THE NEWSLETTER OF THE AMERICAN SOCIETY OF PLANT PHYSIOLOGISTS

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ASPP NEWS

PRESIDENT'S LETTER

Moving the ASPP Education Foundation to the Next Level

In 1995, ASPP created an Education Foundation with the 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." The primary motivation for creating the foundation was to provide ASPP with resources to educate the public regarding scientific advances in plant biology and biotechnology in a much broader forum than our peer-reviewed research journals *(Plant Physiology* and THE PLANT CELL) allow us. The foundation is directed by a board that consists of a chair, the *ex-officio* members representing ASPP (the president, treasurer, and ASPP executive director), and up to 12 members recommended by the chair and the president and approved by the Executive Committee.

The Society set aside $1 million of its endowment to generate investment interest that supports foundation activities. In addition, the first chairman of the foundation, Richard Laster, and ASPP members were successful in soliciting support from several leading agribusiness corporations, including Agracetus, Cargill, Empresas La Moderna, Monsanto Company, Novartis Seeds, Pioneer Hi-Bred International, Zeneca, Abbott Labs, and Weyerhaeuser. In 1998, corporate annual contributions totaled some 57,000. The ASPP membership has also supported the foundation, with contributions in 1998 of nearly $10,000. Thus, the net resources to operate the foundation on an annual basis average more than $140,000, including some $75,000 in endowment fund interest.

The foundation board has considered a wide range of educational activities in which to invest these resources, including K–12 education, international workshops on genetically modified plants, television shows explaining key aspects of plant biology and crop production, educational news releases (for instance, "Inside Science" videos, as used by the American Chemical Society), and the like. To date, our largest investment ($100,000) was for a project entitled "Plants for the 21st Century," which was done in collaboration with the Epcot Center at Walt Disney World in the spring of 1998. This program, as described in the May–June 1998 issue of the *ASPP NEWS,* involved trained Epcot representatives who provided an interactive 12-minute presentation five times a day. In their presentation, they described the process by which transgenic plants are made and explained some of the novel traits that can be created through this technology. A 10-minute videotape showing the activities associated with this program is available from ASPP headquarters, and it has been made available to ASPP members and interested parties. Those who viewed this exhibit were extremely satisfied with the results. It was estimated that more than 88,000 adults and children saw or participated in this exhibit during the time it was on display. Many more saw the video news release ASPP had produced on the exhibit, which was shown on television across the nation.

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Future ASPP Annual Meetings

2000

Saturday, July 15, through

Wednesday, July 19

San Diego, California

2001

Saturday, July 28, through

Wednesday, August 1

Providence, Rhode Island

ASPPNEWS

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Members of the foundation were also responsible for developing the "12 Principles of Plant Biology." The principles originated during an Education Foundation board meeting. The goal was to create a list of fundamental concepts in plant biology that should be generally understood at the K–12 level. The Education Committee has developed a brochure that relates the principles to the National Research Council Science Education Standards. The principles were distributed at the National Science Teachers Association exhibition March 25–28, 1999, and will be featured in *Biology*, by Neil Campbell, the most widely read undergraduate biology textbook in use.

Although the Education Foundation has made a good start, a great deal remains to be accomplished if it is to become the highly visible and sought-after information source that was originally envisioned. To that end the foundation needs to develop a vision of what it will become, and it needs to hire a director who will lead fundraising activities. With its current level of support, the scope of activities it can consider is fairly limited. The foundation also needs to recruit a new chair who will work with the director and help provide the leadership and inspiration for educational outreach activities. A meeting was held at the University of California, Berkeley, on June 4, 1999, to review the organization and past and future activities of the foundation (see the related story on page 6). The meeting was attended by some of the past and present members of the foundation board (notably, past presidents Russell Jones and Bob Buchanan, immediate past president Ken Keegstra, president Brian Larkins, president-elect Debby Delmer, and ASPP executive director John Lisack), as well as Bob Goldberg, Ernie Jaworske, Joe Key, Chris Somerville, Rodrick Park, and Susan Brady, coordinator of public programs for the Lawrence Hall of Science. The consensus opinion of the participants was that the ASPP Education Foundation has the opportunity to become an important source of public information on a number of issues, including the science and technology of genetically modified organisms (GMOs), and crop plants in particular. As I am sure you are aware, issues relating to GMOs and the food produced from them have become highly controversial in some parts of the world. There are governmental and industrial sources of information about GMOs, but these are not necessarily perceived to have broad (international) credibility with certain sectors of the public. ASPP is uniquely placed, through the intellectual capital and independent opinion of its membership, to become an important information source.

In the coming months, the Operations Committee (chair of the Board of Trustees Doug Randall, Ken Keegstra, Debby Delmer, and I) and John Lisack will be actively recruiting a new chair for the Education Foundation, and John Lisack will subsequently hire a director for the foundation. It is our intention to have a fully staffed and active ASPP Education Foundation before we enter the next millennium! If you have ideas regarding potential Education Foundation projects and activities, and of course sources for funding them, please contact John Lisack or a member of the Operations Committee. Input from ASPP members is always welcome!

Brian Larkins
University of Arizona
larkins@biosci.arizona.edu

Call For Nominations

The National Academy of Sciences is accepting nominations for the Gilbert Morgan Smith Medal to recognize excellence in published research on marine or freshwater algae.

Nominations will be accepted through September 1, 1999. For more information, contact:

National Academy of Sciences
Awards Program, Room 185
2101 Constitution Avenue, NW
Washington, DC 20418
Phone: 202-334-1602
Fax: 202-334-2153
E-mail: sgrodin@nas.edu
Web: national-academies.org/nas/awards

Journals Needed

The Universidad Politecnica de Cartagena is looking for collections of back issues of both *Plant Physiology* and THE PLANT CELL. Please contact Dr. Marcos Egea-Cortines, Max-Planck Institute, Carl-von Linne Weg 10, 50829 Koeln, Germany; e-mail cortines@mpiz-koeln.mpg.de (after September 6th, Marcos.Ega@etsia.upct.es), or Dr. Antonio Lopez, Rectorado, Universidad Politecnica de Cartagena, Edificio Regidor Paseo Alfonso XIII, Cartagena 30203, Spain; telephone 34-968-325-696, fax 34-968-325-700, e-mail Antonio.Lopez@rec.upct.es.

ASPP Participates in MIST Career Fair

The ASPP Education Committee coordinated the participation of the Society in the eighth annual Career Fair held by the Minorites in Science and Technology (MIST) Network at The George Washington University April 27–29, 1999. "The fair provides insight into the exciting world of science and technology in hopes of encouraging these students to pursue rewarding careers in the many related fields," stated Mary Phillips, of the MIST Planning Committee.

ASPP Executive Committee member Janet Slovin and ASPP members Bill Gordon and Doug Luster were on hand on different days of the exhibit to talk to students and respond to their inquiries. Approximately 1,500 junior high and high school students from Washington, DC, Virginia, and Maryland attended the fair. Many came loaded with questions for the exhibitors, which engendered lively discussions, especially for those students who demonstrated a genuine interest in plant science.

The 10-minute video "Plants for the 21st Century," highlighting the ASPP Epcot exhibit, ran continuously at the fair. Students were pleased to receive THE PLANT CELL and *Plant Physiology* posters. They also scooped up a number of ASPP brochures: *Principles of Plant Biology—Concepts for Science Education, Discovering How Plants Tolerate Salinity and Water Stress, Comparative Plant Genomics: Gene Discovery in Model and Crop Plants,* and career brochures. ASPP members can receive complimentary copies of these materials by sending a request to the ASPP Education Foundation at asppef@aspp.org.

The MIST Network was founded in 1987 and includes professional organizations, universities, and public and private industry interested in increasing the number of ethnic minorities who pursue careers in science, engineering, and technical disciplines.

Remember!

Job listings on ASPP's Web site are updated every Friday, so be sure to check in frequently. Some jobs listed online are not listed in the newsletter.

http://aspp.org/JOBS

General Research Grants
American Philosophical Society
Philadelphia, Pennsylvania

The American Philosophical Society awards grants toward the cost of scholarly research in all areas of knowledge except those where support by government or corporate enterprise is more appropriate. Projects likely to culminate in scholarly publications are preferred; projects in the creative or performing arts, for the general readership, and educational materials for classroom use are not eligible. Grants cover travel to the objects of research, purchase of photoreproductions of documents, and consumable professional supplies not available at the applicant's institution. The Society makes no grants for study, salary replacement, travel to conferences, consultation with other scholars, assistance with data entry, publication, or translation, or the purchase of permanent equipment, telephone calls, or stationery. Eligible applicants are expected to have held a doctorate for at least one year. Foreign nationals applying from abroad must state precisely what objects of research, ONLY available in the United States, need to be consulted. Amount of award averages $3000, with $6000 being the maximum. In accordance with federal regulations, a 1099 miscellaneous income form will be issued for all grants that exceed $600. Deadlines are March 1 for a decision by mid-June; October 1 for a decision by mid-January; December 1 for a decision by mid-March. Written requests for forms must indicate eligibility, specify the area of research, and state the proposed use of grant funds. Please include a self-addressed mailing label. Telephone requests for forms cannot be honored. Contact the Committee on Research, American Philosophical Society, 104 S. 5th Street, Philadelphia, PA 19106-3387. Questions concerning the eligibility of a project or applicant are accepted at 215-440-3429 or via e-mail to eroach@amphilsoc.org. American Philosophical Society information, directions, and forms can be downloaded from the APS Web site at http://www.amphilsoc.org (click on "research grants" on the homepage).

ASPP Contributes Strong Plant Science Representation at NSTA Convention

ASPP sponsored its second annual exhibit at the National Science Teachers Association National Convention, this year held in Boston from March 25 to 28. The Botanical Society of America (BSA) and the American Phytopathological Society (APS) joined ASPP with adjacent booths. One teacher, who brought along a large cohort of colleagues, described the exhibits as the "plant sciences extravaganza." By Saturday, the second day of the exhibit, teachers were arriving upon the recommendation of friends to visit the "plant place," observed Claudia Jasalevich, an APS coordinator.

ASPP member Paul Williams, Coe Williams, and Dan Lauffer, of the University of Wisconsin, presented the Wisconsin Fast Plants (WFP) display. ASPP member Louise Liao, of the Coalition for Education in the Life Sciences (CELS), worked with them. ASPP member Les Hickok, Tom Warne, and Stephenie Baxter, of the University of Tennessee, displayed the *C-Fern* demonstrations. Peg Henson of WFP demonstrated the popular "Sock Heads" teaching tool, created by ASPP member Dina Mandoli. ASPP plant cubes, plant genomics brochures, career pamphlets, and *Principles of Plant Biology* brochures were on hand and distributed to enthusiastic visitors.

Paul Williams spoke to the Council of State Science Supervisors on behalf of ASPP. He introduced the revised *Principles of Plant Biology—Concepts for Science Education* brochure, which matches principles to the National Research Council's Life Science Standards. He also explained to the supervisors that there were three professional plant societies exhibiting together this year, following ASPP's initiative last year.

Both the WFP and the *C-Fern* programs built on the *Principles of Plant Biology* with interactive activities and scientific explorations. With an underlying theme of encouraging teachers to become science practitioners, hands-on demonstrations and inquiry-based investigations led to extended teacher observations and discussions about the science inherent in the plants. "The genuine interest and enthusiasm of the teachers and visitors with whom we interacted impressed us," stated Les Hickok. All materials were presented in relation to the National Research Council's Life Science Standards. With the WFP and *C-Fern* exhibits next to each other, visitors were able to understand the broad biological principles and complementary nature of both systems. They were also able to discover the obstacles to reaping a seed harvest in the "Farming Fast Plants" demonstration, a process they can use in their classrooms. The teachers spun a "Wheel of Fortune" to see their numerical seed harvest after facing obstacles such as "Aphids attack = 25 seeds" or "Water reservoirs dried out over the weekend = 100 seeds." WFP used soda bottles, film canisters, and paper boxes that are readily translated to student activities. The hands-on activity of constructing a film can hand lens/greenhouse drew 800 teachers in the first day-and-a-half of the exhibit, with teachers lined up four deep and 10 across to participate. "The teachers clearly appreciated the low-cost, easily accessible, and incredibly engaging activities showcased by the *C-Fern* and the Wisconsin Fast Plants programs," commented Louise Liao.

The *C-Fern* exhibit featured a mini-culture inoculation, along with a microscope for observation of living cultures, a video microscope of swimming sperm and chemotaxis, and a continuously playing video of *C-Fern* gametophyte and young embryo development ("*C-Fern:* Spore to Embryo"). In a hands-on activity, *C-Fern* staff guided visitors through the process of inoculating a small culture of *C-Fern* nutrient medium with a spore suspension. Staff described culture maintenance and provided an overview of the potential educational applications of *C-Fern* in the classroom. Information cards and brochures were also provided. Visitors inoculated more than 850 cultures, one per person, over the duration of the exhibit.

More than 22,000 teachers participated in the convention, with many of them stopping by the plant exhibits. Approximately 2,500 K–12, undergraduate, and in-service teachers lingered at the ASPP exhibit to converse with staff. "From discussions with many attendees, ASPP, BSA, and APS are making a significant contribution to the educational community by providing materials and expertise for enhancing the plant biology curricula at the K–12 and undergraduate levels," stated Hickok. "This joint effort was an overwhelming success, judged by the disproportionately large crowds at these exhibits and the numbers of teachers who revisited on successive days of the NSTA convention," added Liao.

Paul Williams (right), of the ASPP Education Committee and Wisconsin Fast Plants, and Dan Lauffer, of Wisconsin Fast Plants, discuss their exhibits with teachers at the National Convention of the National Science Teachers Association held March 25–28.

Paul Williams holds the rapt attention of several NSTA teachers at the ASPP exhibit during the National Convention of the National Science Teachers Association.

New Directions for the Foundation

A group of ASPP leaders met June 4 in Berkeley, California, to review the accomplishments and discuss the future direction of the ASPP Education Foundation. In 1995, ASPP members established the Education Foundation to enhance the role of the plant sciences in a global society. Ever since, the foundation has contributed to the ways that plants and plant-based products sustain and improve life and the many promising new uses for plants made possible through basic research.

The ASPP Constitution states:

> The board of directors of the ASPP Education Foundation shall consist of the chair appointed by the president for a period of three years with the approval of the Executive Committee, the president, the president-elect, the immediate past president, the chair of the board of trustees, the treasurer, and twelve members recommended by the chair and the president and approved by the Executive Committee, four each year for a period of three years.

The Bylaws state:

> The board of directors of the ASPP Education Foundation shall promote and support education in the plant sciences to enhance the role of the plant sciences in a global society. The board will direct and report to the Executive Committee on all activities of the foundation including coordination of foundation budget requests with the board of trustees.

Taking action on 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," the foundation has adopted several outreach educational efforts. Senior executives of leading corporations, such as Monsanto Life Sciences, Novartis Seeds, Pioneer Hi-Bred International, Empresas La Moderna, and Cargill, have been appointed to the board of directors.

In the brief time since its inception, the foundation, working with the Education Committee and the Committee on Public Affairs, has—

- sponsored the creation of and distributed a two-minute video news release that was shown by television stations across the nation
- sponsored the creation of and distributed a 10-minute video on the Epcot display
- defined the *Principles of Plant Biology,* which form the core of an understanding of plant physiology
- distributed the *Principles of Plant Biology* to national and local science education organizations through conferences, workshops, annual meetings, and other national forums, such as the National Council of State Science Supervisors
- promoted the inclusion of the *Principles of Plant Biology* in the textbook *Biology,* read by nearly 250,000 undergraduate students each year
- assessed the needs of teachers in middle and high schools and worked to incorporate the *Principles of Plant Biology* into state science education standards
- sponsored a focus group of teachers from Louisiana, St. Louis, and Baltimore to determine teaching needs and standards
- provided curricular materials to teachers via ASPP's Web site
- sponsored advertisements educating the public about plant biotechnology
- generated news coverage of plant science issues and advances and brought this coverage to the attention of key leaders in business and government.

At the June meeting, Society leaders discussed their vision for the foundation and considered future activities. It was the consensus of the group that ASPP represents the intellectual focus of all plant sciences and that the challenge is to transfer a portion of that knowledge and understanding to the public. Several projects have been identified toward this end that include televised news clips and more extensive television programming. The foundation board next meets in fall 1999.

PEOPLE

ASPP Members Mattoo and Kochian Win USDA Awards

On June 9, ASPP member Autar K. Mattoo, a plant physiologist and biochemist with the U.S. Department of Agriculture, received a USDA honor award for major impact on world agriculture through pioneering research contributions in plant biology.

Mattoo has served as the research leader of the Agriculture Research Service Vegetable Laboratory in Beltsville, Maryland, since 1997. Before that, he was head of ARS's former Plant Molecular Biology Laboratory. His research established the concept that growth regulators called polyamines control plant hormones that, in turn, regulate leaf decay and fruit ripening.

ASPP member Leon V. Kochian, a plant physiologist and research leader with the U.S. Plant, Soil and Nutrition Research Laboratory in Ithaca, New York, received a USDA honor award for pioneering research on the cultivation of crop plant species on marginal soils and in the use of plants to remediate soils contaminated with heavy metals. Kochian has made key discoveries about the basic plant mechanisms governing toxicity and tolerance to aluminum in acid soils and the uptake of metals and radioisotopes in contaminated soils.

Halevy Elected to Norwegian Academy

Professor Abraham H. Halevy, of The Hebrew University of Jerusalem, Faculty of Agriculture, Rehovot, Israel, has been elected to the Norwegian Academy of Science and Letters. He received the diploma at the annual meeting of the academy in Oslo on May 3, 1999.

LET US HEAR FROM YOU!

ASPP NEWS welcomes comments on topics covered in the newsletter and on other points of interest to the profession. Letters are published as space permits and may be edited for clarity and length. Submissions may not necessarily be published; receipt is not acknowledged. Mail letters to Editor, ASPP NEWS, 15501 Monona Drive, Rockville, MD 20855-2768; e-mail nancyw@aspp.org.

WSSA UNDERGRADUATE RESEARCH AWARD – YEAR 2000

The Weed Science Society of America has developed an Undergraduate Student Research grant designed to encourage and involve exceptional undergraduates in agricultural research. Interested faculty members are encouraged to identify potential award candidates and discuss the possibility of sponsoring a research project. Awards may be used as a stipend, for research budget expenses (travel, supplies, etc.), to defer fees, to defray living expenses for summer research, or any combination of these items.

AWARD: Up to $1000 for support of undergraduate research to be conducted over a minimum of one-quarter/semester during 2000. This award may be used to defray the cost of research supplies or as a stipend. Support Of a faculty sponsor is required. Awards will be made to the student, to be administered by the faculty sponsor's department.

APPLICANT: The applicant is an undergraduate student with a strong interest in Weed Science. Students majoring in all related disciplines may apply.

TO APPLY: Applicants should prepare a 2-3 page research proposal, including time, address, phone number, title, objective, experimental approach, discussion, budget and references. The discussion section of the proposal should describe the expected results and their possible significance to Weed Science. The student should provide a cover letter in which general academic and career goals are discussed. A copy of the student's academic transcripts should also be provided.

FACULTY SPONSOR: Any faculty member who is actively engaged in Weed Science research is qualified to be a sponsor. The faculty sponsor should review the research proposal with special attention to the budget, and the distribution of funds should be approved by both the student and sponsor. In addition, the sponsor should provide a letter of reference including a statement of his/her willingness to supervise the proposed research and to provide needed space, equipment, and supplies above those requested in the proposal. The sponsor is encouraged to assist the student in presenting his/her results at a regional Weed Science meeting.

HOW TO APPLY: The completed proposal, academic transcripts, cover letter, and faculty letter of support should be forwarded to: Dr. John Jachetta, Dow AgroSciences, 9330 Zionsville Road, Indianapolis, IN 46268-1054; phone (317) 337-4672; fax (317) 337-4649; e-mail jjjachetta@dowagro.com. Proposals should be received no later than November 15, 1999. Funding decisions will be made by January 25, 2000, and presented at the 2000 WSSA National Meeting Awards Banquet.

DOE Energy Biosciences Budget Up Nearly 4 Percent in Senate Bill

The Senate Appropriations Subcommittee on Energy and Water Development held its markup (vote) on its fiscal year 2000 spending legislation May 25. Chairman Pete Domenici (R-NM) said this was the most difficult energy and water spending bill he has worked with in his past six years with the subcommittee because of the low overall allocation the subcommittee was given.

The non-defense part of the bill was down $490 million from the current year level and $608 million below the president's request, Domenici noted. He said that this low allocation to the subcommittee required reductions in energy research and science. For the Division of Energy Biosciences, the subcommittee approved $31 million for FY2000—an increase of nearly 4 percent. This compares to $29.862 million in FY99 and the president's request of $31.226 million. ASPP Campus Contacts in states with senators on the subcommittee sent letters to their senators urging support for basic plant research supported by DOE. In view of the low allocation, the increase for basic plant research approved by the subcommittee demonstrated a commitment by the subcommittee for research in this area.

The full Appropriations Committee in the Senate approved the legislation on May 27. Senate floor debate began June 14. The legislation passed on the Senate floor on June 16.

The numbers for energy research may not be as good on the House side when it moves its bill. Domenici noted that the House subcommittee allocation for energy spending is $1.8 billion less than even his subcommittee has. Tightened budget caps put in place by the balanced budget act are responsible for the low allocations.
As one appropriations staff member noted, the budget surplus is turning out worse than the deficit in providing funds for spending bills. The balanced budget agreement of 1997 establishing budget caps has succeeded in balancing the budget some four years ahead of schedule; however, Congress and the president are continuing to follow the ever-tightening budget caps because the Social Security account has subsequently been added into the budget considerations.

President Clinton first called for saving Social Security in a televised address to the nation in 1998. Neither party in Congress wants to be accused of "raiding" Social Security by "busting" the budget caps before the upcoming congressional elections.

Experts are not predicting that maintaining the budget caps will save Social Security. The fundamental problem facing Social Security when baby boomers retire will be more people collecting benefits at a time when there will be fewer people paying into Social Security.

Senate Asks President to Address Ag Biotech with Trading Partners

On June 14, the U.S. Senate approved a resolution (S. Res. 120) offered by Senator Charles Grassley (R-IA) requesting that the president raise the issue of agricultural biotechnology at the June G-8 Summit meeting. Although resolutions do not have the force of law, this resolution serves as a significant notice by the Senate to the president that further support from the administration is needed to address foreign trade barriers to modified agricultural products.

The resolution, with its preamble, reads as follows:

"Whereas biotechnology is an increasingly important tool in helping to meet multiple agricultural challenges of the 21st century;

Whereas genetically modified crops are helping to control weeds, insects, and plant diseases to increase crop yields and farm productivity, and to enhance the quality, value, and suitability of crops for food, fiber, and other uses;

Whereas agricultural biotechnology promises environmental benefits by reducing, or perhaps eliminating, the need for chemical pesticides, by improving the efficient utilization of fertilizer, thereby protecting water quality, and by conserving topsoil by reducing the need for tillage;

Whereas in recent years farmers have rapidly adopted agricultural biotechnology, with worldwide acreage of genetically modified crops growing from 4,300,000 acres in 1996, to 69,500,000 acres in 1998, which is more than a 16-fold increase;

Whereas American farmers planted biotech crops on about 38 percent of the soybean acreage, 25 percent of the corn acreage, and 45 percent of the cotton acreage, and within a few years over half of the agricultural crops grown in this country may be genetically modified;

Whereas increased agricultural productivity attained through greater use of biotechnology, in both developed and developing countries, holds a great deal of potential for meeting the nutritional needs of the world's population, of which at least 800,000,000 currently suffer from hunger or malnutrition;

Whereas despite the widespread adoption and extensive global benefits of biotechnology, marked differences among countries in their regulatory approaches are limiting substantially the use of, and trade in, agricultural biotechnology products;

Whereas an open international trading system for products derived from plant and animal agricultural biotechnology would make a broad array of improved products more affordable, including agricultural and food products, pharmaceuticals, and consumer products such as apparel, paper, cosmetics, soaps, and detergents;

Whereas because of the importance of international trade to the strength of the farm economy and the entire food and agriculture sector, any unwarranted

restrictions on trade in biotechnology products could seriously disrupt the farm economy and unjustifiably force farmers to choose between using agricultural biotechnology and exporting their production; and

Whereas the threat to agricultural production and trade from restrictions on products derived from modern biotechnology has become serious enough to warrant the attention of world leaders:

Now, therefore, be it Resolved, That it is the sense of the Senate that—

(1) as the world trading system moves toward a reduction of tariff and nontariff barriers, all countries should work to ensure that scientifically unfounded new barriers are not erected; (2) the President should raise at the June 1999 G-8 Summit the important issues surrounding the use of, and trade in, agricultural biotechnology; and (3) as world leaders prepare for a new round of negotiations on agriculture in the World Trade Organization, the G-8 Summit is an appropriate forum to seek a consensus with the major trading partners of the United States regarding—(A) recognition of the global benefits of agricultural biotechnology, especially in meeting the nutritional needs of millions of people in developing countries; (B) increasing consumer knowledge and understanding of agricultural biotechnology and its benefits; and (C) the adoption of rational, scientifically based systems for the regulation of biotechnology products and for eliminating unjustified barriers to the use of biotechnology products in international trade."

ASPP Congressional Exhibit Explains Plant Functional Genomics

The Fifth Annual Coalition for National Science Funding (CNSF) Congressional Exhibition and Reception held May 19 in the Rayburn House Office Building featured an exhibit explaining plant genomic research, sponsored by ASPP.

"Plant Functional Genomics: The New Engine for Biological Discovery" was the topic of the ASPP exhibit developed by Dr. John Ohlrogge of Michigan State University. The exhibit featured research conducted by the Arabidopsis Functional Genomics Consortium (AFGC). Ohlrogge prepared an exhibit poster and smaller version of the poster for distribution. Congressional staff, NSF officials, Congressman John Olver (D-MA), NSF Assistant Director Mary Clutter, and others visited with Ohlrogge at his exhibit to learn more about this research supported by the National Science Foundation Plant Genome Research program.

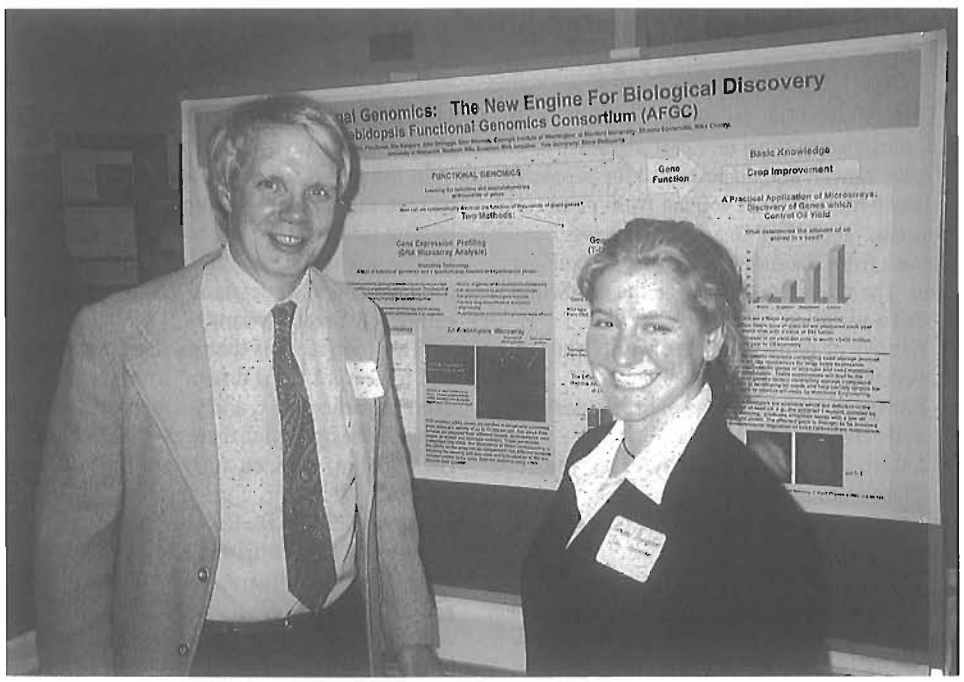
Ohlrogge explained that use of discovery methods such as gene expression profiling and gene inactivation will better enable scientists to engineer plants with enhanced yields in plant seed oils. He said that the development of value-added plants as a new and more effective source of industrial chemicals will aid American farmers, especially in times of food crop surpluses.

Ohlrogge noted that 70 million metric tons of plant oil are produced each year worldwide with a value of $45 billion. A 5 percent increase in oil yield per acre is worth more than $400 million per year to the U.S. economy. Plant-produced chemicals and fuels also offer benefits for the environment compared to petroleum-based products. Further, advances in this area will help address the huge petroleum trade deficit of the nation.

More than 100 congressional staff and 10 representatives attended the exhibition.

This is the fifth year that ASPP has participated in the CNSF Congressional Exhibition and Reception. ASPP's Office of Public Affairs helped initiate the exhibition five years ago by encouraging the CNSF steering committee to experiment with such an exhibition and by coordinating many of the planning and catering arrangements. The CNSF exhibition is the major event of the year for showcasing NSF-supported research for Congress.

Members of AFGC are Pam Green, Ken Keegstra, John Ohlrogge, and Ellen Wisman (Michigan State University); Shauna Somerville and Mike Cherry (Carnegie Institute of Washington at Stanford University); Mike Sussman and Rick Amasino (University of Wisconsin, Madison); and Steve Dellaporta (Yale University).



John Olhrogge, professor at Michigan State University, discusses his functional genomics research supported by NSF with Rachael Bohlander of Senator Spencer Abraham's (R-MI) office.

ASPP Member Martin Sachs Develops Flood-Tolerant Corn

Flood-tolerant corn breeding lines discovered by Agricultural Research Service scientist Martin M. Sachs offer farmers the prospect of salvaging crops despite flooding.

Sachs, based at the University of Illinois, has identified flood-tolerant South American plants that live up to three times longer under water than most North American corn varieties. He found the flood-resistant corn while screening 400 genetic land races from the International Maize and Wheat Improvement Center in Mexico City. He crossed the water-tolerant lines from South America with normal inbred North American lines. The results: One-half of the resulting corn plants survived flooding after the North American parents had died.

Sachs would like to determine the genetic, physiological, biochemical, and molecular differences these flood-tolerant inbreds have and ultimately isolate the gene or genes involved. So far, he has identified 10 different breeding lines, each of which shows a simple dominant trait for increased flood tolerance.

For now, he uses traditional breeding techniques to cross the desired trait into American corn lines. But he envisions that genetic engineering will allow him to fortify corn with even more flood tolerance from rice.

Sachs is director of ARS's Maize Genetics Cooperation Stock Center, part of the National Plant Germplasm System supported by the U.S. Department of Agriculture.

Novartis Seeds Supports ASPP Education Foundation

Novartis Seeds, a division of the Swiss-based multinational company, has contributed a significant annual donation to the ASPP Education Foundation. It joins many ASPP members and other corporations in the efforts of the foundation to educate the public on, and increase awareness of, basic plant science.

Novartis demonstrates its commitment to the foundation through its continuing financial gifts, membership on the foundation board of directors, and active participation in the foundation's meetings and projects, including the ASPP Epcot exhibit. Edward Shonsey, CEO of Novartis Seeds, brings his knowledge and worldwide expertise to the foundation. Ken Keegstra, immediate past president of ASPP, commented, "The generous participation of Novartis in the foundation is a tremendous asset."

Bridging the gap between basic research and scientific application, Novartis is increasingly engaging the collaboration of academic research groups, organizations, and institutions at key points across the United States and in Europe and Japan. The foundation board held one of its meetings at Novartis Seeds in Minneapolis, where board members enjoyed touring the site.

"Novartis Seeds and the ASPP Education Foundation share in the common goal to educate the public about the importance of plant biology, including research using biotechnology, in the development of our food supply," stated ASPP president Brian Larkins.

Healthiest Human Diet Based Largely on Food from Plant Sources

The "Unified Dietary Guidelines" designed to stave off heart diseases, stroke, cancer, and diabetes call for people to "choose most of what you eat from plant sources," according to a June 16 news release from the American Heart Association. The guidelines also urge the following:

- Eat a variety of foods.
- Eat five or more servings of fruits and vegetables each day.
- Eat six or more servings of bread, pasta, and cereal grains each day.
- Eat high-fat foods sparingly, especially those from animal sources.
- Keep your intake of simple sugars to a minimum.

The Unified Dietary Guidelines were developed following a national conference of experts including members of the American Heart Association's Nutrition Committee with the cooperation of the American Cancer Society, American Dietetic Association, American Academy of Pediatrics, and National Institutes of Health.

In the past, each health organization had its own nutritional recommendations, but by joining forces, they hope to make it easier for the public to heed their combined dietary message and to understand exactly what eating right really means.

"The good news is that we don't need one diet to prevent heart disease, another to decrease cancer risk, and yet another to prevent obesity and diabetes," said Richard Deckelbaum, M.D., co-author of the journal article.

Abby Bloch, Ph.D., R.D., of the American Cancer Society's Nutrition and Physical Activity Advisory Board, said "A diet with a variety of plant foods including fruits and vegetables, and low in fat, is the right choice for an overall healthy lifestyle."

The guidelines will be published July 27 in *Circulation: Journal of the American Heart Association.* The recommendations closely follow the U.S. Department of Agriculture's food pyramid and ensure that the diet contains enough vitamins, minerals, fiber, and other essential nutrients.

At the ASPP Education Foundation exhibit at Epcot last year, one of the themes discussed by communicators was the importance of eating a variety of fruits and vegetables. A "wheel of nutrition" at the exhibit featured various fruits and vegetables and listed nutrients and other beneficial compounds found in each plant. The exhibit showed that plant research using biotechnology could lead to increases in the amount of human health-enhancing compounds in plant-based foods. A complimentary 10-minute video of the exhibit is available to ASPP members by contacting the ASPP Education Foundation at asppef@aspp.org.

Anne Datko Retires After 30 Years of Federal Service

ASPP member Dr. Anne Datko retired April 1 after nearly 30 years with the federal government, the last 10 of which were with the U.S. Department of Agriculture's Competitive Grants Program.

In 1989, Dr. Datko joined the old Competitive Research Grants Office (CRGO) in the Cooperative State Research Service as program director of the Plant Abiotic Stress program for the 1990 program year. In 1991, CRGO was reorganized as the National Research Initiative (NRI) Competitive Grants Program, and she was named division director of two divisions: Natural Resources and the Environment and Enhancing Value and Use of Agricultural and Forest Products. She continued as program director of the Plant Responses to the Environment program, an expanded version of the Abiotic Stress program. In addition, she was the first program director of the Plant Genome program and continued with this program until 1994. In 1995, she became program director of the Improved Utilization of Wood and Wood Fiber program. Other responsibilities included representing the NRI on the NSF/DOE/USDA Joint Program in Collaborative Research in Plant Biology (Triagency Program) and the NSF/DOE/USDA/NASA Terrestrial Ecology and Global Change Program (TECO). She worked extensively with the USDA UV-B Monitoring Program and supported the development of a research quality UV-B spectroradiometer.

Dr. Datko began government service at the National Institute of Mental Health (NIMH) where, beginning in 1969, she was a member of a research section in the Laboratory of General and Comparative Biochemistry. The group, which also included Harvey Mudd and John Giovanelli, published a large number of papers on plant biosynthesis of the sulfur amino acids, the aspartate pathway, and the metabolism of the methyl group of methionine. Dr. Datko transferred to the NIMH Office of Extramural Programs in 1987, where she served as the science review administrator for the Biological and Neurosciences Subcommittee of the Mental Health Small Grants Review Committee. Prior to joining NIMH she had completed a Ph.D. in botany at McGill University in Dr. Gordon MacLachlan's laboratory. She earned a bachelor's degree in biology from Winthrop University and a master's in zoology from Duke University and worked with Drs. L. P. Zill and Bessel Kok at the Research Institute for Advanced Studies prior to attending McGill.

Public Affairs Initiatives Advance Plant Science

The ASPP public affairs program will mark its sixth-year anniversary on August 1. The Committee on Public Affairs, chaired by Lou Sherman the past three years and by Ralph Quatrano during the first three years, has worked closely with the leadership and ASPP Campus Contacts in addressing a broad range of issues affecting plant science.

ASPP Executive Committee member Vicki Chandler noted that it would be helpful to have a list of the program's accomplishments for use in explaining some of the Society's services to potential members. Following is a list of selected public affairs accomplishments:

Protecting USDA Support of Basic Research

One of the first accomplishments of the ASPP's program was to help turn back a skewed protocol at USDA that would have said that basic research does not contribute to sustainable agriculture. Use of the controversial protocol would have left USDA out of compliance with the sustainable agriculture section of the statute and on a subsequent course to support less basic research.

Turning Back Special Interest Effort to Narrow NRI Scope of Research

More recently, a segment of precision agriculture interests led by a major aerospace firm came up with their own approach to capture the bulk of NRI research funding. Again, ASPP led efforts to beat back that attempted raid on the NRI, for which one NRI official credited ASPP with saving the NRI.

Support for Phytoremediation Research

When ASPP suggested in comments to the Department of Energy in September 1994 that a new DOE environmental research program include phytoremediation research, DOE responded with $3.8 million in support of such research. We know of no other society that made such a request for phytoremediation research. Substantial credit must also go to Division of Energy Biosciences staff who worked in support of phytoremediation research.

Saving $3.2 Million in Energy Research Funds

The fiscal year 1996 budget for the DOE Division of Energy Biosciences was down more than $3.2 million in the authorization. As a result of ASPP Public Affairs action, the $3.2 million was restored in the FY96 appropriation.

Turning Back Earmark of NRI

ASPP successfully battled back a $3 million corn genome earmark of the NRI. Congress subsequently kept the $3 million in the NRI plant systems category available for award to the best plant research proposals as determined by peer review without any direction for corn genome research.

New Funds for Plant Genome Research

Senator Christopher (Kit) Bond led efforts in FY98 to provide $40 million in "new" funds for the "plant" genome research program at NSF—a 200-percent increase in plant genome research at the agency. ASPP advocated use of "new" funds instead of "existing" funds and support for "plant" genome research instead of exclusively "corn" genome research. In FY99, Senator Bond succeeded in providing $50 million for plant genome research sponsored by NSF. For FY2000, NSF and Senator Bond are seeking at least $55 million for plant genome research. On August 18, 1998, Senator Bond accepted the American Society of Plant Physiologists "1998 Leadership in Science Public Service Award." The Committee on Public Affairs voted to bestow this honor on him in recognition of his historic leadership in support of plant biology.

Saving Basic Plant Research Program Funds

In 1998, the ASPP Public Affairs Office saved the DOE Division of Energy Biosciences from losing all funding due to a typo in an appropriations committee FY99 budget report. ASPP also successfully beat back an earmark that would have taken $2.5 million from the Division of Energy Biosciences in FY99.

National and Local Media Coverage

ASPP has succeeded in getting positive coverage of plant research by many newspapers, television networks, magazines, and journals.

Developing Public Affairs Response Capabilities

The development of the ASPP Campus Contacts network provides timely, much-needed constituent letters and calls in support of plant research to congressional offices. The writing of topical issue briefs and the development of testimony and other comments on key policy issues help explain benefits of plant research to key officials.

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Hosting White House OSTP Science Section

Some additional Public Affairs activities have included hosting the retreat of the White House Office of Science and Technology Policy science section at ASPP headquarters, visiting key congressional offices and administration officials, and sponsoring congressional exhibits.

Winner of ASAE Government Relations Award of Excellence

Our peers in the association community have recognized ASPP's public affairs efforts. The American Society of Association Executives, representing 20,300 association professionals from more than 11,000 associations, awarded ASPP the 1997 Award of Excellence in Government Relations Certificate in a peer-reviewed competition.

Members can now update mail/e-mail/phone via a new form on the ASPP Web page. Visit our Web site at http://aspp.org/member_services/update.htm.

Release 7 of *Mendel* Database

Mendel is a database of nomenclature for sequenced plant genes. It provides common designations for gene families across the plant kingdom, as recommended by the Commission on Plant Gene Nomenclature (CPGN). We are pleased now to report the mounting of a new release of *Mendel,* 7.0, in the traditional ACeDB format, on the USDA–ARS Center for Bioinformatics and Comparative Genomics at Cornell University's Genome Web site (http://genome.cornell.edu/cgi-bin/WebAce/webace?db=Mendel/) and at Stanford's Genomic Resources site (http://genome-www.Stanford.edu/*Mendel*/).

New Features

Mendel 7.0 is more than twice as large as its predecessor and is contemporary with EMBL/GenBank sequence databases to February 1999. *Mendel 7.0* retains the model of sorting proteins by sequence similarity, which was introduced by the John Innes group under the direction of David Lonsdale. This feature was the key to making *Mendel* contemporary with the sequence databases. The CPGN wishes to express its gratitude to David and to his associates, especially Benedict Arnold, for automating accessions to *Mendel.* Last February, however, the John Innes group (Norwich, UK) announced that it could no longer support the CPGN's *Mendel* database.

The new release contains all protein sequences from Swiss-Prot, release 37. It includes the complete accessions of non-green algae and cyanobacteria in addition to the ongoing coverage of higher plants and green algae. *Mendel 7.0* lists many new gene family names, including those related to alcohol dehydrogenase, methyl transferases, transporters, and additional gene families of chloroplast YCFs and light-harvesting proteins.

Recognizing that function does not always correspond to simple sequence similarity, we have renamed the alignment sets derived through automation as *product families;* the term *gene family* is reserved for sets that share similarity of sequence *and* function, as determined by working groups. The CPGN endorses, and indeed promotes, the importance of integrating hand curation with automated sorting.

Restored Features

With the rush to automation, several important features of the original *Mendel* had become lost or obscured. A number of gene families that had been omitted from *Mendel 6* include families encoding RNAs, catalase, sucrose synthase, and subunits of RNA polymerase. We are also reinstating other features into *Mendel 7.0,* including the fields defining alleles, subgenomes, and links to other databases. Additionally, dialog boxes will be available for comments and suggestions.

Another restored feature of *Mendel 7.0* is the ability to search directly by gene product, in addition to all other parameters available in recent releases, such as plant species, gene synonyms, and accession numbers from EMBL/GenBank and Swiss-Prot.

Further Development of the CPGN Nomenclature

Within the last few months we have identified names for more than 200 new gene families, including a new category: **GeneFamily_Temporary.** Some of these temporary names have been proposed by working groups or by individual scientists; others are based on traditional gene names. All will need to be reviewed publicly on the CPGN's Web site. For example, names for gene families encoding components of acetyl-coenzyme A carboxylase are currently under discussion at http://mbclserver.rutgers.edu/CPGN/FattyAcid.group.html. Those names that survive will be presented for approval by the CPGN's associated scientists.

Interested members of the scientific community are invited to propose gene family names for yet unnamed product families; suggestions should be addressed to cpgn@mbcl.rutgers.edu. Discussions will be posted on the CPGN Web site at http://mbclserver.rutgers.edu/CPGN/Conversations.html. Contributors whose proposals for gene family names are adopted by the CPGN will be identified in *Mendel 7.1.*

We are currently talking with the manufacturer of an excellent relational database whose Web-based format has proved too slow and tedious under our test conditions. We hope to mount a later release of *Mendel* that will be fast, flexible and totally user friendly.

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Commission on Plant Gene Nomenclature
cpgn@mbcl.rutgers.edu

CPGN Web site
http://mbclserver.rutgers.edu/CPGN/
Cornell mirror site
http://genome.cornell.edu/cgi-bin/WebAce/webace?db=Mendel/
Stanford mirror site
http://genome-www.Stanford.edu/*Mendel*/

Getting Hooked on Ethylene

Hans Kende
MSU–DOE Plant Research Laboratory
Michigan State University

In the early 1970s, Jim Tavares and I were working on biochemical mechanisms by which cytokinins delayed foliar senescence. The question at that time was whether cytokinins maintained protein levels in excised leaves by enhancing RNA and protein synthesis or whether cytokinins retarded protein breakdown. Our experiments provided evidence in support of the latter notion (Tavares and Kende, 1970). The next obvious step was the identification of proteinases that were responsible for the degradation of proteins in senescing leaves. What better time and place to start this research than on a sabbatical leave in Philippe Matile's laboratory at the Federal Institute of Technology in Zurich, Switzerland? Phibus, as he is called affectionately by his friends, had performed pioneering research on the lytic compartment of plant cells, and we shared interests in understanding the role of hydrolytic enzymes during plant senescence. I arrived in Phibus's laboratory in the summer of 1972 and began working on proteinases of maize leaves. While I was busy grinding up leaves and assaying enzymes, Bruno Baumgartner, a graduate student in the laboratory, was investigating the remarkable senescence process of *Ipomoea* flowers. The flower of *Ipomoea,* or Japanese morning glory, opens in the morning and starts fading in the early afternoon (Fig. 1). By the end of the day, the corolla is rolled up, and sugars, amino acids, and nucleotides are retrieved by the plant through the action of hydrolases (Matile and Winkenbach, 1971). Today, we would call the tightly timed senescence of the corolla "programmed cell death," which it really may be. Bruno tried to influence the fading process of *Ipomoea* flowers by applying various plant hormones, but without success.

One day, as I was walking to work and thinking about Bruno's experiments, I suddenly remembered an elegant paper by Burg and Dijkman (1967) on the role of ethylene in the fading of orchid blossoms. It dawned on me that senescence of *Ipomoea* flowers must be controlled by ethylene as well. Because we did not have any ethylene in the lab, Bruno and I first tested this idea in an indirect manner. We cut some *Ipomoea* flowers and enclosed them in a desiccator together with the appropriate amount of dry ice, which, upon sublimation, would create a 4% CO_2 atmosphere. We performed this experiment because CO_2 was known to antagonize ethylene action. By the time we left for home late in the afternoon, the *Ipomoea* flowers exposed to CO_2 were still open, whereas the control flowers had faded. The next morning, we obtained some ethylene from the Chemistry Department and incubated flowers in an ethylene atmosphere. We were very excited to see the corollas roll up within less than two hours, long before the control flowers began to fade. Subsequently, we found that treating flowers for one hour with ethylene was long enough to induce "autocatalytic" ethylene synthesis and fading of the corolla (Kende and Baumgartner, 1974). This was the "turning point" that redirected my research toward working on ethylene synthesis and action. Along the way, I was lucky to have some exceptional students and postdocs join my lab, and I also profited greatly from the friendship and generosity of Morris Lieberman and Shang Fa Yang, two pioneers of ethylene research.

Hans Kende

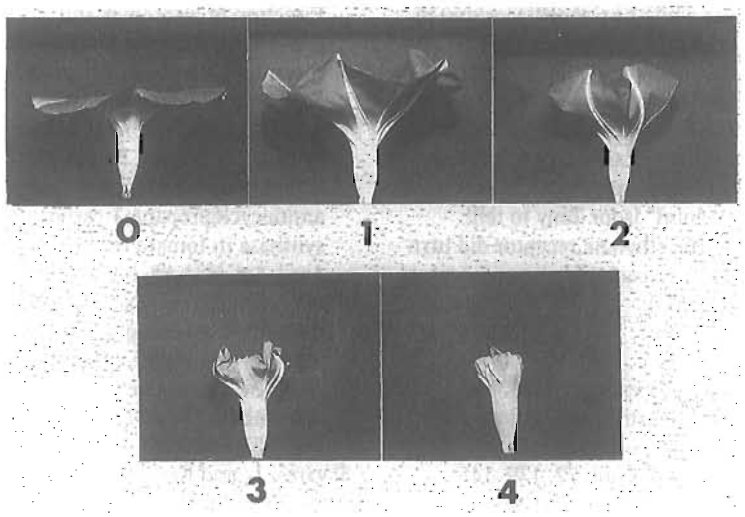

Figure 1. The fading of the morning glory flower. The corolla opens early in the morning (stage 0) and starts to roll up around 2 p.m. (stage 1). The fading process is completed by 5 p.m. (stage 4). Exposure of flowers to ethylene induces, within one to two hours, premature fading.

My sabbatical year in Philippe Matile's laboratory had a further happy consequence. While I was in Zurich, Thomas Boller was just finishing his undergraduate studies, and we got to know each other well. After receiving his Ph.D. in 1977, he joined my laboratory to characterize the hydrolytic enzymes of the central vacuole of plant cells. At the same time, we were also studying the conversion of [^{14}C]methionine to ethylene. In the fall of 1978, Yang and Adams discovered that 1-aminocyclopropane-1-carboxylic acid (ACC) was the immediate precursor of

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ethylene in apple tissue (Adams and Yang, 1979). Very generously, Shang Fa sent us a preprint of their PNAS paper. I consulted ChemSources and found, to my great surprise, that ACC was available from Calbiochem. I immediately ordered one gram of it. As soon as the ACC sample arrived, I tested whether it stimulated ethylene synthesis in *Ipomoea* flower tissue; it did so in a spectacular manner. As a control, I checked whether ACC in solution would spontaneously release ethylene and found this to be the case at a pH above 8. All this happened on a Friday. We realized that oxidative degradation of ACC to ethylene could serve as a convenient assay for ACC and that such a test would be very useful for the identification of the ACC-forming enzyme. Over the weekend, Thomas Boller worked out conditions under which up to 70% of the ACC was converted to ethylene (Boller, Herner, and Kende, 1979). A simpler assay, also based on the oxidation of ACC to ethylene at a high pH, was published in the same year by Lizada and Yang (1979).

During the fall of 1978, Bob Herner, from Michigan State University's Horticulture Department, spent a mini-sabbatical in my lab to study the pathway of ethylene biosynthesis in tomato fruits. With a suitable assay at hand, Thomas, Bob, and I decided that tomatoes would be the best source from which to isolate the ACC-forming enzyme, and we were delighted to find it without much difficulty. We described the kinetic properties of the enzyme; showed that aminoethoxyvinylglycine (AVG), a potent inhibitor of ethylene biosynthesis, acted in a competitive manner with respect to the substrate, *S*-adenosylmethionine; and established that the enzyme activity increased with ripening of the fruit. Our paper describing these results (Boller et al., 1979) was submitted for publication before Thomas returned to Switzerland in December 1978, and preprints were sent to Shang Fa Yang and Morris Lieberman.

The next step in our research was obvious, namely the purification of ACC synthase from tomato fruits. This was first attempted by a postdoc, Michael Acaster. Because of the vanishingly low levels of ACC synthase protein, it became clear that purifying it would not be a routine undertaking (Acaster and Kende, 1983). When Tony Bleecker joined my lab as a graduate student, he managed to purify ACC synthase 6,500-fold and, using this enriched preparation, was able to stimulate antibody production in mice. With the help of Shauna Somerville, he obtained monoclonal antibodies against ACC synthase from murine hybridoma cell lines (Bleecker et al., 1986). These antibodies were used to purify ACC synthase by immunoprecipitation. I hoped that we would be the first to clone an ACC synthase gene, but that was not to be (Sato and Theologis, 1989). However, we could show that at least two genes for ACC synthase were differentially regulated in tomato fruits during ripening and in response to wounding (Olson et al., 1991).

I had a long-standing interest in identifying hormone receptors. Because direct hormone-binding studies turned out to be unsuccessful, I was trying to come up with an alternative strategy. I had been struck by the observation that the concentration range over which plant hormones elicited an increasing response often covered three to four and sometimes even six orders of magnitude. This was indicative of adaptation or desensitization as the hormone concentration was raised (Kende and Gardner, 1976). In a research proposal submitted to NSF in 1981, I proposed to identify the ethylene receptor using the following reasoning: "In bacterial chemotaxis, adaptation and de-adaptation are connected to methylation and de-methylation of transmembrane receptor proteins.... If adaptation to ethylene can be found in rice, we shall investigate whether or not reversible covalent modifications of proteins occur during the periods of adaptation and de-adaptation.... The chances are that such proteins would be hormone receptors." Rice was chosen because Ku et al. (1970) had shown that ethylene promoted growth of rice coleoptiles. Our efforts to find covalent protein modifications in response to ethylene failed, but it was very gratifying that the first breakthrough toward identifying the ethylene receptor was achieved by Tony Bleecker while he was still working in my lab. Using a selection screen based on the triple response of dicot seedlings, he isolated the *etr1* mutant of Arabidopsis (Bleecker et al., 1988). The first indication that this was indeed a receptor mutant came from binding experiments using intact plants. However, this "turning point" is for Tony to tell! Interestingly, the ethylene receptor did turn out to be related to bacterial chemoreceptors (Chang et al., 1993).

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ASPP Education Forum

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Education Publications

In 1987, education posters first appeared at the ASPP national meeting in St. Louis. They've been going strong ever since, and we expect another crop of ideas, experiments, and programs to be presented this year. Although the education posters do foster a sharing of innovation and scholarship in education, the abstract/poster format is somewhat limiting. The Education Committee has long been thinking of an acceptable publication outlet for the authors of these posters and other relevant education articles. We feel strongly that more complete descriptions of original and significant scholarship related to plant biology education would provide a positive synergy for ASPP members involved in teaching and would help foster the more general adoption of ASPP's *Principles of Plant Biology—Concepts for Science Education* (http://www.aspp.org/education/asppprin.htm).

For those of us who wish to publish in the area of plant physiology education, scientific education journals present several problems. First, most plant physiologists are not aware of and do not read such journals. Plant scientists are focused on plant physiology and will most likely spend their time reading the research literature. So an article published in a science education journal will not reach our target audience—the membership of ASPP—nor will it provide the kind of prestige associated with a journal like *Plant Physiology*.

What is needed is a place to present such articles that is accepted as a scholarly plant education journal. One possible solution is an established science education publication such as the *Journal of Natural Resources and Life Sciences Education* (JNRLSE), a publication of the American Society of Agronomy (ASA) in cooperation with eight other science societies. ASA has invited ASPP to participate in this venture and to offer subscriptions to our membership. JNRLSE is available online, and articles are published in one hard-copy volume per year. The Education Committee is interested in finding out if most ASPP members have access to this journal in their libraries and if they would consider publishing education articles related to plant physiology in it.

Another possible solution is for ASPP to initiate an electronic journal devoted to education in plant physiology. An electronic journal must be more than a listserv (the Plant Ed network already offers quick answers to day-to-day questions) and more than just a Web page, which anyone can set up. An ASPP-affiliated electronic journal would provide regular publication of peer-reviewed education articles in plant physiology. Articles would include those based on many of the education posters that are presented at the annual meetings but would be much more in-depth. They would be preserved in an electronic archive and could be downloaded as PDF files like the articles in *Plant Physiology* and THE PLANT CELL. Providing the look and feel of a print journal would be necessary to ensure that authors receive appropriate academic credit for their scholarship.

The Education Committee is interested in your ideas about JNRLSE and about an ASPP-affiliated education journal. We plan to have a couple of copies of JNRLSE and a questionnaire available at the Education Booth during Plant Biology '99 in Baltimore (July 24–July 28). We hope that you will stop by and give us your comments and insight. If you are unable to attend the meeting this summer, please send your comments via e-mail to hcr@brown.edu.

UWS Women and Science Program Curriculum Reform Institute

Every June since 1997, science and mathematics educators from across the country have gathered in Wisconsin for a week of course reform and development. They are brought together by the Curriculum Reform Institute, a project of the University of Wisconsin System Women and Science Program. Developed with funding from the National Science Foundation, the Curriculum Reform Institute matches teams of educators with program mentors for a week of work on course projects proposed by the teams themselves.

The purpose of the institute is to support course projects related to mathematics, science, or engineering, including pedagogy and content shown to be beneficial for women pursuing scientific study. Because approaches to teaching that help to retain women have a positive effect on the learning of men and women alike, the range of projects developed under this program is large. Interdisciplinary courses such as "From Earth to Life," "The Human Genome Project," and "A Walk on the Moon" join with discipline-specific introductory and capstone courses as just some of the institute products. Here's what one participant had to say: "The working groups were great! Our team leaders were great! And collaborating with the other projects in our group was great. It was good because we actually got the time and opportunity to get the projects done."

Applications for the June 2000 institute will be available October 15, 1999, from the UWS Women and Science Program and are due December 17, 1999. For more information, contact the program at 920-424-7414 or www.uwosh.edu/wis.

This work was supported in part by NSF grant #DUE-9653437 to the University of Wisconsin Women and Science Program.

Deadlines for Education Grant Proposals

August 1, 1999: PRELIMINARY PROPOSALS, INFORMAL SCIENCE
Elementary, Secondary, and Informal Education; Program Announcement and Guidelines
Publication NSF 99-92
Division of Elementary, Secondary, & Informal Education (703-306-1628)

August 15, 1999: FULL PROPOSALS, INSTRUCTIONAL MATERIALS DEVELOPMENT
Elementary, Secondary, and Informal Education; Program Announcement and Guidelines
Publication NSF 99-92
Division of Elementary, Secondary, & Informal Education (703-306-1628)

August 25, 1999: FULL PROPOSALS, TEACHER ENHANCEMENT
Elementary, Secondary, and Informal Education; Program Announcement and Guidelines
Publication NSF 99-92
Division of Elementary, Secondary, & Informal Education (703-306-1628)

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August 30, 1999: PROPOSAL DEADLINE
NSF Computer Science, Engineering, and Mathematics Scholarships Program — Program Announcement
Publication NSF 99-121
Division of Undergraduate Education (703-306-1670)

August 30, 1999: TARGET DATE*D2
Instrument Development for Biological Research
Publication NSF 98-119
Division of Biological Infrastructure (703-306-1470)

September 1, 1999: FORMAL PROPOSALS FOR CETP INSTITUTIONAL FOCUS AND SYSTEM-WIDE FOCUS
Undergraduate Education Program Announcement and Guidelines
Publication NSF 99-53
Division of Undergraduate Education (703-306-1670)

September 3, 1999: DEADLINE FOR RECEIPT OF PROPOSALS
Biological Research Collections (BRC)
Publication NSF 98-126
Division of Biological Infrastructure (703-306-1470)

September 7, 1999: FULL PROPOSAL DEADLINE
Integrative Graduate Education and Research Training Program (IGERT)
Publication NSF 98-96
Directorate for Biological Sciences (703-306-1400)

September 15, 1999: DEADLINE DATE
ESR Student Achievement Data Set Analyses — Special Solicitation
Publication NSF 99-122
Division of Research, Evaluation & Communication (703-306-1650)

September 15, 1999: PROPOSALS
Research Experiences for Undergraduates Program (REU)
Publication NSF 96-102
National Science Foundation (703-306-1234)

OBITUARIES

Oleg Georgievich Malishev

Professor Oleg Malishev, president of the Cherkask Region of the Ukraine Society of Plant Physiology and one of the pioneers in the discovery of C4 photosynthesis, died May 19, 1999, in Uman', Ukraine.

Malishev was born in 1944 in the Ul'yanovsk Region of Russia. He received his master's degree in physiological biochemistry from the Tiraspol' Pedagogical Institute in 1968. He then joined Professor Y. S. Karpilov's laboratory in the Moldavian Institute for Research in Irrigation Farming and Vegetable Growth, where he contributed to one of the first descriptions of C4 photosynthesis. In 1973, he received his Ph.D. from the Plant Physiological Institute, Kiev (USSR) Ukraine. He then worked in the Ministry of Food Industry in the Moldavian Republic of the USSR until he joined the faculty at Uman' Pedagogical University, Uman', Ukraine, in 1983.

During his career, Malishev developed many strains of soybean that are used throughout Ukraine and other countries. He had collaborations with scientists around the world, including those from the United States, Australia, and the former Soviet Union. He published more than 50 scientific articles dealing with carbon metabolism of C4 photosynthesis, breeding and productivity of soybean, and plant ecology. Throughout his career he continued to work with C4 plants; his planned "atlas" of the C4 plants of Ukraine remains unfinished. He was one of the founding organizers of the Green Society, which is the only environmental preservation organization in Ukraine.

Oleg's students and colleagues will not forget his helpfulness and great sensitivity. His optimism, love of life, dedication to the preservation of the environment, and great humor will long be remembered.

Karl Y. Bil
Institute of Basic Biological Problems
Russian Academy of Sciences
Pushchino, Moscow Region, Russia
University of Wyoming, Laramie

John N. Nishio
University of Wyoming, Laramie

Alan Wellburn

ASPP headquarters was recently informed of the death of member Alan Wellburn of the University of Lancaster on May 8. Dr. Wellburn had been a member since 1987.

Franklin Gailey

ASPP headquarters was recently informed of the death of emeritus member Franklin Gailey of Berea College. Dr. Gailey had been a member since 1955.

Workshop in China

The international plant biology workshop, entitled "Advanced Plant Biochemistry: Signal Transduction and Metabolic Engineering," was held at Huazhong (Central China) Agricultural University, Wuhan, China, from June 9 to 18. The workshop was co-sponsored by ASPP, the National Natural Science Foundation of China, Ministry of Agriculture of China, State Bureau of Foreign Experts of China, and Huazhong Agricultural University. It featured lectures, seminars, and group interactions in the day and laboratory exercises in the evening. It attracted a broad audience across China; approximately 160 plant biologists from 25 higher learning and research institutions took part in the workshop. The participants exhibited great enthusiasm and dedication to teaching and learning. The lectures were well organized and received, and group discussions were highly interactive and insightful. Some of the evening laboratory exercises lasted until 2:00 a.m.

Eleven speakers from three countries participated: One was from Canada, three were from China, and seven from the United States. The speakers, in alphabetic order, and their topics were—

Illimar Altosaar, University of Ottawa, Bt toxins and engineering crops for insect resistance

Ming Cheng, Monsanto Company, St. Louis, plant transformation and crop improvement

Susheng Gan, University of Kentucky, molecular mechanisms and genetic manipulation of leaf senescence

Tuan-Hua David Ho, Washington University, promoter analysis and ABA signaling and its role in gene regulation

Scot Hulbert, Kansas State University, the molecular basis of plant resistance to disease

Da Luo, Shanghai Research Centre of Life Sciences, the genetic control of plant development

Bruce McClure, University of Missouri, the biochemistry and molecular biology of interspecific pollen rejection

Xuemin Wang, Kansas State University, seed oil metabolism and the role of lipids in signal transduction

Wei-Hua Wu, China Agricultural University, K^+-uptake mechanisms and analysis of low-K^+-tolerant mutants

Qifa Zhang, Huazhong Agricultural University, genome research and molecular breeding

Ling Zheng, Kansas State University, methods to study protein–protein interactions.

This workshop was co-organized by Xuemin Wang (ASPP) and Qifa Zhang (China).

Group Photo of ASPP–China Workshop Participants.

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 28, through
Wednesday, August 1

1999

AUGUST

August 3–7
6th International Congress on Amino Acids
Bonn, Germany
Contact Bijay K. Singh, American Cyanamid Company, PO Box 400, Princeton, NJ 08543-0400; telephone 609-716-2066, fax 609-275-5216, e-mail singhb@pt.cyanamid.com.

August 7–11
1999 APS/CPS Annual Meeting
Palais des Congres de Montreal, Quebec, Canada
Closing date is May 14, 1999. Contact Rhonda Wilkie, Advertising & Exhibit Sales Representative, 3340 Pilot Knob Road, St. Paul, MN 55121-2097; telephone 651-454-7250, fax 651-454-0766, e-mail rwilkie@scisoc.org.

August 10–12
First MIAC-Mexico Plant Biotechnology Conference: Biotechnology and the Response to Stress in Plants
University of Nuevo, Leon, Monterrey, Mexico
Information on Monterrey, registration and the schedule of events can be obtained from Dr. Héctor Cortinas Escobar Apdo. Postal 172 de Río Bravo, Tam. C.P. 88900 Mexico; fax 01-893-4-07-45.

August 15–20
International Conference on Assimilate Transport and Partitioning
Integration of Structure, Physiology and Molecular Biology
NSW, Australia
Information can be found at http://www.newcastle.edu.au/icatp/ or contact Assoc/Prof Tina Offler, Co-Convener & Conference Secretariat ICATP'99, Department of Biological Sciences, The University of Newcastle, Callaghan NSW 2308; Australia; telephone +61-2-4921-5704, fax +61-2-4921-6923, e-mail icatp@newcastle.edu.au.

August 23–27
Plant Protein Club Annual Symposium
Pathway Engineering in Plants
Fundamental Research and Industrial Applications
York, United Kingdom
Contact Plant Protein Club, University of York, PO Box 373, York YO10 5YW, United Kingdom; telephone/fax +44-1-904-434327, e-mail ppc@york.ac.uk, Web site http://www.york.ac.uk/org/ppc.

August 28–September 1
Cellular Responses to Oxidative and Osmotic Stress, Sensing, Signalling and Gene Expression
Egmond aan Zee, Netherlands
Meeting registration deadline is April 2, 1999. For information contact Dr. Pim Mager, telephone +31-20-444-7569, e-mail mager@chem.vu.nl, and for more details visit our Web site at http://www.chem.vu.nl/STAR99/index.html.

SEPTEMBER

September 3–8
Tetrapyrrole Photoreceptors in Photosynthetic Organisms
Castelvecchio Pascoli, Italy
Deadline for applications: May 3, 1999. Chairman: Roberto Bassi, ViceChairman: Samuel I. Beale. For information and application forms, contact the Head of the Euresco Unit: Dr. Josip Hendekovic, European Science Foundation, 1 quai Lezay-Marnésia, 67080 Strasbourg cedex, France; telephone +33-3-88-76-71-35, fax +33-3-88-36-69-87, e-mail euresco@esf.org, Web site http://www.esf.org/euresco.

September 12–17
CO_2-Fixation and Metabolism in Green Plants
Gordon Research Conference, Queen's College
Oxford, United Kingdom
Organizers: H. J. Bohnert, R. Chollet, C. Foyer. Contact H. J. Bohnert, fax 520-621-1697, e-mail bohnerth@u.arizona.edu. For a tentative program, see http://www.grc.uri.edu/programs/1999/CO2.htm.

September 14–18
International Symposium
Ethnobotany Medicinal Plants: Folk Traditions, History, Pharmacology
San José, Costa Rica
For participation and information, please contact the organizers: Simposio, PO Box 6131, 1000 San José, Costa Rica; e-mail simposio@nexos.co.cr. Ronald Chaves can be contacted at fax +506-283-02-63 (Costa Rica) and Professor Alain Touwaide can be contacted at fax +506-283-02-63 (Spain). Visit our Web site at http://www.costarica.com/wg/simposio.

September 17–22
Plant Cell Biology & Biotechnological Applications
Signal Recognition, Transduction Mechanisms & Gene Regulation
Rolduc, The Netherlands
Deadline for applications is July 9, 1999. For information and application forms, contact the Head of the EURESCO Unit: Dr. Josip Hendekovic, European Science Foundation, 1 quai Lezay-Marnesia, 67080 Strasbourg cedex, France; telephone +33-3-88-76-71-35, fax +33-3-88-36-69-87, e-mail euresco@esf.org, Web site http://www.esf.org/euresco/lc99090a.htm.

September 26–30
Silicon in Agriculture
Lago Mar Resort
Fort Lauderdale, Florida
For information, contact Nikki Rogers, Office of Conferences and Institutes (OCI), University of Florida, Leadership and Education Foundation, Inc., Institute of Food and Agriculture Sciences, PO Box 110750, Building 639, Mowry Road, Gainesville, FL 32611-0750; telephone 352-392-5930, fax 352-392-9734, e-mail njr@gnv.ifas.ufl.edu, Web site http://www.ifas.ufl.edu/~conferweb/silicon.htm.

OCTOBER

October 6–14
Optical Microscopy and Imaging in the Biomedical Sciences
Short Course
Marine Biological Laboratory
Woods Hole, Massachusetts
Deadline August 3, 1999. For application forms and information, contact Carol Hamel, Admissions Coordinator, Marine Biological Laboratory, 7 MBL Street, Woods Hole, MA 02453-7401; telephone 508-289-7401, e-mail admissions@mbl.edu, Web site http://www.mbl.edu.

October 10–13
The 9th Gatlinburg Symposium
University of Tennessee, Knoxville
For information on the scientific program, contact Dr. Barry D. Bruce at 423-974-4082 or bbruce@utk.edu. For conference details and registration information, contact Ms. Susan Davis, 212 Conference Center Bldg., Henley Street, University of Tennessee, Knoxville, TN 37996; telephone 423-974-0280, e-mail susandavis@utk.edu.

October 20–22
Autumn School "Biosynthesis and Differentiation of Plant Storage Organs and Products"
Wageningen, The Netherlands
Organizers: D. Vreugdenhil and R.G.F. Visser. Contact Dick Vreugdenhil: fax +31-317-484740, e-mail dick.vreugdenhil@algem.pf.wau.nl. Scientific program and registration: http://www.spg.wau.nl/pf.

October 30–November 2
3rd México-US Symposium
"Plant Biology at the End of the Second Millennium, a Bilateral Overview"
Mérida, Yucatán, México
For information, contact Teresa Hernández-Sotomayor Ph.D. at ths@cicy.mx or see Web site at http://www.cicy.mx/index.html.

DECEMBER

December 11-14
International Conference on Life Sciences in the Next Millennium
Hyderabad, India
For information, please contact the conference secretariat at: The Convener, School of Life Sciences, University of Hyderabad, Hyderabad - 500 046, India; telephone +91-40-3010265, fax +91-40-3010 120 or 145, e-mail iclsnm@uohyd.ernet.in, Web site http://www.uohyd.ernet.in/curr/slconf.htm.

2000

MARCH

March 26–29, 2000
The 5th International Conference on "Plasma Membrane Redox Systems and Their Role in Biological Stress and Disease"
Hamburg, Germany
Detailed information about the conference and a form to receive the first circular can be found at http://www.rrz.uni-hamburg.de/biologie/ialb/redox2000/redox.htm. You can also contact the organizers by sending e-mail to REDOX2000@botanik.uni-hamburg.de or contact M. Böttger, O. Döring, and S. Lüthje, Institut für Allgemeine Botanik, Ohnhorststr. 18, D-22609 Hamburg, Germany; telephone +49-40-82282-345 /348, fax +49-40-82282-254.

APRIL

April 1–5, 2000
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/.

MAY

May 13–18, 2000
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, 2000
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, 2000
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.

JUNE

June 11–16, 2000
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.uch.gr. Also, visit the symposium Web site at http://www.biology.uch.gr/meetings.

OCTOBER

October 3–6, 2000
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/.

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

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):

[ ] Permanent [ ] Temporary [ ] Postdoctoral [ ] Industrial
[ ] Academic [ ] Government [ ] USA only [ ] 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 its location

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

Employer and location	From	To	Position, Title, Duties

References (names, addresses, telephone numbers):

ASPP Job Placement Service

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

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

Department Head and Professor
Virginia Tech, Blacksburg
(Received 5/10)

The Department of Plant Pathology, Physiology, and Weed Science has nationally and internationally recognized programs in plant pathology, weed science, stress physiology, plant transgenics, and conventional plant protection. The Department has 29 faculty, 25 support staff, and 30 graduate students. (For further information visit http://www.ppws.vt.edu.) Four faculty positions have been filled recently, and the department will occupy sizable space in the soon-to-be constructed Plant Sciences building. The head provides leadership and administrative oversight of the department's diverse teaching, research and extension programs. Maintenance of an active research program and participation in educational and/or extension activities are expected. Candidates should possess a record of distinguished professional accomplishments in one of the major disciplines housed in the department or related plant science disciplines, administrative experience, proven leadership and interpersonal skills, communication skills, and a vision of innovative programs in basic and applied plant biology. Applicants should submit a curriculum vitae, a statement of intent, and names of five references. Confidentiality will be maintained until the final slate of candidates is selected. Application review will begin on August 1, 1999. Send application materials to Dr. L. A. Swiger, Dean of the College of Agriculture and Life Sciences, Virginia Tech, Blacksburg, VA 24061-0402. Virginia Tech is an equal opportunity/affirmative action employer.

Assistant-Level Cooperative Extension
Agricultural Experiment Station
University of California, Riverside
(Received 05/14)

The University of California, Riverside, is recruiting for an academic career-track appointment (11 months) position in the area of environmental horticulture-nursery and floriculture crops. Salary is commensurate with education and experience. Applicants must have a Ph.D. degree and research experience with plants. Postdoctoral experience is desirable. The position has both a CE research and education component and an AES research component related to California nursery and floriculture production. Expectations include planning and establishing statewide extension programs addressing nursery and floriculture production concerns for exotic and native plant species. Expertise in one or more of the following areas is desirable: plant physiology, plant improvement, post-harvest handling of crops, soil and water science, pest management, and restoration horticulture. Send letter of application, curriculum vitae, statement of research interests, transcripts, and names and addresses of at least three references to Dr. Elizabeth M. Lord, Chair, Botany and Plant Sciences, University of California, Riverside, CA 92521-0124; fax 909-787-4437, e-mail lord@ucrac1.ucr.edu, Web site http://cnas.ucr.edu/~bps/homepage.htm. Deadline: Review of files will begin in early September 1999 and will continue until the position is filled. The position is available January 1, 2000. The University of California, Riverside, is an affirmative action/equal opportunity employer.

President and CEO
Boyce Thompson Institute
Cornell University, Ithaca, New York
(Received 05/27)

The Boyce Thompson Institute for Plant Research, Inc. (BTI) is seeking nominations and applications for the position of president and chief executive officer. BTI is a non-profit, independent, privately endowed corporation affiliated with and located on the Cornell University campus. The broad scope of research conducted includes environmental biology, insect biology, chemical ecology, plant molecular biology, and plants and human health. Currently in its 75th year of operation, BTI has an annual operating budget of $15 million, and employs approximately 150 scientists and support staff, 47 at the Ph.D. level. The ideal candidate will be a scientific leader with proven administrative ability and demonstrated success in recruiting and fund-raising. Applications and nominations will be held confidential and should be directed to Ronnie Coffman, Associate Dean for Research, CALS/Cornell and Chair of the Search

THE DEADLINE FOR ADS FOR THE SEPTEMBER/OCTOBER ISSUE OF *ASPP NEWS* IS AUGUST 30, 1999.
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*.

Committee, c/o Lucy Pola, BTI, Tower Road, Ithaca, NY 14853. Inquiries may be directed to Ronnie Coffman at wrc2@cornell.edu. Review of nominations and applications will begin June 1, 1999, and will continue until the position is filled. The target starting date is between June 1 and September 1, 2000. BTI is an affirmative action employer and women and minorities are encouraged to apply.

Plant Ecologist
University of Toronto, Scarborough
(Received 05/28)
The Division of Life Sciences, University of Toronto at Scarborough, invites applications for a tenure-stream position in plant ecology. Applicants must have a Ph.D. (or equivalent) and preferably one or more years of postdoctoral experience. The successful candidate will complement current research and teaching strengths in the division and will be expected to take an active role in both undergraduate and graduate teaching, and to develop a strong research program. Interested applicants should submit a complete curriculum vitae, a statement of research and teaching interests, three letters of recommendation (including comments on teaching ability and publications), and copies of recent reprints to Dr. Ron Dengler, Associate Chair, Biology, Division of Life Sciences, University of Toronto at Scarborough, 1265 Military Trail, Scarborough, Ontario, Canada M1C 1A4. The closing date for applications is September 30, 1999. The appointment will be at the assistant professor level, and salary will be commensurate with qualifications. The position will be effective July 1, 2000, subject to budget approval. In accordance with Canadian Immigration requirements, this advertisement is directed to Canadian Citizens and permanent residents of Canada. In accordance with its Employment Equity Policy, the University of Toronto encourages applications from qualified women and men, members of visible minorities, aboriginal peoples, and persons with disabilities.

Assistant/Associate Professor of
Plant Quantitative Genetics
Iowa State University, Ames
(Received 06/01)
The Department of Agronomy is seeking a quantitative geneticist to enhance its tradition of excellence in crop improvement research and education. The incumbent will conduct innovative, multidisciplinary research emphasizing quantitative and population genetics, selection theory and methodology, or evolutionary and ecological genetics. The research program will be primarily applied to the breeding and improvement of small grain crops. Opportunities exist for collaborative research with a diverse group of faculty from plant breeding and genetics, bioinformatics, agronomy, food science, and plant pathology. The incumbent will teach a graduate course in quantitative genetics and advise graduate students. Start-up funds and annual research support are available. Required Qualifications: Ph.D. degree in plant breeding or a related discipline with special emphasis in quantitative genetics and in statistics, and supporting study in contemporary biological sciences. Demonstrated interest, competence or accomplishment in educating graduate students and research mentoring; strong skills in written and oral communication; and evidence of positive experience in working as a team member in cooperative research. Preferred Qualifications: Two to five years of experience in university teaching and research. Position is available January 1, 2000. Submit a letter of application, resume, two-page statement of research plans, reprints of research papers, and names, addresses, and telephone numbers of four references to Dr. Thomas Loynachan, Interim Head, Department of Agronomy, Iowa State University, Ames, IA 50011-1010; telephone 515-294-7636, fax 515-294-3163, Web site http://www.iastate.edu/~hrs_info/jobs/4titles.htm#1. Application deadline is September 30, 1999. Iowa State University is an EO/AA Employer.

Assistant/Associate Professor of Extension Soil Management and Environmental Soil Science
Iowa State University, Ames
(Received 06/01)
The Department of Agronomy is seeking a soil scientist with 70% extension and 30% research appointment. Primary responsibilities will be to develop a strong extension and outreach program in Soil Resource Management with an emphasis on environmental issues in soil management as they relate to tillage, crop production, land use, and soil productivity on and in Iowa soils. The incumbent will be expected to interact in team approaches to problem solving with faculty at ISU, agency personnel, and agribusiness agronomists in developing a research program and in delivering the extension education program. The incumbent will participate in graduate education and may also participate in undergraduate teaching as their schedule permits. There are excellent opportunities for collaborative research and education projects with scientists at the National Soil Tilth Laboratory, the Leopold Center for Sustainable Agriculture, and with crop physiologists, agricultural economists, agricultural engineers, and other faculty. Start-up funds and annual research funds are available. Required Qualifications: Ph.D. in soil science or closely related field; demonstrated expertise in soil management and soil conservation as they relate to environmental issues and crop production; ability to interact and communicate well both orally and in writing with farmers, peers, professionals, agency personnel, and others; and ability to secure external funding. Preferred Qualifications: Post Ph.D. experience in environmental soil science and soil management and in extension program delivery. Experience using distance-learning technologies to deliver extension education programs. Evidence of ability to publish in peer-reviewed publications and in extension publications. Farm experience is desirable. Position is available January 1, 2000. Submit a letter of application, resume, two-page statement of research plans, reprints of research papers, and names, addresses, and telephone numbers of four references to Dr. Thomas Loynachan, Interim Head, Department of Agronomy, Iowa State University, Ames, IA 50011-1010; telephone 515-294-7636, fax 515-294-3163, Web site http://www.iastate.edu/~hrs_info/jobs/4titles.htm#1. Application deadline is September 30, 1999. Iowa State University is an EO/AA Employer.

Tree Fruit Scientist
Oregon State University, Corvallis
(Received 06/04)
The Department of Horticulture, Oregon State University, seeks exceptional candidates in horticulture for a tree fruit scientist position at the assistant or associate professor level. A 12-month tenure-track position will be available January 1, 2000. The position is located at the Mid-Columbia Agriculture Research and Extension Center in Hood River, Oregon. The successful candidate will develop a nationally recognized research program supporting tree fruit production physiology or integrated management systems with a primary emphasis on fresh and processed cherry. Research emphasis will be on aspects of orchard establishment systems including, but not limited to, evaluation and physiology of rootstocks and cultivars, flowering and fruit set physiology, fruit production and quality, nutritional and water management, and physiology and management of biotic and abiotic stress. The candidate must have the ability to direct graduate students and research assistants. The candidate will be expected to work effectively with collaborators at the station, on campus, throughout the Pacific Northwest, and in other disciplines. The applicant must have a Ph.D. degree in horticulture or a closely related field with experience or interest in tree fruits and competence in written and oral communication. Applicants must submit a statement of interest, curriculum vita, transcripts, and three letters of reference. For additional information, call or write Dr. Anita Azarenko, Search Committee Chair, Department of Horticulture, Oregon State University, 4017 ALS, Corvallis, OR 97331-7304; telephone 541-737-5457. Send all application materials to the above address. For full consideration, apply by August 30, 1999; open until filled. OSU is an AA/EEO employer and has a policy of being responsive to dual-career needs.

Lecturer
The Chinese University of Hong Kong
Shatin, New Territories
(Received 06/14)
A position is available for a lecturer in the Department of Biology (carrying the academic title of Assistant Professor or Associate Professor, as appropriate) (Ref. no. 99/072[053]/2). The closing date is July 31, 1999. Applicants should have a Ph.D. in molecular biology or plant biology and relevant postdoctoral research experience. The appointee will: (a) teach undergraduate courses in plant molecular biology, plant biotechnology, microbial biotechnology, and other biotechnology-related courses offered by the Department and the new Molecular Biotechnology Program; and (b) develop a vigorous and competitive research program on plant molecular biology and biotechnology or related areas. Preference will be given to applicants with experience in teaching and independent research in the application of molecular biological approaches and techniques to the study of plant metabolism, functional genomics, and ge-

netic engineering crops for improvement. Some experience in plant cell transformation and tissue culture is preferred. The appointment will be made initially on a fixed-term contract basis for 2 to 3 years from January 2000, and will be renewable subject to performance and availability of funding. The annual salary and fringe benefits are HK$554,280–925,980 by 10 increments (approximately exchange rate in June 1999: £1 = HK$12.52; US$1 = HK$7.75). Starting salary will be commensurate with qualifications and experience. Benefits include leave with full pay, medical and dental care, and where applicable a children's education allowance, housing benefit for eligible appointee (subject to the rules for the prevention of double housing benefits), and a contract-end gratuity (up to 15% of basic salary). Further information about the University and the general terms of service for teaching appointees is available at our homepage at http://www.cuhk.edu.hk. Please send a resume, copies of academic credentials, a publications list and/or abstracts of selected published papers, together with names and addresses (fax numbers and /e-mail addresses if available) of three referees to Personnel Office, The Chinese University of Hong Kong, Shatin, New Territories, Hong Kong; fax 852-2603-6852 before July 31, 1999. Please quote the reference number and mark "Application" on the cover.

Chief Administrative Officer
West Central Research & Outreach Center
University of Minnesota, Morris
(Received 06/24)
The Minnesota Agricultural Experiment Station is requesting applications for a 12-month, administrative position as head of the West Central Research & Outreach Center (WCROC) with academic rank and tenure in a relevant discipline. The head is the chief administrative officer of WCROC and is a member of an administrative group that establishes programs and priorities for the Minnesota Agricultural Experiment Station under the direction of the director. The head is responsible for the personnel and fiscal administration plus the research and educational programs and public relations activities of the WCROC. Requirements include a Ph.D. in an agricultural or related science with a minimum of eight years of experience in research. Desired preparation includes documented research, education and administrative experience, and demonstrated capability in fiscal and personnel management. Also the candidate should have experience in successfully collaborating with people such as educators, scientists, farmers, and agri-business leaders; organizing research teams; building consensus; and providing leadership in a cooperative manner. The candidate should have effective organizational, oral, and written communication skills and the ability to successfully interact with both rural and urban clientele. Experience with agricultural production systems is preferred. It is desired that the candidate demonstrate a commitment to equal opportunity and affirmative action. Send a letter of application that includes a statement of interest related to this position, CV, college transcripts, two selected reprints, and five letters of reference including names and addresses of the individuals providing letters of reference by October 15, 1999, to Dr. Frank Pfleger, c/o Terry Beseman, West Central Research & Outreach Center, State Hwy 329, PO Box 471, Morris, MN 56267. Inquiries should be directed to Dr. Frank Pfleger at 612-625-9736, e-mail francisp@puccini.crl.umn.edu. The University of Minnesota is an equal opportunity employer. Additional information on the WCROC and the College of Agricultural, Food and Environmental Sciences can be obtained at the following Web sites: http://ww.wces.agri.umn.edu and http://www.maes.umn.edu.

POSTDOCTORAL POSITIONS

Postdoctoral Positon
University of Florida, Lake Alfred
(Received 05/20)
A postdoctoral position is immediately available in plant molecular biology to characterize and determine the function of proteins associated with citrus blight (Plant Mol. Biol. **38**, 775–783; 1998). Applicants should have training and experience in molecular biology, good communication skills and be able to work independently. Please send curriculum vitae with cover letter describing research experience and names, e-mail addresses, and phone numbers of three references to Ken Derrick, CREC, University of Florida, Lake Alfred, Fl 33850; telephone 941-956-1151, e-mail ksd@icon.lal.ufl.edu.

Positions Available in Functional Genomics and Eukaryotic DNA Repair Mechanisms
The Samuel Roberts Noble Foundation
Ardmore, Oklahoma
(Received 05/26)
Bioinformatics Research Associate/Assistant Scientist—Position #70. Candidates will be expected to conduct original research in computational methods required for functional genomics, including whole genome sequence comparisons and high density DNA array data sets. Candidates must have demonstrated research productivity in the area of bioinformatics, computational biology, or computer science, and will direct the development and execution of the bioinformatics strategy for the Plant Biology Division's *Medicago truncatula* Functional Genomics Program. Additional positions are available in the laboratory of Dr. Gregory D. May, associate scientist, Plant Biology Division. Area of research: functional genomics.
Postdoctoral/Research Associate—Position #71. The research aim is to understand gene function in the model legume *Medicago truncatula*. Candidates must have extensive experience in the generation of cDNA libraries and the automation of biological experiments for high-throughput analyses. Experience with large-scale sequencing, expression profiling, or robotics is a plus. Experience in designing and developing new databases on an industrial scale is highly desirable. Candidates must have an appreciation of the magnitude and pace of genomic research.
DNA Repair Mechanisms Postdoctoral—Position #72. Position includes characterization of plant DNA repair enzymes with an emphasis on REC2 (RAD51B) and MutS homologs. Candidates must have demonstrated research productivity in the biochemistry and/or molecular genetics of eukaryotic DNA repair. Send a cover letter stating the number of the position you wish to apply for (#70, 71, or 72), areas of interest, full curriculum vitae, and the names and addresses of three referees to Mrs. Jane Nance, Human Resources, The Samuel Roberts Noble Foundation, PO Box 2180, Ardmore, OK 73402; e-mail jenance@noble.org. Further details can be obtained from G. D. May, at gdmay@noble.org. The Noble Foundation is an equal opportunity employer.

Postdoctoral Research Associate
Texas Tech University
Lubbock, Texas
(Received 05/28)
A postdoctoral position is available September 1, 1999, to investigate the response to stress of cotton plants transformed to overexpress antioxidant enzymes. The researcher will develop a mechanistic understanding of the observed protection afforded to transgenic cotton and will assess their performance in the field. Applicants must have a Ph.D. in plant physiology, biochemistry, or related fields. Experience with chlorophyll fluorescence and other analyses of photosynthetic electron transport is strongly preferred. Send a curriculum vitae and have three letters of reference sent to Dr. Scott Holaday, Department of Biological Sciences, Texas Tech University, Lubbock, TX 79409-3131; fax 806-742-2963, e-mail bdash@pop.ttu.edu.

Postdoctoral Research Associate
University of Wisconsin, Madison
(Received 06/02)
A postdoctoral research associate is sought to study protein chemistry and molecular aspects of isoprene emission from plants. This will involve cloning isoprene synthase and collaboration in molecular studies of enzymes in the deoxyxylulose pathway, which leads to isoprene. Transcriptional and posttranslational control of isoprene synthase have been demonstrated and will be studied. Please send a letter describing your experience and goals, curriculum vitae, and names, phone numbers, and e-mail addresses of three references to Thomas D. Sharkey, Department of Botany, 430 Lincoln Dr., University of Wisconsin, Madison, WI 53706; telephone 608-262-6802, e-mail tsharkey@facstaff.wisc.edu.

Postdoctoral Position
University of California, Los Angeles
(Received 06/07)
A postdoctoral position is available at UCLA (http://www.lifesci.ucla.edu/mcdbio/html/lin.html) to study plant blue-light responses in Arabidopsis (Science **279**, 1360–1363; 1998). The applicant should have a Ph.D. in plant science and experience in plant molecular biology. Interested candidates should send a letter and curriculum vitae to Dr. Chentao Lin, Department of Molecular, Cell and Developmental Biology, University of California, Los Angeles, CA 90095-1606; email clin@mcdb.ucla.edu.

Postdoctoral Position
University of Minnesota, St. Paul
(Received 06/07)
A postdoctoral position is available to investigate the role of specific maize beta tubulins. Research will focus on how disruption of tubulin genes by transposon insertion affects maize chilling tolerance, fertility, development, and morphogenesis. The position includes opportunities to spend several weeks working at our industrial research partner's facilities. Applicant needs a strong background in plant molecular genetics. Experience with maize is desirable. To apply, send a curriculum vitae, a cover letter describing research experience, and e-mail addresses of three references to Dr. Sue Wick at swick@biosci.cbs.umn.edu. The University of Minnesota is an equal opportunity educator and employer.

Postdoctoral Fellowship
University of Lisbon, Portugal
(Received 06/08)
A postdoctoral fellowship is available. Research Area(s): Cloning (mutagenesis), production and purification of proteins(s) in an over-expression system; study of the protein(s) role in the mechanisms of intracellular signal perception and transduction (using confocal and cool CCD video microscopy). This is a two-year position. Salary is 270.000 PTE/month. Starts: September 1999. Research laboratory: Department of Plant Biology, Faculty of Sciences of Lisbon (http://correio.cc.fc.ul.pt/~cbv). Desired experience is a Ph.D. in biology/biochemistry (or equivalent) with expertise in molecular biology. To obtain information or send applications (with curriculum vitae) contact Rui Malho, Department de Biologia Vegetal, FCL, Bloco C2, Campo Grande, Lisboa; telephone 1-750-0069, fax 01-750 0048, e-mail r.malho@fc.ul.pt.

Postdoctoral Position
University of Idaho, Moscow
(Received 06/09)
A postdoctoral position is available immediately to study a group of pathogen- and salicylic acid-induced WRKY DNA-binding proteins in tobacco (Plant J. **16**, 515–522; 1998 and Plant J. **18**, 141–149; 1999). The project will focus on the regulation and functions of these DNA-binding proteins during plant defense responses to microbial pathogens. The candidate should have a Ph.D. with a strong background in molecular biology and protein biochemistry. Experience in protein purification is strongly preferred. Please send a letter of application, curriculum vitae, and three letters of reference to Dr. Zhixiang Chen, Department of Microbiology, Molecular Biology and Biochemistry, University of Idaho, Moscow, ID 83844-3052; telephone 208-885-4030, fax 208-885-6518, e-mail zchen@uidaho.edu.

Postdoctoral Position
New Mexico State University, Las Cruces
(Received 06/15)
A three-year postdoctoral position is available to study the role of oxidative stress in crop/weed interactions and determine oxidative stress tolerance mechanism(s) responsible for crop/weed success. Applicants should have a Ph.D. in plant physiology or biochemistry, weed science, or a related field and experience in enzymology, analytical techniques, or plant physiological ecology. Starting salary will be about $32,000 with benefits. The position is available October 1, 1999. The closing date is September 1, 1999, or until the position is filled. Please submit an application letter, a resume, transcript copies, reprints, and three letters of reference sent to Dr. Tracy M. Sterling, Department of Entomology, Plant Pathology and Weed Science, MSC 3BE, New Mexico State University, Las Cruces, NM 88003; telephone 505-646-6177, fax 505-646-8087, e-mail tsterlin@nmsu.edu. New Mexico State University is an equal opportunity institution.

Postdoctoral Research/Teaching Position
University of North Texas, Denton
(Received 06/16)
Beginning the fall semester of 1999, a unique position is available that combines research support with teaching experience (approximately 75% research, 25% instruction) in the biochemistry program at the University of North Texas (UNT). The candidate will teach the first semester of senior undergraduate biochemistry in the fall. In the spring semester, the applicant will be expected to coordinate plus deliver 30% of the lectures in a team-taught graduate course in advanced intermediary metabolism. In addition, the candidate will conduct research in plant defense signaling in a joint project between UNT and the Samuel Roberts Noble Foundation's Plant Biology Division. Specifically, the project is aimed at isolating a receptor(s) for membrane-lipid-derived second messengers involved in signal transduction of pathogen perception. A Ph.D. in biochemistry, molecular biology, or a related discipline is required, and research experience in lipid biochemistry or receptor biology is preferred. The initial appointment is for 12 months, but depending upon progress and availability of funding, a second year at 100% research is anticipated. UNT is located in the Dallas-Ft. Worth metroplex, and is the largest, most comprehensive university in the region with an enrollment of about 26,000. A curriculum vitae and names of three references should be sent to Dr. Kent D. Chapman, Director of the Biochemistry and Molecular Biology Division, University of North Texas, Department of Biological Sciences, Denton, TX 76203-5220; e-mail chapman@unt.edu. UNT is an equal opportunity employer.

Postdoctoral Position
University of Stellenbosch, South Africa
(Received 06/21)
A postdoctoral position will be available January 1, 2000, to study the regulation of carbohydrate metabolism during ripening and maturation in sugarcane and grapes. Applicants should have a Ph.D. and a strong background in plant physiology/biochemistry. Experience in protein purification, enzymology, and metabolic flux analysis is required. To apply, send your curriculum vitae and the names and addresses of three references to Dr. F. C. Botha, Institute for Plant Biotechnology, University of Stellenbosch, Private Bag x1, Matieland, 7602, South Africa; fax +27-21-8083835, e-mail fcb@maties.sun.ac.za.

Postdoctoral Position
University of Stellenbosch, South Africa
(Received 06/21)
A postdoctoral position will be available January 1, 2000, to study the tissue-specific expression of genes involved in carbohydrate metabolism in sugarcane and grapes. Applicants should have a Ph.D. and a strong background in molecular biology and plant biochemistry. Experience in in situ hybridization work is required. To apply, send your curriculum vitae and the names and addresses of three references to Dr. F. C. Botha, Institute for Plant Biotechnology, University of Stellenbosch, Private Bag x1, Matieland, 7602, South Africa; fax +27-21-8083835, e-mail fcb@maties.sun.ac.za.

Postdoctoral Position
University of Missouri—Columbia
(Received 06/21)
A postdoctoral position is available to investigate the roles of MAP kinases and other protein kinases in plant stress responses. The applicant should have a Ph.D. in plant science and experience in plant biochemistry or molecular biology. Interested candidates should send an application letter and curriculum vitae to Dr. Shuqun Zhang, Department of Biochemistry, University of Missouri-Columbia, 117 Schweitzer Hall, Columbia, MO 65211; telephone 573-882-5837, fax 573-884-4812, e-mail zhangsh@missouri.edu. MU is an equal opportunity/affirmative action/ADA institution.

Postdoctoral Position
University of Southampton, Southampton, UK
(Received 06/22)
A postdoctoral position is available to study the role of heavy-metal (CPx-type)–ATPases in metal transport and homeostasis using the model plant Arabidopsis. This will involve functional studies following heterologous expression of the family members in yeast and expression analysis using promoter–GUS constructs and northern analysis. In addition, a mutant-based approach will be taken to establish the physiological role of the individual CPx-ATPases. Knockout mutants defective in family members will be isolated using a PCR-based reverse genetics approach, and the mutant phenotype will be analyzed using a combination of physiological and biochemical experiments. Relevant molecular experience is desirable and applications are invited as soon as possible. To apply send curriculum vitae and covering letter (including names of two academic referees) to Dr. L. E. Williams, School of Biological Sciences, Biomedical Sciences Building, Bassett Crescent East, Southampton, SO16 7PX; e-mail lew@soton.ac.uk.

Postdoctoral Position/Research Assistant
Kansas State University, Manhattan
(Received 06/22)
Two positions are available for a one-year term (extended if funding available) to investigate the molecular mechanisms involved in floral organ development in Arabidopsis and wheat and/or phosphorylation of cell cycle regulators. Experience in molecular biology techniques and/or protein biochemistry preferred. Join a growing department. B.A./B.S. required, M.S. or Ph.D. preferred. Send curriculum vitae, statement of research, experience, and names and contact information for two references to Judy Roe, Division of Biology, Ackert Hall, Kansas State University, Manhattan, KS 66506-4901; e-mail jroe@ksu.edu. Kansas State University is an equal opportunity employer and actively seeks diversity among its employees.

Postdoctoral Position
Kansas State University, Manhattan
(Received 06/25)
A postdoctoral position is available immediately to study the molecular–genetic mechanisms of signal transduction in plant defense against disease. Emphasis will be on the identification and characterization of genes involved in the activation of systemic acquired resistance in Arabidopsis and wheat. Research in Arabidopsis will focus on the characterization of mutants with defects in salicylic acid signaling (Plant Cell **11**, 191–206, 1999; Genes & Dev. **11**, 1621–1639, 1997). Additional projects involve the identification and characterization of genes differentially expressed in these mutants. The candidate should have a Ph.D. with a strong background in plant molecular biology and genetics. Previous experience working with Arabidopsis or wheat, and with Differential Display or cDNA subtractive cloning, would be useful. Send curriculum vitae and letter of application outlining previous research experience and research interests, and have three letters of recommendation sent to Dr. Jyoti Shah, Division of Biology, Kansas State University, Ackert Hall, Manhattan, KS 66506; fax 785-532-6653, e-mail shah@ksu.edu. Kansas State University is an equal opportunity employer and actively seeks diversity among its employees.

Postdoctoral Position
Virginia Tech, Blacksburg
(Received 06/29)
A postdoctoral position supported by a USDA–NRICGP grant is available immediately to continue studies involving the use of antisense genes to characterize the physiological functions of glutathione S-transferases in rice. Candidates should have demonstrated expertise in molecular biology and biochemical techniques. Experience with herbicide physiology is beneficial, but training is available. For publications related to this project, see Wu et al., 1999, Physiologia Plantarum **105**, 102–108. Starting salary is $25,000–$30,000 per year plus benefits, depending on experience and qualifications. The position is renewable for up to three years. Send curriculum vitae, a letter describing research interests and experience, and three letters of recommendation to Dr. Kriton K. Hatzios, Department of Plant Pathology, Physiology, and Weed Science, Virginia Tech, Blacksburg, VA 24061-0331; fax 540-231-7477, e-mail hatzios@vt.edu, Web site http://www.ppws.vt.edu. Application review will begin on August 15, 1999. Virginia Tech is an equal opportunity/affirmative action employer.

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

Research Associate
Oklahoma State University, Stillwater
(Received 05/20)
A position for a research associate is available for up to 2½ years to study the structure of cell wall pectins using cell wall-degrading enzymes, NMR, and mass spectroscopy. See (Zhan D, Janssen P, & Mort A. J. [1998] Scarcity or complete lack of single rhamnose residues interspersed within the homogalacturonan regions of citrus pectin. Carbohydr. Res. **308**, 373–380), for a recent example of our work. The ideal candidate for the position will have experience with modern chromatographic methods, capillary electrophoresis, and polysaccharide characterization. Experience with cloning and expression of proteins in yeast or bacteria will also be useful. Please send applications to Dr. Andrew Mort, Department of Biochemistry and Molecular Biology, 246 NRC, Oklahoma State University, Stillwater, OK 74078; e-mail amort@biochem.okstate.edu. The position is available immediately.

Postdoctoral Position
Cornell University, Ithaca, NY
(Received 06/21)
A postdoctoral position is available September 1 in the Department of Fruit and Vegetable Science for three years. The objective of the project is to investigate metabolism of strawberry fruit with different postharvest tolerances to carbon dioxide. We are looking for a person with a strong background in biochemistry because research will involve metabolite analyses, enzyme activity assays, and measurement of carbon flux using radioisotopes. Starting salary is $26,000 plus benefits. Please send a letter of interest and curriculum vitae and arrange to have three letters of reference sent to Dr. Chris Watkins, Department of Fruit and Vegetable Science, Cornell University, Ithaca, NY 14853; telephone 607-255-1784, fax 607-255-0599, email cbw3@cornell.edu.

Specialist
Plant Gene Expression Center
University of California, Berkeley
(Received 06/22)
A Specialist position is available to investigate the molecular basis of signal perception and transduction by the phytochrome family of photoreceptors. Qualifications required: Extensive experience in plant molecular photobiology, protein biochemistry and genetics, including difference spectroscopy, site-directed mutagenesis, recombinant protein and monoclonal antibody production, yeast two-hybrid analysis, transgenic Arabidopsis production, computational biology and computer graphics. Send curriculum vitae and names of three referees by August 31, 1999, to Dr. Peter H. Quail, Plant Gene Expression Center, 800 Buchanan St., Albany, CA 94710; fax 510-559-5678. The University of California is an equal opportunity/affirmative action employer.

Senior Research Assistant
Samuel Roberts Noble Foundation
(Received 06/30)
The Forage Biotechnology Group (FBG) at The Samuel Roberts Noble Foundation (www.noble.org) is seeking a senior research assistant in the area of molecular marker/genomics research. The senior research assistant will provide technical support in the use of molecular markers for identification of QTL and marker-assisted breeding in forage grasses. Requires an M.S. in biological sciences or a B.S. with two years of relevant work experience. Work experiences should include the use of RFLP/AFLP or other molecular markers. Salary $24,890–$37,330 depending on qualifications and experience. Attractive health and retirement benefits provided. Please send a letter of application and a detailed resume and arrange for three letters of reference to be sent to ATTN: Position #40–(FBG Senior Research Assistant), Human Resources Dept., The Samuel Roberts Noble Foundation, PO Box 2180, Ardmore, OK 73402. Applications will be received until a suitable applicant is found. The Noble Foundation is an equal opportunity employer.

ASSISTANTSHIPS, FELLOWSHIPS, INTERNSHIPS, ETC.

Graduate Research Assistantship
Oklahoma State University, Stillwater
(Received 05/13)
A graduate research assistantship is available immediately to a qualified student interested in pursuing either an M.S. or a Ph.D. at Oklahoma State University. Research topics will be in the areas of plant biotechnology and molecular biology, with a particular focus on gene isolation and expression, protein purification, and engineering of disease resistance in plants. Applicants should have a solid understanding of plant biology and preferably some experience in molecular biology and/or plant pathology. A letter of application, resume, a short statement of research interest, transcripts, GRE and TOEFL (for international students) scores, and three letters of reference should be submitted to Dr. Yinghua Huang, Department of Forestry, Oklahoma State University, 112B Noble Research Center, Stillwater, OK 74078; telephone 405-744-6431, fax 405-744-7373, e-mail huangyx@okstate.edu. Oklahoma State University is an equal opportunity employer.

General Research Grants
American Philosophical Society
Philadelphia, Pennsylvania
(Received 05/27)
The American Philosophical Society awards grants toward the cost of scholarly research in all areas of knowledge except those where support by government or corporate enterprise is more appropriate. Projects likely to culminate in

scholarly publications are preferred; projects in the creative or performing arts, for the general readership, and educational materials for classroom use are not eligible. Grants cover travel to the objects of research, purchase of photoreproductions of documents, and consumable professional supplies not available at the applicant's institution. The Society makes no grants for study, salary replacement, travel to conferences, consultation with other scholars, assistance with data entry, publication or translation, or the purchase of permanent equipment, telephone calls, or stationery. Eligibility applicants are expected to have held a doctorate for at least one year. Foreign nationals applying from abroad must state precisely what objects of research, ONLY available in the United States, need to be consulted. Amount of award averages $3000 with $6000 being the maximum. In accordance with federal regulations, a 1099 miscellaneous income form will be issued for all grants that exceed $600. Deadlines are March 1 for a decision by mid-June; October 1 for a decision by mid-January; and December 1 for a decision by mid-March. Written requests for forms must indicate eligibility, specify the area of research, and state the proposed use of grant funds. Please include a self-addressed mailing label. Telephone requests for forms cannot be honored. Contact the Committee on Research, American Philosophical Society, 104 S. 5th Street, Philadelphia, PA 19106-3387. Questions concerning the eligibility of a project or applicant are accepted at 215-440-3429 or via e-mail to eroach@amphilsoc.org. American Philosophical Society information, directions, and forms can be downloaded from the APS Web site at http://www.amphilsoc.org (click on "research grants" on the homepage).

Graduate Assistant—Crop Physiology
University of Arkansas, Fayetteville
(Received 06/07)
This position is in the cotton physiology program directed by Dr. Derrick Oosterhuis. Research will be conducted to evaluate the mode of action of a new plant growth regulator incorporating *Bacillus cereus*. Studies will include effects on gas exchange, carbohydrates, metabolites generated, and dry mater partitioning. The study will also include the effects of environmental stresses on related physiological processes and yield formation. The program will involve field and controlled environment studies and opportunities for working and communicating with agro-chemical industries. Requires a B.S or an M.S. in plant or crop physiology or related degree. Applicant must be qualified for a graduate degree program. Experience needed working with metabolism or plant growth regulation, plant tissue sampling and analysis, statistics, computer skills, including SAS, WordPerfect, and graphic packages. Analytical expertise with various laboratory instruments and techniques including HPLC, GC, spectrophotometry, and plant analysis would be desirable. Experience with cotton research and production would be useful but not necessary. Stipend: $13,540 (with B.S.), $15,540 (with M.S.). Send letter of application, resume, official transcripts, and names and addresses of three references to Dr. Derrick M. Oosterhuis, Altheimer Laboratory, 276 Altheimer Drive, University of Arkansas, Fayetteville, AR 72704; telephone 501-575-3979, fax 501-575-3975. oosterhu@comp.uark.edu.

Graduate Research Assistantship
North Carolina State University, Raleigh
(Received 06/18)
A research assistantship at the M.S. or Ph.D. level is available to investigate the role of the sugar alcohol mannitol in stress tolerance in plants. The candidate will integrate physiological, biochemical, and molecular research to clarify the role of mannitol metabolism in environmental stress responses in plants. For a review on our work, see Stoop, Williamson, and Pharr (1996) Trends in Plant Science 1, 139–144. The assistantship carries a stipend of $14,000 per year at the M.S. level and $15,000 per year at the Ph.D. level. Candidates for the Ph.D. program must have M.S. in a related field (e.g., biochemistry or plant physiology) and will be guaranteed funding for three years. Interested candidates should send a letter of interest, a curriculum vitae, an official statement of the student's GRE or other standardized test scores, TOEFL scores if applicable, and a list of three referees with addresses, phone numbers, and e-mail addresses to Dr. Stewart Warren, Graduate Program Coordinator, Department of Horticultural Sciences, North Carolina State University, Raleigh, NC 27695-7609. For additional information, contact Dr. Mason Pharr at 919-515-1217, e-mail; mason_pharr@ncsu.edu, or Dr. John Williamson at 919-515-5366, e-mail john_williamson@ncsu.edu. Graduate school admissions application deadlines are: U.S. citizens: Fall semester, June 25 Spring, November 25. International applicants: Spring semester, August 15.

Katherine Esau Postdoctoral Fellowships
University of California, Davis
(Received 06/27)
Applications and nominations are invited for Katherine Esau Postdoctoral Fellowships, which will be awarded to outstanding young scientists interested in structural aspects of plants at the level of tissues, organs, and whole plants. Included would be studies in which plant structure is integrated with development, evolution, and/or function. Modern approaches to important questions in plant anatomy and morphology are encouraged. Preference will be given to candidates who have completed the Ph.D. within the past five years. Esau Fellowships will be awarded for a period of two years to enable successful candidates to work under the mentorship of a University of California, Davis, faculty member. The Esau Fellowship stipend is $26,000 per year plus benefits plus a $3,000 per year research allocation. Applications should include the identification of an appropriate faculty mentor(s), a complete curriculum vitae, graduate and undergraduate transcripts, reprints of published works, a proposal of the research that would be carried out under this program (limited to five single-spaced pages, 12-point font, 1-inch margins), and a statement of the relevance of the proposed research to the planned career in plant structure and development, evolution, and /or function. Applicants are required to provide three letters of reference and a letter of commitment of laboratory space and ancillary support from the proposed UC-Davis faculty mentor. Please send your completed application to Professor Judy Jernstedt, Chair, Faculty Advisory Committee, Esau Fellowships Program, Department of Agronomy and Range Science, University of California, Davis, One Shields Avenue, Davis, CA 95616; fax 530-752-4361. Inquiries may be made by e-mail to the chair at jjernstedt@ucdavis.edu. Fellowships will be awarded on an annual basis. The next deadline for this program will be November 1, 1999. The University of California is an equal opportunity employer.

Graduate Research Assistantships
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 May/June 1999 *ASPP NEWS*)

Postdoctoral/Graduate Student Positions
University of Connecticut, Storrs
(Repeat)
Biotechnology: postdoctoral and graduate student positions are available in the Department of Plant Science at the University of Connecticut. The research interests of faculty are as follows: **Dr. Carol Auer** (cauer@canr1.cag.uconn.edu): Biochemical and genetic approaches to understanding plant hormone (cytokinin) biosynthesis, regulation, and signal transduction; hormonal control of plant growth and development, especially developmental processes (shoot organogenesis) critical to plant transformation. **Dr. Gerald Berkowitz** (gberkowi@canr1.cag.uconn.edu): Molecular characterization of ion channel proteins. Molecular genetic approaches, in addition to biochemical, and patch/voltage-clamp electrophysiological approaches are employed to study structure: function aspects of transport proteins. **Dr. Mark Brand** (mbrand@canr1.cag.uconn.edu): Improvement of woody ornamental crops via gene transfer techniques. Emphasis is on disease/insect resistance and enhancement of ornamental qualities. **Dr. Mark Bridgen** (mbridgen@canr1.cag.uconn.edu): In vitro techniques for plant breeding, especially for Alstroemeria and other geophytes, and plant micropropagation procedures for commercial implementation. **Dr. Yi Li** (yili@canr1.cag.uconn.edu): Manipulation of plant hormone concentrations in transgenic plants; molecular mechanisms of auxin and gravity effects on plant growth and development; improvement of agricultural and horticultural crops via gene transfer techniques; animal vaccine and antibody development in plants. **Dr. Richard Mcavoy** (rmcavoy@canr1.cag.uconn.edu): Applied biotechnology: Using modern gene transfer techniques to improve production and post-harvest characteristics of commercially important ornamentals. Focus is on the development of commercial plant products. **Dr. Susanne Von**

Bodman (svbodman@canr1.cag.uconn.edu): Molecular characterization of signal-induced bacterial gene systems involved in plant pathogenicity and host–microbe interactions. Plant genetic engineering for enhanced disease resistance. Applicants should contact individual faculty directly via e-mail.

Graduate Assistantship
University of Arkansas, Fayetteville
(Repeat)
Contact Dr. Yinong Yang, Department of Plant Pathology, 217 Plant Science Building, University of Arkansas, Fayetteville, AR 72701; fax 501-575-7601, e-mail yiyang@comp.uark.edu. (Details May/June 1999 *ASPP NEWS)*

MS Graduate Position
Salem-Teikyo University, Salem, West Virginia
(Repeat)
Contact Dr. S. Rogers, Department of Bioscience, Salem-Teikyo University, Salem, WV 26426-0500; telephone 304-782-5585, fax 304-782-5579, e-mail rogers@stunix.salem_teikyo.wvnet.edu. EOE/AA. (Details May/June 1999 *ASPP NEWS)*

Graduate Assistantships
University of Florida, Gainesville
(Repeat)
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