MARCH 1984

24th Annual Meeting of the Phytochemical Society of North America.

"The Biochemical Interactions of Plants with Other Organisms"

July 9th - 13th, 1984

will be held at Boston University and will be organized by the Departments of Biology and Chemistry. Boston University is situated near the center of down-town Boston within easy access of public transport, shops, theatres etc.

The meeting will begin with a reception on the evening of Monday, July 9th in the Student Union at Boston University and will be followed by four morning sessions (10th,11th,12th and 13th) and two afternoon sessions (10th and 11th) of Symposium and Contributed Papers.

The Symposium speakers are as follows:

Arthur Ayers, Harvard University, Cambridge, MA. "Plant detection of pathogens".

Pedro Barbosa, University of Maryland, MD. and James Saunders,USDA,Beltsville, M.D. "Plant allelochemics: lineages between herbivores and their natural enemies"

May Berenbaum, University of Illinois, IL."Allelochemical synergism and antagonism in insect/plant interactions."

Murray Blum, University of Georgia, GA. "Evolutionary strategies evolved by insect herbivores to process plant allelochemicals."

John Bryant,University of Alaska,AL. "Adaptation to resource availability as a determinant of chemical defense strategies in woody plants."

Lee Creasy,New York State College of Agriculture and Life Sciences at Cornell University,NY. "Biochemical responses of plants to fungal attack."

I.J.Misaghi,University of Arizona,AZ. "Biochemical aspects of plant-microbe and microbe-microbe interactions in soil."

David Rhoades,University of Washington,WA. "Pheromonal communication between plants."

Elroy Rice, University of Oklahoma, OK. "An overview of allelopathy."

Anthony Waiss ,Plant Protection Phytochemistry Research Unit,USDA,Berkeley,CA. "Modification of host plant resistance to insects with plant bioregulators."

Contributed papers may be presented either orally or as posters on any subject of plant chemistry either as oral or poster presentations. The main poster session will be on the evening of Tuesday, July 10th.

On the afternoon of Wednesday July,11th two field trips are planned 1) a boat trip round the islands in Boston harbor 2) a chartered bus trip around the main points of historic interest in Boston and then a visit to Lexington and Concord.

The banquet dinner will be on the evening of Thursday, July 12th and will be held at Anthony's Pier Four sea-food restaurant in a room overlooking Boston harbor.

Four $250.00 scholarships will be granted for outstanding papers submitted before March 1st by graduate students or junior faculty

members. Awards will be announced by April 1st, 1984. Application forms are attached.

Members of the Organizing Committee are
Dr Gillian Cooper-Driver, Dept. Biological Sciences,
Dr. Tony Swain, Department Biological Sciences
Dr.R. Karl Dieter, Department of Chemistry
Robert Buchsbaum,Department of Biological Sciences
Thomas Steinharter, Department of Biological Sciences.
Boston University,
Boston,Massachusetts 02215.

If you would like further information concerning this meeting, please contact
Dr Gillian Cooper-Driver,
Department Biological Sciences,
2, Cummington Street,
Boston University,
Boston, MA 02215.
Telephone 617-353-2453
or any of the other menmbers of the Organizing Committee.

BOSTON
has a population of 2,800,000.It lies on Massachusetts Bay and is the capital of the Commonwealth of Massachusetts. Founded in 1630, it was the scene of many events leading to the American Revolution. Most of these are celebrated by following the Freedom Trail through the city - a three mile stretch - from the State House on Boston Common to the USS Constitution (Old Ironsides) in the Charlestown Navy Yard. The Trail passes the famed Faneuil Hall (Cradle of Liberty) and the restored early 19th Century Quincy marketplace filled with shops and restaurants for all tastes. Nearby is the New England Aquarium with its huge central tank (0.2 million gallon - the largest in the world), the waterfront, City Hall and the Old State House still bearing the arms of England.

MUSEUMS
include the Museum of Science: Museum of Fine Arts: Harvard University Museums (including the Glass Flowers): Gardner Museum (art): Fogg Art Museum and many more.

UNIVERSITIES
include eleven major institutions and five other degree granting colleges in the city.

HOSPITALS
are Boston's greatest industry: besides the world renowned Mass General, there are five major hospitals and three Medical Schools (Boston University, Harvard, Tufts).

SPORT
includes, besides various University teams, the Red Sox (baseball), Bruins (ice hockey), Celtics (basketball) and the nearby New England Patriots.

cities include Cambridge, home of Harvard University and M.I.T.: Lexington, the site of the first battle of the Revolution: Salem, of 17th Century witchcraft fame: Concord, with its Old North Bridge (where the shot heard around the world was fired) and many other historic places.

WEATHER

in July can be hot (average temperature 73 F, but highest was 99 F on 7/21/80) and humid (rainfall 2.7 inches).

TRANSPORTATION

is via Logan International Airport, two railroads, five interstate highways and the Port of Boston. The Massachusetts Bay Transport Authority (MBTA or the 'T') provides subway and surface transport in the Boston Area (Detailed routes are described below).

BOSTON UNIVERSITY

is an independent, coeducational, non-sectarian approved institution. It was founded in 1864 and was the first college in the country to admit women and minority students to all its programs. Its present enrollment is 19,500 full time students with a faculty of 2,500. There are sixteen schools and colleges. The Department of Biology is part of the College of Liberal Arts which is responsible for the most substantial part of undergraduate training.

ACCOMODATION

Those people attending the 1984 July meeting of the P.S.N.A. will be housed in the largest of the undergraduate residences, WARREN TOWERS, 700 COMMONWEALTH AVENUE, BOSTON, MA 02215. Telephone number 617-353-3932. This normally houses up to 1500 students and has extensive dining and other facilities. It is however not air conditioned.

There are a large number of reasonably priced hotels and motels in the area a few of which are listed below:

Copley Plaza Copley Square Boston	617-267-5300	Single Double No pool	$105-140 $120-155
Eliot Hotel 370, Commonwealth Avenue, Boston	617-267-1607	Single Double No pool	$60-65 $70-75
Howard Johnson's Fenway 1271, Boylston Street, Boston	617-267-8300	Single Double Pool	$49-69 $59-79
Holiday Inn 1651, Massachusetts Avenue, Cambridge	617-491-1000	Single Double Pool	$61 $68

Howard Johnson's 617-267-3100 575, Commonwealth Avenue, Boston		Single Double Pool	$77 $87
Lenox Hotel and Motor Inn 617-536-5300 710, Boylston Street, Boston		Single Double No pool	$65-90 $80-105
Midtown Motor Inn 617-262-1000 220, Huntington Avenue, Boston		Single Double Pool	$69 $74
Ritz-Carlton 617-536-5700 15, Arlington Street, Boston		Single Double No pool	$110-160 $130-160
Travel Lodge 617-277-1200 1200, Beacon Street, Brookline		Single Double No pool	$58 $68

Guest Houses

Anthony's Townhouse 617-566-3972 1085, Beacon Street, Brookline		Single Double No pool	$25 $35

All rates are for one night only and are subject to change. Prices quoted do not include Massachusetts tax.

Lectures, poster sessions and exhibitions will be held a three minute walk away in the SCHOOL OF NURSING, 635 COMMONWEALTH AVENUE.

HOW TO GET THERE

1. There are adequate taxi services in Boston. If you come by air, rail or bus, you will find a rank nearby your place of arrival. Ask for "WARREN TOWERS, BOSTON UNIVERSITY, 700 COMMONWEALTH AVENUE" and leave the cab-driver to do the rest. Prices from the airport should be about $12, less from the rail or bus stations.
2. Taking the subway: the 'T'. From all starting points your destination is 'BOSTON UNIVERSITY - EAST CAMPUS' (this is directly opposite Warren Towers) on the GREEN LINE which goes westwards from the city center to 'BOSTON COLLEGE' (there are three other GREEN LINE rail tracks to different destinations - 'ARBORWAY' (DO NOT TAKE): 'CLEVELAND CIRCLE' and 'RIVERSIDE' - these latter two will take you within 10 minute walk of Warren Towers if alight at KENMORE SQUARE and then turn away from the city and keep to the left side of Commonwealth Avenue for about 700 yards to '700' and you are there.) The charge on the 'T' is 75 cents or one token.
3. Where to get on the 'T'

(a) From Amtrak, South Station (the 'T' is the same), take the RED LINE (to Harvard) to PARK STREET and change to GREEN LINE to BOSTON COLLEGE (see 2).

(b) From Trailways Bus Station, cross road to SOUTH STATION as in 3(a) and (2).

(c) From Greyhound Bus Station, a 5 minute walk to ARLINGTON on the GREEN LINE. Take OUTBOUND to BOSTON COLLEGE (see 2).

(d) From Logan International Airport, take the airport circular bus (50 cents) to 'AIRPORT' Station 'BLUE LINE' and catch INBOUND train (to BOWDOIN) and change to GREEN LINE at 'GOVERNMENT CENTER', then wait for train to BOSTON COLLEGE (see 2).

4. By Car

(a) From the West Route 90 Mass Pike (Interstate). Take Exit 18 (Exits 19 and 20 coincide so make sure you take the right one) - pay toll and get onto STORROW DRIVE (Eastbound - to Boston). Then take exit which says KENMORE SQUARE, ROUTE 1. Bear right to traffic signals then as in 4b.

(b) From the South Route 95 (Interstate). Turn right (BRAINTREE, SOUTH SHORE) on Route 128/Route 93 (same name) when you get to Exit 69, take left BOSTON (right to Plymouth). This puts you on the South East Expressway (which is undergoing extensive repairs so avoid rush hours). Go on until you see exit to Logan Airport (IGNORE IT) and take second exit after this marked Back Bay, STORROW DRIVE, AND CAMBRIDGE,

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Follow road bearing left at Y fork (Storrow Drive) and into underpass and then right at second Y fork. Nor you are on Storrow Drive by the side of the Charles River. Take it to exit which has ROUTE 1, KENMORE SQUARE. 50 yards after exit, keep right to traffic signals: here take right into kenmore (don't take minor Y right after turing). In the squate keep left (2 traffic signals) and you're on COMMONWELTH AVENUE. Warren towers is the three soried yellow canopied building 660 yards up on the LEFT. (c) From the North Take 3, 93 or 95 to Rt. 128 and if on 3 or 95 turn left or right respectively to take you to 93S (on 93S go straight on). Take 93 until you have almost finished wth the double decker bridge over the Charles River and look for exit ROUTE 1 and STORROW DRIVE. Then as for 4(b). N.B. If you are coming by car LET US KNOW, as only a limited amount of parking is available at the university.

All meetings will be held in the School of Nursing.

Monday evening	July 9th, 1984
5.00 - 10.00 pm	Registration
7.00 - 10.00 pm	Reception at the Faculty Club, Boston University
Tuesday morning	July 10th, 1984
8.00 - 12.00 am	Registration
9.00 - 9.10 am	Opening address
9.10 - 10.00 am	Symposium speaker - Arthur Ayers
10.00 - 10.50 am	" " - I.J. Misaghi
10.50 - 11.10 am	Coffee break
11.10 - 12.00 pm	Symposium speaker - Lee Creasy
12.00 - 12.15 pm	Discussion of papers
12.15 - 1.45 pm	Lunch
Tuesday afternoon	
2.00 - 3.15 pm	Contributed papers
3.15 - 3.30 pm	Tea or coffee break
3.30 - 5.00 pm	Contributed papers
7.30 - 9.30 pm	Poster sessions
Wednesday morning	July 11th, 1984
9.00 - 9.50 am	Symposium speaker - Pedro Barbosa and James Saunders
9.50 -10.40 am	" " - May Berenbaum
10.40 -11.00 am	Coffee break
11.00 - 11.50 am	Symposium speaker - Murray Blum
11.50 - 12.40 pm	" " - Anthony Waiss
12.40 - 1.00 pm	Discussion of papers
1.00 - 2.00 pm	Lunch
Wednesday afternoon	Excursions and trips
Thursday morning	July 12th, 1984
9.00 - 9.50 am	Symposium speaker - John Bryant
9.50 - 10.40 am	" " - David Rhoades
10.40 - 11.00 am	Coffee break
11.00 - 11.50 am	Symposium speaker - Elroy Rice
11.50 - 12.10 pm	Discussion of papers
12.10 - 2.00 pm	Lunch
Thursday afternoon	
2.00 - 3.15 pm	Contributed papers
3.15 - 3.30 pm	Tea and coffee
3.30 - 5.00 pm	Contributed papers
7.30 pm	Annual Society Banquet and Awards Presentation
Friday morning	July 13th, 1984
9.00 - 10.45	Contributed papers
10.45 - 11.00	Coffee
11.00 - 12.00	Contributed papers
	Closing address

ABSTRACT FORM

24th Annual Meeting of the Phytochemical Society of North America
Boston University, Boston, MA, USA, July 9 - 13, 1984

Members and nonmembers are invited to present a paper(s) at this meeting in the contributed paper session or Poster Session on any topic of phytochemical interest.

1. Abstracts should fit into the block space given below. Leave the top portion of the box blank.
2. The form below or a facsimile should be used. Since they will be reproduced directly, they should be well prepared and any structure should be neatly drawn.
3. a) The title should be CAPITALIZED.
   b) Locations for authors should follow names if multiple authors are at different locations. Underscore the author who will present the paper.
   c) For uniformity, elite type is preferred. Use single spacing and fill the block to its maximum.
4. Abstracts should be submitted by May 1, 1984, NOTE EARLY DUE DATE. Abstracts will be published in the PSNA Newsletter.
5. Mail the original and one copy to: 1984 PSNA Symposium, c/o Dr. Gillian Cooper-Driver, Department of Biological Sciences, 2 Cummington Street, Boston University, Boston, MA 02215 (617) 353-2453.
6. Presentation format: Oral (15 min.)_____ Poster_____
   Projection_____ requirements: 2"x2" Overhead_____
   Chalkboard_____.

Contributed papers may be presented either orally or as posters and can be on any topic of phytochemical interest, please check a category:

_____ 1) Papers relating to the Sympoisum.
_____ 2) Isolation and identification of compounds
_____ 3) Chemotaxonomy
_____ 4) Chemical ecology
_____ 5) Enzymology
_____ 6) Biosynthesis and metabolism
_____ 7) Localization
_____ 8) Molecular Biology
_____ 9) Other

Interim Financial Report
1 July 1983 - 14 September 1983

Receipts	
Membership dues	$516.34
Interest (Savings Acct)	16.00
	$532.34

Expenditures	
1983 Annual Meeting (EC Travel)	$1,038.42
Mailing Lists	32.00
Foreign Exchange Debit	1.03
	$1,071.45

Summary	
Receipts	$ 532.34
Expenditures	1,071.45
Net Loss	$ 539.11

Assets - 1 July 1983	
Checking	$ 4,684.17
Savings	25,572.09
Total	$30,256.26

Assets - 14 September 1983	
Checking	$ 3,628.72
Savings	26,088.43
Total	$29.717.15

Interim Financial Report
14 September 1983 - 31 December 1983

Receipts	
Membership dues	$ 544.00
Royalties	7.69
Mailing lists	90.00
Refund from Tucson Meet.	541.63
Interest (Savings)	567.84
Interest (Savings)	154.64
	$1,905.80

Expenditures	
1983 Annual Meeting (EC Travel)	$165.62
Mailing lists	41.60
Auditor	50.00
Treasurer Expenses	142.32
Secretary Expenses (Newsletter)	400.00
	$799.54

Summary	
Receipts	$1,905.80
Expenditures	799.54
Net Gain	$1,106.26

Assets - 14 September 1983	
Checking	$ 5,967.15
Savings	23,750.00
Total	$29,717.15

Assets - 31 December 1983	
Checking	$ 7,073.41
Savings	23,750.00
Total	$30,823.41

Phytochemical Society of North America
Annual Meeting, Tucson 1983

Total Income	
Registration	$ 6,017.50
USDA Grant	5,000.00
PSNA	958.37
New Memberships	76.00
Bank Interest	88.68
Total	$12,140.55

Total Expenses	
Conference Dept. (Including banquet & excursion)	$ 5,906.83
General Expenses (publicity, postage, typing)	1,165.05
Travel Awards	750.00
Speakers' Travel Expenses	3,474.67
Honoraria (5)/10-year memberships (4)	844.00
	$12,140.55

Respectively Submitted,
Jonathan Poulton
Treasurer, PSNA

UPCOMING MEETINGS OF INTEREST TO PHYTOCHEMISTS

IOPB 1986, SYMPOSIUM in Zurich, Switzerland - The International Organization of Plant Biosystematists will hold a Symposium in Zurich, Switzerland, July 13-18, 1986, entitled "Differentiation Patterns in Higher Plants." In addition to invited speakers, poster sessions will be accommodated. Short scientific excursions are also being planned. For information, write to the Chairperson, Dr. Krystyna Urbanska, Geobotanisches Institut, E.T.H., 38 Zurichbergstrasse, CH-8044 Zurich, Switzerland.

Third Annual Symposium - Plant Biochemistry and Physiology - April 4, 5 and 6, 1984, University of Missouri-Columbia. The Interdisciplinary Program in Plant Biochemistry and Physiology of the University of Missouri-Columbia is hosting its annual symposium on selected topics in Plant Biochemistry-Physiology. The Symposium begins at 1:00 p.m., Wednesday, April 4th and continues to noon on April 6th. The Symposium will be held at the University of Missouri-Columbia Campus at the Memorial Union. Contact: Doug Randall, Biochemistry Dept., 211 Chemistry Bldg., UMC, Columbia, MO 65211

FIRST ANNUAL MEETING - MID-ATLANTIC PLANT MOLECULAR BIOLOGY SOCIETY, October 18 and 19, 1984. The MAPMBS has been established to hold annual meetings, workshops and seminars in the mid-Atlantic region to promote the exchange of information and techniques in the area of plant molecular biology. The 1st annual meeting will be held at the Beltsville Agricultural Research Center, Beltsville, MD and will include symposium speakers, oral presentations and poster sessions. We hope to attract regional scientists within driving distance of Washington, DC-Baltimore to join our society and attend our first meeting. MAPMBS membership costs $5 per year. We anticipate registration for members for the first meeting to cost approximately $10. If you are interested in joining MAPMBS or attending the 1st meeting October 18 and 19, 1984, please fill our and return the bottom portion.

Name_____ Tentatively, I am interested in presenting:
Affiliation_____ ____ a short talk
Address_____ ____ a poster
_____ ____ a Symposium talk
City_____
State_____Zip_____ General area of research:
Telephone_____ _____
_____

Mail to: Dr. Ben Matthews
USDA, ARS
Tissue Culture and Molecular Biology Lab.
Bldg. 011A, Rm. 116
Beltsville, MD 20705 ___$5 Membership fee enclosed
Make checks payable to MAPMBS

Beltsville Symposia in Agricultural Research IX - Frontiers of Membrane Research in Agriculture - May 20-24, 1984. General Topics of symposia are: Membrane Structure & Function, Membrane Manipulation, Membrane Function in Nutrition & Health, Nutrient Absorption & Transport, Energy Conversion in Membranes, Growth & Reproduction, Membrane Dysfunction Under Stressed Conditions, Membranes & Toxins. In addition, contributed poster paper's are invited. Contact: Dr. M. Christiansen, Beltsville Symposium IX, USDA, Bldg. 001, Rm. 206, Beltsville, MD 20705.

SYMPOSIUM - PROPAGATION OF HIGHER PLANTS THROUGH TISSUE CULTURE, III. DEVELOPMENT AND VARIATION, September 9-14, 1984, University of Tennessee, Knoxville, Contact: Dr. Karen W. Hughes, Dept. of Botany, University of Tenn., Knozville, Tenn., 37996-1100.

CHEMRAWN III WORLD CONFERENCE ON "RESOURCE MATERIAL CONVERSION TO MEET FUTURE NEEDS, (BIO-) CHEMICAL PROCESS BRIDGES" This Conference, sponsored by the International Union of Pure and Applied Chemistry and the Royal Netherlands Chemical Society, will be held on 25-29 June, 1984, at the Congress Centre, The Hague, The Netherlands. Chemrawn III (Chemical Research Applied to World Needs) is the third in a series of international meetins designed by IUPAC to identify and study world needs for which chemical science and technology can contribute to a solution. The central theme of the conference is the flexibility in chemical processing to bridge changing resources and world needs. Lectures will be given by invited speakers and an open poster session is envisaged. Further information on the Congress may be obtained from the Congress Bureau: QLT Convention Services, Keizersgracht 792, 101/EC Amsterdam, The Netherlands.

First National Meeting of International Society of Chemical Ecology, Inc. to be held June 10-13, 1984 at the University of Texas at Austin, TX. The meeting will feature both symposia and contributed papers. Topics for the Symposia are as follows: 1) Chemicals in communication systems, 2) Chemicals in offensive, defensive, and competitive interactions, 3) Evolution of Chemical interactions, 4) Ecologcal chemistry. For information contact: Dr. Larry Gilbert, Zoology Dept., Univ. of Texas at Austin, Austin, TX 78712.

Items of Interest to Phytochemists:

IOPB NEWSLETTER - The International Organization of Plant Biosystematists has restablished the IOPB Newsletter and Issue No. 1 (New Series) has just been published. The IOPB Newsletter is sent free to all members of IOPB. Membership in IOPB is for the period 1983-1987 and is U.S. $25. For membership application form write to the Secretary-Treasurer, IOPB, Dr. Liv Borgen, Botanical Garden and Museum, Trondheimsveien 23B, Oslo 5, Norway, or the President, IOPB, Dr. W. F. Grant, Department of Plant Science, Box 2182, Macdonald College, McGill University, Ste. Anne de Bellevue, Quebec, Canada H9X 1CO. Contributions to the IOPB Newsletter for an international audience, including requests for material, items of research interest, notices of meetings, etc., may be sent by anyone to the Editor, Dr. Krystyna Urbanska, Geobotanische Institut, E.T.H., Zurichbergstrasse 38, CH-8044 Zurich, Switzerland.

RECENT PUBLICATIONS OF INTEREST: Annual Proceedings of the Phytochemical Society of Europe Vol:23 - The Genetic Manipulation of Plants - its application to agriculture - The volume contains symposia from 13 leading workers in the field of Plant Molecular Biology. Vol:24 - Membranes & Compartmentation in the regulation of Plant functions. This volume contains 19 speakers on wide-ranging studies of the roles of membranes within plant cells. Vol:23 $45.00. Vol:24 $70.00. Contact: Oxford Journals Dept., Walton Street, Oxford OX2 6DP, United Kingdom.

JUNE 1984

24th Annual Meeting of the Phytochemical
Society of North America
"The Biochemical Interactions of Plants
with other Organisms".
July 9th - 13th, 1984

All meetings will be held in the Center for Science and Engineering, 590 Commonwealth Ave.

Monday Evening	July 9th, 1984.
5:00-10:00 pm.	Registration at Warren Towers - 700 Commonwealth Ave.
7:00-10:00 pm.	Reception in East Balcony. George Sherman Union - 775 Commonwealth Avenue, second floor, Boston University.
Tuesday morning	July 10th, 1984
8:00-12:00 am.	Registration - front foyer - Science Center.
8:50- 9:00	Opening address

Plant - Fungal and Plant - Plant Interactions Moderator - Tony Swain, Boston University

9:00- 9:50	Arthur Ayers, Harvard University "Plant detection of pathogens."
9:50-10:40	Yigal Elad, Colorado State University and I.J. Misaghi, University of Arizona "Biochemical aspects of plant-microbe and microbe-microbe interactions in soil."
10:40-11:00	Coffee
11:00-11:50	Lee Creasy, Cornell University "Biochemical responses of plants to fungal attack."
11:50-12:40	Elroy Rice, University of Oklahoma "An overview of allelopathy."
12:40- 1:00	Discussion of Symposium papers
1:00- 2:00	Lunch
Tuesday afternoon Contributed papers	Moderator - Karl Dieter, Boston University
2:00- 2:15	W.A. Ayer, Y. Hoyana, S. Pedras and I. van Altena "Metabolites of Gremmeniella abeitina (Scleroderris canker)."
2:15- 2:30	W.A. Ayer, L.M. Browne, M.C. Feng, H. Orszanska, H. Saeedi-Ghomi and G. Lee, "Metabolites of the blue strain fungus complex associated with the mountain pine beetle problem."
2:20- 2:45	K.C. Spencer, E. Rodriquez and A. Gibson "The chemistry of the Pachycereeae and the yeast-cactus-Drosophila coevolved system."

2:45- 3:00 A.P. Drew
"Comparitive inhibition of black cherry growth by groundflora of the Allegheny uplands."

3:00- 3:15 A.R. Gilmore
"Allelopathic effects of giant foxtail on loblolly pine seed."

3:15- 3:30 Tea

3:30- 3:45 B. Zhang and C.S. Tang
"Allelochemical sphere of germinating seeds."

3:45- 4:00 U. Blum, B.R. Dalton and J. Shann
"Effects of various mixtures of ferulic acid and some of its microbial metabolic products on cucumber leaf expansion and dry matter in nutrient culture."

4:00- 4:15 Break for discussion

Contributed papers
Chemotaxonomy

4:15- 4:30 K.R. Downum, D.J. Keil and E. Rodriquez
"Distribution of acetylenic thiophenes in the Pectidinae (Heliantheae-Asteraceae)."

4:30- 4:45 K.C. Spencer and D.S. Seigler
"Cyanogenic glycosides of Carica papaya and its phylogenetic position with respect to the Violales and Capparales."

4:45- 5:00 M.E. Snook and O.T. Chortyk
"The polyphenols of the species Nicotiana."

5:00- 5:15 S. Asen
"Flavonoid chemical markers as an adjunct to cultivar identification."

5:15- 5:30 B. Burke
"The genus Amyris: a dichotomy of classification."

7:30- 9:30 Poster sessions
Symposium topics.

E. Bell and D. Cheney
"Food preferences and phenol content of some intertidal New England seaweeds."

B. Smithson and D. Cheney
"An ecological study of phenolics in the intertidal brown alga Fucus."

G. Bourque, J.T. Arnason, W. Orr and C. Madhosingh
"Photosensitization of plant pathogen Fusarium culmorum by phenylheptatriyne, a secondary metabolite, from species in the Asteraceae."

D.J. Robeson and G.A. Strobel
"Zinniol-induced chlorophyll retention in barley: the selective action of a non host-specific phytotoxin."

J.C. Steffens and D.J. Robeson
"Identification of a phytotoxin from Pyrenochaeta terrestris as secalonic acid A."

S. Brenner and J. Romeo
"Fungicidal activity of nonprotein imino acids from Calliandra."

F.S. Chew and S.P.Courtney
"Plant density variation limits herbivory."
C.G. Jones, T.A. Hess, D.W. Whitman,
M.S. Blum and P. Silk
"The origin and significance of idiosyncratic variation in the chemical defenses of a generalist grasshopper."
P. Molgaard, L Brimer, and H. Ravn
"Caffeic acid esters in Plantago."
T.W. Kimmerer
"Synthesis of phenolic compounds by Populus deltoides Bartr. Leaves in response to stress and "pheremonal" signals."

Isolation of Secondary Compounds and Identification

B.N. Meyer, M.E. Wall, M.C. Wani and
H.L. Taylor
"Plant antitumor agents. 21. Flavones, coumarins and an alkaloid from Sargentia greggii."
D. Strang and T. Robinson
"Small peptides in Lupinus spp.
B. Dalton, S. Weed and U. Blum
"The effectiveness of sterile soils in altering the recovery of four commonly identified phenolic acids."

T.P. Steinharter, G.A. Cooper-Driver and
G.J. Anderson
"A comparison of chromatographic techniques for the isolation of flavonoids from Solanum species."

Enzymology/Biosynthesis, Metabolism/Other

M.R. Pishak and D.L. Gustine
"Mechanisms for synthesis of 3-nitropropanoyl -D-glucopyranoses in Coronilla varia L."
M. Jay, V. De Luca and R.K. Ibrahim
"Purification and kinetics of a flavonol 8-O-methyltransferase from Lotus corniculatus."
S.S. Martin
"Inactivation of polyphenol oxidase of Beta vulgaris."
R.A. Baker and J.H. Tatum
"Formation and phytotoxicity of naphthoquinones from Fusaria.
P.M. Bradley, F. El-Fiki and K.L. Giles
"The effects of putrescine on somatic embryogenesis of Daucus carota as examined by two-dimensional electrophoresis."
P.G. Kadkade
"Influence of cultural conditions of glycoalkaloid formation in Solanum acculeatissimum tissue cultures."
P.G. Kadkade
"Growth and steroidal sapogenin production in tissue cultures of Dioscorea species."

Wednesday morning July 11th, 1984

Plant - Insect Interactions - Moderator - Dr. Francis Chew, Tufts University

9:00- 9:50	Pedro Barbosa, University of Maryland and James Saunders USDA Beltsville "Plant allelochemics: lineages between herbivores and their natural enemies."
9:50-10:40	May Berenbaum, University of Illinois "Allelochemical synergism and antagonism in insect/plant interactions."
10:40-11:00	Coffee break
11:00-11:50	Murray Blum, University of Georgia "Evolutionary strategies evolved by insect herbivores to process plant allelochemicals."
11:50-12:40	Isao Kubo, University of California-Berkeley "Multichemical insect and fungal resistance in plants."
12:40- 1:00	Discussion of Symposium papers
1:00	Excursions - Boat trips

Wednesday evening Moderator - Gillian Cooper-Driver Boston University

Contributed papers

7:30-7:45	M.D. Bowers and G. Puttick "The effects of different iridoid glycosides on specialist and generalist insects."
7:45- 8:00	M.B. Isman "Toxicity and tolerance of sesquiterpene lactones in the migratory grasshopper."
8:00- 8:15	C.N. Koller, D.L. Dahlman and W.J. Mattson "Variation in nitrogen and condensed tannin in a native stand of balsam fir with reference to spruce budworm."
8:15- 8:30	M.E. Montgomery "Is the effect of tannins on gypsy moth caterpillars digestion inhibition?"
8:30- 8:45	Break for discussion
8:45- 9:00	G.M. Puttick and J.P. Glyphis "Consumption and utilization of oaks by the Californian oak moth Phryganidia californica."
9:00- 9:15	D.E. Champagne, J.T. Arnason, B.J.R. Philogene and J. Lam "Phototoxic effects of natural polyacetylenes and thiophenes on insect herbivores."
9:15- 9:30	J.T. Arnason, B.J.R. Philogene and P. Morand "Evaluation of alpha-terthienyl as a control agent for mosquito larva."
9:30- 9:45	D.G. McLachlan, J.T. Arnason and J. Lam "Mechanism of photosensitization by polyacetylenes and thiophenes from the plant family Asteraceae."
9:45-10:00	A.M. Gawienowski "Plant and mammalian hormone interactions."

Thursday July 12th, 1984

Plant - Animal Interactions : Plant communication- Moderator
Dr. R.L. Mansell, University of South Florida

9:00- 9:50 John Bryant, University of Alaska
"Adaptation to resource availability as a determinant of chemical defense strategies in woody plants."

9:50-10:40 David Rhoades, University of Washington
"Pheromonal communication between plants."

10:40-11:00 Discussion of Symposium papers

11:00-11:15 Coffee break

Contributed papers

11:15-11:30 J. Gershenzon and T.J. Mabry
"The effect of artificial defoliation on the sesquiterpene lactone content of Helianthus maximiliana."

11:30-11:45 D.L. Marks
"Chemical determinants of rhesus monkey food choice."

11:45-12:00 M. Bilgener, K. Glander and T. Swain
"Chemical correlates of howler monkeys' food choice."

12:00-12:15 F.D. Provenza and J. Malechek
"Diet selection by domestic goats browsing blackbrush: importance of primary and secondary plant compounds."

12:15-12:30 R. Buchsbaum and J. Wilson
"Seasonal changes in the diet of Canada geese: the role of marsh plant chemistry."

12:30- 1:45 Lunch

Isolation and Identification/Biosyntheses, Metabolism - Moderator
Dr. P. LeQuesne, Northeastern University

Contributed papers

1:45- 2:00 B. Timmermann and T. Mabry
"Sulfated flavonoids: A novel class of sulfur compounds in Brickellia (Asteraceae)."

2:00-2:15 D. Barron, S. Hadjis, L. Colebrook, B. Timmermann, and R. Ibrahim.
"A novel sulfated biflavonol and a flavonol sulfotransferase from Flaveria chloraefolia."

2:15- 2:30 J. Wilson
"Characterization of vascular plant material in sediments of Buzzards Bay, MA."

2:30- 2:45 N. Le-Van and S.J. Wratten
"Compound 30.4B and C, further novel 1,4-Benzoxazin-3-one glucosides from corn (Zea mays)."

2:45- 3:00 N. Le-Van and S.J. Wratten
"Application of 2D-NMR and heteronuclear multipulse dept technique in the structural determination of new 1,4-Benzoxazin-3-one derivatives."

3:00- 3:15 J. Synder
"Structures of robustadials A-D isolated from

the leaves of Eucalyptus robusta."

3:15- 3:30 Tea

3:30- 3:45 P.A. Lizotte and J.E. Poulton
"Identification of the cyanogenic glycoside and partial characterization of vicianin hydrolase from Davallia trichomanoides Blume."

3:45- 4:00 G.A. Barthe and R.L. Mansell
"Changes in limonin and naringin during callus initiation and plant regeneration in Citrus."

4:00- 4:15 G.J. Wagner and C. Keene
"Radiolabeling of trichome exudate diterpenes in tobacco leaf petioles."

4:15- 4:30 C. Grunwald
"Sitosterol and stigmasterol biosynthesis in tobacco seedlings."

4:30- 4:45 D. Barron and R. Ibrahim
"Synthesis of substituted cinnamoyl CoA esters as substrates for a chalcone synthase from Chrysosplenium americanum."

4:45- 5:00 S.A. Sparace and J.B. Mudd
"Studies on the biosynthesis and metabolism of the pyrenocines in cultures of the onion pink root pathogen, Pyrenochaeta terrestris."

5:00- 5:15 C.W.W. Beecher and W.J. Kelleher
"Biosynthetic relationships of the protoberberine alkaloids."

5:15- 6:00 Annual General Meeting

Friday morning July 13th, 1984

Enzymology/Localization/Other - Moderator - Dr. E. Conn, University of California-Davis

Contributed papers

9:00- 9:15	G.W. Kuroki and J.E. Poulton "The characterization of amygdalin hydrolyzing enzymes in Prunus serotina seeds."
9:15- 9:30	E.E. Stinson and R.A. Moreau "Purification and characterization of an AOH-methyltransferase from Alternaria tenuis."
9:30- 9:45	L.A. Pelosi, A. Rother, and J.M. Edwards "Lysine decarboxylase in tissue cultures of Heimia salicifolia."
9:45-10:00	R. Suetfeld "Metabolism of thiphene derivatives in Tagetes patula seedlings."
10:00-10:15	R.W. Durst and W.D. Loomis "Substitution of germanium for boron in suspension-cultured carrot cells."
10:15-10:30	H. Svenningsson, M. Svenningsson and C. Liljenberg "Water deficit reactions in rape seedlings."
10:30-10:45	Coffee
10:45-11:00	G. Hrazdina and G.J. Wagner "Synthesis of flavonoids on endoplasmic reticulum associated enzyme complexes."
11:00-11:15	J. Shann and U. Blum "Uptake of ferulic acid and p-hydroxybenzoic acid by intact and excised roots of cucumber seedlings."
11:15-11:30	S.S. Martin and L.L. Hoefert "A new technique for glucosinolate analysis."
11:30-11:45	A. Koul and C. Nozzolillo "Developmental aspects of flavonoids in lentils (Lens esculenta)."
11:45-12:00	I. Ockenden and J.N.A. Lott "Relationship between seed size and calcium content in some members of the genus Cucurbita."
12:00-12:15	Closing speech

HOW TO GET THERE

1. There are adequate taxi services in Boston. If you come by air, rail or bus, you will find a rank nearby your place of arrival. Ask for "WARREN TOWERS, BOSTON UNIVERSITY, 700 COMMONWEALTH AVENUE" and leave the cab-driver to do the rest. Prices from the airport should be about $12, less from the rail or bus stations.

2. Taking the subway: the 'T'. From all starting points your destination is 'BOSTON UNIVERSITY - EAST CAMPUS' (this is directly opposite Warren Towers) on the GREEN LINE which goes westwards from the city center to 'BOSTON COLLEGE' (there are three other GREEN LINE rail tracks to different destinations - 'AREORWAY' (DO NOT TAKE): 'CLEVELAND CIRCLE' and 'RIVERSIDE' - these latter two will take you within 10 minute walk of Warren Towers if alight at KENMORE SQUARE and then turn away from the city and keep to the left side of Commonwealth Avenue for about 700 yards to '700' and you are there.) The charge on the 'T' is 75 cents or one token.

3. Where to get on the 'T'

(a) From Amtrak, South Station (the 'T' is the same), take the RED LINE (to Harvard) to PARK STREET and change to GREEN LINE to BOSTON COLLEGE (see 2).

(b) From Trailways Bus Station, cross road to SOUTH STATION as in 3(a) and (2).

(c) From Greyhound Bus Station, a 5 minute walk to ARLINGTON on the GREEN LINE. Take OUTBOUND to BOSTON COLLEGE (see 2).

(d) From Logan International Airport, take the airport circular bus (50 cents) to 'AIRPORT' Station 'BLUE LINE' and catch INBOUND train (to BOWDOIN) and change to GREEN LINE at 'GOVERNMENT CENTER', then wait for train to BOSTON COLLEGE (see 2).

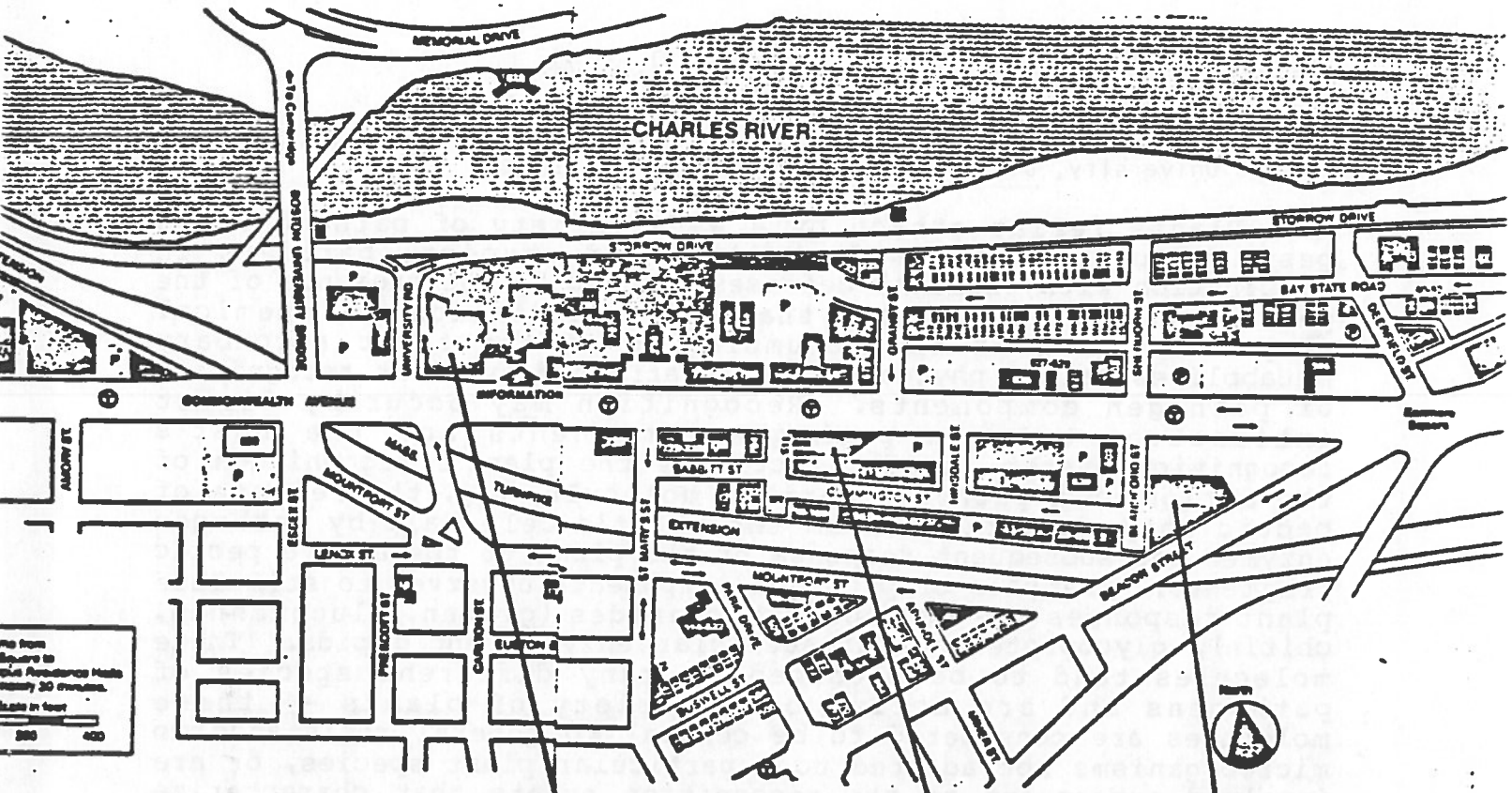
4. By Car

(a) From the West Route 90 Mass Pike (Interstate). Take Exit 18 (Exits 19 and 20 coincide so make sure you take the right one) - pay toll and get onto STORROW DRIVE (Eastbound - to Boston). Then take exit which says KENMORE SQUARE, ROUTE 1. Bear right to traffic signals then as in 4b.

(b) From the South Route 95 (Interstate). Turn right (BRAINTREE, SOUTH SHORE) on Route 128/Route 93 (same name) when you get to Exit 69, take left BOSTON (right to Plymouth). This puts you on the South East Expressway (which is undergoing extensive repairs so avoid rush hours). Go on until you see exit to Logan Airport (IGNORE IT) and take second exit after this marked Back Bay, STORROW DRIVE, AND CAMBRIDGE,

Follow road bearing left at Y fork (Storrow Drive) and into underpass and then right at second Y fork. Nor you are on Storrow Drive by the side of the Charles River. Take it to exit which has ROUTE 1, KENMORE SQUARE. 50 yards after exit, keep right to traffic signals: here take right into kenmore (don't take minor Y right after turing). In the squate keep left (2 traffic signals) and you're on COMMONWELTH AVENUE. Warren towers is the three soried yellow canopied building 660 yards up on the LEFT. (c) From the North Take 3, 93 or 95 to Rt. 128 and if on 3 or 95 turn left or right respectively to take you to 93S (on 93S go straight on). Take 93 until you have almost finished wth the double decker bridge over the Charles River and look for exit ROUTE 1 and STORROW DRIVE. Then as for 4(b). N.B. If you are coming by car LET US KNOW, as only a limited amount of parking is available at the university.

Boston University and Surroundings



George Sherman Union
775, Comm.Ave

Warren Towers
700, Comm.Ave

Science Center
590, Comm.Ave

TUESDAY JULY 10TH 1984 9.00 - 9.50 AM.

PLANT DETECTION OF PATHOGENS. Arthur R. Ayers, Department of Biology, Harvard University, Divinity Avenue, Cambridge, MA 02138.

Plants resist attach by a wide variety of pathogens and pests by using preformed physical and chemical barriers in combination with chemical defenses induced by the presence of the pathogen. It is assumed that the elicitation of chemical responses, such as the accumulation of the toxic secondary metabolites called phytoalexins, is affected by plant recognition of pathogen components. Recognition may occur by direct interaction between pathogen components and the host's recognition system, or indirectly by the plant's recognition of the action of a pathogen derived molecule, e.g. the release of pectic polysaccharides from the plant's cell wall by pathogen enzymes and subsequent response of the plant to the active pectic fragments. Examples of pathogen components observed to stimulate plant responses are wall polysaccharides (glucan, glucomannan, chitin), glycoproteins, extracellular enzymes and lipids. These molecules tend to be produced by many different species of pathogens and are active on a variety of plants -- these molecules are considered to be central to general resistance to microorganisms not adapted to a particular plant species, or are involved subsequent to the recognition events that characterize the interactions between a host and different races of a pathogen. A pathogen wall glucan, termed an elicitor, is being examined to elucidate the early events in the recognition of pathogen components by plant cells.

Many host/pathogen interactions are characterized by a gene-for-gene relationship in which resistance genes in the plant are paired with avirulence genes in the pathogen. The presence of any complementary pair of corresponding host/pathogen genes results in recognition of the pathogen and expression of resistance in the host. Resistance genes may be more appropriately called "recognition" genes, since the same stereotyped biochemical events of resistance may be initiated in response to a variety of different pathogens or different races of the same pathogen. The molecules of host and pathogen that interact in a gene-for-gene relationship, and the products of the avirulence and resistance genes have not been identified. Several potential candidates have, however, been suggested including glycoproteins and glucomannans. Components of a fungal pathogen and its host are now being analyzed with the help of race-specific monoclonal antibodies. Race-specific binding of pathogen glyco-moieties to receptors localized in plant plasma membranes is expected to be the first event in the initiation of gene-for-gene resistance.

TUESDAY JULY 10TH 1984 9.50 - 10.40AM

BIOCHEMICAL ASPECTS OF PLANT-MICROBE AND MICROBE-MICROBE INTERACTIONS IN SOIL. Yigal Elad, Department of Botany and Plant Pathology, Colorado State University, Fort Collins, Colorado 80523 and I.J.Misaghi, Dept. Plant Pathology, Univ. Arizona.

A diverse array of resident microorganisms compete for the limited supply of food in soil. The survival and the successful establishment of each of these organisms depends on the degree of its competitive ability to occupy a niche to the exclusion of others struggling for that niche. Competitive success of soil microorganisms depends in part on the nature and quantity of toxic substances, enzymes, and chelators of essential metals that each microbe can produce. Microbial interactions become much more complex in the rhizosphere of plants because of the substances extruded by roots and leached out from above-ground plant parts and decaying organic debris. The extruded substances modify physical and chemical characteristics of soil, serve as food sources, and act as antimicrobial agents.

Plant growth and survival is greatly affected by the outcome of plant microbe and microbe-microbe interactions in soil. Plants may thrive in soils which support a greater proportion of beneficial microbes (nitrogen fixers, growth promoting bacteria and fungi, etc.) or they may be weakened or killed in soils which are conducive to the establishment of plant pathogens.

Chemical aspects of plant-microbe and microbe-microbe interactions in soil will be discussed.

TUESDAY JULY 10TH 1984 11.00 - 11.50 AM

BOCHEMICAL RESPONSES OF PLANTS TO FUNGAL ATTACK. L. L. Creasy, Department of Pomology, Cornell University, Ithaca, NY 14853.

When plants are challenged by fungi, the result is either disease or suppression of fungal development. This result can be described in a full quantitative range from complete resistance to susceptibility. Relative resistance could be due to any number or combination of factors; morphological, preformed chemical, and specific responses of the plant. These latter include the production of chemicals defined as phytoalexins (antimicrobial compounds of low molecular weight that are synthesized by and accumulate in plants after exposure to microorganisms). Plants also produce 'high' molecular weight compounds, e.g. proteins (including enzymes), peptides, saccharides, phenolics. Active biochemical plant responses are clearly involved in resistance mechanisms and considerable progress has been made in evaluating these mechanisms. The state of knowledge of biochemical responses of higher plants resulting from fungal challenge will be the primary goal of this presentation.

TUESDAY JULY 10TH 1984 11.50 - 12.40 PM.

AN OVERVIEW OF ALLELOPATHY. Elroy L. Rice, Department of Botany and Microbiology, University of Oklahoma, Norman, OK 73019.

Although Theophrastus suggested about 300 B.C. that some plants are toxic to other plants, scientific evidence was not available to substantiate his suggestion until the present century. Moreover, the term allelopathy was not coined until 1937. Molisch originated the term to refer to the production by one plant or microorganism of a chemical compound which affects growth of another plant or microorganism. The effect can be a reduction or a stimulation of growth. Much evidence suggests that allelopathy is important in plant succession (change in vegetation over time) and patterning of vegetation. Many serious weeds are toxic to garden and crop plants; some crop plants are allelopathic to weeds, and some crop plants are toxic to themselves in continuous cropping or to other crop plants. Numerous herbaceous and woody plants are allelopathic to important forest trees, which can be very important in reforestation. Numerous plants are toxic to Rhizobium (the nitrogen-fixing bacterium in legumes), to nodulation of legumes, and to nitrogen-fixation in the nodules of legumes.

TUESDAY JULY 10TH 1984 2.00 - 2.15 PM

METABOLITES OF GREMMENIELLA ABIETINA (Scleroderris canker). William A. Ayer, Yumiko Hoyano, Soledade Pedras, and Ian van Altena. Department of Chemistry, UNiversity of Alberta, Edmonton, Alberta, Canada T6G 2G2.

The Ascomycetous fungus Gremmeniella abietina (Lagerb.) Morelet is a virulent pathogen of pine trees in Europe, Canada, and northeastern United States. A new virulent strain was discovered in New York State in the mid-seventies and has since spread within the United States and into Canada. In cooperation with the Canadian Forestry Service we are investigating the metabolites produced by liquid cultures of both the virulent and the non-virulent strains of G. abietina.

The fungus produces a colorful array of metabolites: blue, red, yellow, burgundy, and colorless compounds. With the exception of the colorless compound, these compounds have not previously been isolated from natural sources. The elucidation of the structures of these compounds will be described and their possible biogenesis will be discussed. A comparison of the "metabolic spectra" of virulent and non-virulent strains will be presented. Some preliminary results of the biological testing of the metabolites on pine seedlings will also be discussed.

TUESDAY JULY 10TH 1984 2.15 - 2.30 PM

METABOLITES OF THE BLUE STAIN FUNGUS COMPLEX ASSOCIATED WITH THE MOUNTAIN PINE BEETLE PROBLEM. W.A. Ayer, L.M. Browne, M.C. Feng, H. Orszanska, H. Saeedi-Ghomi, and G. Lee, Department of Chemistry, University of Alberta, Edmonton, Alberta, Canada T6G 2G2.

In recent years the Canadian Forestry Service has focused attention on infestations of the Mountain Pine Beetle (Dendroctonus ponderosae) which have reached epidemic proportions in western Canada. The infestations cause fatal damage to the tree not as a result of the insect burrowing under the bark and mining the tree but rather as the result of the blue stain fungus complex (so-called because it stains the wood blue) which is introduced by the beetle as it first enters the wood. The blue stain fungus moves rapidly throughout the inner bark and sapwood and is thought to cut off sap movement or to produce a highly phytotoxic substance.

We are investigating the metabolites produced in liquid cultures by the four species involved in the blue stain fungus complex: Ceratocystis clavigera, C. huntii, C. ips and C. minor. The chemistry of the metabolites, some of which we believe to be responsible for the blue discoloration will be described.

TUESDAY JULY 10TH 1984 2.30 - 2.45 PM

SPENCER, KEVIN C., ELOY RODRIGUEZ, Ecology and Evolutionary Biology, University of California-Irvine, and ARTHUR GIBSON, Botany, University of California-Los Angeles.
THE CHEMISTRY OF THE PACHYCEREEAE AND THE YEAST-CACTUS-DROSOPHILA COEVOLVED SYSTEM.

An examination into the triterpenoid, alkaloid and flavonoid chemistries of thirty species of columnar cacti has yielded taxonomically useful data. Among these, an old idea regarding the exclusivity of production of either terpenoids or alkaloids in different cactus lineages in the Pachycereeae is challenged by the discovery of several taxa which produce both. Many terpenoid structures were found to be present in differing amounts in different species, and preliminary data correlate the distribution of these compounds with the host-plant specialization of Drosophila-yeast combines. A hypothesis is advanced wherein yeast modification of plant chemical structures is thought to ameliorate their toxicity toward fruit flies, thus increasing their likelihood of dispersion. Tightly coevolved fungal-insect pairs are one result. A coordinated chemotaxonomic interpretation of these cacti is made using data on all three classes of compounds.

TUESDAY JULY 10TH 1984 2.45 - 3.00 PM

COMPARATIVE INHIBITION OF BLACK CHERRY GROWTH BY GROUNDFLORA OF THE ALLEGHENY UPLANDS
by Allan P. Drew, SUNY College of Environmental Science and Forestry, Syracuse, N.Y.

Seedlings of black cherry (Prunus serotina Ehrh.) are thought to be inhibited in growth by allelochemicals produced by herbaceous groundflora species. To examine this hypothesis, vegetation removal experiments with paired plots were conducted on fern and aster dominated areas beneath a black cherry overstory of a shelterwood cut on the Allegheny uplands of central New York. Complete removal of fern stimulated new black cherry germinant height growth only after two years. Germinant recruitment on the bare plots following two years was less inhibited and seedlings grew faster than black cherry controls of the same age on untouched fern covered plots. Black cherry germinating beneath dense aster cover grew twice as fast in three years as cherry germinating beneath fern. There was also more growth stimulation of new cherry germinants following aster removal than had characterized the treated fern plots. The results are interpreted to suggest that some allelochemical substance in the soil beneath the fern inhibits growth of black cherry seedlings for several years following plot exposure. On aster plots allelopathic inhibition was less pronounced, if it occurred at all.

TUESDAY JULY 10TH 1984 3.00 - 3.15 PM

ALLELOPATHIC EFFECTS OF GIANT FOXTAIL ON LOBLOLLY PINE SEED
A. R. Gilmore - University of Illinois at Urbana-Champaign
Abstract - Water extracts of giant foxtail grass (Setaria) inhibited germination and radicle elongation of loblolly pine (Pinus taeda L.) seed in a laboratory test. Most of the toxic effects came from extracts of dried foxtail tops with lessor amounts from fresh tops and roots. Eight chemical compounds known to be phytotoxin in Setaria were found in extracts of foxtail leaves but could not be found in soil samples under the leaves. Soil texture affected the phytotoxic effects of the extracts.

TUESDAY JULY 10TH 1984 3.30 - 3.45 PM

ALLELOCHEMICAL SPHERE OF GERMINATING SEEDS. Baochen Zhang and C. S. Tang, Department of Agricultural Biochemistry, University of Hawaii, Hon., HI 96822. Both Bidens pilosa L. and mungbean (Vigna radiata L.) released hydrophobic inhibitors during their germination. In V. radiata, vitexin, isovitexin and a noval compound, 3-C-glycosyl-2,4,6,4'-tetrahydroxydibenzoylmethane were identified as the major metabolites inhibitory to the germination and seedling growth of lettuce (Lactuca sativa L.). More than 80% of these compounds were localized in the seed coat which contained over 7% of C-glucosyl flavonoids on dry weight bases. Since nearly all of these inhibitors were exuded within 48 hrs., an effective ALLELOCHEMICAL SPHERE could be formed by the germinating seeds under suitable conditions. Similar situation existed in the case of B. pilosa, but the inhibitors were in the ether soluble fraction. The hypothetical size of allelochemical spheres were approximated using lettuce seeds as acceptors.

TUESDAY JULY 10TH 1984 4.15 - 4.30 PM

DISTRIBUTION OF ACETYLENIC THIOPHENES IN THE PECTIDINAE (HELIANTHEAE:ASTERACEAE)

Kelsey R. Downum, David J. Keil and Elov Rodriguez. Dept. of Ecol. and Evol. Biol, Univ. of CA, Irvine, CA 92717 and Biol. Sciences Dept., Cal. Poly. St. Univ., San Luis Obispo, CA 94307.

The distribution and quantitative significance of biosynthetically related di- and ter-thiophenes from 27 species representing seven genera of the Pectidinae (Heliantheae) were investigated by reverse-phase HPLC. Adenophyllum, Chrysactinia and Nicolletia, three previously unstudied genera, were found to contain thiophenes for the first time. Four derivatives, 5-(4-hydroxy-1-butenyl)-2,2'-bithiophene, 5-(4-acetoxy-1-butenyl)-2, 2'-bithiophene, 5-(3-buten-1-ynyl)-2,2'-bithiophene and 2,2':5',2"-terthiophene were common constituents in most species of Adenophyllum, Chrysactinia, Dyssodia, Hymenatherum, Nicolletia and Porophyllum. One additional compound, 5-methyl-2,2':5',2"-terthiophene, was also present in extracts of Adenophyllum, Dyssodia and Hymenatherum, but was not detected in any other genus. Acetylenic thiophenes were not found in any of the 18 species of Pectis examined, however substantial UV-A-induced toxicity of these extracts was shown, thus demonstrating the existence of phototoxins in Pectis species which are chemically distinct from the thiophenes.

TUESDAY JULY 10TH 1984 4.30 - 4.45 PM

SPENCER, KEVIN C. and DAVID S. SEIGLER. Plant Biology, University of Illinois, Urbana, Illinois, 61801. CYANOGENIC GLYCOSIDES OF CARICA PAPAYA AND ITS PHYLOGENETIC POSITION WITH RESPECT TO THE VIOLALES AND CAPPARALES.

The Caricaceae are placed near the Passifloraceae by most current classifications. The family is unique in the Violales in producing glucosinolates, specifically benzylglucosinolate which is typical and diagnostic for the Capparales. We have found Carica papaya L. (Caricaceae) to contain both a cyclopentenoid and an aromatic cyanogenic glucoside. The production of cyanogenic glycosides by a species which characteristically produces glucosinolates is contrary to the expectations of a prevailing theory of mutual exclusion due to presumed similarity of ecological function. The finding in the Caricaceae of a cyclopentenoid cyanogen, typical of the Passifloraceae, confirms the close relationship of the two families. The presence of both classes of compounds in the Caricaceae suggests that the family may be intermediate between the Violales and the Capparales.

TUESDAY JULY 10TH 1984 4.45 - 5.00 PM

THE POLYPHENOLS OF THE SPECIES NICOTIANA. M. E. Snook and O. T. Chortyk, USDA-ARS, Tobacco Safety Research Unit, P. O. Box 5677, Athens, GA 30613, and V. A. Sisson, USDA-ARS, Tobacco Research Laboratory, Oxford, NC 27565

We have developed a high pressure liquid chromatography (HPLC) method to determine the polyphenolic constituents of tobacco. Our interest in polyphenols is due to their importance in the formation of the tumorigenic catechols of cigarette smoke. We have been examining numerous currently grown tobacco varieties and introduction of the species Nicotiana tabacum for levels of polyphenols. The objective is to find low polyphenol tobaccos for incorporation into a breeding program to develop a safer tobacco. We have now extended this survey to the other 70 species of Nicotiana. The HPLC method, involving chromatography of methanol-water extracts on a Waters micro-Bondapak C_{18} column with a methanol-water solvent system, will be described. Results will illustrate the wide variation in the species of the determined polyphenols--neochlorogenic acid, chlorogenic acid, 4-O-caffeoyl quinic acid, scopoletin, rutin, and kaempferol-glycoside. The changes in total chlorogenic acids, total polyphenols, and certain individual constituents will be discussed in relation to the three subgenera and the fourteen sections.

TUESDAY JULY 10TH 1984 5.00 - 5.15 PM

FLAVONOID CHEMICAL MARKERS AS AN ADJUNCT TO CULTIVAR IDENTIFICATION

Sam Asen, Florist & Nursery Crops Lab., HSI, Beltsville Agricultural Research Center, U.S.D.A., Beltsville, MD 20705

Physiological and morphological attributes have been the primary criteria for differentiating cultivars. These characteristics alone have not been satisfactory particularly when describing new cultivars protected by the plant patent law. Little or no use has been made of the flavonoid chemical markers responsible for flower colors. Petal flavonoids are important because their composition can be quite different for flowers with very similar phenotypic color expression. Both qualitative and quantitative differences in flavonoid chemical markers distinguished gerbera cultivars with very similar colors as well as geranium cultivars. The high performance liquid chromatographic resolution and quantitation of flavonoid chemical markers, as an adjunct to the classical subjective methods presently used, offers an excellent objective method to aid in the positive identification of cultivars as well as available germplasm.

TUESDAY JULY 10TH 1984 5.15 - 5.30 PM

THE GENUS *AMYRIS*: A DICHOTOMY OF CLASSIFICATION. Basil A. Burke, ARCO Plant Cell Research Institute, 6560 Trinity Court, Dublin, California 94568

The taxonomic significance of secondary metabolites is in no way dimmed in the light of molecular biological attempts which focus on primary metabolites as direct tools in the area of chemosystematics. Thus, when choice between two families is to be made, secondary metabolites can be a very useful, simple tool for classification of a genus. The application of this method to the genus, *Amyris* will be reported, with special reference to its value in resolving the dichotomy of the earlier placement of *Amyris* in both Rutaceae and Burseraceae.

POSTER TUESDAY JULY 10TH 1984 7.30 - 9.30PM

A COMPARISON OF CHROMATOGRAPHIC TECHNIQUES FOR THE ISOLATION OF FLAVONOIDS FROM SOLANUM SPECIES. Thomas P. Steinharter*, Gillian A. Cooper-Driver*, and Gregory J. Anderson**. *Biological Science Center, Boston University Boston MA 02215, **Biological Sciences Group U-43, University of Connecticut Storrs CT 06268.

A study was made comparing high performance liquid chromatography (HPLC) with other chromatographic techniques for the characterization of flavonoids, a class of chemical compounds often used for taxonomic and phylogenetic studies.

The flavonoids of several species of Solanum section Basarthrum were isolated and separated by paper, column, thin layer, and C_{18} reverse phase HPLC using a variety of solvent systems. HPLC proved to be particularily useful in establishing the presence of mono-, di-, and tri- glycosides and sugar substitution patterns, but could not provide the necessary resolution for the total identification of individual compounds. Thus, although HPLC provides a much more rapid technique for analyzing flavonoid content in small samples of plant material, at present its benefits appear to be more in establishing quantitative variation within and between plant samples rather than in the characterization of individual compounds.

POSTER TUESDAY JULY 10TH 1984 7.30 - 9.30 PM

AN ECOLOGICAL STUDY OF PHENOLICS IN THE INTERTIDAL BROWN ALGA FUCUS. Bradd A. Smithson and Donald Cheney. Biology Dept. Northeastern University. Boston, Ma. 02115.

The purpose of this study is to examine the distribution and function of phenols in three species of the dominant intertidal brown alga Fucus in New England. Prior studies have reported that the phenols in F. vesiculosis serve as a chemical defense against herbivory. We have examined one or more populations of F. vesiculosis, F. distichus, and F. spiralis from Me. and Ma. for total phenols and palatability to Littorina littorea. Analysis of all three species along an intertidal transect in Me. and subpopulation samples of F. vesiculosis from the intertidal and subtidal fringe in Ma. suggest an inverse relationship between a species' (a plant's) intertidal height and its total phenol level. Adult (≃10cm) plants from two intertidal populations showed similar phenol levels (2.5 % and 2.5 % dry weight) but marked differences in palatability (18 % vs. 1.2 % plant tissue grazed). Similarly, palatability differences amongst plants of different size class were also unrelated to total phenol levels eg. small (<5cm) plants proved most palatable and had high phenol levels. The relationship between palatability and polyphenol content and astringency is under investigation.

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THE EFFECTIVENESS OF STERILE SOILS IN ALTERING THE RECOVERY OF FOUR COMMONLY IDENTIFIED PHENOLIC ACIDS

Barry Dalton, Sterling Weed, and Udo Blum
North Carolina State University, Raleigh, NC

Ferulic, vanillic, p-coumaric, and p-hydroxybenzoic acids were applied to various sterile soil materials (from different horizons in the same profile) varying in mineralogy and in organic matter content. Samples were extracted with Mehlich III (a mild chelating extractant) immediately, and at 1,2,4,8,16, and 32 days after the application of the phenolic acids. The order of the phenolic acids from least amount recovered to greatest amount recovered for all of the various soils was ferulic, p-coumaric, vanillic, and p-hydroxybenzoic acids. In general, there was less recovery of the phenolic acids from the topsoils than from the subsoils. The amount of the various phenolic acids retained in the soils after an immediate extraction was proportional to the amount of organic matter present in the soils.

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THE EFFECTS OF PUTRESCINE ON SOMATIC EMBRYOGENESIS OF DAUCUS CAROTA AS EXAMINED BY TWO-DIMENSIONAL ELECTROPHORESIS. P.M. Bradley, F. El-Fiki and K.L. Giles. Dept. Biology & Biotechnology, Worcester Polytechnic Institute, Worcester MA 01609, USA. Plant developmental processes can be studied using tissue culture models. Interactions between cells can be detected by electrophoresis to show changes in gene expression during changes in growth patterns. These observations can then be related to the biochemical control points responsible for the initiation of developmental events. When carrot suspension cells were treated with putrescine (0.03 μM) and 2,4-D (2 ppm), and then passed to medium lacking these, embryogenesis was induced but was stopped at the globular stage. Subsequent passage to medium lacking in arginine gave mature embryos in a more rapid and better synchronized manner than with control cultures. Electrophoresis showed the appearance or disappearance of several polypeptides. The putrescine/arginine treatment might be used to store immature embryos for long periods, to develop a synchronized embryogenic system for further biochemical studies, and to provide large numbers of embryos for propagation purposes.

POSTER TUESDAY JULY 10TH 1984 7.30 - 9.30 PM

FOOD PREFERENCES AND PHENOL CONTENT OF SOME INTERTIDAL NEW ENGLAND SEAWEEDS. Elizabeth Bell and Donald Cheney, Biology Department, Northeastern University, Boston, MA 02115.

In an effort to learn more about the distribution and function of phenols in seaweeds, we have examined seven common intertidal New England seaweeds for total phenols, astringency and palatability to the herbivorous snail Littorina littorea. Preliminary results suggest that only the brown tested (Ascophyllum nodosum, Petalonia fascia, Fucus vesiculosus) has substantial levels of total phenols (5-10%), whereas the greens (Enteromorpha intestinalis, Monostroma oxyspermum) and reds (Chondrus crispus and Dumontia incrassata) essentially lacked phenols (< 1%). Low % palatability (< 5% wet weight eaten after 14 days) was observed for all species except Enteromorpha intestinalis, which showed a high % palatability (> 60%). This suggests that chemical or structural defenses other than phenols may be active in the green and red seaweeds tested that showed low food preference.

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FORMATION AND PHYTOTOXICITY OF NAPHTHOQUINONES FROM FUSARIA. Robert A. Baker and James H. Tatum. USDA, ARS, Citrus & Subtropical Products Laboratory, 600 Avenue S, N.W. (P. O. Box 1909), Winter Haven, FL 33883.

When grown on certain mineral salts-glucose media, Fusarium solani and F. oxysporum produce a variety of substituted naphthoquinones. Naphthoquinones produced by F. solani occur as stress metabolites, and are elaborated when the media pH falls below 3.0. This occurs as a result of the preferential utilization by F. solani of ammoniacal nitrogen in the medium. Naphthoquinone derivatives are produced by F. oxysporum as the culture ages on pH neutral media.

Several of these compounds are highly phytotoxic, inhibiting root growth substantially at 25 ppm and completely at 100 ppm. Changes in structure leading to reduced phytotoxicity and mode of formation of these structures will be discussed.

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FUNGICIDAL ACTIVITY OF NONPROTEIN IMINO ACIDS FROM CALLIANDRA Sheryl A. Brenner and John T. Romeo, Dept. of Biology, Univ. South Florida, Tampa, FL 33620

Four species of Fungi Imperfecti (Aspergillus niger, Aspergillus spp., Curvularia spp., Penicillium spp.) were isolated from leaf surfaces of Calliandra haematocephala (Mimosoideae) and maintained on agar in the laboratory. Water-methanolic extracts of C. haematocephala leaves were incorporated into liquid slide cultures of the various fungi. 1-5% extracts inhibited spore germination in Aspergillus spp. from 88-13% and mycelial growth from 87-40% of control. Tests on other fungal species produced similar data. Various imino acids isolated from Calliandra were incorporated into slide cultures in which nitrogen was not limiting. Effects of proline were similar to those of control cultures, but pipecolic acid, the nonprotein higher homolog of proline, was inhibitory to both spore germination and mycelial growth at concentrations of 10^{-1} to M^{-4} M. A number of hydroxylated pipecolic acid derivatives including cis-5-hydroxypipecolic acid and 2,4-trans-4,5-trans-4,5-dihydroxypipecolic acid were similarly tested for biological activity. All compounds showed some degree of inhibition. The possible ecological implications are discussed.

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GROWTH AND STEROIDAL SAPOGENIN PRODUCTION IN TISSUE CULTURES OF *DIOSCOREA* SPECIES

P.G. Kadkade, GTE Laboratories, Inc., Waltham, MA 02254

The objective of this study was to determine requirements of *Dioscorea* spp. tissue cultures for maximal steroidal sapogenin production. Tissue cultures were derived from tubers of *D. composita*, *D. nelsonii* and *D. bernoulliana*. Growth and steroidal sapogenin production of the static and suspension cultures were examined under various culture conditions. Steroidal production, especially diosgenin was strongly affected by light, and certain hormonal and precursor compounds. The diosgenin contents in light grown cultures were increased by four fold over that of dark grown cultures. This increase in diosgenin contents was further enhanced by supplementing with cholesterol. Phytosterols including stigmasterol, β-sitosterol were also produced.

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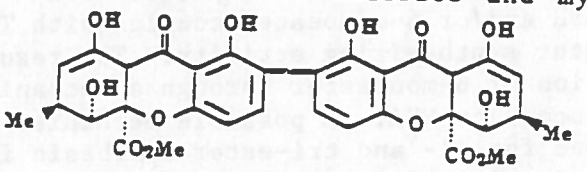
IDENTIFICATION OF A PHYTOTOXIN FROM *PYRENOCHAETA TERRESTRIS* AS SECALONIC ACID A. John C. Steffens and *David J. Robeson*, ARCO Plant Cell Research Institute, 6560 Trinity Court, Dublin, CA 94568-2685.

Pyrenochaeta terrestris, the causal agent of pinkroot disease of onion, has been subjected to a systematic screening for metabolites toxic to onion seedlings. A major, highly phytotoxic component was isolated which showed activity at 10^{-8}M. Spectroscopic data established the identity of the toxin with secalonic acid A, a symetrically dimeric hydroxanthone. Secalonic acid A can be isolated from *P. terrestris*-infected onion roots at levels which are inhibitory to seedling growth. A weakly pathogenic isolate accumulated 20% and 50% as much secalonic acid A in culture filtrate and mycelium, respectively, as a more pathogenic isolate.



Secalonic Acid A

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INACTIVATION OF POLYPHENOL OXIDASE OF BETA VULGARIS.--Susan S. Martin, USDA, ARS, Crops Research Laboratory, Colorado State University, Ft. Collins CO 80523.

Sugarbeet, *Beta vulgaris* L., is well known for its ability to synthesize and accumulate greater than usual amounts of amino acids, particularly glutamic acid and tyrosine. Sugarbeet also contains a very active polyphenol oxidase (PPO; E.C. 1.10.3.1) which has both cresolase and catecholase activity. On injury, dark-colored melanin pigments are produced rapidly by the typical PPO oxidation of tyrosine and of the initial hydroxylated product, 3,4,-dihydroxyphenylalanine (DOPA). Representatives of several classes of possible PPO inhibitors were examined for their ability, relative to a standard aluminimum-clarified extract, to yield aqueous extracts of low color and high clarity. Antioxidants, polyphenol adsorbents, copper chelators, sulfhydryl reagents, and strongly basic ion exchange resins were tested singly and in selected combinations. The best results were obtained with sulfhydryl reagents, especially 2-mercaptoacetic acid (0.1% v/v).

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INFLUENCE OF CULTURAL CONDITIONS ON GLYCOALKALOID FORMATION IN SOLANUM ACCULEATISSIMUM TISSUE CULTURES

P.G. Kadkade, GTE Laboratories, Inc., Waltham, MA 02254

The influence of a wide range of cultural conditions on glycoalkaloid formation in static and suspension cultures derived from the seed of S. acculeastissimum were examined. Synergism between auxins and cytokinins was observed in certain combinations and antagonism in others with respect to the composition of glycoalkaloids in tissue cultures. In general, a combination of Δ^5 -isopentyladenine and 2,4-D favored solasodine and solamargine production. Glycoalkaloid production was also strongly affected by light and certain nutritional factors. High sucrose concentrations increased the levels of glycoalkaloids, but neither glucose nor starch was effective for enhanced glycoalkaloid formation. Among some precursors evaluated, only cholesterol had a dramatic effect. These studies indicate the feasibility for increased glycoalkaloid production, especially solasodine in tissue cultures as compared to the whole plant.

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MECHANISMS FOR SYNTHESIS OF 3-NITROPROPANOYL-D-GLUCOPYRANOSES IN CORONILLA VARIA L.

Mark R. Pishak and David L. Gustine, USDA-ARS, U.S. Regional Pasture Research Laboratory, University Park, PA 16802.

The enzymatic events leading to the formation of 3-nitropropanoyl-D-glucopyranoses (NPA-esters) have yet to be elucidated. A crude extract prepared from Coronilla varia L. leaflets incorporated label from UDP-^{14}C-glucose into the 6-monoester (220 dpm), 1,2,6-triester (415 dpm), and three unknown compounds (709, 287, and 524 dpm). Triton X-100 (0.1%) stimulated formation of NPA-esters from UDP-^{14}C-glucose 3-6 fold while synthesis of unknown radiolabeled compounds was enhanced 9-15 fold. The addition of nitropropionic acid (NPA) and/or CoASH was without effect. Label was not incorporated into NPA-esters or other compounds when ^{14}C-NPA was used as substrate. The addition of CoASH and/or 6-monoester coupled with Triton solubilization did not stimulate NPA-ester synthesizing activity. The results do not support the previously proposed formation of 6-monoester through a mechanism involving direct transfer of glucose from UDP-glucose to NPA. A possible mechanism by which additional NPA residues are attached for di- and tri-ester synthesis is the participation of a carboxyl-activated NPA derivative, for example, NPA-CoA.

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THE ORIGIN AND SIGNIFICANCE OF IDIOSYNCRATIC VARIATION IN THE CHEMICAL DEFENSES OF A GENERALIST GRASSHOPPER

Clive G. Jones[1], Timothy A. Hess[1], Douglas W. Whitman[2], Murray S. Blum[2] and Peter Silk[3]

1. The New York Botanical Garden Institute of Ecosystem Studies, The Mary Flagler Cary Arboretum, Box AB, Millbrook, N.Y. 12545
2. Department of Entomology, University of Georgia, Athens, GA 30601
3. Department of Chemistry, Research & Productivity Council, Fredericton, New Brunswick, Canada E36541

The analysis of individual variation in the chemical defenses of the generalist herbivore lubber grasshopper, Romalea microptera is examined in regard to the influence of age, sex and diet on the quality and quantity of defense. The relationships between defensive variation, feeding behavior, growth and survivorship and predation are discussed.

POSTER JULY 10TH 1984 7.30 - 9.30 PM TUESDAY

Per Mølgaard, Leon Brimer & Helle Ravn: CAFFEIC ACID ESTERS IN PLANTAGO. Quantitative and qualitative determination of glucose and rhamnose esters and the genecological aspects of their distribution in P. major in Denmark.

The presence of these two esters is monogenically ruled with full dominance for glucose ester. The frequency of the recessive allele for rhamnose ester varies throughout the country presumably in accordance with herbivore pressure on the germinating plants. A quantitative HPLC method has been evolved with a sensitivity sufficient for analysis of one single cotyledon. This gives an opportunity to follow the performance of single plants in a cohorde of seedlings to estimate the relative value of the two alternative caffeic acid esters as deterrents towards herbivores.

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PHOTOSENSITIZATION OF PLANT PATHOGEN FUSARIUM CULMORUM BY PHENYLHEPTATRIYNE, A SECONDARY METABOLITE, FROM SPECIES IN THE ASTERACEAE. G. Bourque, J.T. Arnason, Biology Department, U. of Ottawa, and W. Orr, C. Madhosingh, Agriculture Canada.

Phenylheptatriyne (PHT), a polyacetylene present in the genera Bidens, Coreopsis and Dahlia of the Asteraceae is a potent photosensitizer of microorganisms. A quantitative evaluation of its antifungal activity to the model pathogen Fusarium culmorum was undertaken. In the presence of near-UV, the ED_{50} for inhibition of mycelial growth was 2.5 ppm. In addition PHT behaved as a fungicidal agent on germination and germ tube elongation. Inhibition of fungal growth was also apparent in the dark at higher concentrations of PHT. Endogenous concentrations of PHT at different stages of growth of Bidens pilosa were at least an order of magnitude greater than concentrations required for inhibition of growth of F. culmorum, suggesting that PHT may inhibit the growth of unadapted fungi in the host plant. Physiological damage induced by PHT in F. culmorum involves membranes as the site of action, as indicated by experiments on uptake of radioactive phenylalanine, potassium leakage and respiration.

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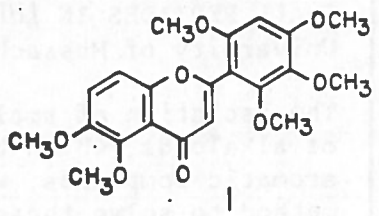
PLANT ANTITUMOR AGENTS. 21. FLAVONES, COUMARINS, AND AN ALKALOID FROM SARGENTIA GREGGII.
B.N. Meyer, M.E. Wall, M.C. Wani, and H.L. Taylor
Research Triangle Institute, Research Triangle Park, NC 27709

Sargentia greggii S. Watts (Rutaceae) has been examined previously and identified compounds include furanoquinoline alkaloids, limonoids, and flavones. We wish to report the isolation of two additional known flavones, 5,6,2'-trimethoxyflavone and 5,6,2',6'-tetramethoxyflavone, plus a new compound, 5,6,2',3',4',6'-hexamethoxyflavone(1). In addition, two known coumarins, 3-(1',1'-dimethyallyl)-herniarin and seselin as well as the new O-geranylosthenol(2) have been isolated. Finally, the previously known isoquinolone casimiroine has been isolated from this species. Although the crude extract displayed moderate 9KB activity, none of the crystalline compounds were significantly active.



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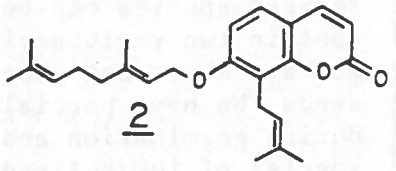

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POSTER TUESDAY JULY 10TH 7.30 - 9.30 PM

PLANT DENSITY VARIATION LIMITS HERBIVORY.
Frances S. Chew, Dept. Biology, Tufts Univ., Medford, MA 02155, and Stephen P. Courtney, Dept. Zoology, Univ. Calif., Davis, CA 95616

We studied interactions between indigenous Capparales and their pierid butterfly herbivores in Morocco for 3 years, and suggest that plants which "escape" herbivory by these specialist herbivores may be either 1) chemically novel for Capparales, or 2) lacking evident chemical novelty but showing highly variable population densities from year to year. We offer evidence that plant species showing large year-to-year fluctuations in population density are less frequently attacked by pierids and are utilized as foodplants by fewer pierid species. We suggest that these highly "variable-density" plant species may be marginal hostplants for the pierid butterflies because natural selection for closer insect adaptation to these plants is frequently confounded or reversed by inconsistent availability of the plants. By contrast, "stable" plant species that escape are chemically novel for Capparales.

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PURIFICATION AND KINETICS OF A FLAVONOL 8-O-METHYLTRANSFERASE FROM *LOTUS CORNICULATUS**
M. Jay, V. De Luca & R.K. Ibrahim, Labo de Phytochimie, Univ. Claude-Bernard, Lyon I, France and Chem. Grad. Faculty & Biol. Dept., Concordia University, Montreal, Canada

L. corniculatus flowers, which accumulate the 8-methoxy derivatives of kaempferol, quercetin and isorhamnetin, contain two distinct O-methyltransferases (OMT) that attack positions 8 and 3' of flavonols (Z. Naturforsch. 38C:413,1983). The novel enzyme, 8-OMT was purified 1400-fold by affinity chromatography on SAH-agarose & chromatofocusing on polybuffer ion exchanger (pI 5.4). It had expressed specificity for the 8-position of 8-OH-quercetin and 8-OH-kaempferol (8-OH-K).

Substrate interaction kinetics of this enzyme resulted in converging double reciprocal plots indicating a sequential binding mechanism. Product inhibition studies showed non-competitive patterns for all four substrate-product pairs; thus implying an iso-ordered Bi Bi mechanism in which isomerization occurred at the product release step. SAM and SAH as well as 8-OH-K and 8-OMe-K were were partners in the reaction sequence, whereas the order of addition and release could not be established without binding studies.

* Supported by NATO, NSERC and FCAC grants.

POSTER JULY 10TH 1984 7.30 - 9.30 PM TUESDAY

SMALL PEPTIDES IN *LUPINUS SPP.* Strang, David & Robinson, Trevor, Biochemistry Dept., University of Massachusetts, Amherst, MA 01003

The isolation of small peptides from species of *Lupinus* is complicated by the presence of alkaloids, which bind ionically to cation exchange resins, and of miscellaneous aromatic compounds, which bind hydrophobically to any resins. We have developed a method to solve these problems and permit the isolation of small peptides as a group, so that their metabolism can be followed during development and their occurrence in several species can be compared. For example, seeds of *L. albus* are already known to contain two γ-glutamyl dipeptides and two much larger, acidic peptides (mol. wt. >1000). We have shown the presence of approximately six additional small peptides in the dormant seeds. We have partially characterized these and followed changes in the peptides during germination and growth. Preliminary studies have been done with four other species of *Lupinus* and with tissue cultures of *L. albus* and *L. polyphyllus*.

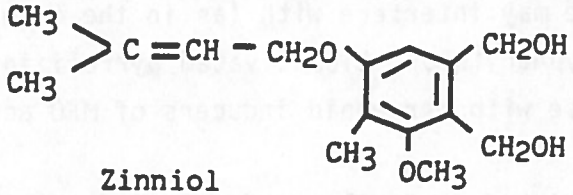
SYNTHESIS OF PHENOLIC COMPOUNDS BY POPULUS DELTOIDES Bartr. LEAVES IN RESPONSE TO STRESS AND "PHEREMONAL" SIGNALS. Thomas W. Kimmerer, Dpeartment of Forestry, University of Kentucky, Lexington KY.

Synthesis of secondary compounds with potential effects on herbivores was examined in greenhouse-grown cottonwood (Populus deltoides Bartr.) seedlings. Wounding of leaves resulted in increased total phenolic (Folin-Denis positive) compounds in wounded leaves, and in increased hemoglobin binding. These increases were largely due to condensed tannin accumulation adjacent to the wound. Increases in total phenolics of up to 100% were observed in 24 hours.

In unwounded leaves on wounded plants, and in unwounded leaves on control plants in close proximity to wounded leaves, increases in total phenolics were of the same magnitude as in wounded leaves, suggesting that pheremonal communication had occurred. However, condensed tannins increased only slightly. Most of the increase in total phenolics was due to a single compound, as yet unidentified. This phenolic has hemoglobin binding ability. Implications of pheremonal communication in herbivory will be discussed.

ZINNIOL-INDUCED CHLOROPHYLL RETENTION IN BARLEY: THE SELECTIVE ACTION OF A NON HOST-SPECIFIC PHYTOTOXIN. David J. Robeson, ARCO Plant Cell Research Institute, 6560 Trinity Court, Dublin CA 94568-2685 and Gary A. Strobel, Dept. of Plant Pathology, Montana State University, Bozeman, MT 59717

Zinniol is a non host-specific phytotoxin characteristically produced by certain species of the genus *Alternaria*, e.g. *A. dauci* and *A. zinniae*. Symptom expression following application of the toxin to cuttings or excised leaves of *Zinnia* (Compositae), *Daucus* (Umbelliferae) and *Cucumis* (Cucurbitaceae) takes the form of browning and necrosis. In contrast, when zinniol is applied to detached leaves of barley (*Hordeum vulgare*, Gramineae) enhanced chlorophyll retention occurs. The synthetic isomer isozinniol showed a similar effect but the response was less pronounced.



Zinniol

WEDNESDAY JULY 11TH 1984 9.00 - 9.50 AM.

PLANT ALLELOCHEMICALS: LINEAGES BETWEEN HERBIVORES AND THEIR NATURAL ENEMIES. Pedro Barbosa, Department of Entomology, University of Maryland College Park, MD 20742 and James A. Saunders, Tobacco Laboratory, USDA, Beltsville, Maryland 20705.

This presentation describes the interactions among plant allelochemicals, insect herbivores and their natural enemies. The aim of the study is to extend our understanding of the ecological implications of the influence of plant allelochemicals by determining if they affect trophic levels beyond that of the herbivore. The questions addressed are Do plant allelochemicals affect insect parasitoids? What is the nature of those effects? and How do insect parasitoids cope with plant allelochemicals in the tissues of their hosts? Our initial studies focusing on the tobacco hornworm, the fall armyworm and their parasitoids Apanteles congregatus and Hyposoter annulipes, respectively, have demonstrated that a greater proportion of parasitoids fail to emerge from herbivore hosts on nicotine diets and fail to form cocoons. Treated adult parasitoids also are significantly smaller than control adults. Adult parasitoids rid themselves of their allelochemical load by shunting it into cocoon silk and meconia. In addition it appears adults may have the capacity to convert nicotine to cotinine, a non-toxic compound. The implications of the results to current theory as well as the application of theory (e.g. in biological control) are discussed.

WEDNESDAY JULY 11TH 1984 9.50 - 10.40 AM.

ALLELOCHEMICAL SYNERGISM AND ANTAGONISM IN INSECT / PLANT INTERACTIONS.
May Berenbaum, Department Entomology, 320, Morrill Hall, University of Illinois, Urbana, IL 61801.

The community structure of secondary compounds (sensu Janzen 1973) has been largely ignored by investigators who instead concentrate on a single class of secondary compounds in plants. Increasing evidence from behavioral and physiological studies of herbivorous insects, however, suggests that interactions among groups of secondary chemicals might be the principal determinants underlying the relationships between plants and their insect associates. Sensory systems of many herbivorous insects respond to a range of chemical signals in the context of host recognition; insects responding to a single "sign" stimulus appear to be exceptional. Thus, synergism, in the form of enhanced response, and antagonism, in the form of reduced probability of detection, are feasible in relationships between herbivores and plants producing complex mixtures of volatiles. Similarly, detoxication systems in many insects appear to operate in a general fashion as regards plant-produced chemicals, the mixed-function oxidase complex in lepidopterous guts, which effects detoxication in most cases by increasing the hydrophilicity of the xenobiotic, is a case in point. The presence of several classes of compounds in plant tissue may interfere with (as in the case of the MFO inhibiting methylenedioxyphenyls or bioactivated pyrrolizidine alkaloids) or enhance (as in the case with terpenoid inducers of MFO activity) detoxification.

The Umbelliferae, which as a family produce a wide variety of secondary products, including furanocoumarins, polyacetylenes, flavonoids, alkaloids, methylenedioxyphenyls and essential oils, is a group well-suited for examining the effects of chemical synergism and antagonism in insect/plant interactions. Examples illustrating the importance of multicomponent systems for long-distance attraction, contact recognition, and allelochemical detoxification in umbellifer specialists are discussed with reference to experiments designed to incorporate chemical complexity into bioassay procedures and phytochemical analyses. Understanding the interactions between phytophagous insects and plant chemicals as reciprocal selective forces can perhaps provide insight into the enormous chemical diversity among angiosperm plants.

WEDNESDAY JULY 11TH 1984 11.00 - 11.50 AM.

EVOLUTIONARY STRATEGIES EVOLVED BY INSECT HERBIVORES TO PROCESS PLANT ALLELOCHEMICALS. Murray S. Blum, Department of Entomology, University of Georgia, Athens, GA 30602.

Insect feeding specialists eclectically process the allelochemical effronteries ingested as concomitants of the nutrients in their diets. A concatenation of physiological and biochemical events occurs subsequent to the entry of allelochemicals into the intestine and it appears that each species processes these compounds in an idiosyncratic manner. Absorption, direct excretion, metabolism, and sequestration constitute some of the devices evolved by herbivores to manipulate plant natural products and it appears likely that different specialists selectively emphasize particular combinations of these devices. Studies of the fates of ingested allelochemicals in specific herbivores indicate that each of these arthropods may focus their processing strategy on only a few of the available compounds. Thus, as a consequence of selectively processing particular compounds, the internal allelochemical fingerprint of the herbivore may differ drastically from that of the host plant.

WEDNESDAY JULY 11TH 1984 11.50 - 12.40PM

MULTICHEMICAL INSECT AND FUNGAL RESISTANCE IN PLANTS. Isao Kubo, Division of Entomology and Parasitology, College of Natural Resources, University of California, Berkeley, California 94720.

Podocarpus gracilior is resistant in nature to insect attack. Apparently, the resistance of P. gracilior is due to a multichemical defense mechanism. Chemicals identified as potential components of the multichemical defense are four norditerpenes including nagilactones C, D, and F, which cause insect feeding deterrent activity ultimately coupled to an insecticidal activity, and podolide, an insecticide; two nonlethal growth-inhibiting biflavones, podocarpusflavone A and 7",4""-dimethylamentoflavone; and the ecdysis inhibiting phytoecdysteroid, ponasterone A.

Similar multichemical defense mechanisms are observed in Ajuga remota to insect attack and Olea europaea to insect and fungal attack.

WEDNESDAY JULY 11TH 1984 7.30 - 7.45 PM

THE EFFECTS OF DIFFERENT IRIDOID GLYCOSIDES ON SPECIALIST AND GENERALIST INSECTS--
M. Deane Bowers and Gillian Puttick, Harvard University, Cambridge, Massachusetts 02138

The effects of the iridoid glycosides aucubin, catalpol, loganin, and asperuloside on growth and survival of three species of Lepidoptera were tested. These three species included two generalists: the gypsy moth, Lymantria dispar, and the southern armyworm, Spodoptera eridania; and a specialist which is confined to feeding on iridoid glycoside containing plants and uses these compounds as larval feeding stimulants: the Buckeye butterfly, Junonia coenia. Within an individual species, the four iridoid glycosides differed significantly in their effects on growth and survival. In addition, there were differences among the three species in how the iridoid glycosides affected their growth and survival. These differences may be related to the feeding strategy of the insect species, and possibly to the biosynthesis of the compounds and their occurrence in plants.

WEDNESDAY JULY IITH 1984 7.45 - 8.00 PM

TOXICITY AND TOLERANCE OF SESQUITERPENE LACTONES IN THE MIGRATORY GRASSHOPPER.

Murray B. Isman, Dept. of Plant Science, U. of British Columbia, Vancouver, CANADA V6T 2A2

Adult male migratory grasshoppers, Melanoplus sanguinipes, were injected abdominally with up to 1.0 umole of purified pseudoguaianolide-type sesquiterpene lactones isolated from species of Parthenium (Asteraceae), using 2 µl of acetone as the carrier. At doses of 1.0 µmole (per 300 mg insect), the compounds produced 40-90% mortality at 48 hours. Lesser doses produced marked dose-dependent sublethal symptoms, ranging from slight depression of locomotary ability to severe paralysis of the legs. Controls treated with acetone alone showed no ill effects. The approximate order of toxicity from this bioassay is parthenin > tetraneurin-A = coronopilin > confertin. Toxicity is probably attributable to (correlated with) binding of the lactones with thiol-containing amino acids in the grasshopper.

In contrast, grasshoppers tolerated 1.0 µmole of parthenin applied topically or ingested, or ingestion of up to 4 µmoles of confertin (applied to cabbage leaf discs) without any apparent effect. Limited bioavailability to target sites may account for tolerance to oral and topical doses.

WEDNESDAY JULY II TH 1984 8.00 - 8.15 PM

VARIATION IN NITROGEN AND CONDENSED TANNIN IN A NATIVE STAND OF BALSAM FIR WITH REFERENCE TO SPRUCE BUDWORM

C. Noah Koller*, D.L. Dahlman**, W.J. Mattson***
(*Univ. MN, St. Paul, **Univ. KY, Lexington, ***NCFES-USFS, E. Lansing, MI)

Our research has quantified nutritional and defensive chemistry changes of balsam fir foliage in a mixed age forest stand over time and assessed spruce budworm feeding, growth and mortality response to it. This report focuses on total nitrogen as a measure of dietary quality and condensed tannin (CT) as a measure of foliar defense. Nitrogen and CT (protein precipitation) values declined over the period of shoot expansion from a maximum at budbreak; but while nitrogen reached a base level in the fall, CT values rose significantly in overwintered foliage. Trees tended to maintain their rank position with regard to nitrogen throughout the summer and from year to year. Relative rank was highly variable with regard to CT, even between consecutive collections. Nitrogen (+) and CT (-) were most significantly correlated with insect weights. It is interesting that budworm concentrates 90% of its feeding when CT values are at their lowest levels. Foliage collected high in crowns and that on flowering shoots had lower CT levels than that from low crown positions or nonflowering shoots. Budworm tend to feed high in the crown and outbreaks are associated with flowering trees.

WEDNESDAY JULY IITH 1984 8.15 - 8.30 PM

IS THE EFFECT OF TANNINS ON GYPSY MOTH CATERPILLARS DIGESTION INHIBITION?

Michael E. Montgomery, USDA Forest Service, Hamden, CT 06514

Addition of either tannic acid or condensed tannin to artificial diets fed to gypsy moth, Lymantria dispar, resulted in up to 50% reduction in growth rate. Tannin levels from 0.1 to 1% dry wt. were increasingly active. Tannin levels from 1 to 10%, a range frequently found in host leaves, did not differ in activity. Reduction in diet consumption, growth rate, or nitrogen utilization efficiency did not occur until after 5 days of continuous feeding on tannin diets. These results do not indicate that tannin was adversely affecting food digestion, but are suggestive of an effect such as interference with absorption of trace minerals or vitamins. Effect of tannins on gypsy moth proteolytic enzymes is also being examined. These results raise questions about the appropriateness of currently used astringency tests to estimate the biological activity of tannins to caterpillars.

WEDNESDAY JULY 11TH 1984 8.45 - 9.00 PM

CONSUMPTION AND UTILIZATION OF OAKS BY THE CALIFORNIAN OAK MOTH PHRYGANIDIA CALIFORNICA. Gillian M. Puttick & J.P. Glyphis, Museum of Comparative Zoology, Harvard University, Cambridge MA 02138.

Consumption and utilization by P. californica was compared on two of its host plants, the coast live oak Quercus agrifolia which is evergreen and the valley oak Q. lobata which is deciduous. Leaves of the deciduous species had a higher nitrogen content and lower leaf specific weight (an index of sclerophylly) and, although the levels of tannin polyphenols were similar in the two species, Q. lobata appeared to be a better quality food plant for oak moth larvae.

WEDNESDAY JULY 11TH 1984 9.00 - 9.15 PM

PHOTOTOXIC EFFECTS OF NATURAL POLYACETYLENES AND THIOPHENES ON INSECT HERBIVORES. D.E. Champagne, J.T. Arnason, B.J.R. Philogène and J. Lam*, Dept. of Biology, University of Ottawa, Ottawa, Ont. and *Dept. of Organic Chemistry, University of Aarhus, Aarhus, Denmark.

Polyacetylenes and thiophenes, characteristic of the Asteraceae, are known to photosensitize a variety of microorganisms but little is known about their effects on herbivorous insects. We incorporated a series of 4 polyacetylenes and 3 thiophenes into an artificial diet at 100 µg/g (0.3-0.5 mM), which was fed to the dark-sided cutworm, Euxoa messoria, with and without exposure to near U.V. (2 $w \cdot m^2$). Three acetylenes and two thiophenes depressed larval growth by 30-50% even without photoactivation; phenylheptatriyne (PHT), PHT acetate, and α-terthienyl (α-T) were also phototoxic. Growth depression is due to feeding inhibition, light-independent interference in nutrient metabolism, and light-dependent toxicosis. The relatively low concentrations able to produce toxic effects suggests that these secondary metabolites present a significant barrier to nonadapted insect herbivores, and play an important role in plant defense.

Supported by NSERC.

WEDNESDAY JULY 11TH 1984 9.15 - 9.30 PM

EVALUATION OF ALPHA-TERTHIENYL AS A CONTROL AGENT FOR MOSQUITO LARVAE. J.T. Arnason, B.J.R. Philogène and P. Morand, Biology and Chemistry Departments, University of Ottawa, Ottawa, Canada.

New methods to synthesize alpha-terthienyl (α-T) on a large scale have permitted field and laboratory evaluation of this naturally occurring phototoxin from plants for blackfly and mosquito control. The acute toxicity of α-T to blackfly larvae (Similium verecundum) was LC_{50}-LC_{90} = 28-70 ppb. In field trials effective control of 3rd and 4th instar larvae of Aedes intrudens was achieved with application of 0.1 kg/ha to natural breeding pools. Similar results were found in simulated pool trials conducted under more controlled conditions with laboratory-reared Aedes atropalpus larvae. Alpha-terthienyl is non persistent with a half-life of ~4 hours in sunlight. The results suggest possible use of the phototoxin for mosquito control.

WEDNESDAY JULY IITH 1984 9.30 - 9.45 PM

MECHANISM OF PHOTOSENSITIZATION BY POLYACETYLENES AND THIOPHENES FROM THE PLANT FAMILY ASTERACEAE. D.G. McLachlan, J.T. Arnason & J. Lam*, Dept. of Biology, University of Ottawa & *Dept. of Organic Chemistry, University of Aarhus, Denmark.

The mechanism of photosensitization by polyacetylenes and thiophenes from species of the plant family Asteraceae was examined. Under aerobic and anaerobic conditions, thiophenes were found to be photodynamic sensitizers, while with polyacetylenes both photodynamic and non-photodynamic mechanisms were observed. Relative toxicities of polyacetylenes and thiophenes were generally similar, although in vitro singlet oxygen production was considerably less for polyacetylenes than thiophenes, which is indicative of an alternative mechanism of action for polyacetylene photosensitization. In vitro rates of photodegradation of polyacetylenes were higher than for thiophenes suggesting that bond breaking/formation processes are more favored relative to energy transfer to oxygen for polyacetylenes than for thiophenes. Structure/function relationships were examined on the basis of water octanol partition coefficients and photon absorption. Generally thiophenes were more toxic and had higher partition coefficients than acetylenes. Thiophenes also had much higher relative light absorption than acetylenes although relative toxicities were similar which suggests that acetylenes undergo an alternative, more efficient, phototoxic mechamism.

Supported by NSERC.

WEDNESDAY JULY IITH 1984 9.45 - 10.00 PM

PLANT AND MAMMALIAN HORMONE INTERACTIONS

A. M. Gawienowski, Dept. of Biochemistry,
University of Massachusetts, Amherst, Massachusetts

It is known that mammalian hormones can alter the sex of a plant and that typical mammalian steroid hormones have been isolated from plants. The plant hormone gibberellic acid has about one twentieth the estrogenic activity of estradiol and is synergistic with estradiol. Gibberellic acid has androgenic, progestational as well as glucocorticoid activity in mammals. Our laboratory also revealed the inhibition of gibberellic acid action in mammals by a prostaglandin inhibitor. There are interactions of the plant hormones in mammals and mammalian hormones in plants.

THURSDAY JULY 12TH 1984 9.00 - 9.50 AM.

ADAPTATION TO RESOURCE AVAILABILITY AS A DETERMINANT OF CHEMICAL DEFENSE STRATEGIES IN WOODY PLANTS. J.P.Bryant, P. Reichardt, T. Clausen, F.S. Chapin III. Institute of Arctic Biology, University of Alaska, Fairbanks, Alaska 99701.

Woody plants adapted to low resource environments have a limited capacity acquire resources and store their carbon and nutrient reserves in parts eaten by herbivores. These traits limit their capacity for compensatory growth that would otherwise allow replacement of parts eaten by herbivores. Consequently these plants have responded to herbivory by evolving strong constitutive defenses. Woody plants adapted to high resource environments are selected for rapid growth and competitive ability. Moreover, because high resource environments are frequently a result of severe disturbance, for example wildfire, high resource adapted plants are often selected for a high capacity for compensatory growth. In these plants evolution has favored allocation of resources to growth related processes rather than strong constitutive defenses. Herbivore attack during the juvenile growth phase is particularly detrimental to woody plant fitness because it reduces competitive ability during establishment and occurs at ages of high reproductive value. Consequently, all woody plants are more strongly selected for defense during juvenility than maturity. This ontogentic variation in defense is most strongly expressed in woody plants adapted to high resource environments because of their requirement for competitive ability and their plasticity in resource allocation. Decreased light or increased growth because of increased mineral

nutrition causes carbon stress in woody plants and carbon stress causes reductions in carbon based defenses. Evidence from studies designed to test these predictions in a boreal forest is presented. This experimental evidence demonstrates that phytochemical defenses against generalist herbivores are based upon specific molecules that are present in (active) concentrations ranging from a few tenths of a percent dry mass plant part to 30% dry mass. In agreement with prediction, plants adapted to low resource environments have very efficient constitutive defenses and less defensive plasticity during ontogeny than plants adapted to high resource environments. Furthermore, preliminary experiments inidicate that carbon stress leads to a reduction in the concentration of defensive molecules in a rapidly growing tree, Alaska paper birch.

Bioassays of deterrent chemicals from both high and low resource adapted plants with snowshoe hares demonstrate that variation in defense of plant species and both growth stages and parts within individual plants is based upon qualitative and quantitative variation in defensive chemistry. Minor structural modifications of deterrent molecules can have dramatic effects upon their efficies as herbivore deterrents and levels of defensive substances can vary by more than an order of magnitude between growth stages and parts within individual plants. This chemical variation and experimental studies of snowshoe hare use of boreal woody plants suggests that the multispecies dietary requirement of generalist browsing mammals is based upon avoidance of overingestion of toxic secondary metabolites rather than avoidance of generalized digestion-inhibiting substances. The implications of these results for theories of plant-herbivore interactions are discussed.

THURSDAY JULY 12TH 1984 9.50 - 10.40 AM.

PHEROMONAL COMMUNICATION BETWEEN PLANTS. David F. Rhoades, Department of Zoology, University of Washington, Seattle, Wa 98195.

Experiments designed to detect defensive responses of Sitka willow trees were conducted by comparing the nutritional quality to insects,and chemistry, of leaves from willows experiencing attack by tent caterpillars or webworms to those of nearby unattacked willows. Results suggested that responses occurred not only in the attacked trees but also in the unattacked ones. Excavation revealed no subterranean connections between the trees.

The results of these experiments, together with the knowledge that plants generally emit small quantities of terpenes, ethylene and other volatile compounds into the atmosphere, and that the amount and type of emission can be altered by damage of plants, led me to suggest that plants were sensitive to airborne pheromonal signals emitted by nearby attacked plants.

Subsequent experiments by other workers supports this hypothesis. If defensive communication between plants exists, we can expect plant consumers to have evolved offensive counteradaptations which interfere with this process.

THURSDAY JULY 12TH 1984 11.15 - 11.30 AM

THE EFFECT OF ARTIFICIAL DEFOLIATION ON THE SESQUITERPENE LACTONE CONTENT OF HELIANTHUS MAXIMILIANI. J. Gershenzon and T. J. Mabry, Dept. of Botany, Univ. of Texas, Austin, TX 78712 and D. L. Marshall, Dept. of Botany and Plant Science, Univ. of California, Riverside, CA 92521

Recent studies have shown that herbivory, like fungal or bacterial attack, can induce increased levels of defensive compounds in certain species of plants. We investigated the effects of artificial defoliation on the concentration of sesquiterpene lactones in the leaves of Helianthus maximiliani. Half of the leaves were removed from several clones during the middle of the growing season. The concentration of sesquiterpene lactones increased an average of 40% in these defoliated clones and decreased an average of 20% in undefoliated control clones. Defoliation had no effect on sesquiterpene lactone composition. Since sesquiterpene lactones have been shown to inhibit the growth and feeding of several insects that feed on Helianthus species, the response of H. maximiliani to defoliation may help to reduce further predation on plants that have already suffered extensive damage.

THURSDAY JULY 12TH 1984 11.30 - 11.45 AM

CHEMICAL DETERMINANTS OF RHESUS MONKEY FOOD CHOICE. David L. Marks, Boston University Biological Science Center, Boston MA 02215.

The influence of plant chemistry on rhesus monkey (Macaca mulatta) food choice was studied by chemically analyzing plants collected during a feeding study of wild rhesus monkeys in Pakistan. Both preferred and non-preferred plant items were collected and analyzed for tannins, alkaloids, fiber, lignin, sugars, total free amino acids and protein.

Highly favored foods were generally high in total protein and/or sugars. Several of these items were found to contain essential amino acids in quanities which could satisfy the amino acid requirements of the rhesus.

Eaten items were on average significantly lower in protein-precipitating capacity (astringency) than items which were never eaten. All other chemical measurements including those for condensed and hydrolyzable tannins were not significantly different between preferred and non-preferred plants.

THURSDAY JULY 12TH 1984 11.45 - 12.00 PM

CHEMICAL CORRELATES OF HOWLER MONKEY'S FOOD CHOICE. Mahmut Bilgener, Boston University Science Center, Boston MA 02215, Kenneth E. Glander, Duke University Department of Anthropology, Durham, NC 27715 and Tony Swain, Boston University.

Howler monkeys (Alouatta palliata) are the largest leaf-eating primates of the New World. They spend a large portion of their feeding time on 15 of 96 tree species in Costa Rica. They even select certain individual trees in a species.

Analysis of food and non-food items (65 samples from 12 families and 19 species) showed a strong correlation between the total protein content and feeding time. Condensed tannins and total phenolics were also positively correlated with feeding time. This suggests that tannins are not an important factor adversely affecting howler food choice, although they are negatively correlated with in vitro digestibility of the plant samples.

THURSDAY JULY 12TH 1984 12.00 - 12.15 PM

DIET SELECTION BY DOMESTIC GOATS BROWSING BLACKBRUSH: IMPORTANCE OF PRIMARY AND SECONDARY PLANT COMPOUNDS

by Frederick D. Provenza and John C. Malechek, Utah State Univ., Logan, UT 84322

Blackbrush (Coleogyne ramosissima) is a spinescent shrub occurring in nearly monospecific stands in the southwestern United States. Winter browsing by domestic goats stimulates spring twig production by blackbrush plants. Current season's twigs produced by older branches growing on the outer edges of the plant canopy (terminal branches) were higher in crude protein (1.9%) and in vitro digestible dry matter (10%) than older terminal twigs, but current season's terminal twigs contained 2.4 times more tannins than older twigs. Within blackbrush plants, current season's twigs on sprouts and younger branches (basal branches) were slightly higher in crude protein (0.4%) and in vitro digestible dry matter (3%) than current season's terminal twigs, and terminal twigs contained 1.3 times more tannins than basal twigs. Goats browsing current season's twigs during winter consumed diets higher in crude protein, in vitro digestible organic matter and tannins than did goats browsing older twigs. They also lost less weight than their counterparts browsing older twigs. When given a choice, however, goats preferred not to eat current season's twigs, presumably because of their high tannin concentrations and their location within the plant canopy.

THURSDAY JULY 12TH 1984 12.15 - 12.30 PM

SEASONAL CHANGES IN THE DIET OF CANADA GEESE: THE ROLE OF MARSH PLANT CHEMISTRY

Robert Buchsbaum and John Wilson. Boston University Marine Program, Woods Hole, MA.

Canada geese feeding in salt marshes select their plant food using different types of chemical cues in different contexts. In the spring they eat graminaceous plants and avoid most forbs because the forbs are higher in phenolics and some types of terpenoids. Of the plants that are high in phenolics, a number are astringent but lack typical condensed and hydrolyzable tannins. Two closely related species of Salicornia are distinguished by geese because one contains an ether soluble deterrent. Unlike many other herbivores, however, geese are insensitive to cyanogenic glycosides and at least one kind of sesquiterpene lactone.

In the summer the diet of geese switches from marsh graminoids to the submerged angiosperm, Zostera marina. This switch is caused by the declining nutrient content of graminoids and changes in the nutritional needs of geese rather than by any changes in levels of secondary metabolites. Z. marina provides a source of easily digestible calories because it is lower in cell wall constituents and higher in soluble carbohydrates than marsh plants. Geese depend on this plant for building up energy reserves.

THURSDAY JULY 12TH 1984 1.45 - 2.00 PM

SULFATED FLAVONOIDS: A NOVEL CLASS OF SULFUR COMPOUNDS IN BRICKELLIA (ASTERACEAE)

Barbara N. Timmermann, University of Arizona, Department of Pharmaceutical Sciences, Tucson, AZ 85721 and Tom J. Mabry, University of Texas, Department of Botany, Austin, TX 78712.

During the detailed biochemical systematic investigations of the New World genus Brickellia, we have isolated and characterized several new sulfated flavonoids in addition to highly methoxylated flavone and flavonol aglycones and glycosides.

Although flavonoid sulfates appear to be rare in the Plant Kingdom, recent studies have indicated that these novel conjugates of phenolic compounds with inorganic sulfate occur in nature in plants inhabiting saline, gypseous or marshy areas. Our studies have revealed, however, that these compounds also accumulate in large amounts in species adapted to arid and semiarid environments. The discovery of sulfated flavonoids in Brickellia has led us to develop new reactions and methods for their separation and identification.

Chemistry, role as taxonomic markers, and possible ecological significance of sulfated flavonoids from Brickellia will be discussed.

THURSDAY JULY 12 TH 1984 2.00 - 2.15 PM

A NOVEL SULFATED BIFLAVONOL & A FLAVONOL SULFOTRANSFERASE FROM *FLAVERIA CHLORAEFOLIA**

D. Barron, S. Hadjis, L. Colebrook, B. Timmermann & R. Ibrahim, Chem. Graduate Faculty & Biol. Dept., Concordia University, Montreal and College of Pharmacy, Univ. of Arizona.

A major sulfated flavonoid was isolated from *C. chloraefolia* (2mg/g FW). UV, IR and ^{1}HNMR spectra displayed a blocked 7-OH group, an S=O linkage and 9 aromatic protons, resp.; the latter indicating two flavonoid rings. Mild acid hydrolysis of this compound yielded two flavonols with distinct R_f values and UV spectra and SO_4" which precipitated with $BaCl_2$. One flavonol was unequivocally identified as quercetin; the other tentatively identified as a quercetin derivative with an additional substitution on ring A. The fact that the 7-OH groups of both flavonols became free after acid hydrolysis semms to indicate that these positions may be sulfated in the parent compound.

A sulfotransferase, which utilized PAP^{35}S as sulfate donor, was partially purified from the same tissue and transferred SO_4"groups to a number of hydroxyl groups of quercetin; thus indicating the presence of several flavonol sulfotransferases in this tissue.

* Supported by NSERC & FCAC grants and University funds.

THURSDAY JULY 12TH 1984 2.15 - 2.30 PM

CHARACTERIZATION OF VASCULAR PLANT MATERIAL IN SEDIMENTS OF BUZZARDS BAY, MA.
Wilson, John O. Biology Dept., Boston University, Boston, MA.

Export from salt marshes and fluvial transport of land-derived vascular plant material have been implicated as significant sources of organic matter in coastal waters. The presence of vascular plant remains in these coastal sediments can be established through the use of lignin oxidation products.

Lignins are phenylpropane polymers incorporated in the cell walls of most vascular plants as support structures. Lignins yield simple phenolic compounds as oxidation products and these products can then be used to indicate the nature of the original plant source. For instance, gymnosperm lignins yield p-hydroxyl and vanillyl monomers while angiosperm lignins yield p-hydroxyl, vanillyl, and syringyl monomers.

Results from cupric oxide oxidation of sediments from Buzzards Bay indicate that grasses contribute the bulk of the lignin in these sediments. The lignin oxidation product pattern is very similar to that obtained from the dominant marsh grass, Spartina alterniflora, particularly in terms of the observed high concentrations of p-coumaric and ferulic acids. Terrestrially-derived organic matter makes up a significant fraction of the total organic matter in nearshore sediments from Buzzards Bay.

THURSDAY JULY 12TH 1984 2.30 - 2.45 PM

COMPOUND 30.4B AND C, FURTHER NOVEL 1,4-BENZOXAZIN-3-ONE GLUCOSIDES FROM CORN (ZEA MAYS). N. Le-Van and S. J. Wratten, Monsanto Agricultural Products Company, 800 N. Lindbergh Blvd., St. Louis, MO 63167, USA.

Cyclic hydroxamic acids (e.g. 1) are present in the cereal grasses, maize, wheat and rye and have been reported to be important in the resistance of these plants to fungi and insects [1]. We have recently reported the structure of an unusual chlorinated 1,4-Benzoxazin-3-one (BOA) glucoside, compound 30.4 (2), isolated from young corn roots [2]. As in the case of compound 30.4, the isolation of the new compounds required that the young roots be fixed in liquid nitrogen, pulverized, and rapidly extracted with acetone to avoid enzymatic hydrolysis. This paper describes the isolation and structure determination of two new members of this structural class, compound 30.4B (3) and 30.4C (4). Their structures were established by a combination of spectroscopic techniques (^{1}H, ^{13}C NMR, MS, UV and IR) and chemical transformations.

THURSDAY JULY 12TH 1984 2.45 - 3.00 PM

APPLICATION OF 2D-NMR AND HETERONUCLEAR MULTIPULSE DEPT TECHNIQUE IN THE STRUCTURAL DETERMINATION OF NEW 1,4-BENZOXAZIN-3-ONE DERIVATIVES. N. Le-Van and S. J. Wratten, Monsanto Agricultural Products Company, 800 N. Lindbergh Blvd., St. Louis, MO 63167.

Three new 1,4-Benzoxazine-3-one derivatives (BOA) have recently been isolated from corn roots [1,2], in addition to the known metabolites. This paper describes the application of 2-dimensional homonuclear shift-correlated spectroscopic techniques, as well as the ^{13}C-NMR heteronuclear multipulse DEPT technique (= Distorsionless Enhancement by Polarization Transfer) in the structural elucidation of these natural products. The assignment of all protons could be made using the ^{1}H shift-correlated technique (COSY). ^{13}C-NMR data of other BOA derivatives obtained using the DEPT technique is also presented.

THURSDAY JULY 12TH 1984 3.00 - 3.15 PM

STRUCTURES OF ROBUSTADIALS A-D, ISOLATED FROM THE LEAVES OF EUCALYPTUS ROBUSTA. John Synder, Department of Chemistry, Boston University, Boston, MA 02215.

The leaves of Eucalyptus robusta are used in Chinese herbal medicine to treat malaria. The ethanol extract of the leaves was found to be toxic to the malaria-inducing protozoa Plasmodium bergheii. From this extract, the four major components believed to be the active constituents were isolated. The structures of these compounds, robustadials A-D were resolved using spectroscopic techniques. Especially important to the structure determination was the application of the two-dimensional nuclear magnetic resonance techniques, J-resolved spectroscopy and correlated spectroscopy. Current work on the determination of the absolute stereochemistry of these molecules will also be presented.

THURSDAY JULY 12TH 1984 3.30 - 3.45 PM

IDENTIFICATION OF THE CYANOGENIC GLYCOSIDE AND PARTIAL CHARACTERIZATION OF VICIANIN HYDROLASE FROM DAVALLIA TRICHOMANOIDES BLUME. Pauline A. Lizotte and Jonathan E. Poulton, Dept. of Botany, University of Iowa, Iowa City, IA 52242.

Upon maceration, young fronds and fiddleheads of the fern Davallia trichomanoides release hydrogen cyanide. The cyanogenic compound was extracted from fern tissue in boiling 80% methanol, purified by cellulose column chromatography and recrystallized from benzene: methanol (1:1, v/v). The cyanogen was identified as vicianin (the β-vicianoside of (R)-mandelonitrile) by mass spectrometry, proton-NMR and 13C-NMR and by comparison with authentic vicianin isolated from Vicia angustifolia seeds. A β-glycosidase, vicianin hydrolase, was partially purified from Davallia trichomanoides fronds using ion-exchange chromatography and chromatofocusing (pI= 4.5). At the optimum pH of 6.0, this enzyme showed highest activity with (R)-vicianin, releasing mandelonitrile and the disaccharide vicianose.

THURSDAY JULY 12TH 1984 3.45 - 4.00 PM

CHANGES IN LIMONIN AND NARINGIN DURING CALLUS INITIATION AND PLANT REGENERATION IN CITRUS SP. Gary A. Barthe and Richard L. Mansell. Biology Dept., U. of South Fla., Tampa, FL 33620. In cultured albedo explants the concentration and content of both limonin and naringin decreased rapidly during the first three weeks of culture. Thereafter the decrease continued but at a slower rate; over a culture period of 42 weeks the total decrease was 99%. Examination of a 2-5 year-old callus from a variety of Citrus sp. showed a wide variation in concentration as did cell suspension cultures. During regeneration of plants from the callus tissue there is a strong correlation between the stage of plantlet regeneration and limonin and naringin content. 95 percent of the total limonin in regenerated tissue was found in the A-ring lactone form.

THURSDAY JULY 12TH 1984 4.00 - 4.15 PM

RADIOLABELING OF TRICHOME EXUDATE DITERPENES IN TOBACCO LEAF PETIOLES

G. J. Wagner and C. Keene, Agronomy Dept., U. of Kentucky, Lexington, KY 40546

A method was devised wherein cored petioles of maturing tobacco leaves were filled with aqueous solutions containing ^{14}C-Na acetate or ^{14}C-mevalonic acid lactone. Seven days after labeling petioles of Nicotiana tabacum T.I.-1068, 0.5 to 0.75% of the introduced label was recovered with trichome exudate. Extracts obtained from ^{14}C-acetate labeled petioles were fractionated on silica (Waters Sep/Pac #51900) by sequential elution. Hexane, methylene chloride, acetonitrile, methanol and H_2O eluted 4, 12, 50, 12 and 20% of the applied label, respectively. The fraction eluted with acetonitrile and crude exudate were chromatographed using C-18 reverse phase HPLC and fractions of the eluate were analyzed for radioactivity. In both samples, 37 and 14% of the label was eluted as components having the same retention as the α and β anomers, respectively, of 4, 8, 13-duvatriene-1,3diol. The diterpenes were shown to be principal constituents of unlabeled exudate from T.I.-1068 by gas chromatography of butyl boronic acid derivatized exudate. Ratios of α and β anomers observed by gas chromatography and radiolabeling were similar. Three labeled unknowns were also observed by HPLC and are being studied. Distribution of labeled diterpenes in tissue ~~and trichome components is also being examined.~~

THURSDAY JULY 12TH 1984 4.15 - 4.30 PM

SITOSTEROL AND STIGMASTEROL BIOSYNTHESIS IN TOBACCO SEEDLINGS. Claus Grunwald, Illinois Natural History Survey and University of Illinois, Champaign, IL 61820.

Radioactive mevalonic acid (MVA) is readily incorporated into the two major plant sterols sitosterol and stigmasterol. Using MVA, sitosterol is labeled first and in greater amounts than stigmasterol and thus it has been suggested that sitosterol, via dehydrogenase, may give rise to stigmasterol; however, direct evidence for this enzyme is poorly documented. Six-day-old tobacco seedlings rapidly incorporated and metabolized sitosterol ^{14}C but incorporation into stigmasterol was only negligible. After 24 hr, 65% of the incorporated sitosterol was recovered as free sterol, 7% as steryl glycoside, and 2% as steryl ester. Recovery of radioactivity from free stigmasterol was 1% (background) of free and did not increase with time. However, a digitonin precipitable radioactive component with a R_f value quite similar to stigmasterol was identified. Simultaneous incorporation experiments with MVA-^{14}C and sitosterol-^{3}H revealed that MVA, but not sitosterol, served as substrate for stigmasterol. The data suggest that sitosterol and stigmasterol do not have a simple precursor-product relationship but that both sterols arise from a common precursor.

THURSDAY JULY 12TH 1984 4.30 - 4.45 PM

SYNTHESIS OF SUBSTITUTED CINNAMOYL CoA ESTERS AS SUBSTRATES FOR A CHALCONE SYNTHASE FROM *CHRYSOSPLENIUM AMERICANUM**

Denis Barron and Ragai Ibrahim, Chemistry Graduate Faculty and Department of Biology
Concordia University, Montreal, Québec, Canada H3G 1M8

C. americanum accumulates a number of flavonols that are substituted at positions 3,5,6,7,2',4' and/or 5'. Except for the 4'-position, it is not known whether ring B substitution is determined at the phenylpropanoid or flavonoid level. In order to study the substrate specificity of the chalcone synthase of this tissue, a number of mono-, di- and trisubstituted cinnamoyl CoA esters were synthesized chemically and purified by HPLC. Their structure was verified by UV and NMR spectroscopy.

The partial purification of the chalcone synthase will be presented and its acceptor ability for these substrates will be discussed.

* Supported by NSERC & FCAC grants and University funds.

THURSDAY JULY 12TH 1984 4.45 - 5.00 PM

STUDIES ON THE BIOSYNTHESIS AND METABOLISM OF THE PYRENOCINES IN CULTURES OF THE ONION PINK ROOT PATHOGEN, *PYRENOCHAETA TERRESTRIS*.
Salvatore A. Sparace and J. Brian Mudd, ARCO Plant Cell Research Institute, 6560 Trinity Ct., Dublin, California 94568

Pyrenochaeta terrestris (Hansen) Gorenz, Walker, and Larson, the causal agent responsible for the onion (*Allium cepa*) pink root disease, accumulates three pyrones known as pyrenocines A, B, and C when grown in potato dextrose liquid medium. These metabolites show varying degrees of phytotoxicity and may be involved in pathogenesis. During the period of rapid pyrenocine accumulation [1]-^{14}C-acetate, [2]-^{14}C-acetate, ^{14}C-formate, and [methyl]-^{14}C-methionine are all readily incorporated into all pyrenocines while R-[2]-^{14}C-mevalonate does not serve as a precursor indicating that the pyrenocines may be methoxy substituted polyacetates and not terpenoid in nature. After 18 hours of incubation with precursor, radioactive pyrenocines represent approximately 5% of the offered label when acetate or formate are the precursors and greater than 25% of the offered label when [methyl]-^{14}C-methionine is the precursor. Pulse-chase experiments using ^{14}C-acetate suggest the involvement of an, as yet, uncharacterized precursor and that pyrenocine A may be derived from pyrenocine C.

THURSDAY JULY 12TH 1984 5.00 - 5.15 PM

BIOSYNTHETIC RELATIONSHIPS OF THE PROTOBERBERINE ALKALOIDS:
C.Wm.W. Beecher and W.J. Kelleher, The University of Connecticut, School of Pharmacy, Storrs, CT

While the origins of all of the atoms of the protoberberine skeleton have long been known, the interrelations of most members of this large and variable class remain unresolved. We have resolved these interrelationships for the alkaloids produced by a protoberberine-producing callus tissue. Through the employment of enzyme extracts and radioactively labeled substrates, we have been able to examine single reactions, in contrast to the multi-step sequences usually obtained when classical feeding methods are used. Our results have enabled us to establish the relationships among the four protoberberine alkaloids produced by a callus culture of Berberis aggregata. The alkaloids investigated include columbamine, jatrorrhizine, berberine, palmatine and their respective tetrahydro derivatives, viz. isocorypalmine, corypalmine, canadine and rotundine.

FRIDAY JULY 13TH 1984 9.00 - 9.15 AM

THE CHARACTERIZATION OF AMYGDALIN HYDROLYZING ENZYMES IN Prunus serotina SEEDS.
Gary W. Kuroki and J.E. Poulton. Department of Botany, University Iowa, Iowa City, IA 52242.

Black cherry (Prunus serotina Ehrh.) seeds accumulate high concentrations of the cyanogenic disaccharide amygdalin (the β-D-gentiobioside of (R)-mandelonitrile). Hydrolysis of amygdalin occurs in a sequential manner by the action of two distinct β-glucosidase activities, namely, amygdalin hydrolase (AH) and prunasin hydrolase (PH). Both enzymes have been partially purified from black cherry seeds. Their behavior towards a variety of glycosidic substrates indicates a high specificity for their respective endogenous cyanogenic substrate. Further purification of AH and PH suggests multiple forms of each enzyme may exist. These apparent isozymes differ only slightly in their isoelectric points as determined by analytical isoelectric focusing. Whether these multiple forms exist in vivo or are generated as artifacts of the isolation and purification procedures will be discussed.

FRIDAY JULY 13TH 1984 9.15 - 9.30 AM

PURIFICATION AND CHARACTERIZATION OF AN AOH-METHYLTRANSFERASE FROM ALTERNARIA tenuis

E. E. Stinson and R. A. Moreau, Eastern Regional Research Center, ARS, NER, USDA, 600 E. Mermaid Lane, Philadelphia, PA 19118

A new methyltransferase was identified in the mold Alternaria tenuis NRRL 6434. This methyltransferase catalyzes the methylation of alternariol, a phenolic mycotoxin, to produce alternariol monomethyl ether. The methyl doner is S-adenosyl-L-methionine. Unlike many fungal S-adenosylmethionine methyltransferases, this activity is cytosolic and is not associated with any particulate fraction. This enzyme activity exhibits a pH optimum at 8. Divalent cations appear to stimulate methyltransferase activity. Despite apparent structural similarity of the substrate to substituted coumarins and cinnamic acids, no activity towards these compounds has been observed.

FRIDAY JULY 13TH 1984 9.30 - 9.45 AM

LYSINE DECARBOXYLASE IN TISSUE CULTURES OF HEIMIA SALICIFOLIA.

Lenore A. Pelosi, Ana Rother, J.M. Edwards, School of Pharmacy, University of Connecticut, Storrs, Connecticut 06268.

The aim of our research has been to obtain a better understanding of the phenomenon of altered secondary metabolism in certain plant tissues when grown as cell or callus cultures. The biosynthesis of phenyl- and biphenylquinolizidine alkaloids in Heimia salicifolia is repressed below detectable limits in all nonchlorophyllous heterotrophic cultures, both callus and suspension, which we have developed to date. This observation led us to speculate that chloroplasts might represent the degree of morphologic differentiation necessary for the biosynthesis of the Heimia alkaloids.

Lysine decarboxylase catalyzes the decarboxylation of lysine to cadaverine, diverting lysine from primary metabolism in the first step of the biosynthesis of the phenylquinolizidines. The enzyme has been quantitated and partially characterized in our tissue cultures, in an attempt to gain a better understanding of the factors which might be limiting the capacity of our undifferentiated cultures to produce alkaloids.

FRIDAY JULY 13TH 1984 9.45 - 10.00 AM

METABOLISM OF THIOPHENE DERIVATIVES IN TAGETES PATULA SEEDLINGS

R. Suetfeld, Bot. Inst. d. WWU., Schlossgarten 3, D-4400 Muenster, W.-Germany

During the first days of growth, various thiophene derivatives accumulate in Tagetes seedlings. Their accumulation pattern observed point to an intensive metabolism during this developmental stage. As yet, a screening for enzymes involved in either biosynthetic or turnover steps yielded in the detection of four specific reactions: 1. 4-Acetoxybutinylbithiophene:4-acetate esterase (Suetfeld and Towers, 1982) (1). 2. 4-Hydroxybutinylbithiophene (acetyl-CoA):4-acetate transferase. 3. 3,4-Diacetoxybutinylbithiophene:3-acetate esterase. 4. A further specific enzyme which metabolizes a fourth thiophenic substrate isolated from Tagetes. The structure of this particular substrate could not be established as yet. - The purified enzymes exhibit different biochemical properties. As far as investigated until now, their specific activities during seedling development concur very well with the accumulation curves of their respective substrates in the natural system.

(1) Suetfeld, R. and G.H.N. Towers, Phytochemistry 21, 277-279 (1982)

FRIDAY JULY 13TH 1984 10.00 - 10.15 AM

SUBSTITUTION OF GERMANIUM FOR BORON IN SUSPENSION-CULTURED CARROT CELLS

Robert W. Durst and W. David Loomis, Dept. of Biochemistry and Biophysics, Oregon State University, Corvallis, Oregon 97331

Germanate forms chemical complexes similar to those formed by borate. Previous studies with whole plants suggested that Ge could replace B as a nutrient for a few days, but not for longer periods (McIlrath & Skok, 1966, Pl. Physiol. 41, 1209). To reevaluate this question we have used suspension-cultured carrot cells and found that Ge can substitute for B in this system. Ge cultures have been maintained through repeated subculturing for more than a year. Optimum concentration for Ge was 0.45 mM with a range for half-maximum growth of 0.03-8 mM. The same cell line growing in B medium has an optimum of 0.3 mM and a half-maximum range of 0.002-9 mM. Cellular concentrations of B or Ge rise slowly with increasing culture medium concentration until toxic levels are reached, at which point cellular levels increase rapidly. Doubling time at optimum concentration is ca. 3 days for Ge and ca. 2 days for B.

Preliminary results indicate that protoplasts isolated from cells grown at optimum B or Ge concentration contain less than 3% of the B or Ge present in the intact cells.

FRIDAY JULY 13TH 1984 10.15 - 10.30 AM

WATER DEFICIT REACTIONS IN RAPE SEEDLINGS

Svenningsson H., Svenningsson M. & Liljenberg C.
Dept of Plant Physiology, University of Göteborg, Sweden.

The present investigation is part of a stress physiology program going on in our lab.

The reactions of severe water deficit stress were followed by measuring the following parameters; ROOT EXUDATES were collected from Brassica seedlings grown under sterile conditions. The hydrophobic part of the exudate was analysed and in part characterized after stress. The levels of abscisic acid and glucosinolates of the roots increased remarkably as a response to stress. The total amounts of ACYL LIPIDS of the roots as well as the amounts of the major membrane lipid components, the PHOSPHOLIPIDS, decreased on dry weight basis after stress. The EPICUTICULAR WAX of the seedling leaves was found to increase after the first stress period. After three consecutive stress periods no significant difference in the amount of epicuticular wax was found between stressed and non-stressed seedlings. However, the CUTICULAR RATE was lower after the first, as well as after the third stress period than that of the control plants.

FRIDAY JULY 13TH 1984 10.45 - 11.00 AM

SYNTHESIS OF FLAVONOIDS ON ENDOPLASMIC RETICULUM ASSOCIATED ENZYME COMPLEXES.

Geza Hrazdina, Department of Food Science and Technology, Cornell University, Geneva, N. Y. 14456 and George J. Wagner, Department of Agronomy, University of Kentucky, Lexington, Kentucky 40546-0091

We have investigated the possible role of membrane bound multienzyme complexes in phenylpropanoid and flavonoid metabolism using three tissues by 1) correlating enzyme induction kinetics and rates, 2) by examining the molecular weight of the putative complexes, 3) channeling of substrates, 4) the susceptibility of bound activities to trypsin digestion and 5) investigating the structurally linked latency of bound activities. Results suggest that at least a part - and possibly the entire pathway - from phenylalanine to flavonoids is partially or completely endoplasmic reticulum bound, and that this metabolism is facilitated by a multienzyme complex.

FRIDAY JULY 13TH 1984 11.00 - 11.15 AM

UPTAKE OF FERULIC ACID AND p-HYDROXYBENZOIC ACID BY INTACT AND EXCISED ROOTS OF CUCUMBER SEEDLINGS

Jodi Shann and Udo Blum
North Carolina State University, Raleigh, NC

The uptake of ferulic acid and p-hydroxybenzoic acid - two commonly isolated allelochemicals - was investigated using excised roots and whole plants of cucumber. Depletion of the phenolic acids from solution, and quantification of root and shoot contained (^{14}C-labeled) phenolic acids were used in the calculations of plant uptake. Rates of uptake were determined for concentrations of phenolic acid ranging from 0.1 to 1.0 mM and under varying solution conditions. Conditions tested included: high or low nutrient levels, aerated or non-aerated solutions, and pH levels of 4.0 to 7.0. Uptake of both phenolic compounds was concentration dependent. Solution conditions such as pH and state of aeration effected the uptake of ferulic acid, with greatest rate of uptake occuring at pH's below the pKa (4.75) and under aerated conditions.

FRIDAY JULY 13TH 1984 11.15 - 11.30 AM

A NEW TECHNIQUE FOR GLUCOSINOLATE ANALYSIS.--Susan S. Martin and Lynn L. Hoefert, USDA, ARS, Crops Research Laboratory, Colorado State University, Ft. Collins, CO 80525, and P.O. Box 5098, Salinas, CA 93915.

The thioglucoside bond of glucosinolates is hydrolyzed by the enzyme glucosinolate glucohydrolase (EC 3.2.3.1). The resulting aglucone spontaneously rearranges to products of several chemical classes, typically including isothiocyanates, thiocyanates, nitriles, and epithio compounds. We used the nonfluorescent thiol reagent dibromobimane to trap the enzymatically produced aglucone of sinigrin (allyl glucosinolate), forming a fluorescent derivative with optimal fluorescence at excitation 380 nm and emission 475 nm. The *in vitro* reaction with sinigrin reached maximal fluorescence in 60 to 90 minutes at 23 C, typical of the enzymatic hydrolysis of sinigrin. We have made initial use of this technique for glucosinolate localization at the cellular and subcellular level and for assay of myrosinase activity. Other uses for the technique and similar procedures based on the same principle can be envisioned.

FRIDAY JULY 13TH 1984 11.30 - 11.45 AM

DEVELOPMENTAL ASPECTS OF FLAVONOIDS IN LENTILS (LENS ESCULENTA).

Anju Koul and Constance Nozzolillo, Department of Biology, University of Ottawa, Ottawa KIN 6NJ, Canada.

Roots, stems, leaves, flowers and fruits were harvested from two cultivars of lentils one anthocyanin-producing, the other not, at various stages of development. Methanol extracts were "finger-printed" by 2-dimensional TLC and by HPLC. The patterns of vegetative tissues were similar for the two cultivars and showed no obvious qualitative differences with age. Compounds in the root were quite different from those in the shoot. Both stem and leaves had a similar pattern dominated by flavone glycosides. Flavonoid patterns of the flower and fruit were different from those of vegetative parts and dominated by the flavonol, quercetin-3-rhamnoside. Condensed tannins, procyanidin and prodelphinidin, were detected only in flower parts and seed coats of the anthocyanin-producing cultivar. Anthocyanins appeared in the basal stem region and as stripes in the petals of the same variety. Stem pigments were predominantly delphinidin glycosides.

FRIDAY JULY 13TH 1984 11.45 - 12.00 PM

RELATIONSHIP BETWEEN SEED SIZE AND CALCIUM CONTENT IN SOME MEMBERS OF THE GENUS CUCURBITA

Irene Ockenden and John N. A. Lott
Department of Biology, McMaster University, Hamilton, Ontario, L8S 4K1

The fruit produced by various species within the genus Cucurbita range from large, edible squash to small, bitter tropical gourds. The seeds of these species show more than a ten-fold variation in size and a considerable variation in the total embryonic calcium as measured by atomic absorption spectroscopy. The 20 mg embryos of Cucurbita andreana contain about three times more calcium per gram of embryo tissue than the 200 mg embryos of Cucurbita maxima var. Warted Hubbard. There is also a significant negative correlation between seed size and calcium level within the same species. This correlation is present even in seeds of different size obtained from one fruit. The larger, heavier seeds generally have a lower concentration of calcium. The variation of calcium concentration in seeds from fruits of different size from the same and different vines is also discussed.

The PSNA welcomes the following new members:

Dr. Alois Bell
USDA, Southern Region National Cotton Pathology Research Lab.
P. O. Drawer JF
College Station, TX 77841

Dr. Nagi R. Achhireddy
University of Florida
Inst. of Food and Agri. Sci.
Citrus Res. and Ed. Center
700 Experimental Station Road
Lake Alfred, FL 33850
Interests in: Herbicides, Allelochemics,
Growth Regulators, Photosynthesis & N-metabolism

Dr. Murray B. Isman
Dept. of Plant Science
University of British Columbia
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Interests in: Toxicity and fate of plant natural
products in insects

Mr. Kevin Simcox
N-519 Turner Hall
Dept. o Plant Pathology
Univ. of Illinois
Urbana, Il 61801
Interests in: Host-pathogen interactions
phytoalexins, Fungal elicitors

Dr. Michael M. Martin
Division of Biological Sciences
Univ. of Michigan
Ann Arbor, MI 48109
Interests in: Symbiosis, plant-animal interactions,
Insect nutrition

Dr. Henry Yokoyama
Fruit and Chemical Vegetable Lab.
USDA, 263 South Chester Ave.
Pasedena, Ca 91106

Dr. Tibor Fuleki
Horticultural Products Laboratory
Horticultural Research Institute of Ontario
Ontario Ministry of Agriculture and Food
Vineland Station, Ontario, Canada LOR 2EO
Interest in: Phenolics, Anthocyanins,
Flavonoids, Isolation of Natural Products

Proposed Constitutional change for PSNA:
A proposal has been submitted to the PSNA Executive Committee to change the voting system for officers of the PSNA. The present system elects officers by majority vote of members present at the annual business meeting. The proposed change would involve a mail ballot sent to all members. This change will be discussed at the Annual Business Meeting in Boston, Mass. this year.

Positions Open:

Biotechnologist: Applications are invited from qualified persons with a Ph.D. in biotechnology, bioengineering, or a related field, and a proven ability to conduct independent research in the areas of fermentation, microbial transformations, and biomass processing. The successful candidate will be expected to pursue a vigorous research program, including proposal development. Annual salary is $29,000 with funds provided by grants or contracts (50%) and state support (50%). Please send curriculum vitae, list of publications, statement of research interests and three letters of recommendation to: Dr. Joseph J. Hoffmann, Director, Bioresources Research Facility, University of Arizona, 250 E. Valencia Rd., Tucson, AZ 85706.

Items of Interest to Phytochemists: Courses Offered--PLANT CELL AND TISSUE CULTURE COURSE--A course consisting of lecture-discussions and laboratory exercises in most aspects of plant cell and tissue culture will be held at the University of Tennessee, Knoxville from August 13-24, 1984. This course is designed for persons with a degree in science or experience in plant tissue culture who need a thorough knowledge of and training in plant cell and tissue culture. The course will cover extablishment, growth, nutrition and handling of single cells, callus cultures, suspension culturea and organ cultures. The status, methodology and prospects of protoplasts, cryogenic storage and production of drugs and chemicals by plant cell cultures will be covered. Mutant selection, cell cycle analysis and cytogenetics in cultures will be major topics. The faculty members of the course are D. Dougall, R. Henke, K. Hughes, from the Botany Department; Dr. Paul Bottino, Department of Botany, University of Maryland and Dr. Alan Gould, Pfizer Central Research, Groton, Connecticut.

This course will be limited to eighteen participants. Fees for the course will be $1100 per person, and places will be reserved in th order of receipt of fees.

For further information please contact Dr. D. K. dougall, Botany Department, The University of Tennessee, Knoxville, TN 37996-1100 (615/974-2256).

Meetings of Interest to Phytochemists:

America Society of Plant Physiologists - University of California at Davis. Aug. 12-17, 1984.

Tissue Culture Association, Inc. - June 3-7, 1984. Shamrock Hilton Hotel, Houston, Tx. "Hormone Actions in Cultured Cells" contact G. J. MCGarrity (609) 966-7377.

PSNA - June 12-16, 1985 - Asilomar Conference Center, Pacific Grove, CA. "Shikimate Pathway and Some Recent Developments."

PSNA - July 14-18, 1986 - Beltsville Agricultural Research Center, Beltsville, MD "Phytochemistry of Environmental Pollution."

1984 Annual Meeting Phytochemical Society of North America
July 9th-13th 1984
Boston University, Boston MA 02215

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Thomas Steinharter	Dept. of Biological Sciences 2 Cummington St. Boston University Boston, MA 02215	
E.E. Stinson	Plant Science Laboratory USDA/ERRC Philadelphia, PA 19118	
Bruce B. Stowe	946A Kline Biology Tower Yale University Box 6666 New Haven, CT 06511-8112	(203)436-0419
* Raiuer Suetfeld	Botanisches Institut Westfaelische Wilhelms-Universitaet SchloBgarten 3 D-44 Muenster, West Germany	(Germany) 0251-833839
Helen Svenningsson	Dept. Plant Physiology Botanical Inst. University of Goteborg Carl Skottsbergs gata 22 Goteborg, Sweden S-413 19	(46)31 418700
* Tony Swain	Dept. of Biological Sciences 2 Cummington St. Boston University Boston, MA 02215	
Chung-Shih Tang	Dept of Agr. Biochemistry Univ. of Hawaii 1800 East-West Rd. Honolulu, Hawaii 96822	(808)948-7306
Barbara Timmermann	Dept. of Pharmaceutical Sciences Univ. of Arizona Tucson, Arizona 85721	(602)621-7928 626-1713

George J. Wagner	Dept. of Agronomy Univ. of Kentucky Lexington, KY 40546-0091	(606)257-5974
John Wilson	Dept. of Biological Sciences 2 Cummington St. Boston University Boston, MA 02215	
Patricia Younger	Faculte de Foresterie Dep. D'Ecologie Universite Laval Quebec, Quebec, Canada G1S 3W8	(418)656-7773
Baochen Zhang	Dept. of Agr. Biochemistry Univ. of Hawaii 1800 East-West Rd. Honolulu, Hawaii 96822	(808)948-7306

PHYTOCHEMICAL SOCIETY OF NORTH AMERICA

Newsletter

October 1984

Volume 24
Number 3

Executive Committee PSNA 1984 - 1985

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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 and the role of plant substances in related fields. Annual membership dues are $8.00 for regular members and $4.00 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. Changes in addresses and annual dues should be sent to the Society Treasurer.

Oct 1984

Minutes of the 24th Annual Business Meeting of PSNA
Boston University, July 12, 1984

The meeting was called to order by President Ibrahim at 5:30 p.m. In addition to the Executive Committee a quorum of members were present. Saunders read the minutes of the 1983 Annual Business Meeting which were published in the September PSNA Newsletter. Ibrahim motioned and Nozzolillo seconded that the minutes be accepted. The motion passed.

Ibrahim called upon Cooper-Driver to give a report of the 1984 Local Committee. She reported that the meeting seemed to be going quite well. Approximately 125 people had registered for the meeting and approximately 30 new members had joined the PSNA at the meeting. (78 participants attended the banquet - most enjoyable - 20 took the tour through historic Lexington-Concord and 40 enjoyed the boat trip tour of Boston Harbor). There were 3 changes in the Symposium schedule during the last few months before the meeting. The names of the winners of the travel awards for 1984 were: Kevin Spencer from Irvine, CA, Kelsey Downum from Irvine, CA, and Jonathan Gershenzon from Pullman, Washington.

Conn suggested that the PSNA thank the local committee headed by Cooper-Driver, Swain for a very well run meeting.

Chan gave a report of the 1985 PSNA meeting to be held in Asilomar, CA, June 12-16, 1985. The symposium topic will be "Shikimate Pathway, Recent Developments." The Local Committee is composed of Bock Chan, Eric Conn, Verne Singleton, and Juanita Ladyman. The list of symposium speakers is as follows:

SHIKIMATE PATHWAY
Recent Developments

Speakers:

Floss, Heinz G. Dept. of Medicinal Chemistry Purdue University West Lafayette, IN 47907	"An Overview"
Jensen, Roy A. Dept. of Chemistry and Biology State University of NY Binghamton, NY 13901	"Alternate Route of Phenylalanine and Tyrosine Biosyntheses"
Amrhein, Nicholas Lehrstuhl fur Pflanzenphysiologie Ruhr - Universitat D-4630 Bochum Federal Republic of Germany	"Regulation and Inhibition of the Shikimate Pathway"
Barlett, Paul Dept. of Chemistry University of California Berkeley, CA 94720	"Bio-Rational Designed Inhibitors of the Shikimate Pathway"
Haslam, Edwin Dept. of Chemistry University of Sheffield Sheffield 537HF United Kingdom	"Benzoic Compounds: Biochemistry and Chemistry"

Kosuge, T.
Dept. of Plant Pathology
University of California
Davis, CA 95616

"Indole Plant Hormones: Biochemistry

Pelter, Andrew
Chemistry Department
University College of Swansea
Swansea, United Kingdom

"Lignans: Biochemistry and Chemistry"

Leistner, E.
Institut fur Pharmazeutische Biologie
Nussallee 6
D-5300 Bon 1
Federal Republic of Germany

"Quinones - biochemistry"

Moore, Harold
Dept. of Chemistry
University of California
Irvine, CA 92717

"Quinones - chemistry"

Brown, Stewart
Dept. of Chemistry
Trent University
Peterbrough, Ontario
K9J 7B8, Canada

"Coumarins - biochemistry"

Dreyer, David L.
Plant Protection Phytochemistry
WRRC, ARS, USDA
800 Buchanan Street
Berkeley, CA 94710

"Coumarins - chemistry"

For further information, please contact: (415)486-3408

Bock G. Chan, Plant Protection Phytochemistry
WRRC, ARS, USDA
800 Buchanan Street
Albany, CA 94710

Saunders gave a report of the 1986 Local Committee. The meeting is to be held in Beltsville, MD. There will be two co-chairpersons on the Organizing Committee - James Saunders and Lynn Kosak-Channing. The dates for the meeting have been set for July 14-18, 1986 and the Symposium Topic will be on the "Effects of Environmental Pollutants on Plant Chemistry". The organizers plan to use broad definitions of pollutants to include air, soil, and water environments and address the changes in plant chemistry. Facilities will be at USDA and housing at local motels. Current prices range from $6 to $35 per night.

The Organizing Committee is actively seeking suggestions for symposium speakers. These should be sent to Saunders or Kosak-Channing, USDA, Bldg. 001, Rm. 116, Beltsville, MD 20705 (301)344-3477.

Dick Mansell gave a report on the 1987 meeting of the PSNA to be held in Tampa, FL at the University of South Florida. The topic will be on "Immunological and Instrumental Developments in Plant Science." Suggestions for symposium speakers should be sent to D. Mansell, Dept. of Biology, University of South Florida, Tampa, FL 33620 (813)974-2327.

The treasurers report was given by Poulton as follows:

Interim Financial Report
14 September 1983 - 31 December 1983

Receipts		Expenditures	
Membership dues	$544.00	1983 Annual Meeting (EC Travel)	$165.62
Royalties	7.69	Mailing lists	41.60
Mailing lists	90.00	Auditor	50.00
Refund from Tucson meeting	541.63	Treasurer expenses	142.32
Interest (Savings)	567.84	Secretary expenses (Newsletter)	400.00
Interest (Checking)	154.64		$ 799.54
	$1,905.80		

Summary

Receipts	$1,905.80
Expenditures	799.54
Net Gain	$1,106.26

Assets - 14 September 1983		Assets - 31 December 1983	
Checking	$5,967.15	Checking	$ 7,073.41
Savings	23,750.00	Savings	23,750.00
TOTAL	$29,717.15	TOTAL	$30,823.41

Interim Financial Report

1 January 1984 - 30 June 1984

Receipts		Expenditures	
Membership dues	$ 2,231.90	1984 Annual Meeting	$ 2,000.00
Royalties	3,709.24	1985 Annual Meeting	$ 1,250.00
Mailing list Sales	130.00	Directory Printing	853.11
Interest (Savings Acct.)	1,154.50	Postage Costs	368.37
Interest (Checking Acct.)	367.89	Treasurer's expenses	44.02
	$ 7,593.53	Foreign Exchange Debit	5.77
			$ 4,521.27

Receipts	$ 7,593.53
Expenditures	4,521.27
Net Gain	$ 3,072.26

Assets - 1 January 1984		Assets - 30 June 1984	
Checking	$ 7,073.41	Checking	$10,145.67
Savings	23,750.00	Savings	23,750.00
	$30,823.41	Total	$33,895.67

Members

Total 367	USA	273
	Canada	52
	Foreign	42

SUMMARY OF PSNA MEMBERSHIP 1979-1984

	Total Membership	Student	USA	Canada	Foreign
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	data unavailable	264	49	45
1984	367	38	273	52	42

Respectively submitted,
J. Poulton, Treasurer, PSNA

Saunders made motion to accept and Martin seconded that the treasurers report be accepted. Motion passed.

Ibrahim welcomed Eric Conn as Editor-in-Chief this year. He thanked Frank Loweus for the excellent job he had done as Editor-in-Chief for the last 5 years. Conn thanked the society for the position and indicated he would try to get the volume out a few months earlier.

Saunders gave a secretary's report. Saunders read a letter from Luis J. Corrvera the Secretary General of the Latin American Society of Phytochemistry, a newly established society as of November 1983. Saunders indicated correspondence and negotations were underway to have a joint meeting with the Phytochemical Society of Europe in 1986 or 1987. Saunders indicated that the books on display in the lobby would be donated to the Science and Engineering Library at Boston University.

Ibrahim gave a president's report. The Executive Committee had set up an Advisory Committee to give advice to the Executive Committee on such matters as Annual meetings and membership. The Executive Committee voted to continue the travel awards for another year. Ibrahim indicated that there is a possibility of a joint meeting with Group Polyphenols in 1988 or 1989.

Saunders read the following proposed Constitutional change.
Article VI
Section 1. Election of officers shall be by majority vote of mail ballots distributed to the membership by the secretary prior to the Annual Meeting of the Society.

A Nominating Committee consisting of the immediate Past-President as Chairperson and two members appointed by the President shall prepare a slate of nominations for Vice-President, Secretary and Treasurer. In addition, nominations will be solicited from the membership through the Society Newsletter. At least two names for each office will be presented to the membership, in writing by the Nominating Committee. Results of the elections will be announced at the Annual Business Meeting of the Society.

After discussion concerning the pro's and con's of the change Hrazdina motioned and Saunders seconded that the Executive Committee take the suggestions during the discussion and rework the proposed change for submission at the next Annual Business Meeting.

Hrazdina gave a report of the Nominating Committee:

Jonathan Poulton for Treasurer
George Wagner for Secretary
David Loomis for Vice-President

Nominations from the floor included Treavor Robinson for Vice President and Susan Martin for Secretary. Nominations from the floor were closed and ballot elections were held. Poulton was reelected Treasurer, Wagner was elected Secretary and Loomis was elected Vice President.

As there was no new business the meeting was adjourned by the new President Mansell at 6:27 p.m.

Respectfully submitted,
J. Saunders, Past-Secretary, PSNA

OUR GRATITUDE

The society wishes to express their gratitude for services well rendered to outgoing officers who were members of the 1983-84 Executive Committee, PSNA. They are: Dr. Geza Hrazdina, Dr. James A. Saunders, Dr. Frank A. Loewus.

PSNA TRAVEL AWARDS

The following were awarded travel grants for best papers submitted for the 1984 Boston meeting. There were 12 applicants.

Kelsey R. Downum, Dept. of Ecol. & Evol. Biology, UC - Irvine, CA
Kevin C. Spencer, Dept. of Ecol. & Evol. Biology, UC - Irvine, CA
Jonathan Gershenzon, Inst. of Biol. Chem., Washington State Univ., Pullman, WA

LOGO

Apparently the society does not have a logo for use on, for example, the cover of the newsletter? Should we have one? Have you any suggestions?

MEETINGS OF INTEREST

PSNA - June 12-16 at Asilomar Conference Grounds CA, symposium topic "Shikimate Pathway - Recent Developments." Preliminaries on meeting arrangements will appear in the December 1984 PSNA newsletter. American Society of Plant Physiologists.

ASPP - June 23-27 at Brown University, Providence, RI

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PHYTOCHEMICAL SOCIETY OF NORTH AMERICA

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Jonathan Poulton
Treasurer

Application for Membership

Date: _____

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_____

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Class of Membership Desired and Annual Dues (U.S. Funds): Regular ($8.00) _____

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Make check or money order payable to PHYTOCHEMICAL SOCIETY OF NORTH AMERICA and send with this application to the Treasurer at address above.

George J. Wagner
Secretary, PSNA
Department of Agronomy
University of Kentucky
Lexington, KY 40546-0091

SEND TO:

Dr. John T. Romeo
Dept. of Biology
Univ. of South Florida
Tampa, FL 33620

PHYTOCHEMICAL SOCIETY OF NORTH AMERICA

Newsletter

December 1984

Volume 24
Number 4

Executive Committee PSNA 1984 - 1985

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PEC 1984

First Announcement:

25th (Silver Anniversary) Annual Meeting of

the Phytochemical Society of North America

will be held on June 12-16, 1985 at the Asilomar Conference Center, Pacific Grove, CA 93950. This year marks the Silver Anniversary of the PSNA and plans are underway to celebrate this occasion by recognizing Society founders and early members and by reminiscing, hopefully with the help of accumulated photos and shared anecdotes. The executive and organizing committees wish to solicit the use of photos which reflect the Society's history. If enough interesting photos are gathered, they will be mounted and displayed in a central location at the meeting for all to enjoy. Connie Nozzolillo has volunteered her photos and will coordinate this effort. Please contact Connie if you plan to bring memorabilia.

The symposium topic, the "Shikimate Pathway: Recent Developments" will be covered by 11 lectures. A list of speakers and their topics is contained on the adjoining page and members are encouraged to detach the page and post it as a means of advertizing our meeting. The organizing committee (Bock G. Chan, Eric Conn, Juanita Ladyman and Vernon Singleton) has assembled a stimulating and balanced symposium agenda. As usual, the meeting will feature contributed papers and poster presentations on any topic in phytochemistry. Abstracts of papers and posters will be published in the issue of the newsletter circulated prior to the meeting.

It is hoped that an evening forum entitled "A Dialog Between Academic and Biotechnology Scientists", moderated by Terry Graham of Monsanto, will be a highlight of the meeting. One of the most advanced and promising efforts to genetically engineer higher plants concerns the shikimate pathway and the herbicide glyphosate (Monsanto is a leader in this effort). Therefore, it is most appropriate to discuss the present and future relationship of biotechnology and phytochemistry at this particular meeting which focuses on the shikimate pathway.

The meeting will be held in an ideal and picturesque location. The Asilomar Conference Center is located in the very scenic and historically rich Monterey Peninsula, California (See enclosed maps). The Center is best described as a serene, contemplative site on the edge of the Pacific Ocean. A unique and recently opened aquarium, Cannery Row, Carmel, 17-mile drive, Point Lobos, and other attractions are within 10 miles of the Conference Center. Several of California's earliest missions are nearby. Within 2 hours drive are San Francisco to the North, Hearst Castle to the South and Yosemite National Park to the East.

Estimated costs for the meeting will be:

First class meals, lodging and banquet*.	$240.00
Registration	55.00
Registration for students.	25.00

No registration charge for students contributing papers.

*This package price is the only one available at the conference center and is for the entire meeting period. Housing and meals for a partial period must be obtained at hotels,

campgrounds and restaurants available outside of but close to the conference center (along 17-mile drive and elsewhere). Further information about outside accommodations with approximate prices, addresses and phone numbers will be provided in the next newsletter.

There is limited space at the conference center (258 beds available). Asilomar Conference Center requires a firm commitment on meals and lodging registration by May 1 so it is necessary to have the registration and abstract deadline be April 15, 1985. The next newsletter - to be mailed in early February - will contain further details and forms for registration and abstracts. Mark your calendar for an April 15, 1985 registration and abstract deadline now! PSNA members are encouraged to register early.

The travel award program for students and young scientists will be continued at the 1985 Asilomar meeting. Up to 4 awards of $250.00 each are authorized. Those interested in applying should simply indicate this wish to Dr. Mansell and he will send instructions.

Any inquiries concerning the 1985 meeting should be made to Bock G. Chan, Plant Protection Phytochemistry, WRRC, ARS, USDA, 800 Buchanan St., Berkeley, CA 94710.

Other Business

Apparently a few members have not received their 1984 PSNA Directory. You should contact J. Poulton if you did not receive one.

The Society has received a formal invitation from the acting director of the USDA station at Beltsville, MD that we hold the 1986 meeting at that location. Lynn Kosak-Channing and Jim Saunders are the organizers. The symposium topic will be "Phytochemical effects of Environmental Compounds". For information contact Lynn Kosak-Channing, Research Chemist, Plant Genetics and Germplasm Institute, Beltsville, MD 20705.

New Members

The following new members are welcomed into the PSNA:

Dr. Edward L. (Ted) Tashian 5700 Ming Avenue, #73 Bakersfield, CA 93309	Seed production, tissue and pollen culture, secondary metabolites, plant nutrition.
Dr. David J. Robeson ARCO Plant Cell Res. Inst. 6560 Trinity Court Dublin, CA 94568-2685	Phytochemical aspects of plant host-pathogen interactions, including phytoalexin elicitation and the production of phytotoxic metabolites by phytopathogenic microorganisms.
Jeffrey Atkinson Department of Chemistry University of Ottawa Ottawa, Ontario Canada, K1K 3T6	Phototoxins and antifeedants, synthesis of natural products.
Dr. Vladimir F. Rasper Department of Food Science University of Guelph Guelph, Ontario Canada, N1G 2W1	Polyphenols, carbohydrates (functional behavior in cereal grains and cereal grain products)

Dr. Wendell Cottle
Hercules Res. Center
Lancaster Pike and Hercules Rd.
Wilmington, DE 19898
Terpene and phenolic biochemistry, fatty acids, lipids, pesticides, plant physiology.

Dr. Tibor Fuleki
Horticultural Products Lab
Ontario Ministry of Ag. and Food
Vineland Station, Ontario
Canada, LOR 2EO
Phenolics, anthocyanins, flavonoids, isolation of natural products, industrial applications

Dr. T.M. Seaman
Dept. of Agronomy and Soils
WSU
Pullman, WA 99164
Plant phenolics

Dr. Gladys Maina
National Agric. Labs
Box 14733
Nairobi, Kenya

Edwin S. Stewart
P.O. Box 49129
Austin, TX 78765
Sesquiterpene lactones of Helianthus

Dr. Anthony M. Gawienowski
Department of Biochemistry
University of Massachusetts
Amherst, MA 01003
Plant and Mammalian Hormone Interactions

Dr. Dan King
Departmentof Biology
University of South Florida
Tampa, FL 33620
Photosynthesis; cell/tissue cultures

Dr. Don P. Cheney
Biology Department
NE University
Boston, MA 02115
Products/chemicals produced by algae; chemical ecology

Dr. Michael M. Martin
Division of Biol. Sciences
University of Michigan
Ann Arbor, MI 48109
Symbiosis, plant-animal interactions, insect nutrition

Meetings of Interest:

Annual Meeting, American Society of Plant Physiologists and Canadian Society of Plant Physiologists (joint meeting), Brown University, Providence, Rhode Island, June 23-28, 1985.

Beltsville Symposia in Agricultural Research. X. "Biotechnology for Solving Agricultural Problems". May 5-9, 1985, Beltsville Agricultural Research Center, Beltsville MD. For information contact: Beltsville Symposium X Registration Office, U.S. Department of Agriculture, Blds. 001, Room 236, BARC-West, Beltsville, MD 20705.

"Third Biomass Energy Research Conference". Gainesville, Fla. March 12-24. Contact: Wayne H. Smith, Office of Conferences and Institutes, 1041 McCarty Hall, Institute of Food and Agricultural Sciences, Univ. of Florida, Gainesville, Fl. 32611. (904) 392-1511.

Professional Positions:

Please send information on staff, post-doctoral and fellowship opportunities in Phytochemistry so that we may help to disseminate this information.


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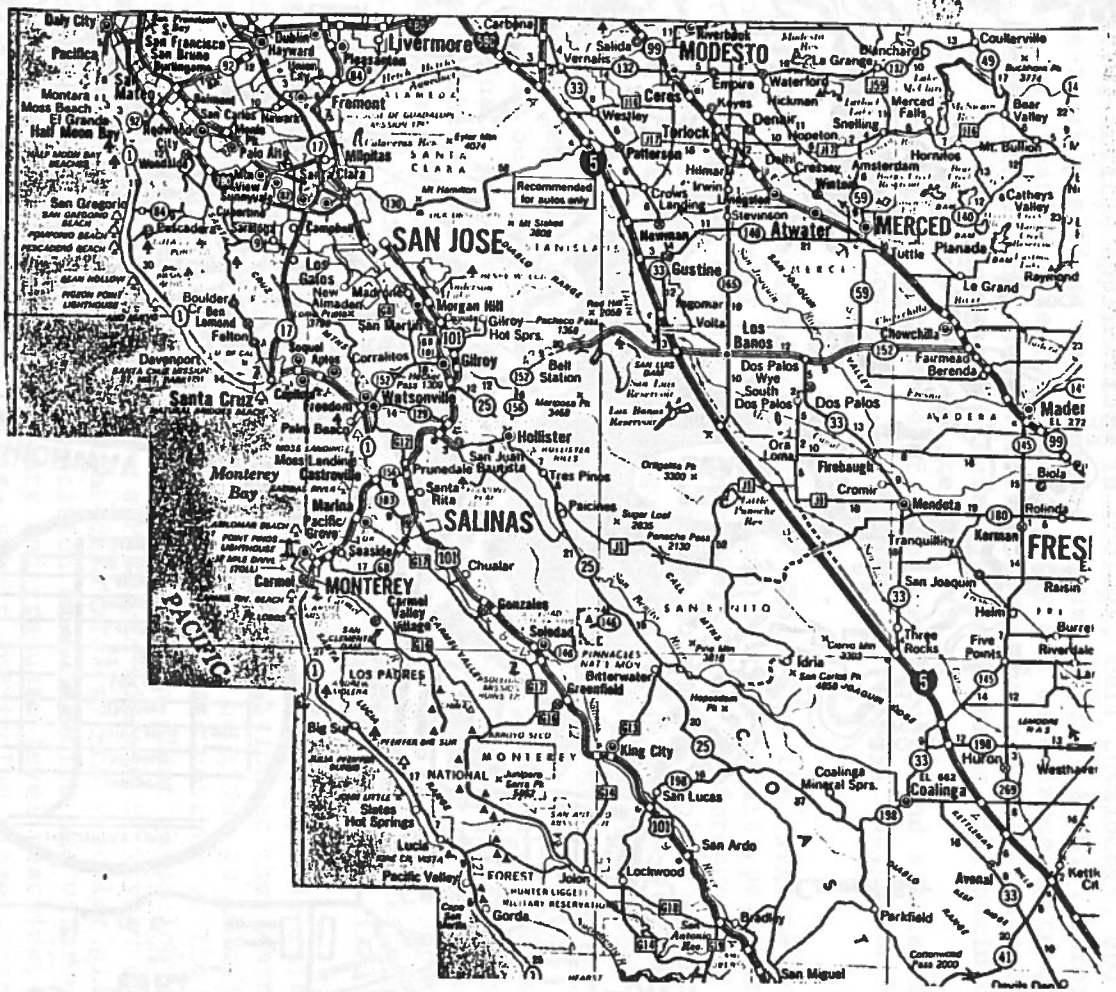
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Phytochemical Society of North America

25th Annual Meeting

June 12-16,1985

ASILOMAR
Conference Center
Pacific Grove,
California 93950

SHIKIMATE PATHWAY

RECENT DEVELOPMENTS

Speakers:

Floss, Heinz G. Dept. of Chemistry Ohio State University Columbus, OH 43210	"The Shikimate Pathway - An Overview"
Jensen, Roy A. Dept. of Chemistry and Biology State University of NY Binghamton, NY 13901	"Tyrosine and Phenylalanine Biosynthesis: Relationship Between Alternative Pathways, Regulation and Subcellular Localization"
Amrhein, Nicholas Lehrstuhl für Pflanzenphysiologie Ruhr - Universität, D-4630 Bochum Federal Republic of Germany	"Specific Inhibitors as Probes into the Biosynthesis and Metabolism of Aromatic Amino Acids"
Bartlett, Paul Dept. of Chemistry University of California, Berkeley, CA 94720	"Synthetic Organic Chemistry and The Shikimate Pathway: Inhibitors and Intermediates"
Haslam, Edwin Dept. of Chemistry University of Sheffield Sheffield 537HF, United Kingdom	"Hydroxybenzoic Acids and Enigma of Gallic Acids"
Kosuge, T. Dept. of Plant Pathology, University of California, Davis, CA 95616	"Indoleacetic Acid, Its Synthesis and Regulation: A Basis for Tumorgenicity in Plant Diseases"
Pelter, Andrew Chemistry Department Univ. College of Swansea Swansea, United Kingdom	"The Synthesis of Lignans"
Leistner, E. Institut für Pharmazeutische Biologie Nussallee 6, D-5300 Bonn 1 Federal Republic of Germany	"Biosynthesis of Chorismate - Derived Quinones"
Moore, Harold Dept. of Chemistry, Univ. of California Irvine, CA 92717	"Naturally Occurring Quinones as Bioreductive Alkylating Agents"
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Graham, Terry Monsanto Chemical Co. St. Louis, MO 63155	Moderator of Evening Forum: "A Dialogue Between Academic and Biotechnological Scientists"

Presented papers and posters
are encouraged.

Further Information, please contact: Bock G. Chan, Plant Protection Phytochemistry
WRRC, ARS, USDA, 800 Buchanan Street
Berkeley, CA 94710 (Phone: (415) 486-3408)

PHYTOCHEMICAL SOCIETY OF NORTH AMERICA

DEPARTMENT OF BOTANY • UNIVERSITY OF IOWA • IOWA CITY, IOWA 52242 • 319-353-6834

Jonathan Poulton
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Phytochemical Society of North America
George J. Wagner, Secretary
Department of Agronomy
University of Kentucky
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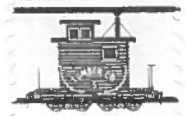

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Dept. of Biology
Univ. of South Florida
Tampa, FL 33620

PHYTOCHEMICAL SOCIETY OF NORTH AMERICA

Newsletter

December 1984

Volume 24
Number 4

Executive Committee PSNA 1984 - 1985

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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 $8.00 for regular members and $4.00 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.

PEC 1984

First Announcement:

25th (Silver Anniversary) Annual Meeting of

the Phytochemical Society of North America

will be held on June 12-16, 1985 at the Asilomar Conference Center, Pacific Grove, CA 93950. This year marks the Silver Anniversary of the PSNA and plans are underway to celebrate this occasion by recognizing Society founders and early members and by reminiscing, hopefully with the help of accumulated photos and shared anecdotes. The executive and organizing committees wish to solicit the use of photos which reflect the Society's history. If enough interesting photos are gathered, they will be mounted and displayed in a central location at the meeting for all to enjoy. Connie Nozzolillo has volunteered her photos and will coordinate this effort. Please contact Connie if you plan to bring memorabilia.

The symposium topic, the "Shikimate Pathway: Recent Developments" will be covered by 11 lectures. A list of speakers and their topics is contained on the adjoining page and members are encouraged to detach the page and post it as a means of advertizing our meeting. The organizing committee (Bock G. Chan, Eric Conn, Juanita Ladyman and Vernon Singleton) has assembled a stimulating and balanced symposium agenda. As usual, the meeting will feature contributed papers and poster presentations on any topic in phytochemistry. Abstracts of papers and posters will be published in the issue of the newsletter circulated prior to the meeting.

It is hoped that an evening forum entitled "A Dialog Between Academic and Biotechnology Scientists", moderated by Terry Graham of Monsanto, will be a highlight of the meeting. One of the most advanced and promising efforts to genetically engineer higher plants concerns the shikimate pathway and the herbicide glyphosate (Monsanto is a leader in this effort). Therefore, it is most appropriate to discuss the present and future relationship of biotechnology and phytochemistry at this particular meeting which focuses on the shikimate pathway.

The meeting will be held in an ideal and picturesque location. The Asilomar Conference Center is located in the very scenic and historically rich Monterey Peninsula, California (See enclosed maps). The Center is best described as a serene, contemplative site on the edge of the Pacific Ocean. A unique and recently opened aquarium, Cannery Row, Carmel, 17-mile drive, Point Lobos, and other attractions are within 10 miles of the Conference Center. Several of California's earliest missions are nearby. Within 2 hours drive are San Francisco to the North, Hearst Castle to the South and Yosemite National Park to the East.

Estimated costs for the meeting will be:

First class meals, lodging and banquet*	$240.00
Registration	55.00
Registration for students	25.00

No registration charge for students contributing papers.

*This package price is the only one available at the conference center and is for the entire meeting period. Housing and meals for a partial period must be obtained at hotels,

campgrounds and restaurants available outside of but close to the conference center (along 17-mile drive and elsewhere). Further information about outside accommodations with approximate prices, addresses and phone numbers will be provided in the next newsletter.

There is limited space at the conference center (258 beds available). Asilomar Conference Center requires a firm commitment on meals and lodging registration by May 1 so it is necessary to have the registration and abstract deadline be April 15, 1985. The next newsletter - to be mailed in early February - will contain further details and forms for registration and abstracts. Mark your calendar for an April 15, 1985 registration and abstract deadline now! PSNA members are encouraged to register early.

The travel award program for students and young scientists will be continued at the 1985 Asilomar meeting. Up to 4 awards of $250.00 each are authorized. Those interested in applying should simply indicate this wish to Dr. Mansell and he will send instructions.

Any inquiries concerning the 1985 meeting should be made to Bock G. Chan, Plant Protection Phytochemistry, WRRC, ARS, USDA, 800 Buchanan St., Berkeley, CA 94710.

Other Business

Apparently a few members have not received their 1984 PSNA Directory. You should contact J. Poulton if you did not receive one.

The Society has received a formal invitation from the acting director of the USDA station at Beltsville, MD that we hold the 1986 meeting at that location. Lynn Kosak-Channing and Jim Saunders are the organizers. The symposium topic will be "Phytochemical effects of Environmental Compounds". For information contact Lynn Kosak-Channing, Research Chemist, Plant Genetics and Germplasm Institute, Beltsville, MD 20705.

New Members

The following new members are welcomed into the PSNA:

Dr. Edward L. (Ted) Tashian 5700 Ming Avenue, #73 Bakersfield, CA 93309	Seed production, tissue and pollen culture, secondary metabolites, plant nutrition.
Dr. David J. Robeson ARCO Plant Cell Res. Inst. 6560 Trinity Court Dublin, CA 94568-2685	Phytochemical aspects of plant host-pathogen interactions, including phytoalexin elicitation and the production of phytotoxic metabolites by phytopathogenic microorganisms.
Jeffrey Atkinson Department of Chemistry University of Ottawa Ottawa, Ontario Canada, K1K 3T6	Phototoxins and antifeedants, synthesis of natural products.
Dr. Vladimir F. Rasper Department of Food Science University of Guelph Guelph, Ontario Canada, N1G 2W1	Polyphenols, carbohydrates (functional behavior in cereal grains and cereal grain products)

Dr. Wendell Cottle
Hercules Res. Center
Lancaster Pike and Hercules Rd.
Wilmington, DE 19898
Terpene and phenolic biochemistry, fatty acids, lipids, pesticides, plant physiology.

Dr. Tibor Fuleki
Horticultural Products Lab
Ontario Ministry of Ag. and Food
Vineland Station, Ontario
Canada, LOR 2E0
Phenolics, anthocyanins, flavonoids, isolation of natural products, industrial applications

Dr. T.M. Seaman
Dept. of Agronomy and Soils
WSU
Pullman, WA 99164
Plant phenolics

Dr. Gladys Maina
National Agric. Labs
Box 14733
Nairobi, Kenya

Edwin S. Stewart
P.O. Box 49129
Austin, TX 78765
Sesquiterpene lactones of Helianthus

Dr. Anthony M. Gawienowski
Department of Biochemistry
University of Massachusetts
Amherst, MA 01003
Plant and Mammalian Hormone Interactions

Dr. Dan King
Departmentof Biology
University of South Florida
Tampa, FL 33620
Photosynthesis; cell/tissue cultures

Dr. Don P. Cheney
Biology Department
NE University
Boston, MA 02115
Products/chemicals produced by algae; chemical ecology

Dr. Michael M. Martin
Division of Biol. Sciences
University of Michigan
Ann Arbor, MI 48109
Symbiosis, plant-animal interactions, insect nutrition

Meetings of Interest:

Annual Meeting, American Society of Plant Physiologists and Canadian Society of Plant Physiologists (joint meeting), Brown University, Providence, Rhode Island, June 23-28, 1985.

Beltsville Symposia in Agricultural Research. X. "Biotechnology for Solving Agricultural Problems". May 5-9, 1985, Beltsville Agricultural Research Center, Beltsville MD. For information contact: Beltsville Symposium X Registration Office, U.S. Department of Agriculture, Blds. 001, Room 236, BARC-West, Beltsville, MD 20705.

"Third Biomass Energy Research Conference". Gainesville, Fla. March 12-24. Contact: Wayne H. Smith, Office of Conferences and Institutes, 1041 McCarty Hall, Institute of Food and Agricultural Sciences, Univ. of Florida, Gainesville, Fl. 32611. (904) 392-1511.

Professional Positions:

Please send information on staff, post-doctoral and fellowship opportunities in Phytochemistry so that we may help to disseminate this information.

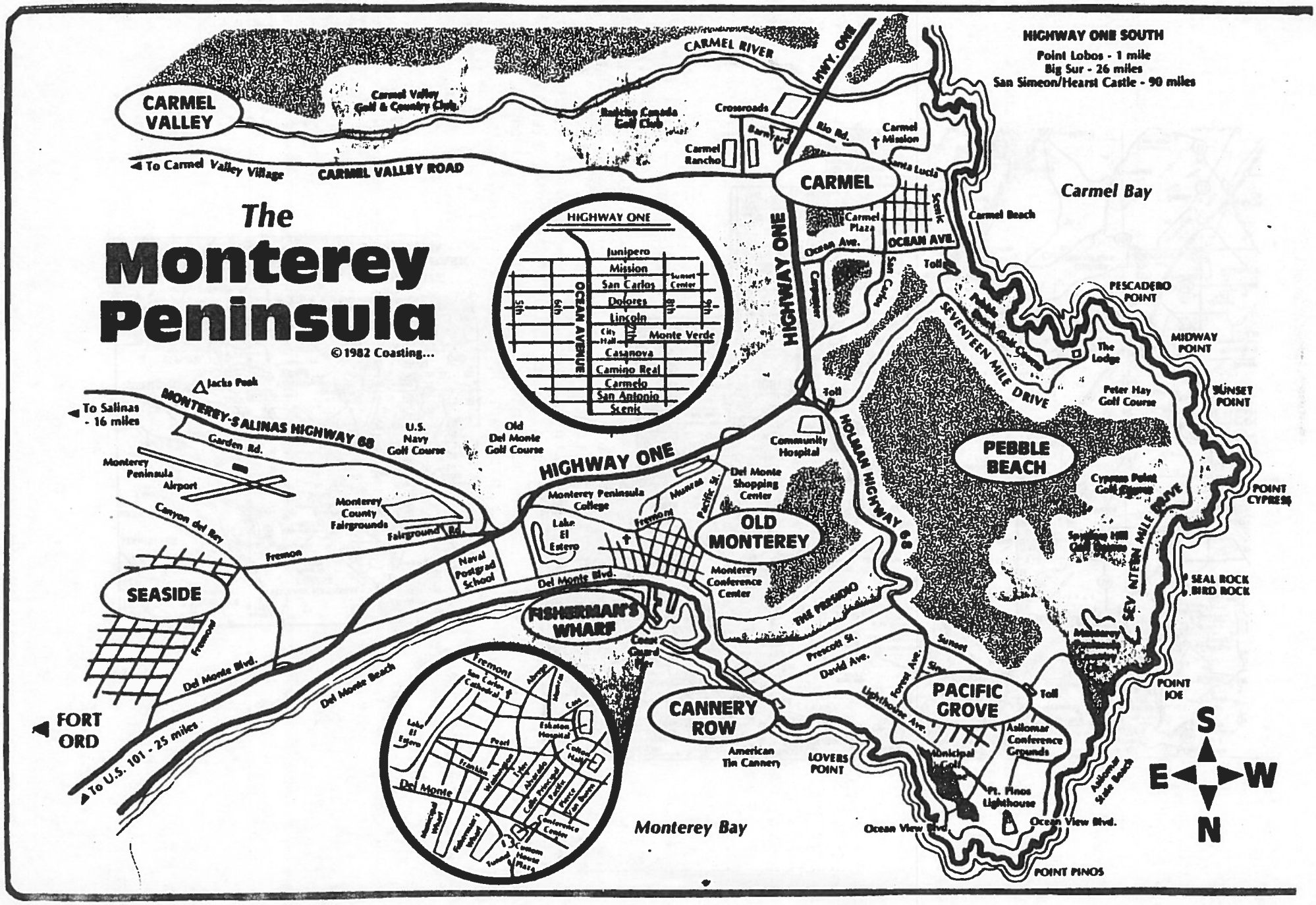
PLANT ECOLOGY/CELL PHYSIOLOGY/SYSTEMATICS. The Department of Botany, Louisiana State University, invites applications in ecology, cell physiology, and systematics for new tenure-track positions expected for August, 1985. A Ph.D. before appointment, evidence of creative research, and quality and experience in teaching are required. Responsibilities include developing an active research program and teaching introductory and specialty courses. Review of applications will begin on 1 December 1984 and continue until the positions are filled.

Send resume, names and addresses of three references, and a brief statement of research goals to: Search Committee, Department of Botany, LSU, Baton Rouge, LA 70803-1705.

PLANT MOLECULAR BIOLOGIST. The Department of Biology of the Virginia Polytechnic Institute and State University announces a tenure-track faculty position at the Assistant Professor level, available 1 September 1985. Preference will be given to candidates with a strong background in plant molecular biology with research interests in the structure, function, regulation and manipulation of chloroplast genes. However, candidates with research interests in the general area of plant molecular biology and demonstrated competence in recombinant DNA techniques are also encouraged to apply. Post-doctoral training is highly desirable. The successful applicant will be expected to establish an active research program and participate in the graduate and undergraduate instructional programs of the department.

Applicants should submit a curriculum vitae, a 2-3 page statement of research interests and names of at least three references to: Dr. A. Esen, Department of Biology, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061. Application deadline is January 15, 1985 or until the position is filled.

PLANT CELL/DEVELOPMENTAL BIOLOGIST. The Department of Botany, University of Minnesota, invites applications for a tenure-track position at the assistant professor level beginning fall 1985. Preference will be given to individuals interested in differentiation in vascular plants and its control at the cellular and tissue levels to complement the present faculty in plant physiology and plant molecular biology. Applicants must have a Ph.D., a minimum of 1 year of postdoctoral experience, and thorough training in plant cell biology and vascular plant development. Responsibilities include implementation of a creative and vigorous research program and participation in undergraduate and graduate level teaching, including plant cell biology, morphogenesis. Please submit curriculum vitae, transcripts, reprints of research articles, a statement of professional goals, research interests, and teaching experience, and three letters of recommendation by 15 February 1985 to: Dr. Willard L. Koukkari, Search Committee Chair, Department of Botany, 220 Biological Sciences Center, University of Minnesota, St. Paul MN 55108.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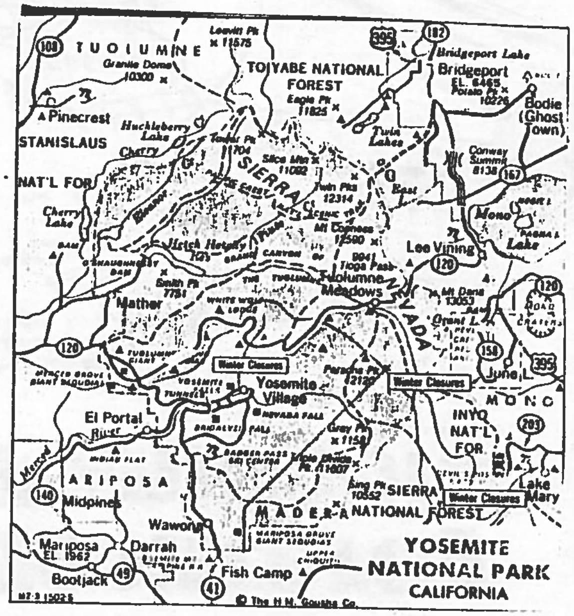
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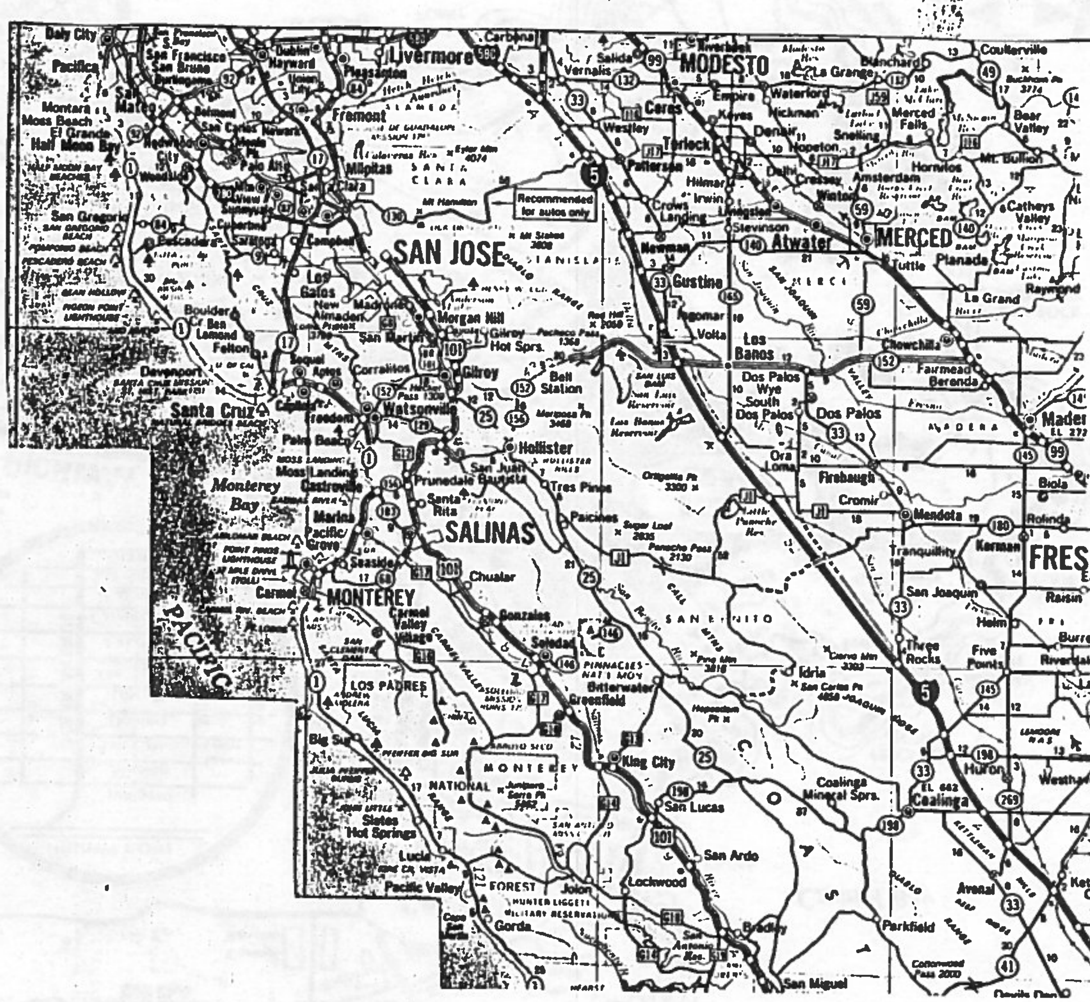
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Phytochemical Society of North America

25th Annual Meeting

June 12-16,1985

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California 93950

SHIKIMATE PATHWAY

RECENT DEVELOPMENTS

Speakers:

Floss, Heinz G. Dept. of Chemistry Ohio State University Columbus, OH 43210	"The Shikimate Pathway - An Overview"
Jensen, Roy A. Dept. of Chemistry and Biology State University of NY Binghamton, NY 13901	"Tyrosine and Phenylalanine Biosynthesis: Relationship Between Alternative Pathways, Regulation and Subcellular Localization"
Amrhein, Nicholas Lehrstuhl für Pflanzenphysiologie Ruhr - Universität, D-4630 Bochum Federal Republic of Germany	"Specific Inhibitors as Probes into the Biosynthesis and Metabolism of Aromatic Amino Acids"
Bartlett, Paul Dept. of Chemistry University of California, Berkeley, CA 94720	"Synthetic Organic Chemistry and The Shikimate Pathway: Inhibitors and Intermediates"
Haslam, Edwin Dept. of Chemistry University of Sheffield Sheffield 537HF, United Kingdom	"Hydroxybenzoic Acids and Enigma of Gallic Acids"
Kosuge, T. Dept. of Plant Pathology, University of California, Davis, CA 95616	"Indoleacetic Acid, Its Synthesis and Regulation: A Basis for Tumorgenicity in Plant Diseases"
Pelter, Andrew Chemistry Department Univ. College of Swansea Swansea, United Kingdom	"The Synthesis of Lignans"
Leistner, E. Institut für Pharmazeutische Biologie Nussallee 6, D-5300 Bonn 1 Federal Republic of Germany	"Biosynthesis of Chorismate - Derived Quinones"
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Jonathan Poulton
Treasurer

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