

PHYTOCHEMICAL SOCIETY OF NORTH AMERICA

Newsletter

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Executive Committee PSNA 1987-1988

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The Phytochemical Society of North America is a non-profit scientific organization whose membership (currently about 400) is open to anyone with an interest in phytochemistry, the role of plant substances, and in related fields. Annual membership dues are \$15.00 for regular members and \$8.00 for student members. Annual meetings featuring symposium topics of current interest and contributed papers by conference participants are held throughout the United States, Canada and Mexico. A newsletter is circulated to members several times a year to keep them informed of upcoming meetings and developments within the Society.

If you would like additional information about the PSNA or if you have material to be included in the newsletter, please contact the Society Secretary. Annual dues and changes in addresses should be sent to the Society Treasurer.

PROFESSOR TONY SWAIN REMEMBERED

With the sudden and unexpected death of Tony Swain in England on September 25, 1987, we have lost a leading figure in the world of phytochemistry. Many of us have also lost a very dear friend. Tony was born in Malton, Yorkshire, England in 1922 and served as a Captain in Queen Victoria's Own Madras Sappers and Miners in Europe and the Far East from 1943 to 1946. After the war, he studied chemistry at Exeter where he obtained a Ph.D. He subsequently spent a relatively long and productive period at the Low Temperature Research Station, Cambridge. There, together with Bate-Smith, some pioneering work on plant phenolics was carried out. Tony, in fact, was the founder and the Secretary of the Plant Phenolics Group in the U.K. which eventually grew to be the Phytochemical Society of Europe. In 1962, he organized an exciting NATO meeting on Chemical Plant Taxonomy, a subject of which he had a wealth of knowledge.



From 1965-68 he served as Secretarial Advisor in the Cabinet Office, London, and during this period, found time to serve as Secretary of the IUPAC Commission on Plant Chemical Taxonomy. In 1969-70 he spent a sabbatical year at Harvard where, together with Richard Schultes, the ground was laid for the Alpha-Helix Amazonian Expedition in which I was fortunate to take part when it was realized in 1977.

In 1970, he set up the biochemical laboratory at Kew where he continued investigations on phenolics and extended his research into biochemical ecology.

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CALL FOR NOMINATIONS

The PSNA constitution specifies that members are responsible for nominating candidates for election of officers. A new Vice President (President-Elect) is elected each year and automatically becomes President the next year or anytime that the office of President may be vacated. The President is not eligible for election to the office of President (or Vice President) at a later date and cannot succeed himself(herself) as President. The Secretary and Treasurer are elected for three year terms and may be re-elected. Jonathan Poulton will step down as Treasurer this year.

A form is provided (see center section of the newsletter) for submitting nominations for PSNA President-Elect and Treasurer. Please enter your nominations, remove the sheet, fold, stamp and mail it to Dr. G.H. Neil Towers, Department of Botany, The University of British Columbia, Vancouver, B.C. V6T 2B1, Canada. Nomination forms must be mailed by March 15, 1988. Election ballots will be distributed to members on April 15, 1988

Five years later he left the U.K. to serve as Professor in the Biology Department, Boston University. He served as Chairman of that Department from 1975-80.

He returned to Kew as an Honorary Research Fellow in 1986 until his death.

Even to those phytochemists who knew him casually, Tony was a delightfully friendly, but frank, critic at conference sessions; and his name, of course, will always be associated with the journal, Phytochemistry, which he founded in 1961. Although an author of over 150 scientific papers and review articles and editor of nine books, I think that his strength lay in his vast knowledge of phytochemistry, his willingness to share his ideas and thoughts with students, technicians and colleagues, and his promotion of what has always been an extremely important branch of biology and of chemistry.

As a personal friend of his for thirty years, I would much rather talk about the good times we have enjoyed at conferences all over the world, good times which have been equally shared by many of the members of PSNA. But this is a time to pay him honour and recognition. We will always remember him for his wisdom, his charming sense of humour and his commitment to the mysteries of phytochemistry. His name will surely be recalled for many years to come at gatherings of phytochemists.

G.H.N. Towers

PROPOSED CHANGES IN THE PSNA CONSTITUTION

The following proposed changes in the Constitution were approved unanimously by the Executive Committee on June 21, 1987 in Tampa, Florida. They will be on the 1988 election ballot that will be mailed to members in April. Deletions are in brackets; new materials are underlined:

ARTICLE XIII, Section 1. Upon [recommendation] approval by a 2/3 majority of the Executive Committee this Constitution may be changed or amended by a simple majority [of] vote[s] of the membership [collected for this purpose].

ARTICLE XIII, Section 2. Proposed amendments shall be made in writing to the Executive Committee via the Secretary four months prior to the Annual Meeting. [and] After approval as indicated above in section 1, voting materials shall be distributed to the membership at least two months prior to the Annual Meeting together with the ballot for election of officers.

RATIONALE: The revised wording attempts to remove an ambiguity in the constitution. Section 1 of ARTICLE XIII appears to state that the Executive Committee must first approve, while section 2 implies that the amendments can just be made by any member directly to the Secretary.

Further amendments should be forwarded to the Secretary. All proposed changes should be thoroughly researched as to implications to all sections of the constitution and bylaws.

REPORT ON THE FIRST LATINAMERICAN PHYTOCHEMICAL SOCIETY MEETING

The first meeting of the Sociedad Latinoamericana de Fitoquímica took place November 15-20, 1987 in Montevideo, Uruguay. Due largely to the heroic efforts of Patrick Moyna, about one hundred phytochemists from virtually every Latinamerican country assembled at the Facultad de Química to present their work orally or as posters and to hear a series of invited lectures. The Phytochemical Society of Europe and Phytochemical Society of North America were represented respectively by David Philippon and John Romeo.

The scientific portion of the meeting was a rousing success! The quality of the symposium talks, contributed papers and posters was of a high caliber. Language was not a barrier in any real sense so long as one understood Spanish, the prevailing language. A small number of talks were in Portuguese and a handful in English. As one might expect, the areas of phytochemistry encompassed were many and varied, ranging from classical isolation/characterization studies of natural products, ethnobotany, and traditional metabolic studies to chemical ecology, pharmacological testing and modern methodology.

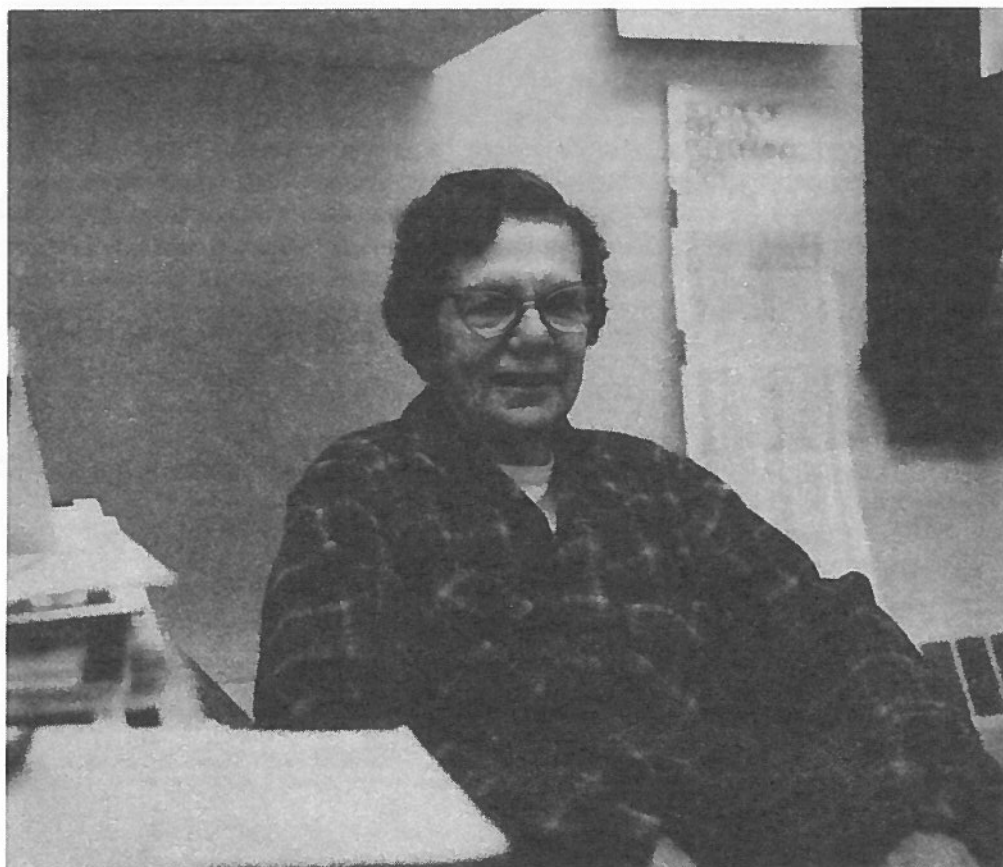
The SLF continues to have serious organizational problems. At two open sessions scheduled during the conference, participants could not agree on a structure for the society, a set of goals for the future, a site or time for a second meeting, whether or not dues should be collected, or even a purpose for the existence of the society. Various concerns were expressed such as: whether or not such a multinational society is a threat to national societies, how money collected in dues would be spent, and how small countries should be represented within any structure. It was agreed, finally, to select a multinational committee to debate these questions over the next few months. The committee chosen is composed of: Patrick Moyna (Uruguay), E. Gross (Argentina), Guillermo Schmeda (Paraguay), E.P. Schenkel (Brazil), Wanda Quilhot (Chile), Alain Fournet (Bolivia) and Mahabir Gupta (Panama). Otto Gotlieb (Brazil) will serve as senior advisor to the group. Whether or not this society will survive probably depends upon the emergence of a strong leader within this group.

Mr. Moyna of the SLF was given a copy of the PSNA bylaws and assured of our support and assistance on matters in which our experience might be valuable. The possibility was raised of a joint meeting at a site in the Caribbean sometime in the future. Clearly this eventuality appears to be a long way off.

John Romeo

BIOGRAPHICAL SKETCH OF LIFE MEMBERSHIP AWARD WINNER

HELEN A. STAFFORD received her B.A. from Wellesley College, M.A. from Connecticut College and Ph.D. from the University of Pennsylvania. Her Master's thesis was done with Dr. R.H. Goodwin and her Ph.D. thesis with Dr. D.R. Goddard. She was a Research Associate in Biochemistry with Dr. B. Vennesland and Instructor in Botany at the University of Chicago.



She has been Assistant Professor, Associate Professor and Professor of Biology at Reed College. Helen received a Guggenheim fellowship for research in Dr. K.V. Thimann's laboratory at Harvard University, and a National Science Foundation Senior Postdoctoral Fellowship for research in Dr. T.A. Geisman's laboratory at the University of California at Los Angeles. She has spent one sabbatical leave in Dr. A.W. Galston's laboratory at Yale University and another in Dr. T. Cheng's laboratory at the Oregon Graduate Center. Helen has served as CUEBS Commissioner from 1968-71, as a member of the NSF Metabolic Biology panel 1973-75, on the Editorial Boards of Plant Physiology since 1964, and of Plant Science since 1982. She was PSNA President in 1977-78 and currently chairs the PSNA Advisory Committee. Her research on the metabolism and regulation of phenolic compounds in higher plants is supported by NSF, and she has published many papers.

In recognition of her outstanding scientific achievements in and contributions to the field of phytochemistry, Helen received the life membership award at the 1987 PSNA meeting at Tampa. Congratulations!

PHYTOCHEMICAL SOCIETY OF NORTH AMERICA

Financial Statement

January 1, 1987 - December 31, 1987

CHECKING ACCOUNT

<u>Receipts</u>		<u>Expenditures</u>	
Membership Dues	\$ 4,008.00	1987 Meeting Advance	\$ 6,000.00
Royalties	3,868.16	1987 Meeting Student Travel Assistance	2,075.00
Interest (Savings)- transferred to checking	1,310.83	1987 Meeting Best Paper Award	200.00
Interest (Checking)	251.04		
1986 USDA Grant	1,000.00	1987 Meeting (EC Travel)	481.50
Beltsville Meeting Refund	123.84	Secretary's Expenses	2,100.00
Refund from G. Wagner (ex-Secretary)	426.65	Treasurer's Expenses	74.11
Mailing Lists	35.00	Transfer to Savings	181.88
1988 Meeting Sponsors	1,500.00		
	<hr/>		<hr/>
	\$12,523.52		\$11,112.49

CHECKING ACCOUNT SUMMARY

Receipts	\$12,523.52
Expenditures	11,112.49
Net Gain	<hr/> \$ 1,411.03

SAVINGS ACCOUNT ACTIVITY

Accumulated Interest (retained in Savings)	\$ 846.13
Transfer from Checking	181.88
Net Gain	<hr/> \$1,028.01

ASSETS - January 1, 1987

Checking	\$ 4,668.99
Savings	\$36,152.31
	<hr/>
	\$40,821.30

ASSETS - December 31, 1987

Checking	\$ 6,080.02
Savings	\$37,180.32
	<hr/>
	\$43,260.34

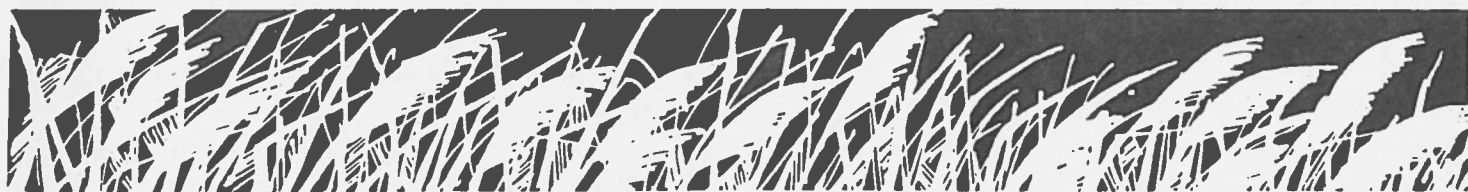


The Phytochemical Society of North America

PLANT NITROGEN METABOLISM

An International Symposium
The University of Iowa, Iowa City

June 26—30, 1988



The twenty-eighth Annual Meeting of the Phytochemical Society of North America will feature a symposium on recent developments in primary and secondary nitrogen phytochemistry as well as contributed oral poster sessions in all areas of phytochemistry. This meeting is not restricted to PSNA members, and affiliates of other societies are encouraged to participate.

28th Annual Meeting

The Phytochemical Society of North America

TENTATIVE PROGRAM

Saturday, June 25

- 1:00-8:00 PM Registration
7:30-10:00 PM Welcome Reception

Sunday, June 26

- 8:00 AM-5:00 PM Registration
9:00 AM Opening Address
9:30 AM-Noon Symposium
1:30-5:00 PM Contributed Papers
7:00-9:00 PM Poster Session
(Refreshments provided)
9:00 PM Graduate student/Post-Doc Mixer

Monday, June 27

- 8:30 AM-Noon Symposium
1:30-3:30 PM Contributed Papers
4:30 PM Field Trip to Herbert Hoover
Historic Site and Prairie
7:30 PM Steak Dinner at West
Branch, Iowa

Tuesday, June 28

- 8:30 AM-Noon Symposium
1:30-3:00 PM Contributed Papers
3:30 PM Depart to Dubuque for
Evening Dinner Cruise on
the Mississippi

Wednesday, June 29

- 8:30 AM-Noon Symposium
1:30-3:30 PM Contributed papers
4:00 PM Annual Business Meeting
6:15 PM Reception and Banquet

Thursday, June 30

- 9:00 AM-Noon Symposium and Closing
Remarks

SYMPOSIUM SPEAKERS

An Overview of Nitrogen Metabolism in
Higher Plants

D.G. Blevins (University of Missouri-Columbia)

Regulation of Nodule Specific Host Genes
Involved in Carbon and Nitrogen
Assimilating Pathways

D.P.S. Verma (Ohio State University)

Synthesis, Transport and Utilization of
Products of Symbiotic N₂ Fixation

J.S. Pate (University of Western Australia)

Genetics and Molecular Biology of Higher
Plant Nitrate Reductases

A. Kleinhofs (Washington State University)

The Use of Mutants Lacking Glutamine
Synthetase and Glutamate Synthase To Study
their Role in Plant Nitrogen Assimilation

P.J. Lea (University of Lancaster, United Kingdom)

Assimilation of Ammonia by Glutamate
Dehydrogenase?

D. Rhodes (Purdue University)

Sites of Action of Herbicides in Amino Acid
Metabolism: Primary and Secondary
Physiological Effects

D.L. Shaner (American Cyanamid Company, NJ)

Metabolism of 1-Aminocyclopropane -1-
carboxylic Acid in Relation to Ethylene
Biosynthesis

S.F. Yang (University of California-Davis)

Structure and Expression of Wheat and Rice
Seed Protein Genes

T.W. Okita (Washington State University)

The Biological Activity of
Polyhydroxyalkaloids and Related Compounds
from Plants

L.E. Fellows (Royal Botanic Gardens, Kew, United
Kingdom)

Primary and Secondary Metabolism of
Polyamines in Plants

H.E. Flores (Louisiana State University)

Biosynthesis of Alkaloids Using Plant Cell
Cultures

M.H. Zenk (University of Munich, West Germany)

Mayflower Hall Parking and Transportation Options

A limited number of parking spaces is available at the Mayflower Hall parking lot on a first-come, first-served basis. If parking is not available, the Mayflower Hall Registration Desk will offer alternative parking suggestions. A free campus bus system, "Cambus", serves Mayflower Hall every half hour from 7 AM-7 PM daily. The Iowa City Transit System also provides bus service twice each hour from the Mayflower Hall at 50 cents per ride.

Alternative Accommodations

Alternative accommodations are available within 3 miles of IMU at the following hotels/motels in Coralville: Alamo Friendship Inn, 319-337-9888; Best Western-Cantebury Inn, 319-351-0400; Clayton House, 319-354-4400; Super 8, 319-337-8388; Ironmen Inn, 319-351-6600.

TRANSPORTATION TO IOWA CITY

Iowa City is located in east-central Iowa, about 60 miles west of the Mississippi River. Those coming by auto should follow Interstate 80 to the Iowa City-Dubuque Street exit (Junction 247) and travel south on Dubuque Street for 1.5 miles to reach the downtown area. The Mayflower Residence Hall is located on the left hand side of Dubuque Street about 1/2 mile south of Interstate 80.

The nearest airport to Iowa City is Cedar Rapids Municipal Airport located 25 minutes north of Iowa City. Shuttle service to Iowa City from the Cedar Rapids Municipal Airport is available from a number of airport ground transportation companies. Average rates are \$10.00 one-way and \$18.00 round trip.

Discount Airfares

Travel arrangements for discounted air fares may be made by contacting the official travel agent, Group Travel Directors, Inc., 1-800-222-7907 (In Minnesota call 1-800-747-2255). United Airlines is the Official Group Travel Carrier for the PSNA meeting. If United Airlines should not service your area, Group Travel will suggest an alternate carrier. The greatest discounts will be given to those who book early.

EMERGENCY CALLS

You can be reached during the symposium by contacting the Center for Conferences and Institutes during office hours or by leaving a message on their answering machine (319-335-3231).



MEETING LOCATION AND ACCOMMODATIONS

Registration and all sessions will be held at the Iowa Memorial Union (IMU), located on the banks of the Iowa River near the center of campus. All meals and snacks may be purchased within a variety of eating-places in this fully air-conditioned building or at restaurants downtown (a 5 minute walk from IMU). The IMU also houses an excellent hotel (the Iowa House; for details, see below), the University Book Store, recreation area, TV room, and movie theater. The IMU Parking Ramp (\$4.00 per day) provides the closest parking for meeting participants. The following accommodations options are open to meeting participants and their guests:

Iowa House

A block of rooms has been reserved at the Iowa House in the IMU on The University of Iowa campus. Rates range from \$27-\$45. Complimentary parking is provided in the IMU Parking Ramp for those staying at Iowa House. Reservations are held under the name Phytochemical Society of North America. For reservations, contact the Iowa House using their 800 number from Monday-Friday, 8 AM-4:30 PM (Central Time Zone): outside Iowa, 1-800-553-6380; in Iowa, 1-800-272-6412, or anytime, Monday-Sunday, 319-335-3513.

Holiday Inn

An additional block of rooms has been reserved under the name of the Society at the Holiday Inn-Iowa City. This hotel is located in downtown Iowa City and is 5 blocks from IMU. Room rates range from \$52-\$67. Parking is complimentary for guests only. For reservations, contact the Holiday Inn-Iowa City directly (319-337-4058).

Mayflower Hall

A block of single and double rooms each with air conditioning has been reserved at Mayflower Hall, a University of Iowa residence hall located 3/4 mile from the Iowa Memorial Union. These rooms, arranged in suites of two, share a kitchenette and a bath. Preparation of meals is permitted, but guests must provide their own cooking and eating utensils. A touch tone phone is provided in each room. Guests may make on-campus, credit card, or collect calls. Room telephones can receive long distance calls but not collect calls. These rooms will be provided with the following services: clean linen; clean towels; daily room cleaning and trash removal; a pillow; and a bedspread. Blankets are provided upon request from the Mayflower Hall Registration Desk. Laundry facilities are also available in the building. Single rooms are \$90.00 for 5 nights and double rooms are \$65.00 for 5 nights per person. Available from June 25 - June 30, reservations must be received by WEDNESDAY, MAY 25. Unless otherwise requested, roommates of same sex will be randomly assigned.

Mayflower Hall Meal Service Option

An optional meal service is available for Mayflower Hall guests only. Meal service begins with dinner on Saturday, June 25, and will end with breakfast on Thursday, June 30. On Sunday, only breakfast and a noon dinner will be served. For the remaining three days, 3 meals are served each day. Meals are served in the Burge Hall food service dining room (3 blocks from IMU). The cost of this meal service is \$40.00 per person.



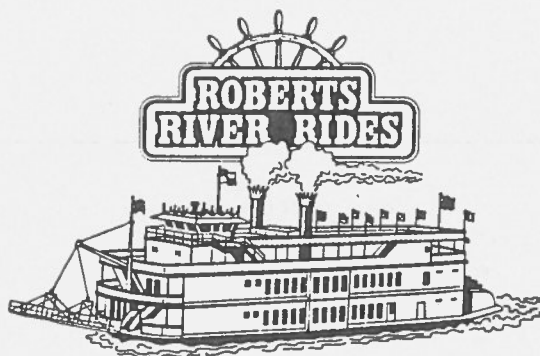
SPECIAL EVENTS AND GUEST PROGRAM

There will be an active guest and social program at this meeting including excursions to a native prairie and the Herbert Hoover Historic Site, a dinner cruise on the Mississippi River, and a banquet.

The meeting will open on Saturday evening (June 25) with a Welcome Reception (at no charge). Following the Poster Session on Sunday night (June 26), UI Botany Department graduate students will host a get-together for graduate students and post-docs attending the meeting.

All participants and their guests may register for a guided visit on Monday evening (June 27) to Rochester Cemetery and the Herbert Hoover National Historic Site, followed by a cook-it-yourself steak dinner (alternative meat choices are available) at a restaurant in West Branch, Iowa. Rochester Cemetery is one of only a few surviving natural prairies in Iowa and is noted for its dazzling displays of wildflowers throughout spring and summer. At the Herbert Hoover Historic Site, you can visit the birthplace and boyhood home of America's 31st President as well as a one-room school, a working blacksmith shop, and a Friends Meeting house dating from the 1850's.

Beginning at 3.30 PM on Tuesday afternoon (June 28), we will be leading a field trip to Dubuque, where registrants may visit the historic districts of this riverside town and ride the Fenelon Place Elevator, the world's shortest, steepest scenic railway (for a nominal fee), before boarding a stern-wheeler for a two and a half hour prime rib dinner and dance cruise on the Mississippi River.



The Annual PSNA Banquet will be held in the Iowa Memorial Union on Wednesday evening, June 29. It will be preceded by a Reception in the lobby of Iowa Hall (part of the UI Museum of Natural History). Iowa Hall offers visitors an overview of Iowa's natural heritage—its geology, archaeology and ecology. Special exhibits include a Mesquakie Indian habitat and dioramas of long-extinct land and sea animals that once inhabited prehistoric Iowa.

Guest Program-Kalona Excursion

Horse drawn buggies and today's automobiles share the same roads in Kalona, 18 miles southwest of Iowa City. The Des Moines Register rated Kalona as "one of the best small towns in Iowa." Come experience the Kalona charm on this optional guest program tour and luncheon on Wednesday, June 29, from 9:00 AM - 3:30 PM. Among other stops, your tour will include the Historical Village of Kalona, the Kalona Cheese Factory, and the Country Lane Egg Center. A traditional home-cooked Mennonite luncheon meal will be served.

TRAVEL ASSISTANCE AND BEST PAPER AWARD

PSNA has allocated funds which will allow partial travel assistance for graduate student members presenting oral (but not poster) presentations at the 1988 meeting. Depending on the response, this might cover up to 50% of an economy airline fare. To be considered for an award, candidates should complete the attached questionnaire and submit it by May 2 with a proposed travel budget, curriculum vitae, paper abstract, and a letter of support from the supervising professor verifying need for assistance to Dr. Jonathan E. Poulton, Department of Botany, University of Iowa, Iowa City, IA 52242. Student membership may be obtained by enclosing \$8.00 dues with your registration form. Recipients of travel assistance awards will be notified by May 16.

Additionally, an award of \$100 will be given for the outstanding oral presentation by a graduate student or recent Ph.D. (within 6 months of having received the degree at the time of presentation). To be considered for this award, please mark the relevant box on the attached questionnaire. The winner will be announced at the Annual Business Meeting on June 29.

REGISTRATION

To enroll, please complete the registration form provided and return it **NO LATER THAN JUNE 1** to: The University of Iowa, Center for Conferences and Institutes, Room 210, Iowa Memorial Union, Iowa City, IA 52242. Make checks or money orders for the registration fee payable to: **THE UNIVERSITY OF IOWA**. The conference registration fee includes all meetings and a copy of the published proceedings.

Cancellations may be made through June 1; all but \$10 is refundable. Refunds will not be made after June 1, but substitutions will be accepted. Registrations postmarked after June 1 will be assessed a late registration fee.

Registration will be held in the Iowa House Lobby on Saturday, June 25, 1:00-8:00 PM, and Sunday 26, 8 AM-5 PM.

LEISURE ACTIVITIES

Named Iowa ("Beautiful land") centuries ago by native American Indians, this state is best known for its lush farmland. Over 300 state and county parks offer excellent opportunities for family and recreational activities, such as camping, boating, fishing, and swimming. The average daytime temperature is 70 degrees with various levels of humidity throughout the month of June. There's something for everyone for visitors to Iowa-the beautiful land between two rivers (the Mississippi River to the east and the Missouri River to the west).

The University of Iowa is located at Iowa City, a delightful university community of 50,000 that offers numerous cultural interests and historical landmarks. The campus is dominated by the Old Capitol building, which served as the first state capitol from 1846 until 1857 when the state's government was moved to Des Moines. A member of the Big Ten Conference, The University of Iowa was founded in 1847. The student population averages 29,000 each year, and about 12,000 students enroll for courses during the summer session. A number of cultural, recreational, and historical opportunities awaits visitors to Iowa City, The University of Iowa, and nearby communities. Your registration packet will include several brochures and informational handouts to help you plan your "free time" during the PSNA meeting. Here's a brief overview of some of these visitor-oriented offerings:

The University of Iowa Field House

Here you'll find something for your recreational and fitness needs. The Field House offers a suspended jogging track, swimming, weight lifting, squash, basketball, volleyball, and even table tennis all under the same roof at little or no cost to meeting participants.

Other Recreational Opportunities

Canoeing on the Iowa River, sailing on Lake McBride, tennis courts, and golf courses can be found both on or off campus. Don't forget still another possibility, a leisurely jog along the beautiful Iowa River!

The University of Iowa Museum of Art

Not far from the IMU along the west bank of the Iowa River, the Museum of Art contains over 5,000 works of art from numerous artists that span six centuries.

The University of Iowa Museum of Natural History

On the University of Iowa campus, the Museum of Natural History features several bird and mammal galleries including the state-of-the-art Iowa Hall Gallery which illustrates Iowa's natural heritage.

The Bijou Theater at IMU

Here's a possible evening entertainment suggestion. The Bijou Theater screens classic, contemporary, and foreign films. Check the IMU Box Office for the screening times of the films offered during the PSNA meeting.

Old Capitol

Recently restored to its original splendour, Old Capitol was the first permanent seat of Iowa's territorial capitol and state governments. It's a classic example of Greek Revival architecture and features the unusual reverse spiral staircase.

Plum Grove

The Iowa City home of Robert Lucas, Iowa's first territorial governor from 1838-41. Built in 1844, the restored red brick home contains numerous historical documents and antique furnishings.

The Amana Colonies

The historic 7 villages of the Amana Colonies were founded in 1854 by German immigrants. Just 20 miles from Iowa City, these villages are located on 26,000 acres of scenic farmland and wooded hills along the Iowa River. Main Amana is probably best known throughout the world as the home of the Amana Woolen Mills and the Amana Furniture Factory. A number of family-owned and operated restaurants serve reasonably priced "family style" meals for the hungry visitor. Don't forget to sample the Amana wines or visit the small independent brewery of Millstream Beer (across the street from the Amana Woolen Mills). In nearby High Amana, the Amana line of appliances are made.

REGISTRATION FORM (88-178-01/L421)
PHYTOCHEMICAL SOCIETY OF NORTH AMERICA
28th ANNUAL MEETING
 June 26-30, 1988

S.S.# _____ Name _____
 (Last) (First) (MI)

Address _____
 (Street or P.O:) (City) (State) (Zip)

Daytime Telephone (____) _____ Title: _____

Institution _____

CONFERENCE REGISTRATION

_____ Participant (member) - \$55 \$ _____
 _____ Participant (non-member) - \$ 75 \$ _____
 _____ Participant (graduate) - \$25 \$ _____
 _____ Participant (graduate student presenting paper)
 \$ No charge _____
 _____ Membership in PSNA - (Full \$15, Student \$8)
 \$ _____
 _____ Spouse/Guest - \$10.00 \$ _____
 (Children under age 12 - no charge)
 _____ Late Registration (after June 1, \$80) \$ _____

SPECIAL EVENTS REGISTRATION (Pre-registration required)

(1) **Welcome Reception, Saturday, June 25**
 7:30-10:00 PM (no charge) No. Attending _____ \$ No charge

(2) **Herbert Hoover Historic Site, Prairie Visit,**
& Steak Dinner, Monday, June 27, 4:30-9:00 PM
 (\$12.00 per person) No. Attending _____ \$ _____

(3) **Mississippi Dinner Cruise, Tuesday, June 28**
 3:30-10:00 PM (\$25.00 per person) No. Attending _____ \$ _____

(4) **Reception and Banquet, Wednesday, June 29**
 6:15-10:00 PM (\$20.00 per person) No. Attending _____ \$ _____

(5) **Guest Program, Kalona Excursion, Wednesday, June 29**
 9:00 AM-3:30 PM (\$15.00 per person) No. Attending _____ \$ _____

Total Amount Enclosed (Conference and Special Events Regn.): \$ _____

Please make checks or money orders payable to: THE UNIVERSITY OF IOWA. Return BY JUNE 1 to: The University of Iowa, Center for Conferences and Institutes, Room 210, Iowa Memorial Union, Iowa City, IA 52242.

**MAYFLOWER RESIDENCE HALL
HOUSING REGISTRATION FORM (88-178-01/L421)**

Program Title: **Phytochemical Annual Meeting**

To reserve housing at the Mayflower Residence Hall, please complete this form and send with full payment to: The University of Iowa, Center for Conferences and Institutes, Room 210, Iowa Memorial Union, Iowa City, IA 52242. Reservations must be received NO LATER THAN WEDNESDAY, MAY 25.

Name _____ S.S.# _____

Address _____

(street or P.O.)

City _____ State _____ Zip _____

Phone (daytime) _____

Arrival Date _____ Estimated Hour _____ AM _____ PM

Departure Date _____ Estimated Hour _____ AM _____ PM

June

Circle Nights for Housing: 25 26 27 28 29
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I request a double room reservation with _____

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INVITATION TO PARTICIPATE

Members and non-members are invited to present a paper(s) at this meeting in the Contributed Paper Sessions or Poster Session on any topic of phytochemical interest. Depending on response, we intend to devote one or more of the Contributed Sessions to the topics of nitrogen phytochemistry, agricultural biochemistry, enzymology, isolation and characterization of natural products, and allelochemical interactions.

PRESENTATION FORMAT

Contributed papers may be presented either orally or as posters. Oral presentations will be restricted to 12 min. maximum and will be followed by an opportunity for questions (2 min.). Slide (2"x2") projectors, overhead projectors, and a chalkboard will be available. Poster boards will be provided allowing 48"x48" space for each presentation. Participants having additional presentation requirements should indicate their needs on the questionnaire below.

PREPARATION OF ABSTRACTS

Abstracts of all presentations will be published in the PSNA Newsletter prior to the meeting and distributed to all meeting participants and PSNA members. The following rules should be observed in the preparation of abstracts for the 1988 meeting:

1. Abstracts of contributed oral and poster presentations are due by May 2.
2. Abstracts should be not less than 125 words or exceed 200 words. The abstract should be typed single spaced in the block space provided below or within a facsimile thereof.
3. The entire title should be capitalized. Locations for authors should follow names if multiple authors are at different locations. Please underline the author who will present the paper. See example below for other details to be followed.
4. Complete the attached questionnaire indicating your presentation format, eligibility for awards consideration, and any additional projection requirements.
5. Mail the completed questionnaire and two copies of the abstract to: Dr. J.E. Poulton, Department of Botany, University of Iowa, Iowa City, Iowa 52242. Abstracts should arrive no later than May 2.
6. For additional information about abstracts, call Dr. J.E. Poulton(319-335-1322).

EXAMPLE

PURIFICATION AND SOME PROPERTIES OF AN ISOFLAVONE-SPECIFIC 5-O-METHYLTRANSFERASE FROM YELLOW LUPIN

Henry E. Khouri, Satoshi Tahara and Ragai K. Ibrahim, Plant Biochemistry Laboratory, Biology Department, Concordia University, Montreal, Quebec, Canada H3G 1 M8.

An isoflavone 5-O-methyltransferase (OMT) was partially purified from roots of yellow lupin (Lupinus luteus L. cv. Barpine) by fractional precipitation with ammonium sulfate, followed by gel filtration and ion exchange chromatography using an FPLC system. This novel enzyme, which was purified 810-fold, catalyzed position-specific methylation of the 5-OH group of a number of substituted isoflavones. The OMT had a pH optimum of 7 in phosphate buffer, an apparent pI of 5.2, a molecular weight of 55,000, no requirement for Mg²⁺, and was inhibited by various SH-group reagents. The K_m values for the isoflavone substrates varied between 1 and 10 μM and that for SAM was 100 μM. The role of this enzyme will be discussed in relation to the biosynthesis of the 5-O-methylisoflavones that accumulate in this tissue.

QUESTIONNAIRE

Please check the appropriate boxes.

Oral Presentation.....

Poster Presentation.....

Consideration for Travel Assistance Award.....

Consideration for Best Paper Award
(Oral Presentation Only).....

Additional requirements for presentation:

ABSTRACT FORM - Please observe the attached rules and submit 2 copies by May 2.

IMPORTANT DEADLINES

Abstracts due in Iowa City	May 2
Consideration for Travel or Best Paper Award	May 2
Mayflower Hall Registration due in Iowa City	May 25
Meeting and Special Events Registration (thereafter assessed late registration fee)	June 1

PHYTOCHEMICAL SOCIETY OF NORTH AMERICA

REPORT OF THE TREASURER

The Phytochemical Society of North America maintained its strong financial position during 1987 and closed the year with total assets of \$43,260.34. This represents 6.0% growth in total assets since December 31, 1986. The attached Financial Statement shows that our major sources of income were once again membership dues (\$4,008.00), royalties from sales of Recent Advances in Phytochemistry (\$3,868.16), and interest from savings and checking accounts (\$2,408.00). We received about \$500 less in membership dues than last year; this amount was offset by a comparable increase in revenue from royalties. As expected, our income from interest on savings and checking accounts continued to decrease this year due to falling interest rates. Our savings are currently in the form of two 6-month insured Money Market Certificates paying 6.75% and 5.75% interest (as compared with 14.8% in 1981 and 10.9% in September 1984). By comparison, the charge-free checking account pays 5.25% interest. Our thanks are due to the USDA for supporting the 1986 Maryland Meeting, to Monsanto, Dionex, and du Pont for their support of the 1987 Tampa Meeting, and to Monsanto and du Pont for sponsorship of the 1988 Iowa City Meeting. The major expenditures this year included an advance for the 1987 Tampa Meeting (\$6,000), Travel Assistance Awards for graduate students presenting papers at Tampa (\$2,075.00), and the customary \$2,100 for publishing the Newsletter. At this time, the final financial statement for the Tampa Meeting is not available. I understand from Dick Mansell that he will be returning over \$3,300 to the Treasury, which clearly would strengthen our overall financial position still further.

At year's end, the PSNA had 334 active members, of which 35 were students. Of the total membership, 258 are from the United States, 42 from Canada, while another 34 are from overseas. The attached summary of membership during 1979-1987 shows that the total membership reached a maximum in the early 1980's and has since declined. To combat this trend, the Executive Committee intends to initiate a membership drive in 1988. John Romeo has set up a committee for this purpose. Also, I would like to repeat my perennial exhortation that each PSNA member try to recruit at least one colleague or student in their institution to join our Society. Among the many advantages of PSNA membership which might be pointed out are: (a) reduced registration costs at annual meetings, (b) significant discounts (25-40%) on volumes of Recent Advances in Phytochemistry, and (c) receipt of the quarterly Newsletter and biennial Directory of members.

In an effort to attract young scientists to PSNA, the Executive Committee identified the sum of \$3,000 to provide partial travel assistance to graduate students presenting papers at the Tampa Meeting. Twelve students were supported, and all meeting participants benefited from their excellent talks. The Executive Committee consequently agreed to allocate \$3,000 to the Travel Award Program for the 1988 Meeting.

The 1988 PSNA Directory, which lists the addresses and research interests of the membership as known by the Treasurer as of January 1, is currently at

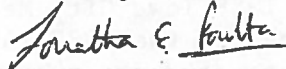
the publishers and will be mailed to you in late March. If you have not received your copy by May, please notify me. Furthermore, if you are changing your address in the near future, please advise me promptly of your new location so that your correspondence will not suffer delays.

I would like to remind those who have not already done so to remit their 1988 dues as soon as possible. Any members who are about to enter retirement are entitled to emeritus status which exempts them from dues.

Copies of all bank statements and the auditor's report are on file. If you have any comments, suggestions concerning investments, or criticisms concerning the Treasury or if you simply require more information, please feel free to contact me.

Finally, as I indicated last summer, I will be resigning as Treasurer after the Iowa City Meeting. It has been a great pleasure to serve on the Executive Committee and to get to know so many of you during the past 5 years. May I wish the incoming Treasurer all the best keeping track of the ever-changing addresses. I would be delighted to work with him/her to insure a smooth transition.

Respectfully submitted,



Jonathan E. Poulton
 Department of Botany
 University of Iowa
 Iowa City, IA 52242

SUMMARY OF PSNA MEMBERSHIP 1979-1987

	Total Membership	Student	USA	Canada	Overseas
1979	290	17	241	34	32
1980	315	29	245	36	34
1981	344	41	270	37	37
1982	364	46	278	46	40
1983	358	a	264	49	45
1984	367	38	273	52	42
1985	373	31	282	50	41
1986	359	38	279	40	40
1987	334	35	258	42	34

^aData unavailable

ROYALTIES - RECENT ADVANCES IN PHYTOCHEMISTRY, VOLS. 10-20

Volume	1979	1980	1981	1982	1983	1984	1985	1986	# Sold	Total Royalty
10 Wallace-Mansell	496.58	418.78	369.78	255.07	120.64	62.39	57.94	45.86	1879	3361.62
11 Runeckles-Loewus	774.08	311.08	284.30	72.67	84.50	19.00	29.85	47.64	1134	4481.50
12 Swain-Marborne	3605.35	975.39	426.00	171.67	226.21	95.62	64.30	86.78	1389	5651.32
13 Swain-Waller	1386.42	211.48	166.97	45.54	81.50	31.14	23.21	24.79	825	1971.05
14 Swain-Kleiman			1496.87	104.33	115.04	53.05	21.46	33.21	735	1823.96
15 Loewus-Ryan			2133.37	469.97	367.89	140.10	44.71	59.50	861	3215.54
16 Creasy-Hrazdina				1940.17	614.46	214.18	99.64	45.46	816	2913.91
17 Mozzolillo-Lea-Loewus					2074.92	377.01	235.19	124.45	689	2811.57
18 Timmermann						2332.30	546.31	355.90	685	3234.51
19 Swain et al.							2109.77	404.34	593	2514.11
20 Conn								2640.23	509	2640.23

NEW PSNA MEMBERS

The following are new members of our society. We welcome you and invite your participation in society business and at PSNA meetings.

Peter Carmeci
P.C. Inc.
11805 Kim Place
Potomac, MD 20854

Michael J. Muhitch
Seed Biosynthesis Res. Unit
USDA-ARS-NRRC
Peoria, IL 61604

Lavina Faleiro
Dept. of Biology
Florida International University
Miami, FL 33199

John A. Norris
Dept. of Botany
University of Texas
Austin, TX 78713

Sandeep Gupta
Boyce Thompson Institute
for Plant Research
Cornell University
Ithaca, NY 14853

Kusum Sachdev-Gupta
Boyce Thompson Institute
for Plant Research
Cornell University
Ithaca, NY 14853

Robert H. Johnson
Dept. of Biology
University of South Carolina
Columbia, SC 29208

Dirk Selmar
Botanisches Institut
University of Braunschweig
B.O. Box 3329
D-3300 Braunschweig
West Germany

Ken W. Joy
Biology Dept.
Carleton University
Ottawa, Ontario
Canada K1S 5B6

Paul Spencer
Dept. of Botany
University of British Columbia
Vancouver, B.C.
Canada V6T 2B1

1988 PSNA MEETING AT IOWA CITY, IOWA

Plans for this year's meeting are now complete. A poster announcing the symposium on "Plant Nitrogen Metabolism" was distributed in late fall to PSNA members, non-members and institutions. Meeting information, registration and abstract forms have already been mailed to members and others who responded to the symposium announcement. These materials are also included in this newsletter (see center pages).

STUDENT PROGRAMS initiated at the 1987 meeting at Tampa are being continued this year. Partial travel assistance will be available for any graduate student members of PSNA who apply and present a paper at the 1988 meeting. In addition, there will be a "Best Student Paper Award" for a graduate student or recent Ph.D. See meeting material for information about these awards. Application materials should be sent by May 1, 1988 to Dr. J. Poulton, Dept. of Botany, University of Iowa, Iowa City, IA 52242. Indicate on your abstract form that you are applying for student travel assistance and/or would like to participate in the "Best Paper" competition.

Among the excursions and social events planned for the Iowa City meeting are a field trip to a native prairie, a get-together for graduate students and post-docs, a voyage on the Mississippi River on a stern wheeler, the banquet and a program for spouses and children.

Jonathan Poulton reports that considerable interest in the meeting has been generated by the symposium announcement distributed last fall. We hope that the excellent symposium, comfortable meeting facilities, interesting excursions and special events will draw a record number of participants to Iowa City in late June.

POSITION AVAILABLE

UNIVERSITY OF CALIFORNIA, DAVIS. PLANT BIOCHEMIST/MOLECULAR BIOLOGIST.
The Department of Biochemistry and Biophysics invites applications for a full-time (11 month/yr) tenured appointment as an Associate or Full Professor of Biochemistry and Associate Biochemist or Biochemist in the Agricultural Experiment Station. Preference will be given to individuals with demonstrated research accomplishment in plant biochemistry and whose research interests emphasize the molecular biology of the plant cell. Applicants should have a Ph.D. or equivalent degree in biochemistry or a closely related discipline. The candidate will also be expected to teach at the graduate and/or undergraduate level, to advise students and to guide graduate students towards advanced degrees in biochemistry. Applications must be received by March 31, 1988. Candidates should submit a resume, copies of recent publications, a statement of professional goals/research interests and the names and addresses of three references to: Dr. J.C. Lagarias, Chair, Search Committee, Department of Biochemistry and Biophysics, University of California, Davis, California 95616. The University of California is an equal opportunity employer and invites



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PHYTOCHEMICAL SOCIETY OF NORTH AMERICA

Newsletter

Volume 28
Number 1

June 1988

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The Phytochemical Society of North America is a non-profit scientific organization whose membership (currently about 400) is open to anyone with an interest in phytochemistry, the role of plant substances, and in related fields. Annual membership dues are \$15.00 for regular members and \$8.00 for student members. Annual meetings featuring symposium topics of current interest and contributed papers by conference participants are held throughout the United States, Canada and Mexico. A newsletter is circulated to members several times a year to keep them informed of upcoming meetings and developments within the Society.

If you would like additional information about the PSNA or if you have material to be included in the newsletter, please contact the Society Secretary. Annual dues and changes in addresses should be sent to the Society Treasurer.



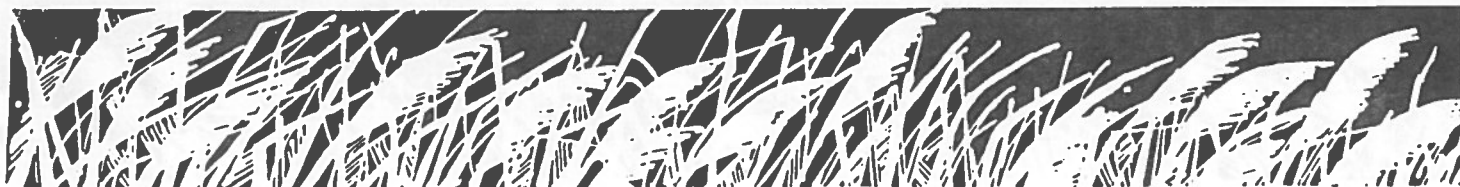
PHYTOCHEMICAL SOCIETY OF NORTH AMERICA NEWSLETTER

JUNE, 1988

VOLUME 28, NUMBER 1

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The Phytochemical Society of North America

PLANT NITROGEN METABOLISM

An International Symposium

June 26-30, 1988

The 28th Annual Meeting of the Phytochemical Society of North America will be held at the University of Iowa in Iowa City during June 26-30, 1988. This will feature a Symposium on recent developments in primary and secondary nitrogen phytochemistry as well as contributed oral and poster sessions in all areas of phytochemistry. We are delighted to report that near record numbers of papers have resulted from our call for participation and we look forward to an extremely exciting and informative meeting. The Symposium Organizing Committee heartily invites you to join us in Iowa City. Registration forms for the meeting and special events, as well as details about housing, were provided in the February Newsletter. Additional forms may be obtained from: J.E. Poulton, Department of Botany, University of Iowa, Iowa City, IA 52242. The meeting program, abstracts of papers, and University of Iowa maps are enclosed.

Transportation to Iowa City

Iowa City is located in east-central Iowa, about 60 miles west of the Mississippi River. Those coming by auto should follow Interstate 80 to the Iowa City-Dubuque Street exit (Junction 244, not 247 as stated earlier) and travel south on Dubuque Street for 1.5 miles to reach the downtown area. The Mayflower Residence Hall is located on the left hand side of Dubuque Street about 1/2 mile south of Interstate 80.

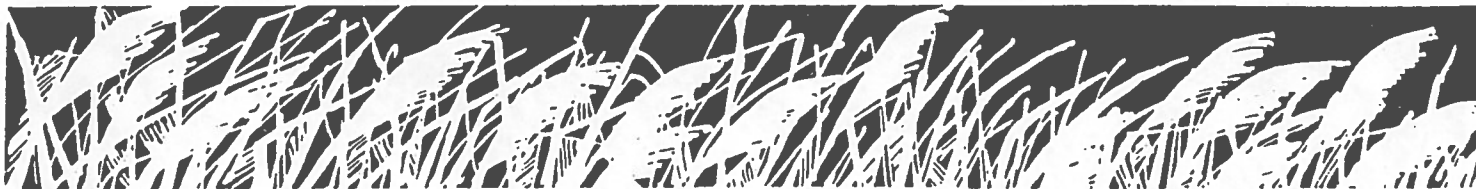
The nearest airport to Iowa City is Cedar Rapids Municipal Airport located 25 minutes north of Iowa City. Shuttle service to Iowa City from the airport is available from the Cedar Rapids Airport Transportation Company, located right beside the airport baggage claim area. Fares have recently increased to \$14.00 (one-way) and \$27.00 (round-trip).

Registration and Housing Check-In

Registration will take place on Saturday, June 25, from 1:00-8:00 PM in the Iowa House Lobby in the Iowa Memorial Union (IMU) and on Sunday, June 26, from 8:00 AM-noon outside the Terrace Room (IMU). Housing check-in at the Iowa House and the Mayflower Residence Hall is available 24 hours.

Location of Sessions

All sessions, except for the Poster Session (Main Lounge, IMU) will be held in the Terrace Room (IMU). The Welcome Reception on Saturday evening will take place in the North Room of the Iowa Memorial Union.



PHYTOCHEMICAL SOCIETY OF NORTH AMERICA
1988 Annual Meeting and Symposium

Saturday, June 25

- Afternoon ARRIVAL AND REGISTRATION
Registration: 1:00-8:00 PM (Iowa House Lobby, IMU)
Housing Check-in: at Iowa House and Mayflower Residence
Hall available 24 hrs
- 4:00-5:30 EXECUTIVE COMMITTEE MEETING (IMU)
- Evening WELCOME RECEPTION in North Room, IMU
7:30-10:00 PM

SUNDAY, June 26 (Terrace Room, IMU)

- Morning REGISTRATION: 8:00 AM-noon (outside Terrace Room, IMU)
- 8:50 WELCOME REMARKS
- Morning Session (Eric E. Conn, presiding)
- 9:00-10:00 SYMPOSIUM 1
AN OVERVIEW OF NITROGEN METABOLISM IN HIGHER PLANTS
Dale G. Blevins
- 10:00-11:00 SYMPOSIUM 2
REGULATION OF NODULE-SPECIFIC HOST GENES INVOLVED IN CARBON AND
NITROGEN ASSIMILATING PATHWAYS
D. P. S. Verma
- 11:00-11:30 Coffee Break
- 11:30-12:30 SYMPOSIUM 3
SYNTHESIS, TRANSPORT AND UTILIZATION OF PRODUCTS OF SYMBIOTIC N₂ FIXATION
John S. Pate
- 12:30-2:00 Lunch Break
- Afternoon Session (David S. Seigler, presiding)
- 2:00-2:15 Contributed Paper 1
NITRATE REDUCTASE ACTIVITY OF SEEDLING ROOTS AND LEAVES IN MAIZE
POPULATION SELECTED FOR MATURE LEAF NRA.
K. A. Dallmier and R. H. Teyker
- 2:15-2:30 Contributed Paper 2
PURIFICATION OF GLUTAMINE SYNTHETASE ISOFORMS FROM AN
APOCYNACEAE: *Catharanthus roseus*.
M. L. Miranda-Ham and V. M. Loyola-Vargas

- 2:30-2:45 Contributed Paper 3
ACTION OF LIGHT, NITRATE AND AMMONIUM ON THE APPEARANCE OF NADH-
AND FERREDOXIN-DEPENDENT GLUTAMATE SYNTHASES (GOGAT) IN THE
COTYLEDONS OF MUSTARD SEEDLINGS
U. Hecht and H. Mohr
- 2:45-3:00 Contributed Paper 4
METABOLISM OF GLUTAMINE BY DEAMIDATION AND TRANSAMINATION IN *Pisum
sativum*
Robert J. Ireland and Subhas C. Gupta
- 3:00-3:15 Contributed Paper 5
ALANINE AS AN AMINO DONOR IN PHOTORESPIRATORY NITROGEN METABOLISM
Ken W. Joy, G.R. Stewart and P.J. Lea
- 3:15-3:30 Contributed Paper 6
ELECTRON MICROSCOPIC CYTOCHEMICAL LOCALIZATION OF DIAMINE AND
POLYAMINE OXIDASES IN PLANT TISSUES
Robert D. Slocum and Martin J. Furey III
- 7:00-10:00 POSTER SESSION AND RECEPTION (Main Lounge, IMU)

MONDAY, June 27 (Terrace Room, IMU)

Morning Session (Ann Oaks, presiding)

- 9:00-10:00 SYMPOSIUM 4
GENETICS AND MOLECULAR BIOLOGY OF HIGHER PLANT NITRATE REDUCTASES
Andris Kleinhofs and Robert L. Warner
- 10:00-11:00 SYMPOSIUM 5
THE USE OF MUTANTS LACKING GLUTAMINE SYNTHETASE AND GLUTAMATE
SYNTHASE TO STUDY THEIR ROLE IN PLANT NITROGEN METABOLISM
A. J. S. Murray, R. D. Blackwell, P. J. Lea and K. W. Joy
- 11:00-11:30 Coffee Break
- 11:30-12:30 SYMPOSIUM 6
ASSIMILATION OF AMMONIA BY GLUTAMATE DEHYDROGENASE ?
David Rhodes, Dennis G. Brunk and Jose R. Magalhaes
- 12:30-2:00 Lunch Break
- Afternoon Session (Jonathan Gerschenzon, presiding)
- 2:00-2:15 Contributed Paper 7
CHARACTERIZATION OF A METHIONINE AMINOTRANSFERASE FROM *Brassica
carinata*.
C. Chapple, J. Glover and B. E. Ellis
- 2:15-2:30 Contributed Paper 8
LIGNIN BONDING PATTERNS IN WOODY PLANTS
Ramon A. Razal, Etsuo Yamamoto and Norman G. Lewis

- 2:30-2:45 Contributed Paper 9
 CONJUGATED POLYACETYLENES AND ACETYLENIC THIOPHENES IN *Flaveria*
 (HELIANTHEAE; ASTERACEAE)
Lavina Faleiro and Kelsey Downum
- 2:45-3:00 Contributed Paper 10
 BIOCHEMICAL AND HISTOCHEMICAL LOCALIZATION OF MONOTERPENE
 SYNTHESIS IN SPEARMINT (*Mentha spicata*)
Jonathan Gershenzon, Massimo Maffei and Rodney Croteau
- 3:00-3:15 Contributed Paper 11
 ACTIVATION OF DEOXYARABINOHEPTULOSONIC ACID-7-PHOSPHATE SYNTHASE
 IN PARSLEY CELL CULTURES (*Petroselinum hortense*) BY FUNGAL
 ELICITOR
Kent F. McCue and Eric E. Conn
- 3:15-3:30 Contributed Paper 12
 CADMIUM STRESS RESPONSE IN TOMATO CELLS
Mary Lou Mendum, Subhash Gupta and Peter Goldsbrough
- 4:15 Bus leaves IMU for Field Trip to Iowa Prairie and Hoover Museum

TUESDAY, June 28 (Terrace Room, IMU)

Morning Session (Kelsey R. Downum, presiding)

- 9:00-10:00 SYMPOSIUM 7
 SITES OF ACTION OF HERBICIDES IN AMINO ACID METABOLISM: PRIMARY
 AND SECONDARY PHYSIOLOGICAL EFFECTS
Dale L. Shaner
- 10:00-11:00 SYMPOSIUM 8
 METABOLISM OF 1-AMINOCYCLOPROPANE-1-CARBOXYLIC ACID (ACC) IN
 RELATION TO ETHYLENE BIOSYNTHESIS
Shang-Fa Yang
- 11:00-11:30 Coffee Break
- 11:30-11:45 Contributed Paper 13
 SELECTIVE PHYTOTOXIC EFFECTS OF HYDROCINNAMIC ACID
Jeffrey D. Weidenhamer, G. Bruce Williamson, Nikolaus H. Fischer
 and Nesrin Tanrisever
- 11:45-12:00 Contributed Paper 14
 DO PLANTS RELEASE NITRIFICATION INHIBITORS?
Gregory W. McCarty and John M. Bremner
- 12:00-12:15 Contributed Paper 15
 SEASONAL CARRYOVER EFFECTS OF *Sorghum bicolor* ON THE WEED
 POPULATION
Frank A. Einhellig and James A. Rasmussen

12:15-12:30 Contributed Paper 16
THE INFLUENCE OF NITROGEN FIXATION ON CHEMICAL DEFENSE, GROWTH
AND REPRODUCTION IN *Lotus corniculatus* L.
Michelle A. Briggs

12:45 Advisory Committee Meeting (location to be announced)

REMAINDER OF DAY FREE FOR FIELD TRIP TO DUBUQUE

WEDNESDAY, June 29 (Terrace Room, IMU)

Morning Session (James A. Saunders, presiding)

9:00-10:00 SYMPOSIUM 9
STRUCTURE AND EXPRESSION OF WHEAT AND RICE SEED PROTEIN GENES
Thomas Okita, Joseph Anderson, Arun Aryan, James Hnilo, Woo-Taek
Kim, Raymond Larsen, Douglas Leisy and Christopher Reeves

10:00-11:00 SYMPOSIUM 10
PRIMARY AND SECONDARY METABOLISM OF POLYAMINES IN PLANTS
Hector E. Flores and Calixto M. Protacio

11:00-11:30 Coffee Break

11:30-11:45 Contributed Paper 17
PATTERNS OF BENZYLISOQUINOLINE ALKALOIDS IN *Papaver somniferum*
PLANTS AND *Agrobacterium rhizogenes* TRANSFORMED TISSUES
Robert D. Williams and Brian E. Ellis

11:45-12:00 Contributed Paper 18
ARGININE AND ORNITHINE DECARBOXYLASES AND POLYAMINES IN
PYRROLIZIDINE ALKALOID-CONTAINING PLANTS
Helena Birecka, Mieczyslaw Birecki and Michael W. Frohlich

12:00-12:15 Contributed Paper 19
DYNAMICS OF BENZOPHENANTHRIDINE ALKALOID PRODUCTION IN SUSPENSION
CULTURES OF *Eschscholzia californica* AFTER TREATMENT WITH A
YEAST ELICITOR.
Margaret A. Collinge and Peter E. Brodelius

12:15-12:30 Contributed Paper 20
METABOLIC EXCURSIONS OF LYCORINE IN THE AMARYLLIDACEAE
R. S. Srivastava, S. K. Singh and S. Ghosal

12:30-2:00 Lunch Break

Afternoon Session (Russell L. Larson, presiding)

2:00-2:15 Contributed Paper 21
IMPACT OF CHEMISTRY ON "HAIRY ROOT" BIOTECHNOLOGY
Felix J. Parodi and Nikolaus H. Fischer

- 2:15-2:30 Contributed Paper 22
 SESQUITERPENE LACTONES FROM ROOTS OF *Rudbeckia grandiflora*
 (ASTERACEAE)
Marta Vasquez, Francisco A. Macias and Nikolaus H. Fischer
- 2:30-2:45 Contributed Paper 23
 THE MODE OF TOMATO RESISTANCE TO *Verticillium albo-atrum* IN VITRO
Mark Bernards and Brian E. Ellis
- 2:45-3:00 Contributed Paper 24
 EFFECT OF ELECTROPORATION PROFILES ON THE INCORPORATION OF VIRAL
 RNA INTO TOBACCO PROTOPLASTS
James A. Saunders and Camelia Rhodes Smith
- 3:00-3:15 Contributed Paper 25
 EFFECTS OF ELICITORS ON THE ADENINE NUCLEOTIDE LEVELS IN
 SUSPENSION CULTURED PLANT CELLS.
Peter E. Brodelius and Andreas Haener
- 3:15-3:30 Contributed Paper 26
 INTERVAL INJECTION/DISPLACEMENT rp-HPLC: A NEW TOOL FOR THE
 ENRICHMENT AND SEPARATION OF SECONDARY NATURAL PRODUCTS
Rainer Suetfeld
- 3:30-3:45 Coffee Break
- 3:45-5:00 Annual Business Meeting
- 6:15 Reception (Lobby of Iowa Hall, Macbride Hall)
- 7:30 Banquet (Triangle Ballroom, IMU)

THURSDAY, June 30 (Terrace Room, IMU)

Morning Session (Norman G. Lewis, presiding)

- 8:45 WELCOME REMARKS by Dean Duane C. Spriestersbach, Vice President
 for Educational Development and Research, The University of Iowa
- 9:00-10:00 SYMPOSIUM 11
 CASTANOSPERMINE, SWAINSONINE, AND RELATED POLYHYDROXY ALKALOIDS
 FROM PLANTS
L. E. Fellows
- 10:00-10:30 Coffee Break
- 10:30-11:30 SYMPOSIUM 12
 BIOSYNTHESIS OF ALKALOIDS USING PLANT CELL CULTURES
Meinhart H. Zenk
- 11:30 CLOSING REMARKS

Sunday 9:00-10:00

Symposium 1

AN OVERVIEW OF NITROGEN METABOLISM IN HIGHER PLANTS

Dale G. Blevins, Plant Biochemistry/Physiology Group, 204 Curtis Hall, University of Missouri, Columbia, Missouri 65211.

Ammonium, nitrate, urea and dinitrogen gas serve as the predominant nitrogen sources for higher plants. Recent advances in nitrate reduction include the purification of, and antibody production for, nitrate reductase, localization of nitrate reductase in chloroplast and identification of the reductant for nitrite reductase in root tissue. In urea metabolism, the nickel-requiring enzyme, urease, has been found in an embryo-specific form and in a ubiquitous form. Soybeans that are nulls in either or both urease forms have been found recently, and should lead to elucidation of the role of urease. New information in the area of nitrogen fixation includes the following: plant phenolics are signals that interact with bacterial nodulation genes; isolation of calcium-binding proteins involved in infection events; description of a dinitrogenase which contains vanadium (no molybdenum); finding that homocitrate is used in the biosynthesis of the iron-molybdenum cofactor of dinitrogenase. Inhibition of nodule plant fraction and root glutamine synthetase may increase nitrogen fixation rates, which has interesting implications on the role of nitrogen metabolism in the regulation of nitrogen fixation. Pathways of ureide synthesis and catabolism have been described for nodulated soybeans and cowpeas.

Sunday 10:00-11:00

Symposium 2

REGULATION OF NODULE-SPECIFIC HOST GENES INVOLVED IN CARBON AND NITROGEN ASSIMILATING PATHWAYS

D. P. S. Verma, Department of Molecular Genetics and Biotechnology Center, The Ohio State University, Columbus, Ohio 43210

Several plant genes involved in symbiotic nitrogen fixation have evolved nodule-specific regulation and both carbon and nitrogen metabolisms in nodules have become highly compartmentalized. The plant genes encoding nodule-specific proteins (nodulins) are induced as part of the developmental program of the nodule and their induction occurs prior to, and independent of the commencement of nitrogen fixation. These genes are induced in both infected and uninfected cells of the nodules. We have isolated a number of these genes from soybean and have determined subcellular location and function of the encoded proteins. We have observed that glutamine synthetase activity in soybean is stimulated by the availability of NH_4^+ provided externally or through symbiotic nitrogen fixation and this enzyme is localized in the infected cells of the nodules. Two genes were found to be expressed at different levels. On the other hand, uricase (nodulin-35) is located in the uninfected cells and is restricted to the peroxisomes of these cells. We have recently shown that nodulin-100 encodes sucrose synthase in nodules and the activity of the enzyme appears to be regulated by the availability of free heme. A new dicarboxylic acid transport system induced during nodulation may involve some of the peribacteroid membrane nodulins. Thus nodule-specific genes are regulated by a variety of signals and perform both structural and metabolic functions to sustain symbiotic state in nodules.

Sunday 11:30-12:30

Symposium 3

SYNTHESIS, TRANSPORT AND UTILIZATION OF PRODUCTS OF SYMBIOTIC N_2 FIXATION.

John S. Pate, Department of Botany, The University of Western Australia, Nedlands, Western Australia 6009.

The initial and secondary organic products formed in the assimilation of ammonia formed from N_2 fixation vary consistently between different symbiotic systems in relation to both the biochemical disposition and taxonomic status of the macrosymbiont. Compounds utilized for initial transport of fixed N from symbiotic organs to host plant also differ between symbioses, as do the nitrogenous solutes subsequently selected for further transport in the host plant, for storage of fixed N surplus to current growth requirements, and for chemical defence against predators. Case studies will be presented illustrating these differences and discussing their significance in relation to the overall metabolism of fixed N by different ages and types of host plant tissues or organs. Particular emphasis will be placed on the synthesis, transport and catabolism of citrulline, glutamine, asparagine, allantoin, and allantoic acid by N_2 -fixing symbioses, in an attempt to evaluate the metabolic implications and overall cost effectiveness when one or more of these solutes is/are employed predominantly by a specific host.

Monday 9:00-10:00

Symposium 4

GENETICS AND MOLECULAR BIOLOGY OF HIGHER PLANT NITRATE REDUCTASES

Andris Kleinhofs and Robert L. Warner, Department of Agronomy and Soils and Program in Genetics and Cell Biology, Washington State University, Pullman, WA 99164-6420.

Nitrate assimilation is the primary pathway through which plants accumulate reduced nitrogen. The pathway consists of the reduction of nitrate to ammonium by nitrate and nitrite reductases, the incorporation of ammonium into glutamate by GS/GoGaT, and the uptake and transport of nitrate. The first step in the nitrate reduction pathway, nitrate reductase, is highly regulated and is believed to be rate limiting. Isolation of nitrate reductase-deficient mutants, the purification of the protein without major degradation and the cloning of nitrate reductase genes, led to the current research interest in nitrate reductase. Cumulatively, nitrate reductase-deficient mutants have identified structural genes for the NADH-specific and the NAD(P)H-bispecific nitrate reductases, and at least five different loci involved with the molybdenum cofactor. Purification of nitrate reductase by affinity chromatography has revealed that nitrate reductases are large homodimers with FAD, cytochrome b557 and Mo as prosthetic groups. The availability of monospecific antisera and the development of efficient expression vectors led to the cloning of the nitrate reductase genes from barley, squash, *Arabidopsis*, tobacco and maize. This work, with particular emphasis on the recent developments, will be reviewed.

Monday 10:00-11:00

Symposium 5

THE USE OF MUTANTS LACKING GLUTAMINE SYNTHETASE AND GLUTAMATE SYNTHASE TO STUDY THEIR ROLE IN PLANT NITROGEN METABOLISM

A. J. S. Murray, R. D. Blackwell, P. J. Lea and K. W. Joy*. Division of Biological Sciences, University of Lancaster LA1 4YQ, UK. *Department of Biology, Carleton University, Ottawa, Canada K1S 5B6.

Mutant lines of barley are now available that are lacking either chloroplast glutamine synthetase, ferredoxin dependent glutamate synthase or both together. The inability of these mutant lines to carry out photosynthesis and re-assimilate ammonia liberated during photorespiration will be discussed. The amino acid metabolism of further mutants lacking phosphoglycolate phosphatase, glycine decarboxylase and hydroxypyruvate reductase will be described.

Monday 11:30-12:30

Symposium 6

ASSIMILATION OF AMMONIA BY GLUTAMATE DEHYDROGENASE ?

David Rhodes, Dennis G. Brunk and Jose R. Magalhaes. Department of Horticulture, Purdue University, West Lafayette, IN 47907.

This presentation will address some of the technical difficulties in determining flux of $^{15}\text{N}]\text{H}_4^+$ via the glutamate dehydrogenase (GDH) pathway when superimposed upon a much larger flux via the glutamine synthetase (GS)-glutamate synthase (GOGAT) cycle in multi-compartment higher plant systems. Tracer studies with ^{15}N in the absence of inhibitors of the GS-GOGAT cycle fail to conclusively rule out a 5% contribution of GDH to net ammonia assimilation. A mitochondrial GDH-deficient mutant of *Zea mays* is shown to exhibit a 30% lower rate of $^{15}\text{N}]\text{H}_4^+$ assimilation than the wildtype. However, neither genotype exhibits any detectable $^{15}\text{N}]\text{H}_4^+$ assimilation following a 2 h preincubation with the GS inhibitor, methionine sulfoximine (MSO) [1 mM]. These ambiguous results help focus attention on the validity of the assumption that inhibitors of the GS-GOGAT cycle, such as MSO, are without effects on carbon economy and the supply of 2-oxoglutarate to mitochondrial GDH *in vivo*.

Tuesday 9:00-10:00

Symposium 7

SITES OF ACTION OF HERBICIDES IN AMINO ACID METABOLISM: PRIMARY AND SECONDARY PHYSIOLOGICAL EFFECTS

Dale L. Shaner, American Cyanamid Co., P.O. Box 400, Princeton, NJ 08540.

Several potent, broad spectrum herbicides kill plants by inhibiting the synthesis of essential amino acids. These herbicides include the imidazolinones, sulfonyleureas, triazolopyrimidines, phosphinothricin, and glyphosate. Although these herbicides act on different amino acid biosynthetic pathways, their effects on the plant show some similarities. These effects include increased free amino acid levels, decreased soluble protein levels, decreased synthesis of DNA and RNA accompanied by reduced rates of cell division, alterations in the carbohydrate status of the plant, changes in hormonal levels, changes in enzyme levels and activities, and changes in the levels of metabolic intermediates. Some of these phenomena could be due to the primary effect of the herbicide on amino acid synthesis or they could be secondary responses due either to the changes in amino acid levels or to secondary sites of action. The use of herbicide resistant plants with mutations at the site of action of the herbicide aid greatly in providing the answers to these questions. Furthermore, separating the primary effects from the secondary effects of these herbicides will reveal much about the interactions between amino acid metabolism and other metabolic processes.

Tuesday 10:00-11:00

Symposium 8

METABOLISM OF 1-AMINOCYCLOPROPANE-1-CARBOXYLIC ACID (ACC) IN RELATION TO ETHYLENE BIOSYNTHESIS

Shang-Fa Yang, Department of Vegetable Crops, University of California, Davis, CA 95616.

The gaseous plant hormone ethylene is biosynthesized from ACC, a non-protein amino acid. ACC synthase, which converts S-adenosylmethionine (SAM) to ACC with stereospecificity, is the rate-controlling enzyme in ethylene biosynthesis. ACC synthase can be induced by various developmental and external factors, resulting in a dramatic increase in ethylene production. ACC synthase *in vivo* as well as *in vitro* has been shown to be labile and rapidly inactivated. ACC oxidase, which catalyzes the oxidation of ACC to ethylene, CO₂ and HCN, requires integral vacuole or protoplast structure and has not been demonstrated in isolated form. The HCN thus formed during ethylene biosynthesis is metabolized into β-cyanoalanine and its conjugates so rapidly that the steady state concentration of HCN in plant tissue is maintained at a low level below 0.1 μM. In addition to its conversion to ethylene, ACC can be conjugated to a biologically inactive end product N-malonyl-ACC (MACC). This process participates in the regulation of ethylene biosynthesis by lowering the tissue level of ACC.

Wednesday 9:00-10:00

Symposium 9

STRUCTURE AND EXPRESSION OF WHEAT AND RICE SEED PROTEIN GENES

Thomas Okita, Joseph Anderson, Arun Aryan, James Hnilo, Woo-Taek Kim, Raymond Larsen, Douglas Leisy, and Christopher Reeves, Institute of Biological Chemistry, Washington State University, Pullman, WA 99164-6340.

The molecular control of storage protein and starch synthesis is currently being investigated in developing wheat and rice seeds. Structural and functional analysis of the wheat gliadin promoter was conducted by transient expression assays of a series of vectors introduced by electroporation into tobacco protoplasts and by gel retardation assays of nuclear extracts from endosperm tissue. Results from both assays specify a promoter region, -140 to -196 bp from the translational start, necessary for gliadin gene transcription. The rice storage proteins, glutelin and prolamine, are both encoded by complex multigene families consisting of several classes. Different patterns of mRNA accumulation are evident between these various classes of genes indicating that both glutelin and prolamine genes are activated and transcribed differentially during endosperm development. Furthermore, analysis of membrane bound polysomes shows that glutelin transcripts are more efficiently recruited into translational complexes than those for prolamine. Therefore, differences in mRNA recruitment account for the preferred synthesis and accumulation of glutelin polypeptides. The primary structure of the rice endosperm ADPglucose pyrophosphorylase, a key regulatory enzyme of starch biosynthesis, was elucidated and possesses significant homology to the homologous enzyme from bacteria. The characterization of this gene will aid in attempts to increase crop productivity by enhancing the capacity of sink tissues to convert photoassimilates into starch.

Wednesday 10:00-11:00

Symposium 10

PRIMARY AND SECONDARY METABOLISM OF POLYAMINES IN PLANTS

Hector E. Flores and Calixto M. Protacio, Department of Plant Pathology and Biotechnology Institute, Pennsylvania State University, University Park, PA 16802

Polyamines are amino acid-derived, simple aliphatic compounds present in all prokaryotic and eukaryotic cells. Current experimental evidence supports their involvement in the regulation of cell division and development. In higher plants, polyamine metabolism has unique features which may be relevant to these and other proposed functions. Putrescine, the precursor of spermidine and spermine, can be made via decarboxylation of ornithine and arginine. Several lines of evidence suggest differential regulation of these alternative pathways upon ionic stress, during cell division, or during embryogenesis. S-Adenosylmethionine (SAM) is a common precursor for polyamines and ethylene, as well as a methyl group donor. SAM decarboxylase catalyzes the reaction which commits SAM to polyamine synthesis, whereas the action of aminocyclopropane carboxylic acid synthase diverts part of the SAM pool into ethylene. Polyamines and ethylene appear to have antagonistic functions in plant cells, but the mechanism(s) regulating their synthesis from SAM is presently unknown. In addition to being present in "free" form, polyamines are also found in plants cells as hydroxycinnamic acid conjugates (HCAs), and serve as precursors for several types of alkaloids. The synthesis of these polyamine-derived secondary metabolites appears to be developmentally regulated. A role for HCAs in flower development has been proposed.

Thursday 9:00-10:00

Symposium 11

CASTANOSPERMINE, SWAINSONINE AND RELATED POLYHYDROXY ALKALOIDS FROM PLANTS

L. E. Fellows, Jodrell Laboratory, Royal Botanic Gardens, Kew, TW9 3DS, UK.

Over the last twenty years a novel range of alkaloids in which the nitrogen containing ring is substituted by two or more hydroxy and/or hydroxymethyl groups, and most of which have been found to be potent and specific inhibitors of glycosidase enzymes, has been extracted from both plants and micro-organisms. Compounds discovered to date can be classified into four structural types: polyhydroxy derivatives of piperidine, pyrrolidine, indolizidine and pyrolizidine. Many of these have been shown to inhibit so-called processing glycosidases involved in the elaboration of the oligosaccharide side-chains of glycoproteins. Since different alkaloids inhibit different processing enzymes, they are providing biochemists with a unique set of "tools" with which to probe many intractable problems of molecular biology, in particular the structure-activity relationship of glycoproteins and their role in such processes as the immune response, cancer metastasis, intracellular transport and viral infectivity, including that of HIV1 (AIDS). The indolizidines castanospermine and swainsonine are probably of greatest interest in this respect.

The molecular basis for the glycosidase inhibition is believed to be the similarity between the configuration of hydroxy substituents on the alkaloid nucleus and those on the ring of pyranose and furanose sugars. However, it is not yet possible to predict in advance to what extent a particular enzyme will be inhibited by a given alkaloid. Enzymes carrying out the same reaction in different organisms may vary greatly in susceptibility. Such empirically determined selectivity is proving to be of both academic and practical interest.

Despite their relatively recent discovery, surveys now suggest that alkaloids of this type are widespread in Nature. They differ from the better-known alkaloids in that their water solubility prevents their extraction from alkaline solution into organic solvents such as chloroform, a traditional procedure of alkaloid chemists. In addition most do not react with screening reagents routinely used for alkaloid detection, such as Dragendorff. So far the biosynthetic pathways in higher plants have not been examined, but studies on microorganisms indicate the existence of two pathways, one from pipecolate (to the indolizidine swainsonine) and one from glucose (to the piperidine deoxyojirimycin).

These compounds now command a high price as laboratory reagents, and may eventually find a place as pharmaceuticals or selective pesticides. This paper will review present knowledge of their distribution and properties.

Thursday 10:30-11:30

Symposium 12

BIOSYNTHESIS OF ALKALOIDS USING PLANT CELL CULTURES

Meinhart H. Zenk, Lehrstuhl fuer Pharmazeutische Biologie, Universitaet Munchen, Karlstrasse 29, D-8000 Munchen 2, West Germany.

The largest naturally occurring group of alkaloids comprises compounds based on the isoquinoline nucleus. Studies with intact plants have mapped out the general features of the multistep biosynthetic routes which lead to these alkaloids. Through the use of plant cell suspension cultures, the isolation and characterization of the enzymes of isoquinoline metabolism have been made feasible. In addition, this system has enabled studies of the regulation and compartmentalization of these steps. Details of the specific sequence and biochemical mechanisms of bisbenzylisoquinoline, protoberberine, protopine and benzophenanthridine biosynthesis have been unraveled. Furthermore, recent work on the early steps of benzylisoquinoline biosynthesis has led to a revision in the pathway leading from tyrosine to reticuline. By a combination of tracer experiments with ^{13}C -NMR and enzyme isolation studies it has now been demonstrated that (S)-norcoclaurine occupies the central position in the biosynthesis of this alkaloid group.

Sunday 2:00-2:15

Paper 1

NITRATE REDUCTASE ACTIVITY OF SEEDLING ROOTS AND LEAVES IN MAIZE POPULATION SELECTED FOR MATURE LEAF NRA.

K. A. Dallmier and R. H. Teyker*, Iowa State University, Ames, IA 50011, *University of Illinois, Urbana, IL 61801.

Two experiments were conducted to determine nitrate reductase activity (NRA) of seedling leaves and roots of five maize (*Zea mays* L.) populations representing six cycles of divergent selection for mature leaf laminal NRA. Comparison of results from intact plant experiments and dark grown, detopped roots were made. Plants in both experiments were grown in complete, ammonium-N solution until transferred to complete solution containing nitrate-N to induce nitrate reductase (NR). Cultures were harvested during induction of NR (6h) and during "steady state" conditions (26-28h) and assayed for NRA. Intact plants were separated into leaf and root portions before NRA assay. Seedling leaf NRA showed significant population differences for both uptake periods and paralleled the effects of selection of mature leaf laminal NRA in field grown plants. Results of intact seedling root NRA indicated no population differences whereas the extreme cycles of selection for mature leaf NRA (+C6 vs. -C6) were significantly different in root NRA of the detopped plants. The effects of root morphology, nitrate uptake and accumulation on NRA will also be discussed.

Sunday 2:15-2:30

Paper 2

PURIFICATION OF GLUTAMINE SYNTHETASE ISOFORMS FROM AN APOCYNACEAE: *Catharanthus roseus*.

M. L. Miranda-Ham and V. M. Loyola-Vargas, Depto. Bioquimica, Division de Biologia Vegetal, CICY, Apdo. Postal 87 Cordemex, 97310 Yucatan, Mexico.

Two glutamine synthetases (GSI and GSII) were identified in the leaves of *C. roseus* by chromatography on a DEAE-Sephadex column. The contribution of GSII was higher to the total activity when leaves were harvested from mature plants under the summer photoperiod. When an extract from leaves of plants under a longer darkness period (winter) was chromatographed, two peaks of enzymatic activity were also detected but in this case GSI was predominant. This behaviour resembles closely to that of green and etiolated rice leaves. Both isoforms have an absolute requirement for activity of Mg^{2+} and GSI is heat stable while GSII is not. Their role in ammonia assimilation for biosynthetic purposes will be discussed.

Sunday 2:30-2:45

Paper 3

ACTION OF LIGHT, NITRATE AND AMMONIUM ON THE APPEARANCE OF NADH- AND FERREDOXIN- DEPENDENT GLUTAMATE SYNTHASES (GOGAT) IN THE COTYLEDONS OF MUSTARD SEEDLINGS

U. Hecht and H. Mohr, Biologisches Institut II der Universitaet, Schaeenzlestrasse 1, D-7800 Freiburg i. Br., West Germany.

NADH- and Fd-GOGAT were separated by FPLC. With a novel approach it was confirmed that NADH-GOGAT is located in the cytosol while Fd-GOGAT is located in the cytosol while Fd-GOGAT is located in the plastids. NADH-GOGAT is only detectable during early seedling development with a peak occurring between 2 and 2.5 days after sowing. With the beginning of plastidogenesis around two days after sowing Fd-GOGAT appears while NADH-GOGAT drops to a very low level. Appearance of both enzymes is stimulated by light operating through phytochrome, but Fd-GOGAT is much more affected than NADH-GOGAT. The NADH-GOGAT level is strongly increased in the presence of nitrate while the Fd-GOGAT level responds only slightly. The level of NADH-GOGAT does not respond to the application of ammonium while the Fd-GOGAT level is reduced.

Sunday 2:45-3:00

Paper 4

METABOLISM OF GLUTAMINE BY DEAMIDATION AND TRANSMINATION IN *Pisum sativum*.

Robert J. Ireland and Subhash C. Gupta, Biology Department, Mount Allison University, Sackville, New Brunswick, Canada E0A 3C0.

In animal tissues there is no glutamate synthase activity but two other routes for glutamine (GLN) metabolism: deamidation by glutaminase and transamination by GLN amino-transferase (GLNAT). We have found that pea leaf extracts catalyze both of these reactions. GLN deamidation activity decreases as leaves expand, and varies diurnally, decreasing during the photoperiod and increasing during the dark. The addition of various oxo-acids (OG, PYR, GLYOX) stimulates (up to 3X) the deamidation of GLN. This appears to be due to a combination of GLNAT activity followed by deamidation of the oxo analog of GLN, 2-oxoglutaramate, since this stimulation can be completely inhibited by aminoxyacetate, an aminotransferase inhibitor. This oxo-acid-stimulated activity also varies diurnally, but it increases during the photoperiod and decreases during the dark. Both stimulated and non-stimulated ("glutaminase") activities are optimal at pH 8.0. DEAE-Sephacel chromatography yields two peaks of "glutaminase" activity, well separated from each other and asparaginase activity. These two pathways are being characterized further.

Sunday 3:00-3:15

Paper 5

ALANINE AS AN AMINO DONOR IN PHOTORESPIRATORY NITROGEN METABOLISM

Ken W. Joy, Biology, Carleton Univ., Ottawa, Canada; G. R. Stewart, University College, London, UK.) and P. J. Lea (Lancaster University, UK.).

Photorespiration in leaves of C-3 plants involves a large cyclic flow of amino-N used in the synthesis of glycine from glyoxylate. Glycine is converted to serine, with release of CO_2 and ammonia, and the latter is reassimilated to glutamate (via glutamine). The conventional view is that the cycle is completed by utilization of Glu and Ser as the donors for Gly synthesis. However, N-labeling experiments show that alanine can also contribute amino-N to the photorespiratory cycle, and may be used in preference to Glu (e.g. Ta and Joy, *Planta* (1986) 169: 117).

When photorespiration is increased, levels of Ala in pea leaves quickly decrease, yet the absolute amount of N entering Ala is increased several-fold. Changes in Ala levels in photorespiratory mutants of barley, or with inhibitors, also suggest that photorespiration greatly increases utilization and turnover of Ala, consistent with an active role in photorespiration. It is not clear why Ala (which may be synthesized from Glu) is utilized in preference to direct use of Glu.

Sunday 3:15-3:30

Paper 6

ELECTRON MICROSCOPIC CYTOCHEMICAL LOCALIZATION OF DIAMINE AND POLYAMINE OXIDASES IN PLANT TISSUES

Robert D. Slocum and Martin J. Furey III, Department of Biology, Williams College, Williamstown, MA 01267.

Diamine oxidases (DAO) and polyamine oxidases (PAO) appear to be the major enzymes regulating polyamine catabolism in plant tissues and may play a role in mobilizing amine nitrogen. Amine oxidase-dependent production of H₂O₂ may also influence growth by controlling peroxidase-mediated reactions important in cross-linking of cell wall phenolics, lignification, etc. Using the CeCl₃ cytochemical method for H₂O₂ (Thomas and Trelease, *Protoplasma* (1981) 108:39), we have localized both DAO and PAO to the cell wall in pea epicotyl and root and corn coleoptiles, respectively. The vast majority of activity staining is located in the middle lamella. No intracellular activity was observed. Incubation of pea tissues in substrate + aminoguanidine, an inhibitor of DAO, greatly reduced staining, while - substrate controls exhibited little or no background staining, indicating that this cytochemical method is specific for the amine oxidase enzyme.

(This work was supported by a grant (NAGW-1049) from NASA.)

Monday 2:00-2:15

Paper 7

CHARACTERIZATION OF A METHIONINE AMINOTRANSFERASE FROM *Brassica carinata*.

C. Chapple, J. Glover and B. E. Ellis, Department of Chemistry and Biochemistry, University of Guelph, Guelph, Ontario, Canada N1G 2W1.

The transamination of methionine is considered to be the first step in alkylglucosinolate biosynthesis in *Brassica*. This same enzymatic reaction also functions in the reverse direction as part of a sulphur salvage pathway, now known as the methionine cycle, following ethylene and polyamine synthesis. The isolation of a methionine aminotransferase from *B. carinata* was undertaken to obtain probes for examining both of these metabolic functions, with the ultimate goal being the modulation of glucosinolate biosynthesis in *Brassica*. A 220 kD methionine:glyoxylate aminotransferase has been partially purified from leaf tissue of *B. carinata*, using chromatofocusing, gel filtration, and ion exchange chromatography on Mono Q. Ion exchange chromatography resolves the enzyme into 3 forms. The potential role of each of these putative isoenzymic forms in glucosinolate biosynthesis or the methionine cycle is currently under investigation.

Monday 2:15-2:30

Paper 8

LIGNIN BONDING PATTERNS IN WOODY PLANTS

Ramon A. Razal, Etsuo Yamamoto and Norman G. Lewis. Departments of Forest Products and Biochemistry, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.

For the first time, the bonding patterns of specific carbon atoms in woody plant lignin have been identified *in situ*. This was accomplished by administering and incorporating into the lignin fraction of *Leucaena leucocephala*, a tropical hardwood, ferulic acid enriched with ¹³C at either the 1-, 2-, or 3-C atom of the side chain. The plants were grown hydroponically over extended periods of time under aseptic conditions in media containing the ferulic acid precursor, and then the tissues were examined by solid-state ¹³C NMR spectroscopy. Consequently, resonances due to the bonding patterns of the specific carbons have been determined. These resonances differ substantially from similarly labelled synthetic dehydrogenatively polymerized (DHP) lignin and wheat (grass) lignin in both spectral profile and relative peak intensities.

Monday 2:30-2:45

Paper 9

CONJUGATED POLYACETYLENES AND ACETYLENIC THIOPHENES IN *Flaveria* (HELIANTHAEAE; ASTERACEAE)

Lavina Faleiro and Kelsey Downum. Dept. of Biology, Florida International University, Miami, FL 33199.

Recent studies on the acetylenic thiophene composition of *Flaveria* spp. have shown that bi- and terthiophenes are major secondary constituents in roots. We have paid particular attention to *F. linearis* which produces no detectable bi- or terthiophenes in leaf tissue. Instead, this species is characterized by acetylenic monothiophenes. In addition to the lipophilic monothiophenes, water-soluble polyacetylenes also have been detected by HPLC. The U.V. spectra of these polyacetylenes are consistent with diene-triene derivatives. Following acid hydrolysis, these acetylenes can be partitioned into petroleum ether or chloroform suggesting that they may be conjugated to hydrophilic components. Enzymatic hydrolysis with β -galactosidase also releases the polyacetylenes, further suggesting that the acetylenic moiety may be conjugated to a sugar. Structural information and aspects of phototoxic biological activity of these acetylenic derivatives will be discussed.

Monday 2:45-3:00

Paper 10

BIOCHEMICAL AND HISTOCHEMICAL LOCALIZATION OF MONOTERPENE SYNTHESIS IN SPEARMINT (*Mentha spicata*)

Jonathan Gershenzon, Massimo Maffei and Rodney Croteau, Institute of Biological Chemistry, Washington State University, Pullman, WA 99164-6340.

A large variety of secondary plant products accumulate in epidermal glands. Although many of these substances are thought to be synthesized in the glands themselves, the actual site of their biosynthesis has rarely been determined. Among the well-known constituents of epidermal glands are the monoterpenes of mints. We investigated the location of monoterpene biosynthesis in spearmint focusing on carvone, the principal monoterpene in this species. Carvone is biosynthesized from the primary isoprenoid intermediate geranyl pyrophosphate in three steps: cyclization, hydroxylation and dehydrogenation. We localized the presence of the enzymes catalyzing these three steps in spearmint leaves using selective extraction procedures and cell-free assays. The location of the dehydrogenase activity was also studied using histochemical methods. Our results show unequivocally that carvone biosynthesis is restricted to the epidermal glands.

Monday 3:00-3:15

Paper 11

ACTIVATION OF DEOXYARABINOHEPTULOSONIC ACID-7-PHOSPHATE SYNTHASE IN PARSLEY CELL CULTURES (*Petroselinum hortense*) BY FUNGAL ELICITOR

Kent F. McCue and Eric E. Conn, Department of Biochemistry and Biophysics, University of California, Davis, CA 95616.

We have examined the effects of crude fungal elicitor from *Phytophthora megasperma* (Pm elicitor) on the shikimic acid pathway in parsley cell suspension cultures. Enzyme activity of deoxyarabinoheptulosonic acid-7-phosphate (DAHP) synthase was increased 2-3 fold by induction with Pm elicitor. DAHP synthase (DS) activities have been characterized for two isozymes; one that requires DTT and has a low K_m for erythrose-4-phosphate (DS-Mn), and one that is inhibited by DTT and has a high K_m for erythrose-4-phosphate (DS-Co)¹. Particle enrichment studies indicate the subcellular location of DS-Co in the cytosol, and DS-Mn in the proplastid. The induction treatment increased the plastidial isozyme DS-Mn exclusively. Using cycloheximide and actinomycin D as translational and transcriptional inhibitors respectively, the increase in DS-Mn activity by elicitation was reversed.

1. Ganson, R.J., d'Amato T.A., and Jensen, R.A., *Plant Physiol.* (1986) 82:203-210.

Monday 3:15-3:30

Paper 12

CADMIUM STRESS RESPONSE IN TOMATO CELLS

Mary Lou Mendum, Subhash Gupta and Peter Goldsbrough, Department of Horticulture, Purdue University, West Lafayette, IN 47907

In response to cadmium (Cd) tomato cells in suspension cultures produce small cysteine-rich peptides called phytochelatins (PCs). These peptides possess a general structure (γ -Glutamyl-cystenyl) $_n$ -glycine, where $n=2-10$; and similar to glutathione (GSH), where $n=1$. Adding GSH to the medium increases the tolerance of unselected cells to Cd, but above 200 μ M Cd, GSH does not appear to be effective in increasing the rate of PC synthesis. Buthionine sulfoximine (BSO), an inhibitor of γ -glutamylcysteine synthetase, the first enzyme in the GSH synthesis pathway, prevents the continued synthesis of PCs in Cd-treated cells and results in reduced tolerance to Cd. BSO inhibition of PC synthesis can be overcome by supplying exogenous GSH. ID₅₀ for BSO in the absence of Cd is similar in both unselected and Cd-tolerant cells. However, in the presence of 50 μ M Cd, Cd-tolerant cells have a significantly higher ID₅₀ for BSO than unselected cells. HPLC-purified PCs were used to study Cd-binding to PCs. Absorption spectra between 210-300 nm showed a metallothioneine-like shift in the presence of Cd. This assay is being currently used to examine the ability of PCs to bind other heavy metals. The analysis of proteins by 1D and 2D PAGE from uninduced and Cd-induced cells did not show major changes in protein patterns. Similar results were obtained when RNA from such cells were translated *in vitro* and analyzed by SDS-PAGE.

Tuesday 11:30-11:45

Paper 13

SELECTIVE PHYTOTOXIC EFFECTS OF HYDROCINNAMIC ACID

Jeffrey D. Weidenhamer, G. Bruce Williamson, Nikolaus H. Fischer and Nesrin Tanrisever. Departments of Chemistry and Botany, Louisiana State University, Baton Rouge, LA 70803.

As part of a detailed investigation of the possible role of hydrocinnamic acid in allelopathic interactions of the Florida wild rosemary (*Ceratiola ericoides*) in the Florida Scrub, studies have been conducted to determine the phytotoxicity of hydrocinnamic acid to twelve mono- and dicotyledon species in germination and growth bioassays. The growth of several native grasses and herbs thought to be allelopathically excluded from the scrub, including *Schizachyrium scoparium*, *Leptochloa dubia* and *Rudbeckia hirta*, as well as *Heterotheca subaxillaris*, a roadside weed, are strongly inhibited by hydrocinnamic acid. Of the species tested, only big bluestem (*Andropogon gerardii*) was unaffected. Studies of the effect of pH on the phytotoxicity of hydrocinnamic acid and the comparative phytotoxicity of several cinnamic acid derivatives will also be presented.

Tuesday 11:45-12:00

Paper 14

DO PLANTS RELEASE NITRIFICATION INHIBITORS?

Gregory W. McCarty and John M. Bremner. Department of Agronomy, Iowa State University, Ames, Iowa 50011.

Recent allelopathy literature reflects considerable interest in hypotheses that vegetation in some ecosystems inhibits nitrification in soil by releasing allelopathic compounds that inhibit the oxidation of ammonium by nitrifying microorganisms in soil. The most extensively cited hypothesis is that climax vegetation inhibits nitrification by releasing phenolic compounds. Another hypothesis is that vegetation in ponderosa pine ecosystems inhibits nitrification by releasing volatile terpenoids. To test the validity of these hypotheses, we studied the effects of different amounts of eight phenolic acids, five tannins, and six terpenoids on nitrification in soil treated with ammonium sulfate. The results provided no support for the hypotheses tested because they showed that none of these compounds had a significant effect on nitrification in soil even when the amounts applied greatly exceeded the amounts that have been reported to occur in soil. They also indicated that the apparent inhibition of nitrification observed when soils were exposed to terpenoid vapors was due to immobilization of ammonium nitrogen by microbial activity stimulated by the organic carbon in these vapors.

Tuesday 12:00-12:15

Paper 15

SEASONAL CARRYOVER EFFECTS OF *Sorghum bicolor* ON THE WEED POPULATION

Frank A. Einhellig, Department of Biology, University of South Dakota, Vermillion, SD 57069, and James A. Rasmussen, Department of Biology, Mount Marty College, Yankton, SD 57078.

A strip crop design was employed to compare weed conditions in the year following grain sorghum, soybeans, and corn. The study site was a farm in northeastern Nebraska with silty-clay loess soils of neutral pH and modest slope. Crops were planted no-till and no commercial chemicals were used. Three years of field experience showed weed growth was consistently lower in strips where grain sorghum [*Sorghum bicolor* (L.) Moench] had grown the prior year. Aerial weed cover in May of 1985 and 1986 was twice as high where corn or soybeans had been the previous crop. Midsummer weed biomass the year after grain sorghum was only 25-50% of that found after corn and soybeans in both 1986 and 1987. These weed differences were primarily on the broadleaf component and not the grass weeds. This weed suppression by grain sorghum appears to be the result of allelopathy.

Tuesday 12:15-12:30

Paper 16

THE INFLUENCE OF NITROGEN FIXATION ON CHEMICAL DEFENSE, GROWTH AND REPRODUCTION IN *Lotus corniculatus* L.

Michelle A. Briggs, Department of Entomology, Pennsylvania State University, University Park, PA 16802.

Replicates of *Lotus corniculatus* (birdsfoot trefoil) clones were grown under three nutrient (nitrogen) availabilities, including one treatment which obtained nitrogen solely from *Rhizobium* fixation. Plants were harvested over a four month period and analyzed for shoot dry weight, reproductive output, protein concentration, and both cyanide and condensed tannin concentrations. Plants from both of the fertilized treatments were larger than plants relying solely on fixation. Fertilized plants also had higher protein and condensed tannin concentrations. Cyanide concentration was rarely affected by nutrient availability. Reproductive output in plants relying on fixation was three times greater than in either of the fertilized treatments. The cost of defense in terms of growth and reproduction will also be discussed.

Wednesday 11:30-11:45

Paper 17

PATTERNS OF BENZYLISOQUINOLINE ALKALOIDS IN *Papaver somniferum* PLANTS AND *Agrobacterium rhizogenes* TRANSFORMED TISSUES

Robert D. Williams and Brian E. Ellis, Dept. Chemistry and Biochemistry, Univ. of Guelph, Guelph, Ontario, Canada N1G 2W1.

Analysis of the benzylisoquinoline alkaloid profiles of *Papaver somniferum* tissues over the life cycle of the plant from germination to post petal-drop revealed particularly high concentrations of alkaloids in juvenile root tissue. In order to generate large amounts of root tissue for studies of biosynthesis of these alkaloids, infection of *P. somniferum* seedlings with various strains of *A. rhizogenes* has been carried out. Removal and culture of the adventitious roots forming at the wound site has led to the development of a number of suspension culture cell lines which are phytohormoneautotropic and accumulate sanguinarine as the major alkaloid. All of these cell lines spontaneously regenerated plantlets when cultured in the light. The alkaloid profiles of these cell lines are being analyzed to examine the influence of the strain of *A. rhizogenes* used for transformation on the type and quantity of alkaloids produced in the transformed cells.

Wednesday 11:45-12:00

Paper 18

ARGININE AND ORNITHINE DECARBOXYLASES AND POLYAMINES IN PYRROLIZIDINE ALKALOID-CONTAINING PLANTS

Helena Birecka, Mieczyslaw Birecki and Michael W. Frohlich. Department of Biological Sciences, Union College, Schenectady, N.Y. 12308.

Using specific, enzyme-activated inhibitors we demonstrated that endogenous putrescine formed from an endogenous source is the precursor of the aminoalcohol moiety of pyrrolizidine alkaloids in *Heliotropium*, *Senecio*, and *Crotalaria* plants exposed to ¹⁴C-labelled CO₂. In *Heliotropium* species endogenous arginine was the only detectable precursor of putrescine channeled into pyrrolizidines, whereas in *Senecio* and *Crotalaria* plants no arginine decarboxylase activity was detected and endogenous ornithine was the main if not the only putrescine precursor. No correlation between the activities of ornithine and arginine decarboxylases and polyamine or alkaloid contents was found in either species. The effects of inhibition of either ornithine or arginine decarboxylase or of both enzymes on polyamine and chlorophyll levels in alkaloid-containing and nonalkaloidal species are discussed.

Wednesday 12:00-12:15

Paper 19

DYNAMICS OF BENZOPHENANTHRIDINE ALKALOID PRODUCTION IN SUSPENSION CULTURES OF *Eschscholzia californica* AFTER TREATMENT WITH A YEAST ELICTOR.

Margaret A. Collinge and Peter E. Brodelius. Institute of Biotechnology, ETH-Honggerberg, CH-8093 Zurich, Switzerland.

A number of benzophenanthridine alkaloids are induced in suspension cultures of *Eschscholzia californica* after treatment with an elicitor prepared from yeast extract. The formation of the alkaloids, sanguinarine, chelerythrine and macarpine, has been studied as function of elicitor concentration (0-100 µg carbohydrate per g fresh weight of cells), incubation time after elicitation (0-48 h), and culture age (0-8 days). A significant portion of these alkaloids is released into the medium. Sanguinarine and chelerythrine reach maximum levels a few hours after the time of elicitation. Thereafter, their levels decline and the amount of macarpine increases. The relative proportions of the three alkaloids depend on the growth stage of the cells when elicited. Viability of elicited cells as determined by their subsequent growth is not significantly reduced.

Wednesday 12:15-12:30

Paper 20

METABOLIC EXCURSIONS OF LYCORINE IN THE AMARYLLIDACEAE

R. S. Srivastava, S. K. Singh and S. Ghosal, Pharm. Chem. Research Laboratory, Dept. of Pharmaceutics, Banaras Hindu University, Varanasi-221005, India.

A very important observation made during the present investigation is that lycorine does not occur as a free alkaloid in the producer plants in appreciable amount at any period of time. The alkaloid is present mostly in the form of glucosyloxy, acyl glucosyloxy and phosphatidyl conjugates in its natural source. During the process of isolation, the alkaloid is liberated from the respective conjugates. Likewise, lycorine is released in its natural source according to the demand of the producer cell. Free lycorine as soon as it is produced is either converted into the cell growth-proliferative conjugates as above or is catabolized into other well known Amaryllidaceae alkaloids, e.g. hippeastrine, narcissidine and the 2-oxyphenanthridinium betaine. The details of these findings will be presented.

Wednesday 2:00-2:15

Paper 21

IMPACT OF CHEMISTRY ON "HAIRY" ROOT BIOTECHNOLOGY

Felix J. Parodi and Nikolaus H. Fischer, Department of Chemistry, Louisiana State University, Baton Rouge, LA 70803.

"Hairy" root cultures obtained by transformation of plant cells with the appropriate strain of *Agrobacterium* grow at rates faster than normal roots and, in contrast to undifferentiated plant cell cultures, produce natural products characteristically found in normal roots. The importance of chemistry in the utilization of this biotechnological system for the production of pharmaceuticals, flavors, fragrances, natural dyes and agrichemicals will be discussed. Selected examples on structural studies of root constituents of *Tagetes*, *Bidens* and *Ambrosia* will be presented.

Wednesday 2:15-2:30

Paper 22

SESQUITERPENE LACTONES FROM ROOTS OF *Rudbeckia grandiflora* (ASTERACEAE)

Marta Vasquez, Francisco A. Macias, and Nikolaus H. Fischer, Department of Chemistry, Louisiana State University, Baton Rouge, LA 70803.

The genus *Rudbeckia* L. (Asteraceae, Heliantheae) consists of about 18 species of annual and perennial herbs divided into two subgenera, *Rudbeckia* and *Macrocline*. From floral parts of *R. grandiflora* we have previously isolated eudesmane-type sesquiterpene esters and pseudoguaianolides.

As part of a biochemical systematic study within the tribe Heliantheae combined with a search for bioactive plant products from roots and "hairy root" cultures, we have analyzed the roots of *R. grandiflora* for their terpenoid constituents. The isolation and structure elucidation of three new 12,6-trans-germacrolides, rudbeckin B, C and D, by chemical and spectral methods will be presented.

Wednesday 2:30-2:45

Paper 23

THE MODE OF TOMATO RESISTANCE TO *Verticillium albo-atrum* IN VITRO

Mark Bernards and Brian E. Ellis, Department of Chemistry and Biochemistry, University of Guelph, Guelph, Ontario, Canada N1G 2W1.

In tomato, resistance to the pathogen *V. albo-atrum* is governed by the single dominant *Ve* locus. We have developed an *in vitro* co-cultivation system employing cultured tomato cells derived from near-isogenic genotypes differing at the *Ve* locus, and *V. albo-atrum*. Using this system, we have demonstrated a delay in the growth of *V. albo-atrum* (up to 24 hours) in co-cultivation with *Ve*⁺ (resistant) tomato cells relative to *Ve*⁻ (susceptible) tomato cells. In order to establish the molecular basis for the delay in fungal growth on the resistant (*Ve*⁺) tomato cell lines, we have begun to investigate putative defense responses described for the whole plant-pathogen interaction. Preliminary results indicate that neither enhanced phenylalanine ammonia-lyase activity nor rishitin accumulation are involved in the delay in *V. albo-atrum* growth.

Wednesday 2:45-3:00

Paper 24

EFFECT OF ELECTROPORATION PROFILES ON THE INCORPORATION OF VIRAL RNA INTO TOBACCO PROTOPLASTS.

James A. Saunders and Camelia Rhodes Smith, Plant Sciences Institute, USDA, ARS, Beltsville, MD 20705.

The uptake and expression of viral RNA by tobacco protoplasts was examined using both square wave and exponential wave electroporation pulses. These electric pulses when supplied at sufficient field strength for a critical duration were capable of incorporating expressible RNA into more than 60% of the surviving protoplasts. Distinct differences were noted in the results obtained with the square wave vs. the exponentially decaying pulse wave electroporation experiments. The ratio of viable cells to cells showing incorporation of RNA was consistently higher using the square wave generator vs. the exponential generator even when both machines were optimized for maximal performance. It was shown, however, that both wave forms were able to produce viable cells capable of expressing foreign RNA at a predictable level.

Wednesday 3:00-3:15

Paper 25

EFFECTS OF ELICITORS ON THE ADENINE NUCLEOTIDE LEVELS IN SUSPENSION CULTURED PLANT CELLS.

Peter E. Brodelius and Andreas Haener, Institute of Biotechnology, ETH-Honggerberg, CH-8093 Zurich, Switzerland.

The effect of elicitors on the intracellular levels of ATP and ADP in two plant cell suspension cultures, *Nicotiana tabacum* and *Eschscholzia californica*, has been studied. The former culture was elicited with chitosan and the latter with an elicitor prepared from yeast extract. ATP and ADP concentrations in cell-free extracts were determined with a luminometric assay. A rapid increase in the amounts of both nucleotides (up to 3 fold) was observed after elicitation and maximum values were reached within 1-2 h. The levels of ATP and ADP regained those of the controls after a few hours. The response of the cells was dependent on the amount of elicitor added.

In addition, initial studies on the luminometric determination of ATP *in vivo* under various conditions will be discussed. A transgenic cell culture expressing the firefly luciferase gene has been used for these studies.

Wednesday 3:15-3:30

Paper 26

INTERVAL INJECTION/DISPLACEMENT rp-HPLC: A NEW TOOL FOR THE ENRICHMENT AND SEPARATION OF SECONDARY NATURAL PRODUCTS

Rainer Suetfeld, Research Institute Ital., P.O. Box 48, NL-6700 AA Wageningen, The Netherlands.

rp-HPLC proved to be a suitable tool for the analysis and preparative work on several plant products. However, a crucial step in the preparative work is the concentration of extracts (aqueous or organic solvents) prior to HPLC injection. Conventional concentration procedures often lead to a loss of compounds, formation of insoluble residues, degradation of unstable compounds or formation of artificial products. The new interval injection/displacement rp-HPLC method circumvents harsh concentration procedures. Numerous, diluted samples are injected step-by-step; compounds are enriched at the column surface without invading the stationary phase. After full load, compounds are fractionated and eluted by a particular displacement procedure on which a separation quality is achieved equal to linear or gradient HPLC elution modes. The method was proven to be applicable to the enrichment and fractionation of natural products from *Tagetes* in a broad range of polarities, either from crude plant extracts or from enzyme assay mixtures.

Poster Session

Paper 1

DIFFERENTIAL REGULATION OF GDH ACTIVITY BY GROWTH REGULATORS AND NITROGEN SOURCE IN *Canavalia ensiformis* TISSUE CULTURE

Felipe Vazquez-Flota, Jesus Quiroz, Keith N. Scorer and Victor M. Loyola-Vargas. Depto. Bioquimica, Division de Biologia Vegetal, Centro de Investigacion Cientifica de Yucatan, Apdo. Postal 87 Cordemex, 97310 Merida, Yucatan, Mexico.

It is now accepted that, under specific physiological conditions, GDH plays an important role in both ammonium assimilation and glutamic acid metabolism. Using *in vitro* callus cultures of *Canavalia ensiformis*, we show that the two GDH activities are differentially regulated by the auxin/cytokinin ratio present in the medium. Both GDH activities are also independently modulated by the type of auxin employed and, under a given auxin/cytokinin regimen, by the inorganic nitrogen source.

(Supported by CONACyT Grant No. PCCBBNA-020988.)

Poster Session

Paper 2

AMINE OXIDASE DISTRIBUTION IN *Canavalia ensiformis* (L.) DC.: A HISTOCHEMICAL STUDY

R. M. Caamal, C. Oropeza, J. Quiroz, V. M. Loyola-Vargas and Keith N. Scorer. Centro de Investigacion Cientifica de Yucatan, A.C., Apdo. Postal 87 Cordemex, 97310 Yucatan, Mexico.

Using a histochemical staining technique, we have mapped the distribution of amine oxidase in different regions of *Canavalia ensiformis* (L.) DC. during germination and the first two weeks of growth. Except for roots and embryos, where staining was not observed, each region of the plant showed a characteristic staining profile which varied according to the substrate employed in the staining medium and the age of the plant. Intense staining was generally associated with the younger regions, such as internodes and petioles. In older regions staining was absent or greatly reduced. Studies with 2,4-dichlorophenol indicate that endogenous catalase did not influence staining profiles and inhibitor studies suggest the presence of an amine oxidase similar to that found in other legumes. The results demonstrate that amine oxidase activity is distributed throughout the plant in a very specific manner which changes with time according to the developmental stage of the plant.

Poster Session

Paper 3

ELIMINATION OF THE ADVERSE EFFECTS OF UREA FERTILIZER ON SEED GERMINATION AND SEEDLING GROWTH IN SOIL

John M. Bremner and Michael J. Krogmeier, Department of Agronomy, Iowa State University, Ames, Iowa 50011.

The rapidly increasing importance of urea fertilizer in world agriculture has stimulated research to find methods of reducing the problems associated with the use of this fertilizer. One of these problems is that urea has adverse effects on seed germination and seedling growth in soil. Because there is evidence that these adverse effects are caused largely, if not entirely, by ammonia produced through hydrolysis of urea by soil urease, we explored the possibility that they could be reduced or eliminated by amending urea fertilizer with a small amount of a urease inhibitor. Studies using seeds of alfalfa (*Medicago sativa* L.), barley (*Hordeum vulgare* L.), oats (*Avena sativa* L.), rye (*Secale cereale* L.), sorghum (*Sorghum bicolor* (L.) Moench), and wheat (*Triticum aestivum* L.) showed that N-(n-butyl) thiophosphoric triamide (NBPT) was the most effective of 10 urease inhibitors evaluated for reduction of the adverse effects of urea on seed germination and seedling growth in soil and indicated that these effects could be completely eliminated by amending urea fertilizer with as little as 0.01% by weight of NBPT.

Poster Session

Paper 4

THE PURIFICATION AND PROPERTIES OF LYSINE SENSITIVE ASPARTATE KINASE FROM CARROT CELL TISSUE CULTURE

P. L. R. Bonner, J. M. Relton*, R. M. Wallsgrove* and P. J. Lea, Division of Biological Sciences, University of Lancaster, Lancaster LA1 4YQ, UK. *Rothamsted Experimental Station, Harpenden, Herts AL5 2JQ, UK.

Lysine-sensitive aspartate kinase has recently been purified over 1000-fold from carrot cells grown in suspension culture (*Biochim. Biophys. Acta* (1988) 953: 48-60). The enzyme has a molecular weight of 253,000 and the K_m values for aspartate and ATP are 2.35 and 0.6 mM respectively. The enzyme is feedback regulated by the synergistic action of lysine and S-adenosyl-methionine. The K_i value for lysine is considerably lower at pH 8.4 than at the pH for the optimum enzyme activity of 7.4. The full kinetics of lysine and S-adenosylmethionine inhibition will be shown.

Poster Session

Paper 5

MAIZE KERNEL PEDICEL TISSUE CONTAINS TWO GLUTAMINE SYNTHETASE ISOZYMES WHICH ARE DIFFERENTIALLY EXPRESSED DURING DEVELOPMENT.

Michael J. Muhitch, Seed Biosynthesis Research Unit, USDA, ARS, Northern Regional Research Center, Peoria, IL 61604.

Maize (*Zea mays* L.) kernel glutamine synthetase (GS) (EC 6.3.1.2) activity was highest in the pedicel tissue during the period of maximum nitrogen accumulation. Anion exchange chromatography was used to resolve two forms of GS from pedicel extracts. The total activity of the early-eluting form (GS_{p1}) increased during kernel development while that of the late eluting form (GS_{p2}) remained constant. GS_{p1} and GS_{p2} had different transferase to synthetase activity ratios (5 and 23, respectively) which did not change during development. GS_{p1} and GS_{p2} were purified from pedicel tissue extracts by a combination of anion exchange, hydroxyapatite, hydrophobic and dye-ligand chromatographies. Purified GS_{p1} exhibited ca. 10 fold higher K_m values for glutamate (21 vs 2 mM) and ATP (12 vs 1 mM) than did purified GS_{p2}. Neither GS_{p1} nor GS_{p2} was inhibited by amino acids or nucleotides, but both were affected by energy charge. The role of the pedicel GS isozymes in maize kernel nitrogen assimilation will be discussed.

Poster Session

Paper 6

4-METHYLENEGLUTAMINE AMIDOHYDROLASE: OCCURRENCE IN SPECIES WHICH ACCUMULATE 4-METHYLENEGLUTAMINE AND ACTIVATION OF THE PEANUT LEAF ENZYME BY DETERGENTS

Harry C. Winter and Eugene E. Dekker, Department of Biological Chemistry, The University of Michigan, Ann Arbor, MI 48109-0606.

Amidohydrolase (AH) activity having 9-fold preference for 4-methyleneglutamine (Megln) over glutamine has previously been isolated from peanut leaves (Powell and Dekker, *J. Biol. Chem.* (1983) 258: 8677-8683). In this study, we found that leaf homogenates of *Gleditsia triacanthos* also rapidly hydrolyze endogenous Megln to 4-methyleneglutamic acid (Meglu); little activity is detected in dialyzed extracts. No activity is observed in leaf homogenates of *Sophora japonica* or *Caesalpinia pulcherrima*, species which accumulate Megln but not Meglu. AH activity purified 450-fold from peanut leaves is activated by the following detergents at 0.1%: Triton X-100, 173%; SDS, 157%; Na-deoxycholate, 148%; Na-octanoate, 129%; benzalkonium chloride, 127% of control. Enzyme treated with 0.1% detergent remains activated when diluted 100-fold in the assay mixture; the activated enzyme has a higher V_m with no change in K_m for Megln. Although Megln-AH appears to be a soluble enzyme, association with membrane components may play a role in its regulation. Also, its presence in some but not all species which accumulate Megln during germination suggests alternate pathways for utilization of the amide N of this compound.

(Supported by USDA grant #87-CRCR-1-2563).

Poster Session

Paper 7

PLANT REGENERATION FROM INDICA RICE PRIMARY CALLUS IS INFLUENCED BY THE $\text{NO}_3^-/\text{NH}_4^+$ RATIO.

Howard D. Grimes, David S. Koetje and Thomas K. Hodges, Department of Botany and Plant Pathology, Purdue University, West Lafayette, Indiana, 47907.

The effect of varying the $\text{NO}_3^-:\text{NH}_4^+$ ratio on callus initiation and plant regeneration was studied. When total [N] was held constant, small changes in the $\text{NO}_3^-:\text{NH}_4^+$ ratio produced dramatic differences in plant regeneration (28 mM $\text{NO}_3^-:7$ mM NH_4^+ [80:20] = 0.75 plants/embryo; 26.25 mM $\text{NO}_3^-:8.75$ mM NH_4^+ [75:25] = 1.97 plants/embryo). The data also showed that if either NO_3^- or NH_4^+ was used as the sole N source, no plants were regenerated. In additional experiments, the $\text{NO}_3^-:\text{NH}_4^+$ ratio was also shown to produce abnormal plant morphologies. At a $\text{NO}_3^-:\text{NH}_4^+$ ratio = [50:50] (17.5 mM NO_3^- and 17.5 mM NH_4^+), for instance, leaves and roots were stunted, and the leaves were tightly curled. These symptoms may reflect an altered auxin response in these regenerated plants. Incorporation of organic N sources, such as tryptophan, into the medium modify the ratios at which optimal regeneration was observed. These data suggest that the N source may alter cell metabolism and developmental potential.

Poster Session

Paper 8

INFLUENCE OF NITROGEN SOURCE ON NITRATE REDUCTASE AND GLUTAMINE SYNTHETASE IN SHOOTS OF *Typha latifolia* L.

Robert L. Jacobson and Thomas K. Soulen, Department of Botany, 220 Biological Sciences Center, University of Minnesota, St. Paul, MN 55108.

Shoot extracts of *Typha latifolia* L. (cattails) grown on varying combinations of nitrate and ammonia were examined for nitrate reductase (NR) or glutamine synthetase (GS) activity. Plants supplied with increasing levels of nitrate generally exhibited an increase in NR activity. NR activity was 40% lower when ammonia was also present. The presence of ammonia, however, did not prevent increases in NR activity in the presence of increased nitrate. Cattails provided with ammonia as the only nitrogen source exhibited low but measurable NR activity, and there was no detectable nitrate in shoots of plants grown only on ammonia, suggesting the presence of a constitutive form of the enzyme. No differences in shoot GS activity were observed among plants provided with 112 ppm total nitrogen supplied as varying ratios of nitrate and ammonia.

Poster Session

Paper 9

NITRATE UTILIZATION IN C_3 AND C_4 CEREALS

M. Zoumadakis, L. A. Cass and A. Oaks, Biology Department, McMaster University, Hamilton, Ontario, Canada L8S 4K1.

Preliminary experiments by Martin et al. (*Plant Physiol.* (1983) 71:177-181) indicated that C_3 cereals (barley and wheat) accumulated higher levels of NO_3^- than did C_4 cereals (maize and sorghum). Contrary to our predictions subsequent experiments showed that nitrate reductase activity (NRA) was also higher in barley and wheat than in corn while total protein (Lowry test) was higher in corn and sorghum. In order to pin-point the limiting factors in NO_3^- -assimilation we decided to examine the effects of NO_3^- on 1) steady state levels of NRA and nitrate reductase protein (NRP); 2) the induction of NRA and NRP, and 3) the uptake and translocation of NO_3^- in the seedling plant. We used 1, 5, and 20 mM KNO_3 in a system where seedlings were grown on Kimpack paper for 8 days at 20°C (barley) or 7 days at 28°C (maize). The results show that the rate of NO_3^- uptake is higher, the induction of NRP more apparent and the level of NRA is higher at 1 or 5 mM KNO_3 in maize than in barley. At 20 mM KNO_3 both the accumulation of NO_3^- and the level of NRA is higher in barley. The results suggest that the synthesis of NR is under tighter control in maize than in barley and that in maize NO_3^- -N is converted more efficiently to other functional proteins.

Poster Session

Paper 10

ASPARTATE AMINOTRANSFERASE ISOZYME EXPRESSION IN ALFALFA ROOT NODULES: EVIDENCE FOR MULTIGENE EXPRESSION.

S. M. Griffith and C. P. Vance, USDA-ARS, St. Paul, MN 55108.

Isoforms of aspartate aminotransferase (AAT) from alfalfa root nodules were purified to homogeneity and characterized for a greater understanding of their developmental role in nodule N and C metabolism. Nodules from plant-controlled ineffective genotypes were compared. Zymograms of effective and ineffective nodules showed differences in AAT isozyme expression. Mature effective nodules showed two major regions of AAT banding each containing one to three allozymes. AAT-1 allozymes predominated in roots. Allozymes of the AAT-2 region in effective nodules increased in activity at the onset of N₂ fixation and coincided with an increase in protein concentration, whereas, plant-induced ineffective genotypes showed lower AAT activity and varied in their expression of nodule proteins AAT-2b and AAT-2c. AAT-2a, b, and c were purified to homogeneity. Their molecular weight, determined by exclusion chromatography and SDS-PAGE, were 80 and 40 kD, respectively. AAT-1 and AAT-2 appear to be nodule enhanced proteins.

Poster Session

Paper 11

ENHANCEMENT OF SYMBIOTIC N₂-FIXATION

Thomas J. Knight¹, Rebecca Dickstein², Champa Sengupta-Gopalan³ and Pat J. Unkefer¹. ¹Los Alamos National Laboratory, Los Alamos, NM; ²Harvard Medical School, Boston, MA; ³Plant Genetic Engineering Laboratory and New Mexico State University, Las Cruces, NM.

Infestation of the alfalfa rhizosphere with *Pseudomonas syringae* pv. *tabaci* results in increased plant growth, nodulation, total plant nitrogen, and N₂ fixation rates. Pathovar *tabaci* lives on the root surfaces where it releases tabtoxinine-β-lactam (TβL), an irreversible inhibitor of GS in planta. TβL acts in the roots and nodules to inactivate only the root form of GS. TβL is a poor inhibitor of GS_n-s and near normal GS_n-s activity is found; the TβL-treated nodules have impaired GS-catalyzed NH₃ assimilation because normal nodules contain both root and nodule-specific forms of GS. Thus, the TβL-treated nodules have about 50% of normal plant GS activity. The bacteroid GS activity is normal. Amino acid and ammonia pools are significantly altered. Western and Northern blot analysis of nodules from treated and untreated plants detected differences in several proteins including GS and in RNA for GS.

(Supported by the Southwest Consortium on Plant Genetics and done under the auspices of the US Department of Energy.)

Poster Session

Paper 12

SESQUITERPENE METABOLITES FROM *Fusarium sporotrichioides*

Susan P. McCormick, Scott L. Taylor, Ronald D. Plattner and Marian N. Beremand, USDA-ARS, Northern Regional Research Center, 1815 North University St., Peoria, IL 61604.

Strains of *Fusarium* produce the sesquiterpenoid trichothecene mycotoxins that are responsible for a variety of health problems, including vomiting, alimentary toxic aleukia, and skin inflammation, for humans and agricultural animals. Mutant strains of *F. sporotrichioides* NRRL 3299 have been generated by UV irradiation and selected for using an antibody screen for T-2 toxin. Three mutant strains, blocked in their ability to synthesize T-2 toxin, were previously isolated and characterized by their trichothecene metabolite profile in liquid culture (YEPD medium): strain MB1716 accumulates diacetoxyscirpenol; MB2972 accumulates didecalonectrin and decalonectrin; and MB5493 accumulates the sesquiterpene hydrocarbon trichodiene. An examination of these three mutant strains and the parent strain on solid rice medium yielded, in addition to the metabolites observed in liquid culture, a number of novel trichothecenes and bicyclic oxygenated derivatives of trichodiene. The role of these compounds in the biosynthesis of trichothecenes and sambucoins is being studied.

Poster Session

Paper 13

BIOCHEMICAL GENETICS OF GLUCOSINOLATES IN *Arabidopsis thaliana*

Laurence Davin, G. Haughn, D. Reed, M. Gibling and E. W. Underhill. Plant Biotechnology Institute, N.R.C., 110 Gymnasium Road, Saskatoon, Sask. Canada S7N 0W9.

Glucosinolates, a diverse class of sulphur-containing glucosides, have been found in all Cruciferae that have been examined. The hydrolytic products of some glucosinolates, in certain cruciferous feeds and fodder, exhibit toxic effects on animals. As part of a program to genetically engineer low glucosinolate levels in crops, a study was undertaken with mutants of *Arabidopsis thaliana* to define the biosynthetic step(s) which might most appropriately be blocked. Twenty-three glucosinolates were found in wild type leaves and seeds.

Plants derived from mutagenized seed have been assayed (HPLC) for glucosinolate mutants. One of the mutants found lacks 3 and 9 of the glucosinolates normally present in leaf and seed tissues, respectively. The analytical data suggest the mutant is deficient in one or more of the enzymes required for extension of the carbon chain of methionine beyond that of homomethionine. Experiments are currently being done to determine the enzyme(s) involved.

Poster Session

Paper 14

METABOLIC EVIDENCE FOR THE DEGREE OF SPECIFICITY OF GLUCOSINOLATE BIOSYNTHETIC ENZYMES

Darwin W. Reed, L. R. Hogge, J. W. D. Groot Wassink and E. W. Underhill. Plant Biotechnology Institute, N.R.C., 110 Gymnasium Road, Saskatoon, Sask., Canada S7N 0W9.

Approximately one hundred glucosinolates constitute an important class of plant thioglucosides. Although the biosynthesis of only a few have been studied, it is generally held that they are derived from amino acids or by structural modification of existing glucosinolates. Intermediates in the pathway include N-hydroxyamino acids, aldoximes, thiohydroximates and desulphoglucosinolates. Plants were fed amino acids and the above intermediates with side-chains different from those normally present in the plants examined. In all species studied large amounts of glucosinolates were produced with side-chains that corresponded with the intermediates fed; only negligible amounts, if any, of "unnatural" glucosinolates were formed from the amino acids. The data suggest that within a plant species high enzyme specificity exists only for the side-chain structure of the amino acid progenitor of the glucosinolate but not for the intermediates. They also indicate a minimum number of enzymes are involved in the formation of this class of compounds.

Poster Session

Paper 15

CHORISMATE MUTASE ISOZYME PATTERNS IN TUBERS AND LEAVES OF *Solanum tuberosum* L. CV WHITE ROSE

Gary W. Kuroki and Eric E. Conn, Department of Biochem. and Biophys., University of California, Davis, CA 95616.

Chromatography on DEAE-cellulose has resolved two aromatic amino acid regulated forms (CM-1A, CM-1B) and one unregulated form (CM-2) of chorismate mutase from tubers and leaves of *Solanum tuberosum*. Three day old tuber disks demonstrated a 4 to 5-fold increase in CM-1 activity following wounding. By contrast, CM-2 activity levels were not affected by this treatment. The CM-2 isozymes isolated from tubers and leaves had native molecular weight values of 55,000 and 51,500, respectively, and K_m (chorismate) values of 55 μM and 202 μM, respectively. Furthermore, CM-2 from tubers represented only 10-15% of the total CM activity, whereas CM-2 from leaves comprised 77% of the total CM activity. The CM-1 isozymes isolated from both tubers and leaves shared similar native molecular weight values of 55,000, K_m (chorismate) values of 40-56 μM, and inhibition by phenylalanine (I₅₀=110-145 μM) and tyrosine (I₅₀=50-70 μM). The resolution of CM-1A and CM-1B occurred only in the presence of 10 mM PIPES buffer. When this buffer was replaced by ACES, BES, imidazole or Tris, only a single peak of CM-1 activity was observed. Analytical IEF of this fraction yielded only one CM-1 activity peak.

Poster Session

Paper 16

DETERMINATION OF THE ALLELOPATHIC HYDROCINNAMIC ACID IN THE SOIL UNDER THE FLORIDA WILD ROSEMARY (*Ceratiola ericoides*)

Elizabeth D. Jordan, Nikolaus H. Fischer, G. Bruce Williamson* and Jeffrey D. Weidenhamer. Departments of Chemistry and *Botany, Louisiana State University, Baton Rouge, LA 70803.

Ceratiola ericoides is a shrub endemic to the Florida sand pine scrub community. There is only sparse vegetation immediately surrounding mature *Ceratiola* shrubs, and field and laboratory studies have provided strong evidence of the allelopathic activity of the shrub. Hydrocinnamic acid (HCA) is biologically active on seeds of grasses native to the neighboring Florida sandhill community. HCA is a breakdown product of the dihydrochalcone ceratiolin, which is found in abundance in water washes of fresh *Ceratiola* foliage. In the present study, water extracts of monthly samples of the soil under three individual *Ceratiola* shrubs were analyzed by reverse-phase HPLC. The extracts contained HCA in varying concentrations, with the higher concentrations occurring during the summer rainy season. The implications of this data on the allelopathic interactions of the shrub and sandhill communities will be discussed.

Poster Session

Paper 17

RADIOIMMUNOASSAY DETERMINATION OF SCOPOLAMINE YIELDS IN TISSUE CULTURES OF *Datura*

Brett J. Savary and Donald K. Dougall. Botany Department, University of Tennessee, Knoxville, TN 37996.

A sensitive radioimmunoassay has been established for investigations concerning variability of scopolamine yields by cell and tissue cultures of *Datura*. A scopolamine-binding antiserum of apparent high specificity was obtained with the immunogen described by Weiler *et al.* (1981). The assay uses the commercially synthesized labeled antigen, (N-methyl³H)-scopolamine methyl chloride. Callus cultures from plants of five species of *Datura* (maintained on B5 medium supplemented with 1 mg/L 2,4-D and 0.1 mg/L kinetin) exhibited low levels of antigenic activity.

A *D. stramonium* callus tissue extract was analyzed by coupled HPLC/RIA. Scopolamine, hyoscyamine and 6-hydroxyhyoscyamine were identified as antigenic components of the extract. Hyoscyamine was accumulated in excess of scopolamine in a quantity sufficient to interfere in the determination of scopolamine in the unpurified extract. Preliminary efforts have demonstrated the separation of hyoscyamine from scopolamine using a Waters C18 Sep Pak solid phase extraction cartridge.

Poster Session

Paper 18

PURIFICATION OF THE FIRST ENZYME IN THE CHLOROPHYLL BIOSYNTHETIC PATHWAY FROM *Chlamydomonas reinhardtii*

Tien-En Chang, Wei-Yeh Wang and Becky Wegmann, Department of Botany, University of Iowa, Iowa City, IA 52242

Plant cells start the chlorophyll biosynthetic pathway with glutamate. The enzyme involved in the first step of the pathway, a glutamyl-tRNA synthetase, has been purified from a green alga *Chlamydomonas reinhardtii*. Glutamyl-tRNA serves as the precursor of D-aminolevulinic acid, the intermediate under regulation in chlorophyll biosynthesis.

The purification procedure includes ammonium sulfate fractionation, gel permeation, DEAE ion-exchange and Blue-Sepharose affinity column chromatography, and non-denaturing polyacrylamide gel electrophoresis. The enzyme has an isoelectric point of 4.6 and is composed of 2 identical subunits, each with a molecular weight of 32,500 daltons. The amino acid composition and partial N-terminal amino acid sequence of the enzyme have been determined. Polyclonal antibodies have been raised and shown to inhibit the activity of the native enzyme.

Poster Session

Paper 19

PHYTOALEXIN PRODUCTION BY SUGARCANE INFECTED WITH *Colletotrichum falcatum*

Anita M. Brinker and D. S. Seigler. Department of Plant Biology, University of Illinois, Urbana, Illinois 61801.

Colletotrichum falcatum, the fungus causing the sugarcane disease red rot, is a major pathogen in subtropical areas. The disease takes its name from the large red lesions that develop in infected stalks. The anthocyanidin luteolinidin had previously been extracted from these lesions and was reported by others to be a phytoalexin. Components of an extract of infected sugarcane were separated by two-dimensional paper chromatography. The individual substances were assayed for their effects on germination of *C. falcatum* spores. Extracts of wounded and of untreated sugarcane were similarly fractionated and bioassayed. Initial studies indicate that luteolinidin is not the most toxic component of the red lesions. Also, a toxic substance(s) is present in extracts of cane that was wounded but not infected; whether the substance(s) is the same as that in infected cane is being investigated.

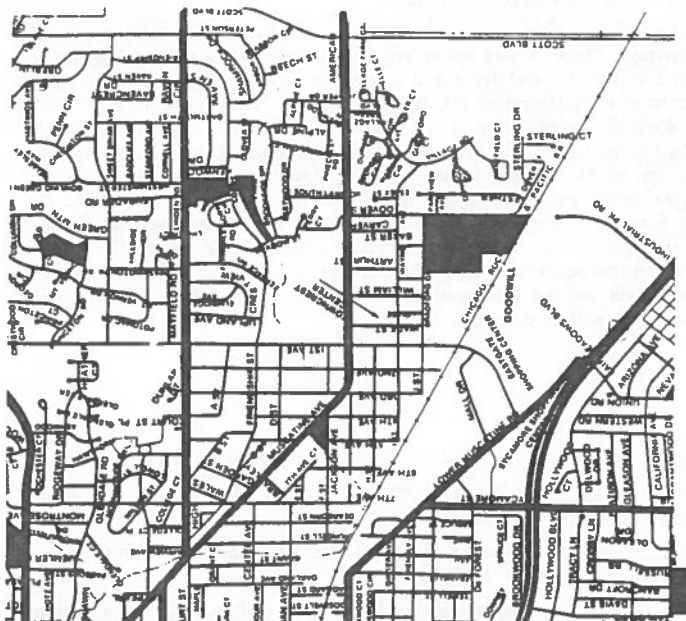
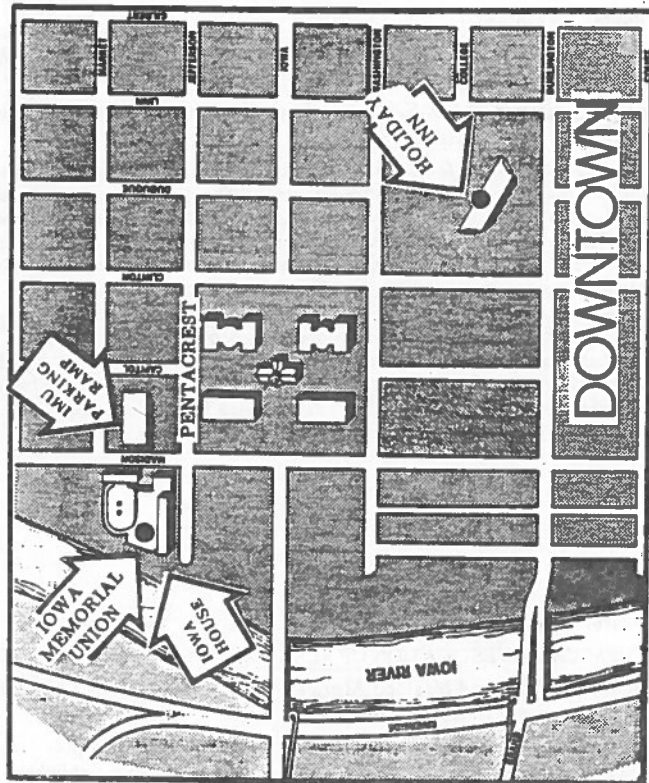
Poster Session

Paper 20

CHEMICAL INVESTIGATION OF ALKALOIDS OF *Haplophyton crooksii*

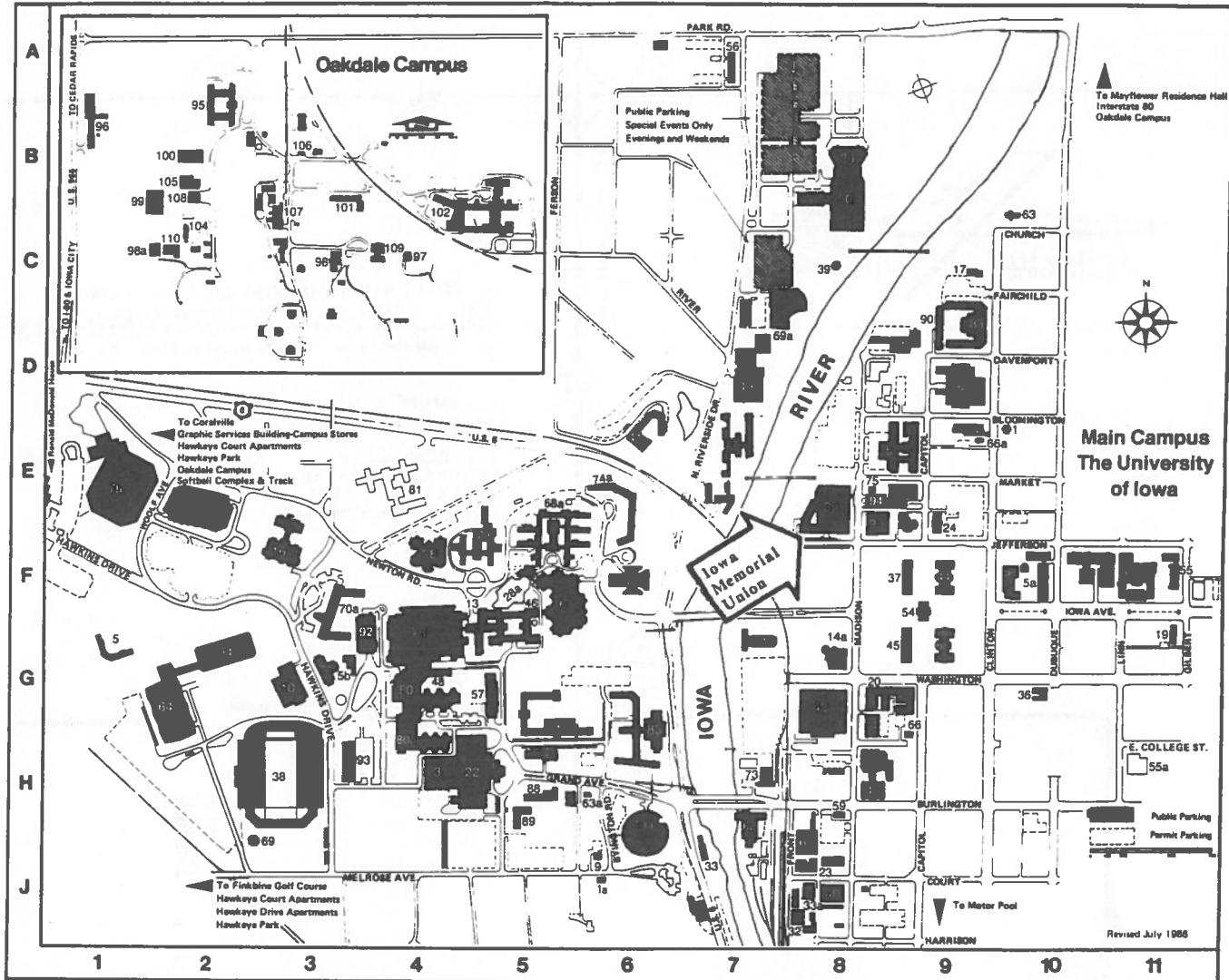
Mohamad Mroue and Maktoub Alam, Department of Medicinal Chemistry and Pharmacognosy, University of Houston, Houston, Texas 77004.

Chemical investigation of the perennial shrub *Haplophyton crooksii* (Apocynaceae) has resulted in the isolation of the alkaloid β -yohimbine and a regioisomer of the brisindole alkaloid-norcimiphytine. The structures of the isolated compounds were determined by the interpretation of the NMR data which included two dimensional ¹H-¹H, ¹H-¹³C correlation, NOE and the recently developed reverse-detected long-range ¹H-¹³C correlation spectrometry.



IOWA CITY

THE UNIVERSITY OF IOWA CAMPUS



MAIN CAMPUS

BUILDINGS

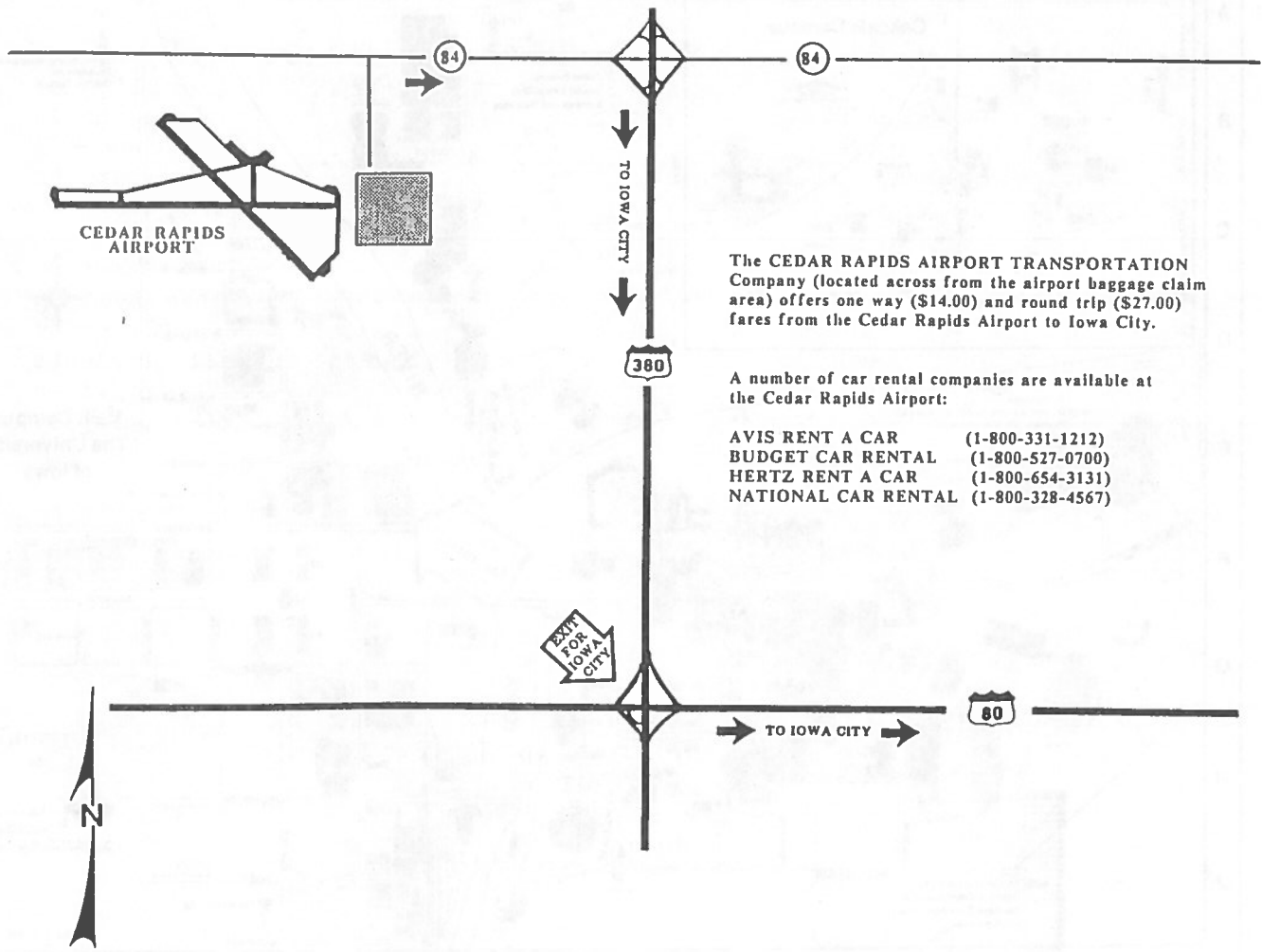
- 1 Admissions Visitors Center (D-10)
- 1a Afro-American Cultural Center (J-6)
- 2 Alumni Center (D-7)
- 3 Armory (H-4)
- 4 Art Building (E-7)
- 5 Baseball Stadium (G-1)
- 5a Biology Building (F-10)
- 5b Botany Plant House (G-3)
- 6 Bowen Science Building (F-5)
- 7 Calvin Hall (F-9)
- 7a Cambus Offices (H-2)
- 7b Carver-Hawkeye Arena (E-1)
- 8 Chemistry-Botany Building (E-9)
- 9 Chicano/Indian American Cultural Center (J-6)
- 10 Chilled Water Plant (G-3)
- 11 Clapp Recital Hall (B-8)
- 13 College of Medicine Administration Building (F-5)
- 14 Communications Center (G-8)
- 14a Communication Studies Building (G-8)
- 15 Danforth Chapel (F-7)
- 16 Dental Science Building (F-3)
- 17 Dey House (C-9)
- 19 Eastlawn (G-11)
- 20 Engineering Building (G-8)
- 21 English-Philosophy Building (G-7)
- 22 Field House (H-4)
- 23 General Stores (J-8)
- 24 Gilmore Hall (F-9)
- Graphic Services Building (directions E-2)
- 25 Halsey Gymnasium (F-8)
- 26 Hancher Auditorium (B-8)
- Hawkeye Court Apartments (directions E-2)
- Hawkeye Drive Apartments (directions J-2)
- Hawkeye Park (directions E-2)
- 28a Health Sciences Library (F-4)
- 28b Human Biology Research Facility (G-5) (under construction)
- 32 Hydraulics Annex East (J-8)

- 33 Hydraulics Laboratory (J-7)
- 33a Hydraulics Model Annex (J-8)
- 34 Indoor Practice Facility (G-2)
- 35 Iowa Memorial Union (F-8)
- 36 Jefferson Building (G-10)
- 37 Jessup Hall (F-9)
- 38 Kinnick Stadium (H-3)
- 39 Lagoon Shelter House (C-8)
- 40 Laundry Building (J-8)
- 40a Law Building (H-6)
- 41 Law Center (E-6)
- 42 Library, Main (G-8)
- 43 Lindquist Center (H-8)
- 44 Macbride Hall (F-9)
- 45 MacLean Hall (G-9)
- 46 Medical Laboratories (G-5)
- 47 Medical Research Center (G-5)
- 48 Medical Research Facilities (G-4)
- Motor Pool (directions J-9)
- 49 Museum of Art (D-7)
- 50 Music Building (B-8)
- 51 North Hall (D-9)
- 52 Nursing Building (F-6)
- 54 Old Capitol (F-9)
- 55 Old Music Building (F-11)
- 55a Old Public Library (H-11)
- 56 Parklawn Apartments (A-7)
- 57 Pharmacy Building (G-5)
- 58 Phillips Hall (F-10)
- 59 Physical Plant Offices (H-8)
- 60 Physical Plant Shops (J-8)
- 62 Power Plant (H-7)
- 63 President's Residence (B-10)
- 63a Radiation Protection (H-8)
- 64 Recreation Building (G-2)
- 64a Ronald McDonald House (E-1)
- 64b Schaeffer Hall (G-9)
- 65a Seashore Hall (F-11)
- 66 Security Building, 131 S. Capitol (H-9)
- 66a Shambaugh House Honors Center (D-9)
- 66b Softball Complex and Track (directions E-2)
- 67 Spence Laboratories of Psychology (F-11)
- 68 State Historical Society (F-11)

- 68a Steindler Building (F-5)
 - 69 Tennis Center (H-2)
 - 69a Theatre Building (D-7)
 - 70 Trowbridge Hall (E-9)
 - 70a University Hospital School (F-3)
 - 72 Van Allen Hall (F-10)
 - 73 Water Treatment Plant (H-7)
 - 74 Wendell Johnson Speech and Hearing Center (G-3)
 - 74a Westlawn (E-6)
 - 75 Women's Resource and Action Center (E-8)
- ### HOSPITALS
- 78 General Hospital (G-4)
 - 79 Psychiatric Hospital (F-5)
 - 80 Roy J. Carver Pavilion (G-4)
 - 80a John W. Colleton Pavilion (G-4)
 - 81 Veterans Administration Hospital (E-4)
- ### RESIDENCE HALLS
- 82 Burge (D-9)
 - 83 Currier (D-9)
 - 84 Daum (D-9)
 - 85 Hillcrest (H-6)
 - 85a Mayflower (directions A-11)
 - 86 Quadrangle (G-5)
 - 87 Rienow (H-5)
 - 88 Slater (H-5)
 - 89 South Quadrangle (H-5)
 - 90 Stanley (D-9)
- ### PUBLIC PARKING RAMP
- 92 Hospital Parking Ramp No. 1 (G-3)
 - 93 Hospital Parking Ramp No. 2 (H-3)
 - 94 Iowa Memorial Union Parking Ramp (E-8)
- ### OAKDALE CAMPUS
- 95 Agricultural Medicine Research Facility (B-2)
 - 96 Animal Quarters (B-1)
 - 97 Child Behavior and Development, Institute of (C-4)
 - 98 Employees' Building (C-3)
 - 98a Helicopter Hangar (C-2)

- 99 Hydraulics Research Lab (B-1)
 - 100 Iowa Geological Survey (B-2)
 - 101 Oakdale Apartments (B-3)
 - 102 Oakdale Hall (C-4)
 - 104 Pediatric Research (C-2)
 - 105 Physiology Research Building (B-2)
 - 106 Post Office (B-3)
 - 107 Power Plant (C-2)
 - 108 Research Facilities (B-2)
 - 109 Technology Innovation Center (C-3)
 - 110 Waste Storage Facility (C-2)
- ### COLLEGES
- Business Administration, Phillips Hall (58) (F-10)
 - Dentistry, Dental Science Building (16) (F-3)
 - Education, Lindquist Center (43) (H-8)
 - Engineering, Engineering Building (20) (G-8)
 - Graduate, Gilmore Hall (24) (F-9)
 - Law, Law Building (40a) (H-6)
 - Liberal Arts, Schaeffer Hall (65) (G-9)
 - Medicine, College of Medicine Administration Building (13) (F-5)
 - Nursing, Nursing Building (52) (F-6)
 - Pharmacy, Pharmacy Building (57) (G-5)
- ### OTHER MAJOR OFFICES
- Academic Affairs, Jessup Hall (37) (F-9)
 - Admissions Office, Calvin Hall (7) (F-9)
 - Athletic Ticket Office, Carver-Hawkeye Arena (7a) (E-1)
 - Business and Liberal Arts Placement Office, Iowa Memorial Union (35) (F-8)
 - Business Office, Jessup Hall (37) (F-9)
 - Campus Information Center, Iowa Memorial Union (35) (F-8)
 - Campus Stores, Graphic Services Building (directions E-2)
 - Continuing Education, Seashore Hall (65a) (F-11)

- Dental Clinics, Dental Science Building (16) (F-3)
- Educational Placement, Lindquist Center (43) (H-8)
- Family Practice Clinic, Steindler Building (68a) (F-5)
- Financial Aid Office, Calvin Hall (7) (F-9)
- Iowa Testing Programs, Lindquist Center (43) (H-8)
- Museum of Natural History and Iowa Hall, Macbride Hall (44) (F-9)
- Orientation Services, Calvin Hall (7) (F-9)
- Parents Association, Old Capitol (54) (F-9)
- Parking Office, Iowa Memorial Union Parking Ramp (94) (E-8)
- Personnel Services, Eastlawn (19) (G-11)
- President's Office, Jessup Hall (37) (F-9)
- Public Information and University Relations, Old Capitol (54) (F-9)
- Publications and Printing Service, Graphic Services Building (directions E-2)
- Purchasing, Jefferson Building (36) (G-10)
- Regional Child Health Specialty Clinics, University Hospital School (70a) (F-3)
- Registrar's Office, Jessup Hall (37) (F-9)
- Residence Services, Burge Hall (82) (D-9)
- Special Support Services, Calvin Hall (7) (F-9)
- State Archaeologist, Eastlawn (19) (G-11)
- Student Health Services, Steindler Building (68a) (F-5)
- Undergraduate Advising Center, Burge (82) (D-9) and Quadrangle (86) (G-5)
- University Hygienic Laboratory, Oakdale Hall (102) (C-4)
- Weeg Computing Center, Lindquist Center (43) (H-8)



The CEDAR RAPIDS AIRPORT TRANSPORTATION Company (located across from the airport baggage claim area) offers one way (\$14.00) and round trip (\$27.00) fares from the Cedar Rapids Airport to Iowa City.

A number of car rental companies are available at the Cedar Rapids Airport:

- AVIS RENT A CAR (1-800-331-1212)
- BUDGET CAR RENTAL (1-800-527-0700)
- HERTZ RENT A CAR (1-800-654-3131)
- NATIONAL CAR RENTAL (1-800-328-4567)

DATES SET FOR 1989 PSNA MEETING IN VANCOUVER

The 1989 PSNA meeting in Vancouver, British Columbia will begin with registration on June 25. The scientific sessions (symposium, papers and posters) are scheduled for June 26 through 28. The symposium topic will be "Biologically Active Products of Mevalonic Acid." Meeting organizers, G.H. Neil Towers and Bruce A. Bohm, will provide further details for the fall issue of the newsletter.

ERIC CONN NAMED TO NATIONAL ACADEMY OF SCIENCES

Eric E. Conn, Professor of Biochemistry at the University of California, Davis and PSNA Editor-in-Chief, was among 61 new members and 15 foreign associates recently named to the National Academy of Sciences. A native of Colorado, he received his bachelor's degree from the University of Colorado and earned his doctorate from the University of Chicago.

His pioneering studies of cyanide in plants have earned numerous honors and awards over the years. The focus of his research has been on understanding the production of cyanide by plants and the role played by this poisonous substance in plant metabolism. About 2,000 species of plants are known to produce cyanide, and it is thought that cyanide provides protection against grazing animals and the invading growth of other plants.



In recent years, Eric has turned his attention to two large groups of cyanide-producing plants native to Australia, the acacias and eucalyptus. An Australian species has recently been named Acacia conniana in his honor.

In addition to his accomplishments as a phytochemist, he has also been influential in the development of the UCD Department of Biochemistry and Biophysics, which was newly formed when he arrived at UCD from U.C. Berkeley in 1958. He has been highly praised for his teaching and is co-author of the text, Outlines of Biochemistry, which was recently published in its fifth edition.

Eric was president of the Phytochemical Society of North America (1971) and currently serves as Editor-in-Chief and member of the PSNA Executive Committee. He has also served as president of the American Society of Plant Physiologists.

The National Academy of Sciences, established by congressional charter, serves as an advisory body to the U.S. Government. Election to this prestigious organization, one of the highest honors possible for American scientists, is based on the originality and quality of a scientist's body of work, not a single achievement. Congratulations for this well-deserved honor!

NEW PSNA MEMBERS AND THEIR RESEARCH INTERESTS

The following are new members of our society. We welcome you and invite your participation in society business and at PSNA meetings.

Clint Chapple
Dept. of Chemistry and Biochemistry
University of Guelph
Guelph, Ontario
Canada, N1G 2W1

Enzymology of Glucosinolate

Paul L. Durham
1000 W. Benton 309E
Iowa City, IA 52240

Plant Biochemistry

Cary Dustin
Biology Department
Boston University
Boston, MA 02215

Chemical ecology of ferns

John R. Obst
Forest Products Laboratory
One Gifford Pinchot Drive
Madison, WI 53705

Lignin Chemistry

Robert A. Sinnott
605 W. 11th Street
Tempe, AZ 85281

Phytochemistry of simple and modified phenolic compounds

POSITION AVAILABLE

UNIVERSITY OF CALIFORNIA, DAVIS. ASSISTANT PROFESSOR OF BIOCHEMISTRY AND ASSISTANT BIOCHEMIST IN THE AGRICULTURAL EXPERIMENT STATION. The Department of Biochemistry and Biophysics invites applications for a full-time (11 month/year) tenure-track appointment. A Ph.D. or equivalent degree is required in Biochemistry or a closely related field; post doctoral experience of at least two years is preferred. Preference will be given to applicants with demonstrated research competence in the general area of eukaryotic molecular biology. The principal duties involve teaching in graduate and undergraduate biochemistry courses, advising students and guiding graduate students to advanced degrees in biochemistry. Applications must be received by August 1, 1988. Candidates should submit a resume, copies of publications, outline of proposed research program and the names and addresses of three references to: Dr. Roy H. Doi, Chair, Search Committee, Department of Biochemistry and Biophysics, University of California, Davis, California 95616. The University of California is an equal opportunity/affirmative action employer and invites applications from all qualified individuals.

MEETINGS AND PROGRAMS OF INTEREST

PLANT GROWTH REGULATOR SOCIETY OF AMERICA, 15TH ANNUAL MEETING: Hilton Palacio del Rio Hotel, San Antonio, Texas, July 31 - August 4, 1988. For further information, contact David Parrish, Agronomy Department, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061. (Tel. 703-961-6300).

NORTH AMERICAN TANNIN CONFERENCE: Port Angeles, Washington, August 9-11, 1988. For further information, contact the Conference Assistant, College of Forestry, Oregon State University, Corvallis, OR 97331 (Tel. 503-754-2004).

GROUPE POLYPHENOLS INTERNATIONAL: Brock University, St. Catherines, Ontario, August 16-19, 1988. For further information, contact Dr. T. Fuleki, HIRO, Vineland Station, Ontario, Canada, LOR 2E0.

WORKSHOP ON BIOASSAY-DIRECTED DISCOVERY OF ANTITUMOR AND ANTIVIRAL AGENTS FROM NATURAL RESOURCES: Lister Hill Auditorium, National Library of Medicine, Bethesda, Maryland, October 18 and 19, 1988. The preliminary program lists the following topics:

Mechanism-Based Approaches in Anticancer Drug Research
Current Status of Antitumor Natural Product Research
Prescreening and Screening Models for Antitumor Agents
Preclinical Evaluations of Anticancer Drugs

Strategy in Antiviral drug Research
Current Status of Anti-AIDS Drug Research
Screening and Prescreening Models for Antiviral Agents
Small Immunomodulators as Antitumor or Antiviral Agents
Screening Models for Small Immunomodulators

Other Topics Related to Mechanism-Based Bioassay and
Non-Mammalian Bioassay Systems and their Applications.

Panel Discussion on Integrated Approach for Discovery of
Antitumor Agents.

Size of the workshop will be limited to 160 participants. Attendees will be chosen on a first-come-first-served basis. Telephone registration requests to the Bioorganic and Natural Product Chemistry Study Section, Division of Research Grants, National Institutes of Health (Tel. 301-496-7107).

INTERNATIONAL SOCIETY FOR PLANT MOLECULAR BIOLOGY, 2ND INTERNATIONAL CONGRESS: Jerusalem, Israel, November 13-18, 1988. For further information, contact the Secretariat: Mrs. Ruth Goldstein, The Aharon Katzir-Katchalsky Center, The Weizmann Institute of Science, 76100 Rehovot, Israel (Tel. 972-8-472148).

RECENT ADVANCES IN PHYTOCHEMISTRY SERIES

ISBN	EDITOR--TITLE	LIST PRICE	DISCOUNT PRICE
426757	Saunders et al.--PHYTOCHEMICAL EFFECTS OF ENVIRONMENTAL COMPOUNDS, 1987 (Vol. 21)	\$57.50	\$34.50
422832	Conn--THE SHIKIMIC ACID PATHWAY, 1986 (Vol. 20)	\$55.00	\$33.00
420066	Cooper-Driver et al.--CHEMICALLY MEDIATED INTERACTIONS..., 1985 (Vol. 19)	\$45.00	\$27.00
417200	Timmermann et al.--PHYTOCHEMICAL ADAPTATIONS TO STRESS, 1984 (Vol. 18)	\$49.50	\$29.70
413779	Nozzolillo et al.--MOBILIZATION OF RESERVES IN GERMINATION, 1983 (Vol. 17)	\$52.50	\$31.50
410230	Creasy/Hrazdina--CELLULAR & SUBCELLULAR LOCALIZATION IN PLANT METABOLISM, 1982 (Vol. 16)	\$49.50	\$29.70
407582	Loewus/Ryan--THE PHYTOCHEMISTRY OF CELL RECOGNITION & CELL SURFACE INTERACTIONS, 1981 (Vol. 15)	\$49.50	\$29.70
405725	Swain/Kleiman--THE RESOURCE POTENTIAL IN PHYTOCHEMISTRY, 1980 (Vol. 14)	\$39.50	\$23.70
401886	Swain/Waller--TOPICS IN THE BIOCHEMISTRY CHEMISTRY OF NATURAL PRODUCTS, 1979 (Vol. 13)	\$45.00	\$27.00
400286	Swain et al.--BIOCHEMISTRY OF PLANT PHENOLICS, 1979 (Vol. 12)	\$85.00	\$51.00
347113	Loewus/Runeckles--THE STRUCTURE, BIO-SYNTHESIS. AND DEGRADATION OF WOOD, 1977 (Vol. 11)	\$75.00	45.00

Volumes 1-4, 9 and 10 also available

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PHYTOCHEMICAL SOCIETY OF NORTH AMERICA

Newsletter

Volume 28
Number 2

November 1988

THE 1988 ANNUAL MEETING AT IOWA CITY

We arrived in Iowa City during an early summer heat wave with afternoon temperatures in the 100's. Beginning with the Welcome Reception on Saturday evening, all attending were drawn to the cool comfort of the Iowa Union. Facilities there provided a comfortable auditorium with adjacent cafeterias and dining rooms. The excellent program of symposium talks and contributed papers was thus enjoyed in cool comfort. As the meeting progressed, the weather began to moderate. On Monday afternoon a trip to the Herbert Hoover Museum, with a stop at the natural prairie at the Rochester Cemetery and dinner at a cook-it-yourself steak house in West Branch, provided a pleasant break in the program. The next afternoon a bus left at 3:30 for a trip to the historic district of Dubuque. A ride on the Fenelon Place Elevator, followed by a dinner cruise on the Mississippi River aboard the "Spirit of Dubuque", provided another enjoyable diversion. The annual banquet on Wednesday evening was preceded by a reception in the lobby of the Museum of Natural History. These diversions are documented in our first Annual Meeting Centerfold. (See pages 10 and 11.) This photographic record was made possible thanks to Bruce B. Stowe.

MINUTES OF THE 28TH ANNUAL BUSINESS MEETING

The 1988 business meeting of the Phytochemical Society of North America was called to order at 3:35 P.M., June 29, 1988. President John Romeo announced that attendance at the Iowa City meeting totalled 105 with 10 countries represented. Of the registrants, 48 were members and 20 new members had been recruited by Wednesday afternoon.

John Romeo thanked Jonathan Poulton and his associates at the University of Iowa for the excellent organization of this year's meeting. All agreed that the comfortable facilities, enjoyable excursions and delightful weather (which was almost chilly by the end of the meeting) made the 1988 meeting among the most successful in the history of the society.

It was moved and seconded that the minutes of the 27th annual meeting at Tampa, Florida be accepted as printed in the October, 1987 PSNA Newsletter. Secretary Helen Habermann reported that improvements in the Newsletter's appearance would continue. It is anticipated that a desk top publishing system that can interface with available word processing equipment will be available sometime in the next year. It will make possible a smaller, print-like type, more material per page and fewer pages per issue. The latter change is important to offset the recent hikes in postal rates. Input from the members concerning changes and items to be published is most welcome. We need more information about positions available (including assistantships and fellowships) and meetings of other societies of interest to our members.

Jonathan Poulton presented the treasurer's report including a financial summary of the 1987 PSNA annual meeting in Tampa; Financial Statement for January 1, 1987 to December 31, 1987; Interim Financial Statement for January 1, 1987 to May, 1988; summary of royalties received for "Recent

Advances in Phytochemistry" volumes 10 to 21 through 1987; and a summary of PSNA membership for 1979 through 1987.

Support of the Iowa City meeting from the University of Iowa Graduate College (\$5,000), the University of Iowa Department of Botany (Cone Foundation, \$2,000), U.S.D.A. (\$1,000), Monsanto (\$1,000), Exhibitor subsidies (\$525) and DuPont (\$500) was acknowledged. The Iowa City meeting is expected to cost the society approximately \$5,500, an amount greater than that needed to support the Tampa meeting. This increase was related to higher travel costs for symposium speakers, more of whom came from overseas this year. Income from sales of "Recent Advances in Phytochemistry" continues to yield royalties in excess of \$3,000 per year. The financial status of PSNA remains strong, and a balance of well over \$40,000 will be turned over to the Society's new treasurer. The only troubling aspect of the treasurer's report was the continuing decline in membership which began in 1986.

Helen Habermann summarized plans for the 1989 meeting at the University of British Columbia, Vancouver, Canada reported to the executive committee by Neil Towers. Registration on June 25 will be followed on June 26 to 29 by symposium sessions and contributed papers. Planned recreational activities include a boat ride (with dinner) on the 27th and the banquet on June 28. The symposium topic is "Biologically Active Products of the Mevalonic Pathway" and nine speakers have accepted invitations to attend. Bruce Bohm of U.B.C. is assisting Neil Towers with local arrangements for the meeting. Housing in the Gates Residences will be available from June 24 through July 1 for those who wish to extend their stay in Vancouver (staying over Saturday night can substantially reduce airfare). Vancouver's outstanding climate and recreational possibilities provide a marvelous opportunity to combine professional business and family vacations.

John Romeo reported on meeting plans for 1990 and beyond. The meeting in Quebec City, Canada in 1990, will be held jointly with the Chemical Ecology Society. Local arrangements are being organized by Jeremy McNeil at Laval University. The PSNA symposium topic will be "Phytochemical Methodology." The dates have not yet been set, but the Quebec meeting will be held either in late June or in August.

Plans for 1991 are still vague with no decision on either site or symposium topic.

Discussions between P.J. Lea, incoming president of the Phytochemical Society of Europe and the Executive Committee on Tuesday, June 28, resulted in agreement concerning a joint PSNA/PSE meeting at a site on the East Coast of the U.S. easily accessible for Europeans. Possible topics have been raised but no final decisions have been made concerning symposium topic or organizational details.

Editor-in-chief, Eric Conn, reported that Volumes 26 and 27 of the "Recent Advances in Phytochemistry" have been published since last year's meeting. All but two manuscripts of the Iowa City symposium on "Plant Nitrogen Metabolism" had been received, and Volume 28 should be published on schedule next spring. After thanking him for his report, President John Romeo congratulated Eric Conn on his election to the National Academy of Sciences.

John Romeo reported that this year's non-competitive student travel awards had been granted to 10 students from the U.S. and abroad. Award amounts ranged from \$50 to \$250 and equaled up to 50% of economy airfare. Names of the 1988 PSNA student travel award winners and their institutions are:

Michelle A. Briggs
Department of Entomology
Pennsylvania State University
University Park, PA 16802

Kent F. McCue
Dept. of Biochemistry & Physics
University of California
Davis, CA 95616

Clint Chapple
Dept. of Chemistry & Biochemistry
University of Guelph
Guelph, Ontario, N1G2W1, Canada

Mary Lou Mendum
Dept. of Horticulture
Purdue University
West Lafayette, IN 47907

Lavina Faleiro
Department of Biological Sciences
Florida International University
Miami, FL

Maria de Lourdes Miranda-Ham
C.I.C.Y.
Cordmey, 97310 Yucatan
Mexico

Gregory W. McCarty
Dept. of Agronomy
Iowa State University
Ames, IA 50011

Ramon A. Razal
Dept. of Wood Science and Forest
Products
Virginia Polytechnic Inst. & State
University
Blacksburg, VA 24060

Ursula Hecht
Biologisches Institut II
Universitat Freiburg
West Germany

Robert E. Williams
Dept. of Chemistry & Biochemistry
University of Guelph
Guelph, Ontario N1G2W1, Canada

Jim Saunders announced the Student Best Paper award winner and presented a check for \$100 to Ramon Razal of VPI, Blacksburg, VA. Alois Bell and Susan McCormick assisted in judging the student oral papers. All participants in the student best paper competition had received a set of suggestions prepared by Jim Saunders who praised the excellence of all preparations and the high quality of slides.

In the absence of Neil Towers, results of the election were announced by the secretary. Our new President-elect is Jonathan Poulton; treasurer for 1988-1991 is Kelsey Downum. The constitutional amendment clarifying procedures for initiating changes in the PSNA constitution passed by an overwhelming majority. There were 167 ballots returned compared to 137 last year.

John Romeo praised the work of the PSNA advisory committee for their input on society matters based on their expertise and wisdom. Helen Stafford has completed her term on the advisory committee and Connie Nozzolillo has been appointed to a 5-year term.

Suggestions of a membership committee consisting of Dick Mansell, Le Creasy and Jim Saunders, appointed by John Romeo in September, 1987, were

discussed during the executive committee meeting on June 25. Several of the membership committee's recommendations will be implemented during the next year:

1. The cost of annual dues will be included in registration for all non-members attending the 1989 annual meeting in Vancouver.
2. A mailing list prepared by R. Mansell will be used to distribute meeting announcements.
3. The draft material for a brochure to be distributed to potential members will be edited, designed to make it attractive to recipients and printed. Copies will be mailed to all members who will be asked to forward them to individuals interested in joining PSNA. We anticipate that such a targeted distribution to students, colleagues, post-docs, authors of papers to whom reprint requests are being sent, or contacts at professional meetings will produce a higher yield of new members than distribution to a large mailing list. Members were reminded that the most persuasive reason for joining PSNA is the 40% member discount on volumes of "Recent Advances in Phytochemistry," which each year would more than offset the membership dues.

Discussion of the declining membership followed. Kelsey Downum suggested distributing PSNA brochures to the mailing list prepared by Dick Mansell. Joe Olechno questioned the reason(s) for declining membership. Jim Saunders urged that the society promote increased industrial participation in and support of PSNA meetings. John Romeo reminded members of continuing support by companies such as Monsanto, DuPont, and Dionex and suggested that it would be desirable to expand the society's contacts with industry. Kelsey Downum pointed out that increased attendance at meetings of representatives of industry, especially members employed by industry, would be desirable.

Joe Olechno announced that there are job openings at Dionex and urged those with a botanical orientation to apply. Openings include laboratory positions in applications and development. Joe Olechno urged members to cultivate contact with individuals in industry to take advantage of corporate America. Companies selling equipment frequently have money available to support travel to meetings to report on research in which the equipment they manufacture has been used. Smaller companies developing new techniques are especially eager to have their products advertised in this way. A good strategy is to send reprints of publications to companies whose instruments are mentioned.

John Romeo thanked Jim Saunders for his work on the membership committee and in the student best paper competition during the past year. The meeting was then turned over to new President Dave Seigler who entertained a motion to adjourn. The motion was seconded and the meeting was adjourned at 4:45 P.M.

Respectfully submitted

Helen M. Habermann

SUMMARY OF EXECUTIVE COMMITTEE MEETINGS, IOWA CITY, 1988

Jonathan Poulton, chairman of the local organizing committee, reported that of the approximately 100 registrants for the Iowa City meeting, 40% were PSNA members and 60% were non-members. A comparison of finances for the 1987 and 1988 meetings indicated an increased cost of this year's meeting that was primarily the result of increased costs of travel support for symposium speakers, more of whom came from abroad (five from Europe or Australia) than in other years. These increases were partially covered by increased non-PSNA income. It was agreed that the estimated \$5,500 cost to the society (vs. \$2,676 for last year's meeting) was an appropriate utilization of society funds. Non-PSNA support included contributions from the University of Iowa graduate College (\$5,000), the University of Iowa Department of Botany (CONE Foundation \$2,000), U.S.D.A (\$2,000), Monsanto (\$1,000), exhibitor subsidies (\$525) and DuPont (\$500). An advertisement for this year's meeting in Science yielded a few additional registrants. Invitations to investigators who published the results of their research on plant nitrogen metabolism in Plant Physiology were more effective in yielding non-member registrants than the advertisement in Science.

Jonathan Poulton presented an interim financial statement for the period January 1, 1980 to May 31, 1988 which documented the continued health and financial stability of the society. Assets increased from \$43,260.34 to \$49,242.47 for the period. Part of this increase came from \$3,323.35 refunded from the 1987 meeting in Tampa. A troubling aspect of the treasurer's report was the continued erosion in numbers of members which began in 1986. Royalties from sales of "Recent Advances in Phytochemistry" remained strong with first year sales of volume 21 producing \$2,287.89 in royalty income for the society.

Neil Towers reported that the 1989 PSNA meeting at the University of British Columbia in Vancouver, would begin with registration and a welcoming reception on June 25th. Morning symposium sessions and afternoon contributed papers will be scheduled on June 26 to 29. Planned recreational activities include a boat ride on the 27th and the banquet on the 28th. The symposium topic is "Biologically Active Products of Mevalonic Acid" and nine speakers have accepted invitations to attend. Bruce Bohm is working with Neil Towers on local arrangements at U.B.C. Single rooms will be available in the Gates Residences (\$26 Cdn. per night) and suites (accommodating up to 4 persons each) will be available (\$55 Cdn. double occupancy plus \$10 per extra body). Accommodations will be available beginning June 24 through July 1 for those who wish to extend their stay in Vancouver (staying over Saturday can substantially reduce the cost of air fare). Possibilities for recreation and sightseeing in the Vancouver area are outstanding. Requests for corporate support of the 1989 meeting will be pursued by incoming-president Seigler.

John Romeo reported on plans for our joint meeting in 1990 with the Chemical Ecology Society in Quebec City, Canada. The symposium, being organized by N.H. Fischer (Louisiana State University) and Jerry McLaughlin (Purdue University), will be on "Modern Methodology of Phytochemistry." The dates of the 1990 meeting have not yet been set but it will probably be held in June. The organization of this meeting is such that the two societies will be meeting concurrently but with separate programs.

There was preliminary discussion concerning the site and symposium topic for the 1991 PSNA meeting. Neil Towers suggested that a symposium on Flavanoids would be timely and there was general agreement that a western site should be chosen. Austin, Texas; Irvine, California; and Monterey, Mexico were suggested.

John Romeo circulated a letter from P.J. Lea supporting a joint meeting of the PSNA with the Phytochemical Society of Europe. P.J. Lea, currently PSE vice chairman, will become the PSE chairman in 1990. The possibility of meeting in Miami was suggested by John Romeo who pointed out that Miami's international airport would be accessible not only to North Americans and Europeans wishing to attend but also to Latin American phytochemists. A discussion with Professor Lea during lunch on June 28 concerned the organizational details, possible symposium topics and organizers. All present enthusiastically supported the proposed joint meeting.

In September 1987, J. Romeo asked Dick Mansell, Le Creasy and Jim Saunders to prepare recommendations to the executive committee on ways to increase the number of PSNA members. This committee met by telephone conference call on several occasions and, in January, submitted the following three recommendations for consideration by the executive and advisory committees of the society:

1. To publish abstracts of oral and poster session papers as an appendix to "Recent Advances in Phytochemistry".
2. To include cost of PSNA membership in the annual meeting registration fee for non-members. Such increased registration cost would be more than offset by the 40% discount on one volume of "Recent Advances in Phytochemistry."
3. To prepare a permanent mailing list of major university departments and others for distribution of meeting announcements and society information.

Jim Saunders also wrote the draft of a brochure to be mailed to prospective PSNA members. After discussion, the Executive Committee rejected the first proposal. The major reason was that adding unedited and unrelated abstracts to the annual "Recent Advances in Phytochemistry" volume would not have a beneficial effect on the symposium volume. Furthermore, anyone wishing to cite a PSNA abstract may now do so because both abstracts and pages of the meeting issue of the Newsletter are numbered

Members of the executive committee felt that an extensive mailing list would be of questionable benefit for recruitment. However, the idea of a brochure based on the draft prepared by Jim Saunders should be pursued. Helen Habermann will edit and design the brochure for distribution to members of the executive and membership committees for comment. It was suggested that a few brochures be sent to each PSNA member for distribution to prospective members including: students, postdocs, colleagues, and authors of papers to whom reprint requests are being sent. All members have PSNA directories to identify non-members. Potential members could be selected based on published papers, contacts at professional meetings, or other evidence of interest in Phytochemistry.

Eric Conn brought a copy of the recently published 1988 volume of "Recent Advances in Phytochemistry" based on the symposium at the Tampa meeting organized by T. Kosuge of the University of California at Davis.

Prof. Kosuge died in March and thus did not see the published results of the symposium he had planned. This volume, "Opportunities for Phytochemistry in Plant Biotechnology," has been dedicated to Prof. Kosuge, and Eric Conn will present a copy of Volume 22 to Mrs. Kosuge. Editor-in-chief Conn reported that two of the 1987 symposium speakers failed to submit manuscripts for their chapters and therefore these were omitted from the volume to avoid delay in publication. He urged that symposium organizers warn authors well in advance that manuscripts must be completed by the time of the meeting. Meeting expenses for symposium speakers are paid with the assumption that acceptable manuscripts will be submitted on time.

The current contract with Plenum Press expires in 1989 with publication of the Iowa City Symposium volume. Plenum appears to be interested in renewal of its contract with PSNA for another five years.

Eric Conn has indicated his intention to retire as PSNA Editor-in-Chief in 1989. The executive committee received suggestions concerning possible new editors from the advisory committee and letters from two volunteers for this position. Helen Stafford was selected and has agreed to serve a 5-year term as editor-in-chief.

Funds were allocated to subsidize travel of students to the Iowa City meeting. Ten awards were granted in amounts ranging from \$50 to \$250 to students from 4 countries at a total cost of \$1600. Award winners are listed elsewhere in this newsletter. Student travel support of \$3,000 has been allocated for the PSNA annual meeting in Vancouver in 1989. There were 13 applicants for this year's best student paper award.

Helen Habermann reported that improvements in the Newsletter's appearance will continue next year with availability of desk top publishing and improved printing capabilities at Goucher College. Using a more print-like type face will make it possible to insert more material per page and to decrease the number of pages per issue. This should reduce the cost per issue sufficiently to offset recent increases in postal rates. The newsletter will continue to be mailed first class to insure the most rapid possible delivery. Please contact the secretary if there have been delays in delivery of your newsletter, or if you wish to make suggestions about changes in the newsletter's content or format.

Ballots were counted at the end of the executive committee meeting. A total of 167 ballots were returned compared to 137 last year. Although this was not quite up to the extrapolated number that the members were challenged to meet this spring, it was considered to be a good return from a smaller membership. (42% return vs. 34% last year). Our president-elect is Jonathan Poulton, and the PSNA treasurer for 1988 to 1991 is Kelsey Downum. The constitutional amendment, concerning clarification of procedures for amending the PSNA constitution, passed by an overwhelming margin (147 for, 3 against and 17 non-voting).

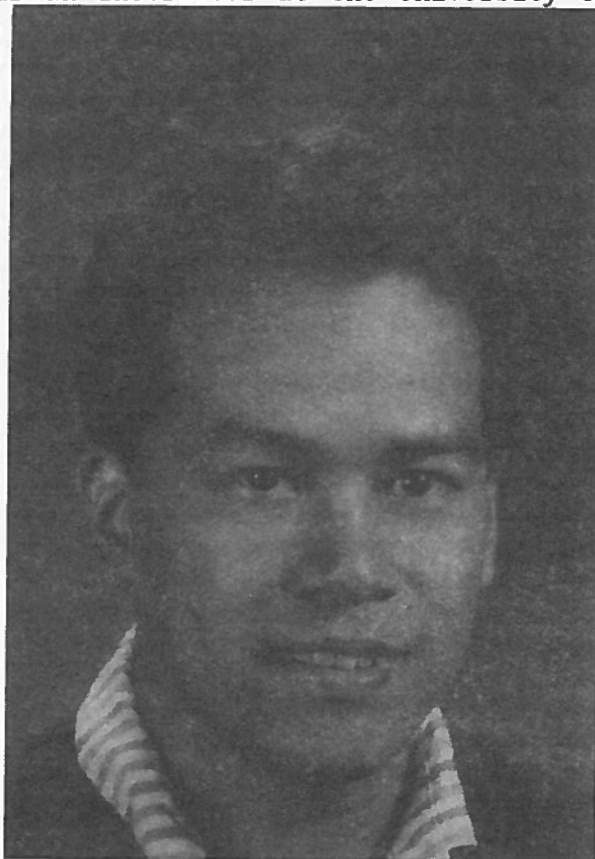
This summarizes matters discussed during a lengthy meeting of the executive committee on June 25, 1988 and a brief meeting with P.J. Lea of the PSE on June 28, 1988.

Respectfully submitted,

Helen M. Habermann

BIOGRAPHICAL SKETCH: RAMON A. RAZAL, STUDENT BEST PAPER AWARD WINNER, 1988 MEETING AT IOWA CITY

RAMON A. RAZAL is currently completing his Ph.D. in Wood Chemistry/Biochemistry at Virginia Polytechnic Institute and State University, Blacksburg, VA. Prior to 1985, he was an instructor at the University of the Philippines at Los Banos, Laguna where he obtained his B.S. in Forest Products Engineering in 1978 and M.S. in Wood Science and Technology in 1983. For his master's thesis, he characterized the extractives of Dipterocarpus grandiflorus Blanco, a widely distributed, but rather refractory commercial timber from tropical Southeast Asia. His present study deals with the structural elucidation of lignin in situ, using a methodology which involves incorporation of specifically labelled carbon-13 precursors into Leucaena leucocephala plant tissue, followed by solid-state C-13 nuclear magnetic resonance spectroscopy (J.C.S. Chem. Commun., in press). Portions of his Ph.D. studies were also spent on lignin biodegradation, and some of this work was published last year (Lewis, N.G., R.A. Razal and E. Yamamoto. 1987. PNAS, 84: 7925-7927). After completion of his Ph.D., he intends to further his interests in plant natural products, particularly medicinals from tropical plants, as well as tannin chemistry.



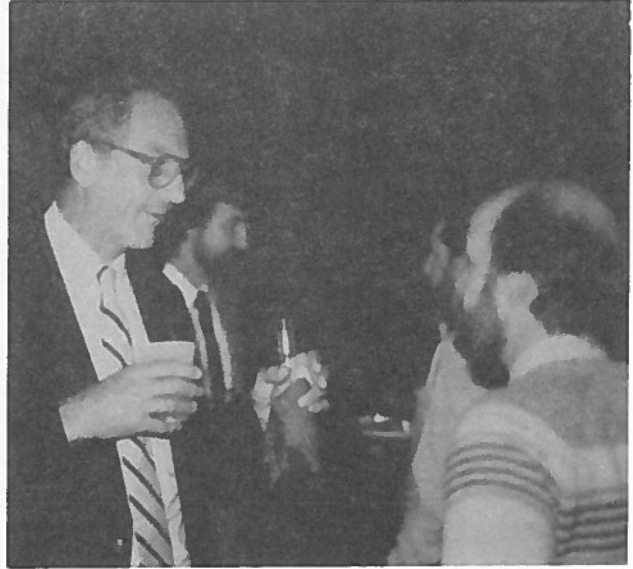
PSNA BROCHURES ENCLOSED: PLEASE DISTRIBUTE TO POTENTIAL MEMBERS!

For the first time, the P.S.N.A. Newsletter is being mailed in an envelope so that copies of a brochure can be enclosed. This is an exploratory version of a long awaited brochure that, we hope, will encourage all those who should be members of the PSNA (and are not) to join.

It is assumed that present members are in the best position to identify and persuade good new members to join. You may find them among your colleagues, students, postdocs, professional acquaintances at other institutions, those from whom you request reprints or those who request reprints from you. Remember that non-members can easily be identified by their absence from the current PSNA membership directory.

If you can use additional copies of the brochure, please call (301)337-6303 or write the secretary. Application forms (in the brochure or inside the back cover of every issue of the newsletter should be mailed to the Treasurer who is eagerly awaiting all those checks and many new names to add to our membership roll.

FIRST ANNUAL PSNA CENTERFOLD :



Discussions in the Natural History Museum



The PSNA Banquet

1988 MEETING IN IOWA CITY



Phytochemists encounter native prairie at Rochester cemetery



The Welcoming Reception,
Iowa Memorial Union



Dinner on the Mississippi River
aboard the "Spirit of Dubuque"

29TH ANNUAL MEETING OF THE PHYTOCHEMICAL SOCIETY OF NORTH AMERICA, 1989

The next annual meeting of the PSNA will be held June 25-30, 1989 on the campus of the University of British Columbia, Vancouver, B.C., Canada. The meeting organizers are G.B.N. Towers and Bruce A. Bohm, both of U.B.C. As in past years, the meeting will consist of contributed paper sessions and a symposium. The 1989 symposium is entitled "Biologically Active Products of the Mevalonic Acid Pathway." Contributed papers are welcome on any aspect of plant chemistry and may be either oral or poster presentations.

The meeting will begin with registration and an evening reception on Sunday, June 25. The symposium sessions have tentatively been scheduled for the mornings of June 26, 27, and 28. Contributed paper sessions will be held during the afternoons of June 26 and 28, and both morning and afternoon of June 29.

The following have accepted our invitation to participate in the 1989 symposium. The titles of their papers are listed.

Dr. Raymond J. Andersen, Departments of Chemistry and Oceanography, University of British Columbia. "The Isolation of Terpenoids with New Carbon Skeletons from Marine Invertebrates."

Dr. Thomas J. Bach, Botanisches Institut II der Universität Karlsruhe. "Regulation of Terpenoid Biosynthesis.":

Dr. Albert Boronat, Unidad de Bioquímica, Facultad de Farmacia, Universidad de Barcelona. "Molecular Cloning and Characterization of Plant 3-Hydroxy-3-methylglutarylcoenzyme-A reductase."

Dr. Rodney Croteau, Institute of Biological Chemistry, Washington State University. "The Mevalonate Pathway in Plants."

Dr. Nikolaus H. Fischer, Dept. of Chemistry, L.S.U., Baton Rouge. "Sesquiterpene Biosynthesis."

Dr. W. David Nes, U.S.D.A., "Control of Sterol and Triterpene Biosynthesis in Plants and its Functional Importance to Developmental Regulation."

Dr. Bernard O. Phinney, Department of Biology, U.C.L.A.. "Recent Studies of Gibberellins."

Dr. Edward Piers, Department of Chemistry, University of British Columbia, "Recent Advances in the Synthesis of Terpenoids."

Dr. Charles A. West, Department of Chemistry, U.C.L.A. "Diterpenoid Phytoalexins: Biosynthesis and Regulation."

Several excursions and social events are planned. Evening events include the welcoming reception on Sunday, June 25, Bar-B-Q on campus, Vancouver harbour and waterfront tour by boat with dinner and the annual banquet. Tuesday afternoon is being left unscheduled so that participants may visit the Museum of Man on the U.B.C. campus (this major repository of

West Coast Indian artifacts, including totem poles, is free on Tuesdays). Other attractions in nearby Vancouver, such as Stanley Park and Aquarium, Granville Island, or Chinatown (with its wide variety of shops, restaurants and impressive formal gardens) might alternatively be explored during this time. Thursday evening will also be free for dinner on the town.

Symposium and contributed paper sessions will be held in the U.B.C. Law lecture facilities which are conveniently close to living quarters in the Gates residences. Dormitory rooms will be available from June 24 through July 1 for those who wish to do more extended sightseeing and/or reduce the cost of airline tickets by staying over Saturday night.

Possible day trips that will be available for Friday, June 30, include a train trip on the "Royal Hudson" to Squamish, a ferry trip to Victoria on Vancouver Island or a ferry trip to Butchart Gardens on Vancouver Island. Details will appear with registration materials in the February PSNA Newsletter.

Funds will be available to provide travel assistance (up to 1/2 the cost of economy air fare) for graduate students presenting oral papers at the 1989 meeting. In addition, an award of \$100 will be presented for the best paper by a graduate student or post doc.

If you would like further information about the 1989 PSNA meeting, please contact:

Dr. G.B.N. Towers
Department of Botany
University of British Columbia
Vancouver, B.C. V6T 1B1, Canada
(604) 228-3338

or Dr. Bruce A. Bohm
Department of Botany
University of British Columbia
Vancouver, B.C. V6T 2B1, Canada
(604) 228-3348

PLANS FOR PSNA MEETINGS: 1990 AND BEYOND

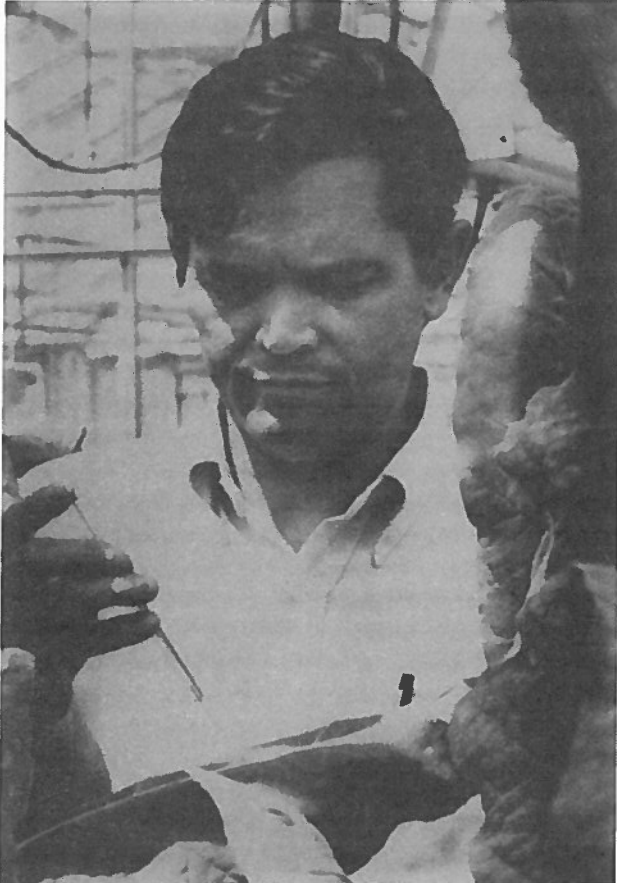
In 1990, the PSNA will meet in Quebec City, Canada with the International Society of Chemical Ecology. The symposium on "Modern Phytochemical Methods" is being organized by N.H. Fischer of Louisiana State University and Jerry McLaughlin of Purdue University. The PSNA and ISCE will hold separate symposia, but contributed papers from both societies will be grouped together by topic. Jeremy McNeil of Laval University will handle local arrangements for both societies in Quebec.

Plans for 1991 are still vague with no decision on either site or symposium topic.

Planning has begun for a joint meeting with the Phytochemical Society of Europe in 1992. P. Lea, incoming president of the PSE met with the PSNA executive committee in Iowa City. It was agreed that a site on the East Coast of the U.S. such as Miami, which would be easily accessible for both PSE members and Latinamerican phytochemists who may wish to attend, was desirable. Possible symposium topics were suggested, but no decisions were made concerning the symposium or the organizational details of the meeting.

GEORGE WAGNER RECEIVES PHILIP MORRIS TOBACCO SCIENCE AWARD

George J. Wagner was selected by Tobacco Science magazine to receive the 1988 Philip Morris U.S.A. Award for Distinguished Achievement in Tobacco Science. The award, presented in early October at the annual Tobacco Chemists Research Conference in Lexington, Ky, cited Wagner's research and its contributions to understanding the physiology and biochemistry of the tobacco plant.



The Philip Morris U.S.A. Award, established in 1967 to recognize outstanding contributions to basic or applied tobacco science by U.S. Residents, consists of a bronze medallion and a cash prize of \$5,000.

Professor Wagner is director of graduate studies in the University of Kentucky's Plant Physiology/Biochemistry/Molecular Biology Program. He is a member of the American Society of Plant Physiologists, the Phytochemical Society of North America (PSNA secretary from 1984 to 1987) and the American Association for the Advancement of Science. After completing his undergraduate and graduate studies at the State University of New York at Buffalo, he was a research associate at the Brookhaven National Laboratory before joining the University of Kentucky faculty in 1977.

NEW PSNA MEMBERS AND THEIR RESEARCH INTERESTS

We welcome the new members listed below. Their research interests, if known, are indicated. All are invited to participate in society business and PSNA meetings.

John A. Attaway
Florida Department of Citrus
P.O. Box 148
Lakeland, FL 33802

Citrus chemistry

Wendy Bauer
72 Price's Trailer Court
Blacksburg, Va 24060

Biochemistry, Plant Metabolism
Secondary Plant Metabolism

Michelle A. Briggs
Department of Entomology
Pennsylvania State University
University Park, PA 16802

James V. Capogreco
Department of Biological Science
Florida State University
Tallahassee, FL 32306

Plant/Insect Interactions

David P. Carew
College of Pharmacy
University of Iowa
Iowa City, IA 52242

Pharmacognosy

Christine A. Catsakis
415 Seminole Drive
Blacksburg, VA 24060

Kaliprasuna Dhara
Department of Forest Products
Virginia Polytechnic Inst. and
State University
Blacksburg, VA 24061

Oxygen and Nitrogen
Heterocycles

Frank Einhellig
Biology Dept.,
Churchill-Haine Lab.
University of South Dakota
Vermillion, SD 57069

Allelopathy, Biochemical
Interactions among Plants

Hector E. Flores
Biotechnology Institute
Pennsylvania State University
University Park, PA 16802

Plant Tissue Culture,
Secondary Metabolism

S.M. Griffith
USDA-ARS
St. Paul, MN 55108

Subhash C. Gupta
Department of Horticulture
Purdue University
W. Lafayette, IN 47907
Nucleic acids

Biosynthesis and Metabolism,
Growth & Development, Proteins,
Non-protein amino acids,
Phenolics, Sulfur compounds,

Ursula Hecht
Biologisches Institut II
Schanzlestrasse 1
D-7800 Freiburg
West Germany

Hoon Huh
1194 Ray Place
St. Paul, MN 55108

Thomas R. Lantzy
Dept. of Forest Products
Virginia Polytech. Inst. &
State University
Blacksburg, VA 24060

Lignification in Plants and
Trees, Natural Products
Chemistry

Victor M. Loyola-Vargas
C.I.C.Y.
Apdo. Postal 87
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Nitrogen Metabolism in
connection with Stress and
Secondary Metabolism

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Nitrogen Fixation and
Metabolism, Enzymology

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Heavy Metal Stress, Physiology

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Mexico

Enzymology of Ammonia
Assimilation in plants under
normal and stressful
conditions

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Hope College
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Phenolic Metabolism,
Allelopathy, Chemical
Communication/Interaction
between Organisms

Thomas Okita
Institute of Biological Chemistry
Washington State University
Pullman, Wa 99164

Primary Metabolism (Polysac-
charides, Proteins) Biotechnology
and Biotransformations, Molecular
Biology, Tissue Culture

Jong M. Park
Vipont Research Laboratories
Plant Biotechnology Institute
110 Gymnasium Road
Saskatoon, Sask. S7N 1Z8, Canada

Plant Secondary Metabolite
Production, Plant Regeneration,
Micropropagation

Bernard O. Phinney
Department of Biology
University of California
Los Angeles, CA 90024

Gibberellins: Isolation,
Biosynthesis, Gene Expression;
Plant Hormones: Physiology &
Mechanisms of Action

Richard J. Petroski
U.S.D.A.
Northern Regional Research Center
1815 N. University
Peoria, IL 61604

Pharmacognosy

David Rhodes
Department of Horticulture
Purdue University
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Nitrogen Metabolism, Plant
Stress Physiology

Anthony M. Rossi Department of Biological Science Florida State University Tallahassee, FL 32306	Insect-Plant Interactions
Brett V. Savary Dept. Entomology & Plant Pathology 205 Ellington, Plant Sciences Bldg. Knoxville, TN 37901	Alkaloids, Biosynthesis and Metabolism, Isolation and Identification of Compounds, Tissue Culture
Arif Hussain Shah College of Pharmacy King Saud University Riyadh 11451, Saudi Arabia	Isolation and Structural Determination of Chemical Constituents of Medicinal Plants
Grace Sirju-Charran Dept. Plant Sci. & Biochemistry The University of the West Indies, St. Augustine Campus Republic of Trinidad and Tobago	Metabolism of IAA in relation to Tubercization and Abscission, Enzymology
Robert D. Slocum Department of Biology Williams College Williamstown, MA 01267	Nitrogen metabolism: Urea Cycle and Polyamine Biosynthesis Regulation
Maurice E. Snook USDA-ARS Russell Research Center P.O. Box 5677 Athens, GA 30613	Chemical aspects of Insect and Disease Resistance in Plants
Thomas K. Soulen Department of Botany 220 Biological Sciences Center University of Minnesota St. Paul, MN 55108	
E. John Staba Unit F-9106, College of Pharmacy College of Pharmacy University of Minnesota Minneapolis, MN 55455	Plant Tissue Culture, Secondary Products
Chanh Ta Plant Research Centre Central Exp. Farm, Bldg. 12 Ottawa, Ontario K1A0C6, Canada	
Pat J. Unkefer Los Alamos National Laboratory Mail Stop C 345 Los Alamos, NM 87545	Nitrogen Metabolism, Plant-Microbe Interactions, Enzymology
Marta Vasquez 7169 N. Fairlane Ct. Baton Rouge, LA 70812	Natural Products

Hugo Vits
921 Washington Ave. S.E.
Minneapolis, MN 55455

Robert D. Williams Plant Cell Culture, Secondary
Dept. of Chemistry & Biochemistry Metabolism
University of Guelph
Guelph, Ontario N1G2W1, Canada

Harry C. Winter Nitrogen Metabolism, Amino Acid
Dept. Biological Chemistry Metabolism in Germination,
University of Michigan Enzymology
Med. Sci. I. M-5312-0606
1301 Catherine Rd.
Ann Arbor, MI 48109

Michael Zoumadakis
Biology Department
McMaster University
Hamilton, Ontario L854K1, Canada

POSITIONS AVAILABLE

MICHIGAN STATE UNIVERSITY. POSTDOCTORAL POSITION IN BIOCHEMICAL MS.
(Beginning Summer/Fall 1988). Research will emphasize development and improvement in desorption ionization techniques for analyses of peptides, complex carbohydrates and other compounds of biochemical interest. This position involves operating supervision of a JEOL HX110 double focusing mass spectrometer. Numerous opportunities exist for collaboration with biochemists, molecular biologists, plant physiologists and other biomedical researchers. Candidate should have proclivity for instrumentation including familiarity with vacuum systems, electronics, and data systems. Salary range \$17K to \$20K, commensurate with credentials. Persons interested in applying for this position should send CV and references to: Prof. J.T. Watson, MSU-NIH, Mass Spectrometry Facility, Department of Biochemistry, Michigan State University, East Lansing, MI 48824-1319. Phone (517) 353-0612.

ARS, NORTHERN REGIONAL RESEARCH CENTER (NRRG), Peoria, IL Postdoctoral Research Associate in the Mycotoxin Research Unit. Postdoctoral fellow needed to join collaborative research project (with Dr. D.T. Wicklow, Mycotoxin Ecology Research, ARS/USDA, Peoria, IL and Dr. Greg Noel, Nematode Laboratory ARS/USDA, Urbana, IL) to examine three-way interactions between seed and root-feeding nematodes, root-infecting fungi and toxigenic biocontrol fungi. The incumbent will investigate the role of fungal secondary metabolites produced by biocontrol fungi in protecting seedlings from root-feeding nematodes. Roots wounded by nematodes are susceptible to plant pathogenic fungi. We plan to contrast the biocontrol capacity of toxigenic vs. nontoxigenic strains, test individual toxins as nematocides, and apply biologically active fractions/compounds directly to seeds as is done with commercial fungicides. Experience required in isolation and structure determination of biologically active plant or fungal secondary metabolites, chemical separation techniques and chemical analytical

techniques. Experience in plant pathology or nematode bioassay procedures is desirable. Appointments are for up to 2 years in duration, generally at a G-11 or G-12 level (\$27,716 to \$33,218). Applicants should contact Dr. Wicklow for an application form and submit it along with OPM Form 1170/17 (list of coursework) or copy of transcript(s), a one-page abstract of Ph.D. Dissertation, list of publications, presentations, honors and awards and a qualifications summary. Application material should be sent to Dr. Donald T. Wicklow, ARS/USDA, NRRC, 1815 N. University Street, Peoria, IL 61604; phone (309) 685-4011 ext. 394. ARS/USDA, NRRC is an equal opportunity employer.

MEETINGS AND PROGRAMS OF INTEREST

UCLA SYMPOSIUM: NEW DIRECTIONS IN BIOLOGICAL CONTROL: Frisco, Colorado, January 20-27, 1989. For further information, contact UCLA Symposia, 2032 Armacost Avenue, Los Angeles, CA 90025. (Tel. 213-207-5042).

UCLA SYMPOSIUM: PLANT GENE TRANSFER: Park City, Utah, April 1-7, 1989. For further information, contact UCLA Symposia, 2032 Armacost Avenue, Los Angeles, CA 90025 (Tel. 213-207-5042).

CENTENNIAL SYMPOSIUM CELEBRATION ON PERSPECTIVES IN BIOCHEMICAL AND GENETIC REGULATION OF PHOTOSYNTHESIS: The Connecticut Agricultural Experiment Station, New Haven, CT, April 5-7, 1989. There is no registration fee and the symposium is open to all who register by February 15, 1989. For further information, contact Dr. I. Zelitch, Department of Biochemistry and Genetics, The Connecticut Agricultural Experiment Stations, P.O. Box 1106, New Haven, CT 06504.

BELTSVILLE SYMPOSIUM XIV: THE RHIZOSPHERE AND PLANT GROWTH: Beltsville, Agricultural Research Center, Beltsville, MD, May 8-11, 1989. For further information, contact Dr. Donald L. Keister, USDA-ARS, Building 011, HH-19, BARC-W, Beltsville, MD 20705.

THE 8TH INTERNATIONAL WORKSHOP ON PLANT MEMBRANE TRANSPORT: Venice, Italy, June 25-30, 1989. For the first circular and other information, please write to Dr. F. Rasi-Caldogno, Organizing Committee, Dipartimento di Biologia, Universita Degli Studi di Milano, Sezione di Fisiologia e Biochimica delle Plante, via Celoria 26, 20133 Milano, Italy.

PHYTOCHEMICAL SOCIETY OF EUROPE: SIGNAL PERCEPTION AND TRANSDUCTION IN HIGHER PLANTS: Toulouse, France, July 9-13, 1989. For further information, contact Dr. R. Ranjeva, Centre de Physiologie Vegetale de l'Universite Paul Sabatier, URA CNRS 241, 118, Route de Narbonne, F-31062 Toulouse, Cedex, France.

NORTH AMERICAN SYMBIOTIC NITROGEN FIXATION CONFERENCE: Department of Genetics, Iowa State University, Ames, Iowa, July 30-August 3, 1989. For further information, call Dr. Alan G. Atherly, (Tel. 515-294-3908).



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