching Tool Available for Student Research

need Windows to view this lecture). The Executive Committee will soon vote on a statement, prepared by the Public Affairs Committee, concerning GMOs. This statement will represent the Society's first official stance on this topic. It won't satisfy everyone, but it will be a balanced statement on the promise of our science.

Finally, if you haven't read the proposal by Jon Monroe (in the November/December 2000 issue of the *ASPP NEWS*), please take a look and let me know what you think. Jon put forward an idea for restructuring the sections of the Society. Since we just renamed the Society, it seems an opportune time to look at the sectional structure and consider alternatives that might work better. Currently, our sections are based on an arbitrary geography of the United States, and some sections are more active than others. It is worth noting that international members may form a section and that particular interest groups may also form sections. The sections may hold local meetings that serve as an easy entrance for students into the scientific world, and they may be represented on the ASPP Executive Committee. The ASPP leadership will be examining this issue in the coming months, so if you have an opinion, let us hear it. ☺

Daniel Cosgrove
Penn State University
dcosgrove@psu.edu

A new biology research teaching tool features core experiments and variations that can launch students into the world of scientific research. The National Association of Biology Teachers (NABT) published *Encouraging Student Biological Research Through Teacher-Scientist Partnerships* with the participation of scientists and educators. The publication reflects the intent of the National Science Education Standards and assists teachers and students in integrating research into their high school biology classes.

Several ASPP members were involved in the development of this innovative student research publication. Doug Luster and Mark Holland served on the review panel, and James Saunders was one of the project writers.

The book includes 11 core laboratory investigations with 10 variations for each core experiment. The first page of each lab shows the relationship between the core experiment and the variations with an At-a-Glance Map. Each activity is divided into two sections: Directions for Teachers and Directions for Students. Directions for Teachers contains content background, teaching tips, time considerations, instructional strategies, suggested readings, common student misconceptions, sample data, interpretation of the data, and sample

questions with answers. Directions for Students is a guide for students to conduct their own research under the guidance of the teacher.

For the development of this publication, writing partnerships between high school teachers and scientists were formed, resulting in 12 teams in the Central North Carolina and greater metropolitan Washington, DC, areas. School sites were specifically chosen to include students of diverse cultural, ethnic, and socioeconomic backgrounds. Experts updated team members on relevant content, education, and production elements. Team members then developed lab topics that teachers field-tested for three years nationally in the United States to provide the best science and pedagogy for biological scientific research.

NABT is developing a Web page where each lab will list the contact information for the developers, field testers, and scientists who worked on each specific lab. There will be an area for "New Ideas" for each lab. *Encouraging Student Biological Research Through Teacher-Scientist Partnerships* is available from NABT, 12030 Sunrise Valley Drive, #110, Reston, VA 20191-3409; telephone 703-264-9696 or 800-406-0775, fax 703-264-7778. The NABT Web site is <http://www.nabt.org>. ☺

ASPP JOURNALS LAUNCH NEW E-LETTER FEATURE!

ASPP has added a new feature to *Plant Physiology* and *The Plant Cell Online* to make it easy for readers to comment on published papers. **E-letters** is a monitored forum for letters to the editor about papers published in the two journals. A menu box at the beginning of each research article now includes a link to **e-letters**. By clicking on this link, readers can easily e-mail a letter to the editor for possible publication online. All letters are monitored by the editorial office and will be circulated to editorial board members for review.

Readers will be able to follow the correspondence regarding any paper by clicking on a link on the opening page of the electronic journal. Letters are indexed by published article and can be viewed according to author, time submitted, and title.

The editors hope that this new feature will encourage thoughtful and constructive dialogue on the scientific advances published in *The Plant Cell* and *Plant Physiology*.

www.plant.org

Foundation Documentary Production Team Completes Filming

The production of the ASPP Education Foundation documentary film on the history of agriculture moved rapidly ahead the past several months, with the involvement of prominent scientists on-site in four nations. An award-winning crew joined Education Foundation Chair Bob Goldberg in making the documentary. Filming was completed in December, and the project is now being edited. The documentary will be presented at Plant Biology 2001, ASPP's annual meeting in Rhode Island in July.

The script, reviewed by ASPP members Bob Goldberg, Brian Larkins, Debby Delmer, Dick Flavell, and others, features real events that present unusual opportunities for filming in the United States, Mexico, Europe, and India.

Filming began at the "World Food Prize Ceremony" in Ames, Iowa, where Goldberg interviewed Norman Borlaug, M. S. Swaminathan, Roger Beachy, and C. S. Prakash. The production team also filmed at Pioneer-Hybrid International, Inc., interviewing Bill Niebur, one of Pioneer's corn breeders. Next the crew spent two days on Max Smith's soybean/corn/hog farm showing the farm activities and discussing the history of agriculture with Professor John Pesek from Iowa State University.

In Los Angeles the production team filmed the "rich and famous" eating in organic restaurants and interviewed Ann Gentry, an activist in the organic movement and owner of the Real Food Daily Restaurant in Los Angeles. They also interviewed Dick Flavell of Ceres, Inc., and ASPP members Bob Fischer, of the University of California at Berkeley, and

Ann Hirsch, of the University of California, Los Angeles, about a variety of topics dealing with agricultural origins, the importance of breeding and crop production, hunter and gatherer diets, agriculture of the future, and other issues related to agriculture and society. A grocery store was the scene for the filming of a wide variety of foods.

The filming continued in Mexico at the Aztec Pyramids outside Mexico City. Dr. Joaquin Garcia-Barcena, the director of Mexico's National Institute of Anthropology and History and an expert on the origins of agriculture, discussed the origins of corn and other crops and how those developments led to the origins of civilization. The crew filmed rows of teosinte plants at the Centro Internacional para Mejoramiento de maiz y Trigo (CIMMYT; the International Maize and Wheat Improvement Center) and interviewed Luis Herrera-Estrella about the beginnings of plant genetic engineering.

In England, E. J. Collins, Bruce Ames, and Frank Furedi shed light on agricultural innovations and the relationships between technology and society during filming at Dover Castle, England, depicting the Middle Ages. Three weeks in New Delhi, India, showing the effects of the Green Revolution, completed the filming.

"I have begun to appreciate how hard the filming process is," commented Goldberg. "ASPP is fortunate to have Martin Durkin, director of Kugelblitz, making this documentary for us. All of the members of the crew are real professionals, hardworking, and dedicated to making the most outstanding film on agriculture that can be made." 🌿

New Staff

Jennifer Fleet joined the Society in late December as production coordinator for *The Plant Cell*. In her new position, she handles articles from acceptance to publication, tracking manuscripts and proofs to ensure that deadlines are met, reviewing pages and cover proofs, and placing advertisements. Before joining ASPP, Jennifer was the production editor for two scholarly journals at the American Diabetes Association: *Diabetes* and *Diabetes Care*. Prior to that, she worked on the *Journal of Neuroscience*. She



adds that she's excited to be working on such a scientifically important and cutting-edge publication as *The Plant Cell*. 🌿

PEOPLE

Richard S. Nelson

Richard S. Nelson was recently promoted to full scientist within the Plant Biology Division of The Samuel Roberts Noble Foundation. Nelson received his Ph.D. in biology from the University of Illinois



at Urbana-Champaign in 1985 and did postdoctoral research in the Department of Biology at Washington University in St. Louis. He joined the staff of Noble's Plant Biology Division in 1988. Dr. Nelson is also an adjunct professor at Oklahoma State University in the Department of Plant Pathology.

An ASPP member since 1980, Dr. Nelson has published more than 45 research and review articles in scientific journals. He has served as an associate editor for the journals *Molecular Plant-Microbe Interactions* and *Phytopathology*. He currently serves as a senior editor for *Phytopathology* and is on the editorial board of *Molecular Plant Pathology*. He is a member of the Scientific Advisory Council of the American Type Culture Collection representing the American Phytopathological Society and a past chair of the Virology Committee of the American Phytopathological Society. He has served as an ad hoc reviewer for National Science Foundation, USDA National Research Initiative Competitive Grants Program, Department of Energy, and BARD (United States-Israel Binational Agricultural Research and Development) proposals.

Dr. Nelson's research is directed toward understanding the mechanism of cell-to-cell and vascular spread of viruses in plants. His laboratory is also conducting research on the localization and identification of host and viral factors involved in virus accumulation. 🌿



USAID Developing Plant Research Initiative Sponsored by Senator Bond

The U.S. Agency for International Development (USAID) is currently examining its budget in considering development of plant biotechnology research and development programs to implement Senator Christopher Bond's (R-MO) new initiative for USAID.

Senator Bond noted that his plant research initiative will provide a funding boost in the campaign to unlock the potential of biotechnology in addressing the health, humanitarian, and environmental challenges in the developing world.

The USAID Center for Economic Growth and Agricultural Development, Office of Agriculture and Food Security, Agriculture Enterprise and Market Development Division will be developing programs to support the directed funds and more than \$20 million in non-directed funds for plant biotechnology research and development.

It will be a number of months before USAID solicits proposals for the new programs. An announcement may appear in the *Federal Register* in spring 2001 at the earliest. Use of a request for pre-proposals or

pre-applications in advance of an RFP is one approach under consideration.

U.S. foreign assistance has the twofold purpose of furthering America's foreign policy interests in expanding democracy and free markets while improving the lives of the citizens of the developing world. USAID conducts activities in more than 75 nations.

USAID's history goes back to the Marshall Plan reconstruction of Europe after World War II and the Truman administration's Point Four Program. In 1961, President John F. Kennedy signed the Foreign Assistance Act into law and created USAID by executive order.

Since that time, USAID has been the principal U.S. agency to extend assistance to countries recovering from disaster, trying to escape poverty, and engaging in democratic reforms.

USAID is an independent federal government agency that receives overall foreign policy guidance from the secretary of state. The agency works in six principal areas to achieve sustainable development and advance U.S. foreign policy objectives:

- economic growth and agricultural development
- population, health, and nutrition
- environment
- democracy and governance
- education and training
- humanitarian assistance.

The USAID Center for Economic Growth and Agricultural Development recognizes that because the majority of people in the poorest countries derive their livelihoods from agriculture, the transformation of agriculture and food systems is an essential aspect of broad-based economic growth. USAID agricultural development activities rely on the participation of International Agricultural Research Centers, American universities, and American businesses, in partnership with national programs and nongovernmental organizations, to generate solutions to the challenges facing agriculture in developing countries.

ASPP has been in contact with USAID on the development of the new research initiative. 🌱

National Plant Genome Initiative Progress Report Finds New Opportunities

The White House-appointed Interagency Working Group (IWG) on Plant Genomes has issued its November 2000 annual progress report made available to Congress on the National Plant Genome Initiative (NPGI).

The report indicated that plant genomics research tools and resources being generated by NPGI projects are opening new opportunities for the entire community of plant biologists to participate in the plant genomics revolution.

The report noted that new strategies to sequence large genomes with so-called rough draft sequencing are gaining prominence. New strategies to condense gene-rich regions of large genomes such as maize are being developed. "This will surely be followed by an opportunity to begin large-scale sequencing of those regions, as an alternative to whole genome sequencing," the report stated. Needed improvements in data management of plant genome informa-

tion, including the need for new informatics tools, can be addressed through NPGI.

NPGI is contributing to increased opportunities to collaborate with industry. At the same time, the intellectual property issues on sharing materials and data between private-sector researchers and publicly funded researchers has become a big issue.

The report said that recent public debates over genetically modified organisms and plant biotechnology have been a wakeup call to the plant genome research community. NPGI researchers are aware that they must be involved in communicating to the public the importance of plant genome research and its social impact.

Scientific progress cited in the report included the accelerated sequencing of the Arabidopsis genome. The international rice genome-sequencing consortium has so far deposited 26 million basepairs (Mb) into a public database (GenBank), of which the U.S. sequencing groups contributed 9.4 Mb.

"There have been several positive interactions between industry and academia as evidenced by the Monsanto offer of its rough draft sequence of the rice genome and Cereon Genomics' release of its data on single nucleotide polymorphisms in Arabidopsis," the report said.

Researchers supported by NPGI made an important fundamental discovery that the centromeric region of plant chromosomes contains functional genes. This finding has directly challenged the established paradigm that the eukaryotic centromeres do not contain any active genes.

Another contribution to fundamental biology from the NPGI project is the first successful cloning and functional confirmation of a plant quantitative trait locus (QTL) in tomato. Most of the economically important traits (for instance, yield, size, and flavor of tomato) are controlled by QTLs that

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result from complex interactions of multiple genes. This work successfully isolated the specific QTL responsible for increased fruit size.

The report said it is anticipated that the trend toward comparative genomics will continue. A major challenge is to develop adequate research tools to provide comparisons across plant species and for genetic and physical maps as well as sequence data.

Co-chairs of the IWG are Mary Clutter, assistant director for biological sciences, National Science Foundation (NSF), and Eileen Kennedy, deputy undersecretary, Research, Education and Economics, U.S. Department of Agriculture (USDA). Members are Elke Jordan of the National Institutes of Health, Sally Rockey of USDA, Clifford Gabriel of the White House Office of Science and Technology Policy (OSTP); Judy St. John of USDA, Agricultural Research Service; Gregory Dilworth of the Department of Energy (DOE); and Noah Engelberg of the Office of Management and Budget. Contributing to the preparation of the report were Sharlene Weatherwax of DOE, Jane Silverthorne of NSF, Ed Kaleikau of USDA, Leland Ellis of USDA, and Machi Dilworth of NSF.

The IWG was appointed in May 1997 by OSTP in response to a request from Senator Christopher Bond (R-MO) and the Senate VA, HUD and Independent Agencies Appropriations Subcommittee that he chairs. Bond led bipartisan efforts in Congress that have resulted in \$215 million for the NPGI over four years.

"There is no question that the NPGI has changed the plant research community in a profound way," the report noted in citing the many benefits of the initiative.

The report will be on the OSTP Web site at <http://www.ostp.gov/>.

Completion of Arabidopsis Genome Sequence—Model of Success

Although much heralded in the plant science community, Arabidopsis hasn't been quite as recognizable to the general public as more sought-after plants, such as home-grown tomatoes, flavorful grapes, or fresh corn on the cob. Somehow, Arabidopsis never achieved among the citizenry the majesty of a mighty sequoia or the allure of an orchid in bloom.

However, on December 14, extensive media coverage of this roadside weed made it look as popular in newspapers throughout the country as roses on Valentine's Day. Stories on Arabidopsis ran by the dozen in a special issue of *Nature* that day, and newspapers across the country and overseas carried news of the momentous completion of the Arabidopsis genome sequence.

A special White House reception (attended by many ASPP members) was held to celebrate the event. Neal Lane, assistant to the president for science and technology, was joined by National Science Foundation Director Rita Colwell, Deputy Secretary for Agriculture Richard Rominger, and Department of Energy Director of Basic Energy Sciences Patricia Dehmer in explaining the unheralded virtues of this diminutive but distinguished plant. As Dr. Lane noted, only a huge snowstorm in home state Missouri kept Senator Christopher Bond (R-MO) from being able to attend. Bond saw the importance of this unassuming plant back in 1997 and provided millions of dollars in federal support for accelerated research on it. The senator was represented at the reception by Cheh Kim of his committee staff.

Ralph Waldo Emerson said that a weed is simply "a plant whose values have not yet been discovered." ASPP President Dan Cosgrove noted that for some 800 million undernourished people throughout the world, the Arabidopsis genome sequence could indeed speak the poetry of life.

Following is a story on Arabidopsis published in the *Washington Post* December 14 by staff writer Rick Weiss, which includes comments from several ASPP members.

Plant's Genetic Code Deciphered ©2000, *The Washington Post* Reprinted with permission

Capping a massive international five-year effort, scientists have for the first time identified and placed in order the more than 100 million letters of genetic code that nature uses to make a plant.

The feat marks only the third time that a complex organism has had its entire genetic code revealed, after the recent genetic unveilings of a tiny soil-dwelling worm and a fruit fly. (The human genetic sequence has been largely completed, but details of that work have yet to be published.)

The new work paints the clearest portrait yet of flowering plants, a unique class of life that arose a mere 200 million years ago and quickly came to dominate most of Earth's ecosystems. It sheds light on how plants diversified and adapted, and in particular how they overcame the special problems that come with being rooted to a single spot, unable to flee or hide. And it reveals that plants have an astonishing array of biological "senses"—more, perhaps, than people have—through which they experience and respond to the world around them.

More practically, because all flowering plants from broccoli and roses to towering oaks are genetically very similar to the species of plant that was studied—a common roadside weed in the mustard family—scientists now have the genetic toolbox that will allow them to tinker with an entire kingdom of life upon which all animals, including humans, are completely dependent.

Call for 2001 Nominations for

ASPP Awards will be sent to all members in February. Nominations are due at ASPP headquarters by Tuesday, April 3. Questions should be addressed to John Lisack, Jr., executive director, at jlisack@aspp.org.

SPECIAL MEETING ANNOUNCEMENT!

In compliance with the positive membership vote December 20, 2000, to change the Society's name: The ASPP Executive Committee recommends that the name of the organization, as designated in the Articles of Incorporation filed in the District of Columbia, be changed from the American Society of Plant Physiologists to the American Society of Plant Biologists, and that this recommendation be approved by the membership at a special meeting of the members to be held on February 24, 2001, from 12:00 noon until 12:15 p.m. at ASPP Headquarters, 15501 Monona Drive, Rockville, MD 20855.

This is a standard procedure required by the District of Columbia, where the Society is incorporated. Any member wishing to attend is welcome and should contact Donna Gordon, executive assistant, at 301-251-0560, ext. 131.

That could greatly accelerate ongoing and, in some cases, controversial efforts to engineer crops that are exceptionally nutritious or resistant to insects, and to develop plants that can detoxify soil contaminants or make novel medicines or other products in their leaves.

"It's like standing on top of a hill and seeing gold mines everywhere," said Elliot Meyerowitz of the California Institute of Technology in Pasadena, whose pioneering work on the project helped reveal how silky flowers sprout from woody stems, why different flowers have characteristically different numbers of petals, and how flower genes can influence the eventual size of a plant's edible fruits.

Among many surprising findings, described in eight articles published in this week's issues of the journals *Nature* and *Science*, is that flowering plants have closely related versions of many human disease genes. That discovery is already offering clues about why certain human diseases produce the symptoms they do. And it suggests that plants may eventually be useful not only as a source of novel medicines, but also as screening tools for testing the potential usefulness of experimental drugs.

"This is like a Rosetta stone that will allow us to compare all other living things on Earth," said Peter Raven, director of the Missouri Botanical Garden in St. Louis. "It will lead us to discoveries that are unimaginably interesting."

All this from a scraggly eight-inch-tall plant called *Arabidopsis thaliana*. Plant geneticists a decade ago selected the weed as their "model organism" representing all 250,000 flowering plant species. Because it grows well indoors, matures in less than two months and produces huge numbers of seeds, a single lab group can grow a million of them a year without a single tractor—confirming Ralph Waldo Emerson's observation that a weed is simply a plant whose virtues have not yet been discovered.

In 1996, an international consortium of scientists, including the Institute for Genomic Research in Rockville, banded together to form the Arabidopsis Genome Initiative. With funds from government agencies on three continents, the group began unraveling the DNA on the weed's five chromosomes.

The new articles show that Arabidopsis has about 26,000 genes, fewer than in most other plants and about a third the number believed to reside in the human genome. Almost 1,000 of those are involved in photosynthesis, all stolen from an ancient species of photosynthetic bacteria that learned how to make energy from sunlight about 3.5 billion years ago and at some point

took up permanent residence inside a line of cells that would become green plants.

Scientists said they were surprised to find that most of Arabidopsis's genes are essentially copies of the plant's original set of about 15,000 genes—indicating that at one or more points in the plant's evolutionary history, its entire genome accidentally doubled in size. Although many of those duplicate genes were gradually lost, the plant evidently kept and modified many others to perform new and useful tasks.

Most of the genes in Arabidopsis are similar enough to their counterparts in other plants that as scientists identify the ones for drought and pest resistance, for example, they'll be able to insert them into soybeans and other crops in which they are expected to work fine.

Moreover, about 30 percent of the genes have notable similarities to human genes, evidence of a very early chapter of life before the forebears of plants and animals went their independent ways about 1.6 billion years ago. Of 289 human disease genes that the scientists focused on, nearly half were found to have near relatives in Arabidopsis. For example, a gene the plant uses to respond to ethylene gas, a volatile plant hormone, is similar to a gene linked to Wilson's disease in people. That makes sense, because plants use copper to transport ethylene and the human disease involves copper metabolism as well. But some symptoms of the disease have never been easily attributable to copper problems, said Joseph R. Ecker, a professor at the Salk Institute in La Jolla, California, who works with Arabidopsis. Now the mustard plant findings have given a clue that those symptoms may be related to gas transport problems in patients with the disease gene.

Arabidopsis also devotes more than 400 genes to making the tough walls that surround every plant cell—structural enhancements that animal cells lack but that are crucial to plants, whose immobility leaves them no choice but to tough it out under extreme environmental stresses. Many cell wall components are of economic value because they are made into paper, fibers and other products, and scientists want to manipulate the related genes so plants can make materials with enhanced properties.

Researchers also want to get their hands on the genes that plants use to make "secondary compounds," a family of about 100,000 chemicals that animal cells cannot make and that have value as dyes, fragrances, flavorings and drugs.

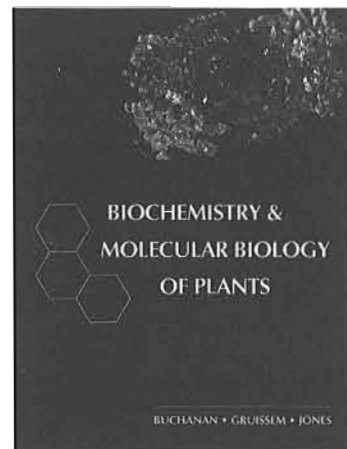
But perhaps the most fascinating insight into what it's like to be a plant comes from the genetic baring of the plant's complex sensory system. Scientists said they were

astounded to find that hundreds of Arabidopsis genes encode hormone receptors, or biological antennas for detecting signals from inside or outside the plant—such as "seeing" sunlight in the day and "feeling" the cold at night.

"It's all about how plants put on sunscreen in the morning and put on their bed socks at night," said Steve Kay of the Scripps Research Institute in La Jolla, who studies plants' biological clocks.

It's also about how plants feel the chewing of insects on their leaves (which they respond to by producing insecticidal chemicals), how they detect the touch of the wind (which triggers water retention hormones), and how they smell gases from other plants (which can trigger blasts of chemical warfare agents).

Plants also have many genes that work like human immune system genes, rallying to attack bacteria and fungi when the plant becomes aware that it has become infected. The National Science Foundation is launching a 10-year effort, called Project 2010, to understand what every Arabidopsis gene does. 🌱



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NPR Morning Edition Examines Arabidopsis Genome

National Public Radio's *Morning Edition* on December 14 addressed the completion of the Arabidopsis genome sequence with ASPP members Elliot Meyerowitz, Jeff Dangl, and Joe Ecker. The transcript follows.

Arabidopsis Weed Is First Plant Genome to Be Deciphered

BOB EDWARDS, host: After a six-year international effort, plant biologists have marked a major milestone. Researchers have deciphered the entire genome of a weed. Its proper name is Arabidopsis. It's the first complete genetic map of a plant. NPR's David Kestenbaum reports.

DAVID KESTENBAUM: People always ask Joe Ecker, Why Arabidopsis? Why not the rose? Why not iceberg lettuce? Ecker is a biologist at the Salk Institute. He was in DC for yesterday's announcement. On a laptop in his hotel room, he's pulled up a top 10 list of reasons [for] Why Arabidopsis? Mostly, it was easy, he says. The plant has a small, compact genome, but it is related to broccoli, and its genes could be used to design crops that would grow almost anywhere.

JOE ECKER (biologist, Salk Institute): Arabidopsis is found from the equator to the Arctic. And there are a number of varieties of Arabidopsis that will grow under a whole host of different conditions . . . cold, hot, increased salt, etc.

KESTENBAUM: Ecker says you could probably find one growing in a sidewalk crack. So we go on a little field biology expedition. Ecker checks the soil of plants in the hotel lobby. No luck. Outside in the cold night air, the sidewalk cracks are bare. So

Ecker picks through a bed of decorative cabbages on 11th Street.

ECKER: It's kind of dark here. No, it looks like the gardeners have done too good of a job of weeding. You know, one would pull it out if you saw it. It's a garden variety weed. It's a good weed. It grows fast, it sets seeds, and it gets the heck out of there.

KESTENBAUM: That's another reason plant geneticists are fond of Arabidopsis. You can cram a lot of them in a small space and they reproduce quickly. The researchers are particularly proud of this genetic map. Unlike the human genome sequence, which still has gaps and typos, the Arabidopsis genome is really done, they say. Jeff Dangl, a biologist at the University of North Carolina, says researchers in his lab trust the Arabidopsis database or they're learning to.

JEFF DANGL (biologist, University of North Carolina): When the people in my lab are sequencing something and they say, "Hey, you know, the sequence in the database is wrong," I tell them, "Well, no. Better go back and look at your sequence because it's highly likely that your sequence is wrong."

KESTENBAUM: The details of the sequencing effort appear in today's issue of the journal *Nature*. A sequence is just that: a string of chemical letters. But this one held a few surprises. Elliot Meyerowitz is a biologist at Caltech.

ELLIOT MEYEROWITZ (biologist, California Institute of Technology): There were almost 26,000 genes that were identified in Arabidopsis, which is twice as many as were found in *Drosophila*, the fruit fly. And I find that surprising because flies can see and they have brains and they can

learn and they fly. So I think that either flies have learned to use their smaller number of genes more cleverly or perhaps, more likely, plants are much more complicated than we've given them credit for.

KESTENBAUM: Meyerowitz, like many plant biologists, thinks plants are underappreciated. When he sees a telephone pole, he thinks, that was once a tree.

MEYEROWITZ: People seem to be very interested in diseases and in treatments for them, but not so interested in the rest of the natural world, which, as a plant scientist, I find surprising. I'm looking out the window right now, and I don't see any animals, but I see a lot of plants.

KESTENBAUM: The Arabidopsis genome will help scientists understand basic biological questions about how plants develop, how they fight off pests. That's important because plants are important, he says. The cotton clothes you wear, the air you breathe, the aspirin you swallow all have their origins in plants. And, of course, plants convert sunlight into usable energy.

MEYEROWITZ: I've read that more than 80 percent of human food is plants. And, of course, most of the rest of it is something that just ate a plant.

KESTENBAUM: *You* try doing photosynthesis. ☘

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Important Dates in 2001

Washington, DC, Section meeting—Beltsville, Maryland: February 23

Abstract submission deadline for Plant Biology 2001: March 1

Officer nominations close: March 12

Midwest Section meeting—Galesburg, Illinois: March 23–24

Southern Section meeting—Raleigh–Durham, North Carolina: March 24–26

Award nominations close: April 3

Northeast Section meeting—Worcester, Massachusetts: May 4–5

Plant Biology 2001—Early bird registration cutoff: May 15

Plant Biology 2001—Housing registration cutoff: June 15

Plant Biology 2001—Providence, Rhode Island: July 21–25

FDA Consumer Roundtable Discusses Modified Foods

The U.S. Food and Drug Administration (FDA) Consumer Roundtable on Consumer Protection Priorities discussed oversight of genetically modified foods December 13 in Washington, DC.

Joseph Levitt, director of the FDA Center for Food Safety and Applied Nutrition, said biotechnology has been one of the four highest priorities of the past year that the center was able to address successfully. Other priorities successfully accomplished, according to Levitt, were progress on food safety, food additives, and dietary supplements.

Levitt noted that FDA held three hearings across the nation to hear public comments on modified foods. In giving his impressions of the hearings, Levitt said it was sobering to hear so many groups call upon FDA "to do the public's bidding instead of industry's bidding." This is a theme adopted by a number of anti-biotech groups and their allies on this issue. (ASPP had participated in

press briefings in coordination with each hearing and presented testimony at two of the hearings. ASPP Past President Debby Delmer and ASPP member Rob Donaldson presented statements on behalf of ASPP at the hearings. Debby, Rob, Committee on Public Affairs Chair Peggy Lemaux, and Ron Smarrelli participated in the press briefings.)

Michael Jacobson of the Center for Science in the Public Interest said that the entrance of many modified foods into the marketplace and other changes in the food system, including more interest in functional foods and supplements, warranted a doubling of staff for the Center for Food Safety and Applied Nutrition. Jacobson called upon FDA to implement what he called a mandatory transparent approval process for modified foods.

Steven Druker of the Alliance for Bio-Integrity said there are serious scientific disputes regarding genetically modified organisms (GMOs) and scientific concerns

with FDA claims that modified foods are safe. Druker did not cite any science sources on this.

A representative of a breast cancer awareness group raised a question of health safety concerns with GMOs, although she didn't cite studies of any kind. Frances Smith of Consumer Alert responded to the comment by noting that two studies have shown that there were far lower amounts of a known potential cancer-causing agent found in Bt corn than found in traditionally bred corn. ASPP staff had been in discussion with Smith concerning those two studies earlier that day.

Levitt said he would welcome public input into the development of a guidance document for voluntary labeling of modified foods. He said that his staff will devote a considerable amount of time next year to move his center to College Park, Maryland. ☞

USDA Advisory Committee Discusses Public Plant Breeders, Gene Flow from Transgenic Crops

The U.S. Department of Agriculture Secretary's Advisory Committee on Agricultural Biotechnology (ACAB) discussed a range of topics including the role of public and private plant breeding and gene flow from modified crops at its November 29–30 meeting in Washington, DC.

ACAB and ASPP member Jim Cook helped lead the discussion in support of public plant breeders. Cook said the nation needs an infrastructure of public plant breeding in place to work in concert with private plant breeders. Cook was appointed by the committee to an ad hoc workgroup to write a statement on public plant breeding for ACAB's consideration.

The workgroup's statement called for ACAB to recommend to the secretary the strengthening of the nation's capacity in public-sector plant breeding and conservation of plant genetic resources.

The statement called for an identification of principles and goals for the Public Plant Breeding Program, taking into account advances in biotechnology and other relevant technologies. Principles and goals of the program would include

- giving farmers wider choices
- enhancing biodiversity

- addressing gaps between current public- and private-sector plant breeding efforts
- assuring public confidence.

Although divisions sometimes appear in ACAB among organic and production farmers and consumer advocacy groups and scientists, there appeared to be general agreement on the need for greater public support of plant breeders. Official action on the statement by ACAB was deferred for further review by all members of the committee. Margaret Mellon of the Union of Concerned Scientists was among the ad hoc subgroup members supporting public breeding programs.

Another item on the ACAB agenda was the question of potential gene flow from transgenic crops to wild and weedy relatives. Professor Allison Snow of Ohio State University said crops that are weedy and might hybridize with wild plant species include rice, canola, sunflower, squash, poplar, oats, wheat, lettuce, and carrot.

Snow said pollen movement allows spontaneous crossing with the same or related species. She said that in the short term, most pollen stays near the source, but in out-crossing species, some pollen can travel more than a kilometer (case studies

with sunflower, radish, and corn). Over the long term, crop genes can accumulate in natural populations, Snow said. She said seed dispersal via people can start new populations many miles away.

Snow said that consequences of gene flow from GM crops could be

- "contamination" of non-GM crops
- spread of transgenic herbicide resistance
- possible effects on genetic diversity of related species
- spread of superior transgenic crop traits to weeds (for example, pest resistance).

In conclusion, Snow said that from an environmental perspective, gene flow may be harmless in most cases but that the spread of transgenic resistance to herbicides should be avoided. She added that we need to consider both benefits and risks of GM crops for the environment and for society in industrialized and developing countries. ☞

Randall Commentary Looks at Promise of Research

A commentary written by ASPP member Doug Randall discussing the contribution of plant research to bountiful food supplies was published by the *Columbia Daily Tribune* on November 21. Letters to the editor of this type are examples of public education efforts by plant scientists. For advice to ASPP members from a newspaper editorial page editor on how to get your letter published in a newspaper, see the ASPP homepage at http://www.aspp.org/public_affairs/editorial/editor.htm/.

Randall's commentary is used here with permission:

As most of the nation celebrates Thanksgiving Day with a hearty dinner, it will be another desperate day of hunger for 800 million people worldwide.

Diseases related to nutritional deficiencies are widespread among those without enough food, currently one in eight people. Traditional plant breeding and agricultural practices that worked wonders during the Green Revolution no longer provide the increases in crop yields needed to feed a growing world.

Scientists such as Norman Borlaug, 1970 Nobel peace laureate and a father of the Green Revolution, recognize that advances in science and technology, particularly biotechnology, will be needed to feed the 8.3 billion people projected to be on this planet by 2025. Plant science, bolstered by biotechnology and plant genomic research, offers hope for enhancing yield and nutritional quality while achieving sustainable agricultural practices. Important research is being done at the University of Missouri, much of it involving genomics and major crops such as corn and soybeans. These efforts focus on understanding how plants function with the long-term objective of meeting food and fiber needs in environmentally friendly ways.

Much of this research is possible thanks to the efforts of Senator Kit Bond and his colleagues on the key committee he chairs. Bond initiated support for important plant genome research and wrote a new program in the Foreign Operations budget that will let scientists in developing nations partner with plant scientists in Missouri and other states to address production and disease problems. This support will help scientists and farmers counter food shortages around the world. 🌱

Communicating Science in the Public Interest

A report issued by the National Science Board (NSB), "Communicating Science and Technology in the Public Interest," provides guidance on the role that the science community should play in expanding public awareness of science.

In a cover letter for the report sent December 11 by Board Chairman Eamon Kelly, it was noted that the board's findings and recommendations can be grouped into three broad categories of need:

- increased advocacy for science and engineering
- increased collaboration with National Science Foundation communication efforts
- an expanded role of NSB members in communicating science.

The report is available on the NSF Web site at <http://www.nsf.gov/cgi-bin/getpub?nsb0099/>. Printed copies can be obtained by e-mail from NSBoffice@nsf.gov. 🌱

Scientists' Views on Public Outreach

Research America President Mary Woolley recently discussed at a forum in Washington, DC, the results of a survey that sought to determine why some scientists don't get involved in public outreach and policy matters.

Of those scientists in this Kellogg survey who elect not to conduct public outreach, a reason given most often (by 70 percent) was that they don't have the time. Some 42 percent don't believe such activities would make a difference. The same percentage also said that they don't know how to become involved. A total of 39 percent said they did not want to become involved. Some 27 percent said people don't care. A total of 12 percent of the respondents said they are happy with the job that others are doing.

Woolley noted that these and other reasons some scientists give for resisting public advocacy activities have attained popular "myth" status. Polls show that the public does care about research, with nearly 75 percent of respondents saying the federal government should support basic research even if it brings no immediate benefits.

A 1996 Roper poll found that 74 percent of the public say they felt that too little

recognition (award, prizes, media attention, etc.) is given to scientists. At the same time, 87 percent of the respondents say too much recognition is given to entertainers and sports stars. In the same Roper poll, 83 percent indicated their general reaction to science and technology as "satisfaction and hope" or "excitement and wonder."

Woolley was asked for her views about a campaign by one science discipline to receive "equal" funding with another science discipline (some animal scientist and livestock producer organizations have targeted plant research in this way). She argued against such a campaign that demonstrates to legislators conflicts in the science community. She noted that "robbing Peter to pay Paul" is a losing proposition.

ASPP members who know or work with growers are urged to contact the ASPP Public Affairs Office at bhyps@aspp.org to be part of outreach efforts to growers in support of plant research sponsored by the USDA National Research Initiative Competitive Grants Program. 🌱

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Compiled and edited by Gary Kuleck,
Biology Department, Loyola Marymount
University, 7900 Loyola Blvd., Los Angeles,
CA 90045, e-mail gkuleck@lmu.edu.

Education Posters at the Plant Biology 2001 Annual Meeting July 21–25, 2001 The Rhode Island Convention Center, Providence, Rhode Island

The ASPP Education Committee strongly encourages our members to consider submitting an education poster at the annual meeting in Providence this July. If you are concerned as to what subject material would be appropriate, please examine the abstracts from past meetings available at http://www.aspp.org/annual_meeting/index.htm. If you still are uncertain about a submission, feel free to contact the ASPP Education Committee for advice.

The Use of Case Studies in Plant Biology

One of the emergent successful teaching methodologies prevalent in a number of disciplines is the use of case studies to both challenge and intrigue students. Although there is a collection of case studies in science (<http://ublib.buffalo.edu/libraries/projects/cases/ubcase.htm>) at the The National Center for Case Study Teaching in Science at the State University of New York at Buffalo, very little is evident in plant biology. If you use any form of case study in your teaching (e.g., guided inquiry through the literature) or are interested in this teaching style, please

contact us. (Many thanks to Dr. Carl Pike at Franklin & Marshall College for bringing this to our attention.)

Genome Consortium for Active Teaching (GCAT)

If you are interested in bringing cutting-edge functional genomic methodology into your undergraduate research/teaching laboratory, the Genome Consortium for Active Teaching (GCAT) homepage (<http://www.bio.davidson.edu/Biology/GCAT/GCAT.html>) is a great place to start. GCAT goals include using a centralized chip reader to make microarray experiments affordable, creating a clearinghouse for teaching genomics, and establishing a large database for pedagogical use. Ultimately, the consortium looks to develop a global network of teachers using functional genomics in the undergraduate curriculum.

In late November, the ASPP Education Committee sent out a questionnaire to determine the extent of involvement of ASPP members in undergraduate and high school student research and outreach activities. The response was outstanding with nearly 500 ASPP members responding. Although a detailed report will be available in the next Ed Forum, it is clear from the responses that our membership is fully involved in supporting undergraduate research and find it rewarding to all involved. For the substantial portion of our membership who are interested in becoming involved at the level of high school/undergraduate research, we will attempt to provide resources on the ASPP Web site for education.

ASPP Book Program

ASPP welcomes proposals for its book program. Books typically published by the Society are edited, peer-reviewed works based on symposium proceedings and collections of mini-reviews. Topics include plant physiology, molecular biology, environmental biology, biochemistry, cell biology, biophysics of plants, regulation of gene expression, molecular and genetic basis of plant development, plant-microbe interactions, and molecular aspects of plant cell organization and function. Books must be timely and focused on a single topic. Proposals must demonstrate scholarship, good writing, and the potential to fill an existing need in the field.

To obtain more information on publishing books with ASPP, contact the publications director at 15501 Monona Drive, Rockville, MD 20855-2768 USA or e-mail nancyw@aspp.org.

Grants Available to ASPP Members in Education Exhibit Competition

We will again be sponsoring a competition for the presentation of interactive exhibits/demonstrations at the Education Booth in Providence during Plant Biology 2001. Last year's exhibits were a great success both for the exhibitors and presenters. We strongly encourage members to consider submitting a proposal or joining us at the Booth for these exciting exhibits.

Have you developed new ways of carrying out plant science education either in your teaching laboratory or classroom?

The Education Committee cordially invites you to share your activity with the ASPP membership by hosting an interactive exhibit/demonstration at the Education Booth at ASPP's annual meeting this summer in Providence from July 21 to 25. We are looking for new ideas and technology that you are using in the teaching laboratory or classroom and, as an incentive, we are offering a cash grant of \$500 and registration costs for up to three presenters.

An application form will be e-mailed to prospective applicants upon request. Submissions are due by **March 15, 2001**. Winning exhibitors will be notified by **April 15, 2001**, and winning abstracts will be posted in the annual meeting abstract database.

In general, proposals should

1. State clearly the rationale behind the exhibit. Why is this exciting and fun? How does it involve new techniques or technology?

2. Provide a clear, detailed summary of how the exhibit will function. What "wow" response will you elicit from the visiting participants at the booth?

3. Indicate the equipment that will be required for the exhibit. For example, will you need a computer, Internet connection, or VCR and monitor to run your exhibit?

Winners will be highlighted in the ASPP Ed Forum in the *ASPP NEWS* and on our Web site. Winning exhibits will be on display throughout the conference, and the winners will be expected to spend time each day at their booth interacting with visiting colleagues.

We can't think of a better opportunity to showcase your new approaches or new technology for plant biology education. We strongly encourage members to consider submitting a proposal or joining us at the Booth for these exciting exhibits!

E-mail gkuleck@lmu.edu for an application.

Colin Brady

Dr. Colin Brady, who retired from CSIRO in 1993, died at his home in Nelsons Bay north of Sydney, N.S.W. Australia, on July 4 at age 70. He is survived by his wife Helen and their five children and three grandchildren.



Colin's career as a plant physiologist/biochemist was spent largely within the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and began in 1951 when he joined the Flax Research Unit. He completed his MSc. Agr. in Sydney and then obtained his Ph.D. from the Rowett Research Institute in Aberdeen, Scotland, under the supervision of the Nobel Laureate Professor R.L.M. Synge.

He was renowned as a protein biochemist and worked on a diverse range of plants from bananas to wheat. His and his colleagues' work on the fruit-softening enzyme polygalacturonase was the basis of the subsequent development and the first commercial release of genetically modified tomatoes in the United States and later in the United Kingdom.

Colin Brady was appointed visiting professor to a number of institutions, including the Massachusetts Institute of Technology, the University of Malaya, and the University of California, Davis, and was a frequent invited speaker at international conferences on postharvest physiology.

He was a meticulous worker and a perfectionist in his science. One of his great gifts was his ability to generate this urge, together with the enthusiasm to get it right, in all his colleagues. His openness, friendliness, and dry sense of humor made it a pleasure to work with him.

After his retirement Colin retained an active interest in plant biology at the University of Newcastle near his home. He also became very active in his local environment as a member of the Fingal Bay Parks and Reserves Committee. His special project was the rehabilitation of the 8.2-hectare Barry Park. ☪

Jim Speirs
Daniel Schachtman
CSIRO Plant Industry, Canberra

Barry Pogson
Australian National University, Canberra

Gerald T. Babcock

Gerald T. Babcock, born February 9, 1946, in Minneapolis, Minnesota, died December 22, 2000, at the age of 54. He was a faculty member of the Michigan State University Department of Chemistry since 1976, serving as chair from 1990 to 1998. Professor Babcock was a world-renowned scientist in the field of oxygen chemistry and earned numerous awards and honors, including the 2000 Charles F. Kettering Award of the American Society of Plant Physiologists. We honored him then as we pay tribute to him now for his pioneering contributions toward understanding the mechanism of water oxidation and oxygen evolution in the photosystem II (PSII) reaction center. Although the contributions to this area alone were outstanding, Dr. Babcock's contributions were made more valuable, both conceptually and pedagogically, by his similar contributions to the mechanism of oxygen reduction to water in the respiratory enzyme cytochrome oxidase. The complementary nature of these two major research areas gave him a unique perspective in his research, writing, and lectures on metal-catalyzed water-oxygen reactions.

Beginning with his very first research publication as a Ph.D. student in 1973, Dr. Babcock's work focused on the kinetic components of electron donation in the PSII reaction center that were detectable by electron paramagnetic resonance spectroscopy. This work would much later lead to the discovery by the Babcock lab that signal II was associated with a pair of conserved tyrosines in the P_{sbA} and P_{sbD} polypeptides of PSII. Subsequent to this breakthrough, Dr. Babcock produced a substantial body of evidence to suggest that one of these tyrosines may be directly involved, by H-atom abstraction, in the oxidation of water. This new description of the water-splitting chemistry has transformed the view of the entire field concerning the mechanism of the reaction catalyzed not only by PSII but

of other metalloradical enzymes, such as ribonucleotide reductase.

Dr. Babcock's interest in cytochrome oxidase also dates back to the 1970s, and he studied this key enzyme by similarly applying a wide range of spectroscopic and chemical approaches. A defining breakthrough was the direct observation of the oxygen adduct at the enzyme's active site by time-resolved Raman spectroscopy. This was shortly followed by his direct demonstration of an oxoferryl [Fe(IV)=O] intermediate and at a later stage of the reaction cycle by the same technique. Dr. Babcock proposed a role for a tyrosyl radical in the mechanism of the O-O bond-breaking reaction that is nearly the exact reverse of the mechanism proposed for the O-O bond-forming step in PSII. The recent discovery of tyrosyl radicals in cytochrome oxidase supports the proposed role of tyrosine in the reaction mechanism and illustrates the intellectual leadership that characterized Dr. Babcock's work in these complementary fields.

A meaningful measure of Dr. Babcock's influence can also be seen from his mentoring and service contributions. He trained more than 60 graduate students and postdoctoral fellows during his highly productive but all too short career. He served as an associate editor or co-editor for six different journals and on numerous grant review panels for five different funding agencies. He organized a number of meetings and symposia, including Gordon Conferences in two different subject areas. In recognition of his outstanding research and service achievements, Dr. Babcock was named University Distinguished Professor in 1997 and received the Michigan Academic Governing Board Award in 1999.

Gerry Babcock's many friends and colleagues around the world will miss his gentle giving nature, his keen intellect, and his infectious love of life and science. ☪

Don Ort
University of Illinois, Urbana-Champaign

Plant Physiology Introduces Digital Proofs for Authors

Plant Physiology is now sending digital proofs to authors of accepted manuscripts. This new system, called *s-Proof*, delivers article page proofs to authors electronically as PDF pages for corrections and revisions. Supplemental material such as reprint order forms and author instructions on how to handle the proofs are also provided. The system is simple to use and will reduce the production time of manuscripts by eliminating the lag of traditional mail systems. Color figures will be included in the proofs, but traditional Iris proofs will be mailed to authors who request them.

Gatherings



ASPP NEWS publishes dates, titles, locations, and contact names and addresses for meetings, courses, seminars, and the like that are of interest to ASPP members. Submit announcements via e-mail to sbraxton@aspp.org or mail to Sylvia Braxton Lee, ASPP NEWS, 15501 Monona Drive, Rockville, MD 20855-2768 USA. **Faxed transmissions are not accepted.**

FUTURE ASPP ANNUAL MEETING SITES

2001: Providence, Rhode Island
Saturday, July 21, through
Wednesday, July 25

2002: Denver, Colorado
Saturday, August 3, through
Wednesday, August 7

2003: Honolulu, Hawaii
Saturday, July 26, through
Wednesday, July 30

2001

MARCH

March 7–10

International Conference on Nature Farming and Ecological Balance (ICNFEB 2001)

Hisar, India

Organized by the International Society for Nature Farming (ISNF) in collaboration with CCS, Haryana Agricultural University, Hisar, India. For information, contact Dr. I. S. Hooda, Organizing Secretary, ICNFEB-2001 Conference Secretariat, Department of Agronomy, CCS Haryana Agricultural University, Hisar-125004, Haryana, India; telephone +91-16 62-31 171, fax +91-16 62-34 613, -34 952, e-mail icnfeb@hau.hry.nic.in, Web site <http://www.geocities.com/icnfeb2001>.

APRIL

April 2–6

Society for Experimental Biology Annual Main Meeting
University of Kent at Canterbury,
United Kingdom

See <http://www.sebiology.com> for more information or contact the main SEB office at +44-20-8439-8732 or seb@sebiology.com.

April 6–11

Keystone Symposium on Plant Foods for Human Health: Manipulating Plant Metabolism to Enhance Nutritional Quality
Breckenridge, Colorado

Organizers: Dean Della Penna

(dellapen@pilot.msu.edu) and Michael A. Grusak (mgrusak@bcm.tmc.edu). Information on the program and how to register can be found at <http://www.symposia.com/MeetingDetail.cfm?MeetingNumber=E5&Year=2001>.

April 18–20

Global Agriculture 2020: Which Way Forward?
John Innes Centre, Norwich, United Kingdom
Contact Agric. 2020 Conference Secretariat, John Innes Centre, Norwich Research Park, Norwich, UK, NR4 7UH; telephone +44-1-603-450581/450641, e-mail agric.2020@bbsrc.ac.uk, Web site <http://www.jic.bbsrc.ac.uk/events/agric2020>.

April 22–26

The 85th Annual Meeting of the Potato Association of America (PAA 2001)
St. Augustine, Florida

Oral and poster abstracts are being accepted through January 10, 2001. For more information visit the conference Website <http://www.ifas.ufl.edu/~conferweb/paa/> or contact the University of Florida, IFAS Office of Conferences by telephone 352-392-5930 or by fax 352-392-9734 or by e-mail mtatlock@gnv.ifas.ufl.edu.

MAY

May 30–June 2

Plant Photobiology
19th Annual Missouri Symposium
University of Missouri, Columbia
See <http://www.biosci.missouri.edu/liscum/ussp01.html> for contacts and information.

JUNE

June 16–20

2001 Congress on in Vitro Biology
Regal Riverfront Hotel
St. Louis, Missouri

Contact: Marietta W. Ellis; telephone 301-324-5054, fax 301-324-5057. Program information can be viewed at www.sivb.org.

June 18–20

XX Congress of the Scandinavian Society for Plant Physiology

Røros, Norway

Contact Knut Asbjørn Solhaug, PO Box 5014, NO-1432 Ås, Norway; telephone +47-64948482, fax +47-64948502, e-mail knut.solhaug@ibn.nlh.no, Web site <http://www.green.uio.no/SPPS.html>.

June 21–23

First European Allelopathy Symposium
Physiological Aspects of Allelopathy
Vigo, Spain

For more information, e-mail feas@uvigo.es or visit us at <http://www.uvigo.es/feas>.

June 23–27

XII International Conference on Arabidopsis Research

Madison, Wisconsin

Contact details to be provided by the North American Arabidopsis Steering Committee and posted at the TAIR Web site at www.arabidopsis.org.

JULY

July 1–4

Plant Growth Regulation Society of America
Wyndham Miami Beach Resort, Miami, Florida
Contact: Dr. Gary Stutte, Program Chair, Dynamac Corporation, Mail Code DYN-3, Kennedy Space Center, FL 32899; telephone 321-476-4319, fax 321-853-2859, e-mail gary.stutte-1@ksc.nasa.gov, Web site <http://www.griffin.peachnet.edu/pgrsa>.

July 1–6

Gordon Research Conference on "Molybdenum and Tungsten Enzymes"

Queens College, Oxford, United Kingdom
Chairs: Dave Garner and Ralf Mendel. Detailed information about the conference can be found at <http://www.grc.uri.edu>. For further information, contact Dr. Ralf Mendel at r.mendel@tu-bs.de.

July 8–12
The 6th International Symposium on Inorganic Nitrogen Assimilation
The Champagne Congress Centre
Reims, France

Information is available at <http://www.inra.fr/Internet/Projets/reims2001/> or e-mail hirel@inra.versailles.fr and p.lea@lancaster.ac.uk.

July 8–21
Plant Biochemistry Summer Course 2001
Institute of Biological Chemistry
Washington State University, Pullman

For information, contact Karen Maertens (maertens@wsu.edu) or visit the Institute of Biological Chemistry Web site at www.wsu.edu.

July 10–14
10th International Congress on Molecular Plant–Microbe Interactions
Memorial Union of the University of Wisconsin–Madison

For more information, contact the local host/chair, Sally Leon, at sal@plantpath.wisc.edu, or visit the Web site at <http://www.plantpath.wisc.edu/mpmi/>.

July 21–25
The Quadrennial Joint Annual Meetings of the American Society of Plant Physiologists and the Canadian Society of Plant Physiologists (Societe Canadienne de Physiologie Vegetale)
The Rhode Island Convention Center
Providence

For more information see http://www.aspp.org/annual_meeting/pb-2001/index.htm or contact American Society of Plant Physiologists, telephone 301-251-0560, fax 301-279-2996, e-mail aspp@aspp.org.

July 25–30
The Fifth International Conference on Tetrapyrrole Photoreceptors in Photosynthetic Organisms
Brown University, Providence, Rhode Island
Meeting will follow the ASPP annual meeting,

which is also being held in Providence. The chair for the conference is Samuel I. Beale, and the vice chair is Alfred Holzwarth. For more information, see http://www.brown.edu/Departments/Molecular_Biology/ICTPPO/.

July 28–August 2
XIV International Plant Nutrition Colloquium
University of Hannover, Hannover, Germany

Hosted by the International Council on Plant Nutrition, President W. J. Horst. The meeting will be followed by a two-day field trip. Information on the program and how to register can be obtained from www.ipnc2001.uni-hannover.de.

AUGUST

August 6–10
7th International Congress on Amino Acids and Proteins
Vienna, Austria

For information, contact Bijay K. Singh, BASF Corporation, PO Box 400, Princeton, NJ 08543-0400; telephone 609-443-8341, fax 609-275-5216, e-mail singhb@pt.cyanamid.com.

August 13–15
International Satellite Conference on “Chloroplasts: Development and Function”
New Delhi, India

The meeting is in conjunction with the XII International Photosynthesis Congress to be held in Brisbane, Australia, August 18–23, 2001. Contact: Professor A. S. Raghavendra, Department of Plant Sciences, School of Life Sciences, University of Hyderabad, Hyderabad 500046, India; telephone +91-40-3010630, fax +91-40-3010145, e-mail asrsl@uohyd.ernet.in, Web site <http://www.geocities.com/satellitedelhi>.

August 27–29
Symposium: Environmental Signalling: Arabidopsis as a Model
Utrecht University, Utrecht, The Netherlands
Organizers: Sjef Smeekens, Marcel Proveniers, Rens Voeseek and Pieterse Corné. See the Web

page for information and registration: <http://www.bio.uu.nl/EPS-summerschool/>.

SEPTEMBER

September 2–7
9th Cell Wall Meeting
Toulouse, France

Contacts: Pr Marie-Therese Esquerre-Tugaye, Pr Rafael Pont-Lezica, UMR 5546 CNRS/UPS, Pôle de Biotechnologie Végétale, BP 17 Auzeville, 31260 Castanet-Tolosan, France; telephone +33-5-62-19-35-24 or +33-5-62-19-35-16, fax +33-5-62-19-35-02 or +33-5-62-19-65-25, e-mail cwall2001@smcv.ups-tlse.fr, Web site <http://www.smcv.ups-tlse.fr/ang/congress.htm>.

September 12–15
Plant Protein Phosphorylation
Vienna, Austria

See the Web site at <http://www.at.embnet.org/gem/plant/congress.htm> for details.

NOVEMBER

November 11–15
6th ISSR Symposium “Roots: The Dynamic Interface Between Plants and the Earth”
Nagoya, Japan

Organizers: Japanese Society for Root Research (JSRR) and International Society of Root Research (ISSR). For information e-mail Dr. S. Morita at anatomy@mail.ecc.u-tokyo.ac.jp or visit the Web site at <http://wwwsoc.nacsis.ac.jp/jsrr/issr/>.

ASPP Placement Service

This form may be used only by members of the American Society of Plant Physiologists.

Please print or type your placement information on this form (curriculum vitae will not be accepted) and send it to
Donna Gordon, ASPP Headquarters, 15501 Monona Drive, Rockville, MD 20855-2768 USA; e-mail dgordon@aspp.org

LAST NAME	TITLE	FIRST NAME	INITIAL
STREET ADDRESS			
CITY	STATE	ZIP	COUNTRY
TELEPHONE	FAX	E-MAIL	

I am seeking the following position (check all that apply):

- | | | | |
|------------------------------------|-------------------------------------|---------------------------------------|--------------------------------------|
| <input type="checkbox"/> Permanent | <input type="checkbox"/> Temporary | <input type="checkbox"/> Postdoctoral | <input type="checkbox"/> Industrial |
| <input type="checkbox"/> Academic | <input type="checkbox"/> Government | <input type="checkbox"/> USA only | <input type="checkbox"/> Outside USA |

US citizen? Yes No **Date available:** _____

Fields of interest, specialties, and publications titles: _____

Thesis, dissertation topics, professor: _____

Professional societies and honors: _____

Degree/year	Major	Minor	College/university and location

Postdoctoral study (specialty and with whom, where, and when): _____

Employer and location	From	To	Position, title, and duties

References (names, addresses, and telephone numbers):

ASPP Job Placement Service



I. Registering with the ASPP Placement Service and Obtaining Placement Files

ASPP headquarters in Rockville, Maryland, operates a placement service in which are kept active two files of resumes of individuals who are seeking employment. Employers are urged to survey the resume files for those seeking permanent positions and those seeking postdoctoral or similar positions. The files cost \$25 each and may be ordered from Donna Gordon, ASPP Placement Service, 15501 Monona Drive, Rockville, MD 20855-2768 USA. Those seeking employment should complete the Placement Service Form on the previous page to be included in the service.

II. Placing a Position Ad in *ASPP NEWS* and on the ASPP World Wide Web Homepage

Submit all ads by e-mail to Sylvia Braxton Lee at sbraxton@aspp.org (or by mail to Sylvia Braxton Lee, 15501 Monona Drive, Rockville, MD 20855-2768 USA). If you are submitting a chargeable ad, please include billing information when you send the ad.

- **Academic/Government/Industry Permanent Positions (Ph.D. level):**
Fee: \$150. Includes listing in one issue of the *ASPP NEWS* and 12 weeks on the ASPP online Job Bank.
Word Limit: 200 for print ad; no limit for online ad.
- **Postdoctoral Positions**
Fee: No charge for universities, non-profit organizations, and government installations; \$150 for private companies. Includes listing in one issue of the *ASPP NEWS* and 12 weeks on the ASPP online Job Bank.
Word Limit: 200 for print ad; no limit for online ad.
- **Research/Technical Positions (non-Ph.D.)**
Fee: No charge for universities, non-profit organizations, and government installations; \$150 for private companies. Includes listing in one issue of the *ASPP NEWS* and 12 weeks on the ASPP online Job Bank.
Word Limit: 200 for print ad; no limit for online ad.
- **Assistantships, Fellowships, Internships, etc.**
Fee: No charge; ad will appear in two issues of the *ASPP NEWS*: the first time at full length; the second time in an abbreviated form, and 12 weeks on the ASPP online Job Bank.
Word Limit: None.

ACADEMIC/GOVERNMENT/INDUSTRY PERMANENT POSITIONS (Ph.D.)

Assistant or Associate Professor
Lehman College
The City University of New York, Bronx
(Received 11/15)

A tenure-track assistant/associate professor of plant biology position with research interests in functional genomics and biotechnology is available. Position effective September 1, 2001. Candidates must have a Ph.D., postdoctoral experience, strong publication record in a relevant area, and excellent communication skills. Candidates will be expected to conduct an active research program, including participation in the CUNY doctoral program, and teach genetics at the undergraduate and graduate levels. Department faculty research interests include plant physiology, plant development, plant biochemistry, plant molecular biology, plant genetics, plant biotechnology, plant-microbial interactions, cell biology, ethnobotany, phytochemistry, plant ecology, animal physiology, animal development, and neurobiology. Salary range for assistant professor is \$32,703-\$60,571 and for associate professor \$42,616-\$71,818 per qualifications and experience. Send curriculum vitae and related materials to Dr. Thomas E. Jensen, Professor and Chairman, Department of Biological Sciences, Lehman College, CUNY, 250 Bedford Park Boulevard West, Bronx, NY 10468-1589. Applications will be

accepted until the position is filled. Affirmative action/equal employment opportunity/ADA employer. The Lehman College Web site is <http://www.lehman.cuny.edu>.

Faculty Position

University of Wisconsin, Milwaukee
(Received 11/22)

The Department of Biological Sciences invites applications for a tenure-track faculty position in ecological plant physiology at the assistant professor level. We seek a broadly trained plant physiologist whose research addresses fundamental questions regarding the impact of environmental variability on plant metabolism (e.g. photosynthesis, nutrient assimilation). Programmatic needs would best be met by someone emphasizing a comparative ecological approach, working at the whole organism or cellular level, and using either algae or aquatic plants as study systems. The position provides the opportunity to interact with students and faculty in a vibrant research and teaching environment that includes an active research group in plant science, ecology, and evolution (<http://www.uwm.edu/Dept/Biology/>). Candidates must have a Ph.D. in an appropriate discipline; postdoctoral experience is desirable. The successful candidate will be expected to develop a nationally competitive research program supported by extramural funding, participate in training of graduate

students at the M.S. and Ph.D. levels, teach plant physiology, participate in team teaching basic biology, and develop a graduate course in area of research specialty. The position includes a competitive start-up package and salary, as well as an excellent benefits package. All applicants should submit a curriculum vitae, a concise statement of research goals and teaching philosophy, and three letters of reference. Application materials should be sent to Chair, Ecological Plant Physiologist Search Committee, Department of Biological Sciences, PO Box 413, University of Wisconsin-Milwaukee, Milwaukee, WI 53201-0413. Applications must be postmarked by February 16, 2001. UWM is an equal opportunity/affirmative action employer.

Sitlington Chair in Molecular Plant Biology

Oklahoma State University, Stillwater
(Received 12/08)

Oklahoma State University invites applications at the associate or full professor level for the Sitlington Chair in Molecular Plant Biology. Applicants should have a doctorate in a biological science and a research program investigating fundamental plant biology. Areas of interest include, but are not limited to, biotic and abiotic stress, metabolic engineering, signal transduction, genome evolution, development, gene-silencing, and functional genomics. This full-time

THE DEADLINE FOR ADS FOR THE MARCH/APRIL ISSUE OF *ASPP NEWS* IS FEBRUARY 28, 2001.
Check *ASPP's* World Wide Web site (http://www.aspp.org/job_bank/index.htm) every Friday for new job listings.
Jobs with early application deadlines are listed on the Web site, but might not appear in *ASPP NEWS*.

(11-month) position encompasses a 75% research and 25% teaching effort. An endowment is available to support research. The chair is expected to: develop a strong, externally funded research program; provide innovative undergraduate and graduate training; and foster strong academic ties among the 25 research groups in the OSU Plant Biotechnology Network (<http://www.plantbionet.okstate.edu>). The successful applicant will join one of the following departments: Biochemistry and Molecular Biology, Entomology and Plant Pathology, Forestry, Horticulture and Landscape Architecture, or Plant and Soil Sciences. Opportunities exist for research collaborations with the Noble Foundation in Ardmore, Oklahoma. Please submit teaching philosophy and future research plans, a curriculum vitae, contact information for four references, and reprints of major publications to Dr. Charles M. Taliaferro, Search Committee for Sitlington Chair in Molecular Plant Biology, 368 Agricultural Hall, Division of Agricultural Sciences & Natural Resources, Oklahoma State University, Stillwater, OK 74078-6028; telephone 405-744-9627, e-mail cmt@mail.pss.okstate.edu.

Faculty Position

University of Arkansas, Little Rock (Received 12/12)

The University of Arkansas at Little Rock (UALR) invites applications for a tenure-track faculty position in the newly formed Applied Biosciences option in the Applied Science Graduate Program. We are looking for an energetic scientist to develop an Interdisciplinary Genomics and Bioinformatics Group as part of the rapidly expanding research community at UALR and at the University of Arkansas for Medical Sciences (UAMS). Technologies such as high-throughput sequencing and expression profiling (microarray technology) are desired to analyze the genome of plants, animals, and microorganisms in collaboration with other UALR and UAMS researchers. The candidate should hold an earned Ph.D. in genetics, biochemistry, computer science, or a related field. Predoctoral candidates will be considered as well, with the stipulation that their Ph.D. research area is in bioinformatics and will be completed before employment commences. Preferences will be given to candidates with documented postdoctoral experience in bioinformatics. Applicants should have an understanding of the algorithms and tools for sequence analysis and homology searches, DNA clustering and alignment, and gene structure prediction. Programming experience and database design are desirable. Applicants should send a curriculum vitae, a publication list, a statement of research interests and teaching philosophy, and three letters of reference to Dr. Roger Hawk, Chair, Department of Applied Science, University of Arkansas at Little Rock, 2801 South University Avenue, ETAS 575, Little Rock, AR 72204-1099; telephone 501-569-8010, fax 501-569-8020, e-mail rmhawk@ualr.edu. The university is an affirmative action/equal opportunity employer. Under Arkansas law, all applicants are subject to disclosure. Persons hired must have proof of legal authority to work in the United States.

Assistant Professor Simon Fraser University British Columbia, Canada (Received 12/18)

The Department of Biological Sciences is seeking a tenure track faculty member in the area of plant physiology. The appointment will be made at the assistant professor level with a start date on or after September 1, 2001. Any area of modern plant physiology is of interest. Candidates who use cellular approaches to study fundamental processes in the area of plant physiology are especially encouraged to apply. The successful candidate will pursue a vigorous, externally funded research program that includes the training of graduate students. She or he also will be expected to teach undergraduate courses in plant physiology, and to contribute to the teaching of an introductory cell biology/biochemistry course. A Ph.D. degree is required, and appropriate postdoctoral experience is preferred. Applicants should send, no later than March 15, 2001, a curriculum vitae, representative reprints, a one-page summary of their research objectives, and three letters of reference to Dr. Norbert H. Haunerland, Chair, Department of Biological Sciences, Simon Fraser University, 8888 University Blvd., Burnaby, B.C. V5A 1S6, Canada; fax 604-291-4312. In accordance with Canadian immigration requirements, this advertisement is directed to Canadian citizens and permanent residents. This position is subject to final budgetary approval. Simon Fraser University is committed to employment equity, welcomes diversity in the workplace, and encourages applications from all qualified individuals, including women, members of visible minorities, aboriginal persons, and persons with disabilities. Further information about the Department can be found on our Web site at <http://www.sfu.ca/biology/>.

Faculty Positions

Donald Danforth Plant Science Center St. Louis, Missouri (Received 12/29)

The Danforth Center announces positions for faculty at full, associate and assistant member levels to direct fundamental research programs. We are seeking scientists with broad interests/training in at least two scientific disciplines and well-formed research programs that will benefit from interactions with scientists of other disciplines. Demonstration of prior/current support and of interdisciplinary research is beneficial. Up to 10 faculty appointments will be considered in molecular physiology, biochemistry, phytochemistry/neutraceuticals, genetics, cell biology, gene regulation, root-soil interactions, molecular plant pathology, and abiotic stress biology. Successful candidates are expected to develop collaborative research programs within the Danforth Center and/or with scientists at partner institutions. Send resume, brief description of research interests, reprints of three key publications, and names of three references to Ms. Billie Broeker, Human Resources, Donald Danforth Plant Science Center, 7425 Forsyth Boulevard, Campus Box 1098, St. Louis, MO

63105. See our Web site at www.danforthcenter.org, for more information. The Donald Danforth Plant Science Center is an equal opportunity/affirmative action employer and encourages applications from under-represented groups, including minorities, women, and people with disabilities.

POSTDOCTORAL POSITIONS

Postdoctoral Position University of Florida, Gainesville (Received 11/02)

A postdoctoral position is available in metabolic biochemistry, engineering, and genomics of plant sulfur and one-carbon metabolism (Plant Cell **11**, 1485, 1999; J Biol Chem **275**, 15962, 2000; Trends Plant Sci **5**, 206, 2000; <http://www.hos.ufl.edu/meteng/1Cpage1.html>). A strong background in biochemistry is required; cDNA cloning and plant transformation experience is essential. Applicants must have good scientific writing skills and be able to work independently. Please send curriculum vitae, cover letter describing research interests and experience, and names of three references to Andrew Hanson, University of Florida, Horticultural Sciences Department, Gainesville, FL 32611-0690; telephone 352-392-1928, ext. 334; e-mail adha@gnv.ifas.ufl.edu.

Postdoctoral Position University of California, Berkeley (Received 11/09)

A postdoctoral position is available to study molecular genetics of plant development. Successful candidates have the choice of studying one of the two projects: (1) IAA signaling and provascular development (Development **126**, 2979-2991) or (2) molecular mechanism of EMF-regulated shoot development (Plant Cell **9**, 2011-2024). We are employing a variety of molecular, immunological, and functional genomics approaches to investigate the two projects. Candidates should have a strong background in molecular biology and biochemistry. Send curriculum vitae by e-mail and three letters of recommendation to zrsung@nature.berkeley.edu. Questions should be addressed to Dr. Z. R. Sung, Department of Plant and Microbial Biology, University of California, Berkeley, CA 94720.

Postdoctoral Research Position The Samuel Roberts Noble Foundation Ardmore, Oklahoma (Received 11/10)

A postdoctoral position is immediately available in the Forage Biotechnology Group of The Noble Foundation. The successful candidate will work on improvement of drought tolerance of forage grasses by genetic engineering. Applicants should have a Ph.D. with a strong background in plant molecular biology/physiology. The project is supported by the the Noble Foundation and the position is initially available for two years with the possibility of renewal for an additional year. Annual salary is in the range of \$31,090-\$46,630

depending upon qualifications and experience. Application and job description are obtainable from our Web site at www.noble.org. For details of the project, contact Dr. Zengyu Wang at zywang@noble.org or call 580-221-7368. For application, send a cover letter, detailed curriculum vitae, and arrange for three letters of reference to be directly sent to Ms. Laura Claypool, Human Resources Department, Attn: Job# FBG30700-ZW152, The Samuel Roberts Noble Foundation, PO Box 2180, Ardmore, OK 73402.

Postdoctoral Fellow
The Samuel Roberts Noble Foundation
Ardmore, Oklahoma
(Received 11/10)

The Forage Biotechnology Group of The Noble Foundation, Inc. is seeking a postdoctoral fellow. The research focus for the position will be generation of ESTs/ microarrays, microarray based gene discovery, and development of SSR markers from ESTs in cool season grasses. Ph.D. is required with a strong background in plant molecular biology. Previous experience with molecular markers and/or functional genomics is a plus. Position available for two years with possible renewal for an additional year. Salary of \$31,090–\$46,630 depending upon qualification and experience. For project details, contact Dr. Rouf Mian at rmian@noble.org or call 580-221-7307. Application and job description are available online (www.noble.org). Please send a letter of application, detailed curriculum vitae, and arrange for three letters of reference to be sent to: Human Resources Department, Attn: Position # 30700-RM149, The Samuel Roberts Noble Foundation, PO Box 2180, Ardmore, OK 73402.

Postdoctoral Research Positions
Purdue University, West Lafayette, Indiana
(Received 11/15)

Several postdoctoral research positions are available to investigate the role of plant genes and proteins in the *Agrobacterium* transformation process. Work in our laboratory uses both forward and reverse genetics, yeast two-hybrid systems, and suppressive subtractive hybridization to identify *Arabidopsis* genes necessary for *Agrobacterium*-mediated transformation. Candidates should have extensive experience in plant molecular, cell biology, and genetic techniques as applied to answering fundamental biological questions (not merely experience in transforming and analyzing plants). Salary will be commensurate with experience. Please send a curriculum vitae and the names of three references to Dr. Stanton B. Gelvin, Department of Biological Sciences, Purdue University, West Lafayette, IN 47907-1392; telephone 765-494-4939, fax 765-496-1496, e-mail gelvin@bilbo.bio.purdue.edu. Purdue University is an affirmative action/equal opportunity employer.

Postdoctoral Position
University of Arizona, Tucson
(Received 11/16)

A postdoctoral position is available at the University of Arizona to characterize mutations in

chromatin proteins in *Arabidopsis*. This research is part of an NSF Plant Genome research project (<http://Ag.Arizona.Edu/chromatin/chromatin.html>) in functional genomics, the goal of which is to investigate chromatin-level control of gene expression and gene silencing in *Arabidopsis* and maize using insertional mutations, dsRNA-mediated dominant mutations and GAL4 tethering. Minimum qualifications: Ph.D. in molecular genetics or related discipline and current visa. Preferred qualifications: experience in gene regulation, epigenetics, chromatin, and/or transgene expression in plants. Applicants should send a curriculum vitae, statement of research accomplishments and aspirations, and names of three references to Richard Jorgensen, Department of Plant Sciences, University of Arizona, Tucson, AZ 85721-0036; e-mail raj@ag.arizona.edu. Please refer to position number 20292.

Postdoctoral Fellowships
Samuel Roberts Noble Foundation
Ardmore, Oklahoma
(Received 11/14)

Two three-year postdoctoral fellowships are available immediately as part of a joint project between the laboratories of Dr. Richard A. Dixon, director, and Dr. Nancy L. Paiva, associate staff scientist, in the Plant Biology Division, Samuel Roberts Noble Foundation, Ardmore, Oklahoma. The successful candidates will have a Ph.D. in molecular biology, biochemistry, or related sciences, with preference given to candidates with experience in biochemistry of plant natural products and proven skills in molecular biology, particularly cDNA library construction and heterologous gene expression in bacteria, yeast, or other systems. The project will involve characterization of structural and regulatory genes for condensed tannin biosynthesis in alfalfa and *Medicago truncatula* using chemical, biochemical, molecular biological, and bioinformatic approaches. The project is funded jointly by Akkadox Corporation, La Jolla, California, and Forage Genetics International, West Salem, Wisconsin. Minimum starting salary is \$31,090. Application and job description are obtainable from The Noble Foundation Web site at www.noble.org. To apply, send a letter outlining research interests and experience, curriculum vitae, and names of three references to Jane Nance, Human Resources Department, Attn: Position # PltBio31400-RD157, Samuel Roberts Noble Foundation, PO Box 2180, Ardmore, OK 73402; telephone 580-223-5810, fax 580-221-7362, e-mail nfhr@noble.org. Informal inquiries can be made to Dr. Richard Dixon (radixon@noble.org, telephone 580-223-5810) or Dr. Nancy Paiva (nlpaiva@noble.org, telephone 580-223-5810).

Postdoctoral Position
Estación Experimental del Zaidín (CSIC)
Granada, Spain
(Received 11/24)

A two-year postdoctoral position starting January/February 2001 is offered to a European Union non-Spanish national to work in an EU project at the Estación Experimental del Zaidín (CSIC), Granada, Spain. Candidates should have extensive

experience in plant molecular biology, and knowledge of plant cell biology and biochemistry is desirable. The work will involve the cloning, sequencing, and expression of cDNAs of different antioxidative enzymes of plant peroxisomes. Some cDNAs will be used to overexpress antioxidative enzymes in *Escherichia coli* to obtain high amounts of recombinant proteins. The monthly net salary is Euros 1900. To apply, please send curriculum vitae, a description of your research experience, and the names and addresses (including e-mail) of three references to Prof. Luis A. del Río, Estación Experimental del Zaidín, Depto. Bioquímica, Biología Celular y Molecular de Plantas, Apartado 419, E-18080 Granada, Spain; fax +34-958-129600, e-mail ladelrio@eez.csic.es.

Postdoctoral Position
University of New Hampshire, Durham
(Received 12/05)

A postdoctoral position is available to conduct research in the area of gene cloning and genetic engineering of biosynthetic pathways in plants. The selected candidate will be required to have experience and training in the area of plant molecular biology, specifically in the field of gene cloning and gene expression in plants. Significant experience in the areas of gene cloning and sequencing, plasmid vector construction, and transformation of dicots is required. Proven ability to work as part of a multidisciplinary team is strongly preferred. Expertise in plant biochemistry would be a plus. Applicants must have a Ph.D. in plant molecular biology or a related field. Position is a 12-month appointment, potentially renewable annually for three years. Salary is competitive and commensurate with experience. Application, including a curriculum vitae and three letters of recommendation, should be sent by January 31, 2001, to Dr. Subhash C. Minocha, Professor of Plant Biology and Genetics, Rudman Hall, University of New Hampshire, Durham, NH 03824; telephone 603-862-3840, fax 603-862-3784, e-mail sminocha@christa.unh.edu. For additional information about our laboratory, see <http://www.pbio.unh.edu/faculty/minocha/minocha.html>. UNH is an equal opportunity employer.

Postdoctoral Research Associate
University of Minnesota, St. Paul
(Received 12/11)

Position is available immediately to characterize a long-sought lignin depolymerase gene from *Trametes cingulata*, produce recombinant enzyme and optimize its activity. Ph.D. is required in molecular biology, biochemistry, or appropriately related field. Practical experience is essential in protein purification, gene cloning, and production of recombinant enzymes through eukaryotic expression systems. Familiarity with (open-column) SEC, kinetic analysis, and Fortran programming would be advantageous. Excellent writing skills with ability to work both independently and as part of a team are very important. Position is a full-time appointment with \$27,800 to \$30,800 annual salary for one to three years contingent upon satisfactory progress and continued funding. Please send (hardcopy) resume describing experience with specific

experimental techniques, graduate transcripts or academic record, copies of relevant publications, and names, addresses, telephone numbers, and e-mail addresses of three professional references to Professor Simo Sarkanen, Lignin Biochemistry Group, College of Natural Resources, Kaufert Laboratory, University of Minnesota, 2004 Folwell Ave., St. Paul, MN 55108-6128; telephone 612 624-6227, e-mail ssarka@cnr.umn.edu. Applications will be reviewed beginning January 16, 2001, and continue until position is filled. The University of Minnesota is an equal opportunity educator and employer.

Postdoctoral Research Position
The Samuel Roberts Noble Foundation
Ardmore, Oklahoma
(Received 12/12)

A postdoctoral position is immediately available in the Forage Biotechnology Group of The Noble Foundation. The successful candidate will work on genetic manipulation of flowering time in forage crops. Applicants should have a Ph.D. with a strong background in plant developmental biology/molecular biology. Previous experience on generation of transgenic monocot plants would be a plus, but training will be provided if necessary. The project is supported by the Noble Foundation, and the position is initially available for two years with the possibility of renewal for an additional year. Annual salary is in the range of \$31,090 to \$46,630, depending upon qualifications and experience. Application and job description are obtainable from our Web site at www.noble.org. For details of the project, contact Dr. Zengyu Wang at zywang@noble.org or 580-221-7368. For application, send a cover letter and detailed curriculum vitae and arrange for three letters of reference to be directly sent to The Samuel Roberts Noble Foundation, Human Resources Department, Attn: Job# FBC30099-12W, PO Box 2180, Ardmore, OK 73402.

Postdoctoral Position
USDA/ARS, Lubbock, Texas
(Received 12/13)

The Plant Stress and Germplasm Development Unit, Lubbock, Texas, is currently seeking candidates for a one- to two-year postdoctoral position. The successful candidate will participate in a project involving design, construction, and testing/screening of new plant-functional promoters. Experience with basic recombinant DNA techniques, reporter gene assays, and plant promoter structure/function analysis are strongly desired. The position is classified at GS/11 level (salary currently set at \$42,724, plus excellent benefits package). Send curriculum vitae with names, addresses (e-mail preferred), and telephone numbers for three references to Jeff Velten, USDA/ARS, 3810 4th St., Lubbock, TX 79415; telephone 806-749-5560, fax 806-723-5271, e-mail jvelten@lbrk.ars.usda.gov. E-mail applications are encouraged, MS Word or WordPerfect. USDA/ARS is an equal opportunity employer.

Postdoctoral Research Associate Position
Kentucky State University, Frankfort
(Received 12/12)

Since 1990, the Kentucky State University (KSU) Land Grant Program has had a comprehensive research project directed toward developing pawpaw *Asimina triloba* L. Dunal as a new commercial tree fruit crop. There will be a postdoctoral research associate position available at KSU beginning February 1, 2001. The successful candidate's research focus will be to develop in vitro techniques for mass clonal propagation and short-term (cold preservation) and long-term (cryopreservation) methods for the preservation of pawpaw germplasm. The candidate will also conduct research in an effort to develop a method to clonally propagate pawpaw genotypes by mound layering. Some research efforts will be conducted at the University of Kentucky in cooperation with Dr. Robert Geneve. The candidate must have earned a doctoral degree from an accredited university in the area of horticulture, plant physiology, or related field. To officially apply for the position, send a letter describing your interests, curriculum vitae, official college transcripts, and three letters of reference to Ms. Evette Beasley, Cooperative Extension Building, Kentucky State University, Frankfort, KY 40601. The search will continue until a suitable candidate is found. For further information about the position, contact Dr. Kirk W. Pomper, Principal Investigator of Horticulture, telephone 502-597-5942, fax 502-597-6381, e-mail kpomper@gwmail.kysu.edu, Web site <http://www.pawpaw.kysu.edu>. Kentucky State University is an affirmative action/equal opportunity employer; women and minorities are encouraged to apply.

Postdoctoral Position
Cornell University, Ithaca, New York
(Received 12/20)

A two-year postdoctoral position is available in the Department of Horticulture, Cornell University, Ithaca, New York from September 1, 2001, to research the role of antioxidant genes and enzymes in superficial scald development of apple fruit. A strong background in molecular biology and enzymology is required. Experience with fruit tissues is desirable. Beginning salary is \$27,000 plus benefits. Send inquiries to Chris Watkins (cbw3@cornell.edu).

Postdoctoral Position
University of California, Riverside
(Received 12/20)

A postdoctoral position will be available starting in May-June 2001, to investigate the regulation of protein synthesis in plants. Molecular studies will include protein-protein and protein-RNA analysis between the poly(A)-binding protein and translation initiation factors using yeast two-hybrid, immunoprecipitation, and GST pull-down assays. Genetic analyses of their developmental role will also be studied using transgenic plants exhibiting altered expression profiles. Further research description is available at www.biochemistry.ucr.edu/faculty/gallie.html. Candidates must have a strong background in

molecular biology and/or biochemistry. Salary will be commensurate with experience. Applicants should send a curriculum vitae by e-mail, statement of research accomplishments, and three letters of recommendation to Dr. Daniel R. Gallie, Department of Biochemistry, University of California, Riverside, CA 92521; fax 909-787-3590, e-mail drgallie@citrus.ucr.edu.

Postdoctoral Scientist
The Danish Institute of Agricultural Sciences
(Received 12/20)

The Department of Plant Biology invites applications for a two-year postdoctoral position in plant molecular biology and transformation. The project will focus on the production of industrial enzymes in leaves of clover and includes gene modification, generation of constructs, transformation of clover, and characterization of the transformants by biochemical, molecular and immunological methods. It is a collaborative project with two major Danish companies, DLF-Trifolium and Novo Nordisk, working in the fields of plant biotechnology and enzyme production, respectively. The successful candidate will be associated with a group of 14 scientists and Ph.D. students with expertise in molecular biology, cereal transformation and molecular markers. Postdoc salaries in Denmark are of the order of US\$ 45,000 and include full medical insurance, and a contribution (15%) for a pension fund. Foreign specialists are granted a special low tax rate. For further information, contact D.Sc. Preben Bach Holm, The Danish Institute of Agricultural Sciences, Research Centre Flakkebjerg, DK-4200 Slagelse, Denmark; telephone +45-58113449, fax +45-58113449, e-mail prebenb.holm@agrsci.dk. Applicants should send a letter of interest marked "Enzyme production", curriculum vitae, reprints of publications, and references in four copies before February 1, 2001, to The Danish Institute of Agricultural Sciences, Management Secretariat, Research Centre Foulum, Postboks 50, DK-8830 Tjele, Denmark.

Postdoctoral Research Associate
The University of Chicago, Chicago, Illinois
(Received 12/22)

We are investigating the signaling pathways that control plant defenses and cell death. Recently, we found a connection between salicylic acid, defense signaling, cell death and cell growth (expansion and division) in an Arabidopsis mutant called *acd6* (Rate et al. Plant Cell 11, 1695-1708; 1999). The successful candidate will investigate the molecular basis of *ACD6* function and participate in the genetic analysis of *acd6* suppressor mutants. Experience with molecular biology, biochemistry, HPLC, cytology, genetics, electron microscopy, flow cytometry and plant transformation is essential. Ph.D. and one or more years of postdoctoral experience are required. Evidence of prior productivity is also required, such as publications in peer-reviewed journals. The salary range is \$24,000-26,000 plus health and retirement benefits. The successful candidate will join an interactive community at the University of

Chicago with several labs working on various aspects of Arabidopsis cell-cell communication and plant cell biology. For more information on the project, please contact Sharlene Johnson, Personnel Manager, The University of Chicago, MGCB Department, CSLC1105A, 920 East 58th St., Chicago, IL 60637. To apply for this position, please send a curriculum vitae, representative publications, and the names of three references to the above address.

RESEARCH/TECHNICAL POSITIONS (Non-Ph.D.)

Research Specialist University of Arkansas, Fayetteville (Received 11/06)

A research specialist position is immediately available in the Department of Horticulture, University of Arkansas. The successful candidate will provide technical support in sample preparation and analysis of various phytonutrients in horticultural crops. Requirements are an M.S. or a B.S. with two to five years of experience with a strong background in chemistry; experience with laboratory analytical instrumentation, particularly HPLC and GC; good general laboratory skills; and an interest in plant production of phytonutrients. Starting salary range \$20,000–\$23,000 depending on qualifications/experience, with extensive benefits. To apply, please send a letter detailing experience and interests, a curriculum vitae, undergraduate and graduate transcripts, and three letters of reference to Dr. Brad Murphy, Department of Horticulture, 316 Plant Sciences, University of Arkansas, Fayetteville, AR 72701; telephone 501-575-2670, fax 501-575-8619, e-mail bmurph@mail.uark.edu. For more information on Arkansas Horticulture see our homepage at <http://www.uark.edu/ArkHort>.

Senior Research Assistant The Samuel Roberts Noble Foundation Ardmore, Oklahoma (Received 11/13)

The Forage Biotechnology Group of The Noble Foundation, is seeking a senior research assistant to provide technical support for molecular marker, tissue culture, and transformation research involving forage legumes. Qualifications include an M.S. in plant science or related field. Experience with DNA-based marker systems, tissue culture, transformation, or other molecular techniques required. Salary commensurate with qualifications and experience. Health retirement benefits provided. Application and job description available online at www.noble.org. Please send a letter of application and detailed curriculum vitae and arrange for three letters of reference to be sent to Human Resources Department, Attn: Position # FBC3070-MS151, The Samuel Roberts Noble Foundation, PO Box 2180, Ardmore, OK 73402.

Specialist I, Plant Genetics New Mexico State University, Las Cruces (Received 11/13)

New Mexico State University is seeking candidates

for two full-time positions as Specialist I, Plant Genetics. Bachelor's degree in molecular biology, microbiology, biochemistry, or related field is required. Master's degree is preferred. Minimum of two years' experience is required in molecular biology, microbiology, and/or biochemistry. Positions are contingent upon funding. Salary is commensurate with qualifications and experience. Applications must be received by January 12, 2001. Please send letter of application, resume, and three letters of reference to Dr. John Kemp, New Mexico State University, Entomology, Plant Pathology and Weed Science, PO Box 30003, MSC 3BE, Las Cruces, NM 88003. NMSU is an EEO/AA employer.

Supervisory Plant Physiologist or Supervisory Research Chemist or Supervisory Research Geneticist (Plants) (Interdisciplinary) USDA/ARS, Pullman, Washington (Received 11/21)

The U.S. Department of Agriculture, Agriculture Research Service, Wheat Genetics, Quality, Physiology, and Plant Disease Research Unit, Pullman, Washington (located on the campus of Washington State University), invites applications for the position of research leader, GS-14/15 (\$70,457 to \$107,738 per annum, salary commensurate with experience). The research leader will lead a dynamic five-scientist team to address issues important in the production of wheat germplasm and varieties with improved yield, agronomic characteristics, pest and disease resistance, and milling and quality for end-product utilization. The research leader also conducts a personal research program. A Ph.D. or equivalent in plant physiology, biochemistry, molecular biology, cereal chemistry, plant genetics, or a closely related field is desired. This is a competitive, permanent appointment and U.S. citizenship is required. ARS is an equal opportunity provider and employer. Women and minorities are encouraged to apply. Applications must be marked "ARS-X1W-1101." For specific application procedures and requirements, please call Ms. Pamela Dean at 509-335-3238 or e-mail pdemes@wsu.edu. You may obtain a copy of the vacancy announcement from Ms. Dean or from the ARS home page (<http://www.ars.usda.gov/afm/hrd/resjobs/index.html>) under announcement ARS-X1W-1101. Applications must be postmarked by February 26, 2001.

Research Assistant The Samuel Roberts Noble Foundation Ardmore, Oklahoma (Received 11/22)

A research assistant position is available to join the microscopy support group. The research assistant will be assigned to work on various projects using microscopy techniques. This will involve immunocytochemistry (light and electron), in situ hybridization, and confocal microscopy. A B.S. degree in biology and previous experience in light and electron microscopy of plant material are required. Organizational skills and the ability to work collaboratively with various research groups are essential. Salary is commensurate with experience (\$28,000–

\$39,200). Application and job description obtainable from our Web site at www.noble.org. To apply, send a letter outlining research interests and experience, curriculum vitae, and names of three references to Human Resources, Position #PltBio30700-EB147, The Samuel Roberts Noble Foundation, PO Box 2180, Ardmore, OK 73402; telephone 580-223-5810, fax 580-221-7362, e-mail NFHR@Noble.org.

Genomics Researchers Kumho Life & Environmental Science Laboratory Kwangju, Korea (Received 11/29)

Seeking individuals to work as project leader and principal investigators in genomics and/or bioinformatics at Kumho Life & Environmental Science Laboratory, where research focus is on plant biotechnology. We are seeking a qualified project leader to lead the newly established functional genomics program, as well as several principal investigators to join the current research staff to conduct research in plant functional genomics and bioinformatics. These positions require a Ph.D. degree with postdoctoral experience. Experience and a strong background in molecular biology and genetics are desirable. Attractive employment packages include competitive salary, rent-free apartment, and other benefits including moving expenses and children's educational expenses. We invite applicants for these positions regardless of their nationality. For consideration, send curriculum vitae and three letters of reference to Mr. Jin Cheol Chung, Kumho Life & Environmental Science Laboratory, Kwangju 500-712, Korea; telephone +82-62-970-2622, fax +82-62-972-5085; e-mail jchung@ksc.kumho.co.kr. KLESL is an equal opportunity employer.

Research Associate I / Lab Manager Iowa State University, Ames (Received 12/11)

An individual is sought for research and lab management in molecular and genomic studies of bacterial plant pathogenesis and plant defense. Individual will: 1) carry out experiments and data analysis; 2) see to the maintenance of supplies, equipment, and computing facilities in the lab; and 3) oversee lab safety, newcomer orientation, and hourly workers. Minimum qualifications include B. A. or B. S. in biology or related discipline, with significant coursework, experience, or skills in a computer-related field; or, *vice-versa*, is required. Good organization, time management, and communication skills are also essential, as is the ability to work effectively with people. Preferred qualifications include significant experience in laboratory research, through an M.S. degree or employment, with an emphasis on one or more of the following, is preferred: molecular biology, genetics, biochemistry, cell biology, and bioinformatics. Background in plant research, particularly rice, and ability to work with diverse computing environments including LINUX is also highly desirable. The salary \$24,331 or higher, commensurate with qualifications (ISU pay Grade P11). The start date is as soon as possible. To guarantee consideration, applications

should be received by January 15, 2001. Send (hard copy) resume including summary of coursework (or transcripts) and research experience, phone numbers and e-mail addresses of three references, and a brief statement of current and future employment goals to Dr. Adam Bogdanove, Department of Plant Pathology, 351 Bessey Hall, Iowa State University, Ames, IA 50011. For questions about this position, e-mail Dr. Bogdanove at ajbog@iastate.edu.

**Assistant Specialist
University of California at Berkeley
(Received 12/18)**

An assistant specialist position is available to conduct molecular-genetics studies on the expression of transgenes introduced into the plant genome through site-specific recombination. A Ph.D. in plant biology or related field is preferred. Professional experience and demonstrated accomplishments in plant transformation and the structural and functional analysis of transgenes in plants is necessary. Send curriculum vitae and names of three references, by March 15, 2001, to Rona Kagawa, University of California at Berkeley, Plant and Microbial Biology, 111 Koshland Hall #3102, Berkeley, CA 94720-3102. The University of California is an equal opportunity/affirmative action employer.

ASSISTANTSHIPS, FELLOWSHIPS, INTERNSHIPS, ETC.

**Ph.D. Graduate Research Assistantship
University of Guelph, Guelph, Ontario, Canada
(Received 11/02)**

A graduate research assistantship to pursue a Ph.D. degree in the Department of Plant Agriculture is available May 1, 2001. The successful candidate will be enrolled in the Crop Biotechnology program within the department. Research will involve identification and optimization of mitochondrial gene regulatory regions as a component of a project to develop a plant mitochondrial transformation system. Applicants should have an M.S. degree in molecular genetics, plant biology, or related field. For more information, contact Dr. David Wolyn, Department of Plant Agriculture, Bovey Building, University of Guelph, Guelph, Ontario, Canada N1G 2W1; telephone 519-824-4120, ext. 3092, fax 519-767-0755, e-mail dwolyn@uoguelph.ca.

**Graduate Research Fellowships
Oregon State University, Corvallis
(Received 11/08)**

The Department of Horticulture at Oregon State University is offering two graduate research fellowships, the ARCO and Swallow Fellowships, to conduct research that leads to an M.S. or a Ph.D. degree and contributes to research programs within the department and discipline. Faculty interests include plant breeding and genetics, plant physiology, postharvest physiology, biotechnology, molecular biology, sustainable agriculture, and horticultural systems that integrate basic plant and crop management sciences in nursery, orchard, berry, and vegetable cropping systems. The fellowship stipends are \$16,500 for M.S. candidates and \$18,000 for Ph.D. candidates; tuition will be waived. Applicants

with a B.S. or B.A. degree in agriculture, biology, or related field will be preferred. Selection will be based on academic achievements, GRE scores, academic and/or work experience, letters of reference, and a personal letter describing goals and interests in research. The application deadline is February 15, 2001. In addition to these fellowships, graduate research assistantships are offered by faculty members, for which there is no application deadline. For information, contact Dr. Jim Myers, Department of Horticulture, Oregon State University, 4017 ALS, Corvallis, OR 97331-7304; e-mail myersja@bcc.orst.edu, Web site <http://www.orst.edu/dept/hort/grad>.

**Graduate Fellowships
Lehman College
City University of New York, Bronx
(Received 11/09)**

Graduate research assistantships available for students applying to the Plant Sciences Ph.D. Subprogram of the Biology Ph.D. Program of the City University of New York. The Plant Sciences Ph.D. program is a long-standing joint program between CUNY and the New York Botanical Garden, consisting of 32 doctoral faculty. Research areas include biotechnology and metabolic engineering of plant biosynthetic pathways, natural product biochemistry, medicinal plants and economic botany, signal transduction in plants, plant-microbial interactions, in vitro production of plant natural products, and plant development. To apply, download the doctoral program application forms from our Web site <http://www.a32.lehman.cuny.edu/PlantPhD>. For more information, contact Dr. Eleanore Wurtzel, Chair, Plant Sciences Ph.D. Program, Department of Biological Sciences, Lehman College, CUNY, 250 Bedford Park Blvd. West, Bronx, NY 10468; telephone 718-960-8643, fax 718-960-7348, e-mail twlc@cunyvm.cuny.edu.

**Graduate Assistantship in Plant Physiology
University of Florida, Gainesville
(Received 11/13)**

A graduate research and teaching assistantship (M.S. or Ph.D. level) is available at the Horticultural Sciences Department, University of Florida, Gainesville. The ideal candidate will be motivated in plant molecular biology research. The assistantship is restricted to U.S. citizens and permanent residents and requires a minimum total score of 1000 on the verbal and quantitative parts of the GRE and a 3.0 GPA minimum for a total of 4.0 in upper-division undergraduate/master's-level courses. The assistantship will pay up to \$14,000 (M.S.) or \$15,000 (Ph.D.) per year with a tuition waiver. For information on graduate studies at the University of Florida, Gainesville, please see <http://www.rgp.ufl.edu/education/graduateadmissions.html>. To apply, please mail a curriculum vitae and the names of three references to Dr. Bala Rathinasabapathi, Assistant Professor, Plant Molecular and Cellular Biology Program, Horticultural Sciences Department, University of Florida, Gainesville, FL 32611-0690; telephone 352-392-3991.

**Graduate Assistantship
University of Nevada, Reno
(Received 11/28)**

A graduate research assistantship (M.S. or Ph.D. level) is available at the Department of Biochemistry, University of Nevada, Reno. The ideal candidate will be highly motivated to conduct research on stress protective (Late Embryogenesis Abundant or LEA) proteins isolated from higher plants. The major goal of the research will be to analyze the function of these proteins in vitro and in vivo using biochemical and biophysical approaches and an appropriate transgenic model system. The successful candidate will have been admitted to the department's graduate program and have completed a B.S. or an M.S. degree in biochemistry, plant sciences, botany, microbiology, biology, or a related field. For information on graduate studies at the University of Nevada, Reno, see <http://www.unr.edu/grad>. Departmental research assistantship stipends start at \$16,000 (Ph.D.) per year with a tuition waiver. To apply, please submit a letter of interest, resume, undergraduate and graduate transcripts, GRE/TOFEL scores, and three letters of reference to Dr. John C. Cushman, Department of Biochemistry/MS200, University of Nevada, Reno, NV 89557-0014; telephone 775-784-1918, fax 775-784-1650, e-mail jcushman@unr.edu.

**Graduate Assistantships
University of South Dakota, Vermillion
(Received 12/05)**

Graduate assistantships to pursue a Ph.D. or master's degree in the Department of Biology are available on a competitive basis. The assistantship will pay \$11,000 (master's level) or \$13,000 (Ph.D.) per year with a two-thirds in-state tuition waiver. Research will focus on the areas of environmental plant stress physiology, biochemistry, and molecular biology. Applicants should have a strong background in plant biology. For more information contact Dr. Zoran Ristic, Department of Biology, University of South Dakota, Vermillion, SD 57069; telephone 605-677-6170, fax 605-677-6557, e-mail zristic@usd.edu.

**Graduate Research Assistantships
University of Florida, Gainesville
(Received 12/06)**

The plant molecular and cellular biology (PMCB) program crosses both departmental and college lines and currently consists of 25 faculty members. PMCB faculty and students are strongly unified through common research interests in basic plant sciences, a strong journal club program, a monthly visiting speaker program, and an annual two-day workshop (held at Daytona Beach, Florida) for research presentations by students, postdoctoral associates, PMCB faculty, and invited outside scientists. PMCB offers graduate degrees at the M.S. and Ph.D. levels. Graduate research assistantships start at \$16,500. For more information and to apply to the PMCB program, visit our Web site at <http://www.ifas.ufl.edu/~PMCB/> or contact Dr. Kenneth Cline at kcline@ufl.edu, or the Graduate Program in Plant Molecular & Cellular Biology, c/o Horticultural Sciences, PO Box 110690, University of Florida, Gainesville, FL 32611-0690.

Graduate Assistantships**North Dakota State University, Fargo
(Received 12/18)**

B.A. and M.S. applicants are sought for Ph.D. assistantships in the Department of Biology beginning fall 2001 or sooner. Research will focus on photosynthesis in the model organism *Chlamydomonas reinhardtii*. Ongoing projects involve understanding the role of the manganese stabilizing protein (MSP) in photosystem II (PSII) and the reaction mechanism of oxygen production in PSII. Students will have the opportunity to experience a variety of techniques in the areas of protein biochemistry, Fourier-transform infrared spectroscopy (FT-IR), *Chlamydomonas* genetics, and molecular biology. A research assistantship is available, and students are encouraged to apply for a NDSU Presidential Doctoral Fellowship (16,000/year stipend). Selection will be based on academic achievements and/or research experience. Foreign applicants are encouraged to apply, but TOEFL scores are necessary for consideration. Applicants should send a resume with names and addresses of three references, a copy of undergraduate and graduate transcripts, and a letter describing professional goals to the address below. For more information about specific research projects and application requirements, please contact Ron Hutchison, Department of Biology, 218 Stevens Hall, North Dakota State University, Fargo, ND 58105-5516; telephone 701-231-7224, e-mail ron_hutchison@ndsu.nodak.edu.

Graduate Assistantship**Cornell University, Ithaca, New York
(Received 12/20)**

A teaching assistantship is available leading to a M.S. or Ph.D. degree with specialization in postharvest harvest physiology (fruit) for fall

2001. A suitable candidate will have an interest in horticulture and a desire to use modern techniques to tackle physiological problems of interest. Full tuition waiver plus stipend will be provided. Inquiries should be directed to Chris Watkins, e-mail cbw3@cornell.edu.

**Graduate Fellowships and Assistantships
Michigan State University, East Lansing
(Repeat)**

To obtain information about the Plant Science Fellowships or Plant Science programs at Michigan State University, please contact Ms. Judy Ward, The Graduate School, Michigan State University, 118 Linton Hall, East Lansing, MI 48824; telephone 517-355-0301, e-mail wardj@msu.edu, Web site at www.msu.edu/user/gradschl/plantsci.htm. (Details November/December 2000 *ASPP NEWS*)

**Fellowships in Molecular and
Environmental Plant Science****Texas A&M University, College Station
(Repeat)**

For information about the MEPS graduate program, consult our Web site at <http://www.meps.tamu.edu/> or contact Chair, MEPS Program, Department of Soil and Crop Sciences, Texas A&M University, College Station, TX 77843-2474. AA/EOE. (Details November/December 2000 *ASPP NEWS*)

Graduate Assistantships**University of Florida, Gainesville
(Repeat)**

Contact: Dr. D. J. Huber, Graduate Coordinator, Horticultural Sciences Department, PO Box 110690, University of Florida, Gainesville, FL 32611-0690; telephone 352-392-1928, ext. 216, e-mail rgoetz@ufl.edu.

Graduate Assistantship**West Virginia University, Morgantown
(Repeat)**

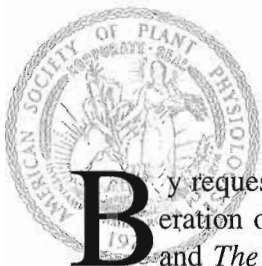
Contact and/or send resume with names and addresses of at least three references to Dr. Rajeev Arora, Division of Plant & Soil Sciences, PO Box 6108, West Virginia University, Morgantown, WV 26506; telephone 304-293-6023, ext. 4335, fax 304-293-2960, e-mail rarora@wvu.edu. (Details November/December 2000 *ASPP NEWS*)

Graduate Research Assistantships**Louisiana State University, Baton Rouge
(Repeat)**

Please submit a letter of interest, resume, undergraduate and graduate transcripts, and GRE/TOEFL scores and arrange to have three letters of reference sent to Dr. Norimoto Murai, Department of Plant Pathology and Crop Physiology, Louisiana State University and LSU Agricultural Center, Baton Rouge, LA 70803-1720; telephone 225-578-1380, fax 225-578-1415, e-mail nmurai@lsu.edu. (Details November/December 2000 *ASPP NEWS*)

Graduate Teaching Assistantships**Ohio State University, Columbus
(Repeat)**

Applications or inquires should be directed to Dr. Randy Scholl, Department of Plant Biology, The Ohio State University, 1735 Neil Ave, Columbus, OH 43221; telephone 614-292-1982, fax 614-292-6345, e-mail scholl.1@osu.edu. (Details November/December 2000 *ASPP NEWS*)



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