

ASPP NEWS

PRESIDENT'S LETTER

Plant Biology 2000!

Summer will be here before you know it, and now is the time to firm up your plans for scientific meetings and vacations. This year, Plant Biology 2000—ASPP's annual meeting—offers you a great chance to combine both activities in one rewarding trip to San Diego.

First, and most important to you as scientists, the Program Committee has done a great job in organizing symposia that are designed to keep you up-to-date on exciting areas of plant biology. For example, what could be more timely than the symposium organized by our recent Gibbs Medal winner Steve Tanksley on "Comparative Genomics in Plants"? Clearly this is where the action will be in genomics, and it is the aspect of genomics that relates most closely to many of our members' own scientific interests. So use this opportunity to see what approaches are being taken by those actively engaged in these endeavors.

In my opinion, our meetings have not stressed enough the exciting advances taking place in molecular studies of plant development, so I am very happy to say that one of the leaders in this field, Sarah Hake, is organizing a symposium on "Leaf Development" that should surely attract more developmental plant biologists, as well as those of us who want to keep up on this field for purposes of teaching.

Clark Lagarias, who is known for his work on the evolution of phytochromes, is organizing a symposium on the "Evolution of Photoreception"—another area that has seen great progress in recent years. Clark is certainly the person to choose the right talks for this topic. The symposium is one of

several that should also appeal to our phycology colleagues, who will be holding their meeting at the same time and on the same site.

"Redox Regulation" is organized by Stephen Mayfield. This topic used to be something seemingly relevant only to those interested in the regulation of certain enzymes involved in carbon metabolism. But we now recognize that this type of regulation has much broader significance, making this topic very timely.

Finally, I have to promote my own "President's Symposium"! Traditionally, this symposium has focused on research related to the president's own field, but Ken Keegstra pre-empted me by doing cell walls just two years ago. So I decided to take advantage of the fact that this is our first ASPP meeting of the new millennium to have a look at "Plants Through the Millennia." What better person to begin than Linda Graham, who will speak on the evolution of land plants, a topic we've not covered for a long time and one that also should be of real interest to the phycologists. I also thought that it is worth learning more about how modern molecular techniques are being used to study the evolution of our major crop plants. For this, Jonathan Wendel, whose own research concentrates on the evolution of cotton, will speak on this crop but will also provide insights and comparisons related to the evolution of our other major crop species. My late husband, Yoash Vaadia, used to tell me wonderful stories about the great work done in the United Kingdom at Rothamsted on mineral nutrition and development of fertilizers, so I have persuaded Roger Leigh of Cambridge to address this topic and provide

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Future ASPP Annual Meetings

2000

Saturday, July 15, through
Wednesday, July 19
San Diego, California

2001

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

2002

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



ASPP NEWS

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us with insights on the new directions being taken in the study of mineral nutrition in plants. Finally, I have asked Bob Goldberg, one of our great imaginative thinkers, to gaze into his crystal ball and talk about "Plants of the Future." At last check, Bob was still gazing, and I can't wait to see what he comes up with to close the symposium.

I'd also like to point out a few changes initiated by the Program Committee that I'm sure you will all enjoy. First, we want to recognize the effort our young people put in to prepare and present their posters. In the past, poster sessions were squeezed between other events. This year, we will be devoting Sunday afternoon exclusively to posters, and we will have another major poster session Monday evening that features refreshments and beer. We are confident that with these prime times assigned, everyone will be able to see all the posters and will find their authors present to engage in discussions. In addition, we want to help our newest colleagues, the undergraduates, get the most out of this meeting. We'll have a get-together for all undergraduates just before the regular mixer on Saturday evening. They'll have a chance to meet each other and show each other their posters. As I well remember from long ago, there is nothing worse than going to your first big meeting and feeling alone and without friends. We hope this get-together will help our undergrads make friends that very first day.

Other highlights of this year's meeting include 17 minisymposia on hot topics and special workshops focused on public affairs, education, biotechnology, and modeling. Two career workshops designed to help students and postdocs find and secure jobs will also be offered. The Saturday afternoon opening session will feature the annual awards ceremony and the Shull Address by Sabeeha Merchant. In addition, check our Web page and registration materials for the popular luncheons and breakfasts sponsored by the various committees. And last but not least, save time in your Tuesday night schedule to attend the Beach Party dinner and dance, which will be held at the Embarcadero Park on the San Diego waterfront.

Finally, what better place than San Diego to combine a meeting with a family vacation? It's a beautiful city, the weather is wonderful and mild all summer long (remember Baltimore last year?), and there is the Zoo, Sea World, the Harbor and the Pacific Ocean, Old Town, Mexico, and great restaurants. And our convention site, the Town and Country Resort and Convention Center,

provides us with the best of both worlds—relatively confined space for the meeting on beautiful grounds with swimming pools and lovely facilities. And it's right on the light rail system that can take you to Old Town,

the Harbor, and even all the way to Tijuana! So come and enjoy the sun and the science! ☺

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ASPP Education Foundation Marches into New Millennium

Future projects under consideration by the ASPP Education Foundation include video news stories on plant science for distribution to local television stations across the nation; a television series program on plant science, such as a "Nova" or Discovery channel production; and advertisements on plant science for publication in national newspapers. Bob Goldberg, foundation board chair, met with an advisory committee on March 2, 2000, to discuss a number of possible initiatives.

The Education Foundation has been active in educating the public about plant science research and biotechnology since 1996. It will continue these efforts through bold new projects.

One of the first projects it funded was a \$42,000 focus group study in 1996, *Sowing the Seeds: Focus Group Research on How Educators May Integrate Plant Science into Their Teaching*, conducted by Belden & Russonello (B&R) to discover how to include more plant science teaching in the public education science curricula. B&R moderated six groups of middle- and high-school science educators in three U.S. cities: St. Louis, Los Angeles, and Baltimore. Including a wide range of demographic variables, the group examined five vital areas of plant science education. The report suggested that ASPP encourage the inclusion of plant science and physiology in formal curriculum requirements.

On the basis of these findings, the foundation supported ASPP's development of the *Principles of Plant Biology—Concepts for Science Education*. In conjunction with a national mandate to update curriculum standards for public K–12 education, the foundation assisted ASPP in conducting a gap analysis of national and selected state standards to determine whether they reflect the principles. The principles have been correlated to the educational Life Science Standards of the National Research Council.

The *Principles of Plant Biology—Concepts for Science Education* have been presented and distributed through national and local

science education organization conferences, workshops, annual meetings, and other national forums such as the annual National Science Teachers Association conventions, the National Council of State Science Supervisors, and Wisconsin Fast Plants. The *Principles of Plant Biology* are included in the textbook *Biology*, which is used by nearly 250,000 undergraduate students every year.

In 1998, the foundation sponsored "Plants for the 21st Century" at Epcot Center in Orlando, Florida. Held from March 13 through April 4 at the "Science Jam" and again April 17 through May 31 at the Epcot International Flower and Garden Festival, this exhibit drew up to 200 visitors an hour during peak times. The presentations gave visitors opportunities for innovative participation in creative plant science learning experiences. They were able to explore the research and products of plant biotechnology and to understand their value in meeting the projected doubling of food demands in the 21st century.

The foundation funded the creation of a 10-minute videotape and a two-minute video news release of the exhibit. These videotapes have been freely distributed to hundreds of teachers and ASPP members to disseminate the information in the Epcot exhibit.

The Education Foundation has also sponsored the development of plant science education materials, added links and references on the ASPP Web site, produced brochures, and funded the creation of plant science issues papers.

The foundation is a forum for leaders in business and plant research to work together to improve education and to promote public understanding of the plant sciences. It is taking the lead in helping to create information exchange among scientists, industry, and the public. ASPP President Deborah Delmer expressed appreciation to ASPP members, foundation board corporate members, and the other corporate foundation donors for their generous support of, and active participation in, foundation activities. ☺



The luncheon sponsored by the Committee on the Status of Women in Plant Physiology (CSWIPP) will be held Monday, July 17, 2000, at the annual ASPP meeting in San Diego.

Our speaker will be Dr. Debra R. Rolison, who heads Advanced Electrochemical Materials at the Naval Research Laboratory. Dr. Rolison is concerned about the dearth of women in U.S. chemistry departments and recently published an editorial on the topic in the March 13, 2000, issue of *Chemical and Engineering News*. Many of the problems that face women chemists also face women in biology, and Dr. Rolison will address these issues.

ASPP, Wisconsin Fast Plants Hold Special Workshop for ASPP Members

The ASPP Education Committee, Executive Committee, and Education Foundation joined Wisconsin Fast Plants in Madison to hold a workshop on using the ASPP *Principles of Plant Biology—Concepts for Science Education* and the National Science Education Standards.

The focus of the 2^o-day workshop for 24 ASPP members January 14–16, 2000, was on the uses of Fast Plants for teaching high school and college general biology, plant science, genetics, ecology and evolution, and plant breeding. Committee member Paul Williams prepared the special workshop with his Wisconsin Fast Plants colleagues, and ASPP Education Committee member Gary Kuleck participated. Workshop emphasis was on the alignment of educational material with the National Science Education Standards. Featured activities illustrated the ASPP *Principles of Plant Biology*, and additional attention was given to the uses of Fast Plants in independent undergraduate and high-school research projects.

One of the participants, Mary Poulson of the Department of Biological Sciences at Idaho State University, stated, "I applied to attend the workshop because we are 'revamping' our two-semester biology majors course at ISU, and I am charged with the botany lecture and laboratory sections." She indicated that it is a continual challenge to

The CSWIPP-sponsored workshop on careers will take place on Sunday evening, July 16. The committee decided to host two workshops this year. One, which will be very similar to last year's, is entitled "Where Are the Jobs?" The second, which will focus more on the mechanics of getting a job, is tentatively titled "How to Get the Jobs." The workshops will be preceded by pizza and beverages. Each workshop is limited to 120 participants, so sign up early. Last year's event filled up quickly. This year, attendees will choose one of the workshops; participation is limited to one workshop per attendee. Both workshops will be very helpful for those who are job hunting. ☺

keep students interested in the value of plants in the world. "Not only did I learn many new ways to pique student interest at the workshop, I also learned pedagogical tools, such as the inquiry-based learning approaches used by Dr. Paul Williams."

Using easily accessible, inexpensive household items, such as bottles and deli containers, the Wisconsin Fast Plants staff demonstrated hands-on activities and provided handouts, pre-prepared experimental materials, lists of suppliers, and plants at various developmental stages. Participants learned how to make a hand lens with a film container and particularly enjoyed making their own Bottle Botanical Gardens with selections of various plants.

The workshop was supported by a grant of \$16,000 in "good works funds" provided by the ASPP Executive Committee. The Society and a number of institutions whose faculty participated covered travel, housing, and tuition costs for participating ASPP members.

Workshop participants expressed appreciation for the helpful and accommodating efforts of the Wisconsin Fast Plants staff, including Paul Williams, Coe Williams, and Dan Lauffer. Coe coordinated the arrangements, logistics, and details of the workshop. ☺

Monsanto Contributes to ASPP Education Foundation

Monsanto Company recently made a generous contribution to the ASPP Education Foundation. Since joining the foundation board in 1996, Monsanto has been a strong and consistent financial supporter of the foundation.

One of the world's largest agricultural and pharmaceutical businesses, Monsanto Company also supports interdisciplinary plant research through the plant science institute in St. Louis, Missouri, a consortium of the Missouri Botanical Garden, Washington University in St. Louis, the University of Missouri at Columbia, and Monsanto.

Monsanto representatives Hendrik Verfaillie and Rob Horsch have been very helpful in foundation activities and support. The perspective and insights of both plant scientists and corporate leaders enhance the capabilities of the foundation to carry out its mission to promote a broad understanding of the importance of plant sciences in providing an ongoing supply of affordable, high-quality food, fiber, and renewable resources. ☺

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Joanne Chory Wins L'Oréal–Helena Rubinstein “For Women in Science” Award

ASPP member Joanne Chory has received the 2000 L'Oréal–Helena Rubinstein Award “For Women in Science.”

Chory, who is a professor at The Salk Institute's Plant Biology Laboratory and an associate investigator of the Howard Hughes Medical Institute, was cited by L'Oréal as “one of the world's best known researchers in molecular plant biology.” She received the honor for her work in bringing new understanding to the way plants react to light. Her group was among the first to use genetics to determine how plants adapt their development and growth in relation to light. In darkness, and when underground, normal young plants are white, their stems grow quickly, and their leaves remain folded. When exposed to light, stem growth slows, leaves start unfolding, and the photosynthesis process begins. Chory's work on the critical genetic analysis of mutant plants growing in darkness in the same way as normal plants growing in light led to the discovery of transduction pathways for light signals. She went on to determine that some of the mutant plants are deficient in the synthesis of a particular class of plant steroid hormones, the brassinosteroids. Her work led to the discovery that the brassinosteroids act through a unique transmembrane receptor kinase that is different from steroid hormone receptors in animals.

Chory received her A.B. degree in biology from Oberlin College and her Ph.D. in microbiology from the University of Illinois. From 1984 until 1988, when she joined The Salk Institute, she conducted postdoctoral research in plant molecular genetics at Harvard Medical School. In 1994, she received the Award for Initiatives in Research from the National Academy of Sciences. She was the recipient of the 1995 ASPP Charles Albert Shull Award and in 1997 was named an associate investigator of the Howard Hughes Medical Institute. Chory is a fellow of the American Academy of Arts and Sciences and a member of the U.S. National Academy of Sciences.

“For Women in Science” is a partnership that brings together UNESCO and L'Oréal for five years, from 1999 to 2004. It is based on the conviction that “science is a fundamental factor of development and that women are essential to the advance of scientific research.” The L'Oréal–Helena Rubinstein Awards form part of the “For Women in Science” program, with the general goal of promoting women and giving them greater visibility in life sciences.

In 1999, 400 sponsors were asked to nominate women scientists for the award. In October 1999, the jury selected five winners for the year 2000 awards chosen from among 94 candidates. In addition to Joanne Chory,



Joanne Chory

the winners are Eugenia Maria Del Pino Veintimilla, professor of biology, Ecuador; Valerie Mizrahi, professor of molecular biology, South Africa; Tuneko Okazaki, professor of molecular biology, Japan; and Margarita Salas, professor of molecular biology, Spain. ♪

Journals Launch Best Paper Award

Beginning next year, *Plant Physiology* and THE PLANT CELL will sponsor the Young Scientist's Best “Plant Biology” Paper-of-the-Year Award.

The winning paper will be selected by a committee from each journal that is composed of the editor-in-chief and selected members of the respective editorial boards. Nominations will be submitted by members of the editorial boards, by reviewers, or by others familiar with the scientific content of the paper. Each year in November, ASPP will remind its members by e-mail and the *ASPP NEWS* to nominate papers for the prizes. Letters of nomination are not to exceed two pages and should describe the research, its significance, and the role that the first author (the nominee) played in the discovery

process. Articles must have been published during the previous calendar year (therefore, the awards given in 2001 will be for papers published in 2000). Papers that show truly novel mechanistic or conceptual insight at any level of biological complexity, from the molecular to the whole plant, will be considered.

Six copies of the nominating letter and six copies of the paper should be sent to the editor-in-chief of *Plant Physiology* or THE PLANT CELL. The deadline for submission each year will be February 15, and the selection will be made in March. The winner will be announced in the *ASPP NEWS* and in both journals, as well as in the program of the Society's annual meeting. The winner will be the first author of the paper and, to

qualify, must have been a graduate student or postdoc at the time the work was performed or the paper was written. If two authors contribute equally and their publication is chosen for an award, the prize will be split between the two. For scientists not on a traditional career track, five years of professional work post-Ph.D. will be the cutoff for consideration.

Winners will receive a \$1,000 cash prize and a subsidy of up to \$1,500 to attend the ASPP annual meeting the year of the award. The ASPP Program Committee will schedule an appropriate minisymposium at the annual meeting that will feature a presentation by the award recipient. The winner and his or her presentation will be highlighted in the program. ♪



Record Increase Sought in NSF Budget

NSF Director Rita Colwell and Assistant Director Mary Clutter reported yesterday on the president's fiscal year 2001 budget request for the National Science Foundation, including the NSF Biological Sciences Directorate.

Substantial increases of 17.3 percent overall and 19.7 percent for research are being sought by the National Science Foundation in the FY2001 budget. For the Biological Sciences Directorate, the requested increase is 23.3 percent.

NSF unveiled the new "2010 Project," which will be a functional genomics research project for Arabidopsis. The total genomics sequence for Arabidopsis may be known as early as July of this year. The 2010 Project is the next step and will provide knowledge of the functions of the genes. The NSF proposed 2001 budget provides \$25.5 million for the project.

With the 2010 Project, total proposed funding for plant genome research sponsored by NSF for FY2001 is \$105 million. This includes a proposed \$59.63 million in

level funding for the National Plant Genome Initiative.

Funding is up significantly for core research programs in biology. Strengthening disciplinary research is a priority in the NSF budget. Areas of emphasis of emerging importance include functional genomics of key organisms with high environmental significance and fundamental biology with enhanced research support taking advantage of genomics data sets and other resources.

The proposed increase for Education and Human Resources is 5.5 percent.

Mary Clutter noted that Rita Colwell, who addressed ASPP members at the Society's annual meeting in Baltimore in July 1999, was effective in working directly with President Clinton, in addition to the Office of Management and Budget, for this historically high requested budget increase. NSF officials said support from the science community will be needed to seek approval of the NSF proposed budget in Congress. ☛



Rita Colwell



Mary Clutter

Plant Genome Progress Report

A progress report on the National Plant Genome Initiative, written by the National Science and Technology Council, Committee on Science, and Interagency Working Group on Plant Genomes (IWG) in October 1999 and released in January 2000, reviews progress to date and future plans for the plant genome initiative.

The progress report takes a look at six goals identified by the IWG in 1998 and discusses future plans. The report said it is anticipated that the focus of the National Plant Genome Initiative will shift toward functional genomics. The report calls for increased funding of plant genome research at NSF, USDA, DOE, and NIH.

The National Plant Genome Initiative has provided \$150 million in new funds for plant genome research supported by NSF over the past three years. The initiative was requested by Senator Christopher Bond (R-MO).

The IWG plant genome progress report can be found on the ASPP homepage at <http://www.aspp.org/pubaff/plgenrpt.htm>. ☛

Research Funding Up in USDA's 2001 Budget

The president's proposed budget for fiscal year 2001 for the U.S. Department of Agriculture calls for significant increases for research programs supporting plant research. Following are some of the proposed hikes:

- an increase of 26 percent, or \$31 million, for the National Research Initiative Competitive Grants Program (NRI)
- a net increase of 7.7 percent, or \$64 million, for the Agricultural Research Service
- level funding for formula grants of \$543 million
- a total of \$120 million in mandatory funds for the new Initiative for Future Agriculture and Food Systems competitive grants program.

The proposed increase for NRI will address key issues in agriculture and related sciences through additional research investments in genetics, bio-based products and value-added agricultural commodities, food safety, human nutrition research, and pest and disease management.

The NRI budget request is often vulnerable to cuts before enactment. Support by the science community is needed to seek enactment of proposed increases for the NRI, ARS, and Initiative for Future Agriculture and Food Systems. The provision of level funding for formula funds in the budget proposal, as opposed to reductions proposed last year, may contribute to more cooperative efforts in the agricultural science community in support of the 2001 proposed budget.

Congress has not fully supported the Initiative for Future Agriculture and Food Systems in the past, and there is some question whether it will support the \$120 million included in the FY2000 budget or again in the FY2001 budget. There is an apparent difference of opinion between the department and the House Appropriations Committee as to what Congress said about funding for the program in the enacted legislation and report for FY2000. ☛

DOE Seeks 9.5 Percent Increase for Division of Energy Biosciences

The Department of Energy fiscal year 2001 budget proposal calls for an increase of \$2,935,000, or 9.5 percent, for the Division of Energy Biosciences, which supports basic energy research on plants and microbes. If this increase is approved, it would provide a budget of \$33,714,000 for the Division of Energy Biosciences for FY2001. The FY2000 budget for the division is \$30,779,000. (FY2000 runs from October 1, 1999, to September 30, 2000.)

ASPP member participation will be sought to encourage support in Congress for research sponsored by the Division of Energy Biosciences. ASPP activities in support of the division in recent budget years contributed to budget increases and were key in turning back attempted cuts of several million dollars. ☘

ASPP Joins *Journal of Natural Resources and Life Sciences Education*

ASPP has become a cooperating society in the American Society of Agronomy publication of the *Journal of Natural Resources and Life Sciences Education* (JNRLSE). ASPP members can subscribe to JNRLSE at the ASA membership rate of \$27/year and submit their abstracts to the journal for publication. Education Committee Chair Carol Reiss will serve a three-year term as the ASPP associate editor to JNRLSE. Submission and subscription inquiries should be directed to the managing editor, Susan Ernst, at sernst@agronomy.org, fax 608-273-2021.

Secretary of Agriculture Names ASPP Members C. S. Prakash, Jim Cook to Advisory Committee on Agricultural Biotechnology

Agriculture Secretary Dan Glickman recently named ASPP members Jim Cook of Washington State University and C. S. Prakash of Tuskegee University to the newly formed USDA Advisory Committee on Agricultural Biotechnology. The committee will advise the secretary on policy related to the creation, application, marketability, trade, and use of agricultural biotechnology.

"It is my hope that this group, which brings together people with a range of perspectives and experiences, will engage in the kind of thoughtful and civil debate on biotechnology that our country now needs," said Glickman. "The panel will examine many of the complex issues related to agricultural biotechnology."

The committee, authorized for two years, will hold its first meeting on March 29–30, 2000, in Washington. The meeting will be open to the public.

Secretary Glickman appointed Dennis Eckart, a former congressman from Ohio, as chair of the committee. Eckart is currently an attorney at Baker and Hostetler, LLP, in Washington, DC. The committee's appointed members are listed below:

Dale E. Bauman—Liberty Hyde Bailey Professor and Professor of Nutritional Biochemistry, Department of Animal Science and the Division of Nutritional Sciences, Cornell University, Ithaca, New York

Daniel R. Botkin—Research Professor, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara

Carolyn Brickey—Executive Director, National Campaign for Pesticide Policy Reform, San Francisco, California, and member, National Organic Standards Board

R. Jeffrey Burkhardt—Professor of Food and Resource Economics, Food and Resource Economics Department, University of Florida, Gainesville, and member, U.S./EU Committee on Ethics and Food Biotechnology

R. James Cook—R. James Cook Endowed Chair in Wheat Research, Department of Plant Pathology, Washington State University, Pullman

James F. Dodson—Farmer and seed sales representative for Pioneer Hi-Bred International, Inc., Robstown, Texas, and Chair, Environmental Task Force, National Cotton Council

Linda J. Fisher—Vice President for Government and Public Affairs, Monsanto Company, Washington, DC

Carol T. Foreman—Distinguished Fellow and Director, the Food Policy Institute, Consumer Federation of America, Chevy Chase, Maryland, and member, USDA Meat and Poultry Inspection Advisory Committee

David J. Frederickson—President, Minnesota Farmers Union, St. Paul

Rebecca J. Goldberg—Senior Scientist, Environmental Defense Fund, New York, New York

Michael K. Hansen—Research Associate, Consumer Policy Institute, Consumers Union, Yonkers, New York

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Jim Cook



C. S. Prakash

Neil E. Harl—Professor of Economics and Charles F. Curtiss Distinguished Professor in Agriculture, Iowa State University, Ames

Thomas J. Hoban—Professor, Department of Sociology and Anthropology, North Carolina State University, Raleigh

Marjorie A. Hoy—Eminent Scholar and Davies, Fischer, and Eckes Professor of Biological Control, Department of Entomology and Nematology, University of Florida, Gainesville

Charles S. Johnson—Executive Vice President, Dupont, Wilmington, Delaware, and member, USDA/Foreign Agricultural Service Emerging Market Committee

Anne R. Kapuscinski—Professor and Extension Specialist, Department of Fisheries and Wildlife, University of Minnesota, St. Paul

Edward L. Korwek—Attorney, Hogan and Hartson, LLP, Washington, DC

Sharan A. Lanini—Farmer and Sales/Marketing Manager for Growers Transplanting, Inc./Rocket Farms, Salinas, California, and member, California Department of Food and Agriculture Organic Food Act Advisory Committee

Mark Lipson—Organic Farmer and Policy Program Director, Organic Farming Research Foundation, Davenport, California

Mary-Howell Martens—Organic Farmer and Adjunct Biology Instructor, Finger Lakes Community College, Penn Yan, New York

Marshall A. Martin—Professor, Department of Agricultural Economics, Purdue University, West Lafayette, Indiana, and member, National Agricultural Biotechnology Council

J. Calman McCastlain—Attorney, Pender, McCastlain, and Pak, P.A., Little Rock, farmer and grain elevator operator, and Director, Arkansas Wheat Promotion Board

E. Bruce McEvoy—Chief Executive Officer, Sealed Sweet Growers, Inc., Vero Beach, Florida

Margaret G. Mellon—Director, Agriculture and Biotechnology Program, Union of Concerned Scientists, Washington, DC

Lorraine D. Nakai—Entomologist and farmer, Navajo Agricultural Products Industry, Farmington, New Mexico

Philip T. Nelson—Farmer, Chair, Livestock and Dairy GRITS Committee, Illinois Farm Bureau, and Chair, American Farm Bureau Federation, Swine Advisory Committee, Seneca, Illinois

Carol Nottenburg—Attorney and Director of Intellectual Property and Principal Scientist, Center for the Application of Molecular Biology to International Agriculture, Red Hill, Australia

Roger C. Pine—Farmer and President, National Corn Growers Association, Lawrence, Kansas

Channapatna S. Prakash—Professor of Plant Molecular Genetics, College of Agriculture, Tuskegee University, Auburn, Alabama, and member of the U.S. Sweetpotato Crop Advisory Committee

Frank L. Sims—President, North American Grain, Cargill, Inc., Minnetonka, Minnesota, and member, Chicago Board of Trade

J. Michael Sligh—Director for Sustainable Agriculture, Rural Advancement Foundation International—U.S.A., Chapel Hill, North Carolina

Jerome B. Slocum—Farmer and President, North Mississippi Grain Company, Cold Water, Mississippi

Austin P. Sullivan, Jr.—Senior Vice President for Corporate Relations, General Mills, Inc., Plymouth, Minnesota; and Chairman, Biotechnology Task Force, Grocery Manufacturers of America

Virginia V. Weldon—Physician and Director, Center for the Study of American Business, Washington University, St. Louis, Missouri; and member, President's Committee of Advisors on Science and Technology

David M. Winkles, Jr.—Farmer, President, South Carolina Farm Bureau, Sumter, South Carolina, and member, United Soybean Board

Margaret M. Wittenberg—Vice President of Government and Public Affairs, Whole Foods Market, Inc., Dripping Springs, Texas, and member, National Organic Standards Board

Michael W. Yost—Farmer and President, American Soybean Association, Murdock, Minnesota. ☺

Senator Bond Gives Senate Reasons to Support Plant Biotechnology

In a speech in the U.S. Senate January 26, 2000, Senator Christopher Bond (R-MO), plant research champion in Congress, provided strong arguments in support of plant research using biotechnology. Bond cited a letter on biotechnology signed by some 500 scientists, including nearly 100 ASPP members. A letter to the editor by ASPP member C. S. Prakash of Tuskegee University was also cited by in his statement. The statement can be found at <http://thomas.loc.gov/cgi-bin/query/z?r106:S26JA0-93>.

The leading work of Senator Bond in support of plant research, including research using biotechnology, is providing important information to the Senate at a time when anti-biotech interests are seeking legislative and other restrictions on biotech products.

Following are major portions of Bond's statement:

THE BENEFITS AND POLITICS OF BIOTECHNOLOGY (Senate - January 26, 2000)

As we move into this next century, we face a great opportunity and great challenge. We need only to look backward to help contemplate the immense change and innovation that is in front of us. While positive change is to the long-term benefit of all, it typically results in short-term difficulties, anxiety, and fear for some. How we cope with those difficulties defines our vision and tests our courage. In the last century, we saw the industrial age and the computer age. We experienced fits of fear regarding everything from aviation, penicillin, industrialization, computerization, and, most recently, the noncalamity, fortunately, known as Y2K.

Remarkably, plant technology in this half-century has helped make it possible for the U.S. farmer, who in 1940 fed 19 people, to

feed 129 today. Meanwhile, worldwide, population grows and farmland shrinks; policymakers, farmers, doctors, business leaders, scientists, and others look ahead and search for critical tools to meet the increasing demands of a growing and changing world.

Nobel Prize-winning chemist Robert F. Curl of Rice University said that "it is clear that the 21st will be the century of biology." Scientists, medical doctors, government officials, farmers, and others have testified before the Congress and elsewhere to the benefits of this new generation of technology, which may offer the sustainable production of safer and more abundant food sources, new vaccines and medicines, as well as biodegradable plastics and cleaner energy alternatives.

Senator Mack hosted a hearing of the Joint Economic Committee in September

entitled "Putting a Human Face on Biotechnology," where Tour de France winner Lance Armstrong testified about his personal experience using biotechnology and will to overcome cancer. Senators Lugar and Harkin held two days of hearings in October with a diverse number of distinguished witnesses [Editorial note: eight ASPP members testified at these Senate Agriculture Committee hearings] to discuss the science and regulation of biotechnology.

Bipartisan members, including Senators Kerry, Durbin, Hagel, Craig, Frist, Conrad, Lugar, Gorton, Grassley, Ashcroft, Robb, Burns, Grams, Gordon Smith, Baucus, Helms, Hutchison, Roberts, Bayh, Brownback, Crapo, and Coverdell, have joined me in expressing to the president our bipartisan commitment to biotechnology. We urge the administration and the State Department to be firm in their negotiations in Montreal, to say that the phytosanitary agreements are adequate in all we need to regulate biotechnology.

As chairman of the Senate Appropriations Subcommittee that funds public research activities at the National Science Foundation, I have worked with my partner, Senator Mikulski, to win congressional approval of \$150 million in the past three years for the plant genome initiative at the National Science Foundation to study the structure, organization, and function of genomes of significant plants important to improving human health and the environment.

Recently, I received a letter signed by more than 500 scientists revealing the exceptionally strong scientific consensus endorsing biotechnology. [Editorial note: Some 100 ASPP members were among the scientists signing the letter to Senator Bond.] These are public- and private-sector scientists; the majority of whom are from academic institutions representing nearly every state, a number of foreign countries, the National Academy of Sciences, private foundations, federal research agencies, and our national labs. Here is some of what they told me about biotechnology:

The ultimate beneficiaries of technological innovation have always been consumers, both in the United States and abroad. In developing countries, biotechnological advances will provide means to overcome vitamin deficiencies, to supply vaccines for killer diseases like cholera and malaria, to increase production and protect fragile natural resources, and to grow crops under normally unfavorable conditions.

Millions of people have eaten the products of genetic engineering and no adverse effects have been demonstrated. The proper balance of safety testing between companies and the government is a legitimate area for further

debate. So are environmental safeguards. But the purpose of such debate should be to improve biotech research and enhance its benefits to society, not stop it in its tracks. . . .

In an op-ed in the *New York Times* entitled "Who's Afraid of Genetic Engineers?" former President Jimmy Carter outlined the sad irony. He [asked readers to] imagine a country placing such rigid restrictions on imports that people would not get vaccines and insulin. And imagine those same restrictions being placed on food products as well as on laundry detergent and paper. As far-fetched as it sounds, many developing countries and some industrialized ones may do just that. He concluded that if imports are regulated unnecessarily, the real losers will be the developing nations. Instead of reaping the benefits of decades of discovery and research, people from Africa and Southeast Asia will remain prisoners of outdated technology. Their countries could suffer greatly for years to come. It is crucial that they reject the propaganda of extremists groups before it is too late.

Renowned scientists have dedicated their lives to understanding biotechnology and using it to the benefit of mankind to solve problems of hunger, disease, and environmental degradation. These problems are considerable now, but will grow in magnitudes in the years ahead. In the tabloid press, however, a teenager dressed up as a corn cob will get as much attention and is attributed the same credibility as leading scientists, whose work is subjected to rigorous peer review.

We need to be clear about several issues. First, our government and its citizens are second to none in our collective commitment to food safety. We have a rigorous multiagency approval process that has stood the test of time since 1938. It is based not on politics but on scientific consensus. It is supported by bipartisan members of each body who have the strongest commitment to food safety and environmental protection. None of us is an advocate for unfettered technology. As with any technology, there are limits that will be and must be subjected to law, not to mention common sense.

Second, we need to realize that there are strong elements in the EU who are more than happy to exploit fears—fears that they helped create—to provide short-term protection to their farmers from imports. In a sentence, fear and hysteria, without scientific basis, are being used by some to limit the productivity of foreign farmers—period . . .

Finally, let me emphasize this critical point. The issue of risk is not one-dimensional. Yes, we must understand and evaluate the relative risk to a monarch butterfly

larvae. Additional research already has answered many such questions. But there is another risk. That risk is that naysayers and the protectionists succeed in their goals to kill biotechnology and condemn the world's children to unnecessary blindness, malnutrition, sickness, and environmental degradation.

Dr. C. S. Prakash, who directs the Center for Plant Biotechnology Research at Tuskegee University in Tuskegee, Alabama, said the following in a column for the *Atlanta Journal-Constitution*: Antitechnology activists accuse corporations of "playing God" by genetically improving crops, but it is these so-called environmentalists who are really playing God, not with genes but with the lives of poor and hungry people.

While activist organizations spend hundreds of thousands of dollars to promote fear through antiscience newspaper ads, 1.3 billion people who live on less than \$1 a day care only about finding their next day's meal. Biotechnology is one of the best hopes for solving their food needs today, when we have 6 billion people, and certainly in the next 30 to 50 years, when there will be 9 billion.

Those people, who battle weather, pests, and plant disease to try to raise enough for their families, can benefit tremendously from biotechnology, and not just from products created by big corporations. Public-sector institutions are conducting work on high-yield rice, virus-resistant sweet potato and more healthful strains of cassava, crops that are staples in developing countries.

The development of local and regional agriculture is the key to addressing both hunger and low income. Genetically improved food is "scale neutral," in that a poor rice farmer with one acre in Bangladesh can benefit as much as a larger farmer in California. And he doesn't have to learn a sophisticated new system; he only has to plant a seed. New rice strains being developed through biotechnology can increase yields by 30 to 40 percent. Another rice strain has the potential to prevent blindness in millions of children whose diets are deficient in vitamin A.

Edible vaccines, delivered in locally grown crops, could do more to eliminate disease than the Red Cross, missionaries, and U.N. task forces combined, at a fraction of the cost. But none of these benefits will be realized if Western-generated fears about biotechnology halt research funding and close borders to exported products. For the well-fed to spearhead fear-based campaigns and suppress research for ideological and pseudoscience reasons is irresponsible and immoral.

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Dr. Prakash just released a petition signed by more than 600 scientists declaring support of agricultural biotechnology. In his press release he noted, "We in the scientific community felt it necessary to counteract the baseless attacks so often being made on biotechnology and genetically modified foods. Biotechnology is a potent and valuable tool that can help make foods more productive and nutritious. And, contrary to anti-biotech activists, they can even advance environmental goals such as biodiversity."

Not content to live with their own brand of Ludditism, European activists have shifted the battleground, and they are now looking to export not answers or solutions or constructive proposals, but fear, hysteria, and unworkable restrictions to Asia, South America, and even the United States. Many have stayed out of this debate, thinking the controversy will blow over as it does with most regulated technologies. Many, particularly those who understand the science of the issue, have been silent, thinking possibly that people would understand and that the technology would sell itself.

I have said from the beginning that we could not take for granted that people would embrace the technology because it is complex. I have said from the beginning that American consumers would want information. Consumers who know the facts—who know the benefits this technology will provide—will endorse it. American consumers demand food safety, but they also embrace technology and progress. They are not satisfied to say that what we are doing is good enough. And finally, they want to base their decisions on science, not fiction, and it is the open discussion of facts that the vandals, the protectionists, and the Luddites fear the most.

President Clinton outlined what is at stake last week in proclaiming January 2000 as National Biotechnology Month.

Today, a third of all new medicines in development are based on biotechnology.

Designed to attack the underlying cause of an illness, not just its symptoms, these medicines have tremendous potential to provide not only more effective treatments, but also cures. With improved understanding of cellular and genetic processes, scientists have opened exciting new avenues of research into treatments for devastating diseases—like Parkinson's and Alzheimer's, diabetes, heart disease, AIDS, and cancer—that affect millions of Americans. Biotechnology has also given us several new vaccines, including one for rotavirus, now being tested clinically, that could eradicate an illness responsible for the deaths of more than 800,000 infants and children each year.

The impact of biotechnology is far-reaching. Bioremediation technologies are cleaning our environment by removing toxic substances from contaminated soils and groundwater. Agricultural biotechnology reduces our dependence on pesticides. Manufacturing processes based on biotechnology make it possible to produce paper and chemicals with less energy, less pollution, and less waste. Forensic technologies based on our growing knowledge of DNA help us exonerate the innocent and bring criminals to justice.

A question is whether we want to continue with a fixed number of agricultural uses or whether we want to expand them to provide farmers and consumers new options and new opportunities. A question for some is whether we want to be more pro-environment and pro-health and nutrition than we are anti-corporate.

Like many of my colleagues here in the Senate, I have consulted scores of scientists in the academic world, in the public sector, and in the private sector. I have consulted medical professionals and farmers for their practical experience regarding biotechnology. But let me finish by reading you a quote from a December 25, 1999, interview in *New Scientist*, and you consider for yourself who might be the source:

"I believe we are entering an era now where pagan beliefs and junk science are

influencing public policy. GM foods and forestry are both good examples where policy is being influenced by arguments that have no basis in fact or logic." The source is not a corporate leader, a senator, or a university scientist. It is an ecologist with a Ph.D. That ecologist is Patrick Moore, one of the founding members of Greenpeace and a veteran of the frontline against everything from whaling to nuclear waste since the 1970s.

The scientific consensus among government and academic scientists in the United States is extraordinary. The scientific community in Europe, some of whom I have met with, agree but have been intimidated and silenced. Please give the scientific and medical communities the opportunity to speak to these complex issues before you are swayed by the tabloids in Europe, those who may have their head buried in the flat earth, and the vandals and extremists who have been condemned even by some of their very own.

We have a system in the United States to identify and evaluate relative risk, and, if necessary, mitigate those risks. The focus of international leaders should be on working constructively to identify and evaluate relative risk so that our people may have the options of biotechnology safely available to them. The development of this technology is not recreational. It is to solve real world problems, and the possibilities are truly breathtaking. There is too much at stake for those who know better to remain passive.

In 1921, Missouri's renowned plant scientist, George Washington Carver, said, "I wanted to know the name of every stone and flower and insect and bird and beast. I wanted to know where it got its color, where it got its life—but there was no one to tell me." He added that "No individual has any right to come into the world and go out of it without leaving behind him distinct and legitimate reasons for having passed through it." This issue will be a test of our collective vision, discipline, and courage. ♻

Important Dates in 2000

Award nominations close: April 3

Northeast Section meeting—University of Connecticut: April 7–8

Washington, DC, Section meeting—Arboretum, Washington, DC: May 9

Plant Biology 2000—Early-bird registration cutoff: May 15

Plant Biology 2000—Housing registration cutoff: June 9

Plant Biology 2000—San Diego, California: July 15–19

Western Section meeting—Lake Tahoe, California: November 3–5

FDA Commissioner Answers Questions on Genetically Modified Foods

The commissioner of the U.S. Food and Drug Administration, Jane Henney, answers some of the more frequently asked questions on genetically modified foods in the following article. Her use of simple, easy-to-understand terms to answer questions on plant science issues may be helpful for those who discuss this topic with friends, neighbors, and family. See http://www.fda.gov/fdac/features/2000/100_bio.html.

FDA Consumer magazine
January–February 2000

Are Bioengineered Foods Safe? by Larry Thompson

Since 1994, a growing number of foods developed using the tools of the science of biotechnology have come onto both the domestic and international markets. With these products has come controversy, primarily in Europe where there is some question whether these foods are as safe as foods that have been developed using the more conventional approach of hybridization.

Ever since the latter part of the 19th century, when Gregor Mendel discovered that characteristics in pea plants could be inherited, scientists have been improving plants by changing their genetic makeup. Typically, this was done through hybridization in which two related plants were cross-fertilized, and the resulting offspring had characteristics of both parent plants. Breeders then selected and reproduced the offspring that had the desired traits.

Today, to change a plant's traits, scientists are able to use the tools of modern biotechnology to insert a single gene—or, often, two or three genes—into the crop to give it new, advantageous characteristics. Most genetic modifications make it easier to grow the crop. About half of the American soybean crop planted in 1999, for example, carries a gene that makes it resistant to an herbicide used to control weeds. About a quarter of U.S. corn planted in 1999 contains a gene that produces a protein toxic to certain caterpillars, eliminating the need for certain conventional pesticides.

In 1992, the Food and Drug Administration (FDA) published a policy explaining how existing legal requirements for food safety apply to products developed using the tools of biotechnology. It is the agency's responsibility to ensure the safety of all foods on the market that come from crops, including bioengineered plants, through a science-based decision-making process. This process

often includes public comment from consumers, outside experts, and industry. The FDA established, in 1994, a consultation process that helps ensure that foods developed using biotechnology methods meet the applicable safety standards. During the past five years, companies have used the consultation process more than 40 times as they moved to introduce genetically altered plants into the U.S. market.

Although the agency has no evidence that the policy and procedure do not adequately protect the public health, there have been concerns voiced regarding FDA's policy on these foods. To understand the agency's role in ensuring the safety of these products, *FDA Consumer* sat down with Commissioner Jane E. Henney, M.D., to discuss the issues raised by bioengineered foods.

FDA Consumer: Dr. Henney, what does it mean to say that a food crop is bioengineered?

Dr. Henney: When most people talk about bioengineered foods, they are referring to crops produced by utilizing the modern techniques of biotechnology. But really, if you think about it, all crops have been genetically modified through traditional plant breeding for more than a hundred years.

Since Mendel, plant breeders have modified the genetic material of crops by selecting plants that arise through natural or, sometimes, induced changes. Gardeners and farmers and, at times, industrial plant breeders have crossbred plants with the intention of creating a prettier flower, a hardier or more productive crop. These conventional techniques are often imprecise because they shuffle thousands of genes in the offspring, causing them to have some of the characteristics of each parent plant. Gardeners or breeders then look for the plants with the most desirable new trait.

With the tools developed from biotechnology, a gene can be inserted into a plant to give it a specific new characteristic instead of mixing all of the genes from two plants and seeing what comes out. Once in the plant, the new gene does what all genes do: it directs the production of a specific protein that makes the plant uniquely different.

This technology provides much more control over, and precision to, what characteristic breeders give to a new plant. It also allows the changes to be made much faster than ever before.

No matter how a new crop is created—using traditional methods or biotechnology

tools—breeders are required by our colleagues at the U.S. Department of Agriculture to conduct field testing for several seasons to make sure only desirable changes have been made. They must check to make sure the plant looks right, grows right, and produces food that tastes right. They also must perform analytical tests to see whether the levels of nutrients have changed and whether the food is still safe to eat.

As we have evaluated the results of the seeds or crops created using biotechnology techniques, we have seen no evidence that the bioengineered foods now on the market pose any human health concerns or that they are in any way less safe than crops produced through traditional breeding.

FDA Consumer: What kinds of genes do plant breeders try to put in crop plants?

Dr. Henney: Plant researchers look for genes that will benefit the farmer, the food processor, or the consumer. So far, most of the changes have helped the farmer. For example, scientists have inserted into corn a gene from the bacterium *Bacillus thuringiensis*, usually referred to as BT. The gene makes a protein lethal to certain caterpillars that destroy corn plants. This form of insect control has two advantages: it reduces the need for chemical pesticides, and the BT protein, which is present in the plant in very low concentrations, has no effect on humans.

Another common strategy is inserting a gene that makes the plant resistant to a particular herbicide. The herbicide normally poisons an enzyme essential for plant survival. Other forms of this normal plant enzyme have been identified that are unaffected by the herbicide. Putting the gene for this resistant form of the enzyme into the plant protects it from the herbicide. That allows farmers to treat a field with the herbicide to kill the weeds without harming the crop.

The new form of the enzyme poses no food safety issues because it is virtually identical to nontoxic enzymes naturally present in the plant. In addition, the resistant enzyme is present at very low levels, and it is as easily digested as a normal plant enzyme.

Modifications have also been made to canola and soybean plants to produce oils with a different fatty acid composition so they can be used in new food processing systems. Researchers are working diligently to develop crops with enhanced nutritional properties.

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FDA Consumer: Do the new genes, or the proteins they make, have any effect on the people eating them?

Dr. Henney: No, it doesn't appear so. All of the proteins that have been placed in foods through the tools of biotechnology and that are on the market are nontoxic and rapidly digestible and do not have the characteristics of proteins known to cause allergies.

As for the genes, the chemical that encodes genetic information is called DNA. DNA is present in all foods, and its ingestion is not associated with human illness. Some have noted that sticking a new piece of DNA into the plant's chromosome can disrupt the function of other genes, crippling the plant's growth or altering the level of nutrients or toxins. These kinds of effects can happen with any type of plant breeding—traditional or biotech. That's why breeders do extensive field testing. If the plant looks normal and grows normally, if the food tastes right and has the expected levels of nutrients and toxins, and if the new protein put into food has been shown to be safe, then there are no safety issues.

FDA Consumer: You mentioned allergies. Certain proteins can cause allergies, and the genes being put in these plants may carry the code for new proteins not normally consumed in the diet. Can these foods cause allergic reactions because of the genetic modifications?

Dr. Henney: I understand why people are concerned about food allergies. If one is allergic to a food, it needs to be rigorously avoided. Further, we don't want to create new allergy problems with food developed from either traditional or biotech means. It is important to know that bioengineering does not make a food inherently different from conventionally produced food. And the technology doesn't make the food more likely to cause allergies.

Fortunately, we know a lot about the foods that do trigger allergic reactions. About 90 percent of all food allergies in the United States are caused by cow's milk, eggs, fish and shellfish, tree nuts, wheat, and legumes, especially peanuts and soybeans.

To be cautious, the FDA has specifically focused on allergy issues. Under the law and the FDA's biotech food policy, companies must tell consumers on the food label when a product includes a gene from one of the common allergy-causing foods, unless it can show that the protein produced by the added gene does not make the food cause allergies.

We recommend that companies analyze the proteins they introduce to see whether these proteins possess properties indicating that the proteins might be allergens. So far,

none of the new proteins in foods evaluated through the FDA consultation process have caused allergies. Because proteins resulting from biotechnology and now on the market are sensitive to heat, acid, and enzymatic digestion; are present at very low levels in the food; and do not have structural similarities to known allergens, we have no scientific evidence to indicate that any of the new proteins introduced into food by biotechnology will cause allergies.

FDA Consumer: Let me ask you one more scientific question. I understand that it is common for scientists to use antibiotic resistance marker genes in the process of bioengineering. Are you concerned that their use in food crops will lead to an increase in antibiotic resistance in germs that infect people?

Dr. Henney: Antibiotic resistance is a serious public health issue, but that problem is currently and primarily caused by the overuse or misuse of antibiotics. We have carefully considered whether the use of antibiotic resistance marker genes in crops could pose a public health concern and have found no evidence that it does.

I'm confident of this for several reasons. First, there is little if any transfer of genes from plants to bacteria. Bacteria pick up resistance genes from other bacteria, and they do it easily and often. The potential risk of transfer from plants to bacteria is substantially less than the risk of normal transfer between bacteria. Nevertheless, to be on the safe side, the FDA has advised food developers to avoid using marker genes that encode resistance to clinically important antibiotics.

FDA Consumer: You've mentioned the FDA's consultative process a couple of times. Could you explain how genetically engineered foods are regulated in the United States?

Dr. Henney: Bioengineered foods actually are regulated by three federal agencies: the FDA, the Environmental Protection Agency (EPA), and the U.S. Department of Agriculture (USDA). The FDA is responsible for the safety and labeling of all foods and animal feeds derived from crops, including biotech plants. The EPA regulates pesticides, so the BT used to keep caterpillars from eating the corn would fall under its jurisdiction. The USDA's Animal and Plant Health Inspection Service oversees the agricultural environmental safety of planting and field testing genetically engineered plants.

Let me talk about the FDA's role. Under the federal Food, Drug, and Cosmetic Act, companies have a legal obligation to ensure that any food they sell meets the safety standards of the law. This applies equally to conventional food and bioengineered food. If a food does not meet the safety standard, the

FDA has the authority to take it off the market.

In the specific case of foods developed utilizing the tools of biotechnology, the FDA set up a consultation process to help companies meet the requirements. Whereas consultation is voluntary, the legal requirements that the foods have to meet are not. To the best of our knowledge, all bioengineered foods on the market have gone through the FDA's process before they have been marketed.

Here's how it works. Companies send us documents summarizing the information and data that they have generated to demonstrate that a bioengineered food is as safe as the conventional food. The documents describe the genes they used: whether they are from a commonly allergenic plant, the characteristics of the proteins made by the genes, their biological function, and how much of them will be found in the food. They tell us whether the new food contains the expected levels of nutrients or toxins and any other information about the safety and use of the product.

FDA scientists review the information and generally raise questions. It takes several months to complete the consultation, which is why companies usually start a dialog with the agency scientists nearly a year or more before they submit the data. At the conclusion of the consultation, if we are satisfied with what we have learned about the food, we provide the company with a letter stating that they have completed the consultation process and we have no further questions at that time.

FDA Consumer: Because genes are being added to the plant, should the FDA review biotech products under the same food additive regulations that it reviews food colors and preservatives?

Dr. Henney: The food additive provision of the law ensures that a substance with an unknown safety profile is not added to food without the manufacturer proving to the government that the additive is safe. This intense review, however, is not required under the law when a substance is generally recognized as safe (GRAS) by qualified experts. A substance's safety can be established by long history of use in food or when the nature of the substance and the information generally available to scientists about it is such that it doesn't raise significant safety issues.

In the case of bioengineered foods, we are talking about adding some DNA to the plant that directs the production of a specific protein. DNA already is present in all foods and is presumed to be GRAS. As I described before, adding an extra bit of DNA does not raise any food safety issues.

As for the resulting proteins, they too are generally digested and metabolized and do

not raise the kinds of food safety issues as those that are raised by novel chemicals in the diet. The proteins introduced into plants thus far either have been pesticides or enzymes. The pesticide proteins, such as BT, would actually be regulated by the EPA and go through its approval process before going on the market. The enzymes have been considered to be GRAS, so they have not gone through the food additive petition process. The FDA's consultation process aids companies in determining whether the protein they want to add to a food is generally recognized as safe. If FDA has concerns about the safety of the food, the product would have to go through the full food additive premarket approval process.

FDA Consumer: Should the FDA require companies to tell consumers on the label that a food is bioengineered?

Dr. Henney: Traditional and bioengineered foods are all subject to the same labeling requirements. All labeling for a food product must be truthful and not misleading. If a bioengineered food is significantly different from its conventional counterpart—if the nutritional value changes or it causes allergies—it must be labeled to indicate that

difference. For example, genetic modifications in varieties of soybeans and canola changed the fatty acid composition in the oils of those plants. Foods using those oils must be labeled, including using a new standard name that indicates the bioengineered oil's difference from conventional soy and canola oils. If a food had a new allergy-causing protein introduced into it, the label would have to state that it contained the allergen.

We are not aware of any information that foods developed through genetic engineering differ as a class in quality, safety, or any other attribute from foods developed through conventional means. That is why there has been no requirement to add a special label saying that they are bioengineered. Companies are free to include in the labeling of a bioengineered product any statement as long as the labeling is truthful and not misleading. Obviously, a label that implies that a food is better than another because it was, or was not, bioengineered would be misleading.

FDA Consumer: Overall, are you satisfied that the FDA's current system for regulating bioengineered foods is protecting the public health?

Dr. Henney: Yes, I am convinced that the health of the American public is well protected by the current laws and procedures. I also recognize that this is a rapidly changing field, so the FDA must stay on top of the science as biotechnology evolves and is used to make new kinds of modifications to foods. In addition, the agency is seeking public input about our policies and will continue to reach out to the public to help consumers understand the scientific issues and the agency's policies.

Not only must the food that Americans eat be safe, but consumers must have confidence in its safety, and confidence in the government's role in ensuring that safety. Policies that are grounded in science, that are developed through open and transparent processes, and that are implemented rigorously and communicated effectively are what have assured the consumers' confidence in an agency that has served this nation for nearly a hundred years.

Larry Thompson is a member of the FDA's public affairs staff. ☞

Arson at MSU Agricultural Biotech Office Linked to Eco Terrorism

The Associated Press (AP) reported that a fax sent by a radical U.S. environmental group claims the group's responsibility for arson at the agriculture building at Michigan State University (MSU) and mentions the university's presumed association with the Monsanto Company.

The Earth Liberation Front claimed by fax sent to AP in Detroit and local papers that it was responsible for the fire in the school's Agriculture Hall New Year's Eve, which caused \$400,000 worth of damage, AP reported.

The fax mentioned Catherine Ives, the director of MSU's Agricultural Biotechnology Support Project, whose office was among those damaged. The group claimed that Ms. Ives directed a program funded by Monsanto and the U.S. Agency for International Development that sought to get developing nations to drop their current agricultural practices and rely on genetically engineered plants, AP reported.

Monsanto is listed as a partner on the project's Web site, and company officials said they gave the university \$2,000 recently to

send five African students to a conference on biotechnology, but Ms. Ives says that is as far as the relationship goes.

Ms. Ives said she lost many books, papers, and lectures in the fire.

"This was an attack on me," she said. "It was personal. I was named. It was a violation. I'm afraid. My family is afraid."

Local law enforcement officials, the U.S. Bureau of Alcohol, Tobacco and Firearms, and the Federal Bureau of Investigation continue to investigate, with all questions being referred to the university.

The Earth Liberation Front also claimed to have set a \$12 million fire at a Vail, Colorado, ski facility in 1998, released minks from a Michigan mink farm in 1998, and torched the corporate headquarters of a timber company last year in Oregon.

Ms. Ives says her project studies ways to keep biotechnology public and accessible to developing nations. Biotechnology, she argued, could help stop a coming food shortage that could turn the world's last remaining forests into farm fields. ☞

Plant Scientists Eligible for NSF Grants for Research Coordination Networks

The NSF Directorate for Biological Sciences announces plans to support research coordination networks designed to foster communication and promote collaboration among scientists with common interests from a broad background across disciplinary, geographic, and organizational boundaries. The ultimate objective is to move a field forward or to create new research directions through increased research coordination and networking. It is anticipated that this program will contribute to further advances in all areas of biological sciences supported by the National Science Foundation. The program announcement can be found at <http://www.nsf.gov/pubs/2000/nsf0056/nsf0056.htm/>.

This program is patterned after a successful three-agency (DOE, USDA, and NSF) program in plant biology called "Multi-Institutional Research Coordination Group Awards."

We appreciate receiving information on the program announcement from Dr. Machi Dilworth, director of the Biological Infrastructure Division of the NSF Directorate for Biological Sciences. ☞

Finding of Switch for Hydrogen Production Reported by *San Francisco Chronicle*

The *San Francisco Chronicle*, Science section, Saturday, January 29, 2000, reported that plant scientists have found a metabolic switch in algae that allows the primitive plants to produce hydrogen gas—a discovery that could ultimately result in a vast source of cheap, pollution-free fuel.

Hydrogen, which can be used as a clean-burning fuel in cars and power plants, is virtually limitless in availability, because it is part of the water molecule, the article noted. It is a candidate to become the world's primary fuel in coming decades. But until now, it was obtainable in quantity only through relatively expensive extraction procedures involving the electrolysis of water or processing of natural gas, the article said.

The breakthrough, by scientists at the University of California, Berkeley, and the U.S. Department of Energy (DOE), would make possible the commercial production of hydrogen gas by photosynthesis in tanks, ponds, or the open ocean, the *Chronicle* reported.

"I guess it's the equivalent of striking oil," said Tasios Melis, a microbial biology professor at UC Berkeley. "It was enormously exciting. It was unbelievable," the newspaper quoted Melis as saying.

Melis made the discovery with UC Berkeley researcher Liping Zhang and with Michael Seibert, Maria Ghiardi, and Marc Forestier of the National Renewable Energy Laboratory, a DOE project in Golden, Colorado.

The team's findings appear in January's issue of *Plant Physiology*, one of ASPP's

science journals, the *Chronicle* said.

The newspaper reported that Seibert said it has been known for decades that algae give off small amounts of hydrogen. The problem from a commercial perspective, he said, was hydrogenase, an enzyme that produces hydrogen but does so only in the absence of oxygen.

All green photosynthetic plants—including algae—consume carbon dioxide in the presence of light to build tissue, respiring oxygen as a waste product. "But because hydrogenase shuts down in the presence of oxygen, it doesn't function during photosynthesis," he said. "It basically only works during darkness, when photosynthesis isn't occurring."

Because plant functions are at low ebb during darkness, Seibert said, the amount of hydrogen produced is minimal. But the team was able to solve the problem by imposing a "nutrient stress" to the algae. "First we grow out the algae, 'fatten' it under normal photosynthetic conditions, . . . then we withhold sulfur."

Sulfur is critical for the completion of normal photosynthesis. In the absence of the element, the algae ceased emitting oxygen and stopped storing energy as carbohydrates, protein, and fats, the article noted. Instead, the algal cells began using "an alternative metabolic pathway" to exploit stored energy reserves anaerobically (in the absence of oxygen). The hydrogenase was activated, splitting large amounts of hydrogen gas from water and releasing it as a by-product.

"The significant thing is that the plant is using the energy of the sunlight to produce hydrogen, not oxygen," said Melis. "Without sulfur, it produces a great deal more hydrogen in the presence of light than it does under normal circumstances in the dark," the *Chronicle* reported.

The algae ultimately would die if the nutrient stress were maintained for more than a few days, but they can be "fattened" again with sulfur and sunlight, allowing for repetitions of the process and continued harvesting of hydrogen gas.

Eventually, the process could be used for the production of huge quantities of hydrogen, the newspaper article said. Hydrogen burns clean and hot, and it constitutes one-third of the water found in the earth's oceans, rivers, lakes, and atmosphere.

Cars already have been developed that run on hydrogen-powered devices known as fuel cells, the article noted. These vehicles are virtually pollution free; the only substance emitted from the tailpipe is water vapor. They do not release carbon dioxide or other heat-trapping gases, which are widely considered the primary culprits in global warming.

"Our long-term goal is to develop strains of algae that we would grow in mass cultures to produce enormous quantities of hydrogen gas," said Melis. "But at this point, we have to improve the production performance." ☛

Plant Gene Register Discontinued

Plant Physiology announced in its December 1999 issue that it will discontinue the publication of the Plant Gene Register (PGR) in 2000. At its winter meeting held January 22, 2000, at ASPP headquarters, the Publications Committee discussed whether the PGR should be continued under the auspices of ASPP and made a motion to the Executive Committee to discontinue the PGR altogether. The Executive Committee voted to approve the Publications Committee's motion at its winter meeting on February 12, 2000.

Plant Physiology started the Plant Gene Register to provide plant scientists with an outlet for their short gene sequencing papers. After gene sequencing became routine, *Plant Physiology* stopped printing

the short papers and published them electronically while continuing to print the titles in the journal to provide nonelectronic citation references for the papers. As of May 2000, *Plant Physiology* will no longer print the titles.

The Publications Committee's motion to discontinue the PGR as a standalone electronic publication was based on a discussion of current approaches to genome analysis. In a time when the number of public plant gene sequences has greatly increased and submissions to the PGR have been decreasing, the committee concluded the PGR is filling only a marginal niche. Gene annotation strategies are changing rapidly, and the committee agreed that annotation is a research issue best left for

the bioinformatics and plant genome database community. ☛



Nitrogen, Nutrition, and a Fertile Future

On February 7, 2000, as part of the Distinguished Leaders in Science program organized by the National Academy of Sciences (NAS) in Washington, DC, Professor Sharon R. Long presented "Life in the Underground: Symbiosis, Phytochemicals, and Agriculture." The talk was simultaneously taped by NAS for educational purposes in public schools.

Professor Long is associate editor of THE PLANT CELL and has been an ASPP member since 1974. As professor of biological sciences at Stanford University and adjunct professor of biochemistry at Stanford University School of Medicine, she is interested in the chemical signals that control cell fate and gene expression. She has pioneered the study of the mechanism by which bacteria of the genus *Rhizobium* infect legume plants to establish a nitrogen-fixing symbiosis on root nodules. The association is usually species-specific, although bacteria may have more than one host. Generally, the presentation of an organism with the "wrong" potential symbiont, or even a mutant of the correct symbiont, will fail to elicit a successful interaction. How do the partners communicate with each other so exclusively?

Prior to infection, legumes produce a flavonoid, for example, luteolin by alfalfa, which disperses for a short distance through the soil and acts as a transcriptional coeffector in nearby bacteria. The bacteria respond by expressing *nod* genes, the product of which is a specific "nodulation factor" signal. Reception of this nodulation factor by the legume in turn results in profound changes in root architecture and growth. The infection process is completed by the formation of root nodules packed with beneficial bacteria.

Knowledge of these signals can be used to manage symbioses more effectively. For example, Long cited work of Phillips and colleagues at UC Davis who analyzed the flavonoid content of many naturally occurring varieties of alfalfa as part of their study on optimizing field effectiveness. In addition, investigations of symbiosis are likely to yield valuable information on the process's flip side, pathogenesis, because of the bacterial symbiont's ability to somehow evade or switch off the plant's normal defense mechanisms. Together with laboratories in Texas and in France, Long and her colleagues are using genetics to analyze early steps in signal transduction



Sharon Long

during *Rhizobium*-plant signaling, particularly the role of calcium, which may in turn yield new insights into mechanisms of plant development.

The free NAS Speaker Series lectures continue until May 2000 and are open to the public. For additional information, please contact www.national-academies.org, or call the Conference, Education & Training Office at 301-610-5959. ☛

2000 Awards Committees

Following is a list of the membership of the ASPP awards committees for 2000, as announced by President Debby Delmer. All awards committees now have five members. In previous years, awards committees had only four members. Members of awards committees serve for three award cycles unless otherwise noted.

CORRESPONDING MEMBERSHIP (4-YEAR TERMS)

N. Baker (00), chair
L. Griffing (01)
R. Chollet (02)
C. Haigler (03)
J. Zeevaart (03)

CHARLES REID BARNES LIFE MEMBERSHIP

K. Cline (00), chair
R. Bressan (01)
T. Hodges (02)
A. Bleecker (02)
H. Beevers, past winner (00)

STEPHEN HALES PRIZE

C. West (01), chair
M. Walker-Simmons (03)
G. Gardner (04)
J. Chory (04)
H. Kende (00), past winner

CHARLES F. KETTERING AWARD

D. Bryant (01), chair
S. Theg (03)
A. Portis (04)
C. Foyer (04)
B. Buchanan (00), past winner

CHARLES ALBERT SHULL AWARD

W. Silk (00), chair
J. Whitmarsh (02)
J. Mullet (04)
J. Dangl (05)
S. Merchant (01), past winner

MARTIN GIBBS MEDAL

K. Keegstra (00), chair
H. Sze (02)

S. Wessler (04)
I. Raskin (05)
S. Tanksley (01), past winner

ADOLPH E. GUDE, JR. AWARD

M. Evans (00), chair
H. Grimes (03)
D. Delmer (06)
A. Hanson (07)
M. Dillworth (01), past winner

DENNIS R. HOAGLAND AWARD

L. Rappaport (03), chair
T. Sharkey (05)
D. McCarty (06)
N. Nielsen (06)
B. Larkins (00), past winner

EXCELLENCE IN TEACHING AWARD

M. Brodl (02), chair
J. Cheeseman (05)
A. Klein (06)
D. Cannington (06)
C. Reiss (01), past winner



Compiled and edited by Carol Reiss, Division of Biomed—Box G-J4, Brown University, Providence, RI 02912, e-mail hcr@brown.edu

Teaching Undergraduates to Do Research

Imagine that you are located at a relatively small, primarily undergraduate college and, during the spring semester, you share the teaching of a single upper-level biology course with an enrollment of about 15 undergraduates. Sound like heaven at a PUI? Hold on. The course is a 15-credit total immersion in undergraduate research and meets Monday through Friday from 9 am to 5 pm (or later) in your research lab.

Peter Conrad and Janice Marchut Conrad teach just such a course at SUNY Plattsburgh each spring. Bio 490, which covers aspects of cellular and molecular biology, has been running in its present form since spring 1996. The course is open to all science students regardless of major. The students learn the skills, techniques, and instrumentation required for the semester's research and are expected to develop and complete a research project during the semester. Finally, students are required to present a poster at their regional ASPP meeting. The Conrads teach that success in research requires the ability to ask the right questions and recognize that important information can be obtained through experimentation. Their program embraces the essence of scientific method and fosters the acquisition and application of knowledge to problem solving, hypothesis formation and testing, and the collection and analysis of data obtained by observation and experimentation.

The course has focused on the Conrads' research interest (*Chlamydomonas*), but an additional exciting aspect of the course has been the participation of visiting scientists. Each year, the Conrads invite several outside scientists to spend several days in their research and teaching lab. This participation gives the students first-hand interaction with research scientists and their approaches to problem solving. The Conrads' impressive list of past visitors includes Karen Kindel (Cornell University), Randy Wayne (Cornell University), David Higgs (Boyce Thompson Institute), Sam Beale (Brown University), the late Richard Crain (University of Connecticut), Lynn Quarmby (Emory University), Susan Dutcher (University of Colorado), Howard Anderson (the National Institutes of

Health), Philip Reid (Smith College), Kenneth Foster (Syracuse University), and Irwin Dutch (MVI-Nikon microscopes). With the guidance of these outside advisers and their in-house teachers, the students formulate a research problem and attack the problem in the laboratory.

The results of the students' work are presented as posters at regional ASPP (Northeast Section; NEASPP) meetings. The classes from 1996 to 1999 have presented at NEASPP meetings held at Plattsburgh State University, Cornell University, the University of Massachusetts at Amherst, and the University of New Hampshire. The Conrads say that their students exhibit about five posters a year, but this author remembers vividly that the poster sessions at the Plattsburgh meeting were dominated by posters on *Chlamydomonas* from Bio 490 students (many bearing Karen Kindel's name as well).

Bio 490 offers students the chance to immerse themselves in original research in cell biology, because the students take no other courses during that semester. According to several interviews published in *Plattsburgh Magazine*, the students considered that their time in the Conrads' laboratory was an essential part of their undergraduate career. One former student, Lorraine Toner ('99), is now employed as a research assistant in a cellular physiology and immunology lab at Rockefeller University. She says, "It was there [in Bio 490] that I learned the true meaning of research: that there are no answers. It taught me that it's not going to be right every time. Research is a tedious job. Bio 490 prepared me for the failures that come with research." Her supervisor, an associate professor in immunology, speaks highly of Toner's abilities in the lab: "She learns very quickly and came to us prepared to learn."

Another student, Emily Meseck, now at Cornell's College of Veterinary Medicine, credits her undergraduate research experience at Plattsburgh State with "preparing me for the problem-based learning system in place at the College of Veterinary Medicine. The research done by Plattsburgh students is above and beyond undergraduate level. It was an open and inviting experience and built one's confidence in one's own abilities. This is what carries you through graduate school and beyond. The most important skills that undergraduate research taught me were critical thinking and problem solving. Everything else flows from those skills. You

must rely on yourself . . . to find and utilize the available resources. Research, in or out of the lab, is integral to those activities."

Janice Conrad reports that it is surprising how many of the students stay in touch with the Conrads. Many of the students apply for graduate or professional schools within one year of taking the course or are looking for jobs in academic or industrial labs. Even more impressive is that almost 60 percent of their former students are still involved in some area of biology today.

Each of this year's proposals has been well researched and approaches a significant and difficult problem. What are some of the projects planned for this semester? Titles include, Does *Chlamydomonas reinhardtii* have phytochrome? Can *C. reinhardtii*, a unicellular, photosynthetic organism, be altered by insertional mutagenesis to create an alternative oxidase (AOX) mutation? How would this mutant survive physiological stresses under which survival has been attributed to AOX function? *C. reinhardtii*: A model to investigate the possibility of H₂O₂ signaling between the mitochondria and nucleus as a function of heme/heme-containing molecules. I look forward to reading the resulting posters at the next NEASPP meeting at the University of Connecticut in April. 🌱



2000 Membership Directory

(PRINT EDITION)

coming soon! See

the online directory

at [http://aspp.org/](http://aspp.org/member_services/)

[member_services/](http://aspp.org/member_services/)

[members.htm](http://aspp.org/member_services/).

Executive Committee Holds Winter Meeting

The ASPP Executive Committee met at the Society's headquarters in Rockville, Maryland, on February 12, 2000, to address a full agenda. President Debby Delmer opened the meeting with a grateful acknowledgment of the many accomplishments of the committees and staff. Given the flurry of interest in biotechnology, she emphasized a need to present a scientific perspective in all of our statements, particularly with the high profile of genetically modified plants.

Some of the meeting's highlights follow:

- The committee voted not to present "Best Poster Awards" because of the difficulty in establishing a fair and equitable selection procedure during the meeting.
- A full-time science writer for *Plant Physiology* will be hired to produce a new column of article summaries titled "On the Inside" and to edit Updates, Scientific Correspondence, and Meeting Reports.
- The Plant Gene Register, which was part of *Plant Physiology*, will be discontinued.

- Access to online issues of *Plant Physiology* and THE PLANT CELL will be free after 12 months.
- ASPP will participate in the NIH initiative PubMed Central and will release content after 12 months.
- A casual food and refreshments event will be scheduled during the careers workshops arranged by the Committee on the Status of Women in Plant Physiology at Plant Biology 2000.
- A proposal to Web-cast significant symposia during Plant Biology 2000 was tabled to determine the costs for such a service.
- An allocation of \$1,000 to each of the five sections was made to fund registration, housing, and transportation costs for minority undergraduate students to attend sectional meetings.
- The joint meeting with the Canadian Society of Plant Physiologists will be moved forward one year to 2006.

• Making the Education Committee chair a member of the Executive Committee will be placed on the next ballot for vote by the membership.

• A special reception will be planned for undergraduate attendees at Plant Biology 2000.

• Funding a major financial award through the National Academy of Sciences will be explored.

Several other items were tabled until the summer meeting so that more information could be provided. The Executive Committee next meets on July 14th and 18th in San Diego during the annual meeting. Members are encouraged to attend. Please notify Susan Chambers at chambers@aspp.org if you plan to attend to ensure sufficient space. ♪

OBITUARY



Robert J. Williams

The community of plant physiologists lost an important member with the recent death of Robert J. Williams.

Bob served in the U.S. Army during the 1950s and had the misfortune to be among troops that were placed in trenches to "observe" the firing of an atomic bomb in Nevada. In 1994, he developed a melanoma in one eye. In subsequent years he developed more widespread cancers, and this finally led to his death last October.

Bob's professional career was spent mostly with the Red Cross laboratories in Bethesda, Maryland, where he worked on technologies for the preservation of tissues and cells either in the freeze-dried state or, later, in the vitrified state. With his colleagues, he was able to show that cell damage during freeze-drying was mainly a consequence of the loss of osmotic function as water was removed and the associated damage to membranes. His laboratory group was able to establish that the hardening of woody stems against freeze damage was a consequence of the accumulation of sugars and the associated formation of the intracellular glassy state. He was the first to show the formation of sugar-glasses in orthodox seeds in the dry

state. In his seed studies he went on to show that mixed polyols were important contributors to the stability of the glassy state and that phase separations of the polyols in the glass could limit the stability of the dry seed. His research explained the deterioration of seeds that were stored in liquid nitrogen or that were dried excessively.

Bob had an extraordinarily quick mind and a sparkling knack for innovative research ideas. His strong background in biophysics fit well with the emerging realization of the importance of biophysical phenomena in environmental adaptation. His strong bent toward mathematical analyses, his affinity for historical development of biological ideas, his insatiable appetite for sailing, and his splendid sense of humor made him an exciting and stimulating contributor to our science.

We will miss Bob Williams. ♪

Carl Leopold
Boyce Thompson Institute

CALL FOR NOMINATIONS: Teaching Awards

The USDA Cooperative State, Research, Education, and Extension Service (CSREES), Science and Education Resources Development (SERD), through the Higher Education Programs (HEP) office, announces this year's National Awards Program for Excellence in College and University Teaching in the Food and Agricultural Sciences. Nominations are due by April 15, 2000.

Information and a nomination kit may be obtained from P. Gregory Smith in the HEP office (202-720-1973), or visit the HEP Web site at <http://www.reeusda.gov/serd/hep/teachgui.htm>. Five copies of the nomination package must be post-marked by April 15, 2000, and sent to:

P. Gregory Smith
National Program Leader
Excellence in Teaching Awards
Program
U.S. Department of Agriculture
CSREES/SERD/Higher Education
Programs
1400 Independence Avenue, SW
Stop 2251
Washington, DC 20250-2251

CALL FOR PROPOSALS

Have you developed new ways to conduct hands-on science 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 the ASPP annual meeting this July in San Diego. We are looking for new ideas and technologies that are being used in the classroom and, as an incentive, we are offering a **cash grant of \$500 and registration costs** for up to four presenters. Proposals should—

- State clearly the rationale behind the exhibit. Why is this exciting and fun? How does this involve new techniques or technology?
- Provide a clear, detailed summary of how the exhibit will function. What “wow” response will you elicit from people visiting the booth?
- Indicate the equipment that will be required for the exhibit. For example, will you need a computer, an Internet connection, or a VCR or monitor for your exhibit?

We can't think of a better opportunity to showcase your new approaches or new technology for the plant biology classroom. We hope that you will consider submitting a proposal and will join us at the Education Booth for these exciting exhibits!

Proposals must be **submitted by June 1, 2000**, to Gary Kuleck by e-mail (gkuleck@popmail.lmu.edu) or to Gary Kuleck, Biology Department, Loyola Marymount University, 7900 Loyola Blvd., Los Angeles, CA 90045.



Plant Physiologist for Research in Phytonutrients Beltsville Human Nutrition Research Center, Phytonutrients Laboratory Agricultural Research Service, U.S. Department of Agriculture

The Phytonutrients Laboratory of the Beltsville Human Nutrition Research Center has an opening for a Plant Physiologist. Incumbent will conduct research concerning processes that affect the content and distribution of organic phytochemicals and will collaborate with nutritionists in assessing health effects of phytochemicals that are available from foods.

A Ph.D. or equivalent in Plant Physiology or a related field is desirable. Preference will be given to candidates who have research experience in organic micronutrients. Incumbent must have a record of independent research and have demonstrated scholarly achievement, including publications on phytochemicals or related topics in peer-reviewed journals. Applicants must be U.S. citizens.

Salary range: \$51,200 to \$93,500. Must request application materials from Beverley Jacobs at 301-504-1350 or through the Web at www.ars.usda.gov. Refer to Announcement No. ARS-XOE-0178. Specific questions regarding the positions may be directed to Dr. Beverly Clevidence, 301-504-8396 or Clevidence@bhnrc.arsusda.gov. Closing date: May 1, 2000.

ARS is an Equal Opportunity/Affirmative Action Employer/Provider.

Gatherings



The *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

2000: San Diego, California

Saturday, July 15, through
Wednesday, July 19

2001: Providence, Rhode Island

Saturday, July 21, through
Wednesday, July 25

2002: Denver, Colorado

Saturday, August 3, through
Wednesday, August 7

2000

APRIL

April 1–5

The XVI International Congress on Sexual Plant Reproduction

Banff, Alberta, Canada

Co-organizers: Dr. D. D. Cass, University of Alberta (d.cass@ualberta.ca) and Dr. V. K. Sawhney, University of Saskatchewan (sawhney@admin.usask.ca). For information, check our Web site at <http://www.usask.ca/biology/spr/>.

April 11–13

MICRO 2000

International Microscopy Conference & Exhibition

Hammersmith, London

For registration forms and information, contact Royal Microscopical Society, 37/38 St. Clements, Oxford OX4 1AJ, UK; telephone +44-1865-248768, fax +44-1865-791237, e-mail for conference information rebecca@rms.org.uk, e-mail for exhibition information allison@rms.org.uk, Web site <http://www.rms.org.uk>.

April 12–13

Royal Society Meeting

Photoprotection of the Photosynthetic Apparatus:

Alternative Photon and Electron Sinks
London

Organized by Professor C. B. Osmond FRS and Professor C. H. Foyer. For information, contact Oliver Carruthers, The Royal Society, 6 Carlton House Terrace, London, SW1Y 5AG, UK; e-mail Oliver.Carruthers@royalsoc.ac.uk, Web site <http://www.royalsoc.ac.uk>.

April 12–15

Plant Protein Phosphorylation-Dephosphorylation

University of Missouri, Columbia

Information including online registration and abstract information is available at <http://muconf.missouri.edu/plantbiochemsymposium>.

MAY

May 13–18

Auxin 2000

Ajaccio, Corsica

Organizers: Alan Jones, Catherine Perrot-Rechenmann, and Mark Estelle. For information on the speakers, venue, application for participation, and estimated costs, visit the Web site at <http://www.isv.cnrs-gif.fr/CR/aux2000> or contact alan_jones@unc.edu.

May 14–18

World Congress for Soilless Culture on Agriculture in the Coming Millennium

Kibbutz Ma'ale Ha'chamisha, Israel

For information, contact the Congress Secretariat, Ortra Ltd., 1 Nirim Street, PO Box 9352, Tel Aviv 61092, Israel; telephone +972-3-6384444, fax +972-3-6384455, e-mail soil@ortra.co.il.

May 14–19

10th International Symposium on Iron Nutrition and Interactions in Plants

Houston, Texas

Organizing Committee Chairman: Michael A. Grusak. For information, contact Stancia Pemberton, USDA/ARS Children's Nutrition Research Center, 1100 Bates Street, Houston, TX 77030; telephone 713-798-7020, fax 713-798-7078, e-mail stanciap@bcm.tmc.edu.

May 18–20

Plant Signaling 2000

Pennsylvania State University, University Park

This symposium deals with the signaling mechanisms underlying plant responses to their environment; their internal physiological status; and the activity of pathogens, insects, and other organisms. Topics will include gene silencing; signaling via lipids, active oxygen species, calcium, kinases, and hormones; disease; defense; and other topics. See the Web site at www.lsc.psu.edu/phys/annualsym.html for the speaker list and registration forms. Sponsored by the Intercollege Program in Plant Physiology.

May 19–21

Plant–Microbe Adaptations to Winter Environments in Northern Areas

Akureyri, Iceland

Arranged by the Nordic Association of Agricultural Scientists in cooperation with the International Workshop on Plant–Microbe Interactions at Low Temperatures under Snow. For information, contact Bjarni E. Gudleifsson, Agricultural Research Institute, 601 Akureyri, Iceland; telephone +354-462-4477, fax +354-462-7144, e-mail beg@rala.is.

JUNE

June 11–16

International Symposium on Grapevine Physiology & Biotechnology

Heraklion, Crete, Greece

For information, contact Professor K. A. Roubelakis-Angelakis, Department of Biology, University of Crete, PO Box 2208, 71409 Heraklion, Greece; telephone/fax +30-81-394459, e-mail poproube@biology.ucre.gr. Also, visit the symposium Web site at <http://www.biology.ucre.gr/meetings>.

June 22–24

CUR 2000: The Many Facets of Undergraduate Research

The College of Wooster, Wooster, Ohio

For information, visit CUR's Web site at <http://www.cur.org> and go to the meetings and events section. The College of Wooster's Web site is <http://www.wooster.edu/cur>.

June 24–28

**Molecular Biology of Model Legumes
John Innes Centre, Norwich, United Kingdom**

Local scientific organizer: Martin Parniske (martin.parniske@bbsrc.ac.uk). To register contact UEA Conference Services, University of East Anglia, Norwich, NR4 7TJ, UK; telephone +44-1603-593271, fax +44-1603-250585, e-mail legume@uea.ac.uk. Further details can be found at <http://www.jic.bbsrc.ac.uk/events/elm-2000/>.

June 24–28

XI International Conference on Arabidopsis Research

Madison, Wisconsin

Co-chairs: Detlef Weigel and Mary Lou Guerinot. For information, contact Mary Lou Guerinot at telephone 603-646-2527, fax 603-646-1347, e-mail Guerinot@Dartmouth.edu, Web site http://www.arabidopsis.org/Arabidopsis_XI.html.

June 24–29

Gordon Research Conference on Mitochondria and Chloroplasts

Connecticut College, New London

Chair: David Stern, Boyce Thompson Institute at Cornell University. Vice chair: Eric Shoubridge, McGill University. For information, contact David Stern at telephone 607-254-1306 or at e-mail ds28@cornell.edu. The program is available at <http://www.grc.uri.edu/programs/2000/mitochon.htm>.

June 29–July 2

Symposium on Biosynthesis of Glucose Polysaccharides

Scheman Continuing Education Building
Iowa State University, Ames

Registration deadline is May 30, 2000. For information, contact Plant Biochemistry and Molecular Biology Conferences, Symposium Office, 3208 Molecular Biology Building, Iowa State University, Ames, IA 50011-3260; telephone 515-294-7978, fax 515-294-2244, e-mail pbmb@iastate.edu, Web site <http://molebio.iastate.edu/~gfst/phomepg.html>.

JULY

July 15–19

**Plant Biology 2000: Seeding the Future
San Diego, California**

Contact Susan Chambers, 15501 Monona Drive, Rockville, MD 20855-2768; telephone 301-251-0560, ext. 111, fax 301-279-2996, e-mail chambers@aspp.org or on the World Wide Web see URL <http://aspp.org/meetings/meetings.htm>.

July 16–21

**Plant Molecular Biology Gordon Conference
"Biological Regulatory Mechanisms"**

Plymouth, New Hampshire

For information and application, contact the Gordon Research Conferences, University of Rhode Island, PO Box 984, West Kingston, RI 02892-0984; telephone 401-783-4011. For online information and registration, go to <http://www.grc.uri.edu/attend.htm>. For further information, contact Robert L. Last at rob.last@cereon.com.

AUGUST

August 13–19

The 6th Gordon Research Conference on the Plant and Fungal Cytoskeleton

Proctor Academy, Andover, New Hampshire

Organizers: W. Z. Cande and L. Pon. Detailed information about the conference, including topics, speakers, and a preliminary registration form, can be found at the GRC homepage at <http://www.grc.uri.edu/>.

August 16–20

4th International Fructan Symposium

Arolla, Switzerland

Organizers: Th. Boller, M. Frehner, U. Hochstrasser, F. Keller, M. Lüscher, A. D. Meyer, and A. Wiemken. For registration forms and information, contact Secretariat Fructan-2000, Department of Botany, University of Basel, Hebelstr.1, CH-4056 Basel, Switzerland; telephone +41-61-267 23 11, fax +41-61-267 23 30, e-mail fructan2000@ubaclu.unibas.ch, Web site <http://www.unibas.ch/bothebel/fructan2000/second/>.

August 20–25

Gordon Conference on Plant Cell Walls

Kimball Union Academy, Meriden,
New Hampshire

Deborah Delmer, Chair; Dan Cosgrove, Co-chair. Information on the program and how to register can be obtained from the Gordon Conference Web site at <http://www.grc.uri.edu>. Conference limited to 135 participants; preference given to speakers and those registrants who offer to present posters. Scientists from industries having interest in cell walls are also welcome to apply.

SEPTEMBER

September 3–5

Plant Nutrient Transport through Biological Membranes

German Society for Plant Nutrition

Giessen, Germany

For information, contact Sven Schubert, Institute of Plant Nutrition, Interdisciplinary Research Center, Justus Liebig University, Heinrich-Buff-Ring 26-32, D-35392 Giessen, Germany; telephone +49-641-99-39-160, fax +49-641-99-39-169, e-mail sven.schubert@ernaehrung.uni-giessen.de.

September 6–8

Society For Experimental Biology, Plant Transport Group Meeting

University of Hertfordshire, United Kingdom

Organizers: R. Gordon-Weeks, M. J. Hawkesford, A. Miller, and F. Theodoulou and hosted by IACR Rothamsted. For information, please contact Ruth Gordon-Weeks, Biochemistry and Physiology Department, IACR Rothamsted, West Common, Harpenden, Herts, AL5 2JQ, UK; telephone +44-1582-763133, fax +44-1582-763010, e-mail ruth.gordon-weeks@bbsrc.ac.uk.

OCTOBER

October 3–6

Workshop: The Role of Invertases in Plant Carbohydrate Partitioning and Beyond

University of Regensburg, Germany

For information and registration, contact Thomas Roitsch, Lehrstuhl fuer Zellbiologie und Pflanzenphysiologie, Universitaet Regensburg, 93040 Regensburg, Germany; telephone +49-941-943-3021, fax +49-941-943-3352, e-mail thomas.roitsch@biologie.uni-regensburg.de, Web site: <http://www.biologie.uni-regensburg.de/invertase/>.

NOVEMBER

November 6–10

SPARC 2000

**2nd SPARC General Assembly
Stratospheric Processes and Their Role in Climate**

Mar del Plata, Republic of Argentina

Biological Effects of UV Radiation. Call for Papers. A Special Associated Workshop on the impacts of UV on terrestrial and aquatic ecosystems will be held within the SPARC-2000 (Stratospheric Processes and Their Role in Climate) Congress, Mar del Plata, Argentina. Organizers: Walter Helbling and Virginia Villafañe (Estación de Fotobiología Playa Unión; e-mails fotobiol@cpsarg.com or fotobiol@arnet.com.ar). Aquatic Systems. Carlos Ballaré (Universidad de Buenos Aires; e-mail ballare@ifeva.edu.ar). Terrestrial Systems (Web page: <http://www.sparc2000.at.fcen.uba.ar>).

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

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, when): _____

Employer and location	From	To	Position, Title, Duties

References (names, addresses, telephone numbers): _____



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; **FAXED ADS ARE NOT ACCEPTED**). A fee of \$150 for print, Web, or both is charged for all academic/government/industry permanent positions and for all positions, regardless of rank, posted by private companies (private nonprofit companies are not charged a fee). If a fee is charged for your ad, please include billing information at the time the ad is submitted.

- **Academic/Government/Industry Permanent Positions (Ph.D.):** Limited to 200 words; ad will run 12 weeks on the Web and appear in one issue of *ASPP NEWS*. (If the ad runs only on the Web, the word limit is waived.)
- **Postdoctoral Positions and Research/Technical Positions (non-Ph.D.):** At universities and government installations, limited to 100 words; at private companies, limited to 200 words. Ad will run 12 weeks on the Web and appear in one issue of *ASPP NEWS*. (If the ad runs only on the Web, the word limits are waived.)
- **Assistantships, Fellowships, Internships, etc.:** Announcements of programs and fellowships or internships for students seeking advanced degrees run at no charge and without a word limit. They will run two times in *ASPP NEWS*: the first time, they will run at full length; the second time, they will include location, contact name, and address, with a reference to the original posting. These announcements will run on the ASPP World Wide Web homepage for 12 weeks from the date of posting.

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

Assistant Professor—Landscape Horticulture University of Kentucky, Lexington (Received 01/06)

A 12-month, tenure-track research and teaching position is available in the University of Kentucky's Department of Horticulture. The individual will establish a competitive research program in one of two priority areas, weed science/management or physiology of plant stress tolerance, related to field-grown horticultural crops. Undergraduate teaching responsibilities include courses in landscape horticulture and advising landscape management students. The individual must secure outside funding for research, direct graduate students, publish research in refereed journals, and foster intra- and interdepartmental research. Approximate assignment: 75% research and 25% teaching. A Ph.D. in horticulture, plant science, or weed science and knowledge related to landscape horticulture is required. The ability to use electronic media for educational program delivery is expected. The individual should possess the ability to function within a team and to communicate effectively. Applications will be accepted through March 31, 2000, or until a qualified applicant is found. To apply, send a letter highlighting educational background, experience and career interests, a resume, transcripts, and the names and addresses of five references to Dr.

Dewayne Ingram, Horticulture Department, N-324 ASN, Lexington, KY 40546-0091; telephone 606-257-1601, e-mail dingram@ca.uky.edu. The University of Kentucky is an equal opportunity employer.

Lecturer

The Hebrew University, Jerusalem, Israel (Received 1/10)

We are seeking candidates for a tenure-track position in the area of plant biology. The position is for October 2000 at the Department of Plant Sciences, the Life Sciences Institute of the Hebrew University of Jerusalem. We are interested in applicants who use novel approaches to investigate plant cell and developmental biology. Postdoctoral experience with a solid publication record and training in plant physiology or plant molecular biology are required. The successful candidate is expected to develop and conduct independent research using molecular approaches to investigate plant growth and development or plant responses to the environment. Applicants should send a curriculum vitae, a description of past research and teaching activities, proposed future research, and addresses for three letters of recommendation by March 1, 2000, to Dr. Pierre Goloubinoff, Head, Department of Plant Science, Institute of Life Sciences, The Hebrew University of Jerusalem, 91904, Jerusalem, Israel; e-mail pierre@vms.huji.ac.il.

Assistant or Associate Professor of Plant Molecular Geneticist Purdue University, West Lafayette, Indiana (Received 1/11)

A position is available for an assistant or associate professor in the Department of Horticulture and Landscape Architecture. The incumbent will pursue an extramurally funded research program using genomics to enhance our understanding of plant biology. Research area is open but could include studies on complex traits such as the quality, composition, and end use of crop plants or the tolerance of plants to abiotic and biotic stress. Scientists using contemporary approaches such as reverse genetics, insertional mutagenesis, and microarray technologies are encouraged to apply. The applicant will participate in the undergraduate and graduate teaching programs of the department, including development of a course in plant genomics. A Ph.D. in plant genetics, molecular biology, or related areas is required. Postdoctoral research experience is highly desirable. Screening of applicants will begin March 1, 2000; however, applications will be accepted until position is filled. Qualified persons should submit a letter of application that includes a statement of professional goals and description of research interests; curriculum vitae; transcripts; and names, addresses, and telephone numbers of four references to Dr. Ray A. Bressan, Search Committee Chair, Purdue University, 1165 Horticulture Building, West Lafayette, IN 47907-1165; e-mail bressan@hort.purdue.edu. Purdue

THE DEADLINE FOR ADS FOR THE MAY/JUNE ISSUE OF *ASPP NEWS* IS APRIL 30, 2000.

Check ASPP's World Wide Web site (<http://aspp.org/JOBS/>) every Friday for new job listings. Jobs with early application deadlines are listed on the Web site, but might not appear in *ASPP NEWS*.

University is an equal opportunity/affirmative action employer.

**Tree Fruit Horticulturist/Physiologist
Washington State University (WSU)
Irrigated Agriculture Research and Extension
Center, Prosser, Washington
(Received 02/02)**

A tenure track at assistant or associate rank (75% Research/25% Extension) is available. The incumbent will lead the WSU stone fruit horticulture research and extension program, emphasizing whole-plant crop physiology and production practices appropriate to the Pacific Northwest. Required: (1) Ph.D. in horticulture or a related plant science discipline, (2) scholarly accomplishments in plant physiology, and (3) demonstration of excellent written, oral, and electronic communication skills. Highly desired: demonstration of excellence in research and extension leadership and team building. Desired: field research experience in crop production. To apply, send a letter addressing qualifications, a statement of professional vision and goals, a detailed resume with publication list, copies of official college/university transcripts, and three letters of reference to Dr. Preston K. Andrews, Department of Horticulture and Landscape Architecture, Washington State University, PO Box 646414, Pullman, WA 99164-6414; telephone 509-335-3603, fax 509-335-8690, e-mail andrewsp@wsu.edu. Screening begins May 1, 2000, and continues until filled. EEO/AA/ADA.

**Assistant Professor
Washington State University, Pullman
(Received 02/10)**

A nine-month, tenure-track position (100% teaching) in the Department of Horticulture and Landscape Architecture, Washington State University, Pullman, is available and starts August 16, 2000. The successful candidate will be expected to teach courses at the undergraduate and graduate level in plant propagation and tissue culture and establish an externally funded research program. Salary will be commensurate with qualifications and experience. Required: Ph.D. in an appropriate area by the start date of the position and demonstrated expertise in one of the following areas: plant propagation, cell and tissue culture, or other closely related areas. Desired: Experience or training in teaching; excellent communication skills; research experience in molecular approaches to address major questions on plant propagation and cell and tissue culture; experience or training in grantsmanship; experience in distance education or computer-based instruction; and postdoctoral experience. To apply, send letter of application, curriculum vitae, copies of transcripts, a summary of research interests, a statement of teaching experience and interests, and names and addresses (including e-mail addresses) of three references to Professor B.W. Poovaiah, Search Chair, Department of Horticulture and Landscape Architecture, WSU, PO Box 646414, Pullman, WA 99164-6414; telephone 509-335-2487, fax 509-335-8690, poovaiah@wsu.edu. Screening begins May 1, 2000, and continues until position is filled. EEO/AA/ADA.

**Assistant Professor
Purdue University, West Lafayette, Indiana
(Received 02/16)**

A tenure-track position in the area of plant biochemistry and molecular genetics is available in the Department of Horticulture and Landscape Architecture. The successful applicant will pursue a vigorous research program directed toward enhancing the value of horticultural crops. The research area is flexible but could include studies on the nutritional, medicinal, industrial or aesthetic properties of horticultural crops, or other output traits that enhance their value. Scientists using contemporary genetic and biochemical approaches are encouraged to apply. The applicant will participate in the department's undergraduate curriculum and teach a graduate-level course in their area of specialization. This is one of six new positions in the School of Agriculture focusing on the area of output trait biology and is a continuation of the school's genomics initiative. Applications should include a statement of professional goals, description of research interests, a complete curriculum vitae, summary of teaching experience, and the names of four references to Dr. Peter Goldsbrough, Search Committee Chair, Department of Horticulture and Landscape Architecture, Purdue University, 1165 Horticulture Building, West Lafayette, IN 47907-1165; telephone 765-494-1334, e-mail goldsbrough@hort.purdue.edu, Web site <http://www.hort.purdue.edu/hort/>. Purdue University is an equal opportunity/affirmative action employer.

**Assistant Professor
University of Georgia
Complex Carbohydrate Research Center
(CCRC), Athens
(Received 02/18)**

The University of Georgia CCRC is seeking an assistant professor for a tenure-track position in molecular biology and/or molecular genetics of complex carbohydrates in plants. We seek a faculty member who will develop an innovative research program using molecular biology approaches to investigate the roles of carbohydrates in plants, such as their biosynthesis and function in plant growth, development, and host-pathogen interactions. Demonstrated research creativity, teaching excellence, and a willingness and ability to participate in a multidisciplinary environment are essential. The successful candidate will occupy laboratory and office space in the CCRC building and have access to outstanding analytical facilities and expertise. Applications received by April 1, 2000, are assured of consideration. Salary is negotiable. Applicants should send a letter of interest, a curriculum vitae and publication list, a description of research interests, and the names and addresses of four referees to Dr. Debra Mohnen, Search Chair, Complex Carbohydrate Research Center, University of Georgia, 220 Riverbend Road, Athens, GA 30602-4712. Inquiries can be sent by e-mail to dmohnen@ccrc.uga.edu. The University of Georgia is an AA/EEO institution.

**Assistant Professorship
Université de Montréal, Canada
(Received 02/24)**

The Department of Biology of the Université de Montréal invites applications for a position of assistant professor in plant developmental biology. The position will be held at the Institut de Recherche en Biologie Végétale (Plant Biology Research Institute). All persons with strong research background in molecular biology of plant development and ability to secure outside research funds are encouraged to apply. We are particularly interested in the candidates working on model systems such as *Arabidopsis thaliana*. A good knowledge of anatomy and electronic microscopy will be an asset. The selected candidate will teach plant development and anatomy at the undergraduate level in French and will participate in teaching at the graduate level in the area of their specialization, preferably in the courses on developmental biology and light- and electron-microscopy. The successful candidate will also be in charge of a well-equipped, modern laboratory in light and electron microscopy. Interested candidates are requested to send their curriculum vitae, a brief description of the proposed research program, and names of three referees before **April 15, 2000**, to Professor Thérèse Cabana, Chair, Département de Sciences Biologiques, Université de Montréal, C.P. 6128, Succursale Centre-Ville, Montreal, Canada H3C 3J7; e-mail cabanat@ere.umontreal.ca. In accordance with the Canadian immigration laws, this advertisement is addressed, in priority, to Canadian citizens and landed immigrants. The Université de Montréal subscribes to the policy of equal access to employment for women and to the principles of employment equity.

**Editor-in-Chief
BioScience, Washington, DC
(Received 02/29)**

The American Institute of Biological Sciences, a non-profit professional association in Washington, DC, seeks an individual to work full-time in the AIBS office as editor-in-chief of its flagship peer-reviewed monthly publication, *BioScience* (in print and online, see www.aibs.org) and as manager of its publications department. Responsibilities for *BioScience* include managing editorial/production staff and budgets, directing editorial policy and solicitation/peer-review of manuscripts, maintaining editorial consistency/quality, and direct substantive editing of writing by scientists, journalists, and freelancers. Requires a Ph.D. in the sciences, preferably in organismal/integrative biology, a minimum of five years' experience in professional editing/publishing, superb oral/written communication skills, and a business-savvy approach. The successful candidate will be a team-oriented leader/innovator who thrives in a fast-paced environment and seeks growth beyond the status quo. Excellent benefits include health care/retirement plan. Send cover letter, resume, writing samples, salary history, and salary requirements to Dr. Richard O'Grady, Executive Director, AIBS, 1444 Eye St. NW, Suite 200, Washington, DC 20005; fax 202-628-1509, e-mail rogrady@aibs.org.

POSTDOCTORAL POSITIONS

Postdoctoral Position

**Rutgers University, New Brunswick, New Jersey
(Received 02/03)**

A postdoctoral position is available at the Biotech Center at Rutgers University to study the mechanism by which pokeweed antiviral protein (PAP) accesses its substrates. PAP is a ribosome inactivating protein with potent antiviral activity against plant and animal viruses. PAP accesses ribosomes by binding to ribosomal protein L3 (JBC **274**, 3859–3864; 1999). PAP inhibits translation of viral RNAs by a novel mechanism by recognizing the cap structure and depurinating the capped RNA template (RNA, in press). A postdoctoral associate is sought to characterize the mechanism by which PAP accesses its substrates. A Ph.D. in a related field and experience with RNA biochemistry, molecular biology, and genetics are highly desirable. Please send a curriculum vitae and three letters of reference to Dr. Nilgun Tumer, Biotech Center, Foran Hall, Cook College, Rutgers University, New Brunswick, NJ 08901-8520; e-mail tumer@aesop.rutgers.edu, Web site <http://www.rci.rutgers.edu/~tumer/>.

Postdoctoral Position

**University of California, Berkeley
(Received 02/10)**

A molecular biologist is needed to investigate the occurrence and patterns of expression of genes associated with a novel hydrogen production and "reversible hydrogenase" pathway in green algae (Plant Physiol. **122**, 127–136; 2000). Applicants should have experience with PCR, sequencing, and other molecular biological techniques. Beginning salary \$30,000/year plus benefits. Send inquiries to Dr. Tasios Melis, Plant & Microbial Biology, University of California, Berkeley, CA 94720-3102; e-mail melis@nature.berkeley.edu. UC Berkeley is an equal opportunity employer.

Postdoctoral Position

**Estación Experimental del Zaidín (CSIC)
Granada, Spain
(Received 02/11)**

A three-year postdoctoral position starting May/June 2000 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. 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 *E. coli* to obtain high amounts of recombinant proteins. The annual salary is ECU 21,300. 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 LuisAlfonso.delRio@eez.csic.es.

Postdoctoral Positions

**Texas Tech University, Lubbock
(Received 02/11)**

Two postdoctoral positions are available in plant genomics at Texas Tech University. Successful candidates will conduct research in one of the following areas: (1) isolation and sequencing of drought-induced ESTs in sorghum, physical mapping and functional genomic analysis of drought tolerance QTLs in sorghum and (2) genetic mapping and QTL analysis for drought tolerance in wheat. Review of applications will begin in March 2000 and continue until the positions are filled. Send letter of interest, resume, and three references to Prof. Henry Nguyen, Plant Molecular Genetics Laboratory, Department of Plant and Soil Science, Texas Tech University, Lubbock, TX 79409-2122.

Postdoctoral Position

**Baylor College of Medicine, Houston, Texas
(Received 02/15)**

A postdoctoral position is available to study ion homeostasis in plants. The aim of this project is to identify and characterize components of ion signaling and ion sequestration that occur around the plant vacuole (Plant Cell **11**, 2113–2122; 1999). A Ph.D. in molecular biology, genetics, or plant biology is required. Due to the funding source, applicants **must** be a U.S. citizen or permanent resident with less than three years' support from another postdoctoral training grant. To apply, send a letter of application, curriculum vitae, and the names and addresses of three reference (by fax or e-mail) to Kendal Hirschi, Plant Physiology Unit (CNRC), Baylor College of Medicine, Houston, TX 77401; fax 713-798-7078, e-mail kraford@bcm.tmc.edu.

Postdoctoral Position

**University of Nebraska, Lincoln
(Received 02/16)**

A postdoctoral position is immediately available to study the role of the small subunit in the function, structure, and expression of the *Rubisco* holoenzyme (Photosynth Res **60**, 29–42; 1999). The work will exploit a *Chlamydomonas* mutant that lacks the *RbcS* gene family (PNAS **93**, 13689–13693; 1996). Applicants should have documented skills in biochemistry and/or molecular genetics. Starting salary is \$26,000 per year plus benefits. Contact for information, or send resume, reprints, and three letters of reference to Dr. Robert J. Spreitzer, Department of Biochemistry, University of Nebraska, Lincoln, NE 68588-0664; e-mail rspreitzer1@unl.edu.

Postdoctoral Position

**Virginia Tech, Blacksburg
(Received 02/22)**

A postdoctoral position is available to study IP3 signaling in Arabidopsis. Research will focus on a group of genes predicted to terminate signal

transduction by directly acting on IP3 second messenger and will utilize a combination of genetic, cellular, molecular, and biochemical approaches. Successful candidates should have a Ph.D. and a strong background in molecular biology, biochemistry, or genetics and a willingness to extend their expertise in new directions. Please send a letter of interest, curriculum vitae, and a list of three references to Dr. Glenda Gillaspay, Department of Biochemistry, 306 Fralin Biotechnology Center, Virginia Tech, Blacksburg, VA 24061; fax 540-231-7126, e-mail gillaspay@vt.edu.

Postdoctoral Position

**University of California, Riverside
(Received 01/05)**

A postdoctoral position will be available April-May to investigate the role of heat shock proteins in plants and yeast. Molecular studies will include protein-protein and protein-RNA analysis between HSPs and cellular proteins. The effect of HSPs on translation and mRNA stability will be emphasized. Genetic analyses of their developmental role will also be studied using transgenic plants exhibiting altered expression levels of the protein. Candidates must have a strong background in molecular biology and biochemistry. Send curriculum vitae by e-mail 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 Position

**University of Wisconsin, Madison
(Received 01/18)**

A postdoctoral position is available to study starch breakdown in leaves. The DOE-funded research will involve intensive molecular work to find Arabidopsis lines with genes for starch degrading enzymes knocked out as well as biochemical measurements of starch breakdown products. The functional genomics approach with Arabidopsis will be complemented with physiological studies with beans, tomatoes, and rice. The overall goal is to test a new hypothesis for how carbon from starch breakdown is exported from chloroplasts at night. Applicants must have experience with PCR and gene cloning and be familiar with carbon metabolism and membrane transporters of the chloroplast. Please send curriculum vitae, statement of research and career interests, and phone number and e-mail addresses of three references by e-mail to Thomas D. Sharkey at tsharkey@facstaff.wisc.edu.

Postdoctoral Associate Position

**The University of Tennessee, Knoxville
(Received 01/18)**

There is an opening in the laboratory of Dr. Daniel M. Roberts for an NSF-supported project to study the structure and function of members of the nodulin 26 aquaglyceroporin family. Responsibilities include the investigation of the structural features of this membrane channel that confers multifunctional transport, including electron

diffraction/membrane crystallography analyses. Other projects include the analysis of the role of CDPK phosphorylation in the regulation of nodulin 26 permeability, in vitro and in vivo, and the analysis of this and related subfamily proteins in the model legume *Lotus japonicus*. Interested applicants should provide three letters of reference to be sent to Dr. Daniel M. Roberts, Department of Biochemistry, Cellular and Molecular Biology, The University of Tennessee, Knoxville, TN 37996; telephone 865-974-4070, fax 865-974-6306, e-mail: drobert2@utk.edu.

Postdoctoral Fellows

**The Samuel Roberts Noble Foundation, Inc.
Ardmore, Oklahoma
(Received 01/24)**

Two positions are immediately available at The Samuel Roberts Noble Foundation, Inc., in the Plant Biology Division to study the molecular and genetic aspects of plant DNA repair mechanisms. The first position emphasizes the molecular biology of DNA mismatch and recombination repair mechanisms and their relationship to cell cycle progression in plants (Position No. PltBio31399A-1/2GM). The second position is focused toward the molecular mechanisms of chimeric RNA/DNA oligonucleotide-directed gene targeting in plants (Proc. Natl. Acad. Sci. **96**, 8774-8778; 1999) (Position No. PltBio31399B-2/2GM). Qualifications include a Ph.D. in biochemistry or cellular and molecular biology. A background in eukaryotic DNA repair mechanisms, protein chemistry, and/or biological mass spectrometry is highly desirable. Experience in plant cell and tissue culture is a plus. Indicate desired position number upon application. To obtain more information about The Samuel Roberts Noble Foundation, Inc., and a job description for these positions, please visit our Web site at www.noble.org. Please send a detailed resume to Laura Claypool, Human Resources Assistant, Attn: Postdoctoral Fellow, Position Number (either PltBio31399A-1/2GM or PltBio31399B-2/2GM), The Samuel Roberts Noble Foundation, Inc., PO Box 2180, Ardmore, OK 73402; e-mail laclaypool@noble.org, Web site www.noble.org.

Postdoctoral Position

**The Samuel Roberts Noble Foundation
Ardmore, Oklahoma
(Received 01/26)**

The Biological Mass Spectrometry Facility at The Samuel Roberts Noble Foundation seeks a postdoctoral fellow to participate in fundamental and applied M.S. research related to proteomic and metabolomic studies of plant systems. Responsibilities will include protein/metabolite extraction, purification, profiling, and identification using 2D PAGE, HPLC, CE, and modern MS. The ideal candidate will have a Ph.D. in a related field and significant experience with MS. More detailed information is available at <http://www.noble.org/plantbio/Sumner/Index.htm>. Interested candidates are encouraged to apply online at <http://www.noble.org/Jobs/Index.html> or submit a curriculum vitae and references to Jane Nance, Human Resources, The Samuel Roberts

Noble Foundation, Position No. PltBio35699LS-1, PO Box 2180, Ardmore, OK 73402.

Postdoctoral/Research Associates

**University of California San Diego, La Jolla
(Received 02/01)**

Postdoctoral and research associate positions are immediately available to work on understanding the molecular pathways utilized by organic toxins to control agricultural pests. Our laboratory has an exciting group involved in characterizing widely used natural Bt toxins. Our current and future work includes using transgenic plants to study the efficacy of toxins on plant-parasitic nematodes, using *C. elegans* as a model organism to study the molecular genetics of toxin action, and searching for new, natural nematocidal toxins. Applicants must have a good background in molecular biology. Experience working with plants is strongly desired. Experience working with nematodes is a plus. Both positions are for at least two years, with the second year contingent on satisfactory progress. Our laboratory is located on the beautiful campus of the University of California at San Diego in an excellent academic environment with a strong presence in plant biology and surrounded by dynamic biotech industries. Send or fax your application, including cover letter, curriculum vitae, and contacts for three references, to Dr. Raffi V. Aronian, Department of Biology, University of California San Diego, La Jolla, CA 92093-0349; telephone 858-822-1396, fax 858-822-2003, e-mail raronian@ucsd.edu.

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

Molecular Biologist BS/MS

**The Monsanto Company
St. Louis, Missouri
(Received 01/28)**

The Hybridization group in the Agricultural Sector of Monsanto Company, has one opening for highly qualified individuals to conduct research in a molecular biology/biochemistry laboratory. The successful candidate will join scientists with expertise in molecular biology, plant biology and genetics, and biochemistry and assist in establishing the technologies to deliver the next generation of hybrid seed production systems to the marketplace. Responsibilities are to perform biochemical, genetic, and molecular analysis of transgenic plants; help build recombinant gene constructs for plant transformation; help develop/improve protocols for high throughput analysis of transgenic plants. We require an advanced degree (or a B.S. with one to three years of pertinent research experiences) in molecular biology or related areas; skills in biochemical analysis (including ELISA, SDS-PAGE, and western); and a working knowledge of molecular analysis of transgenic plants (including Southern, northern, and PCR). Experience with greenhouse work would be a plus. We offer a competitive salary and benefits package. For consideration, please send your resume to The Monsanto Company, Attn: Laura Emmons, Mail Zone BB3G, 700 Chesterfield Parkway North, St. Louis, MO 63198 or send

e-mail to hybridization.program@monsanto.com. Please visit our Web site at www.monsanto.com. EEO/AA Employer M/F/D/V.

Research Scientist Positions

**Institute of Horticulture, ARO-Volcani Center
Bet-Dagan, Israel
(Received 01/31)**

The Institute of Horticulture at the Agricultural Research Organization at the Volcani Center seeks candidates for two tenure-track positions in the units of Citrus Breeding & Molecular Genetics and Fruit-Tree Sciences. Applicants for the two positions should have a Ph.D. in agriculture or plant sciences, with postdoctoral training in an appropriate discipline (e.g. plant breeding/physiology/molecular genetics). Experience in horticulture is advantageous. The successful candidates are expected to initiate their own creative research line, to collaborate with other scientists in the related subject, and to contribute to the fruit-tree agriculture in Israel. Applications, including curriculum vitae, a statement of research interests and previous achievements, and names and addresses of three referees, should be sent to Dr. Yuval Eshdat, Director of the Institute of Horticulture, The Volcani Center, 50250 Bet-Dagan, Israel; e-mail vhuyval@agri.gov.il. Review of applications will begin on April 15, 2000, and will continue until suitable candidates are selected.

Plant Transformation Specialist

**Eden Bioscience Corporation
Bothell, Washington**

(Received 02/23)

EDEN Bioscience is an agricultural life sciences company engaged in the development of proprietary, non-toxic plant treatments that activate plants' own internal defense and growth systems. The Plant Transformation Specialist will participate in a program to evaluate potential commercial applications and to understand the basic molecular mechanisms of the company's technology. Duties and responsibilities are to: (1) be responsible for generation of transgenic plants and subsequent analysis using molecular methods and bioassays, (2) conduct experiments and research in support of the company's overall goals, and (3) attend and/or present research findings at academic symposia/seminars. An M.S. degree in biochemistry, molecular biology, or a related field is required, as well as relevant research experience in academic or industrial laboratories. Experience in plant tissue culture, cotton, and/or monocot transformation, and molecular biology methods, including recombinant DNA; PCR; and northern, Southern, and western analysis, is required. Strong interpersonal skills, a proven capability to implement and follow through complex research programs, and an ability to convey technical ideas in both written and spoken formats are required. Candidate reports to the senior scientist. Send resume to Erick Rabins, EDEN Bioscience Corp., 11816 North Creek Parkway North, Bothell, WA 98011; e-mail rabinse@edenbio.com.

ASSISTANTSHIPS, FELLOWSHIPS, INTERNSHIPS, ETC.

Graduate Assistantships University of Memphis, Tennessee (Received 1/05)

The Department of Biology at the University of Memphis is offering graduate assistantships to qualified M.S. and Ph.D. applicants to pursue graduate training in a variety of disciplines in organismal biology and ecology. For further information, check our Web site at <http://www.people.memphis.edu/~biology>. If interested, contact Graduate Coordinator (wgutzke@memphis.edu) providing a statement of research interests, GPA, GRE, and advanced subject test scores (if available). Applicants interested in plant eco-physiology and/or wetland ecology may contact Dr. S. R. Pezeshki at SRPEZSHK@memphis.edu.

Graduate Assistantship North Dakota State University, Fargo (Received 01/21)

A graduate assistantship is available in the Department of Botany/Biology for a qualified student at either the M.S. or Ph.D. level. Research will be in the areas of plant metabolism and/or plant stress physiology. Students will have the opportunity to experience techniques in enzymology, protein biochemistry, and metabolite analysis, as well as traditional molecular biology techniques. The assistantship is available immediately and will remain open until a suitable candidate is found. It carries an annual stipend that depends on the qualifications of the applicant and a tuition waiver. Students with an M.S., a B.S., or a B.A. in plant physiology, biochemistry, botany, biology, or related fields are encouraged to apply. For more information about the research project and application requirements, please contact Dr. Marc D. Anderson, Assistant Professor, Department of Botany/Biology, North Dakota State University, Fargo, ND 58105; telephone 701-231-6488, fax 701-231-7149, e-mail Marc_Anderson@ndsu.nodak.edu.

Graduate Assistantships University of Florida, Gainesville (Received 02/07)

Research/Teaching assistantships are available for studies leading to an M.S. or a Ph.D. Program areas include plant production and nutrition, plant physiology, postharvest physiology and technology, biochemistry, molecular biology, seed physiology, and plant breeding and genetics. Stipends range from \$14,000 to \$15,000 plus a tuition waiver. The diverse climatic conditions and cultural practices in Florida offer research opportunities with temperate, subtropical, and tropical commodities. U.S. applicants are encouraged to apply. For further information, 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 rego@gvn.ifas.ufl.edu.

National Needs Graduate Fellowships University of Missouri—Columbia (Received 02/07)

The Interdisciplinary Plant Group (IPG) at the University of Missouri—Columbia is dedicated to interdisciplinary research and education in the basic aspects of plant biology. The IPG has extended its interdisciplinary research into the areas of bioinformatics and functional genomics to provide a unique resource for students. MU faculty are involved in functional genomics research in maize, soybeans, wheat, and organelle genomes. The University of Missouri IPG offers graduate fellowships in plant functional genomics. The fellowships are sponsored by the USDA/CREES National Needs Program in Plant Biotechnology. The first-year stipend is \$19,000 (plus fees/tuition), with yearly increments consistent with demonstrated progress. Please refer to the IPG Web site at <http://www.plantgroup.org> for information on programs and for an online application form. Direct inquiries to Joe Polacco by telephone at 573-882-4789 or e-mail PolaccoJ@missouri.edu.

Graduate Research Assistantships in Seed Biology Louisiana State University, Baton Rouge (Received 02/11)

Two GRAs are available under the direction of M. A. Cohn.

Position 1—Physiology of *Spartina* grain viability and dormancy. This M.S.-level GRA in agronomy will focus on: (a) quantifying the relationship between grain moisture, drying rates, and viability of this recalcitrant species and (b) evaluating new/improved dormancy-breaking protocols to reduce stratification requirements.

Position 2—Signal transduction of dormancy-breaking chemicals in rice or physiological genetics of seed dormancy in Arabidopsis (in collaboration with John Larkin). This is an M.S./Ph.D.-level GRA in crop physiology. Previous research has involved structure-activity studies of dormancy-breaking chemicals, ecophysiology, mode of action of dormancy-breaking chemicals using biochemical markers, and metabolism of dormancy-breaking chemicals. The specific research program of the successful candidate for position 2 will evolve from discussions with the major professor and interests of the student. Financials: \$13,000–\$15,000/calendar year. Fellowships are also available on a university-wide competitive basis. Both positions are available beginning in June 2000. To initiate the application procedure, send a letter of interest; curriculum vitae, including GRE and TOEFL scores; and the names, addresses, and telephone numbers of three references to Dr. Marc Alan Cohn, Department of Plant Pathology & Crop Physiology, Louisiana State University, Baton Rouge, LA 70803; telephone 225-388-1464, e-mail mcohn@lsu.edu. The LSU Web site is <http://www.lsu.edu>.

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

For information about the MEPS graduate program, consult our Web site at <http://plantphys.tamu.edu/> or contact Chair, Graduate Admissions Committee, MEPS Program, Department of Horticulture, Texas A&M University, College Station, TX 77843-2133. (Details January/February 2000, *ASPP NEWS*)

Graduate Research Assistantship in Plant Molecular Biology Louisiana State University, Baton Rouge (Repeat)

Contact: Dr. Norimoto Murai, Department of Plant Pathology and Crop Physiology, Louisiana State University and LSU Agricultural Center, Baton Rouge, LA 70803-1720; telephone 225-388-1380, fax 225-388-1415, e-mail nmurai@lsu.edu. (Details January/February 2000, *ASPP NEWS*)

Undergraduate Summer Research Fellowships in "Radical" Biology The Pennsylvania State University University Park (Repeat)

Contact Dr. David Eissenstat, 218 Tyson Building, The Pennsylvania State University, University Park, PA 16802; telephone 814-863-3371, fax 814-863-6139, e-mail dme9@psu.edu. Women and minorities are encouraged to apply. The deadline for the Summer Research Fellowship application is February 28, 2000 (available to U.S. citizens and residents only). (Details January/February 2000, *ASPP NEWS*)

Graduate Assistantships and Fellowships Iowa State University, Ames (Repeat)

Contact us by e-mail (ippm@iastate.edu), visit our Web site (<http://www.public.iastate.edu/~ippm>), or send inquiries to Plant Physiology Graduate Admissions, 353 Bessey Hall, Iowa State University, Ames, IA 50011. (Details January/February 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 rego@gvn.ifas.ufl.edu. (Details January/February 2000, *ASPP NEWS*)

**Postgraduate Student Scholarships
Postdoctoral Fellowships
Centre for Functional Genomics of Cereals
Glen Osmond, Australia
(Repeat)**

Contact: Professor G. B. Fincher at telephone +61-03-9344-5041, fax +61-03-9347-1071, e-mail a.bacic@botany.unimelb.edu.au or Professor T. Bacic at telephone +61-08-8303-7296, fax +61-08-8303-7109, e-mail gfincher@waite.adelaide.edu.au. (Details January/February 2000, *ASPP NEWS*)

**Graduate Research Assistantship
University of Florida, Gainesville
(Repeat)**

Contact: 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. (Details January/February 2000, *ASPP NEWS*)

Plant Biology 2000 Minisymposia Topics

Plant Interaction with Pathogens	Membrane Transporters I
Guard Cell Signal Transduction	Membrane Transporters II
Abiotic Stress I	Genomic Tools I
Abiotic Stress II	Genomic Tools II
Vegetative Plant Development	Enzymology
Societal Issues in GMOs	Seed Biology
Algal Physiology	Bioenergetics in Photosynthesis
Hormone Receptors and Signaling	Cell Walls
Targeting	

Proposal Announcement

The Department of Horticultural Science and the Minnesota Landscape Arboretum at the University of Minnesota have established a visiting Endowed Chair to support research pertinent to the genetic improvement, production, use, or maintenance of perennial landscape plants. The Minnesota Landscape Arboretum, situated in a rural landscape but close to the vibrant Twin Cities area, is an ideal setting for such research. Within the Arboretum's 1,000 acres is a diverse assemblage of land uses, including natural forests and wetlands, restored prairie and wetland, orchards, and highly maintained gardens. Chair-holders, whose research will be of mutual interest to themselves and the Arboretum, will carry out a significant portion of their work at the Arboretum and make use of the unique biological, human, and physical resources of the Arboretum, the Department of Horticultural Science, and other units of the University of Minnesota. Earnings from the endowment, now approximately \$50,000 per year, can be used as salary for the chair-holder (such as sabbatical supplemental salary), or for support of the chair-holder's project (such as equipment, supplies, or support salaries). Proposals are requested for filling this endowed chair. Proposals must be joint projects with a faculty member of the University of Minnesota, not necessarily from the Department of Horticultural Science. The potential for continued collaboration between the chair-holder and the on-campus collaborator will enhance the proposal's chances for success. Projects can be from 6 months to 1 year in duration, with possibility of renewal.

Written notice of intent to apply, including a one-page pre-proposal signed by both applicant and University of Minnesota collaborator, and a one-page CV of the potential visiting scholar, must be fulfilled. A completed application will contain a description of the proposed research project prepared by the scholar from outside the University of Minnesota, along with a complete CV, a letter of support from the collaborating Minnesota faculty member, and two additional letters of reference. Submit notice of intent to apply to John Carter, Department of Horticultural Science, University of Minnesota, St. Paul, MN 55108; telephone 612-624 4966, e-mail carte004@tc.umn.edu. The University of Minnesota is an equal opportunity educator and employer. Review of applications will begin on April 1 and continue until position is filled.

ASPP Headquarters Telephone Extensions and E-Mail Directory

For your convenience, keep this listing of extension numbers and e-mail addresses handy when you contact ASPP headquarters so that you can reach the person best able to assist you.

Our office telephone number is 301-251-0560

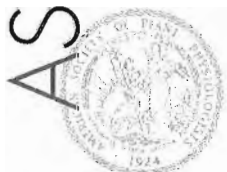
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▼ Plant Physiology (except missing issues)								▼	
▼ THE PLANT CELL									
Disposition of a manuscript									▼
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