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NEWSLETTER

American Society of Plant Physiologists

Inside This Issue. . . .

Deadline for the September/October 1995 issue of the *ASPP Newsletter* is September 1, 1995.

ASPP MEMBERS ELECT DON ORT, APPROVE EDUCATION FOUNDATION

Vesper and Boss Also Chosen by Members in Annual Election

Donald R. Ort, who is just completing a two-year term as secretary of ASPP, will be the Society's president-elect in 1995-1996 and will serve as president in 1996-1997.

The results of the annual election for officers were announced in early July. Joining Ort as newly elected officers are Mary Jo Vesper as secretary, 1995-1997, and Wendy Boss, elected member of the executive committee, 1995-1998.

This year's ballot also included eleven proposed amendments to the Society's constitution and bylaws, including one to establish an ASPP Education Foundation. All amendments passed by a wide margin.

Donald R. Ort, USDA/ARS, and professor of plant biology at the University of Illinois, Urbana, was selected by the ASPP membership to be president-elect.

Don Ort is a plant physiologist with USDA/ARS and a professor of plant biology at the University of Illinois at Urbana. A 1971 graduate of Wake Forest University, where he earned a B.S. in biology and chemistry, Ort did his graduate work at Michigan State University in the laboratory of Norman Good, focusing on coupling of photosynthetic electron transfer to ATP formation. He received his Ph.D. in plant biochemistry in 1974. Then followed two NIH postdoctoral fellowships, one at Purdue with Richard Dilley (evidence for localized chemiosmotic coupling) and one at the University of Washington with Bill Parson (mechanism of proton transport in bacteriorhodopsin), before being hired in the ARS Photosynthesis Research Unit at the University of Illinois in 1978. Don Ort is perhaps best known for the work of his laboratory in investigating the biochemical and molecular bases underlying the effects of environmental factors (principally low temperature and drought) on the photosynthetic performance of plants.

With his selection as president-elect, Ort caps several years of service to ASPP. He has served on the executive committee since 1990 when he was an elected member. As secretary since 1993, he was responsible for planning last year's annual meeting in Portland, Oregon, and this year's meeting in Charlotte, North Carolina. He also is an associate editor of *Plant Physiology*.

Succeeding Don Ort as secretary will be Mary Jo Vesper, associate professor in the Biology Department at the University of Dayton, Dayton, Ohio, and associate dean of the College of Arts and Sciences at Dayton. Vesper earned a B.A. (1973) in biology from Thomas More College in Kentucky, and her master's (1975) and

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Ph.D. (1978) degrees in plant biology from The Ohio State University. She was an assistant professor at the University of North Carolina at Charlotte from 1979 to 1982, before going to the University of Dayton. Mary Jo Vesper's service to ASPP and its Midwest Section has been continuous since 1987, when she was elected secretary-treasurer of the Midwest Section. She is just completing three years on the executive committee as the Midwest Section representative. As incoming secretary for the Society, she will be responsible for planning the annual meetings in 1996 in San Antonio, Texas, and in 1997 in Vancouver, British Columbia.

Rounding out this year's slate of elected officers is Wendy Boss of North Carolina State University in Raleigh. Boss, too, received her undergraduate education at Wake Forest University, where she earned a B.S. in chemistry in 1968. She went on to receive an M.S. in organic chemistry in 1970 from the University of Washington and a Ph.D. in plant physiology in 1977 from Indiana University. With the exception of a sabbatical leave in the laboratory of Anthony Trewavas in 1986, Boss has spent her entire academic career at NCSU, where she is now a professor in the Department of Botany, studying biochemical, molecular, and cellular techniques to study signal transduction pathways involving inositol phospholipids, calcium, and cytoskeletal proteins.

The vote to establish an ASPP Education Foundation is a historic and significant event for ASPP. Now that the establishment of the foundation has been formalized, ASPP's president, Jim Siedow, and president-elect, Bob Buchanan, will be busy over the next several months naming individuals to serve on the inaugural board of directors. For more details about ASPPEF and the significance of the vote, see the president's letter on page 5.

NOTE E-MAIL ADDRESSES FOR ASPP HEADQUARTERS STAFF

Please make note of and immediately begin using the e-mail addresses listed below for ASPP headquarters staff.

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OBITUARIES

Ward B. Davis

The last surviving charter member of ASPP, Ward B. Davis, died in California on June 17, 1995, at the age of 101. Dr. Davis was one of 67 original members of the American Society of Plant Physiologists when the Society was begun 71 years ago in March 1924 by a group of dissident plant physiologists who broke from the Botanical Society of America. Little is known about Dr. Davis's career, but his membership records indicate that he was on the staff of the University of California at Riverside while he was still actively employed.

Joseph E. Varner

Joe Varner died in St. Louis, Missouri, on July 4, 1995, following an illness of several months. Varner, who joined ASPP in 1954 and served the Society as president in 1969-1970, was an emeritus professor at Washington University in St. Louis. A memorial fund to support plant biology has been established in his name at the Department of Biology at Washington University. Contributions may be sent to: Varner Fund, Department of Biology, Box 1137, Washington University, St. Louis, MO 63130. A more complete obituary will appear in the September/October issue of the ASPP Newsletter.

Paul J. Kramer

Paul Jackson Kramer, a most distinguished plant physiologist, died in Chapel Hill, North Carolina, May 24, 1995, at the age of 91. He is survived by his wife of 64 years, Edith Vance Kramer; a daughter, Jean Findeis of Washington; a son, Richard Kramer of Philadelphia; four grandchildren; and one great-grandchild.

Paul Kramer was born on a farm in Brookville, Indiana, on May 8, 1904, to parents who understood the value of education and, in due course, sent him to Miami University in Oxford, Ohio, where he received an A.B. in 1926. He continued to The Ohio State University, where he earned an M.S. in 1929 and a Ph.D. in 1931. In that same year he also began two lifelong partnerships when he married Edith Sara Vance and accepted a position as instructor in the Botany Department at Duke University. By 1945 he had attained the rank of professor and in 1954 was appointed James B. Duke Professor of Botany, a chair that he held until his retirement in 1974, when he was granted emeritus status.

Although Kramer's first research was on the relationship between dormancy and photoperiod, his prominence became manifest in the areas of woody plant physiology and especially soil-plant-water relationships. Together with T. T. Kozlowski, he wrote *Physiology of Trees* in 1960 and, after his retirement, *The Physiology of Woody Plants* in 1979. His first water relations text, *Plant and Soil Water Relationships*, was published in 1949 and was, for many years, regarded as the standard for reference and research. The successor to that book, *Plant and Soil Water Relationships: A Modern Synthesis* (1969), is still used widely, but will soon be supplanted by a text, written with John S. Boyer, completed shortly before his death. His books have been valued by students and scholars throughout the world and have been translated variously into Chinese, Japanese, Portuguese, Russian, and Spanish.

Dr. Kramer was one of the first plant physiologists in the United States to work extensively on woody plants, and early work by him and colleagues helped materially to explain why pine seedlings cannot compete with hardwood seedlings under forest stands. He confirmed experimentally the earlier view of Renner (1915) that two mechanisms were involved in the absorption of water by plants: an osmotic one resulting in root pressure, which dominates in slowly or negligibly transpiring plants, and a passive one, based on a reduced xylem pressure potential, which dominates in plants transpiring more rapidly and which accounts for the bulk of water absorbed. He also conducted early investigations of the effects of low temperatures and deficient soil aeration on water uptake and found that both of these variables decreased root conductivity to water. In addition, he was involved extensively in research on temperature as a limitation to the geographic range of tree species.

Never content with the current state of knowledge, he was constantly alert for new technologies that could be used to refine and resolve recurring physiological questions. Thus, his lab was among the first to utilize radioactive tracers to study mineral absorption mechanisms by mycorrhizae of pine trees and the suberized and unsuberized roots of various other species. Understanding the importance of the quantitative characterization of water stress, he was instrumental in the rapid adoption of water potential concepts and terminology. He and his students spent considerable time and energy testing new methods for measuring the soil and plant water potential and its components (psychrometers, Scholander pressure chamber, porous blocks, and cryogenic techniques).

His interests in temperature, photoperiod, and environmental regulation of plant growth led him to consider the feasibility of a national controlled environment facility. His efforts led ultimately to construction of the phytotrons at Duke University and North Carolina State University. He was fully cognizant of differences between plants grown in controlled environments and the field, so as an integral part of furthering the acceptance of phytotronics he organized a cooperative project to characterize some of these differences and to allow improved methods for predicting behavior in the field from phytotron data. Even after retiring, he did not lose interest in new methods and technologies, and as an emeritus professor he quickly understood the potential and promoted the application of magnetic resonance imaging to problems in water uptake and transport, an effort that his coworkers continue today.

Paul Kramer performed yeoman's service to Duke University, the nation, and most especially the scientific community. Over the course of his career, because of his dedication to truth and the excellence of his research, teaching, and writing, he was instrumental in raising Duke University and particularly the Botany Department from relative obscurity to national and international prominence. In addition to his other faculty responsibilities, he served as director of the Sarah P. Duke Gardens for nearly three decades and as chairperson of the phytotron committee for several years. His service to professional societies was extensive, and he eventually served as president of no fewer than three of them: the American Society of Plant Physiologists, 1945; the American Institute of Biological Sciences, 1964; and the Botanical Society of America, 1964. He also served a term as program director for regulatory biology at NSF and as a trustee for Biological Abstracts.

Accolades, honors, and recognition accumulated for him as they have rarely for

other individuals. He was the recipient of four honorary doctorates from Miami University, The Ohio State University, the University of North Carolina at Chapel Hill, and the University of Paris VII. He received a service award from the Society of American Foresters, a Distinguished Service Award from AIBS, a Merit Award from BSA; was elected a fellow of the American Association for the Advancement of Science; and was recognized with life memberships in ASPP and AIBS. His prominence as a scientist and scholar was acknowledged ultimately by election to the National Academy of Sciences (1962), the American Academy of Arts and Sciences (1963), and the American Philosophical Society (1973).

Dr. Kramer's accomplishments, awards, and honors have been listed, but little has been said about the man, who was a loving husband and father by well-considered choice, a gentleman by virtue of his upbringing, and a scholar and scientist by nature. Graduate education and beyond was an exciting experience in his lab, not merely because of the frequency of visitors, students, and postdoctoral scientists from across the nation and abroad, but primarily because of his own willingness to argue even his most cherished ideas. It seemed, in fact, that there was no concept, idea, or theory so dear or sacred to him that he would not argue willingly and just as willingly be convinced otherwise, given sufficient evidence. It was a wonderful experience to have known a man who lived his life seemingly unencumbered by dogmatic imperatives—a truly modest man who characterized by word and action the very essence of science.

Edwin L. Fiscus
USDA
Raleigh, North Carolina

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PRESIDENT'S LETTER

I offer my congratulations to all the newly elected ASPP officers, and my sincere thanks to all those who ran in the election. It speaks to the continued health of the Society that such a strong slate of candidates was fielded. As long as such good, committed individuals are willing to participate in the governance of the Society, ASPP's future will remain bright.

In addition to the new officers, and as the headline on page 1 of this newsletter announces, the membership of the ASPP has also voted to continue on a path that broadens the scope of the Society's activities to improve our efforts in both plant biology education and the public understanding of the plant sciences. The ASPP Education Foundation (ASPPEF) was approved by a wide margin, and with that approval we will establish ASPPEF as a fully functioning and vital component of the Society. You learned in the last newsletter that Richard Laster, former CEO of DNAP, has agreed to serve in the pivotal role of being the first chair of the board of directors of ASPPEF. We now need to appoint twelve additional members to the ASPPEF board. That task will fall to me in the remainder of my term in office and to my successor, Bob Buchanan. The goal will be to have the full board in place by the end of the year.

Now that ASPPEF is a reality, the hard part of the venture is upon us: making it a success. For that, we will rely on the leadership provided by Dick Laster and the members of the ASPPEF board of directors in seeking financial support from corporations, foundations, individuals, and federal agencies. However, the task is not theirs alone. As with your vote, your support of ASPPEF is needed because the success of the foundation will depend upon contributions from ASPP members. Indeed, fundraisers at Duke tell me that foundations and corporations are likely to want to know what fraction of the membership contributes to ASPPEF as an indication of the level of commitment of the members to the endeavor.

Last year, many of you responded generously to the request to give to ASPPEF along with your annual membership renewal. The membership renewal notices that will be mailed later this fall will again include an opportunity to give to ASPPEF, all donors from 1995 and 1996 will be recognized as Founding Contributors of ASPPEF. When you send in your 1996 membership renewal later this year, I urge you to be as generous as you can in helping the Society get this exciting new venture off to a strong start.

Support for ASPPEF is not limited to the financial realm. Programs that could be supported by ASPPEF include developing new teaching tools and methods for K-12 education, initiating efforts to attract and recruit students into the plant sciences, and expanding ASPP efforts in the arena of public outreach, among others. Even with the availability of funds to develop these programs, they can only be undertaken if you, the members of ASPP, are willing and able to participate in their design, development, and implemenation. As ASPPEF becomes successful in raising funds for various new programs, and it will, you will be kept apprised of these programs and of opportunities to participate in them. Indeed, many of you will be actively sought out to participate in them. When you are, I hope your response will be as enthusiastic and positive as your response to the call to give ASPPEF your vote.

Let me thank you again for your support of the foundation in the election. This is a pivotal step for the Society. As with other ventures the Society has undertaken in the recent past, such as starting THE PLANT CELL and setting up an office of public affairs at ASPP headquarters, the step will lead to a more forward-looking and more vital Society that will, in the long run, better serve the interests of the entire plant science community.

Finally, on a more personal level, and writing with no small amount of sadness, I note the recent passing of Joe Varner. Joe stood out as a giant in ASPP not only for the excellence of his science, but also for the distinguished contributions he made to the Society and the international community of plant scientists as a leader and as a guiding intellectual force over many years. He will be sorely missed.

James N. Siedow
ASPP President, 1994-1995
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Five Companies Provide Support for Women's Committee Luncheon

Elizabeth Bray, chair of the committee on the status of women in plant physiology, announced that five companies have generously provided support for the committee's luncheon held each year at the ASPP annual meeting. The contributions from DuPont Company, Monsanto Company, Pioneer Hi-Bred International, Inc., Ciba-Geigy Corporation, and Beckman Instruments, Inc., will subsidize student attendance at this year's gathering in Charlotte on Monday, July 31.

The luncheon this year should be a lively one. A panel discussion on mentoring is planned. Participants will include Patricia Myers, who, with Cary Mitchell, conducted a survey of women in plant physiology in 1993; Catherine Didion, executive director of American Women in Science; and Dina Mandoli, University of Washington.

LETTER TO THE EDITOR

I would like to thank those members of ASPP who have contacted me for my efforts on behalf of the DOE Energy Biosciences Program. [Editor's note: See May/June 1995 newsletter, page 10.] Of course, this was a labor of love and a matter close to my heart (as well as to my lab budget). However, all of my activities (and certainly any accomplishments) were based on the guiding hand of Brian Hyps, the public affairs director of ASPP. It was Brian who first contacted me and who invited me to testify before the Energy and Water Development subcommittee of the Appropriations Committee. The subcommittee is now chaired by Representative John Myers, whose district encompasses Purdue University.

Brian then helped me to establish a series of meetings with Representative Myers and other members of his staff, as well as staff members from the offices of both Indiana senators. He helped me draft my testimony before the subcommittee and accompanied me during part of my day in Washington. More importantly, he then prompted me at various times after my visit. Once I had established some personal relationships with the staff members in Washington, it was easier to pick up the phone and call them directly. Brian's prompts, which had the sense of disasters of biblical proportions, prodded me into instant action. We can never be precisely sure of cause and effect, but at least people in the direct legislative process were kept educated as to the importance of the research being conducted through Energy Biosciences.

Many of us in science are by nature apolitical or are too busy with our normal research and teaching obligations to become involved in the political process. It even took us a long time to recognize the virtue of having a full-time coordinator for such matters. I feel that the ASPP membership owes a debt of gratitude to those in the organization who pushed for the development of a public affairs director. In this role, Brian Hyps has been a key player these past few months, and his efforts may have brought far more into plant research than the cost of this office for the next 25 years.

I hope that we long remember this lesson and that we maintain support for such activities. If anything, I hope that the office of the public affairs director is strengthened in the near future so that we can continue the momentum initiated by Brian. If our efforts this year are successful, I hope that you will individually and collectively thank Brian for his work.

Sincerely,
Louis Sherman
Biological Sciences
Purdue University

Student and Postdoc Fellowships Available to Attend Joint USA-Mexico Meeting

In November, ASPP will co-sponsor with its counterpart in Mexico, the Society for Biochemistry and Molecular Biology, the first joint USA-Mexico Symposium on the topic "Agrobiology, Molecular Physiology and Biotechnology of Crops Important for Mexican Agriculture." This meeting will be held in Cocoyoc, Morelos, near Mexico City (see Gatherings, page 16).

A grant expected from the National Science Foundation (International Programs) and contributions from U.S. biotechnology companies will make it possible to give $500 fellowships to graduate students and postdoctorals who want to attend this meeting. Preference will be given to Mexican nationals studying outside Mexico and to young researchers who are fluent in Spanish and want to establish contact with Mexican scientists.

Interested individuals should request an application form and instructions for abstract preparation from Maarten Chrispeels (mchrispeels@ucsd.edu). Persons receiving a fellowship will be expected to present a poster about their work and could be selected for a short oral presentation.

Public Affairs

Senate Committee Farm Bill Would Reauthorize NRICGP, Study ARS

The National Research Initiative Competitive Grants Program (NRICGP) would be reauthorized for five years at a level of $500 million under the 1995 Farm Bill approved by the Senate Agriculture Committee on July 18. (The actual appropriation made in separate legislation has generally been about $100 million for a year.) The legislation also allows the NRICGP to award funds available in a two-year period. This will keep the NRICGP from losing funds in instances such as when a potential grantee cannot accept funds near the end of a year because of a change of position or for some other reason. Instead of the funds being lost because they could not be awarded that year, they would be available for use by another grantee the next year.

The legislation also would require that not less than 40 percent of appropriated funds would go for mission-linked systems research, which is an increase from the existing requirement of not less than 20 percent. Sen. Thomas Daschle (D-SD), Democratic Leader in the Senate and a member of the Agriculture Committee, learned that NRICGP in practice currently directs 37 percent of its funds to mission-linked research and thereby he had a persuasive argument favoring the higher-level requirement.

Action by ASPP members helped prevent a more problematic portion of the mission-linked proposal from being included in the legislation. Senate staff assured ASPP that mission-linked research can include fundamental research.

The Farm Bill passed by committee also called for a study of the Agricultural Research Service (ARS) by the National Academy of Sciences. The Academy would review the mission of federal research conducted by ARS, evaluate the strength of ARS science and its relevance to national priorities, and examine how the agency's work relates to the capacity of the U.S. agricultural research, education, and extension system overall. The call for such a study may raise some concerns at this time of budget constriction. ASPP will follow developments concerning the study if this provision is included in the final bill.

DOE ENERGY BIOSCIENCES AVERTS CUTS IN HOUSE

The House Appropriations Committee on June 20 approved funding $30.2 million for the Department of Energy Division of Energy Biosciences for Fiscal Year 1996. This appropriations legislation was later approved by the full House. The Senate Appropriations Subcommittee on Energy and Water Development was expected to vote on appropriations legislation for DOE on July 25.

In addition to providing an increase over the Fiscal Year 1995 appropriation for the Division of Energy Biosciences, the House appropriation also exceeds the President's request of $29,534,000. These increases were approved by the House in the same legislation (HR 1905) that cut overall spending for DOE by six percent for FY 96.

Much of the basic research supported by DOE was spared in the budget cutting. However, research and alternative fuels cuts made up a large portion of the budget reductions for DOE. Those interests that lost funding in the House are mounting efforts to recoup losses as action on the DOE budget moves to the Senate. Continued support by ASPP members will be needed for Division of Energy Biosciences funding in the Senate. Many ASPP members have been actively involved with key members of Congress to explain the importance of basic research supported by the Division of Energy Biosciences.

Concerns over the level of funding became acute after the authorizing subcommittee with jurisdiction over DOE research took the first action and cut funding for the Division of Energy Biosciences significantly below the FY 95 level. ASPP members subsequently increased efforts with the Appropriations Subcommittee on Energy and Water Development urging its support for vital research. The subcommittee recognized the need for increased funding for this program and raised funding above both the FY 95 level and the President's request.

ASPP continued efforts with the authorizing subcommittee and full committee. The full committee subsequently restored the more than $3.2 million the subcommittee had called for cutting below the FY 95 amount for the Division of Energy Biosciences. The full committee also added an increase over the FY 95 level.

(The references to authorizing committees and appropriations committees in this budget story can be confusing. Both committees have jurisdiction over the budget, as does the Budget Committee. However, action by the Budget Committee is advisory. The authorizing legislation for DOE approved by the Science Committee on June 22 is not expected to become law. The appropriations legislation will almost certainly become law in some form. It is the appropriations legislation which will set the spending amounts for DOE. However, the Science Committee staff and Appropriations Committee staff worked with each other on the FY 96 budget legislation

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and both bills have a similar emphasis on the need to support basic research. The increased involvement by the Science Committee on the budget this year enhances its role in the budget process compared to previous years.)

ASPP members who played key roles in supporting funding for the Division of Energy Biosciences in the House were Lou Sherman of Purdue University, Ken Keegstra of Michigan State University, Hans Kende of Michigan State University, Peter Albersheim of the University of Georgia, and several others. Committee on public affairs chair Ralph Quatrano earlier identified Sherman as the lead contact in the important home district of House Appropriations Subcommittee on Energy and Water Development Chairman John Myers (R-IN).

House Committee Approves USDA Research Appropriations

The House Committee on Appropriations recently approved appropriations for Fiscal Year 1996 for Agriculture, Rural Development, Food and Drug Administration, and Related Agencies. Overall spending on discretionary programs was down more than $135 million from Fiscal Year 1995 levels to $13.25 billion. Overall spending on mandatory programs was reduced more than $5.36 billion to $49.2 billion. The legislation reduces spending for nearly every account below 1995 levels.

Funding for the National Research Initiative Competitive Grants Program (NRICGP) for FY 96 in the legislation is approximately level with the FY 95 amount. However, the Committee pointed out that it could also be interpreted that there was an increase for NRICGP. The question of interpretation of an increase, decrease, or same level of funding for NRICGP centers around the removal of earmarked programs from NRICGP in the legislation.

According to the Committee report, "For competitive research grants, the Committee provides $98,810,000. Due to shifting in categories of research in Fiscal Year 1996, the comparison to Fiscal Year 1995 is an increase of $4 million." This shifting of categories refers to the Committee's decision to discontinue funding earmarked categories Water Quality, Integrated Pest Management, and Pesticide Impact Assessment within NRICGP and, instead, to fund them outside of NRICGP.

The NRICGP had not favored having these three programs earmarked within the competitive grants program. The Department of Agriculture requested no dollars for these three earmarked categories within NRICGP. Although the Department did not want to fund these programs as separate earmarks, it had sought a substantial increase in funding in the remaining categories within NRICGP to make up for the loss of the earmarked categories. The three earmarked programs totalled more than $8 million and the remaining six programs received increases totalling $4 million for FY 96.

Funding for Integrated Pest Management and Pesticide Impact Assessment was moved out of NRICGP to the Improved Pest Control program which includes the Pesticide Clearance line item. The legislation funds Integrated Pest Management at $3,093,000 for FY 96. Pesticide Impact Assessment is funded at $1,795,000 for FY 96. Both NRICGP and Improved Pest Control are housed within the Cooperative State Research, Education and Extension Service (CSREES) within the Department. Water Quality is funded at $2.5 million within CSREES as a special research grant for FY 96 under the legislation.

A fourth earmark that NRICGP had not requested to fund was not continued in NRICGP for FY 96 in the legislation. This is the United States-Israel Binational Agricultural Research and Development (BARD) earmarked program, which, in FY 95, NRICGP was directed to fund from the existing categories of research at $2.5 million. The appropriation legislation for FY 96 frees up NRICGP funds for spending in existing categories without earmark restrictions.

For the Agricultural Research Service (ARS), the legislation calls for spending $705,610,000 in FY 96, which is down $9 million from the FY 95 appropriation or slightly more than one percent. The legislation included some of the President's recommendations for closing research locations. The President's budget recommended that 12 research locations be closed. Nine of these research locations were also proposed for closure in the previous budget. Congress had directed that further evaluations be conducted on these sites before concluding action on these proposals.

"The Committee has not been furnished adequate justification to support the closure of these laboratories. However, the Committee is faced with reduced funding allocations and recognizes that difficult decisions must be made within the scope of the information available. In this regard, the Committee concurs with the Administration's proposal to close research facilities at Brawley, CA; Chatsworth, NJ; Orono, ME; Brownwood, TX; and Houma, LA. The research being conducted is of long term importance. . . .The Committee directs that the research be maintained at El Reno, OK; Reno, NV; Miami, FL; and Clemson, SC.

"Program leadership and resources should be redirected and consolidated at primary ARS facilities to coordinate and carry out research currently assigned to East Grand Forks, MN, and Sidney, MT. These locations should be relegated to work site status if required to be maintained for plot work, germplasm collections, or other physical or research applications. The Jackson, TN, location is university owned and houses only one ARS scientist. This scientist should work out of the Stoneville, MS office," the Committee-approved report said.

Important agricultural research generally fared much better in the House Appropriations Committee than in the nonbinding Budget Resolution for FY 96 that emerged from the budget committees. The appropriations legislation in some form will be the applicable law after it is adopted by Congress. The Budget Resolution is just a guideline.

Support by ASPP members and others who contacted their members of Congress helped in protecting funding for research when many other programs in the federal budget are experiencing dramatic cuts or elimination.

Constituent support reinforced calls by leaders in the majority in Congress to place an emphasis on supporting basic research. Spending on special (pork) projects is significantly reduced in the legislation. The legislation still must pass the full House and Senate before being sent to the President for signature into law.

FY 96 NSF RESEARCH DOWN ONE PERCENT IN HOUSE SUBCOMMITTEE

The House Appropriations Subcommittee on VA, HUD and Independent Agencies on July 10 approved spending $2.254 billion on Research & Related Activities of the National Science Foundation for Fiscal Year 1996. This amount is down $26 million from the Fiscal Year 1995 spending level.

NSF Education and Human Resources would receive $599 million, down from $606 million in FY 95. Academic Research and Infrastructure is at $100 million for FY 96, down from $118 million in FY 95. Major Research and Equipment is at $70 million, which compares to $126 million in FY 95. Spending approved by the subcommittee for these three accounts is the same as the President proposed for FY 96.

The cuts for NSF were dwarfed by the size of spending reductions for many other programs in the VA, HUD and Independent Agencies FY 96 appropriations legislation. The Department of Housing and Urban Development is cut $5.6 billion, which is 23 percent below its FY 95 level. The National Service Program, which is strongly supported by President Clinton, is proposed for termination. The Environmental Protection Agency is reduced by 33 percent from its FY 95 level, though EPA research and development is increased by $34 million to a level of $384 million. NASA's total budget is reduced by $720.4 millon below the President's request for FY 96. The subcommittee calls for closure of three NASA centers: Goddard, Langley and the Marshall Space Flight Center.

The full Appropriations Committee was expected to act on the legislation the week of July 17, at which time further details will be available. House floor action is expected to follow soon afterward. After action in the full Appropriations Committee and on the House floor, spending legislation is considered by the Senate Appropriations Subcommittee on VA, HUD and Independent Agencies and by the full Appropriations Committee followed by action on the Senate floor.

Differences in the Senate and House bills will be worked out in conference. The conference agreement will then need approval by the House and Senate before being sent to the President for signature into law or a possible veto. A veto would send the legislation back to the House and Senate. A two-thirds vote in Congress is needed to override a President's veto and that would be difficult to reach, as Republicans have only slim majorities in the House and Senate.

Prior to action by House appropriations subcommittees on FY 96 spending bills, House Speaker Newt Gingrich (R-GA) and Science Committee Chairman Bob Walker (R-PA) met with the subcommittee chairmen overseeing most civilian science programs and urged them to protect funding for research, especially fundamental research. Walker, a close friend of Gingrich's, helped originate many years ago an aggressive Republican, then minority, stance that was joined and lead by Gingrich. Walker's Science committee chairmanship, Budget Committee vice-chairmanship and friendship with the Speaker assists him in his advocacy in support of basic research, which has fared better than many other areas in this year of deep budget cuts.

ASPP member Carl Pike, a constituent of Walker's who has known him for many years, met with Walker recently citing the need to support fundamental research in the plant sciences. A number of other ASPP members have also made important contacts with their members of Congress. Further constituent contacts will be needed in the Senate.

ASPP MEMBERS TO REVIEW CHILDREN'S SCIENCE PROGRAM FOR PBS

Science staff of "The Magic School Bus" will be working with ASPP members to help ensure technical accuracy in television programs relating to plant science.

ASPP member Robert Pearcy, professor at the University of California at Davis, has agreed to volunteer his services in reviewing story content for an upcoming program concerning tropical plants. ASPP members will also be asked to review future programs of The Magic School Bus that relate to plant science.

The Magic School Bus is a children's cartoon on PBS that covers a range of science topics, such as the solar system, germs, sound, kitchen chemistry, seeds, ants, and weather. For the show on seeds, Robby Benson was the celebrity voice of Mr. Seedplot. Directed at viewers age 4 to 10, The Magic School Bus is the first fully animated PBS series.

One of its previous shows explained how plants are the first step in virtually every food chain. This lesson was achieved by having cartoon character children in a classroom bring in things that "match" for a science project. Two of the students forgot about the assignment so they supplied only a tuna fish sandwich and shoes with "green slime" on them with the slim hopes that these items might somehow match. After taking a ride in the Magic School Bus, which converted into a shrinking magic submarine for a closer look at the relationship between plant and fish life under the sea, the students discovered that "green slime" in the form of phytoplankton does have a connection to a tuna fish sandwich after all.

The science show has received high marks from reviewers. The September 5-11, 1994, issue of *Variety* said, "The Magic School Bus expertly balances entertainment and education. The show features an ethnically diverse group of students who take fantastic field trips on a yellow school bus piloted by their teacher, Ms. Frizzle (voiced by Lily Tomlin). Each adventure is exotic enough to keep young viewers glued, plus there's a steady flow of information.

"Tomlin's Ms. Frizzle is the perfect facilitator, whimsical yet trustworthy. Armed with crazy outfits and magical powers, the character doesn't dispense facts as much as urge her students to "take chances" and "ask questions."

The *New York Times* September 22, 1994, review said "'The Magic School Bus'" is educational television at its most disarming, something that seems too often the sole province of public television." The November 26, 1994, issue of *Entertainment Weekly* listed The Magic School Bus as one of the ten best television shows for children

ASPP received the invitation recently from The Magic School Bus to participate in reviews after ASPP staff contacted The Magic School Bus staff. The show can be seen on local public television stations. The National Science Foundation and Department of Energy have supported the program.

Minority Affairs Committee Awards Travel Grants Funded by NSF and USDA

ASPP's minority affairs committee met at ASPP headquarters in Rockville, Maryland, on Saturday, June 24, and awarded 16 travel grants to minority students and beginning faculty to permit them to attend scientific meetings relevant to the plant sciences. Funds for the grants were provided by the National Science Foundation and the U.S. Department of Agriculture.

The travel grant program was advertised to members of other plant science organizations as well as to ASPP members. As a consequence of that interorganizational outreach, eight of the awardees will attend ASPP's annual meeting in Charlotte, North Carolina, five will attend the meeting of the American Phytopathological Society, and the remaining three will attend three smaller, more specialized plant science meetings.

A unique feature of ASPP's grant program is that all awardees are paired with mentors. The mentors will help the awardee benefit as much as possible from attendance at the meeting by guiding them and helping them network with like-minded scientists.

This is the first year for the minority travel grant program. It is anticipated that it will continue and expand in the future. The following individuals are the awardees for 1995-1996:

Pamela D. Adams
Auburn University, Auburn, Alabama
John Rasheed Bennett
Tuskegee University
Tuskegee, Alabama
Angela Foster
Rutgers University-Cook College
New Brunswick, New Jersey
Pamela L. Hughes
Auburn University
Jacquelyn R. Jackson
Tuskegee University
Lillian R. Jones
Marshall University
Hurricane, West Virginia
Roslyn A. March-Amegadzie
Cheyney University
Cheyney, Pennsylvania
Joe R. Montana
Oklahoma State University, Stillwater
Cesar V. Mujer
Texas A&M University, College Station
Philip Ramsey
University of Arizona, Tucson
Yolanda Salva-Vargas
Rutgers University
Patrice N. Smith
University of Tennessee, Knoxville
Teferi Tsegaye
University of Maryland, College Park
Wakar Uddin
University of Georgia, Athens
Debbie Villalon
Institute of Paper Science and Technology
Atlanta, Georgia
Martis Watts
Tuskegee University

NEW EDITION OF PLANT HORMONE BOOK PUBLISHED

A new edition *of Plant Hormones—Physiology, Biochemistry and Molecular Biology*, edited by Peter J. Davies, has just been published and is now available. It contains 35 chapters written by 64 authors and can be obtained through any bookseller or direct from the publisher at: Kluwer Academic Publishers, Order Dept., PO box 322, 3300AH Dordrecht, The Netherlands; e-mail services@wkap.nl, fax 31-78-392254, telephone: 31-78-392233 or Kluwer Academic Publishers, Order Dept., P.O. Box 358, Accord Station, Hingham MA 02018-0358, USA; e-mail kluwer@world.std.com, fax 617-871-6528, telephone 617-871-6600.

AIBS Publication *Science & Biodiversity Policy* Now Available

Compiled from speeches given at the AIBS 1994 Annual Meeting, this 96-page stand-alone supplement contains important information about the many aspects of biodiversity and public policy. Authors include Hal Mooney, Thomas Lovejoy, Jane Lubchenco, Kent E. Holsinger, Quentin D. Wheeler, Monica G. Turner, Frank W. Davis, W. Franklin Harris, Lance H. Gunderson, Jerry F. Franklin, Louisa Willcox, and H. Ronald Pulliam. An excellent teaching resource, topics covered include the role of science in formulating policy decisions and the public's understanding of biodiversity. Single copies are available for $10.50; bulk orders are available at a discount. For more information about the issue, contact Dr. Julie Ann Miller, 202-628-1500, ext. 243; to order, contact Genevieve Clapp, ext. 251.

ASPP Education Forum

Edited by Robert R. Wise, Department of Biology, University of Wisconsin Oshkosh, Oshkosh, WI 54901, e-mail wise@vaxa.cis.uwosh.edu

Saw You in Charlotte

This edition of the Education Forum should be awaiting our return from the 1995 ASPP meetings in Charlotte, NC. The education committee, with help from many others, had a full dance card planned and, with luck, everything was a smashing success. A wrap up of the meetings and talk about future projects will be in the September/October Education Forum.

Hope everyone learned a lot, shared a lot, and had a great time.

Nature Launches Journal for Undergraduate Science Majors

Nature, the prestigious science magazine from the U.K., has announced plans to publish a new journal designed for undergraduate science majors. Called *Nature Undergraduate*, it will be published quarterly starting about January of 1996. The editors anticipate that the journal will be 80-90 pages in 4-color. It will contain research articles by college and high school research students, condensed summaries of student papers published elsewhere, instructional articles, news and perspective sections, an opportunities section (conferences, etc.), and a review section on current interesting topics. *Nature Undergraduate* is designed for undergraduates in the natural sciences. For more information contact Sharon Kedar (Rice University and *Nature*), 11212 Korman Drive, Potomac, MD 20854, 301-399-3677, fax 301-299-9338.

Plant Education Electronic Newsgroup Chartered

According to BIOSCI/bionet manager Dave Kristofferson, the prototype Plant Education newsgroup was made official as of July 10, 1995. The voting was 186 for and 2 against. The charter of the group reads, "The purpose of the PLANT-EDUCATION newsgroup is to function as a means for communication among all educators, including faculty, instructors, lab preparators, and graduate assistants, involved in courses on any aspect of plant biology." Jon Monroe (James Madison University) and Susan Singer (Carleton College) remain as the discussion leaders, although the group remains unmoderated. Subscribers are invited (send message "subscribe plant-ed" to <biosci-server@net.bio.net>) and contributions are encouraged.

Options Available for Plant Physiology Textbooks and Lab Manuals

With the fall semester fast approaching, the question of textbook selection for plant physiology educators is once again at the forefront. Without claiming to be comprehensive, a compilation of current offerings is given below. Although most of the titles are recent (i.e. after 1990), it is possible that some may be out of print or otherwise unavailable.

Which book is the "best"? That depends to a large degree on students' background, the goals of the instructor, and whether the course is introductory or advanced. There has been considerable recent discussion on the plant-ed newsgroup on the strengths and weaknesses of many of the titles listed below. For a look at that discussion, see the plant-ed archives at <gopher/bio.net/PLANT-EDUCATION>. (One contributor to plant-ed, on the other hand, taught an introductory plant physiology class using only the original literature and reviews.)

Anderson, J. W. and J. Beardall (1991) Molecular Activities of Plant Cells: An Introduction to Plant Biochemistry, Blackwell Scientific Publications

Brett, C. and K. Waldron (1990) Topics in Plant Physiology, Vol. 2, Physiology and Biochemistry of Plant Cell Walls, Unwin Hyman Ltd.

Chrispeels, M. and D. E. Sadava (1994) Plant, Genes, and Agriculture, Jones and Bartlett Publishers

Davies, P. J. (ed.) (1987) Plant Hormones and Their Role in Plant Growth & Development, Martinus Nijhous Publishers

Dennis, D. T. and D. H. Turpin (eds.) (1990) Plant Physiology, Biochemistry, and Molecular Biology. John Wiley & Sons

Fosket, D. E. (1994) Plant Growth and Development: A Molecular Approach, Academic Press

Galston, A.W. (1994) Life Processes of Plants. Scientific American Library (dist. by W. H. Freeman)

Hart, J. W. (1987) Topics in Plant Physiology, Vol. 1, Light and Plant Growth, Unwin Hyman Ltd.

Hershey, D. R. (1995) Plant Biology Science Projects, John Wiley & Sons

Hopkins, W. G. (1995) Introduction to Plant Physiology, John Wiley & Sons

Lyndon, R.F. (1990) Topics in Plant Physiology, Vol. 3, Plant Development: The Cellular Basis, Unwin Hyman Ltd.

Lea, P. J. and Leegood, R. C. (1993) Plant Biochemistry and Molecular Biology, John Wiley & Sons

Meidner, H (1984) Class Experiments in Plant Physiology, G. Allen & Unwin

Mohr, H. and P. Shopfer (1995) Plant Physiology, Springer-Verlag

Moore, T. C. (1981) Research Experiences in Plant Physiology: A Laboratory Manual, Springer-Verlag

Murphy, T. M. (1995) Manual for Plant Physiology Laboratory, published by author (contact at <tmmurphy@ucdavis.edu>)

Noggle, G. R. and G. Frits (1983) Introductory Plant Physiology, Prentice Hall

Reiss, C. (1994) Experiments In Plant Physiology, Prentice Hall

Salisbury, F. B. and C. W. Ross (1992) Plant Physiology, 4th ed., Wadsworth Publishing Company

Sebanek, J. (ed.) (1992) Plant Physiology, Elsevier

Taiz, L. and E. Zeiger (1991) Plant Physiology, Benjamin/Cummings Publishers

Ting, I .P. (1982) Plant Physiology, Addison-Wesley Publishing Company

Wilkins, M.B. (ed.) (1987) Advanced Plant Physiology, John Wiley & Sons

Effect of Ultraviolet Light on Arabidopsis Plants: A Laboratory Exercise

by Mark Shotwell (Slippery Rock University, Slippery Rock, PA)

Introduction

Plants growing in sunlight are constantly exposed to ultraviolet radiation. UV light induces the formation of cyclobutane pyrimidine dimers (CPDs) and other photoproducts in DNA, which, if not removed, create potentially lethal mutations. These CPDs can be corrected by at least three different mechanisms: photoreactivation, excision repair, and recombinational repair. The first response is likely to be photoreactivation, in which a photolyase uses radiant energy to break the cyclobutane ring linking the pyrimidines. Photolyases are energized by light of wavelengths between 370-450 nm, in the near-UV range, which is abundant in sunlight. The CPDs not removed by the photolyase may be corrected by excision repair, or another mechanism not yet identified.

To better understand how plants respond to UV light, David Mount's group in the Department of Molecular and Cellular Biology at the University of Arizona isolated several mutants of Arabidopsis hypersensitive to UV radiation. Of these, the best characterized is the *uvh1* mutant (Harlow et al., 1994). The experiment outlined below, developed in Mount's lab, uses the *uvh1* mutant to illustrate the effects of UV light on plants. Its purpose is twofold: (1) to determine the relative UV sensitivity of wild-type Arabidopsis and the *uvh1* mutant, and (2) to assess the role of photoreactivation in the repair of UV damage in Arabidopsis. The latter is accomplished by incubating the plants after the UV exposures in either white light (which contains the photoreactivating wavelengths) or gold light (which lacks the photoreactivating wavelengths). The exercise is quite simple and can be completed in less than an hour. The only piece of equipment required is a UV crosslinker, which can be found in most molecular biology labs.

Materials

- Seeds of wild-type *Arabidopsis thaliana* Columbia ecotype (available from the Arabidopsis Biological Resource Center) and the UV-hypersensitive mutant *uvh1* (soon to be available from ABRC; until then from the author). • For each lab section of 24 students: sixty-four 2.5 inch square pots, two F1020 flats, two propagation domes, eighteen 4-inch white pot labels, eighteen 4-inch yellow pot labels (available from Hummert International, 800-392-9113; cat nos. 12-1250, 11-3050, 11-2568, 49-1504, and 49-1596, respectively).
- Potting soil
- UV crosslinker (e.g. Metro Mix 360)
- Growing area with white fluorescence lights
- Gold-light growth chamber (e.g. shop light with two gold fluorescent bulbs (F40GO) mountedunderneath a table wrapped in black plastic sheeting)
- Lamp with yellow incandescent bulb (General Electric 60A/Y 60 watt Bug Lite)

Part One

1. For each lab section, plant 32 pots of wild-type and 32 pots of *uvh-1*, 12 to 20 seeds per pot. Water thoroughly (with Miracle Gro if desired). Place pots in separate F1020 flats and cover each with a propagation dome to maintain high humidity. Place under fluorescent lights.
2. After 3 days remove the propagation domes.
3. Grow seedlings for two weeks, watering when the soils dry out.

Part Two

1. Divide the class into 6 groups.
2. Have each group get 6 pots of either wild-type or the *uvh-1* mutant.
3. Using white and yellow pot labels as appropriate, have the students label their six pots with their initials, the lab section, either WT or *uvh-1*, and: (1) 0-white, (2) 0-gold, (3) 100-white, (4) 100-gold, (5) 700-white, (6) 700-gold.
4. Have the students place their 0-white pots in the white-light area and their 0-gold pots in the gold-light chamber. IMPORTANT: Remember which pots have white labels and which have yellow labels, since in the dim yellow light they will all look yellow. VERY IMPORTANT: Protect the 100-gold pots from white light as much as possible so that photoreactivation cannot occur.
6. Repeat step 5 for the remaining three 100-white pots and three 100-gold pots.
7. Repeat steps 5 and 6 for the 700 pots, but increase the UV dose to 700 J/m^2. As before, take care to shield the 700-gold pots from white light.
8. After three days, transfer all pots from the gold-light chamber to the white-light area. All the plants will receive white light for the next four days.

Part Three

1. In the following week's lab, have the students retrieve their set of 6 pots from the white -light area and arrange them according to UV dose.
2. Ask the students to assess the damage to the plants caused by the two doses of UV light and the white-light and gold-light treatments. Have them grade the condition of the plants in each pot on the following scale: (1) not damaged, (2) slightly damaged, (3) moderately damaged, (4) severely damaged, (5) dead. The 0-white plants serve as the negative control; thus, they should be assigned a grade of 1. The other plants should be compared to the 0-white plants when assessing the damage.
3. Make sure the students examine not just their own set of plants, but one set of 6 of both the wild-type and the *uvh-1*.
4. Have the students compile their data in one table (it will comprise 12 damage estimates, 6 each for wild-type and *uvh-1*).
5. Interpreting the results will involve asking the following questions:
   a. Is there a general effect on growth of Arabidopsis plants caused by incubation in gold light? (Compare the 0-gold plants to the 0-white plants.)
   b. Is there an effect of increasing doses of UV light on Arabidopsis plants? (Compare the 100-white and 700-white plants to the 0-white plants.)
   c. Is the *uvh-1* mutant more sensitive to UV light than the wild-type? (Compare the *uvh-1* plants to the wild-type plants at each UV dose.) Is it possible to estimate the relative difference in sensitivity

between mutant and wild-type from these results?

d. Do the results support the involvement of photoreactivation in the repair of UV damage to DNA in Arabidopsis plants? (Compare the 100-gold plants to the 100-white plants, and the 700-gold plants to the 700-white plants.) Does photoreactivation occur in the wild-type plants? Does photoreactivation occur in the *uvh-1* plants? Based on these results, which type of DNA repair appears to be defective in *uvh-1* plants, photoreactivation or another mechanism?

Notes

1. The key to the success of this experiment is selecting the right doses of UV light. Two or three preliminary experiments should thus be done to determine the UV dose that results in significant damage to *uvh1* plants incubated in gold light but very little or no damage to plants incubated in white light. This should be between 50 and 150 J/m^2. This will serve as the lower dose in the experiment. Since *uvh1* plants are about 7 times as sensitive as wild-type plants to UV, the higher dose should be 7 times the lower dose (i.e., 350 to 1050 J/m^2). When the experiment works just right, the *uvh1* plants that have received the lower dose show the same damage as the wild-type plants that have received the higher dose. If the students pick up on this, they can arrive at the relative difference in sensitivity between *uvh1* and wild-type.
2. UV crosslinkers generate UV-C, not the less energetic but more physiologically relevant UV-B. (The Arabidopsis mutants are hypersensitive to both.) The experiments may be done using UV-B after replacing the UV-C bulbs in the cross-linker with UV-B bulbs and re-calibrating the machine with a radiometer.

Reference

Harlow, G. R., Jenkins, M. E., Pittalwala, T. S. and Mount, D. W. (1994) Isolation of *uvh-1*, an Arabidopsis mutant hypersensitive to ultraviolet light and ionizing radiation. The Plant Cell 6, 227-235

Numbers Suggest That Electronic Plant Gene Registers Are a Success

By the most recent count, 56 electronic Plant Gene Registers (PGRs) are posted on *Plant Physiology*'s World Wide Web site. The papers, formerly published in print form in *Plant Physiology*, are now published exclusively on line, with a listing in the table of contents of each month's issue of the journal (see the listing under "Electronic Plant Gene Register" in the table of contents of the July 1995 *Plant Physiology*).

The electronic PGRs can be accessed through the World Wide Web, which provides hypertext links directly to GenBank, and through gopher.

To access electronic PGRs via the Web,
use the uniform resource locator (URL):
http://ophelia.com/Ophelia/pgr/index.html
Once you are in a PGR on the Web, selecting the highlighted accession number will take you directly to the appropriate data at GenBank.

To access electronic PGRs through gopher,
point your gopher client to
aspp.org,
select "Publications," then "Plant Physiology,"
and then "Plant Gene Registers."

You can also get gopher access by
pointing your client to
ophelia.com,
selecting "Ophelia Publishing"
and then "Plant Gene Registry."

Gatherings

All announcements are subject to editing. Wherever possible, submit announcements via e-mail to jcarlson@aspp.org. Alternatively, mail submissions to Jody Carlson, *ASPP Newsletter*, 15501 Monona Drive, Rockville, MD 20855-2768 USA. Because announcements are scanned into the computer, faxed transmissions will not be accepted.

FUTURE ASPP ANNUAL MEETING SITES

1995: Charlotte, North Carolina
Saturday, July 29, through
Wednesday, August 2

1996: San Antonio, Texas
Saturday, July 27, through
Wednesday, July 31

1997: Vancouver, British Columbia, Canada
Saturday, August 2, through
Wednesday, August 6

AUGUST

August 6-11
10th International Workshop on Plant Membrane Biology
Regensburg, Germany
Contact Widmar Tanner or Norbert Sauer, Lehrstuhl für Zellbiologie und Pflanzenphysiologie, Universität Regensburg, Universitätsstrasse 31, 93053 Regensburg, Germany; fax 49-941-943-3352. See November/December 1994 ASPP Newsletter for details.

August 7-11
4th International Congress on Amino Acids
Vienna, Austria
Contact: Bijay K. Singh, American Cyanamid Company, P.O. Box 400, Princeton, NJ 08543-0400 USA, or B. Lubec, Department of Pediatrics, University of Vienna, Wahringer Gurtel 18, A-1090, Vienna, Austria. See November/December 1994 ASPP Newsletter for details.

August 7-11
10th International Conference on Frankia and Actinorhizal Plants
University of California, Davis
Contact: Dr. A. M. Berry, Department of Environmental Horticulture, University of California, Davis, CA 95616; fax 916-752-1819 e-mail amberry@ucdavis.edu. See November/December 1994 ASPP Newsletter for details.

August 13-17
Phytochemical Society of North America Annual Meeting
Sault Ste. Marie, Ontario, Canada
Contact: Dr. James A. Saunders, Plant Sciences Institute, USDA, Bldg. 9, Rm 5, Beltsville, MD 20705, telephone 301 504-7477, fax 301 504-6478; or Dr. Pedro Barbosa, Department of Entomology, University of Maryland, College Park, MD 20742, telephone 301 405-3946 office, fax 301 314-9290. See November/December 1994 ASPP Newsletter for details.

August 13-17
5th International Conference on the Transport of Photoassimilates
Canterbury, UK
Contact: Dennis Baker , Biological Sciences, Wye College, Kent TN25 5AH, UK; fax +44-1233-813140, e-mail s.simpson@wye.lon.ac.uk.

August 20-25
10th International Photosynthesis Congress
Montpellier, France
Contact: Dr. Paul Mathis (Photosynthesis Congress), DBCM-SBE, CEA Saclay, Bâtiment 532, 91191 Gif-sur-Yvette CEDEX, France; fax 33-1-69-08-87017. See November/December 1994 ASPP Newsletter for details.

SEPTEMBER

September 3-7
4th International Workshop on Pathogenesis-Related Proteins in Plants: Biology and Biotechnological Potential
Kloster Irsee, Germany
Contact: Dr. Erich Kombrink, Abteilung Biochemie, Max-Planck Institut für Züchtungsforschung, Carl-von Linné-Weg 10, D-50829 Köln, Germany, fax +49-221-5062-313. See November/December 1994 ASPP Newsletter for details.

September 11-13
Physiological Responses of Plants to Pathogens
University of Dundee, Scotland
Contact Dr. Dale Walters, Plant Science Department, The Scottish Agricultural College, Auchincruive, Nr Ayr KA6 5HW, UK. See March/April 1995 ASPP Newsletter for details.

September 11-15
Laboratory Course: NMR of Carbohydrates
Athens, Georgia
See listing above under July 31-August 4 for details.

September 11-16
Plant Respiration: Physiological and Ecological Aspects
Syktyvkar, Komi Republic, Russia
Please address all correspondence to Dr. Tamara K. Golovko, Institute of Biology, Komi Science Center, Ural Division, Russian Academy of Sciences, Kommunisticheskaya, 28, 167610 Syktyvkar, Russia; telephone 821-22-51-15; fax 821-22-201-63. See May/June 1995 ASPP Newsletter for details.

September 13-15
14th Long Ashton International Symposium: Plant Roots—from Cells to Systems
Long Ashton Research Station
Bristol, England
Contact H. M Anderson, Department of Agricultural Sciences, University of Bristol, Institute of Arable Crops Research, Long Ashton Research Station, Bristol, BS18 9AF, United Kingdom; telephone 275-392181, fax 275-394007. See November/December 1994 ASPP Newsletter for details.

September 24-27
European Science Foundation Workshop
Genes and Their Products for Tolerance to Physical Stresses in Plants
Maratea, Italy
For further information please contact A. Leone, Research Centre for Vegetable Breeding, CNR, Via Universita'133, I-80055 Portici, Italy; telephone 39 776 16 46, fax 39 775 35 79, e-mail leone@vm.cised.unina.it. See March/April 1995 ASPP Newsletter for details.

September 25-27
Harnessing Apomixis: A New Frontier in Plant Science
Texas A&M University, College Station
Contact Dr. David M. Steller, Department of Soil and Crop Sciences, Texas A&M University, College Station, TX 77843-2474; telephone 409-845-2745, fax 409-862-4733, e-mail monosom@rigel.tamu.edu. See November/December 1994 ASPP Newsletter for details.

OCTOBER

October 1-4, 1995
International Symposium:
Engineering Plants For Commercial Products/Applications
University of Kentucky, Lexington
Co-organizers: Glenn B. Collins and Robert J. Shepherd. To be added to the conference mailing list, send your name and address to: International Symposium on Engineering Plants, c/o Conferences and Institutes, 218 Peterson Service Building, Lexington, KY 40506-0005 USA; e-mail monica.stoch@ukwang.uky.edu, telephone 606-257-3929, fax 606-323-1053.

October 8-12
Third International Symposium:
Cytochrome P450 Biodiversity
Woods Hole, Massachusetts
Contact: Dr. John C. Loper, Department of Molecular Genetics, University of Cincinnati School of Medicine, Cincinnati, OH 45267-0524, fax 513-558-8474. See November/December 1994 ASPP Newsletter for details.

October 8-12
International Symposium:
Dynamics of Physiological Processes in Woody Roots
Ithaca, New York
Contact Dr. Mary A. Topa, Boyce Thompson Institute, Tower Road, Ithaca, NY 14853-1801, USA; fax 607-254-1242, e-mail mat8@cornell.edu. See November/December 1994 ASPP Newsletter for details.

October 25-29
11th Annual Meeting
American Society for Gravitational and Space Biology
Crystal City, Virginia
This conference provides a forum for presentation and exchange of gravitational and space biological information and data from scholarly and applied research. The program consists of oral and poster scientific sessions, symposia, and workshops. Topics include. mechanosensing and mechanoloading mechanisms; physiological responses to increased levels of carbon dioxide; spaceflight experiment results; controlled ecological life support systems; plant gravity perception; plant growth, development, and genetics; calcium role in cell processes; cell biology; biotechnology/instrumentation; animal structural systems/muscle physiology, animal gravity sensing and neurophysiology; and animal growth, development, and genetics. For further information contact: Donald R. Beem, American Institute for Biological Sciences, Special Science Programs, 730 11th Street NW, Washington, DC 20001; telephone 202-628-1500.

October 25-November 1
Short Course: Optical Microscopy and Imaging in the Biomedical Sciences
Marine Biological Laboratory
Woods Hole, Massachusetts
Course Director: Colin S. Izzard, State University of New York at Albany; telephone 518-442-4367. Designed for research scientists, physicians, postdoctoral trainees, and advanced graduate students in animal, plant, medical, and material sciences seeking a comprehensive introduction to microscopy and video-imaging. The course consists of lectures, laboratory exercises, demonstrations, and discussions that will enable the participant to obtain and interpret microscope images of high quality. Instruction on state-of-the-art equipment will be provided by experienced staff from universities and industry. Topics to be covered include: principles of microscope design and image formation; bright and dark-field, phase contrast, polarized light, differential interference contrast, interference reflection, and fluorescence microscopy; confocal scanning microscopy; digital image restoration, and 3-D reconstruction; video imaging, recording, enhancement, and intensification, analog and digital image processing and analysis; and fluorescent probes and ratio imaging. Application of the optical methods to live cells will be emphasized, other specimens will be covered. Course fee: $1,690 (room and board available at no additional charge). Applications due August 15. Admissions are competitive. For forms and information contact: Admissions Coordinator, Marine Biological Laboratory, Woods Hole, MA 02543; telephone 508-289-7401; e-mail admissions@mbl.edu

NOVEMBER

November 5-9
First Joint USA-México Symposium
Agrobiology, Molecular Physiology, and Biotechnology of Crops Important to Mexican Agriculture
Cocoyoc, Mexico
For more information and registration packets (hotel reservation forms, abstract forms, etc.) send your complete mailing address to Maarten Chrispeels (mchrispeels@ucsd.edu) or Alejandra Covarrubias (crobles@pbr322.ceingebi.unam.mx). See March/April 1995 ASPP Newsletter for details.

November 26-December 1
Sustainable Agriculture for the Tropics: The Role of Biological Nitrogen Fixation
Angro dos Reis, Brazil
The conference will honor the research accomplishments of Dr. Johanna Dobereiner. Speakers representing 13 countries currently are scheduled. The proceedings of the symposium will be published as a special edition of "Soil Biology and Biochemistry." You are invited to present posters, and additional oral presentations may be accepted. Information and registration forms can be obtained from Dr. Avilio A. Franco, EMBRAPACNPAB, Km 47, Estrada Antiga Rio San Paulo, Seropedica, Itaguai, 23851-970, Rio de Janeiro, Brazil.

1996

JANUARY

January 25-27, 1996
Third DBMS Workshop
Plant Cell Metabolism and Its Regulation
Villard de Lans, France
Organizers: R. Douce, J. Joyard. The third workshop of the Département de Biologie Moléculaire et Structurale of the Centre d'Etudes Nucléaires de Grenoble will include sessions on carbon metabolism, nitrogen and sulfur metabolism, cell membranes and transport, metabolism and signaling, and long distance transport. Invited speakers include: H. Barbier-Brygoo, A. A. Benson, R. Brouquisse, D. R. Bush, M. Caboche, M. Chrispeels, S. Delrot, R. Dumas, M. J. Emes, I. Flügge, J. Guern, P. J. Lea, G. Lorimer, A. Pugin, R. Ranjeva, T. ap Rees, K. Saito, J. Schell, H. Sentenac, T. Slabas, M. Stitt, J. Vidal, L. Willmitzer. Application deadline is December 1, 1995. For information, contact: Dr. Jacques Joyard, DBMS/PCV, Grenoble, France, telephone 33-76-88-41-84, fax 33-76-88-50-91.

MARCH

March 8-14, 1996
Keystone Symposium
The Extracellular Matrix of Plants: Molecular, Cellular and Developmental Biology
Tamarron, Colorado

If you have ever applied to attend or have attended a Keystone Symposia conference, you will automatically be sent application information. Otherwise, contact Keystone Symposia, Drawer 1630, Silverthorne, CO 80498; telephone 303-262-1230, fax 303-262-1525. See May/June 1995 ASPP Newsletter for details.

March 10-16, 1996
Seventh International Symposium on Flower Bulbs
Herzliya, Israel

Convener of the meeting is A. H. Halevy. For more information, contact Ortra Ltd., P.O.B. 50432, Tel Aviv, 61500, Israel,; fax 972-3-5174433. See January/February 1995 ASPP Newsletter for details.

March 10-16, 1996
Third International Workshop on Basic and Applied Research in Plasmodesmal Biology
Zichron Yakov, Israel

For further information contact one of the following: Bernard Epel, Division of Plant Biology MRC7, The Scripps Research Institute, 10666 North Torrey Pines, La Jolla, Ca 92037; fax 619-554-6330; e-mail bepel@scripps.edu; Shmulik Wolf, Department of Vegetable Crops, The Faculty of Agriculture, Hebrew University, Rehovot, Israel 76100; fax 972-8- 468-265, e-mail swolf@agri.huji.ac.il; William Lucas, Section of Plant Biology, University of California, Davis, California 95616; fax 916-752-5410, e-mail wjlucas@ucdavis.edu. See March/April 1995 ASPP Newsletter for details.

APRIL

April 11-13, 1996
New Biological Approaches to Understand and Improve Winter Survival of Plants
Århus, Denmark

Contact: Bjarni L. Gudleifsson, RALA Modruvellir, 601 Akureyri, Iceland; telephone: + 354-6-24477, fax + 354-6-27144. See January/February 1995 ASPP Newsletter for details.

April 12-19, 1996
9th International Congress on Soilless Culture
St. Helier, Jersey, Channel Islands

Write to Secretariat of ISOSC, P.O. Box 52, 6700 AB Wageningen, The Netherlands. See January/February 1995 ASPP Newsletter for details.

April 15-17, 1996
Starch: Structure and Function
Cambridge, UK

Contact: Mrs. M. A. Staff, Cavendish Laboratory, Madingley Road, Cambridge, CB3 0HE, United Kingdom; telephone 44-1223-3370007, fax 44-1223-337000. See March/April 1995 ASPP Newsletter for details.

April 17-20, 1996
15th Annual Missouri Symposium
Protein Phosphorylation in Plants
Columbia, Missouri

Topics to include: protein kinases and phosphatases in metabolism; Ca^{2+}-dependent phosphorylation; protein kinases in development; protein phosphorylation in defense responses; protein phosphorylation in control of the cell cycle; protein phosphorylation and signal transduction. To be considered for oral or poster presentations, submit a 1-2 page abstract not later than December 15, 1995. Registration will be limited to 250. Submit abstracts or write for registration material to Missouri Symposium, 117 Schweitzer Hall, University fo Missouri, Columbia, MO 65211; fax 314-882-5635.

MAY

May 12-17, 1996
VIII Congress
International Society of Citriculture
Sun City Resort, South Africa

For information, contact: Congress Secretariat, Institute for Tropical and Subtropical Crops, Private Bag X 11208, Nelspruit 1200, South Africa; telephone 27-1311-52071, fax 27-1311-23854, e-mail supervisor@itsg.arc.agric.sa. See May/June 1995 ASPP Newsletter for details.

JUNE

June 2-5, 1996
The Monroe Wall Symposium on Natural Products:
Harnessing Biodiversity for Therapeutic Drugs and Foods
New Brunswick, New Jersey

Organizers: Rutgers University and Xechem, Inc., New Brunswick, NJ 08901 USA. For further information, contact: Keitgh Wilson, Office of Continuing Professional Education, Rutgers University, Cook College, P.O. Box 231, New Brunswick, NJ 08903-0231; telephone 908-932-9271, fax 908-932-1187.

June 16-21, 1996
Third International Symposium on in Vitro Culture and Horticultural Breeding
Jerusalem, Israel

For more information, or to receive a call for papers, contact Third International Symposium on in Vitro Culture and Horticultural Breeding, P.O. Box 50006, Tel-Aviv 6500, Israel. See May/June 1995 ASPP Newsletter for details.

June 22-26-1996
1996 World Congress on In Vitro Biology
Bioctechnology: From Fundamental Concepts to Reality
San Francisco, California

Program will include a formal symposium, exhibits, contributed sessions, workshops, and poster presentations. Topics will be organized under the general headings of vertebrate, cellular toxicology, invertebrate, and plant. Deadline for abstracts is January 12, 1996. Contact: Tiffany McMillan, telephone 410-992-0946, fax 410-992-0949.

June 23-26, 1996
Second International Symposium on the Biology of Root Formation and Development
Jerusalem, Israel

For more information, or to receive a call for papers, contact Second International Symposium of the Biology of Root Formation and Development, P.O. Box 50006, Tel-Aviv 61500, Israel. See May/June 1995 ASPP Newsletter for details.

JULY

July 7-12 1996
12th International Symposium on Plant Lipids
Toronto, Canada

The 12th International Symposium on Plant Lipids to be held on the main campus of the University of Toronto will cover all topics related to plant lipids including, but not exclusively: fatty acid metabolism, lipid metabolism and biochemistry, membrane structure, oil seed metabolism, isoprenoids and sterols, environmmental effects on lipids and the biotechnology of lipids. The meeting will consist of 30- and 15-minute oral presentations and poster sessions. Anybody interested in plant lipids is invited to attend. To request a registration package, to be distributed at the end of 1995, contact John P. Williams, Department of Botany, University of Toronto, 25 Willcocks St., Toronto, Ontario, Canada M5S 3B2; telephone 416-978- 3540, fax 416-978-5878, e-mail lipids96@botany.utoronto.ca.

July 14-17, 1996
4th IUBMB Conference
The Life and Death of the Cell
Edinburgh, Scotland

Topics at this meeting will include: cell growth, control, and development; cell death mechanisms; signal termination and compartmentalization; cellular fates of proteins; cellular stress and protection mechanisms. To obtain a circular giving details of travel, accommodation, registra-

tion, and scientific and social programs, contact: The Meetings Office, The Biochemical Society, 59 Portland Place, London W1N 3AJ, United Kingdom; telephone 44-171-580-5530, fax 44-171-637-7626, e-mail meetings@biochemsoc.org.uk

July 14-18, 1996
5th Symposium of the International Society of Root Research:
Root Demographics and Their Efficiencies in Sustainable Agriculture, Grasslands, and Forestry
Clemson, South Carolina
Currently sessions are planned for (l) global carbon cycling, (2) water quality, (3) sustainable agroecosystem production, (4) carbon allocation and/or competition by above and below ground biomass in croplands, grasslands and forest ecosystems, and (5) contemporary methods for measuring root dynamics. Internationally recognized keynote speakers will open each session. For additional information please contact Dr. James E. Box, Jr., USDA-ARS, P.O. Box 555, Watkinsville, GA 30677, U.S.A., or by e-mail rootconf@uga.cc.uga.edu, fax 706-769-8962, telephone 706-769-5631. Please supply your name, complete address, and, if available, your e-mail, fax, and telephone numbers.

July 14-19, 1996
8th International Symposium on Molecular Plant-Microbe Interactions and 7th Annual Gatlinburg Symposium
University of Tennessee, Knoxville
Sponsored by the International Society for Molecular Plant-Microbe Interactions. The host for this symposium will be the Center for Legume Research at the University of Tennessee. The meeting will supersede the annual Gatlinburg Symposium hosted by the CLR. Dr. Gary Stacey is chair of the local organizing committee. For more information, contact: Dr. Gary Stacey, Director, Center for Legume Research M409 Walters Life Science Bldg. The University of Tennessee Knoxville, TN 37996-0845 USA; fax 615-974-4007; e-mail: gstacey@utkvx.utk.edu.

July 21-24, 1996
Third International Fructan Symposium
Logan, Utah
Contact N. Jerry Chatterton, USDA/ARS, Forage and Range Research, Utah State University, Logan, Utah 84322-6300, USA; telephone 801-797-2249, fax 801-797-3075, e-mail njchatt@cc.usu.edu.

AUGUST

August 4-9 1996
Postharvest 96:
Fourth Yearly International Conference on Postharvest Science
Taupo, New Zealand
Sessions: Postharvest research on fruits, vegetables and ornamentals; Postharvest physiology, biochemistry, and molecular biology; Packaging, handling, storage, and transport technology. Under the auspices of the ISHS and NZSHS. For more information and registration materials contact: Dr Ian Ferguson, HortResearch, Private Bag 92 169, Auckland, NZ; telephone 00 64 9 849 3660, fax 00 64 9 815 4202, e-mail iferguson@hort.cri.nz.

WSSA UNDERGRADUATE RESEARCH AWARD

The Weed Science Society of America sponsors 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 or semester during 1996. 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.
APPLICANTS:	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 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 students 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, 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, DowElanco, Bld. 308: 3E/10, 9330 Zionsville Road, Indianapolis, IN 46268-1054. Proposals should be received no later than November 1, 1995. Funding decisions will be made by January 15, 1996.