

PHYTOCHEMICAL SOCIETY OF NORTH AMERICA

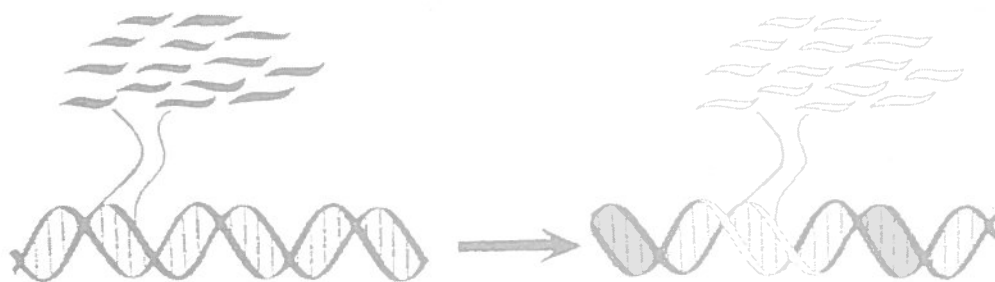
Vol. 3, No. 3 • Feb. 94

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# Newsletter

• Volume 3, Number 3 • Feb. 94 •

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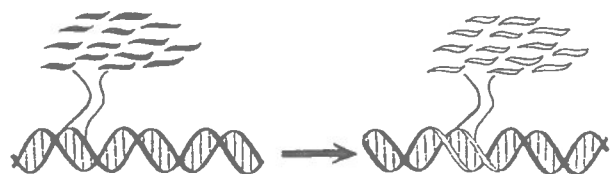
Dr. Neil Towers (1994, Chair)  
Dr. Jonathan Poulton (1995)  
Dr. David Seigler (1996)

Dr. Brian Ellis (1997)  
Dr. Murray Isman (1998)

## PSNA Newsletter

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Editor: **Dr. Alicja M. Zobel**



The Phytochemical Society of North America is a nonprofit scientific organization whose membership (currently over 400) is open to anyone with an interest in Phytochemistry, the role of plant substances, and related fields. Annual membership dues are U.S. \$20.00 for regular members and \$10.00 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 to the Society Secretary. Annual dues and changes in addresses should be sent to the Society Treasurer.

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## From the Editor

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**I**n the last edition of our Newsletter I seeded the idea of short (or longer) accounts about our members' research, with the thought that these would be of especial interest to younger members of the PSNA. Later, in the absence of any volunteers, four prominent members were personally approached to contribute for the present issue, but as we prepare to go to press nothing has yet been heard from these worthy people! Left to myself, I am now going to provide a nest egg in the hope that some of you will come forward and provide a nestful for future issues. You will find my

account on page 2, and I hope such reports can become a regular feature.

As usual, the central insert in this February issue contains full information about the annual conference, to be held this year in Mexico, D.F. on August 15-19. Included are a call for abstracts, an abstract submission form and a registration form. Also as usual, abstracts of papers to be presented will appear in the forthcoming June issue. Please note the dates of the 1995 meeting in Sault Ste. Marie under Upcoming Meetings.

It has been some time since a PSNA directory has been published,

and some information is incomplete or has become out dated. On page 8 of this issue of the Newsletter we are publishing E-mail addresses for some 50 of our members, which you may wish to photocopy and append to the current directory. Our treasurer, Susan McCormick, would be pleased to receive others for inclusion in later issues until a new directory is published.

*The Editor*

# Research Report

## Alicja M. Zobel

Much of my recent research, and indeed that through much of my career, has involved the development of new approaches to the localization of phenolic compounds in plant cells. While still at Warsaw University in Poland I developed cytochemical methods for evaluation of the DNA content in coenocytes, containing proanthocyanidins (formerly known as tannins), some of which reach a length of 32 cm and have up to 52 nuclei and their mother cells, proving that they are diploid in spite of their giant nuclei. I found the large size of these nuclei to result from increased amounts of unbound acidic and basic proteins, for whose determination cytophotometric methods had to be devised.

The most modern and precise localization approach was developed at Cornell University in collaboration with Dr. Geza Hrazdina, after he and his collaborators had produced chalcone synthase (CHS)-specific polyclonal antibodies. Immunogold labelling permitted us to locate CHS mostly on the cytoplasmic phase of the endoplasmic reticulum (ER), proving the theory of Hrazdina and George Wagner, based on biochemical evidence, that the ER is the production site of anthocyanins.

A specific category of phenolics, the furanocoumarins, has been a more recent subject of investigation. A method using autofluorescence of furanocoumarins in the light microscope, developed at Trent University in Canada, allowed these compounds to be histologically located on the surface and interior of plant leaves,

as well as in different compartments of the embryo, seed coat and fruit of species of the Umbelliferae, where they can react as autoinhibitors of germination. Compartmentation of these potentially dangerous compounds is the clue to their effectiveness in the plant. Much remains to be done, but the intriguing question asked in 1976 by Towers and co-workers, why these compounds do not kill the cells which produce them, can now be answered. In the process of biosynthesis on the ER they are encapsulated by membranes, and thus a tonoplast prevents phenolic compounds from moving into the cytoplasm. More attention to this particular cell membrane is certainly warranted. Furanocoumarin aglycones are extruded to the plant surface, sometimes in surprisingly large amounts, forming a very effective barrier against UV radiation, microbes and other "stress" conditions.

At present, here at Trent, we are collaborating with six other laboratories to investigate the possible use of furanocoumarins for benefit to humans, as anticancer drugs and antioxidants. We have found some compounds to retard or inhibit mitoses, but others do not, and still they were found clinically to cause shrinkage of cancer. This is again relevant to my interest in compartmentation of different activities in different parts of the cell. Such compounds influence the structure and cytochemistry of various organelles in different ways, changing their structures and chemistry. Our purely biochemical investigations have suggested that oxygen metabolism is altered, and we are

now struggling to investigate glycolysis by immunogold labelling in collaboration with Dr. Wm. Plaxton. Developing cytochemical and histochemical methods again appears to be my destiny. ■

## Journal News

### *Phytochemistry* Reduced Subscription Rate, 1994

Pergamon Press has advised us that the 1994 subscription rate to *Phytochemistry* for PSNA members will be US\$145. Anyone with queries regarding this or any other aspect of the Society's affiliation with the journal should contact Dr. Helen D. McPherson, Senior Publishing Editor, Chemistry and Chemical Engineering, Pergamon Press Ltd., Headington Hill Hall, Oxford OX3 0BW, U.K.

### *Chemoecology* Change of Publishers and Reduced Rate

Birkhäuser Verlag AG have announced that they have taken over the journal *Chemoecology* from Thieme Publishers, starting with Volume 4 of last August. The journal will appear quarterly, in one volume per year, comprising 240 pages. A reduced subscription rate of US\$98 (a \$100 reduction) is being offered to PSNA members. The change in ownership resulted in a delay and a publishing interruption, but the intention is to redress this problem and ensure regular publication this year.



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# Report of the Treasurer

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The treasury of the Phytochemical Society of North America ended the year with \$35 626.92 in accounts in Peoria. The accompanying financial statement shows that the major sources of receipts during 1993 were membership dues (\$5671.66) and royalties from the sales of Recent Advances in Phytochemistry (\$4558.32). In addition, our accounts with Plenum have been settled and we have been reimbursed for secretarial expenses and page charges from previous volumes (\$7832.00).

Although it is always difficult to agree on an accurate membership count, the membership remains fairly constant. There are now 400 members current in their dues through 1993. During 1993, 101 new members joined PSNA, 36 as a result of attendance at the Asilomar meeting. At the end of 1993, 51 members with dues in arrears were dropped from the membership.

The largest expenditures during 1993 were directed to the annual meetings: \$11,089.55 from the treasury in meeting-related expenses for the 1993 meeting at Asilomar. Gary Kuroki has provided a breakdown for the expenses for the 1993 meeting. In addition to those he lists, \$1089.55 was paid from the treasury for travel and a \$1500 deposit was paid to Asilomar (in 1992). This results in a net expenditure of \$9 301.67 to PSNA for the 1993 meeting. Three thousand dollars has been advanced for the 1994 meeting.

Savings are currently in CD accounts paying 3.75% inte rest. Unfortunately, the bank discontinued rising interest CD accounts which had final interest rates of 7 and 7.5%.

I would like to update the database with current address information, Email addresses and interests. An interest form is attached to the 1994 dues notice. If you do not receive a dues notice because your dues are current, please cut out and send the form in the center insert of this Newsletter to update your information. Members that expect to retire in 1994 are eligible for "emeritus status" and exemption from annual dues — please notify me if you are retiring but wish to remain a member of PSNA.

Respectfully submitted.

*Susan P. McCormick,*  
Treasurer,  
Phytochemical Society  
of North America

# Financial Report

JANUARY 01 - DECEMBER 31, 1993

## Receipts

Membership dues	\$ 5671.66
Plenum Publishing royalties on RAP	4558.22
secretarial expenses and page charges	7832.00
Interest on checking account	122.23
Rental of mailing lists	100.00
Reimbursements	
1992 meeting	3101.23
1993 meeting	7287.88
Secretary account	1216.76
1992 Best Poster	200.00
<b>Total</b>	<b>\$30 089.98</b>

## Expenditures

<b>Meetings</b>	
Advance for 1993 meeting	\$ 10 000.00
EC travel 1993	366.50
Speaker travel, 1993	1089.55
Advance for 1994 meeting	3000.00
<b>Executive Committee expenses</b>	
Secretarial	4000.00
Editor-in-Chief	2000.00
Treasurer	1880.68
<b>Total</b>	<b>\$22 336.73</b>

## Summary

Savings (interest)	\$ 1424.73
Savings (early withdrawal penalty)	-51.23
Checking - Receipts	30 089.98
Checking - Expenditures	-22 336.73
<b>Net Gain/Loss</b>	<b>\$ 9126.75</b>
<b>Assets</b>	
Checking	\$ 6772.43
Savings	\$28 854.49
<b>Total</b>	<b>\$35 626.92</b>

## 1993 PSNA Meeting Receipts and Expenditures

### Receipts

PSNA advance:	\$14 000.00
two checks for	2 000.00
one check for	10 000.00
Blackwell contribution	200.00
Pioneer contribution	1 000.00
registration fees	14 543.00
<b>Total</b>	<b>\$29 743.00</b>

### Expenditures

postage	\$ 425.83
flyers	760.34
poster boards	1 171.00
aquarium	4 109.82
speaker travel	5 803.00
wine	583.77
name tags	256.17
buses	255.00
student travel awards	2 400.00
Asilomar fees	2 165.90
service charges	58.29
<b>Total</b>	<b>\$22 455.12</b>

### Summary

	\$29 743.00
	-22 455.12
<b>Returned to PSNA</b>	<b>\$7287.88</b>

Gary W. Kuroki

# New Members

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## **Bienvenido a Mexico**

The PSNA will host the 1994 meeting in Mexico to celebrate the closer ties in North America between the United States, Mexico and Canada. The location site in Mexico City was chosen because it is the cultural heart of Mexico and will also encourage interaction with a larger group of Mexican researchers and graduate students. Mexico City is one of the great cities of the world featuring the famous Museum of Anthropology, the magnificent colonial city centre -"El zocalo"-, Chapultepec Park, the murals of the internationally known painters Rivera, Orozco and Siqueiros, and the contemporary architecture of the National University Campus. In addition, you may visit nearby Teotihuacan, one of the most impressive archeological sites in the world or the world heritage site, Xochimilco, where the precolumbian chinampa agriculture technique is still carried on. You will also enjoy the very sophisticated cuisine of central Mexico and the many other cultural opportunities in music and dance available.

### **Climate:**

The elevation of Mexico City (7000 feet) creates a pleasant climate year around. Daily maximums are in the 80 F's (28 C) in August and afternoon rainshowers are common. Air pollution is at a minimum at this year of year.

### **Travel:**

Most major US hubs have direct flights to Mexico City. Canada is serviced by Canadian Airlines. As in any major city, rental cars are not recommended in Mexico City because of the traffic congestion and lack of parking. At the airport use the authorized taxi service. Travel by subway (metro) or taxi is easy, convenient and very inexpensive.

### **General Information:**

No visa is required for travel to Mexico by Canadians or Americans, but a valid passport is required. A tourist card will be issued on entry or in advance at a Mexican consulate. Visitors are advised to exchange their currency to pesos (\$ 1 US = \$ 3.50 pesos) before or on arrival to avoid complications and carry all valuables, credit card and identification (including tourist card) in a money belt. On the other hand Mexico City is far safer than many large American cities and most areas can be visited on foot during the day without concern. All hotels and restaurants provide purified water on tap or in bottles. While there are many bargains to be had, Mexico is not as inexpensive as it once was due to the boom in the economy caused by NAFTA.

### **Conference Location:**

The Calinda Geneve Hotel is located in the Zona Rosa district of downtown Mexico and is over 100 years old. The hotel served as the residence and mailing address of the American natural products chemist Roussel Marker, one of the founders of Syntex, who worked out the commercial synthesis of progesterone fifty years ago.

PHYTOCHEMICAL SOCIETY OF NORTH AMERICA  
SOCIEDAD FITOQUIMICA DE AMERICA DEL NORTE  
SOCIÉTÉ PHYTOCHIMIQUE DE L'AMÉRIQUE DU NORD

1994 MEETING-MEXICO CITY  
PHYTOCHEMISTRY OF MEDICINAL PLANTS  
AUGUST 14-18, CALINDA GENEVE HOTEL

PRELIMINARY PROGRAM

The program will include symposium sessions, contributed paper and poster sessions. The meeting site is a beautiful typical Mexican hotel, well located in the Mexico City tourist district. A registration form is enclosed. The organizers suggest the use of a credit card for hotel reservation payment.

Urge your students to apply for travel grants and best student paper awards. Now is a good time to encourage students to join the Phytochemical Society of North America. An application form is on the inside of the back cover of every newsletter and copies of the PSNA brochure are available from the organizers.

A second modern but less expensive hotel, which is five minutes walk from the Calinda Geneve, is the Hotel Segovia Regency which has rooms starting at N\$ 150 (\$ 50 US). Please make reservations by contacting the hotel directly at (525)525-0391 fax or (525)525-0388 (voice).

If you wish to obtain additional hotel options, please contact: Ms. Mary Carmen Soberón, Le Blanc Tours, S. A., Séneca 116-A, México 11560, D. F., Fax: (525)280-8955; Phone: (525)280-7271. For further information on any aspect of the meeting, please contact: Dr. R. Mata, Apartado Postal 70-265, Coyoacán 04511. México, D. F.; fax: (525)622-5329; Dr. J. S. Calderón, fax (525)616-2203 or *E-mail* to [Delgado@redvax1.dgsca.unam.mx](mailto:Delgado@redvax1.dgsca.unam.mx)

PROJECTED SCHEDULE

<i>Sunday, August 14</i>	3.00-6.00 pm-	Registration
	7.00-10.00 pm	Mixer
<i>Monday, August 15</i>	AM	Opening session Symposium presentation (2 talks) Contributed papers (session 1)
	PM	Symposium presentation (1 talk) Contributed papers (session 2) Posters (session 1)
	AM	Symposium presentation (2 talks) Contributed papers (session 3)
	PM	Symposium presentation (2 talks) Posters (session 2)
<i>Tuesday, August 16</i>	AM	Symposium presentation (3 talks)
	AM-PM	UNAM Campus and Botanical Garden Visit
	Evening	Banquet
<i>Wednesday, August 17</i>	AM	Symposium presentation (2 talks) Contributed papers (session 3)
	PM	Contributed Papers (session 4) Symposium presentation (1 talk)

IMPORTANT DEADLINES

May 6, 1994	Deadline for submission of abstracts
	Deadline for submission of registration forms (without late charge)
July 6, 1994	Deadline for submission of hotel reservation form
	Deadline for reservations for post-conference tours & companion's program

Please note that abstract submission form should be mailed to: Dr. R. Mata, Apartado Postal 70-265, Coyoacán 04511, México, D. F., or by *E-mail* to [Delgado@redvax1.dgsca.unam.mx](mailto:Delgado@redvax1.dgsca.unam.mx). Registration forms should be mailed to: Prof. J. T. Arnason, Faculty of Science, University of Ottawa, Ottawa K1N 6N5, Canada. Hotel reservation form should be mailed to: Reservations Department, Hotel Calinda Geneve, Londres 130, México 06600, D. F.



PHYTOCHEMICAL SOCIETY OF NORTH AMERICA  
SOCIEDAD FITOQUIMICA DE AMERICA DEL NORTE  
SOCIÉTÉ PHYTOCHIMIQUE DE L'AMÉRIQUE DU NORD

1994 MEETING - MEXICO CITY

PHYTOCHEMISTRY OF MEDICINAL PLANTS

AUGUST 14-18, CALINDA GENEVE HOTEL



**Xochiquetzal**



**Ix Chel**

**Invited Speakers:**

- J. BEUTLER, N.C.I., U.S.A.- Antiviral and Antitumor Plant Metabolites  
R. BYE, UNAM, Mexico.- Medicinal Plants of Mexico. Biodiversity and Phytochemistry.  
K. HOSTETTMANN, U. of Lausanne, Switzerland.- Applications of Liquid Chromatography Mass Spectroscopy to the Investigation of Medicinal Plants.  
T. JOHNS, McGill U., Canada.- Anticholesteremic Agents from African Plants  
V. LOYOLA-VARGAS, CIC Yucatán, Mexico.- Root Cultures in Biosynthesis of Medicinal Compounds.  
R. MARLES, Brandon U., Canada.- Sesquiterpenes Revisited. Recent Developments in the Assessment of Biological Activities and Structure relationships.  
J. L. McLAUGHLIN, Purdue U., U.S.A.- Annonaceous Acetogenins. Potent Mitochondrial Inhibitors with Diverse Applications.  
H. NIEMEYER, U. de Chile.- Biologically Active Compounds from Chilean Plants.  
R. PEREDA-MIRANDA, UNAM, Mexico.- Biologically Active Natural Products from Mexican Medicinal Plants.  
J. PEZZUTO, U. Illinois, U.S.A.- Natural Product Cancer Chemotherapeutic Agents.  
L. RODRIGUEZ-HAHN, UNAM, Mexico.- Neoclerodane Diterpenoids from American Salvia Species.  
A. J. VLIETINCK, U. Antwerpen, Belgium.- Bioassay Guided Isolation and Structure Elucidation of Pharmacologically Active Plant Compounds.  
H. WAGNER, U. München, Germany.- Plant Immunostimulants and Medicinal Plants as Adaptogens.

Ix Chel, the Maya Goddess of Medicine and Xochiquetzal, the Aztec Moon Goddess of the flowered quetzal bird, look forward to receiving you in Mexico. The program will include plenary lectures on the conference theme and contributed papers and posters on all aspects of phytochemistry. Because of the location in Mexico, a series of conference activities related to the ancient culture and botanical tradition of Mesoamerica is planned. Climate is pleasant at this time in Mexico City and direct flights are available from most North American Centres.

**Organizing Committee:**

Canada: J. T. Arnason, University of Ottawa, D. V. C. Awang, Mediplant. Mexico: X. Lozoya, IMSS; R. Mata, UNAM; J. S. Calderón, UNAM; G. Delgado, UNAM; J. A. Serratos, INIFAP  
For more information fax: (613) 564.9295 (Arnason); (525) 622.5329 (Mata); (525) 616.2203 (Calderón);  
E-mail: delgado@redvax1.dgsca.unam.mx

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PHYTOCHEMISTRY OF MEDICINAL PLANTS  
AUGUST 14-18, CALINDA GENEVE HOTEL**

**CALL FOR ABSTRACTS**

Registrants are invited to present papers or posters on any topic related to phytochemistry. Please read the instructions carefully, and note the abstract deadline of May 6, 1994. All abstracts should be sent to Dr. R. Mata, Apartado Postal 70-265, Coyoacán 04511, México, D. F. or by *E-mail* to: Delgado@redvax1.dgsca.unam.mx

**GENERAL INFORMATION.** Oral presentations will be limited to 15 minutes (12 minutes for presentation and 3 min for questions). A standard 35 mm slide projector and overhead projector will be provided. Additional equipment may be arranged by special request. Please indicate such request on the abstract form. Due to limited time available for presented papers, it may be necessary to restrict the number of oral presentations. If this happens, some authors may be assigned to a poster session. Should this be necessary, authors will be notified 4 weeks in advance of the meeting.

**POSTERS.** Individuals presenting posters will have a space of 1.2 m high by 1.0 m wide. Posters should contain lettering and photos that can be seen from pertinent distance, and information should be arranged in vertical columns. Materials must be anchored by push pins. Posters can be in Spanish or French with an English summary.

**ABSTRACTS.** Abstracts should be submitted in English on the enclosed Abstract Submission Form and must fit entirely within a rectangle 16.5 x 7.6 cm (6.5 x 3 inch) when printed using Courier or Prestige Elite 10 cpi nonproportional fonts or typing elements. You may use the box provided, or use a plain piece of white paper, but the abstract must fit within the allotted space. Two copies of the abstract (unfolded) should be forwarded by mail to Dr. R. Mata, Apartado Postal 70-265, Coyoacán 04511, México, D. F. or by *E-mail* to Delgado@redvax1.dgsca.unam.mx. Please follow the example below when preparing your abstract.

**HOW TO PREPARE THE ABSTRACT, AND SUGGESTIONS TO IMPROVE THE QUALITY OF ORAL PRESENTATIONS**

Rachel Mata, Dept. Farmacia, Facultad de Química, Universidad Nacional Autónoma de México.  
Apartado Postal 70-265, Coyoacán 04511. México, D. F.

An informative abstract will contain a concise statment of the problem/objectives, experimental methods, and results. The text should cite data from representative experiments, and should state findings and draw conclusions. Statements such as, "Such-and-such will be discussed" are not recommended.

Use one idea per slide. For a 35 mm slide, the narrow dimension of your copy should be 0.7 X the long dimension; double space lines, and use bold type. If more than a 4.5" x 3" area is used for typed copy, the final copy will not be visible!

**TRAVEL ASSISTANCE.** Graduate students and recent Ph.D.'s (within one year of graduation) are eligible for partial travel assistance (up to 50% of air fare or equivalent). Everyone applying for travel assistance must be a member of the PSNA, and present a paper (oral or poster) at the meeting.

**BEST PAPER/POSTER AWARDS.** Cash awards (\$ 100.00 USD each) will be given for the outstanding oral and poster presentations by graduate students or recent Ph.D.'s. Please indicate if you wish to be considered for one or both awards on the Abstract Submission Form.



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ABSTRACT SUBMISSION FORM

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City, State, Postal Code: \_\_\_\_\_ Country: \_\_\_\_\_

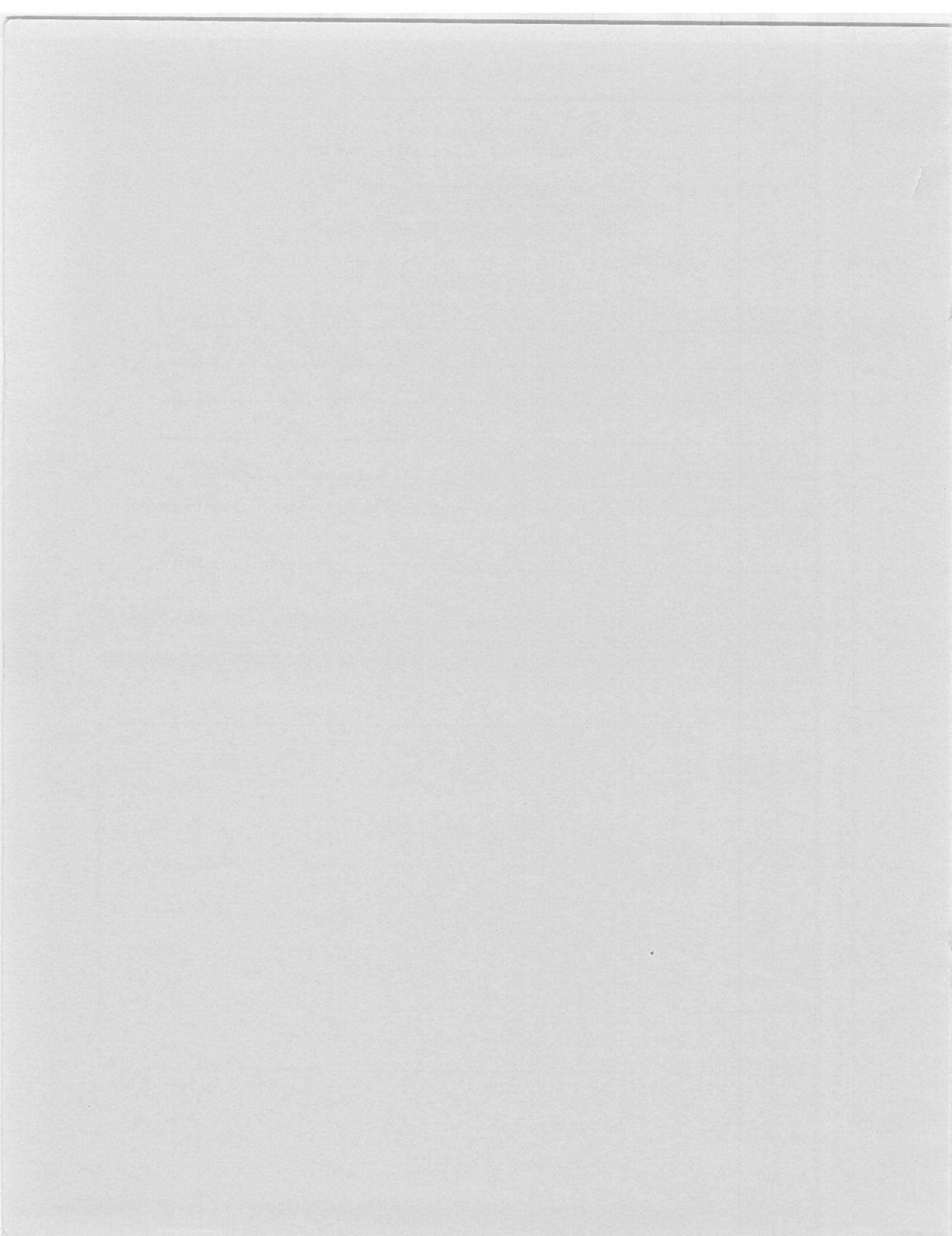
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Preferred presentation medium: \_\_\_\_\_ Oral \_\_\_\_\_ Poster

Please indicate if you would like to be considered for one or both of the following awards (intended for graduate students and recent Ph.D.'s)

\_\_\_\_\_ Travel Assistance \_\_\_\_\_ Best Paper/Poster \_\_\_\_\_ Date of Ph.D. (if recent)

Abstracts must be received by **May 6, 1994**. Send or fax to: Dr. R. Mata, Apartado Postal 70-265, Coyoacán 04511, México, D. F.; Fax: (525)622-5329 or send by *E-mail* to: [Delgado@redvax1.dgsca.unam.mx](mailto:Delgado@redvax1.dgsca.unam.mx)  
Type your abstract in the box provided or on plain paper. Be sure that no part of the abstract extends beyond the 16.5 x 7.6 cm size limit.



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**POST-CONFERENCE TOURS**

- Tour No. 1.-**                    **México-Taxco-Acapulco**  
4 Days and 3 Nights  
Price: \$ 499.00 USD per person in a double room\*
- Tour No. 2.-**                    **San Miguel Allende - Guanajuato**  
4 Days and 3 Nights  
Price: \$ 499.00 USD per person in a double room\*
- Tour No. 3.-**                    **Puebla - Oaxaca**  
4 Days and 3 Nights  
Price: \$ 660.00 USD per person in a double room.\*
- Tour No. 4.-**                    **Mérida - Cancún**  
4 Days and 3 Nights  
Price: \$ 499.00 USD per person in a double room\*
- Tour No. 5.-**                    **The Maya's World: Palenque-Mérida-Cancún**  
7 Days and 6 Nights  
Price: \$798.00 USD per person in a double room.

\* For a single room an extra charge applies.

For further information please contact:

Ms. Mary Carmen Soberón

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Fax: (525) 280-8955 and (525) 280-6460

Telex: 1763404

**Deadline for application: July 6, 1994.**

**PHYTOCHEMICAL SOCIETY OF NORTH AMERICA  
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**ACCOMPANYING PERSON PROGRAM**

- Excursion No. 1.- Mexico City Historical Downtown**  
4 hours. Price: \$ 37.00 USD
- Excursion No. 2.- Teotihuacan Archeological Zone**  
6 hours. Price: \$ 60.00 USD
- Excursion No. 3.- Anthropological Museum**  
4 hours. Price: \$ 37.00 USD

For further information, please contact:

Ms. Mary Carmen Soberón

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Fax: (525) 280-8955 and (525) 280-6460

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# INTEREST FORM

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Please take a moment to provide current information.

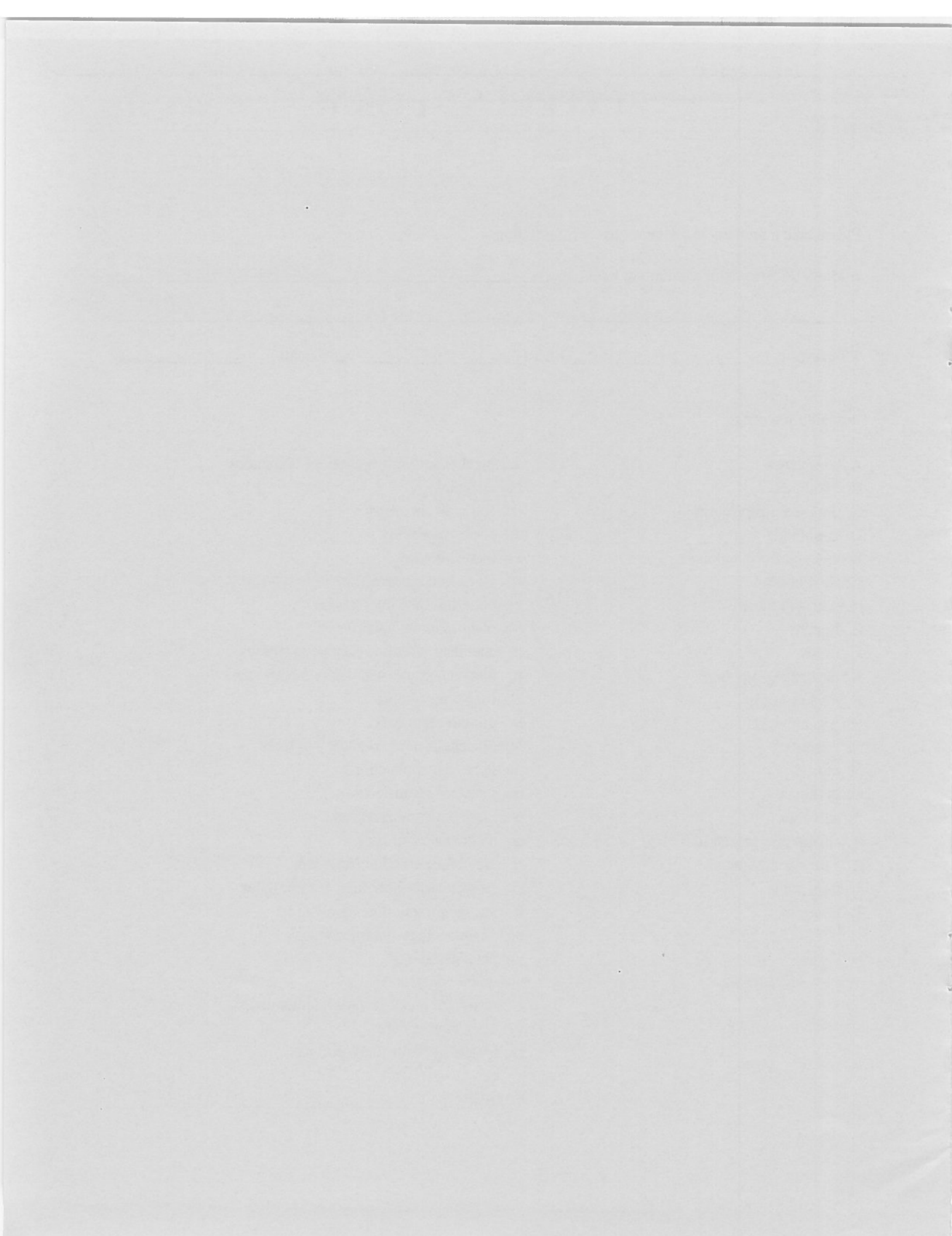
Address (if different from mailing label) \_\_\_\_\_  
\_\_\_\_\_

Telephone (\_\_\_\_\_) \_\_\_\_\_ FAX (\_\_\_\_\_) \_\_\_\_\_ E-mail \_\_\_\_\_

## Research Interests:

- |                           |   |
|---------------------------|---|
| A. acetylenes             | aa. biochemistry/physiology of herbicides |
| B. alkaloids              | bb. enzymology                            |
| C. amino acids/proteins   | cc. cell wall chemistry                   |
| D. coumarins              | dd. chemotaxonomy                         |
| E. cyanogenic compounds   | ee. biotechnology                         |
| F. flavonoids             | ff. plant-insect interactions             |
| G. glucosinolates         | gg. plant-microbe interactions            |
| H. lignans                | hh. plant-plant interactions              |
| I. lipids                 | ii. chemical reactions/organic syntheses  |
| J. nitrogen compounds     | jj. biochemistry of secondary metabolism  |
| K. nucleic acids          | kk. fungal metabolism                     |
| L. organic acids          | ll. growth regulators                     |
| M. phenolics              | mm. biochemistry/physiology of trees      |
| N. pigments               | nn. industrial applications               |
| O. quinones               | oo. structure identification              |
| P. stilbenes              | pp. marine natural products               |
| Q. sugars/polysaccharides | qq. medicinal chemistry                   |
| R. sulfur compounds       | rr. membrane structure/function           |
| S. terpenoids             | ss. molecular/immunological techniques    |
| T. vitamins               | tt. nitrogen fixation/metabolism          |
|                           | uu. pharmacology/pharmacognosy            |
|                           | vv. plant pathology                       |
|                           | ww. plant genetics                        |
|                           | xx. recognition/cell surface interactions |
|                           | yy. tissue/cell culture                   |
|                           | zz. toxicology of natural products        |

OTHER \_\_\_\_\_



# New Members

Ms. Erica Szenasy  
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Zobel, Alicja M. ....	AZOBEL@TRENTU.CA

## POSITION AVAILABLE

Graduate (PhD) Assistantship  
in Crop Science  
University of Guelph,  
Guelph, Ontario

*In vitro* Selection of Tomatoes  
Resistant to *Verticillium* Wilt  
There will be a position  
available in May of 1994 for  
a student interested in pursu-  
ing a PhD degree as part of a  
team project with H.J. Heinz  
Co. This project will involve  
the use of tissue culture  
techniques to select for  
resistance in tomatoes to race  
2 *Verticillium dahliae*.

It will include:

- 1) *in vitro* selection in tomato  
cultures with a toxic fungal  
filtrate, and
- 2) investigations of the  
molecular basis for genetic  
variability in tissue culture  
using flow cytometry and  
PCR technology.

Contact:

Peter Pauls,  
Department of Crop Science,  
University of Guelph,  
Guelph, ON, Canada  
N1G 2W1  
Phone: 519 824-4120,  
Ext. 2460  
FAX: 519 763-8933.



## Phytochemical Society of North America

The 1995 meeting will be held in Sault Ste. Marie, Ontario, in mid-August, and the symposium topic will be Phytochemical Redundancy in Ecological Interactions. Watch for further details of this meeting in subsequent issues of the Newsletter.

## Other Meetings of Interest

### Plant Membrane Biology

(Joint meeting of the Phytochemical Society of Europe and the Scandinavian Society for Plant Physiology): Lund, Sweden, 1994 April 26-29. For information contact Dr. P. Brodelius, Department of Biochemistry, University of Lund, PO Box 7007, S-22007 Lund, Sweden.

### Groupe Polyphenols XVIIIth International Conference on Polyphenols (JIEP '94)

Palma de Majorca, Spain, 1994 May 23-27. Themes to be included are polyphenols in the plant and plant products, polyphenol biosynthesis, molecular biology and genetics of polyphenols, biological and pharmaceutical activities of polyphenols, polyphenols and metal ions, and new analytical techniques for polyphenol studies. A simultaneous translation service, Spanish/English/French will be available. For further information contact Clara Diez de Bethencourt, Instituto de Estudios Avanzados, Universitat de les Illes Balears, Cra. Valldemossa Km 7,5, 07071 Palma de Mallorca, Spain. (Telephone 34-71-17 34 50; FAX 34-71-17 32 48 or 34-71-17 31 84)

### Fourth International Congress on Plant Molecular Biology

Amsterdam, The Netherlands, 1994 June 19-24. The Congress will be composed of plenary sessions, concurrent symposia, poster sessions and interactive workshops. For further information contact the Congress Secretariat, RAI Organisatie

Bureau Amsterdam by Europaplein 12, 1078 GZ Amsterdam, The Netherlands. (Telephone 31-0-20-549-12-12; FAX 31-0-20-646-44-69)

### Plants Phenolics

Ghent, Belgium, 1994 August/September. This meeting is being co-organized by the Groupe Polyphénols and the Phytochemical Society of Europe. For further information contact Prof. P.J. Lea, Division of Biological Sciences, Institute of Environmental and Biological Sciences, Lancaster University, Lancaster LA1 4YO, United Kingdom.

### VIII International Congress of Plant Tissue and Cell Tissue

Firenze, Italy, 1994 July 12-17. For information on the exhibition and circulars contact the Congress Secretariat, Viale G. Milton 81, 50129 Firenze, Italy. (Telephone 39.55.476377, FAX 39.55.476393)

### Natural Products Research

(Joint meeting of the Phytochemical Society of Europe, the American Society of Pharmacognosy, L' Association Française pour l'Enseignement et la Recherche en Pharmacognosie and die Gesellschaft für Arzneipflanzenforschung): Halifax, Nova Scotia, 1994 July 31-August 4. For information contact Prof. R.F. Chandler, Director, College of Pharmacy, Dalhousie University, Halifax, NS, Canada B3H 3J5 (Telephone 902 494-2097, FAX 902 494-1396)

### Allelopathy in Sustainable Agriculture, Forestry and Environment

Indian Society of Allelopathy, 2nd National Symposium: J.N. Vyas University, Jodhpur, India, 1994 September 6-8. Contact Dr. Shamsher S. Narwal, Organizing Secretary, Department of Agronomy, CCS Haryana Agricultural University, Hisar-125 004, Haryana, India. (Telephone 91-1662-73721, Ext. 4268, FAX 91-1662-73552)

### Protein Phosphorylation

(Joint meeting of the Phytochemical Society of Europe and the Industrial and

Biotechnology Group of the Biochemical Society and Society for Experimental Biology): Bristol, UK, 1994 September. Contact Prof. P. Shewry, Head of Station, AFRC Institute of Arable Crops, Long Ashton Research Station, Bristol BS18 9AF, UK. (Telephone 44-275 392181, FAX 44-275-394299)

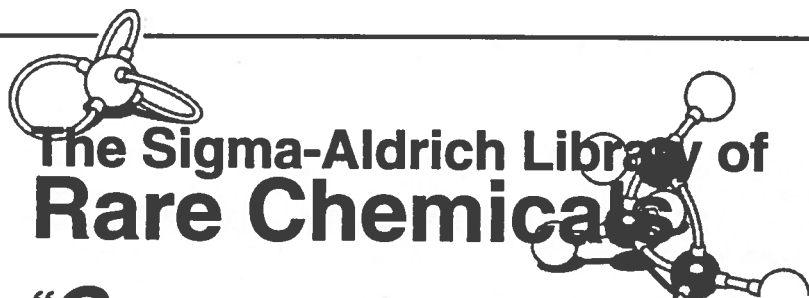
### Evolutionary and Ecological Processes Underlying Biodiversity

Aussois, France, 1994 November 7-11. The conference will be held in an alpine ski resort hotel owned by the Centre National de la Recherche Scientifique, and attendance will be limited to ca. 60 scientists, half of them invited speakers and the other half selected from applicants by the chairperson. Cost for selected applicants will be ca. FRF3700. Applications should be sent to Jaques Blondell, CNRS, Centre d'Ecologie Fonctionnelle et Evolutive, Centre Louis Emberger, BP 5051, F-34033 Montpellier Cedex, France. (Telephone 33 67 61 -32 01, FAX 33 67 41- 2138)

### VIII International Symposium on Toxic Microorganisms

Molecular Approaches to Food Safety Issues Involving Toxic Microorganisms: Peoria, Illinois, 1994 November 15-17. The symposium will include topic sessions on systematics, diagnostics, epidemiology, biosynthesis, pathogenesis and cellular regulation involving molecular approaches. Presentations will cover bacterial toxins, mycotoxins and marine toxins. Contact Dr. Mary Ann Dombrink-Kurtzman, National Center for Agricultural Utilization Research, 1815 N. University St., Peoria, IL 61604, U.S.A. (Telephone 309 681-6254, FAX 309 681-6686)

Mass Spectrometry: Swansea, UK, 1995 September. Contact Dr. C.J. Smith, Department of Biochemistry, University College of Swansea, Singleton Park, Swansea SA2 8PP, UK. (Telephone 44-(0)792-295378, FAX 44-(0)792-295447)



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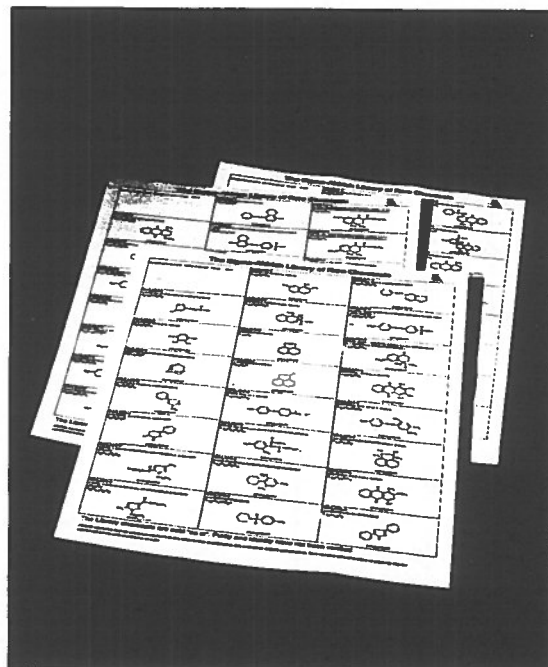
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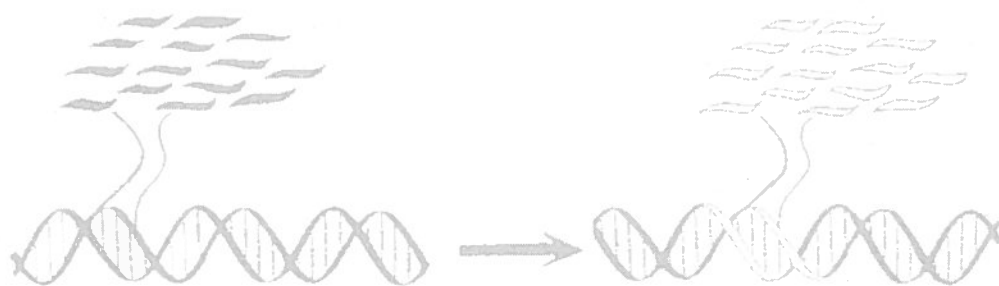
Vol. 4, No. 1 • Jul. 94

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# Newsletter

• Volume 4, Number 1 • July 1994 •

## PSNA Executive Committee 1993-94

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## PSNA Advisory Committee

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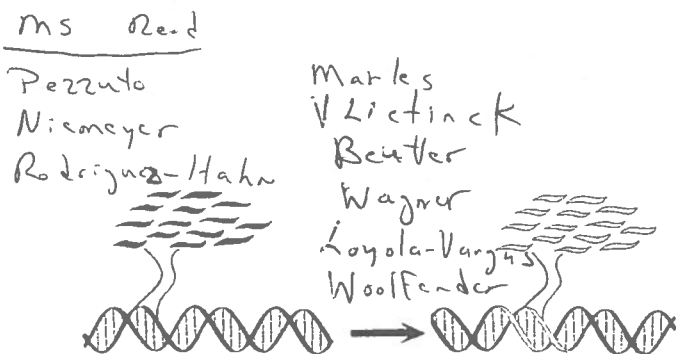
Dr. Neil Towers (1994, Chair)  
Dr. Jonathan Poulton (1995)  
Dr. David Seigler (1996)

Dr. Brian Ellis (1997)  
Dr. Murray Isman (1998)

## PSNA Newsletter

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Editor: **Dr. Alicja M. Zobel**



The Phytochemical Society of North America is a nonprofit scientific organization whose membership (currently over 400) is open to anyone with an interest in Phytochemistry, the role of plant substances, and related fields. Annual membership dues are U.S. \$20.00 for regular members and \$10.00 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 to the Society Secretary. Annual dues and changes in addresses should be sent to the Society Treasurer.

{ Johns - on 1st wk Sept  
McLaughlin - 190 pages - major review  
1992-94 - many structures  
Bye ? = gave copy instructions

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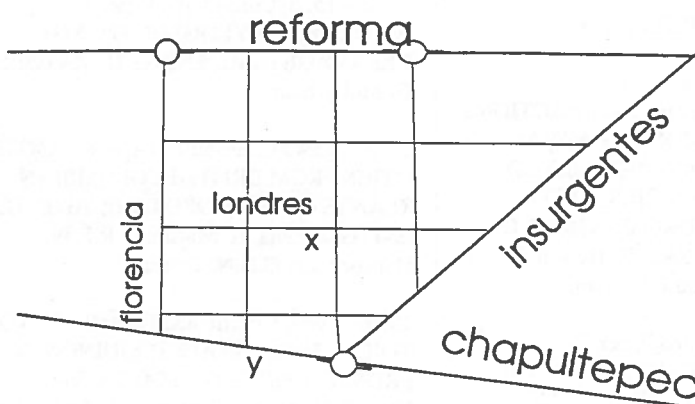
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## From the Editor

As always, this summer issue of the *Newsletter* provides information about the upcoming annual meeting, this year in Mexico City, August 15-18. You will find a map of the meeting area, the program, and the abstracts of symposium and contributed papers. Also included is another report of the research in progress in the laboratory of one of our members, this time President-Elect John Amason. I again appeal for volunteers to submit accounts of their own research (somewhere around 500 words), so that the *Newsletter* can keep PSNA members informed to some degree about what work some of us have under way. Others are interested in what you are doing, so step forward and tell us!

I hope to see you in Mexico City.

*The Editor*



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(Conference hotel)  
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(Alternate hotel)  
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# 1994 PSNA Annual Meeting Program

## Sunday, August 14

14:00 - 18:00 Registration,  
Calinda Geneve Hotel lobby  
13:00 - 15:00 PSNA Executive Meeting  
19:00-21:00 Mixer (Salón Michoacano)

## Monday, August 15

Registration will be open from 8:00 to 12:30

### SYMPOSIUM SESSION I -

Rachel Mata, Chair (Salón Embajadores)

8:30 - 9:00 Welcome -

Kelsey Downum, PSNA President

9:00 - 9:50 Symposium Paper 1 -  
PLANT IMMUNOSTIMULANTS AND  
PLANTS AS ADAPTOGENS. H. Wagner.

9:50 - 10:40 Symposium Paper 2 -  
BIOLOGICALLY ACTIVE NATURAL  
PRODUCTS FROM MEXICAN MEDICI-  
NAL PLANTS. R. Pereda-Miranda.

10:40 - 11:10 Coffee Break

### CONTRIBUTED PAPER SESSION I

Thor Arnason, Chair (Salón Embajadores)

### BEST PAPER COMPETITION

11:10 - 11:30 Contributed Paper 1 -  
THIRD TROPHIC LEVEL INTERACTIONS  
BETWEEN GYPSY MONTH LARVAE,  
PHENOLIC AND FLAVONOL GLYCO-  
SIDES FROM PINE SPECIES, AND A  
NUCLEAR POLYHEDROSIS VIRUS. C.  
Benninger, M. Aboud-Zaid, B. Helson, W.  
Kaupp, H. Damman and J. Picman.

11:30 - 11:50 Contributed Paper 2 -  
INTESTINAL RELAXANT EFFECT OF  
THE METHANOLIC EXTRACT AND  
PURE COMPOUNDS FROM *DODONAEA*  
*VISCOSA* AND *DATURA LANOSA*.  
A. Rojas, S. Cruz, R. Mata and R. Bye.

11:50 - 12:10 Contributed Paper 3 -  
BORNEO ANTIMALARIALS: ETHNO-  
BOTANY AND PHYTOCHEMISTRY. D. J.  
Leaman, H. Soedjito and J. M. Pezzuto.

12:10 - 12:30 Contributed Paper 4 -  
BIOCHEMICAL MANIPULATIONS OF  
CONSTITUTIVE AND INDUCIBLE SEC-  
ONDARY METABOLITES IN HAIRY  
ROOTS OF *HYOSCYAMUS MUTICUS*.  
F. Medina-Bolivar and H. Flores.

12:30 - 12:50 Contributed Paper 5 -  
BIOSYNTHETIC STUDIES OF LAC-  
TUDIN DERIVATIVES IN HAIRY ROOT  
CULTURES OF *LACTUCA FLORIDANA*  
USING <sup>14</sup>C-LABELED SODIUM  
ACETATE. O. Song, N.H. Fisher, E. Ludwig  
and M.A. Hjortso.

12:50 - 13:10 Contributed Paper 6 -  
44-HYDROXYDEHYDROKAWAIN, A  
STYRYL-PYRONE FROM LEGUME  
SPECIES. R. Reyes-Chilpa, L. Quijano, F.  
Gómez-Garibay and  
T. Ramos-Castillo.

13:10 - 15:00 Lunch (Posters for session I  
should be put up during this time)

### CONTRIBUTED PAPER SESSION II -

Dennis V.C. Awang, Chair (Salón  
Embajadores)

15:00 - 15:20 Contributed Paper 7 -  
A ROLE FOR XYLOGLUCAN (XG)  
CLEAVAGE IN RIPENING TOMATOES.  
G. McLachlan.

15:20 - 15:40 Contributed Paper 8 - ANTI-  
BIOTICS FROM BRITISH COLUMBIAN  
PLANTS OF ETHNOBOTANICAL INTER-  
EST. G. Saxena, H. Matsuura, R.E.W.  
Hancock and G.H.N. Towers.

15:40 - 16:00 Contributed Paper 9 - CYTO-  
TOXIC FURANONAPHTOQUINONES  
FROM *TABEBUIA OCHRACEA* SSP.  
NEOCRYSANTA. F. Diaz and J.D. Medina.

16:00 - 16:20 Contributed Paper 10 -  
ISOLATION AND IDENTIFICATION OF  
NEW DIMERIC ANTHRACENONES  
FROM *K. PARVIFOLIA*. V. Rivas, A. Piñero  
and N. Waksman.

16:20 - 16:40 Contributed Paper 11 -  
MINOR INSECTICIDAL CONSTITUENTS  
OF *MELIA TOOSENDAN*. H. Matsuura, W.  
Chen, M. B. Isman, X. Zhang and G.H.N.  
Towers.

16:40 - 17:00 Coffee Break

### SYMPOSIUM SESSION II -

José Calderón, Chair (Salón Embajadores)

17:00 - 17:50 Symposium Paper 3 -  
BIOLOGICALLY ACTIVE COMPOUNDS  
FROM CHILEAN MEDICINAL PLANTS.  
H.M. Niemeyer.

18:00 - 19:30 Dinner

### POSTER SESSION I (Salón Michoacano)

19:30-22:00. Authors for Posters 1-35 are  
asked to be present at their posters from  
19:30-21:00.

Posters marked with an asterisk are part of the  
Best Poster Competition.

Poster 1\* - COMPARATIVE PHYTO-  
CHEMICAL ANALYSIS AND PRELIMI-  
NARY PHARMACOLOGICAL  
EVALUATION OF SOME SPECIES OF  
THE "CACHANA" COMPLEX OF MEDIC-  
INAL PLANTS. M.I. Aguilar, G. Delgado, R.  
Bye, E. Linares and M.L. Villarreal.

Poster 2\* - ALKALOIDS FROM *NARCIS-  
SUS CANTABRICUS*. J. Bastida, J.L.  
Contreras and C. Codina

Poster 3\* - DEFENSE BY SECONDARY  
METABOLITE DIVERSITY VS. A COM-  
PLEX CONSUMER COMMUNITY: THE  
CASE OF ARTIFICIAL SEEDS AND SOIL  
MICROBIOTA. H. Bonfil and  
F.J. Espinosa-García.

Poster 4\* - CARDIAC STIMULATORY  
AND SMOOTH MUSCLE RELAXING  
ACTIVITY OF SEA ANEMONES FROM  
THE WEST COAST OF CANADA. E.I.  
Cline and M. W. Wolowyk.

# 1994 PSNA Annual Meeting Program

Poster 5\* - PURPURASOLOL, A NEW COUMARIN FROM *PTEROCAULON PURPURASCENS*.

S.L. Debenedetti, E.L. Nadinic, M.Boeykens, J.D. Coussio and N. De Kimpe.

Poster 6\* - *IN VITRO* GERMINATION AND TAXANE PRODUCTION OF *TAXUS* SPP.

T. Flores, L.J. Wagner and H.E. Flores.

Poster 7\* - STRUCTURAL STUDIES OF *ERYTHRINA* ALKALOIDS. M.R. García-Mateos, A. Sotelo, B. Lucas and M. Soto-Hernández.

Poster 8\* - ISOLATION OF A PHYTOGROWTH INHIBITOR FROM *MALMEA DEPRESSA*.

A. Jiménez, R. Mata and A.L. Anaya.

Poster 9\* - SPIROCARACOLITONES ISOLATED FROM A NEW GENUS AND SPECIES, *RUPTILIOCARPON CARACOLITO*. THE FIRST CD SPIRO-TRITERPENOIDS. S.L. Mackinnon, T. Durst, J.T. Arnason, C. Bensimon, P.E. Sanchez-Vindas, L. San Roman and L.J. Poveda.

Poster 10\* - ISOLATION BY HPLC OF THE MINOR CONSTITUENTS OF THE PHYTOGROWTH INHIBITOR RESIN GLYCOSIDES FROM *IPOMOEA TRICOLOR*.

A. Pérez-Díaz, M. Bah and R. Pereda-Miranda.

Poster 11\* - ANTITERMITIC ACTIVITY OF *LONCHOCARPUS CASTILLOI* (LEGUMINOSAE) HEARTWOOD FLAVONOIDS AND EXTRACTS. R. Reyes-Chilpa, N. Viveros-Rodríguez, F. Gómes-Garibay, L. Quijano and T. Ríos-Castillo.

Poster 12\* - BIOACTIVE COMPOUNDS FROM *RATIBIDA MEXICANA*.

P. Sánchez, F. Soto, R. Mata, B. Hernández and R. Bye.

Poster 13\* - PHYTOCHEMISTRY AS A TOOL FOR CHEMOTAXONOMY. M. Sellés, J. Bastida, C. Codina and J.L. León.

Poster 14\* - ALKALOIDS FROM *NARCISSUS ASTURIENSIS*. M. Sellés, F. Viladomat and J. Bastida.

Poster 15\* - COMBINED USE OF THERMOSPRAY AND CONTINUOUS FLOW-FAB LIQUID CHROMATOGRAPHY-MASS SPECTROMETRY FOR THE ANALYSIS OF GLYCOSIDES IN CRUDE PLANT EXTRACTS. J.L. Wolfender and K. Hostettmann.

Poster 16 - PHYTOTOXINS FROM *COLLETOTRICHUM DEMATIUM*. M. Abou-Zaid, M. Dumas, T. Buscarini and D. Thompson.

Poster 17 - ESSENTIAL OILS ANALYSIS OF OREGANO (*LIPPIA PALMERI*) FROM WILD PLANTS, MICROPROPAGATED PLANTS AND CALLUS. L. Alcaraz-Meléndez, S. Real-Cosío and R. Vázquez-Duhalt.

Poster 18 - ALLELOPATHIC POTENTIAL OF *IPOMOEA BATATAS* (CONVOLVULACEAE): THE RESIN GLYCOSIDES AS POTENT INHIBITORS OF PLANT GROWTH. A. Alva-García, A.L. Anaya and R. Pereda-Miranda.

Poster 19 - CHEMICAL CONSTITUENTS OF THREE POPULATIONS OF *LEPECHINIA CAULESCENS* (LABIATAE). L. Alvarez, V. Gonzaga, M.I. Chávez, G. Delgado and E.M. Martínez.

Poster 20 - ROLE OF DEHYDRODIFERULIC ACID IN MAIZE RESISTANCE TO EUROPEAN CORN BORER. J.T. Arnason, D.J. Bergvinson, R.I. Hamilton, G.H.N. Towers and J.A. Mihm.

Poster 21 - PHYTOCHEMICAL STUDIES OF *CASTILLEJA TENUIFLORA*. A. Astudillo, D. González, H. Dávalos and M.A. Zárate.

Poster 22 - EFFECT OF 6-METHOXY-BENZYL SALICYLATE ON SLEEP. F. Ayala-Guerrero, J. Taboada, J. Calderón and A. Nieto.

Poster 23 - SYNTHESIS, MICROLOCALIZATION AND ANTIFUNGAL PROPERTIES OF PHENOLIC ACID AMIDES FROM MAIZE. J. Atkinson, R. Assabgui, D. Bergvinson, E. Schneider and J.T. Arnason.

Poster 24 - NEW INSECTICIDAL PIPERACEAE FROM THE NEOTROPICS. C. Bernard, J.T. Arnason, B.J.R. Philogene, H.G. Krishnamurthy, D. Chauret, T. Durst, C. Hasbum, P. Sánchez and L. Poveda.

Poster 25 - ANTIMICROBIAL ACTIVITY OF SOME MEDICINAL PLANTS FROM MEXICO. T. Barrientos, M.T. Gutiérrez, R.M. Ramírez, B. Luna, R. Bye and R. Mata.

Poster 26 - ALKALOIDS FROM *HIPPEASTRUM SOLANDRIFLORUM*. J. Bastida, C.L. Porras, C. Codina, L. Paiz and E. Pöll.

Poster 27 - PRELIMINARY PHYTOCHEMICAL AND PHARMACOLOGICAL STUDIES OF *ALOE BARBADENSIS*. B. Berdeja, E. Meléndez, J. Osante and R. García.

Poster 28 - 6-EPI-MESEMBRANOL, A MESEMBRANE-TYPE ALKALOID ISOLATED FROM *NARCISSUS PALLIDULUS* GRAEELS. S. Bergoñón, M. Díez and C. Codina.

Poster 29 - ISOALLOALANTOLACTONE, A PHOTOSYNTHETIC ELECTRON CHAIN INHIBITOR. M.R. Calera, B. Lotina-Hennsen, R. Mata and A.L. Anaya.

Poster 30 - EFFECT OF CHAPARRIN, NORDIHYDROGUAYARETIC ACID AND THEIR STRUCTURAL DERIVATIVES ON *AMOEB*A CULTURES. C.C. Calzado-Flores, J.J. Segura-Luna and E.M. Guajardo-Touché.

Poster 31 - EFFECT OF SALVIC ACID ON CONTRACTIONS INDUCED BY OXYTOCIN IN THE ISOLATED UTERUS OF RAT. E. Campos, P.G. Vázquez, J. Taboada, C. Guerrero, A.A. Reyes and G.F. Ayala.

Poster 32 - PRENYLATED FLAVANONES, CYCLOARTANES AND OTHER CONSTITUENTS FROM *ESENBECKIA BERLANDIERI* SPP. *ACAPULCENSIS* (RUTACEAE). A.E. Cano, E. Serrano, A. Ruiz-Cancino and G. Delgado.

Poster 33 - TRITERPENES FROM *BORRICHIA FRUTESCENS* (ASTERACEAE). C.L. Cantrell, T. Lu, S.G. Franzblau and N.H. Fischer.



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Poster 35 - LARVAL PERFORMANCE OF A POLYPHAGOUS MOTH (*HYLESIA LINEATA*) RELATED TO THE CHEMICAL INTRAPOPULATION VARIABILITY OF ONE OF ITS TROPICAL DECIDUOUS TREE HOST (*CASEARIA CORYMBOSA*). F.J. Espinosa-García, A.R. Pescador, E.L. Valladares and C. Jian.

## Tuesday, August 16

**SYMPOSIUM SESSION III -**  
H. Wagner, Chair (Salón Embajadores)

9:00 - 9:50 Symposium Paper 4 -  
NATURAL PRODUCTS CANCER CHEMO-  
PREVENTIVE AGENTS. J. Pezzuto.

9:50 - 10:40 Symposium Paper 5 -  
BIOASSAY-GUIDED ISOLATION AND  
STRUCTURE ELUCIDATION OF PHAR-  
MACOLOGICALLY ACTIVE PLANT  
SUBSTANCES. A.J. Vlietinck.

10:40 - 11:00 Coffee Break

**CONTRIBUTED PAPER SESSION III -**  
Antonio Serratos, Chair (Salón Embajadores)

11:00 - 11:20 Contributed Paper 12 -  
PHYTOCHEMICAL RESPONSES/  
ADAPTATIONS OF BARLEY SEEDLINGS  
TO UV-B. L. Liu, D.C. Gitz III and  
J.W. McClure.

11:20 - 11:40 Contributed Paper 13 -  
BIOACTIVE METABOLITES FROM  
YUCATECAN MEDICINAL PLANTS. L.M.  
Peña Rodríguez.

11:40 - 12:00 Contributed Paper 14 -  
ULTRAVIOLET INFLUENCES QUANTI-  
TIES AND QUALITY OF COUMARINS  
EXTRUDED AS CELL PROTECTION.  
A.M. Zobel.

12:00 - 12:20 Contributed Paper 15 -  
INDUCTION STUDIES OF PHOTOTOXIC  
POLYACETYLENES IN SAFFLOWER.  
L. Beaverson and K. Downum.

12:20 - 12:40 Contributed Paper 16 - PHAR-  
MACOLOGICAL AND PHYTOCHEMI-  
CAL STUDIES OF AERIAL PARTS OF  
*BUDDLEJA CORDATA*. T.O. Ramírez,  
V. Flores, C. Escamilla and M. Martínez.

12:40 - 13:00 Contributed Paper 16 - PHY-  
TOCHEMICALS AS A RESOURCE FOR  
ARTHROPOD REPELLENTS. W.S. Bowers.

13:00 - 15:00 Lunch  
(Posters for session II should be put up during  
this time)

**SYMPOSIUM SESSION IV -**  
Xavier Lozoya, Chair (Salón Embajadores)

15:00 - 15:50 Symposium Paper 6 -  
ANTIVIRAL AND ANTITUMOR PLANT  
METABOLITES. J.A. Beutler.

15:50 - 16:40 Symposium Paper 7 -  
BIOLOGICAL DIVERSITY OF MEDICI-  
NAL PLANTS IN MEXICO. R. Bye.

16:40 - 17:00 Coffee Break

**SYMPOSIUM SESSION V -**  
Hermann M. Niemeyer, Chair (Salón  
Embajadores)

17:00 - 17:50 Symposium Paper 8 -  
APPLICATIONS OF LIQUID CHROMA-  
TOGRAPHY - MASS SPECTROMETRY  
TO THE INVESTIGATION OF  
MEDICINAL PLANTS. K. Hostettman.

17:50 - 19:00 Dinner

19:00 - 20:00 PSNA *Business Meeting*  
(Salón Embajadores)

## POSTER SESSION II

20:00 - 22:00 Authors for Posters 36-71 are  
asked to be present at their posters from  
20:00-21:30.

Poster 36 - MALABARICANE GLYCO-  
SIDES FROM *ADESMIA ACONCAGUENSIS*  
BURK (LEGUMINOSAE). F. Faini, E. Gacs-  
Baitz, G. Delle Monache, M. Castillo and R.  
Torres.

Poster 37 - CHILEAN ASTERACEAE  
SPECIES AS SOURCES OF RAW CHEMI-  
CALS. F. Faini and C. Labbé.

Poster 38 - ANTI-TUBERCULOSIS ACTIV-  
ITY OF SESQUITERPENE LACTONES: A  
STRUCTURE-ACTIVITY RELATIONSHIP  
STUDY. N.H. Fischer, T. Lu, C.L. Cantrell  
and S.G. Franzblau.

Poster 39 - TAXOL-LIKE COMPOUNDS IN  
*TAXUS BACCATA* L., *TAXUS CUSPIDATA*  
SIEB. ET ZUCC AND *TAXUS MEDIA*  
REHD. M. Furmanowa, K. Glowniak, A.  
Zobel, W. Dymowski and L. Rapaczewska.

Poster 40 - ALKALOIDS IN TISSUE OF  
*CEPHALOTAXUS FORTUNEI* HOOK.  
M. Furmanowa, K. Glowniak, A. Zobel and  
R. Lasecki.

Poster 41 - TWO NEW DITERPENOIDS  
FROM *SALVIA PARRYI* GRAY.  
E. G. Gómez, A. Reyes, H. Achenbach and  
X. Domínguez.

Poster 42 - CHARACTERIZATION OF THE  
MEMBRANE-ASSOCIATED NAD<sup>+</sup>-  
DEPENDENT ISOCITRATE DEHYDRO-  
GENASE (ICDH) ACTIVITY IN PEA  
MITOCHONDRIA. G. Helfin and  
C. McIntosh.

Poster 43 - SCREENING FOR ANTIMI-  
CROBIAL ACTIVITY AND TOXICITY TO  
BRINE SHRIMP OF CRUDE DRUG  
EXTRACTS FROM MEXICAN MEDICI-  
NAL PLANTS. L. Hernández,  
V. Rodríguez, L. Ponce and C. Madariaga.

Poster 44 - GENETIC STABILITY OF  
SILYMARIN COMPOSITION IN FRUITS  
OF THE MEDICINAL PLANT *SILYBUM*  
*MARIANUM*. E. Hetz, R. Liersch and  
O. Schieder.

Poster 45 - PLANT REGENERATION  
FROM MESOPHYLL PROTOPLASTS OF  
THE MEDICINAL PLANT *SILYBUM MAR-*  
*IANUM* (L.) GAERTN. E. Hetz, R. Liersch  
and O. Schieder.

Poster 46 - FLAVONE-O-GLYCOSIDES  
FROM THE FERN *PTERIS CRETICA*.  
F. Imperato.



# 1994 PSNA Annual Meeting

Poster 47 - 8-C-RHAMNOSYLLUTEOLIN 7-O-RHAMNOSIDE FROM THE FERN *PTERIS CRETICA*. F. Imperato.

Poster 48 - 6-HYDROPEROXYCACALONE, NEW CONSTITUENT FROM *CACALIA DECOMPOSITA* (MATARIQUE) AND EFFECT OF ACTIVE OXYGEN SPECIES ON CACALOL. M. Jiménez, A. Navarro and E. Villanueva.

Poster 49 - MOLECULAR STRUCTURE OF THE FOLIAR SECONDARY METABOLITES OF *CASEARIA CORYMBOSA* (FLA-COURTEACEAE). R. Lindig, M.Y. Ríos and G. Delgado.

Poster 50 - COMPONENTS OF *ARISTOLOCHIA LITTORALIS* PARRODI. A. Lira-Rocha, M. Chinchot, F. Aguilar, E. Naranjo-Rodríguez, F. Vargas and O. Espejo.

Poster 51 - PRODUCTION OF ANTHOCYANINS AND OTHER FLAVONOIDS IN *ACER SACCHARUM* AND *ACER RUBRUM* IN RESPONSE TO STRESS. J. Lynch and A. Zobel.

Poster 52 - METABOLISM OF THE POTATO PHYTOALEXIN SOLAVENTIVONE BY *FUSARIUM SAMBUCINUM*. S.P. McCormick and A.E. Desjardins.

Poster 53 - ISOLATION AND CHARACTERIZATION OF A TRICHOPECENE TRANSACETYLASE FROM *FUSARIUM SPOROTRICHIOIDES*. S.P. McCormick, T. M. Hohn and A.E. Desjardins.

Poster 54 - BIOACTIVE MOLECULES FROM *GENTIANELLA ACHALENSIS*. E. Nadinic, E. Mongelli, S. Debenedetti, P. Sánchez, G. Ciccía, A. Giuliatti and J. Coussio.

Poster 55 - TONALENSIN, A 5(10)-SECOCLERODANE DITERPENE FROM *SALVIA TONALENSIS*. A. Ortega, A. Toscano, E. Díaz and E. Maldonado.

Poster 56 - CHEMICAL ANALYSIS OF WEEDS. SECONDARY METABOLITES OF THE AERIAL PARTS OF *ERAGROSTIS*

*MEXICANA* (GRAMINEAE). J.M. Peguero, M.Y. Ríos, G. Delgado and F.J. Espinosa-García.

Poster 57 - TANNINS FROM *ERYTHRINA HERBACEA*. R.M. Pérez, E. Kolar, F. de Jesus and S. Pérez.

Poster 58 - FERN CONSTITUENTS: PENTACYCLIC TRITERPENOIDS ISOLATED FROM *POLYPODIUM GUTTATUM*. R.M. Pérez, M.G. Ortiz, S. Pérez, C. Pérez and A.L. Montiel.

Poster 59 - FUROCOUMARINS AND CARBAZOLE ALKALOIDS FROM SEEDS OF *MURRAYA KOENIGII*. J. Reisch, A.C. Adebajo and A.J. Aladesanmi.

Poster 60 - TISSUE CULTURE OF *ANREDERA SCANDENS* (BASELLACEAE): RETROCHALCONE SYNTHESIS. E. Rivera, M. Novelo and R. Pereda-Miranda.

Poster 61 - ANTIFUNGAL COMPOUNDS FROM *METOPIMUM BROWNEI* (ANACARDIACEAE). J.F. Rivero, R. Mata, D. Chávez, A.L. Anaya and B. Hernández.

Poster 62 - CHEMICAL CONSTITUENTS OF *CHAMAESYCE PROSTRATA*. S. Rojas, M. Macías, P. Castañeda, R. Mata, E. Linares and R. Bye.

Poster 63 - *PSACALIUM PELTATUM* EXTRACTS AND THEIR HYPOLYCEMIC ACTIVITY. L. Sánchez, R. Román, F. Alarcón, J.L. Flores and R. Soto.

Poster 64 - HPLC ANALYSIS OF SOLUBLE AMINO ACIDS IN PLANT EXTRACTS BY STABLE DERIVATIZATION USING 6-AMINOQUINOLYL-N-HYDROXYSUCCINIMIDYL CARBAMATE. J.A. Saunders, F.J. Turano and C. Burek.

Poster 65 - *IN VITRO* PRODUCTION OF SILYMARIN IN SUSPENSION CELLS OF DIFFERENT PLANT SPECIES. A. Schaal, E. Hetz and O. Schieder.

Poster 66 - CEDRELANOLIDE I, A NEW LIMONOID FROM *CEDRELA SALVADORENSIS*. R. Segura, J. Calderón, R. Toscano, A. Gutiérrez and R. Mata.

Poster 67 - CHRONIC PAIN INDUCED BY 6-EPI-DEACETYL LAURENOBIOLIDE. J. Taboada, C. Gutiérrez-Coutiño, C. Guerrero, E. Campos, F. Ayala-Guerrero and U. Guevara.

Poster 68 - ISOLATION OF THREE DIKETOPIPERAZINES FROM *FUSARIUM OXYSPORUM*. A. Trigos, S. Reyna and L. Cervantes.


Poster 69 - ISOLATION OF TWO DIKETOPIPERAZINES FROM *PHYTOPHTORA CINNAMOMI*. A. Trigos, S. Reyna and D. Graillet.


Poster 70 - BIOACTIVE COMPOUNDS FROM NEOTROPICAL SPECIES OF *PIPER*. J.H. Wen, R. Marquis, J.T. Armason and K.R. Downum.

Poster 71 - INFLUENCE OF CONCENTRATIONS OF DIFFERENT MICROELEMENTS IN THE SOIL ON THOSE IN THE PLANT, AND ON PRODUCTION OF FURANOCUMARINS. A.M. Zobel, S. Dudka, K. Renke and K. Glowniak.

## Wednesday, August 17

SYMPOSIUM SESSION VI - Guillermo Delgado, Chair (Salón Embajadores)

9:00 - 9:50 Symposium Paper 9 - ROOT CULTURES IN THE BIOSYNTHESIS OF MEDICINAL COMPOUNDS. V.M. Loyola-Vargas. 

9:50 - 10:40 Symposium Paper 10 - NEOCLERODANE DITERPENES FROM AMERICAN *SALVIA* SPECIES. L. Rodríguez Hahn. 

10:40-11:00 Coffee Break

11:00 - 15:00 Visit to the Botanical Garden and UNAM campus. Tour with lunch.

# Annual Meeting

Afternoon Free

**Thursday, August 18**

## SYMPOSIUM SESSION VII -

Nikolaus H. Fisher, Chair  
(Salón Embajadores)

9:00 - 9:50 Symposium Paper 11 -  
★ HYPOCHOLESTEROLEMIC AGENTS  
FROM AFRICAN PLANTS. T. Johns.

9:50 - 10:40 Symposium Paper 12 -  
★ SESQUITERPENES REVISITED: RECENT  
DEVELOPMENTS IN THE ASSESSMENT  
OF BIOLOGICAL ACTIVITY AND STRUC-  
TURE RELATIONSHIPS. R.J. Marles.

10:40 - 11:00 Coffee Break

## SYMPOSIUM SESSION VIII -

Robert Bye, Chair (Salón Embajadores)

11:00 - 11:50 Symposium Paper 13 -  
★ ANNONACEOUS ACETOGENINS:  
POTENT MITOCHONDRIAL INHIBITORS  
WITH DIVERSE APPLICATIONS.  
J. L. McLaughlin.

Afternoon Free

19:00 - 20:00 Mixer (Salón Michoacano)

20:00 - 22:00 Banquet and awards  
(Salón Embajadores)

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# Phytochemistry of Medicinal Plants

## Symposium Paper 1 - Monday, 9:00

### PLANT IMMUNOSTIMULANTS AND PLANTS AS ADAPTOGENS

H. Wagner, Institut für Pharmazeutische Biologie der Universität München, Karlstrasse 29, 80333 München, FRG

The medicinal application of immunostimulants and adaptogens is based on the prophylactic and therapeutic concept of increasing the non-specific resistance of the body against infectious and noninfectious stressors, whereas in former times in Traditional Medicine the application of these plant drugs relied on practical experience only. The present approach aims at the rationalisation of the medicinal use of these drugs.

A review is given of present knowledge of the known active principles of the various plant drugs, the most important results of immunological and endocrinal *in vitro* and *in vivo* studies, the suggested mechanisms of action on a molecular biological base and the clinical studies carried out so far with isolated compounds.

## Symposium Paper 2 - Monday, 9:50

### BIOLOGICALLY ACTIVE NATURAL PRODUCTS FROM MEXICAN MEDICINAL PLANTS

Rogelio Pereda-Miranda, Departamento de Farmacia, Facultad de Química, Universidad Nacional Autónoma de México, Apartado Postal 70-265, Coyoacán 04511 D.F. México

The first step in the search for plant drugs of potential therapeutic application is the selection of adequate species for biological and chemical screening. Traditional remedies based on plants are used extensively in Mexico. This knowledge of the indigenous medicine has represented the *biorational* followed during the phytochemical research program directed toward the isolation of biologically active natural products undertaken at the Department of Pharmacy of the School of Chemistry at UNAM.

This lecture deals with the description of some results of the investigations of selected plant drug extracts from the Asteraceae, Lamiaceae and Convolvulaceae families by *in vitro* assay-guided fractionation which has resulted in the identification of biologically active compounds representing a wide range of structures.

## Symposium Paper 3 - Monday, 17:00

### BIOLOGICALLY ACTIVE COMPOUNDS FROM CHILEAN MEDICINAL PLANTS

Hermann M. Niemeyer, Departamento de Ciencias Ecológicas, Facultad de Ciencias, Universidad de Chile, Casilla 653, Santiago, Chile

The geographical isolation of Chile provided by the Andean range, the Pacific Ocean and the Atacama desert has produced a unique flora of

ca. 5000 species, with a high degree of endemism (ca. 50%). The land has been inhabited for over 10,000 years by peoples who have developed rich medicinal traditions based on the use of native plants, some of them continuing up to the present.

The traditional pharmacopea consists of over 300 native species, of which only some 75 have been studied chemically. These chemical studies have been, for the most part, limited in scope and have neither been guided by pharmacological bioassays, nor followed by the testing of the compounds isolated in pharmacologically relevant systems. As a consequence, in most cases the traditional use of the plant can not be associated with the presence in it of any given compound.

This paper will review the present status of the chemistry of native medicinal plants from Chile.

## Symposium Paper 4 - Tuesday, 9:00

### NATURAL PRODUCT CANCER CHEMOPREVENTIVE AGENTS

John M. Pezzuto, Department of Medicinal Chemistry and Pharmacognosy, Program for Collaborative Research, in the Pharmaceutical Sciences, College of Pharmacy, and Specialized Cancer Center, College of Medicine, University of Illinois at Chicago, Chicago, Illinois 60612

As judged by a variety of experimental and model test systems, a large number of compounds are known to inhibit tumorigenesis. Based on these data and epidemiological evidence, it is assumed that the process of cancer chemoprevention is pertinent to humans. Chemopreventive agents are structurally diverse; examples include antioxidants, coumarins, diterpenoids, flavonoids, indoles, retinoids and other vitamins. Surprisingly, however, even though many established cancer chemopreventive agents are constituents of natural products and dietary intervention is a promising approach for the prevention of human cancer, a systematic investigation directed toward the discovery of new chemopreventive agents has never been undertaken. Thus, we have developed a comprehensive research program for the discovery and characterization of novel natural product cancer chemopreventive agents. This entails the coordinated effort of five multidisciplinary, integrated research programs, designed to accomplish the following: (1) selection and provision of source materials, (2) isolation and identification of active principles, (3) short-term *in vitro* bioassays to direct fractionation and study isolates, (4) *in vivo* evaluations to establish efficacy, and (5) chemical synthesis, semisynthesis and structural modification to aid in the establishment of structure, mechanism and efficacy. This research program has led to the procurement of various active principles that are currently considered as viable candidates for more advanced testing and development. In this presentation, an overview of the project will be given, as well as a description of some recent results. Consistent with prevention strategies touted by the National Cancer Institute, the American Cancer Society and others, the eventual goal of this endeavor is to provide cancer chemopreventive agents worthy of clinical investigation. (This work is supported by program project grant PO1 CA48112 awarded by the National Cancer Institute).

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## Symposium Paper 5 - Tuesday, 9:50

### BIOASSAY-GUIDED ISOLATION AND STRUCTURE ELUCIDATION OF PHARMACOLOGICALLY ACTIVE PLANT SUBSTANCES

A.J. Vlietinck, Department of Pharmaceutical Sciences, University of Antwerp (U.I.A.), Antwerp, Belgium

One of the successful methodologies for investigation of traditional medicine as source of new drugs include the pharmacological screening of plant preparations followed by a bioassay-guided fractionation leading to the isolation of the pure active plant constituents. Ideally, this methodology consists in the *in vivo* testing of the traditional drug for the claimed pharmacological activity. After experimental confirmation of this activity, a corresponding *in vitro* method is developed, which will then be used for the monitoring of the activity during the purification of the active plant constituents. Once these active plant substance(s) have been identified, standardization of a plant preparation can be developed or structure activity relationship studies can be started by partial or total synthesis of the active plant substance(s).

Such a research program is best carried out by a multidisciplinary team consisting of at least a pharmacognosist and a microbiologist, pharmacologist or biochemist depending on the kind of test models used in the screening battery. The team should also collaborate with a centre where the selection and collection of the plants to be tested is carried out and with a medicinal or organic chemist, who will be responsible for the synthesis and structure activity relationship studies of the lead compounds. In this communication the strategy for finding new leads from plants used in traditional medicine will be illustrated by several examples in the field of wound healing and antiviral properties.

## Symposium Paper 6 - Tuesday, 15:00

### ANTIVIRAL AND ANTITUMOR PLANT METABOLITES

John A. Beutler, John H. Cardellina II, James B. McMahon, Robert H. Shoemaker and Michael R. Boyd. Laboratory of Drug Discovery Research and Development, Developmental Therapeutics Program, Division of Cancer Treatment, National Cancer Institute, NCI-FCRDC, Frederick, MD 21702-1201 USA

The U.S. National Cancer Institute screening program for novel antiviral and antitumor natural products includes a large proportion of organic and aqueous extracts derived from tropical plants. The prioritization of leads derived from this extensive screening program presents a unique challenge which we have met by designing simple methods of eliminating common "nuisance compounds" from further consideration. These dereplication methods also provide information useful in commencing fractionation of desirable extracts.

Using novel *in vitro* screening methods to direct fractionation, a variety of metabolites have been purified as the active constituents of these extracts. In particular, phorbol ester derivatives with activity versus HIV, and piperidine flavone alkaloids active versus HIV were found. Cytotoxic compounds active through a tubulin mechanism have been

identified using computer pattern matching of cytotoxicity profiles of crude extracts. Such compounds include the methoxyflavone centaureidin, several rotenoids, and a chalcone. Also, a complex group of bis-desmoside monoterpene ester saponins, the elliptosides, with an interesting specific cytotoxicity toward renal cancer cells have been purified from the legume *Archidendron ellipticum*.

## Symposium Paper 7 - Tuesday, 15:50

### BIOLOGICAL DIVERSITY OF MEDICINAL PLANTS IN MEXICO

Robert Bye, Edelmira Linares<sup>1</sup> and Eric Estrada<sup>2</sup>. <sup>1</sup>Instituto de Biología, Universidad Nacional Autónoma de México, 04510 México, D.F., México. <sup>2</sup>Departamento de Fitotecnia, Universidad Autónoma de Chapingo, Chapingo, México, México

Although Mexico is the 14th largest country in the world, it is the third of six megadiversity countries. Mexico's geographic position places it at the interface of the Neotropical Kingdom with warm tropical floristic elements and the Holarctic Kingdom with cold temperate floristic components. The cultural diversity is reflected by the many ethnic groups distributed in 54 language families. Although reduced from the 120 groups present at the time of the Spanish Conquest of the New World, these indigenous languages safeguard the concepts and communication of cultural activities including the conventional use of medicinal plants. The richness of medicinal plants in Mexico can be estimated by the number of species used for remedial purposes. Since the early colonial period, there have been programs to document the number of medicinal plants in Mexico which have resulted in such publications as those of de la Cruz and Badiano, Sahagún and Hernandez which registered over 3,000 plants of which less than a third are known botanically today. During the late 1800's, the Instituto Midico Nacional initiated a nationwide inventory and evaluation of herbal products used in medicine. Today, many local, state and national programs carried out by government agencies and universities suggest that over 15% of the Mexico's 21,600 vascular plant species are employed for curative purposes. The importance of medicinal plants in Mexico can be assessed by their frequency of use. Based upon a national survey, Instituto Mexicano del Seguro Social determined the employment of about 200 species in rural zones; in this "basic list", the ten most frequently cited species consisted of five native taxa while the other five were introduced plants. Vegetal remedies sold in markets of central Mexico are often mixtures of various species. For each ailment category, the mixture invariably contains "fundamental" ingredients which are supplemented by additional herbs depending upon the condition of the patient. Given the large number of medicinal plant species and the restricted distribution of many plants, different species share the same common name and are employed in the same treatments. This "medicinal plant complex" is dominated by one species which is highly valued and used beyond its natural range of distribution while a local species substitutes the dominant element when it is unavailable.

Intraspecific variation is another component of biodiversity of medicinal plants. Although not well documented, genetically based differences in chemical composition and pharmacological activities are known for

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such plants as *Agastache* (Mexican hyssop), *Hintonia* (Mexican quinine) and *Datura* (jimsonweed).

The conservation of medicinal plants is important in order to maintain the species and chemical races for local use and future applications. Changing land use patterns and over-collecting threaten with extinction such plants as *Valeriana* (Mexican valeriana), *Ligusticum* (Mexican loveage) and *Psacalium* (matarique). Dwindling supplies from natural populations and the increased demand have prompted some Mexican farmers to initiate cultivation of such popular herbal remedies as *Heterotheca* (arnica) and *Agastache* (Mexican hyssop).

## Symposium Paper 8 - Tuesday, 17:00

### APPLICATIONS OF LIQUID CHROMATOGRAPHY-MASS SPECTROMETRY TO THE INVESTIGATION OF MEDICINAL PLANTS

K. Hostettmann and J.L. Wolfender. Institut de Pharmacognosie et Phytochimie, École de Pharmacie, Université de Lausanne, CH-1015 Lausanne, Switzerland

Liquid chromatography-mass spectrometry (LC-MS) is a technique that does not yet appear to have gained the popularity that it merits and is still relatively little used in analytical phytochemistry. Because of their complexity, LC-MS instruments are generally regarded as pure research tools without any wide utility in routine analyses. On-line MS detection is nevertheless very versatile and has great potential for the analysis of crude plant extracts.

LC-MS combined with LC-UV (photodiode array detection) permits rapid direct detection of a broad range of plant metabolites in crude plant extracts and with a minute amount of material (1-10 mg extract). Only small quantities of plant material are thus needed for preliminary LC screening. The on-line information (MS and UV) obtained for each metabolite as well as chemotaxonomical considerations generally allow a quick identification of known products. This avoids their time consuming isolation. It also permits the discovery of new compounds in an extract and guides isolation for full identification. In the search for new inhibitors of monoamine oxydase, for example, compounds with potential activity such as xanthenes have been very efficiently screened by these on-line LC detection methods directly in the crude extract of various Gentianaceae species. The substitution pattern of the xanthenes was deduced from the LC-UV spectra. Molecular weights of glycosides and aglycones were easily determined from the TSP-LC-MS data. Finally the position of the free hydroxyl groups was ascertained by post-column addition of UV shift reagents and comparison of the LC-UV spectra obtained for each metabolite.

LC-MS permits the detection of wide variety of metabolites and is less selective than conventional detection methods such as UV or fluorescence. The LC-MS chromatogram obtained from a crude extract contains a large amount of information that can be treated very selectively. By analyzing for example the single ion trace of the pseudomolecular ion of a given compound, it is possible to localize it precisely in an extract and to quantify it, even if this product co-elutes with other non-isomeric metabolites. This technique was thus used in order to stan-

ardize extracts or for trace analysis. It allows especially to detect compounds having poor chromophores that are difficult to analyze by conventional LC-UV. Ginkgolides, artemisinin, acetogenins and sesquiterpene lactones were efficiently detected by this method. For the LC-MS analyses of the crude extracts, two interfaces were used: Thermospray (TSP) and Continuous Flow Fast Atom Bombardment (CF-FAB). TSP provides spectra comparable to those obtained by desorption chemical ionization (D/CI) (100-800 amu) and CF-FAB is a softer ionization technique that allows detection of polar constituents such as high molecular weight glycosides (500-3000 amu). As no universal LC-MS is yet available these two interfaces are complementary and permit the analysis of a broad range of plant metabolites. In this communication, various examples of utilization of both interfaces for the analysis of crude plant extracts will be presented and the complementarity of the LC-UV and LC-MS detection methods will be discussed. The use of these combined LC techniques as a rapid and efficient screening method and their role for the early recognition of metabolites in crude plant extracts will be especially emphasized.

## Symposium Paper 9 - Wednesday, 9:00

### ROOT CULTURES IN THE BIOSYNTHESIS OF MEDICINAL COMPOUNDS

Víctor M. Loyola-Vargas. Centro de Investigación Científica de Yucatán, División de Biología Vegetal. Apdo. Postal 87, 97310 Cordemex, Yucatán, México

Plants produce thousands of different compounds through secondary metabolism pathways. Since many of these products are obtained by direct extraction from plants that are cultivated in the field or sometimes even collected in their original habitat several factors can alter their yield.

The use of plant cell cultures has overcome several inconveniences for the production of secondary metabolites. However, there are still two major obstacles that limit the potential of plant cell cultures from being a commercial source for these compounds: their low productivity and their genetic instability.

During the last decade, the effect of cell organization on the formation of secondary metabolites has been well documented. The expression of secondary metabolic pathways in redifferentiated cell cultures is not surprising, because it mimics exactly what the plant does. In most cases, formation of plant natural products is under very strict temporal and spatial control. In accordance with these statements, organized cultures, and especially root cultures, can make a significant contribution to our understanding of secondary metabolism.

Furthermore, a new alternative has arisen: transformed root cultures. Until now, hairy roots have been obtained from more than 50 different species. The products that they are able to produce range from alkaloids to aromatic compounds and dyes. These kinds of cultures have turned out to be an invaluable tool to study the biochemistry of the metabolic pathways in order to elucidate the intermediaries and enzymes involved in the biosynthesis of secondary metabolites.



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## Symposium Paper 10 - Wednesday, 9:50

### NEO-CLERODANE DITERPENOIDS FROM AMERICAN SALVIA SPECIES

L. Rodríguez-Hahn, B. Esquivel and J. Cárdenas. Instituto de Química, Universidad Nacional Autónoma de México. Coyoacán 04510 D.F. México

*Salvia* is one of the most abundant and diversified genus of the Labiatae family. It comprises more than 900 species distributed in tropical and subtropical zones of the world. Bentham divided the *Salvia* genus into four subgenera (*Salvia*, *Sclarea*, *Leonia* and *Calosphace*). The European and Asiatic *Salvia* spp belong to the subgenera *Salvia* and *Sclarea*. The *Salvia* spp from North America belong to subgenus *Leonia*, whereas most of the *Salvia* spp from Mexico, Central and South America have been included in Subgenus *Calosphace*.

Phytochemical studies of the *Salvia* spp found in Europe and Asia led to the isolation of diterpenes with the abietane skeleton. Most of them have the C ring oxidized to an  $\alpha$ -hydroxy-*p*-quinone. The diterpenes isolated from the few *Salvia* species of the *Leonia* subgenus studied up to now are abietane quinones or neo-clerodane diterpenoids. The subgenus *Calosphace* comprises more than 500 species. Epling divided it into 105 sections according to the botanical characteristics observed. In recent years we have undertaken a systematic study of Mexican *Salvia* species. Through this study we can conclude that there is a close relationship between the diterpenoid content of the species studied and the section to which it belongs. From the species of the section *Eryrostachys* abietane diterpenes, commonly found in European and Asiatic spp, have been isolated. The *Salvia* species classified in Section *Tomentellae* contain abietane and rearranged abietane or icetexane diterpenes. Some of them show a high degree of oxidation. Most of the diterpenes isolated from the *Salvia* species classified in subgenus *Calosphace* studied up to now contain neo-clerodane diterpenoids or diterpenes with a new skeleton biogenetically related to a clerodanic precursor. This is the case of the diterpenoids isolated from species belonging to Sections *Scorodonia*, *Fulgentes*, *Farinaceae* and *Angulatae*, among others.

Some clerodanic diterpenes isolated from several genera of the Labiatae family such as *Ajuga*, *Teucrium* and *Scutellaria* have been shown to have antifeedant activity against economically important insects. Several of the clerodane or rearranged clerodane diterpenoids isolated from the Mexican *Salvia* species have been studied at the Jodrell Laboratory (Kew Gardens) by Dr. M. Simmons, to determine their insecticidal or antifeedant properties. Some of them show interesting activity. The results of these studies will be presented.

## Symposium Paper 11 - Thursday, 9:00

### HYPOCHOLESTEROLEMIC AGENTS FROM AFRICAN PLANTS

Timothy Johns. Centre for Nutrition and the Environment of Indigenous Peoples, Macdonald Campus of McGill University, Ste Anne de Bellevue, Quebec, Canada H9X 3V9

The low incidence of cardiovascular disease, cancer and diabetes in most subsistence communities warrants the examination of traditional consumption patterns in the light of accumulating scientific data on the benefits of non-nutrient constituents in both food and herbal medicine. Affects on glycaemic indices of food are associated with protease inhibitors, amylase inhibitors, lectins, phenolics and phytic acid. Cancer-preventive properties have been attributed to numerous classes of phytochemicals including sulfides, flavonoids, terpenes, coumarins and indoles.

Hypocholesterolemic and atherosclerosis reducing effects are associated with carotenoids, tocopherols, flavonoids, tannins and other polyphenolics, saponins and fiber. Moreover, it is recommended that dietary fat be reduced to less than 30% of calories and dietary cholesterol to < 300 mg/day. These recommendations are consistent with diets of many, but not all, contemporary subsistence and hunter-gatherer groups.

Reports of plants added to milk and meat-based soups by the Maasai and Batemi in East Africa support a role for dietary antioxidants and hypocholesterolemic agents in the low incidence of cardiovascular disease of populations that traditionally consume high levels of dietary fat and cholesterol. Plant food additives of the Batemi of Ngorongoro District, Tanzania, were tabulated based on interviews with 22 informants, and 17 specimens were collected in the field and analyzed for saponin and phenolic content. Sixty-three percent (63%) of the Batemi additives and 89% of these known to be also used by the Maasai contain potentially hypocholesterolemic saponins and/or phenolics. A potential mediating role of plant constituents of lipid metabolism suggests that in an evolutionary context physiological homeostasis could have included both plant non-nutrients and fats in higher dietary levels than are currently recommended.

## Symposium Paper 12 - Thursday, 9:50

### SESQUITERPENE LACTONES REVISITED: RECENT DEVELOPMENTS IN THE ASSESSMENT OF BIOLOGICAL ACTIVITIES AND STRUCTURE RELATIONSHIPS

Robin J. Marles<sup>1</sup>, Liliana Pazos-Sanou<sup>2</sup>, Cesar M. Compadre<sup>3</sup>, R. Lilia Compadre<sup>3</sup>, J. Thor Arnason<sup>4</sup>, Tony Durst<sup>4</sup>, Dennis V.C. Awang<sup>5</sup>, John M. Pezzuto<sup>6</sup>, Nikolaus H. Fischer<sup>7</sup>, Giovanni Appendino<sup>8</sup>, Bohdan Drozd<sup>9</sup>, Elzbieta Bloszyk<sup>9</sup>, Gerard Nowak<sup>9</sup>, and Halina Grabarczyk<sup>9</sup>.  
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## Symposium Abstracts

## Oral Contributed Papers

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Sesquiterpene lactones are constituents often possessing a bitter taste which occur in a number of plant families, especially the Asteraceae. These compounds have been examined previously by numerous researchers for a wide variety of biological effects including potential roles as phytoalexins, allergens, anticancer, and antiinflammatory agents. Toxicity has been a significant barrier to their therapeutic use. We became interested in this class of compounds in part because of their identification as the primary active principles of the medicinal plant "feverfew" (*Tanacetum parthenium*, Asteraceae), the leaves of which have been clinically proven to reduce the incidence and severity of migraine headaches. Through quantitative structure-activity relationship analysis of the activities of a collection of natural and semisynthetic sesquiterpene lactones in antiplatelet, cytotoxic, and various mechanistic bioassays, we are attempting to shed further light on their mechanisms of activities and toxicity. Our goal is the development of sufficiently predictive models to allow the preparation of therapeutic agents with good specificity of action and minimal toxicity.

### Symposium Paper 13 - Thursday, 11:00

#### ANNONACEOUS ACETOGENINS: POTENT MITOCHONDRIAL INHIBITORS WITH DIVERSE APPLICATIONS

Zhe-ming Gu and Jerry L. McLaughlin. Department of Medicinal Chemistry and Pharmacognosy. School of Pharmacy and Pharmaceutical Sciences. Purdue University, West Lafayette, IN 47907-1333

Chemically the Annonaceous acetogenins are C<sub>32</sub> or C<sub>34</sub> fatty acids which are combined with a 2-propanol unit at C-2; the propanol is incorporated into a 2,4-disubstituted  $\gamma$ -lactone which can assume five different forms. In addition, the long hydrocarbon chain usually contains a number of oxygenated moieties (hydroxyls, acetoxylys, ketones, or epoxides) which originate from units of unsaturation, at specific positions along the chain; some of these usually cyclize into one, two, or three tetrahydrofuran (THF) rings, creating a host of complicated stereoisomeric subclasses which are organized depending on the number and arrangement of the THF rings. These compounds are extremely potent and offer exciting potential as new antitumor, pesticidal, antimalarial, antihelminthic, and antimicrobial agents. Members of all of the subclasses act biologically, at least in part, as inhibitors of ATP production through blockage of complex I in mitochondrial respiration (NADH:ubiquinone oxidoreductase). (Aided by RO1 grant

### Oral Paper 1- Monday, 11:10

#### THIRD TROPHIC LEVEL INTERACTIONS BETWEEN GYPSY MOTH LARVAE, PHENOLIC AND FLAVONOL GLYCOSIDES FROM PINE SPECIES, AND A NUCLEAR POLYHEDROSIS VIRUS

Clifford Beninger, Mamdouh Abou-Zaid, Blair Helson, William Kaupp,

\*Hans Damman and \*Jaroslav Picman

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Over 400 tree species are primary or secondary hosts of gypsy moth. Interactions between host plant compounds and a viral pathogen such as nuclear polyhedrosis virus (NPV) *in vivo* may explain gypsy moth host preference in later instars. Extracts from pines consisting mainly of phenolic and flavonol glycosides negatively affected growth of second and third but not fourth instars when incorporated into artificial diet. When dosed with NPV (60,000 PIB/larva) and fed extract (0.1%) in diet of third instars, growth was reduced but survivorship increased. The pure flavonols rutin, quercetin and quercetin 3-O-glucoside initially reduced growth of third instars but this effect was lost over time. These same flavonols also had negative effect on weight initially but increased survivorship slightly for third instars dosed with virus. These results suggest that at least one factor which determines feeding for gypsy moth instars on plant hosts such as pine, is the phenolic and flavonol glycosides present in those hosts and their effect on a pathogenic virus of gypsy moth.

### Oral paper 2\* - Monday, 11:30

#### INTESTINAL RELAXANT EFFECT OF THE METHANOLIC EXTRACT AND PURE COMPOUNDS FROM DODONAEA VISCOSA AND DATURA LANOSA

Alejandra Rojas<sup>1,2</sup>, Silvia Cruz<sup>2</sup>, Rachel Mata<sup>3</sup> and Robert Bye<sup>4</sup>

<sup>1</sup>Facultad de Quimica, Universidad Autónoma de Querétaro, Querétaro, México. <sup>2</sup>Sección de Terapéutica Experimental, CINVESTAV, IPN. <sup>3</sup>Facultad de Química and <sup>4</sup>Instituto de Biología, Universidad Nacional Autónoma de México, Coyoacán 04510, México D.F. México.

The intestinal smooth muscle relaxant effect of *Dodonaea viscosa* (L.) Jacq. (Sapindaceae) and *Datura lanosa* Barclay ex Bye (Solanaceae) was investigated employing isolated rat and guinea pig ileum preparations. The methanolic extracts of these species displayed an equivalent concentration-dependent inhibition of spontaneous and electrically-induced intestinal contractions. Bioassay-guided fractionation of *D. viscosa* active extract resulted in the isolation of four active compounds: ent-15,16-epoxy-9 $\alpha$ -H-labda-13(16),14-diene-3 $\beta$ , 8 $\alpha$ -diol, hauriwaic acid and two flavonoids, sakuranetin and a kaempferol derivative.

# Abstracts of Oral Contributed Papers

## Oral paper 3\* - Monday, 11:50

### BORNEO ANTIMALARIALS: ETHNOBOTANY AND PHYTO-CHEMISTRY

Danna J. Leaman<sup>1</sup>, Herwasono Soedjito<sup>2</sup>, and John M. Pezzuto<sup>3</sup>  
<sup>1</sup>Department of Biology, University of Ottawa, Ottawa, Ontario  
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Sciences, Bogor, Indonesia. <sup>3</sup>Department of Medicinal Chemistry and  
Pharmacognosy, College of Pharmacy, University of Illinois at  
Chicago, Chicago, IL, U.S.A.

Traditional remedies have been the source of important antimalarial drugs and continue to provide novel and effective treatments, both where pharmaceuticals are not available and where the disease is increasingly resistant to commonly prescribed drugs. The Kenyah of the Apo Kayan Plateau, a remote forest-dwelling people in Indonesian Borneo, use 16 malaria remedies derived from plants. A local use index developed during this study, combined with an in vitro screen for activity against *Plasmodium falciparum*, supports the rational selection and application of widely-used remedies by local healers, and assists identification of target species for further studies of safety, efficacy, and conservation.

## Oral paper 4\* - Monday, 12:10

### BIOCHEMICAL MANIPULATIONS OF CONSTITUTIVE AND INDUCIBLE SECONDARY METABOLITES IN HAIRY ROOTS OF *HYOSCYAMUS MUTICUS*

Fabrico Medina-Bolivar and Hector Flores  
Biotechnology Institute, The Pennsylvania State University, University  
Park, PA 16802, USA

Hairy roots of *H. muticus* are capable of producing both intra- and extracellular secondary metabolites. Tropane alkaloids are intracellular constitutive metabolites, while sesquiterpenes are produced and released to the medium upon induction with a fungal elicitor. We have shown that hairy roots overproducing hyoscyamine can be selected using resistance to *p*-fluorophenylalanine (PFP). Overproduction of hyoscyamine was found in PFP-resistant hairy roots regenerated from resistant cells. Incorporation of <sup>14</sup>C-putrescine into hyoscyamine was greater in PFP-resistant than in PFP-sensitive hairy roots. The levels of induced sesquiterpenes, lubimin, and solavetivone were higher in PFP-sensitive roots. We propose that these higher yields are due to differences in the partitioning of acetate between the hyoscyamine and sesquiterpene pathways in PFP-sensitive and PFP-resistant hairy roots.

## Oral paper 5\* - Monday, 12:30

### BIOSYNTHETIC STUDIES OF LACTUCIN DERIVATIVES IN HAIRY ROOT CULTURES OF *LACTUCA FLORIDANA* USING <sup>13</sup>C-LABELED SODIUM ACETATE

Oi Song, Nikolaus H. Fischer, Elise Ludwig\* and Marting Hjortso\*

Departments of Chemistry and \*Chemical Engineering,  
Louisiana State University, Baton Rouge, Louisiana 70803, U.S.A.

Biosynthetic studies of 8-acetyllactucin, 8-deoxylactucin and 8-acetyl-11,13-dihydroxylactucin were carried out using *Agrobacterium rhizogenes* transformed hairy root cultures of blue-flowered lettuce [*Lactuca floridana* (L.) Gaert., Fruct. (Asteraceae, Astereae)]. Experiments with [<sup>1-13</sup>C], [<sup>2-13</sup>C] and [<sup>1,2-13</sup>C<sub>2</sub>] sodium acetate as precursors were performed. The high incorporation of [<sup>1,2-13</sup>C<sub>2</sub>] acetate into 8-acetyllactucin, 8-deoxylactucin and 8-acetyl-11,13-dihydroxylactucin allowed for detailed <sup>13</sup>C NMR analysis of the above sesquiterpene lactones. The results support the previously proposed biogenesis for guaianolide-type sesquiterpene lactones via the acetate-mevalonate-germacradiene pathway.

## Oral paper 6\* - Monday, 12:50

### 4'-HYDROXYDEHYDROKAWAIN, A STYRYL-PYRONE FROM A LEGUME SPECIES

Ricardo Reyes-Chilpa<sup>1</sup>, Leovigildo Quijano<sup>2</sup>, Federico Gómez-Garibay<sup>2</sup>, and Tirso Ríos-Castillo<sup>2</sup>

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Ciudad Universitaria, Coyoacán, 04510 México.

Styryl-pyrone have been isolated so far from primitive angiosperm families, such as: Annonaceae, Lauraceae and Piperaceae. While studying the chemical composition of the roots of the insecticidal and allelopathic shrub *Brongniartia podalyrioides* (Papilionoideae), we isolated 4'-hydroxydehydrokawain. Its structure was determined by spectroscopic evidence and confirmed by X-ray diffraction of its acetate. This compound has been previously isolated from the reputed analgesic herb *Piper methysticum*, but also from two Asteraceae species. Sporadic occurrence of styryl-pyrone in advanced taxa is discussed on the basis of Gottlieb's micromolecular evolution postulates.

## Oral paper 7 - Monday, 15:00

### A ROLE FOR XYLOGLUCAN (XG) CLEAVAGE IN RIPENING TOMATOES

Gordon Maclachlan, Biology Department, McGill University,  
Montréal, Quebec Canada H3A 1B1

The mechanism whereby the "firmness" of fruits decreases during ripening has been much studied because it is a basic characteristic of plant senescence, and it has potential for biotechnological exploitation. Recent transgenic tests reveal that breakdown of pectic materials can not fully explain the softening of ripe tomatoes. This paper reports partial digestion of other major structural wall components, namely, cellulose and xyloglucan (XG), during tomato ripening. The activities of endo-1,4- $\beta$ -glucanase and XG-transglycosylase both increase as XG



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depolymerizes, whereas specific XG-ase activity, assayed viscometrically, is high during fruit development but disappears from ripe tomatoes. Thus, the former are the best candidates for enzymes that cleave XG during fruit ripening, with the latter effective in wall "loosening" during growth.

## Oral paper 8 - Monday, 15:20

### ANTIBIOTICS FROM BRITISH COLUMBIAN PLANTS OF ETHNOBOTANICAL INTEREST

Geeta Saxena, Hideyuki Matsuura, R. E. W. Hancock\* and G. H. N. Towers

Departments of Botany and Microbiology\*, University of British Columbia, Vancouver, B.C. Canada V6T 1Z4.

The flora of British Columbia contains a large number of medicinal plants which were discovered and used by the native peoples in their traditional herbal remedies. The vast majority remain unknown pharmacologically. Our studies, using a newly developed sensitive overlay technique for bioassay has led to the identification of a variety of antibacterial and antifungal agents. These includes fatty acids, flavonoids, quinones, phenolics and terpenoids isolated from species of *Alnus*, *Balsamorhiza*, *Ceanothus*, *Gilia*, *Moneses* and *Rhus*. Their chemistry and antibiotic activity will be discussed.

## Oral paper 9 - Monday, 15:40

### CYTOTOXIC FURANONAPHTHOQUINONES FROM *TABEBUIA OCHRACEA* SSP *NEOCHRYSANTHA*

Fredyc Díaz and J. D. Medina

Instituto Venezolano de Investigaciones Científicas, Centro de Química Apartado 21827, Caracas 1020-A, Venezuela.

Bioassay-directed fractionation of the  $\text{CHCl}_3$  extract of the inner stem bark of *Tabebuia ochracea* ssp *neochrysantha*. (Bur. & K. Schum.) Standl., resulted in the isolation of two new naphtho [2,3-b]-furan-4,9-diones, i.e. the 2-(14-hydroxyethyl)-5,8-dihydroxy- and 2-acetyl-8-hydroxy-7-methoxy, together with seven known naphthofurandiones. The structures of these compounds were elucidated on the basis of their spectral data.

## Oral paper 10 - Monday, 16:00

### ISOLATION AND IDENTIFICATION OF NEW DIMERIC ANTHRACENONES FROM *K. PARVIFOLIA*

V. Rivas, A. Piñeyro, and N. Waksman

Depto. de Farmacología, Fac. de Medicina, U.A.N.L., Ap. Postal 146, Col del Valle, Garza-García, N. L., México.

*K. parvifolia* is a toxic plant growing in Mexico. From the ethyl acetate

extract, obtained from the seeds, we previously isolated and identified three dimeric anthracenones; one of them, T-514 or peroxisomicine showed cytotoxic action in several cell lines. Also observed was a specific effect on the peroxisomal membrane integrity in yeast cells as well as a competitive inhibition "in vitro" of the peroxisomal enzyme catalase. The purpose of the present work was to isolate and identify the minor components of the extract. Separation was achieved by successive extractions, selective precipitation and chromatography on normal and reverse phase. Identification was made by spectroscopic techniques. Until now we could obtain three dimeric anthracenones, structurally similar to T-514. All of them inhibit catalase activity.

## Oral paper 11 - Monday, 16:20

### MINOR INSECTICIDAL CONSTITUENTS OF *MELIA TOOSENDAN*

Hideyuki Matsuura<sup>1</sup>, Wenkui Chen<sup>2</sup>, Murray B. Isman<sup>2</sup>, Xing Zhang<sup>3</sup> and G.H. Neil Towers<sup>1</sup>, Depts. of <sup>1</sup>Botany and <sup>2</sup>Plant Science, University of British Columbia, Vancouver, Canada V6T 1Z4; <sup>3</sup>Northwestern Agric. Univ., Yangling, Shaanxi 712100, P. R. China

Derived from bark extracts of chinaberry trees, *M. toosendan* and *M. azedarach*, "Toosendanin EC" is a botanical insecticide recently developed and registered in the People's Republic of China. The major active principle in the technical concentrate (60-75% by weight) is the apoeuphol limonoid toosendanin. Although pure toosendanin is a potent antifeedant to lepidopteran pests, studies with the variegated cutworm, *Peridroma saucia* and the tobacco armyworm, *Spodoptera litura* indicate that the technical concentrates are more bioactive than pure toosendanin itself. These observations suggest the presence of minor constituents with greater bioactivity. Some of these minor constituents have been identified, and structure-activity relations of this group of limonoids are discussed.

## Oral paper 12 - Tuesday 11:00

### PHYTOCHEMICAL RESPONSES/ADAPTATIONS OF BARLEY SEEDLINGS TO UV-B

Lan Liu, Dennis C. Gitz III and Jerry W. McClure

Department of Botany, Miami University, Oxford, OH 45056 USA.

When grown with supplemental UV-B (280-320 nm) at levels predicted to occur at 40° N latitude from 25% stratospheric ozone depletion there were no significant effects on growth, fresh weight, dry weight, photosynthesis, or chloroplast pigments. C-Glycosylflavone levels were markedly enhanced by UV-B in both the epidermis and underlying tissues. L-Phenyl alanine ammonia-lyase activity was prolonged for several days by UV-B in a pattern correlating with UV-B enhanced phenolic accumulation. UV-B also increased levels of insoluble ferulic acid in the epidermis. The results will be discussed in terms of tissue-specific, developmentally-regulated adaptive responses to UV-B.

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## Oral paper 13 - Tuesday 11:20

### BIOACTIVE METABOLITES FROM YUCATECAN MEDICINAL PLANTS

Luis Manuel Peña Rodríguez

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As part of our studies on bioactive constituents from Yucatecan medicinal plants, we have evaluated the methanolic extracts of *Chiococca alba* (L.) Hitch., *Ocimum basilicum* L., *Cnidioscolus aconitifolius* (Miller) I. M. Johnston, *Ocimum micranthum* Willd., and *Bursera simaruba* (L.) Sarg. All the extracts showed biological activity in at least one of the bioassay tests used (antimicrobial, brine shrimp lethality, and inhibition of crown gall tumors). A bioassay-directed fractionation of the different extracts led us to the isolation of a lignan, two diterpenes, and several triterpenes.

## Oral paper 14 - Tuesday 11:40

### ULTRAVIOLET INFLUENCES QUANTITIES AND QUALITY OF COUMARINS EXTRUDED AS CELL PROTECTION

A. M. Zobel

Chemistry Department, Trent University Peterborough, ON, Canada K9J 7B8

After enhanced UV irradiation *Ruta graveolens* and *Medicago sativa* were investigated for extrusion of coumarins to the leaf surface. There were quantitative changes in bergapten, psoralen and isopimpinellin on the surface of *R. graveolens*. Some new peaks were observed after 366 nm radiation, but different new peaks after 254 nm. In alfalfa the changes in concentration of scopoletin and scoparone were more pronounced, both on the surface and in the interior of the leaves. Some unidentified HPLC peaks and quantitative changes of the latter two coumarins suggest that plant tissues have the ability to change the chemistry of UV-absorbing compounds as a shield on the plant surface.

## Oral paper 15 - Tuesday 12:00

### INDUCTION STUDIES OF PHOTOTOXIC POLYACETYLENES IN SAFFLOWER

Lauralyn Beaverson and Kelsey R. Downum

Dept. of Biol. Sci., Florida International University, Miami, FL 33199, USA.

Safflower (*Carthamus tinctorius* L.; Asteraceae) provides an ideal model system for investigating the induction of phototoxic compounds in plants. Safynol (3,11-tridecadiene-5,7,9-triene-1,2-diol) and a second triene diene-ene derivative were isolated from healthy leaf tissue. Antimicrobial bioassays using *B. cereus*, *E. coli* and *S. cerevisiae*

showed that both phytochemicals were potent UV-A activated antimicrobials. Time course studies during the first 5 weeks of seedling growth revealed that the concentration of both phototoxic acetylenes increase during early seedling growth. Mechanical wounding of leaf tissue resulted in the enhanced production of acetylenes. The concentration of safynol and the triene-diene-ene in wounded plants increased significantly within 36-48 h after wounding. Induction of polyacetylene biosynthesis by mechanical wounding will be used to investigate the consequences of increased phototoxin levels of Safflower leaf physiology.

## Oral paper 16 - Tuesday 12:20

### PHARMACOLOGICAL AND PHYTOCHEMICAL STUDIES OF AERIAL PARTS OF BUDDLEJA CORDATA

Teresa O. Ramírez<sup>1</sup>, Victoriano Flores<sup>1</sup>, Carlos Escamilla<sup>1</sup>, Mariano Martínez<sup>2</sup>

<sup>1</sup>Bioterio Claude Bernard Benemérita Universidad Autónoma de Puebla. <sup>2</sup>Instituto de Química de la Universidad Nacional Autónoma de México. Ciudad Universitaria, Circuito Exterior. Coyoacán 04510. México, D. F.

*B. cordata* has a wide distribution ranging from Mexico to Colombia. It is a medium-sized shrub and its medicinal uses by the indigenous people were described long ago. The aqueous and methanolic extracts of the aerial parts of this plant were tested for diuretic, analgesic, sedative and antipyretic activities. The tests were performed using young Wistar mice. Both extracts showed significant analgesic and antipyretic activities. The chemical study of *B. cordata* led to the isolation of the flavonol glycoside linarin, which showed important antipyretic activity.

## Oral paper 17 - Tuesday 12:40

### PHYTOCHEMICALS AS A RESOURCE FOR ARTHROPOD REPELLENTS

William S. Bowers

Dept. of Entomology, Laboratory of Chemical Ecology, Forbes Bldg. University of Arizona, Tucson, Arizona 85721 U.S.A.

Phytochemicals deployed to discourage herbivory can be viewed as an important resource to lead chemistry for the development of personal repellents for protection against arthropod vectors of disease. Investigations of the spice prepared from buds of the Asian tree *Zanthoxylum bungeanum* led to the discovery of several monoterpenes with significant repellency for insects. The repellent terpenes included piperitone, alpha-terpineol, linalool, 1,8-cineol and 4-terpineol. From the New Zealand tree *Dysoxylum spectabile* we isolated and identified a bicyclic sesquiterpenoid with pronounced repellency for ants. From goat weed, *Ageratum conyzoides* we identified the powerful insect repellent, coumarin. Many of these compounds demonstrated repellency more powerful than the principal constituent of many commercial products i.e., diethyl m-toluamide (DEET).

# Abstracts of Posters

## Poster 1\* - Monday 19:30-21:00

### COMPARATIVE PHYTOCHEMICAL ANALYSIS AND PRELIMINARY PHARMACOLOGICAL EVALUATION OF SOME SPECIES OF THE "CACHANA" COMPLEX OF MEDICINAL PLANTS

María Isabel Aguilar<sup>1</sup>, Guillermo Delgado<sup>2</sup>, Robert Bye<sup>3</sup>, Edelmira Linares<sup>3</sup> and María Luisa Villarreal<sup>4</sup>

<sup>1</sup>Facultad de Química, <sup>2</sup>Instituto de Química and <sup>3</sup>Jardín Botánico de la Universidad Nacional Autónoma de México, Ciudad Universitaria 04510. México, D. F.,

<sup>4</sup>Centro de Investigación Biomédica del Sur, IMSS, Argentina 1, Xochitepec, Morelos, México.

Botanic complexes have been used in Mexican traditional medicine to alleviate common illnesses. In order to compare the chemical contents of a group of plants of the "cachana" complex (*Iostephane madrensis*, *Roldana sessilifolia*, *Liatrix punctata*), and plants related to it (*Iostephane heterophylla*), and to evaluate their chemical and pharmacological relationships within the complex, detailed phytochemical and preliminary biological investigations were performed. Polycyclic diterpenes, bisabolenes, chromenes, coumarins and sesquiterpene lactones were isolated from the above-mentioned species.

In the bioactivity screening, both the extracts and pure substances revealed important effects when tested using *Artemia salina*, microbiological and cytotoxic evaluations.

## Poster 2\* - Monday 19:30-21:00

### ALKALOIDS FROM *NARCISSUS CANTABRICUS*

Jaume Bastida, JoséLuis Contreras, Carles Codina.

Departament de Productes Naturals, Facultat de Farmacia, Universitat de Barcelona, 08028-Barcelona, España.

*Narcissus cantabricus* DC., collected during the flowering period in Almerma, Spain, has been shown to contain six alkaloids: vittatine, crinamine, tazettine, 6 $\alpha$ -hydroxybuphanisine, 6 $\beta$ -hydroxy-buphanisine and the new alkaloid cantabricine, a compound of the crinane type, isolated for a natural source from the first time. Their structures were established by physical and spectroscopic methods.

## Poster 3\* - Monday 19:30-21:00

### DEFENSE BY SECONDARY METABOLITE DIVERSITY VS. A COMPLEX CONSUMER COMMUNITY: THE CASE OF ARTIFICIAL SEEDS AND SOIL MICROBIOTA

Horacio Bonfil and Francisco J. Espinosa-García  
Dept. Ecología Evolutiva, Centro de Ecología, Universidad Nacional Autónoma de México, A.P. 70-275, 04510, México, D.F.

Diversity in secondary metabolites (SM) has been suggested as a valuable asset in plant defense against consumers. We tested the hypothesis that high SM diversity and concentration provides better plant defense than low SM diversity and/or concentration. Six plant SM were added to "seeds" (encapsulated wheat flour) singly or in mixtures of 2 to 6 SM. Mixtures or single compounds were added in conc. of 0.5, 2, 4, mg/g. "Seeds" were buried in an alfalfa field soil and recovered periodically during 50 days. Weight loss rate caused by soil microbiota was not significantly affected by SM diversity. However, high doses and some single SM slightly retarded "seed" degradation. We suggest that plants challenged by complex consumer communities should require either a higher SM diversity, higher SM doses than those that we used or highly toxic compounds.

## Poster 4\* - Monday 19:30-21:00

### CARDIAC STIMULATORY AND SMOOTH MUSCLE RELAXING ACTIVITY OF SEA ANEMONES FROM THE WEST COAST OF CANADA

Edith I. Cline and \*Michael W. Wolowyk  
Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta, Edmonton Alberta, Canada T6G 2C5

For a long time now, the sea anemones have been potential source of novel therapeutic agents. Tropical and sub-tropical species of sea anemones have been investigated for different biological activities, particularly their hemolytic activity. For the past few years, there has been reports on their cardiac stimulatory activity elicited by polypeptides such as Anthopleurin A, B and C from *Anthopleura xanthogrammica* and *A. elegantissima* and Tenebrosin A from the Australian *Actinia tenebrosa*.

Initial screening of ten species of sea anemones (*Urticina lofotensis*, *U. crassicornis*, *U. coriacea*, *U. piscivora*, *Stomphia didemon*, *Pachycerianthus fimbriatus*, *Anthopleura xanthogrammica*, *A. elegantissima*, *Metridium senile* and *Corynactis californica*) native to the West Coast of Canada have shown varying degrees of positive inotropic activity. Using rat left atrial tissues and guinea pig longitudinal smooth muscle strips we have shown that ethanolic extracts of nine of the ten species tested possess varying degrees of potent cardiac stimulatory activity as well as smooth muscle relaxing properties.

\*Deceased January 31, 1992.

## Poster 5\* - Monday 19:30-21:00

### PURPURASOLOL A NEW COUMARIN FROM *PTEROCAULON PURPURASCENS*

S.L. Debenedetti, E.L. Nadinic, M. Boeykens\*, J.D. Coussio and N. de Kimpe\*  
Cátedra de Farmacognosia, Facultad de Farmacia y Bioquímica, Universidad de Buenos Aires. Junín 956. 1113 Buenos Aires. Argentina

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\*Department of Organic Chemistry, Faculty of Agricultural and Applied Biological Sciences, University of Gent, Coupure links 653, B-9000 Gent, Belgium

In continuation of our work on coumarins from *Pterocaulon* genus, we have isolated from the aerial parts of *P. purpurascens* a new 5,6,7,8-tetraoxygenated coumarin named purpurasolol. Together with the known coumarins fraxetin, scopoletin, 7-(2',3'-dihydroxy-3'-methylbutyl) scopoletin and 7-(3'-methyl-2'-butenyl) scopoletin. The structure of the new compound was established by means of <sup>1</sup>H-RMN 500 MHz, <sup>13</sup>C-RMN, EI-MS and by comparison with the previously isolated purpureol 2 and purpurasol 3.

### Poster 6\* - Monday, 19:30-21:00

#### IN VITRO GERMINATION AND TAXANE PRODUCTION OF *TAXUS SPP.*

Tere Flores, Laura J. Wagner and Hector E. Flores  
Biotechnology Institute. The Pennsylvania State University, University Park, PA 16802, USA

This report describes the optimization of environmental and cultural parameters for *Taxus* embryos germination and conversion into seedlings. Pre-germination cold treatment (0, 4 and 10°C) of *Taxus* seeds from three different developmental stages dramatically improved the germination and onset of embryos from old seeds. High rates of germination were obtained at 4°C (80%). The use of modified Gupta and Durzan's medium (DCR) improved germination, resulting in a high percentage (65-70%) of root formation. Removing the shoot apical meristem and reducing the levels of sucrose (3 to 1%) in the medium induced the sprouting of axillary buds. Seedling have been hardened and transferred to soil. Radioactive precursor studies using <sup>14</sup>C-acetate have shown that seedlings have the ability to produce taxanes in vitro.

### Poster 7\* - Monday, 19:30-21:00

#### STRUCTURAL STUDIES OF *ERYTHRINA* ALKALOIDS

Ma. Rosario García-Mateos<sup>1</sup>, Angela Sotelo<sup>2</sup>, Bernardo Lucas<sup>2</sup>, Marcos Soto-Hernández<sup>1</sup>

<sup>1</sup>Centro de Botánica, Colegio de Postgraduados, Chapingo, Edo. de México, 56230, México

<sup>2</sup>Facultad de Química, Departamento de Farmacia, UNAM, 04510, México, D.F.

Interest in the chemistry of *Erythrina* alkaloids attracted attention in 1940s following the discovery of the curare-like action of extracts of seeds of various species. In these early studies the seeds of about 50 species were found to contain alkaloids with muscle paralyzing activity and this greatly stimulated chemical investigations because the *Erythrina* alkaloids are tertiary bases whereas other alkaloids with similar pharmacological activity are quaternary salts. A series of studies of the alkaloidal content of seeds and leaves of *Erythrina* have been undertaken in our lab-

oratory using GC/MS as the main analytical tool to facilitate chemotaxonomic studies. Now we describe investigations of the seeds and flowers of a further two species of *Erythrina*.

### Poster 8\* - Monday, 19:30-21:00

#### ISOLATION OF A PHYTOGROWTH INHIBITOR FROM *MALMEA DEPRESSA*

Adelina Jiménez<sup>1</sup>, Rachel Mata<sup>1</sup> and Ana L. Anaya<sup>2</sup>  
<sup>1</sup>Facultad de Química, <sup>2</sup>Instituto de Fisiología Celular. Universidad Nacional Autónoma de México. Apdo. Postal 70-243, Coyoacán 04510 México D.F.

*Malmea depressa* (Baill) R. E. Fries (Annonaceae) is a dominant medicinal tree found in the tropical forest of Southeast Mexico. Bioassay-guided fractionation of a CHCl<sub>3</sub> extract of the stem bark of *M. depressa* which showed phyto-growth inhibitory activity on seedling growth of *Amaranthus hypochondriacus* and *Echinochloa crusgalli* led to the isolation of a phenylpropanoid [1,2,3,4-tetramethoxy-5-(2-propenyl)-benzene] as the major active principle. The 50% phyto-growth inhibitory concentration (IC<sub>50</sub>) of the extract and the natural product were 134.02 mg/ml and 43.17 mg/ml, respectively, in the case of *A. hypochondriacus* and 457.76 mg/ml and 810.73 mg/ml, respectively, in the case of *E. crusgalli*. In addition, the extract and the isolated compound exhibited antifungal activity.

### Poster 9\* - Monday, 19:30-21:00

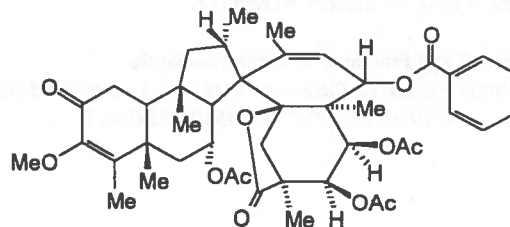
#### SPIROCARACOLITONES ISOLATED FROM A NEW GENUS AND SPECIES, *RUPTILIOCARPON CARACOLITO*. THE FIRST CD SPIRO-TRITERPENOIDS

S.L. MacKinnon<sup>1</sup>, T. Durst<sup>1</sup>, J.(T. Amason<sup>1</sup>, C. Bensimon<sup>1</sup>, P.E. Sanchez-Vindas<sup>2</sup>, L. San Roman<sup>2</sup>, L.J. Poveda<sup>2</sup>

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<sup>2</sup>Universidad Nacional, Heredia, Costa Rica Apdo. 86-3000

As part of the program aimed at the development of "green insecticides" we have screened extracts from various genera of the Rutales, collected mainly from Costa Rica, for growth reducing activity against the European corn borer (*Ostrinia nubilalis*). The most active ethanol extract was that of the bark of *Ruptiliocarpum caracolito*. Bioassay guided fractionation of this extract has led to the isolation of six unique, previously unreported, spiro CD pentacyclic triterpenoids.



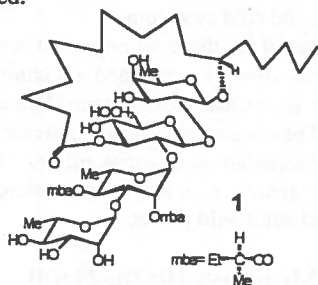
# Abstracts of Posters

## Poster 10\* - Monday 19:30-21:00

### ISOLATION BY HPLC OF THE MINOR CONSTITUENTS OF THE PHYTOGROWTH INHIBITOR RESIN GLYCOSIDES FROM *IPOMOEA TRICOLOR*.

Adolfo Pérez-Díaz, Moustapha Bah and Rogelio Pereda-Miranda  
Departamento de Farmacia, Facultad de Química, Universidad Nacional Autónoma de México.  
Apartado Postal 70-265. México 04511.

We previously demonstrated that the *Ipomoea* resin glycosides are potent inhibitors of plant growth and primarily responsible for the allelopathic interference exhibited by these species. The major phyto-growth inhibitor present in the resins of *I. tricolor* was given the trivial name of tricolorin A (1) which displayed cytotoxic and antimicrobial activities. Three additional compounds were isolated from the bioactive resin of this species and their isolation in a pure state was successfully achieved by a high resolution preparative HPLC methodology. Details of the isolation and the preliminary structural elucidation of these glycolipids will be presented.



## Poster 11\* - Monday, 19:30-21:00

### ANTITERMITIC ACTIVITY OF *LONCHOCARPUS CASTILLOI* (LEGUMINOSAE) HEARTWOOD FLAVONOIDS AND EXTRACTS

R. Reyes-Chilpa<sup>1</sup>, N. Viveros-Rodríguez<sup>1</sup>, F. Gómez-Garibay<sup>2</sup>,  
L. Quijano<sup>2</sup> and T. Ramos-Castillo<sup>2</sup>  
<sup>1</sup>Instituto de Ecología A.C., Apdo. Postal 63, Xalapa, 91000, México.  
<sup>2</sup>Instituto de Química, Universidad Nacional Autónoma de México,  
Ciudad Universitaria, Circuito Exterior Coyoacán, 04510 México, D.F.

The heartwood of the tropical woody species *Lonchocarpus castilloi* is highly resistant to fungi and termites. To date, five fungistatic flavonoids, among them the Castellens D and E, have been identified. We now have examined the effect of the heartwood extracts and Castellens D and E against the drywood termites *Cryptotermes brevis*. The extracts impregnated into filter paper, fairly reduced both the feeding and survival of termites. Non-significant differences among the extracts were detected. The Castellens D and E tested in the same way, showed feeding deterrent activity depending on dosage, but were non toxic at any concentration.

## Poster 12\* - Monday 19:30-21:00

### BIOACTIVE COMPOUNDS FROM *RATIBIDA MEXICANA*

Perla Sánchez<sup>1</sup>, Fernando Soto<sup>1</sup>, Rachel Mata<sup>1</sup>, Blanca Hernández<sup>2</sup> and Robert Bye<sup>3</sup>

<sup>1</sup>Facultad de Química, <sup>2</sup>Instituto de Fisiología Celular, <sup>3</sup>Instituto de Biología, Universidad Nacional Autónoma de México, Coyoacán 04511, México D.F.

In our continuing search for biologically active constituents from endemic medicinal plants from the State of Chihuahua, México we have investigated the roots of *Ratibida mexicana* (Wats.) Sharp (Asteraceae). Bioactivity-guided procedures led to the isolation of two bioactive sesquiterpene lactones (isoalloalantolactone and elema-1,3-11-trien-8,12-olide). Both compounds showed strong phyto-growth inhibitory activity on seedlings of *Amaranthus hypochondriacus* and *Echinochloa crus-galli*. In addition, they exhibited significant cytotoxic and antifungal effects.

## Poster 13\* - Monday, 19:30-21:00

### PHYTOCHEMISTRY AS A TOOL FOR CHEMOTAXONOMY.

Sellés, J. Bastida, C. Codina and \* J. L. León  
Dept. de Productes Naturals, Facultad de Farmacia, Universitat de Barcelona, 08028 Barcelona, Cataluña, España. \*Centro de Investigaciones Biológicas, División de Biología Terrestre, La Paz, Baja California Sur, 23000 México.

*Behria tenuiflora* Greene is an endemic monospecific genus found in the Cape Region, Mexico. This species has been included in two different plant families: Amaryllidaceae and Liliaceae. The phytochemical analysis of *Behria tenuiflora* has now revealed the presence of two alkaloids with a pyridine-pyrrolidine nucleus, thus differing from the Amaryllidaceae type alkaloids. Taking into account the exclusive chemotaxonomic distribution of the Amaryllidaceae alkaloids within this plant family, the results we have obtained suggest *Behria tenuiflora* should not be included in the Amaryllidaceae family.

## Poster 14\* - Monday 19:30-21:00

### ALKALOIDS FROM *NARCISSUS ASTURIENSIS*

M. Sellés, F. Viladomat and J., Bastida  
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We report the alkaloid constituents of the whole plant of *Narcissus asturiensis* (Jordan) Pugsley, an amaryllidaceae species belonging to the *Pseudonarcissus* section, and growing in the Iberian peninsula. This plant has been shown to contain six alkaloids: haemmanthidine, tazettine, 3-epi-macronine, 5,6-dihydrobicolorine and trisphaeridine. Their structures were established by physical and spectroscopic methods. This is the first time that this species has been studied from an alkaloidal point of view.



# Abstracts of Posters

## Poster 15\* - Monday 19:30-21:00

### COMBINED USE OF THERMOSPRAY AND CONTINUOUS FLOW-FAB LIQUID CHROMATOGRAPHY-MASS SPECTROMETRY FOR THE ANALYSIS OF GLYCOSIDES IN CRUDE PLANT EXTRACTS

J. L. Wolfender and K. Hostettmann  
Institut de Pharmacognosie et Phytochimie, École de Pharmacie,  
Université de Lausanne,  
CH-1015 Lausanne, Switzerland

In crude plant extracts, some constituents of biological or pharmaceutical interest exist in the form of glycosides. As these compounds are usually labile and polar, their off-line mass spectral investigation requires soft ionization technique such as D/CI or FAB. When analysed on-line by LC-MS in crude extracts, they need equivalent ionization techniques. In order to screen rapidly and efficiently compounds like saponins, cardenolides or secoiridoid glycosides by LC-MS, the use of two interfaces (TSP and CF-FAB) was investigated. Different extracts of Leguminosae, Apocynaceae and Gentianaceae were analysed by these techniques. TSP LC-MS was found to provide good structural and molecular weight information on small glycosides (mono-, di- and sometimes triglycosides). CF-FAB provides only molecular weight information of these glycosides but allows the analysis of much larger metabolites such as octaglycosidic saponins. The complementary and the potential of these LC-MS techniques for the early recognition of glycosides in crude plant extracts is discussed.

## Poster 16 - Monday, 19:30-21:00

### PHYTOTOXINS FROM *COLLETOTRICHUM DEMATIUM*

Mamdouh Abou-Zaid, \*Michael Dumas, Teresa Buscarini and Dean Thompson  
Natural Resources Canada, Canadian Forest Service, Forest Pest Management Institute,  
\*Ontario Region, P.O. Box 490, Sault Ste. Marie, Ontario,  
Canada P6A 5M7

Phytotoxic secondary metabolites produced by plants and microorganisms represent a wide range of chemical structures and mechanisms of action that have potential utility in biorational and biological pest control strategies, as well as potential pharmaceutical applications. Increasing public concern over traditional methods of pest control have stimulated increased interest in natural products as possible sources of new ecologically friendly approaches. The fungus *Colletotrichum dematium* produces five metabolites when grown in liquid culture. The ethyl acetate extracts were fractionated using a column packed with 50 g of silica gel G60 with methylene chloride followed by increasing concentrations of acetone. Final purification was achieved on Sephadex LH-20 column using MeOH. Pure compounds were subjected to chemi-

cal and physical investigations (UV, <sup>1</sup>H-NMR, <sup>13</sup>C-NMR and FAB-MS). Five compounds were isolated and identified in the ethyl acetate fraction. Two compounds show antifungal activity when tested against *Cladosporium cucumerinum*.

## Poster 17 - Monday, 19:30-21:00

### ESSENTIAL OILS ANALYSIS OF OREGANO (*LIPPIA PALMERI*) FROM WILD PLANTS, MICROPROPAGATED PLANTS AND CALLUS

Lilia Alcaraz-Meléndez, Sergio Real-Cosío and \*Rafael Vázquez-Duhalt  
Dept. de Microbiología del CIBNOR, Apdo. Postal 128, La Paz, Baja California Sur C.P. 23000 México  
\*Dept. de Biotecnología del CINGEBI, Cuernavaca, Morelos. México.

The production of medicinal substances by plant cells cultured "in vitro" is considered a viable alternative to field crops. Oregano (*Origanum* spp. and *Lippia* spp.) is commonly used for culinary purposes and, in traditional medicine, as an antispasmodic, a disinfectant and to reduce asthma and cold symptoms.

Thymol and carvacrol are the most important active compounds of oregano oil. In this work we performed gas chromatography analyses of volatile oils from Baja California oregano (*Lippia palmeri*), wild plants, micropropagated plants and calli grown in tissue culture. Results showed similar concentrations of carvacrol (97-94%) and thymol (2.8-0.49%) in embryogenic callus, leaves from micropropagated plants grown in pots and adult wild plants.

## Poster 18 - Monday, 19:30-21:00

### ALLELOPATHIC POTENCIAL OF *IPOMOEA BATATAS* (CONVOLVULACEAE): THE RESIN GLYCOSIDES AS POTENT INHIBITORS OF PLANT GROWTH

Aurora Alva-Garcma<sup>1</sup>, Ana Luisa Anaya<sup>2</sup> and Rogelio Pereda-Miranda<sup>1</sup>  
<sup>1</sup>Departamento de Farmacia, Facultad de Química, UNAM. Apartado postal 70-265. México 04511.  
<sup>2</sup>Instituto de Fisiología Celular, Universidad Nacional Autónoma de México.

The allelopathic potential of four different varieties of *Ipomoea batatas* was demonstrated by measuring the inhibitory activity of organic extracts on seedling growth of *Amaranthus leucocarpus* and *Echinochloa cruss-galli*. The phytoinhibitory activity was associated in all the cases with the presence of the "so-called" resin glycosides. These active principles are potent inhibitors of plant growth that are primarily responsible for the allelopathic interference exhibited by some of the *Ipomoea* species used in Mexican traditional agriculture as weed controllers. Therefore, the resin glycosides may be involved in the chemical ecology of the plant family Convolvulaceae.



# Abstracts of Posters

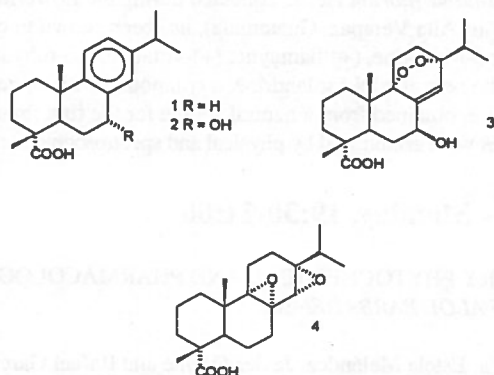
## Poster 19 Monday, 19:30-21:00

### CHEMICAL CONSTITUENTS OF THREE POPULATIONS OF *LEP. ECHINIA CAULESCENS* (LABIATAE)

Laura Alvarez<sup>1</sup>, Virginia Gonzaga<sup>1</sup>, María Isabel Chávez<sup>2</sup>, Guillermo Delgado<sup>2</sup>, and Esteban M. Martínez<sup>3</sup>

<sup>1</sup>Dept. de Química Orgánica, Facultad de Ciencias Químicas e Ingeniería, Universidad Autónoma del Estado de Morelos, Av. Universidad 1001. Cuernavaca, Morelos, México; <sup>2</sup>Instituto de Química y <sup>3</sup>Centro de Ecología, Universidad Nacional Autónoma de México, Circuito Exterior, Ciudad Universitaria. Coyoacán 04510. México, D.F.

*L. caulescens* is a herb widely distributed in Mexico which is used as folk medicine to treat stomach ailments and diabetes. Phytochemical analysis of three populations allowed to isolate abietanoid diterpenes (1-4), pentacyclic triterpenes and flavonoids. Results indicate that there are some observable intrapopulation chemical variations.



## Poster 20 - Monday, 19:30-21:00

### ROLE OF DEHYDRODIFERULIC ACID IN MAIZE RESISTANCE TO EUROPEAN CORN BORER

J.T. Arnason<sup>1</sup>, D.J. Bergvinson<sup>2</sup>, R.I. Hamilton<sup>2</sup>, G.H.N. Towers<sup>3</sup>, and J.A. Mihm<sup>4</sup>

<sup>1</sup>Dept. of Biology, University of Ottawa, Ottawa, Ont., <sup>2</sup>Agriculture Canada, Ottawa, Ontario <sup>3</sup>Dept. of Botany, Univ. of British Columbia, Vancouver, B.C., <sup>4</sup>CIMMYT, El Batán, Mexico.

Maize resistance to insects has largely focussed on the hydroxamic acid DIMBOA but the maize germplasm group, called Multiple Borer Resistant (MBR) Maize, developed by the International Maize and Wheat Improvement Center in Mexico shows high insect resistance

with low levels of DIMBOA. Our investigations suggest that dehydrodiferulic acid cross-links between arabinoxylans of the cell wall provide resistance in MBR maize and are more important than previously described photodimers. Levels of these substances correlate well with leaf toughness and resistance to insects over MBR genotypes.

## Poster 21 - Monday, 19:30-21:00

### PHYTOCHEMICAL STUDIES OF *CASTILLEJA TENUIFLORA*

Adela Astudillo, Diego González\*, Hortencia Dávalos and Miguel A. Zárate

Escuela Nacional de Ciencias Biológicas (IPN), Prolongación Carpio y Plan de San Luis. México 11340, D. F. \*Instituto de Fisiología Celular (UNAM), Ciudad Universitaria. México 04510, D. F.

*Castilleja tenuiflora* is a medicinal plant used in Mexico. Previous tests demonstrated its pharmacological activity. This work presents advances in its chemical characterization. The methodology included a preliminary phytochemical analysis, separation by column and thin-layer chromatography, and crystallization of the purified sample. HPLC retention times and UV spectrophotometrical studies identified the substance as a member of the iridoid's group. The results demonstrated the presence of a substance with a maximal absorption peak at 207 nm, which suggests the lack of a substitute at the third position of the furane ring. In conclusion, the isolation and preliminary characterization of a substance from the iridoid's group of *Castilleja tenuiflora* is presented.

## Poster 22 - Monday, 19:30-21:00

### EFFECT OF 6-METHOXY BENZYL SALICYLATE ON SLEEP

F. Ayala-Guerrero, J. Taboada, J. Calderón and A. Nieto  
Centro de Neurobiología and Instituto de Química, Universidad Nacional Autónoma de México. Ciudad Universitaria, Circuito Exterior, Coyoacán 04510. México, D. F.

Several substances used as analgesics exhibit hypnogenic characteristics. In this context, it is probable that 6-methoxybenzyl salicylate, with a structure similar to that of aspirin, could exert a certain action on sleep.

Experiments were carried out in male adult white rats. Stainless steel electrodes were placed for chronic recordings of cerebral, muscular and ocular activities. Control polygraphic recordings were obtained during 10 continuous hours. Similar recordings followed to intraperitoneal administration (0.6 mg/kg) of 6-methoxybenzyl salicylate (substance obtained from *Ageratina arsenii*).

Total sleep time increased slightly after administration of the tested substance.

# Abstracts of Posters

## Poster 23 - Monday, 19:30-21:00

### SYNTHESIS, MICROLOCALIZATION AND ANTIFUNGAL PROPERTIES OF PHENOLIC ACID AMIDES FROM MAIZE

J. Atkinson<sup>1</sup>, R. Assabgui<sup>2</sup>, D. Bergvinson<sup>3</sup>, E. Schneider<sup>3</sup> and J.T. Arnason<sup>1</sup>

<sup>1</sup>Dept. of Chemistry, Brock University, St. Catharines, Ontario,

<sup>2</sup>University of Ottawa, Ottawa, Ontario, <sup>3</sup>Agriculture Canada, Ottawa, Ontario

Four naturally occurring phenolic acid amides in maize (feruloyl putrescine, *p*-coumaroyl putrescine, diferuloyl putrescine and di-*p*-coumaroyl putrescine) and several derivatives of these compounds were prepared synthetically. Dissection of mature maize kernels followed by HPLC analysis indicated that the maize compounds were localized in the aleurone layer and embryo of kernels. Mycelial growth of the maize ear rot fungus, *Fusarium graminearum* was inhibited by these compounds at concentrations found in the aleurone layer, suggesting they may act as a barrier to invasion by fungi.

## Poster 24 - Monday, 19:30-21:00

### NEW INSECTICIDAL PIPERACEAE FROM THE NEOTROPICS

C. Bernard, J.T. Arnason, B.J.R. Philogene, H.G. Krishnamurthy, D. Chauret, T. Durst

Faculty of Sciences; U. of Ottawa, Ottawa, Canada,

C. Hasbun, P. Sanchez, L. and Poveda; Universidad Nacional, Heredia, Costa Rica

A survey of 15 Piperaceae species from Costa Rica showed that ethanol extracts of 2 spp. had exceptional insecticidal activity to the European corn borer. Effects included high mortality, reduced weight of survivors, and delayed development. A third spp. was phototoxic in a standard mosquito bioassay. Six other spp. had significant insecticidal activities on borer and mosquito larvae, comparable to previously studied African and Asian species. Bioassay guided isolations of some of the active components revealed amides in previously uncharacterized spp., and the monolignol dillapiol as the active component of another spp. Four neolignans are new molecules or described for the first time in this family.

## Poster 25 - Monday, 19:30-21:00

### ANTIMICROBIAL ACTIVITY OF SOME MEDICINAL PLANTS FROM MEXICO

Tomasa Barrientos<sup>1</sup>, Ma. Teresa Gutiérrez<sup>1</sup>, Rosa M. Ramírez<sup>1</sup>, Beatriz Luna<sup>1</sup>, Robert Bye<sup>2</sup> and Rachel Mata<sup>1</sup> <sup>1</sup>Facultad de Química. <sup>2</sup>Instituto de Biología, UNAM, Coyoacán 04511. México, D.F.

The purpose of this work was to determine the potential antimicrobial activity of 38 extracts derived from 29 plants used mainly as antiseptic agents in folk medicine. Seven typical microorganisms including four bacteria, a yeast and two molds were utilized as representatives for initial screening. The results of the quantitative study indicated that the extracts derived from five species (*Malmea depressa*, *Heliopsis longipes*, *Dyssodia papposa*, *Cnidoscylus tehuacanensis* and *Helianthella quinquenervis*) possessed significant antiseptic properties, therefore supporting the ethnomedical uses of these species.

## Poster 26 - Monday, 19:30-21:00

### ALKALOIDS FROM *HIPPEASTRUM SOLANDRIFLORUM*

Jaume Bastida, Claudia L. Porras, Carles Codona, Lillian Paiz\* and Elfriede Pvil \*

Dpt. Productes Naturals, Facultat de Farmàcia, Universitat de Barcelona, 08028-Barcelona, España. \*Depto. Química and \*Dpto. de Botànica, Universidad del Valle de Guatemala, Guatemala.

*Hippeastrum solandriflorum* Herb., collected during the flowering period in Cobán (Alta Verapaz, Guatemala), has been shown to contain five alkaloids: (-)-lycorine, (+)-hamayne, (+)-vittatine, 5,6-dihydrobicolorine and the new alkaloid solandrine, a compound with a phenanthridinium structure, obtained from a natural source for the first time. Their structures were established by physical and spectroscopic methods.

## Poster 27 - Monday, 19:30-21:00

### PRELIMINARY PHYTOCHEMICAL AND PHARMACOLOGICAL STUDIES OF *ALOE BARBADENSIS*

Blanca Berdeja, Estela Meléndez, Javier Osante and Rafael García  
Departamento de Farmàcia, Escuela Nacional de Ciencias Biológicas.  
Instituto Politécnico Nacional. Carpio y Plan de Ayala, México  
11340, D. F.

Diabetes mellitus is one of the major causes of death in recent years. For this reason, it is necessary to develop new drugs for the treatment of this disease. *Aloe barbadensis* (sábila) has been employed to control diabetes in traditional medicine. Preliminary phytochemical analysis of sábila was carried out, and the hypoglycemic effect was evaluated.

## Poster 28 - Monday, 19:30-21:00

### 6-EPI-MESEMBRANOL, A MESEMBRANE-TYPE ALKALOID ISOLATED FROM *NARCISSUS PALLIDULUS* GRAEELS

Salvador Bergoñón, Mar Díez and Carles Codina  
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# Abstracts of Posters

In addition to the previously reported alkaloids of *Narcissus pallidulus* Graells, roserine and mesembrenone, we have isolated another mesembrane-type alkaloid, 6-epi-mesembranol in this Amaryllidaceae plant species. Its structure was unambiguously assigned by physical and spectroscopic methods. This is the first report on the isolation of 6-epi-mesembranol from the Amaryllidaceae family.

## Poster 29 - Monday, 19:30-21:00

### ISOALLOALANTOLACTONE, A PHOTOSYNTHETIC ELECTRON CHAIN INHIBITOR

Mónica R. Calera<sup>1,2</sup>, Blas Lotina-Hennsen<sup>2</sup>, Rachel Mata<sup>2</sup>, and Ana Luisa Anaya<sup>1</sup>

<sup>1</sup>Instituto de Fisiología Celular and <sup>2</sup>Facultad de Química, Universidad Nacional Autónoma de México. Apdo. Postal 70-243. C. P. 04510. México, D. F.

Isoalloalantolactone is a phytotoxic sesquiterpene lactone isolated from *Ratibida mexicana* (Asteraceae). The inhibition of ATP synthesis, proton uptake and electron transport (basal, phosphorylating and uncoupled) from water to methylviologen, indicate that isoalloalantolactone acts as electron transport inhibitor. This lactone did not affect photosystem I but inhibited photosystem II. The site of inhibition is located between P<sub>680</sub> and Q<sub>A</sub>, because the uncoupled electron transport from water to silicomolybdate and that from DPC to DCPIP is inhibited.

## Poster 30 - Monday, 19:30-21:00

### EFFECT OF CHAPARRIN, NORDIHYDROGUAYARETIC ACID AND THEIR STRUCTURAL DERIVATIVES ON AMOEBA CULTURES

C. C. Calzado-Flores<sup>1</sup>, J. J. Segura-Luna<sup>1</sup> and E. M. Guajardo-Touchi<sup>2</sup>  
<sup>1</sup>Centro de Inv. Biomédicas del Noreste, IMSS. <sup>2</sup>Depto. de Química, ITESM, Monterrey, N.L.

Chaparrin is a bitter lactone isolated from the *Castela texana* plant, which has been used in the treatment of human amoebic dysentery. Nordihydroguayaretic acid (NDGA), is a lignan isolated from *Larrea tridentata*. Chaparrin and NDGA have several hydroxyl groups in their molecular structures. The aim of this study was to prove if their inhibitory antiamoebic activity depends of these chemical groups. The results obtained with chaparrin and NDGA showed an inhibitory activity on the growth of *Entamoeba histolytica* cultures, HM-2: IMSS axenic strain. However, modifications to their chemical structure, as by blockage of their four hydroxyl groups by acetylation or methylation, suppressed this activity.

## Poster 31 - Monday, 19:30-21:00

### EFFECT OF SALVIC ACID ON CONTRACTIONS INDUCED BY OXYTOCIN IN THE ISOLATED UTERUS OF RAT

E. Campos, P. G. Vazquez, J. Taboada\*, C. Guerrero\*, A. A. Reyes and G. F. Ayala\*\*

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\*Instituto de Química e \*\*Instituto de Investigaciones Biomédicas, UNAM, 04510 México, D.F.

Salvic acid (SA) is a diterpene isolated from *Brickella tomentella*. The purpose of this study was to analyze the effect of the SA on the contractions induced by oxytocin (OX) in the isolated uterus of rat. The uterus were placed in chambers for isolated organs, in nutrient solution, pH 7.4, maintained at 37°C. The contractile response was registered by a transducer connected to a polygraph Grass 79D. After a stabilization period, spontaneous activity was registered and then a dose-response curve (DRC) to OX (5-500 uU/ml) alone and in presence of SA (0.05-0.15 mM). The results indicated that SA antagonized the effect of OX in a dose-dependent manner.

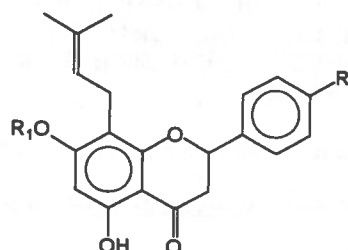
## Poster 32 - Monday, 19:30-21:00

### PRENYLATED FLAVANONES, CYCLOARTANES AND OTHER CONSTITUENTS FROM *ESENBECKIA BERLANDIERI* SSP. *ACAPULCENSIS* (RUTACEAE).

<sup>1</sup>Arturo E. Cano, <sup>1</sup>Enrique Serrano, <sup>1</sup>Alejandro Ruiz-Cancino and <sup>2</sup>Guillermo Delgado

<sup>1</sup>Ciclo Básico del Area Químico-Biológica. Facultad de Estudios Superiores-Zaragoza, Campus II, UNAM, J. C. Bonilla 66, Col. Ejército de Oriente. <sup>2</sup>Instituto de Química de la UNAM, Ciudad Universitaria, Circuito Exterior, Coyoacán 04510. México, D. F.

Alkaloids, limonoids, coumarins, polyprenols, and acylphloroglucinols are considered the main constituents of *Esenbeckia* species. Following our studies on this group of plants, here we report that the 8-prenylated flavanones 1-4 were isolated from the aerial parts of the title plant. Two cycloartanes and other minor constituents were also characterized.



- 1: R<sub>1</sub> = R<sub>2</sub> = H
- 2: R<sub>1</sub> = Me; R<sub>2</sub> = H
- 3: R<sub>1</sub> = H; R<sub>2</sub> = OH
- 4: R<sub>1</sub> = Me; R<sub>2</sub> = OH

# Abstracts of Posters

## Poster 33 - Monday, 19:30-21:00

### TRITERPENES FROM *BORRICHIA FRUTESCENS* (ASTERACEAE)

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In a bioassay-guided search for anti-mycobacterial compounds from higher plants of the south-eastern United States, we chemically investigated the Sea Daisy [*Borrchia frutescens* (L.) DC (Asteraceae, Heliantheae)] from the coastal marshes of Louisiana for their active constituents. From active chromatographic fractions we isolated several new cycloartenol-type triterpenes. Their structures were established by spectroscopic methods and the molecular structures were determined by single crystal X-ray diffraction.

## Poster 34 - Monday 19:30-21:00

### PHYTOTOXICITY OF TRICOLORIN A TO *BOUVARDIA TERNIFOLIA* IN TISSUE CULTURE

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Tricolorin A, a major phytochemical inhibitor from the allelopathic mixture of resin glycosides of *Ipomoea tricolor*, inhibited *Bouvardia ternifolia* callus tissue. This system was employed to further examine the allelopathic potential of tricolorin A and established its relative toxicity in comparison with some known chemical phytotoxins (hydroquinone and salicylic, cinnamic and ferulic acids). This report confirms the involvement of the resin glycosides in the allelopathic interaction of the Convolvulaceae family.

## Poster 35 - Tuesday, 20:00-21:30

### LARVAL PERFORMANCE OF A POLYPHAGOUS MOTH (*HYLESSIA LINEATA*) RELATED TO THE CHEMICAL INTRAPOPULATION VARIABILITY OF ONE OF ITS TROPICAL DECIDUOUS TREE HOSTS (*CASEARIA CORYMBOSA*)

Francisco J. Espinosa-García, Alfonso R. Pescador, Emilia L. Valladares R. and Chen Jian  
Centro de Ecología, Universidad Nacional Autónoma de México, A.P. 70-275, México, D.F., C.P. 04510.

Plant intrapopulation secondary metabolite variation may prevent insect

specialization if larval genotypes differ in performance across host individuals. In a field experiment enclosing full sib larval families in 20 *C. corymbosa* trees we examined whether this performance variability occurred. We recorded *H. lineata* days to pupa, relative growth and survival. Gas chromatograms of non- and medium polarity leaf extracts from each tree were very variable. We found extensive variation in host quality for larvae among trees and significant family by tree interactions. Using multivariate techniques we associated one unidentified peak with delayed larval development and other two with increased biomass accumulation and fast larval development.

## Poster 36 - Tuesday, 20:00-21:30

### MALABARICANE GLYCOSIDES FROM *ADESMIA ACONCAGUENSIS* BURK (LEGUMINOSAE)

Francesca Faini, Eszter Gacs-Baitz, Giuliano Delle Monache, Mariano Castillo and René Torres  
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The Leguminosae have been extensively studied because of their economic importance. However, chemical data are lacking for a great number of wild genera. The genus *Adesmia* includes 230 species restricted to South America. Until now only one paper has been published on this genus and describes flavonoids of several Argentinian species.

Dried and powdered aerial parts of *A. aconcaguensis* were extracted with EtOH. The acoholic residue, fractionated by CC (SiO<sub>2</sub> gel, CH<sub>2</sub>Cl<sub>2</sub>-MeOH), afforded 3 new triterpene glycosides with the rare malabaricane skeleton. The structures were determined by spectroscopic methods: IR, <sup>1</sup>H and <sup>13</sup>C-NMR (COSY, HETCOR) and MS (FAB). This is the first report of this skeleton in the Leguminosae.

Acknowledgements: This research was supported by a DTI (Univ. de Chile) Grant.

## Poster 37 - Tuesday, 20:00-21:30

### CHILEAN ASTERACEAE SPECIES AS SOURCES OF RAW CHEMICALS

Francesca Faini and Cecilia Labbé  
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The potential of several native species of Chilean Asteraceae as sources of raw materials was evaluated. To this purpose, 15 resinous species growing in arid lands and belonging to the genera *Haplopappus*, *Baccharis*, *Gutierrezia*, *Eupatorium*, *Encelia* and *Flourenzia*, were selected on chemical and ecological criteria.

The CH<sub>2</sub>Cl<sub>2</sub> extracts from the aerial parts of the plants were analyzed for resin content, using spectroscopic and chromatographic methods. In

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addition, the C/H ratio, acidity and iodine indexes were calculated. The results suggest that at least five of the species studied could have an industrial potential and therefore would require further chemical, agronomic and biotechnological studies.

Acknowledgements: This research was financed by a DTI (Universidad de Chile) grant.

## Poster 38 - Tuesday, 20:00-21:30

### ANTI-TUBERCULOSIS ACTIVITY OF SESQUITERPENE LACTONES: A STRUCTURE-ACTIVITY RELATIONSHIP STUDY

Nikolaus H. Fischer, Tiansheng Lu, Charles L. Cantrell and Scott G. Franzblau\*

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In a bioassay-guided search for biologically active natural products from higher plants, we have investigated a series of different skeletal types of sesquiterpene- $\alpha$ -methylene- $\gamma$ -lactones for their activity against *Mycobacterium tuberculosis* and *M. avium* using a radiorespirometric method. Tests of over 50 sesquiterpene lactones and derivatives showed that the majority of lactones were not active. However, several compounds exhibited significant activities with minimum inhibitory concentrations of >20mg/ml.

Structure-activity relationship studies with natural and semisynthetic sesquiterpene lactones revealed that the  $\alpha$ -methylene- $\gamma$ -lactone moiety is an essential but not sufficient structural requirement for inhibitory activity against *Mycobacterium tuberculosis* and *M. avium*.

## Poster 39 - Tuesday, 20:00-21:30

### TAXOL-LIKE COMPOUNDS IN *TAXUS BACCATA* L., *TAXUS CUSPIDATA* SIEB. ET ZUCC AND *TAXUS MEDIA* REHD.

M. Furmanowa<sup>1</sup>, K. Glowniak<sup>2</sup>, A. Zobel<sup>3</sup>, W. Dymowski<sup>1</sup> and L. Rapaczewska<sup>1</sup>

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The contents of taxol-like compounds were analyzed in various tissues and organs of *Taxus* species growing in Poland. The needles, stems and flower buds explants of all *Taxus* species were used for callus induction. For phytochemical analysis, TLC and HPLC methods were applied. The highest content of taxol was found in *Taxus cuspidata* needles (0.260 mg/g of dry weight), in *Taxus media* it was 0.230 mg/g and in *Taxus baccata* only 0.116 mg/g. The yield of cephalomannine was in all samples smaller, (ca.50%). Callus contains less taxol-like compounds.

## Poster 40 - Tuesday, 20:00-21:30

### ALKALOIDS IN TISSUE OF *CEPHALOTAXUS FORTUNEI* HOOK

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<sup>3</sup>Dept. of Chemistry, Trent University, Peterborough, Ontario Canada.

The genus *Cephalotaxus* (Cephalotaxaceae) has been found to contain alkaloids with significant antileukemic activity. In our study, parts of leaves of *Cephalotaxus fortunei* were used for callus induction on Delfel and Rothus medium supplemented with 10 mg/L NAA, 1 mg/L kinetin and extract from coco milk (10 ml/L). Average growth rate was 400%. Suspension culture was also maintained on the same type of medium. Using HPLC methods, cephalotoxine was determined quantitatively both in callus (0.015 mg/g of dry weight) and cells from suspension culture (0.005 mg/g of dry weight).

## Poster 41 - Tuesday, 20:00-21:30

### TWO NEW DITERPENOIDS FROM *SALVIA PARRYI* GRAY

Elda G. Gómez, Alfredo Reyes, Hans Achenbach\* and Xorge A. Domínguez

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Two new diterpenoids have been isolated from the root of *Salvia parryi*, together with the previously known taxodione, deacetylnemorone, betulin, oleanolic acid, and  $\beta$ -sitosterol. Their structures were established by spectroscopic means.

## Poster 42 - Tuesday, 20:00-21:30

### CHARACTERIZATION OF THE MEMBRANE-ASSOCIATED NAD<sup>+</sup>-DEPENDENT ISOCITRATE DEHYDROGENASE (ICDH) ACTIVITY IN PEA MITOCHONDRIA

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NAD<sup>+</sup>-ICDH from pea mitochondrial matrix has recently been isolated, purified, and characterized (*Plant Physiol.* 100: 69-75, 1992). From 40-60% of total NAD<sup>+</sup>-ICDH is found tightly associated with the mitochondrial membrane and is not removed by washing with either salt or weak detergent (conditions which result in over 85% solubilization of malate dehydrogenase). The 'membrane' ICDH is being investigated

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malate dehydrogenase). The 'membrane' ICDH is being investigated and compared to the matrix enzyme to elucidate whether these activities represent different forms of ICDH or the same form in two different physical states. A specific polyclonal antibody raised against the 47 kDa subunit of matrix ICDH recognizes a band of identical size in a crude membrane sample. 'Matrix' and 'membrane' ICDH both have pH optima of 7.5 and similar stabilities. Both bind to Matrex gel Blue A but 4x higher salt levels are required to elute 'membrane' ICDH.

### Poster 43 - Tuesday, 20:00-21:30

#### SCREENING FOR ANTIMICROBIAL ACTIVITY AND TOXICITY TO BRINE SHRIMP OF CRUDE DRUG EXTRACTS FROM MEXICAN MEDICINAL PLANTS

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A biological evaluation of hexane, chloroform and methanol extracts prepared from 50 plant species used in the traditional medicine of Durango, Mexico, was conducted. Each extract was evaluated for its lethality to brine shrimp and its antimicrobial activity. The following strains were used as test organisms: *B. subtilis*, *S. aureus*, *E. coli*, *P. aeruginosa* and *C. albicans*. Extracts of 35 plants assayed showed positive results for either of the organisms utilized. Details of these results will be presented. The employment of these simple bioassays systems might be utilized in the detection and isolation of higher plant constituents with a variety of biological activities.

### Poster 44 - Tuesday, 20:00-21:30

#### GENETIC STABILITY OF SILYMARIN COMPOSITION IN FRUITS OF THE MEDICINAL PLANT *SILYBUM MARIANUM*

E. Hetz<sup>1</sup>, R. Liersch<sup>2</sup> and O. Schieder<sup>1</sup>  
<sup>1</sup>Institute of Applied Genetics, Albrecht-Ther-Weg 6, Free University Berlin, 14195 Berlin, Germany  
<sup>2</sup>Madaus AG, 51109 Köln, Germany

Three inbred generations (I<sub>1</sub>-I<sub>3</sub>) were produced from 11 randomly selected plants and were cultivated under field conditions in the years 1990-1992. Two groups of lines were observed, a group with a high content of the flavanolignan silibinin and silichristin and a very low content of silidianin and a second group with a much lower content of silibinin and silichristin but with a relatively high content of silidianin. This observation became more obvious when the relative content (% of silymarin) of the three flavanolignans was estimated. Independent of the year of cultivation all lines of the first group had

approximately 70% silidianin, 30% silichristin and only traces of silidianin in all the three inbred generations, while the lines of the second group had only about 27% silibinin, 13% silichristin and 60% silidianin.

### Poster 45 - Tuesday, 20:00-21:30

#### PLANT REGENERATION FROM MESOPHYLL PROTOPLASTS OF THE MEDICINAL PLANT *SILYBUM MARIANUM* (L.) GAERTN.

E. Hetz<sup>1</sup>, R. Liersch<sup>2</sup> and O. Schieder<sup>1</sup>  
<sup>1</sup>Institute of Applied Genetics, Albrecht-Thaer-Weg 6, Gree University Berlin, 14195 Berlin, Germany. <sup>2</sup>Madaus AG, 51109 Köln, Germany.

Mesophyll protoplasts from the medicinal plant *Silybum marianum* were successfully isolated from young leaves. The cell division frequency depended on the plant lines used. Yields from 64.0% to 84.9% cell division ratios were obtained when plating at a density of 1 x 10<sup>5</sup> protoplasts per ml. Embedding in sodium alginate was very efficient with respect to the frequency of cell division and the development of protoplasts. Two of the six investigated lines showed shoot bud regeneration. Drastic stimulations of shoot bud regeneration from 7.7% to 22.0% were obtained after improvement of the regeneration system. Shoot buds developed to leaf rosettes that could be rooted and transferred to the greenhouse. After self pollination the plants showed 65% to 79% normal fertility.

### Poster 46 - Tuesday, 20:00-21:30

#### FLAVONE-Q-GLYCOSIDES FROM THE FERN *PTERIS CRETICA*

Filippo Imperato, Dipartimento di Chimica, Università della Basilicata, 85100 Potenza, Italy.

Three flavone Q-glycosides (1, 2 and 3) have been isolated from aerial parts of the fern *Pteris cretica* by preparative paper chromatography followed by Sephadex LH-20 column chromatography. Flavonoids 1 and 2 were identified as luteolin 7-Q-robinobioside (1) and luteolin 7-Q-rutinoside (2) by UV spectral analysis in the presence of the usual shift reagents, FAB mass spectrum, 1H NMR spectrum, 13C NMR spectrum and by chemical methods (total acid hydrolysis, controlled acid hydrolysis and Kuhn methylation followed by acid hydrolysis). Flavonoid 1 is a new natural product; flavonoid 2 is a new constituent of ferns. Flavonoid 3 was identified as luteolin 7-Q-glucoside by total acid hydrolysis, β-glucosidase treatment and by the above spectral methods. Identifications of 2 and 3 were confirmed by co-chromatography with authentic samples. The presence of 2 and 3 in *Pteris cretica* suggests that in the biosynthesis of 2, the monosaccharides are attached to the appropriate flavone one at a time.



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## Poster 47 - Tuesday, 20:00-21:30

### 8-C-RHAMNOSYLLUTEOLIN 7-O-RHAMNOSIDE FROM THE FERN *PTERIS CRETICA*

Filippo Imperato, Dipartimento di Chimica, Università della Basilicata, 85100 Potenza, Italy.

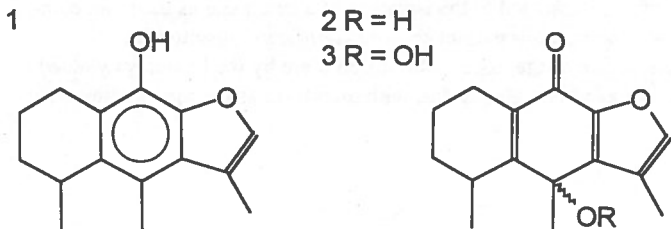
A new flavonoid (1) has been isolated from aerial parts of the fern *Pteris cretica* by preparative paper chromatography followed by Sephadex LH-20 column chromatography. Colour reactions, chromatographic behaviour and UV spectral analysis in the presence of the customary shift reagents suggested that the isolated compound (1) may be a flavone glycoside with free hydroxyl groups at positions 5, 3' and 4'. Total acid hydrolysis of (1) gave L-rhamnose and a flavonoid glycoside (2). Hydriodic acid treatment of 2 gave luteolin; ferric chloride oxidation of (2) gave L-rhamnose. <sup>1</sup>H NMR, <sup>13</sup>C NMR and FAB mass spectrum of (1) showed that the isolated compound is 8-C-rhamnosylluteolin 7-O-rhamnoside which is a new natural product. The presence of a C-glycosylflavonoid O-glycoside is here reported for the first time in ferns.

## Poster 48 - Tuesday, 20:00-21:30

### 6-HYDROPEROXYCACALONE, NEW CONSTITUENT FROM *CACALIA DECOMPOSITA* (MATARIQUE) AND EFFECT OF ACTIVE OXYGEN SPECIES ON CACALOL

Manuel Jiménez Estrada, Arturo Navarro and Eloy Villanueva  
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*C. decomposita* belongs to the "matarique" complex of medicinal plants, which is used for the treatment of several ailments. One, two and eight additional constituents were isolated from the roots of this plant. 3 represents a new natural product. Cacalol (1) and some semisynthetic derivatives displayed antimicrobial activity. 1 is a natural antioxidant, and oxidation experiments indicate that 1 is slowly transformed to 2. With singlet oxygen 1 decomposes, and with ozone, 2-methyl-hexandioic acid was obtained.

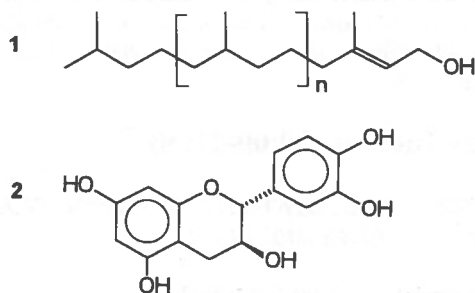


## Poster 49 - Tuesday, 20:00-21:30

### MOLECULAR STRUCTURE OF THE FOLIAR SECONDARY METABOLITES OF *CASEARIA CORYMBOSA* (FLA-COURTEACEAE)

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In order to evaluate the intrapopulational chemical variability of the secondary metabolites of *C. corymbosa*, and its effect in the growth of two of their natural consumers, *Mysoria affinis* and *Hylesia lineata*, chemical analysis of the leaves of this plant was performed. This allowed the identification of six fatty acids, a mixture of polyisoprenalkanes (1), (+)-catechin (2), sucrose and glucose as the major constituents, and derivatives of p-hydroxycinnamic acid as minor constituents. 1 was not toxic to *Artemia salina* and 2 showed activity. It is presumed that the variation in the relative amounts of these natural products between individuals of *C. corymbosa* is associated with the differential growth of the consumers.



## Poster 50 - Tuesday, 20:00-21:30

### COMPONENTS OF *ARISTOLOCHIA LITTORALIS* PARRODI

Alfonso Lira-Rocha, Mónica Chinchot, Francisco Aguilar, Elia Naranjo-Rodríguez, Felipe Vargas and Ofelia Espejo  
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There are 39 species of *Aristolochia* that grow in Mexico and the genus has reputation as a traditional medicinal source. The principal uses of *Aristolochia* species are anti-microbial, anti-fungi, anti-snake bite and anti-scorpion bite. The acid-base partition and chromatographic purification of the methanolic extract of the aerial parts of *A. littoralis* have yielded one bisbenzylisoquinoline alkaloid of the dauricine type and two lignans of the furofuran and the dibenzylbutyrolactone types. The structural assignments were based on analysis of physical and spectral data. *In vitro* evaluation of the methanolic extract showed a reduction of the uterus contraction.

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### Poster 51 - Tuesday, 20:00-21:30

PRODUCTION OF ANTHOCYANINS AND OTHER FLAVONOIDS IN *ACER SACCHARUM* AND *ACER RUBRUM* IN RESPONSE TO STRESS.

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Flavonoids are found extensively in the western diet and have long been perceived as compounds that contribute merely to plant pigmentation. A resurgence of interest in flavonoids is currently expressed by medical researchers who are interested in the radical-scavenging abilities of these compounds. In this experiment, the protective role of these tri-phenolics to plant cells was investigated via a comparison of the contrasting genetic expression during ontogenesis visible in leaf coloration each autumn when *Acer saccharum* becomes red and *Acer rubrum* becomes green. Qualitative and quantitative findings indicated that all of the autumn leaves of both species had an increased concentration of flavonoids. The results suggested that the biosynthesis of flavonoids is stress-induced and is an immediate and non-specific defensive response. We postulate that the hydroxy groups of the flavonoids enable them to serve as scavengers in the vacuole and on the surface of plant cells.

### Poster 52 - Tuesday, 20:00-21:30

METABOLISM OF THE POTATO PHYTOALEXIN SOLAVETIVONE BY *FUSARIUM SAMBUCINUM*

Susan P. McCormick and Anne E. Desjardins  
Mycotoxin Research Unit, USDA, ARS, NCAUR, Peoria IL, 61604,  
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Rishitin, lubimin and solavetivone are potato sesquiterpene phytoalexins. A survey of forty potato varieties indicated that accumulation of these phytoalexins is not correlated with resistance to potato dry rot. Accumulation of solavetivone may be correlated with resistance to golden nematodes. The ability to cause potato dry rot is related to *Gibberella pulicaris* (*Fusarium sambucinum*) tolerance to phytoalexins. Tolerant strains were previously shown to metabolize rishitin and lubimin to non-toxic compounds which do not effect the growth of sensitive strains. We report here that solavetivone is metabolized to 2-(1',2'-dihydroxy-methylethyl)-spiro-[4,5]-dec-6-en-8-one by a solavetivone-tolerant strain of *G. pulicaris*. This metabolite has no effect on the growth of solavetivone-sensitive strains.

### Poster 53 - Tuesday, 20:00-21:30

ISOLATION AND CHARACTERIZATION OF A TRICHOCECENE TRANSACETYLASE FROM *FUSARIUM SPOROTRICHIOIDES*

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U.S.A.

Trichothecenes are toxic sesquiterpenoids produced by several genera of fungi and by two species of the plant genus *Baccharis*. Biosynthesis of the trichothecen T-2 toxin in *Fusarium sporotrichioides* occurs through a series of enzymatic reactions, beginning with the cyclization of farnesyl pyrophosphate to trichodiene. Subsequent pathway steps involve a series of oxygenations, cyclizations, isomerizations and esterifications. At least five of the genes involved in trichothecene biosynthesis were shown to be present on a single cosmid clone. One of these genes, *Tri3* has been identified and characterized with gene complementation, gene disruption and cell-free feeding experiments. Our results show that *Tri3* encodes an transacetylase that converts 15-deacetylcalonecetrin to calonecetrin.

### Poster 54 - Tuesday, 20:00-21:30

BIOACTIVE MOLECULES FROM *GENTIANELLA ACHALENSIS*

E. Nadinic, E. Mongelli\*, S. Debenedetti, P. Sanchez, G. Ciccia\*, A. Giulietti\* and J. Coussio  
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*Gentianella* species have long been used in our traditional medicine. They are used as bitter tonics, as stomachic and for liver problems, as well as a febrifuge and in nervous disorders. *Gentianella achalensis* was selected from among 19 Argentine medicinal plants because of its bioactivity in the brine shrimp toxicity assay and wheat rootlet growth inhibition test. The methanolic extract showed no inhibition in the assays. The dichloromethane extract showed a remarkable toxicity in the brine shrimp assay (LC = 37 ppm) and the bioassay-guided fractionation of the extract led to the isolation of a triterpene as the main compound. The aqueous extract showed significant bioactivities. Fractionation of the extract monitored there by the bioassays yielded a series of xanthone glycosides, with maniferin as the major component.

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## Poster 55 - Tuesday, 20:00-21:30

### TONALENSIN, A 5(10)-SECOCLERODANE DITERPENE FROM *SALVIA TONALENSIS*

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Salvifarinine, a *neo*-clerodane diterpene previously isolated from *Salvia farinacea*, has now been isolated from the aerial parts of *S. tonalensis* together with the novel 5(10)-secoclerodane diterpene, tonalensin. Tonalensin possesses a cyclodecatriene ring whose flexibility resulted in the existence of a conformational equilibrium. This was deduced from the NMR studies at low temperature, which allowed us to assign one set of signals for each conformer. Finally, the structure of tonalensin was corroborated by crystallographic means.

## Poster 56 - Tuesday, 20:00-21:30

### CHEMICAL ANALYSIS OF WEEDS. SECONDARY METABOLITES OF THE AERIAL PARTS OF *ERAGROSTIS MEXICANA* (GRAMINEAE)

Juan M. Peguero<sup>1</sup>, María Yolanda Ríos<sup>1</sup>, Guillermo Delgado<sup>1</sup>, and Francisco J. Espinosa-García<sup>2</sup>

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To evaluate the role of the secondary metabolites present in weeds for their resistance to herbivores and pathogens, particularly those attacking seeds in soil, we analyzed the aerial parts of *E. mexicana*. We characterized five hydrocarbons, two esters of fatty acids, fatty acids, sucrose and b-sitosterol as the major constituents. The flavonoid triclin, a pentofuranosylpentofuranose, mannitol and D-arabinitol were isolated and identified as the minor constituents. This is the first chemical analysis of this plant and the pure substances will serve as standards for comparison with the constituents of other weeds.

## Poster 57 - Tuesday, 20:00-21:30

### TANNINS FROM *ERYTHRINA HERBACEA*

\*Rosa M. Pérez, \*E. Kolar, \*F. de Jesus, \*\*S. Pérez and \*\*C. Pérez  
\*Escuela Superior de Ingeniería Química e Industrias Extractivas, IPN,  
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\*\*Universidad Autónoma Metropolitana-Xochimilco, México, D.F.

The bark and roots of *Erythrina herbacea* (Leguminosae) are widely used in folk medicine as astringent and antidiarrheic. Chemical investigation of the the methanol extract from the bark of *E. herbaceae* has led to the isolation and characterization of two tannins. Their structures were identified on the basis of chemical and spectral evidence as 1-O-galloyl-2,3,4,6-O bis(S) 4,4',5,5',6,6'-hexahydroxydiphenoyl- $\alpha$ -hexahydroxydiphenoxyl  $\beta$ -D-gluco-pyranose and 1-O-galloyl-2,3,4,6-di-O-(S)-4,4',5,5',6,6'-hexahydroxydiphenoyl- $\alpha$ -hexahydroxydiphenoxyl  $\beta$ -D-gluco-pyranose.

## Poster 58 - Tuesday, 20:00-21:30

### FERN CONSTITUENTS: PENTACYCLIC TRITERPENOIDS ISOLATED FROM *POLYPODIUM GUTTATUM*

\* R. M. Pérez G., \*M. G. Ortiz V., \*\*S. Pérez G., \*\*C. Pérez G. and \*\*A. L. Montiel

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From the extract of fresh rhizomes of *Polypodium guttatum* triterpenoids of the hopane group, neohop-(13)18-ene, lupene type lup-(13)-18-ene and cyclopodmenyl acetate were isolated with silica gel in column chromatography and eluted with petroleum ether, hexane:benzene and benzene consecutively.

Their structures were elucidated from their physical data and chemical correlations.

## Poster 59 - Tuesday, 20:00-21:30

### FUROCOUMARINS AND CARBAZOLE ALKALOIDS FROM THE SEEDS OF *MURRAYA KOENIGII*

Johannes Reisch<sup>1</sup>, Adeleke C. Adebajo<sup>2</sup> and Adetunji J. Aladesanmi<sup>2</sup>

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*Murraya koenigii* (L.) Spreng (Rutaceae) is grown throughout Central and Southern Asia. The ethnomedical uses are as stomachic, antidysentery, febrifuge and antiemetic agents.

Phytochemical studies have revealed five furocoumarins and five carbazole alkaloids. The identification was achieved by their spectroscopic analysis.

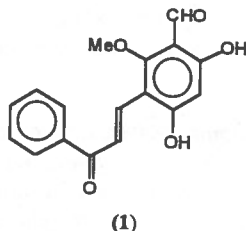
# Abstracts of Posters

## Poster 60 - Tuesday, 20:00-21:30

### TISSUE CULTURE OF *ANREDERA SCANDENS* (BASELLACEAE): RETROCHALCONE SYNTHESIS

Edic Rivera, Miriam Novelo and Rogelio Pereda-Miranda  
Departamento de Farmacia, Facultad de Química, Universidad  
Nacional Autónoma de México.  
Apartado Postal 70-265. México 04511.

Tissue cultures of *Anredera scandens* were established from axillary meristem explants. Callus initiation and growth were achieved on N6 medium supplemented with 2,4-D (0.5 mg/l). Dried callus tissues were extracted with MeOH and further analyzed by GLC and HPLC. These analyses showed the presence of the previously known antimicrobial retrochalcone 1 in high yields (0.01 %).



## Poster 61 - Tuesday, 20:00-21:30

### ANTIFUNGAL COMPOUNDS FROM *METOPIMUM BROWNEI* (ANACARDIACEAE)

J. Fausto Rivero<sup>1</sup>, Rachel Mata<sup>1</sup>, Daniel Chavez<sup>1</sup>, Ana L. Anaya<sup>2</sup> and Blanca Hernandez<sup>2</sup>. <sup>1</sup>Facultad de Química. <sup>2</sup>Instituto de Fisiología Celular, UNAM, Coyoacán 04511. México, D.F.

*Metopium brownei* (Jacq.) Urban (Anacardiaceae) is an abundant medicinal tree from the tropical forests of southeast Mexico and produces a very irritant resin. The stem bark and wood, MeOH-CHCl<sub>3</sub> extracts of *M. brownei* exerted a significant inhibition of the radial growth of two phytopathogenic fungi (*Fusarium oxysporum* and *Pythium* sp). The antifungal principle from the stem bark turns out to be a mixture of three substituted alkylcatechols with zero, one and two double bonds. GC-MS analysis of the *bis*-trimethylsilyl derivatives indicated that the mixture contains mainly *n*-C<sub>15</sub> substituted catechols. Furthermore, small quantities of *n*-C<sub>17</sub> homologs were also detected. On the other hand the major antifungal agents from the wood were characterized as dihydroquercetin and eriodictyol.

## Poster 62 - Tuesday, 20:00-21:30

### CHEMICAL CONSTITUENTS OF *CHAMAESYCE PROSTRATA*

Susana Rojas<sup>1</sup>; Martha Macias<sup>1</sup>, Perla Castañeda<sup>1</sup>, Rachel Mata<sup>1</sup>, Edelmira Linares<sup>2</sup> and Robert Bye<sup>2</sup>. <sup>1</sup>Facultad de Química. <sup>2</sup>Instituto de Biología. Universidad Nacional Autónoma de México, Coyoacán 04510, México D.F.

*Chamaesyce prostrata* (Ait) Millsp (Euphorbiaceae) commonly known as "hierba de la golondrina", is used in folk medicine for the treatment of renal diseases. Phytochemical investigation of the CHCl<sub>3</sub>-MeOH extract of this plant afforded two flavonoids (kaempferol-3,6-dimethylether and kaempferol-7-O-glucoside) and a novel triterpenoid (lanostane-25-en-3β-ol-acetate). The structures were elucidated by chemical and spectroscopic methods.

## Poster 63 - Tuesday, 20:00-21:30

### PSCALIUM PELTATUM EXTRACTS AND THEIR HYPOGLYCEMIC ACTIVITY

Leonora Sánchez, Rubén Román, Francisco Alarcón, José Luis Flores and Rodolfo Soto.

Departamento de Ciencias de la Salud, Div. CBS, Universidad Autónoma Metropolitana Iztapalapa. México, D.F. A.P. 55-535. México

*P. peltatum* is a plant used by the Mexican population for diabetes mellitus control. Hypoglycemic activity of the aqueous decoction of the root of this plant was experimentally confirmed. The purposes of this investigation were:

1. By continuous and discontinuous extractions of the *P. peltatum* root and lyophilized aqueous decoction, to obtain the hexanic, dichloromethanic, methanolic and aqueous extracts.
2. Research on their hypoglycemic activity in male, healthy, fasting mice.

The results showed that hypoglycemic activity is observed in the methanolic and aqueous extracts ( $p < 0.05$ ).

## Poster 64 - Tuesday, 20:00-21:30

### HPLC ANALYSIS OF SOLUBLE AMINO ACIDS IN PLANT EXTRACTS BY STABLE DERIVATIZATION USING 6-AMINO- QUINOLYL-*N*-HYDROXYSUCCINIMIDYL CARBAMATE

James A. Saunders<sup>1</sup>, Frank J. Turano<sup>2</sup> and Christina Burek<sup>1</sup>  
<sup>1</sup>SARL, Plant Sciences Institute, USDA, ARS, Beltsville, MD 20705, U.S.A. <sup>2</sup>Climate Stress Lab., USDA, ARS, Beltsville, MD 20705.

A number of derivatization procedures have been used to analyze solu-

# Abstracts of Posters

ble amino acids on HPLC systems. Many of these procedures were difficult due to long preparation times for handling samples, unstable derivatization products, inability to detect secondary amino acids, and other problems. We have adapted a new derivatization procedure introduced by Cohen and Michaud (1993, *Anal. Biochem.* 211:279) to plant extracts. The procedure is simple, reliable, forms stable derivatization products, and the reagents are commercially available from Waters Chromatography (Millford, MA). Using fluorescent detection, we have analyzed several different types of aqueous plant extracts and found that neither chlorophyll, phenolics, nor alkaloids interfere with the assay. Secondary amino acids such as proline and hydroxyproline are detected as easily as primary amino acids. The procedure is readily adaptable to high sample throughput when coupled with autoinjection capabilities.

## Poster 65 - Tuesday, 20:00-21:30

### IN VITRO PRODUCTION OF SILYMARIN IN SUSPENSION CELLS OF DIFFERENT PLANT SPECIES

A. Schaal, E. Hetz and O. Schieder  
Institute of Applied Genetics, Albrecht-Thaer-Weg 6, Free University Berlin, 14195 Berlin, Germany

Silymarin, which is synthesized only in the fruits of *Silybum marianum*, is a mixture of three flavonolignans: silibinin, silidianin and silichristin. Suspension cells of different lines of *Silybum marianum* and *Onopordum acanthium* were fed for 240 minutes with taxifolin and coniferylalcohol the precursors of silymarin. Additionally the cells were also fed with horseradish peroxidase. Every 30 minutes the suspension cells were separated for testing silymarin content in thin-layer chromatography. After 150 minutes of incubation of suspension cells with the precursors and peroxidase, silymarin production could be detected in all lines of *O. acanthium* and *S. marianum*. The quantity of silymarin depended on the plant line used.

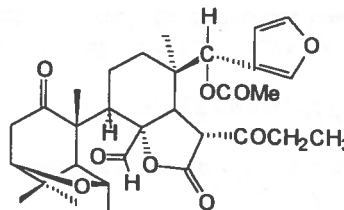
## Poster 66 - Tuesday, 20:00-21:30

### CEDRELANOLIDE I, A NEW LIMONOID FROM *CEDRELA* *SALVADORENSIS*

Rosabel Segura<sup>1</sup>, José Caldersn<sup>1</sup>, Rubín Toscano<sup>1</sup>, Atilano Gutierrez<sup>1</sup> and Rachel Mata<sup>2</sup>. <sup>1</sup>Instituto de Química, <sup>2</sup>Facultad de Química, Universidad Nacional Autónoma de México, Coyoacán 04510, México D.F., México.

A new rearranged limonoid, cedrelanolide I, has been isolated from the stem bark of *C. salvadorensis* (Meliaceae). The structure was unambiguously established by X-ray diffraction analysis. The known compounds photogedunin and gedunin were also isolated. In addition, the phytochemical investigation of the seeds of *C. salvadorensis* led to the

isolation of photodugenin, gedunin and 3-oxo-6 $\beta$ -hydroxyolean-12-en-28-oic acid.



## Poster 67 - Tuesday, 20:00-21:30

### CHRONIC PAIN INDUCED BY 6-EPI-DEACETYL LAURENOBIOLIDE

J. Taboada<sup>1</sup>, C. Gutiérrez-Coutiño<sup>1</sup>, C. Guerrero<sup>1</sup>, E. Campos<sup>2</sup>, F. Ayala-Guerrero<sup>3</sup> and U. Guevara<sup>4</sup>  
<sup>1</sup>Instituto de Química, UNAM. <sup>2</sup>Facultad de Medicina, UNAM.  
<sup>3</sup>Inst. Investigaciones Biomédicas, UNAM.  
Ciudad Universitaria, Coyoacán 04510. México, D. F.  
<sup>4</sup>Hospital de la Nutrición, México

6-epi-Deacetyl laurenobiolide (6-epi) was isolated from *Montanoa grandiflora* (Compositae) collected in Huexotla, State of Mexico. 6-epi shows antibiotic and molluscicide activities, induced chronic pain at a dose of 3 mg, suspended in 0.2 ml of corn oil, into the knee articulation of Wistar rats (350-400 g). Results indicate that 6-epi induced chronic pain for about 12 hrs., that produced modification in the sleep schedule: reduction in the total duration of sleep with major effect on REM in frequency and in the time elapsed in the single episode. The SWS is divided, the time of wakefulness is longer. This compound could be used to evaluate analgesic substances.

## Poster 68 - Tuesday, 20:00-21:30

### ISOLATION OF TWO DIKETOPIPERAZINES FROM *PHYTOPHTORA CINNAMOMI*

Angel Trigos, Silvia Reyna and Dinah Graillet  
Departamento de Química y Biología, Escuela de Ciencias, Universidad de las Américas-Puebla. Apartado Postal 100, Santa Catarina Mártir 72820. Puebla, México.

Cyclo-isoleucylvaline and cyclo-isoleucylisoleucine were isolated from a culture of a Mexican strain of *Phytophthora cinnamomi*, a phytopathological fungus of plants of economic importance. Previous phytopatho-

## Abstracts of Posters

logical assays with the fungus were done on *Persea americana*. Those compounds have not previously been reported from this fungus. The identification was established by spectroscopic methods (IR, MS, <sup>1</sup>H NMR, <sup>13</sup>C NMR, DEPT, COSY, HETCOR). Although these diketopiperazines have not been reported to have phytotoxic and/or antibiotic activity, compounds of similar structure present these activities.

### Poster 69 - Tuesday, 20:00-21:30

#### ISOLATION OF THREE DIKETOPIPERAZINES FROM *FUSARIUM OXYSPORUM*

Angel Trigos, Silvia Reyna and Lourdes Cervantes  
Departamento de Química y Biología, Escuela de Ciencias, Universidad de las Américas-Puebla. Apartado Postal 100, Santa Catarina Mártir 72820. Puebla, México.

Cyclo-propylglycine, cyclo-propylvaline and cyclo-leucylproline were isolated from a culture of a Mexican strain of *Fusarium oxysporum*, a phytopathological fungus of plants of economic importance. Previous phytopathological assays with the fungus were done on *Coffea arabica*. The compounds have not previously been reported from this fungus. The identification was established by spectroscopic methods (IR, MS, <sup>1</sup>H NMR, <sup>13</sup>C NMR, DEPT, COSY, HETCOR). Cyclo-propylvaline and cyclo-leucylproline have been reported to have phytotoxic and/or antibiotic activity, which may be related to the phytopathological activity of this fungus.

### Poster 70 - Tuesday, 20:00-21:30

#### BIOACTIVE COMPOUNDS FROM NEOTROPICAL SPECIES OF *PIPER*

J.H. Wen, R. Marquis\*, J. T. Arnason\*\* and K. R. Downum  
Department of Biological Sciences, Florida International University, Miami, FL 33199 U.S.A., \*Dept. of Biology, University of Missouri-St. Louis, MO 63121-4499, U.S.A., \*\*Dept. of Biology, Ottawa University, Ottawa, Ontario, Canada K1N 6N5.

Thirty-five *Piper* species from Costa Rica were extracted and bioassayed against *B. cereus*, *E. coli*, and *S. cerevisiae*. Thirty-four species were phototoxic and 13 species were bactericidal against *B. cereus*. Focus has been given to the isolation of photoactivated constituents from *Piper* extracts. Column chromatography and TLC on normal phase silica destroyed phototoxin activity. Partitioning between organic and aqueous phases after basification and acidification reduced photoactivity and increased bactericidal activity. At present we are using multilayer counter current chromatography and rpTLC to isolate the photoactivated compound(s).

### Poster 71 - Tuesday, 20:00-21:30

#### INFLUENCE OF CONCENTRATIONS OF DIFFERENT MICROELEMENTS IN THE SOIL ON THOSE IN THE PLANT, AND ON PRODUCTION OF FURANOCOUMARINS

A. M. Zobel<sup>1</sup>, S. Dudka<sup>2</sup>, K. Renke<sup>3</sup> and K. Glowinski<sup>4</sup>  
<sup>1</sup>Chemistry and <sup>2</sup>Environmental Studies, Trent University, Peterborough, ON K9J 7B8, <sup>3</sup>Pharmacy, Medical Academy, Gdansk, Poland and <sup>4</sup>Pharmacognosy, Medical Academy, Lublin, Poland.

High dosages of metal ions included in Sudbury soils were investigated, in comparison with different controls, for the influence of their uptake by leaves of *Ruta graveolens* and on the biosynthesis of defense chemicals such as furanocoumarins. The highest concentrations investigated were 2700 ppm of Ni, 2300 ppm of Cu, 116 ppm Co, 71 ppm Cr, 24 ppm Cd and 400 ppm Pb. The enzymes involved in their production were observed after collection of leaf samples following 3, 18, and 36 h, and 3, 7 and 14 days of treatment. Concentrations of xanthotoxin, bergapten and imperatorin were measured by HPLC following the extraction of these coumarins from two different plant compartments: leaf interior and leaf surfaces.



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# Research Report

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John T. Arnason, Department of Biology, University of Ottawa

Like many of my colleagues, I have been attracted to phytochemistry because of its central role in the interaction between two of the most diverse groups of terrestrial organisms, plants and insects. As a postdoctoral fellow, I had the opportunity to work on a research project in Central America. While there, I saw first-hand the incredible damage insects could inflict on high yield varieties (HYV) of corn introduced into the area, while traditional Maya varieties remained resistant. Local Maya farmers also showed me the variety of biologically active tropical plants that they used. Years later, we found that the resistance in maize was due to a combination of hydroxamic acids that are non-competitive inhibitors of insect trypsin and FAX (ferulic acid esters of cereal cell wall arabinoxylans) that can cross link and strengthen cell walls when diferulate bridges are created by peroxidase. A group of my students are now working on genetic mapping of these defences, their biosynthesis, and their selection in HYV lines, in collaboration with Pioneer, CIMMYT and Agriculture Canada.

Neil Towers (U.B.C.) convinced me that our lab should also be looking at some of the insecticidal and medicinal plants of the area. We have had a long association with tropical plants that include phototoxic insecticides of the Asteraceae, and insect antifeedants and antimalarials of the Mahogany family (Meliaceae). Kelsey Downum (F.I.U.) and I also see considerable

potential in the Piperaceae that are good sources of insecticides, synergists and possibly anticancer compounds. Our Costa Rican collaborators at the Universidad Nacional (Pablo Sanchez, Luis Poveda, Lorena San Roman and Carlos Hasbun) collected our most active species, *Cedro caracolito* from the rainforests of the Osa peninsula. This tree was thought to be a Meliaceae but represents a new genus of a new species as well as the only American representative of its family. Ph.D. student Shawna MacKinnon has isolated five new C,D spiro triterpenoids from this plant which represent a novel biosynthetic class of compounds as well as a new group of insect antifeedants.

Along with collaborators Isman, Towers (U.B.C.) and Durst (U. of O.), students and P.D.F's in my group are continuing to work on phototoxins and antifeedants with the hope that we might be able to understand the role of plant defences in nature or to develop some useful "green" insecticides with soft modes of action. These developments will probably involve specialty products and be realized by small collaborating firms rather than the giants of the agricultural industry. We have also collaborated on similar approaches to produce "ethical phytomedicines" for developing countries such as the approved Mexican antidiarrheal, guava (Lozoya, IMSS, Mexico) or to establish herbal remedies with drug identification numbers for the developed world such as feverfew (Awang, Mediplant). ☞

# Upcoming Meetings

## PHYTOCHEMICAL SOCIETY OF NORTH AMERICA

The 1995 meeting will be held in Sault Ste. Marie, Ontario, on August 15-17, and the symposium topic will be Plant-Insect Interactions. Watch for further details of this meeting in subsequent issues of the *Newsletter*.

## OTHER MEETINGS OF INTEREST

**PLANT PHENOLICS:** Ghent, Belgium, 1994 August/September. This meeting is being co-organized by the Groupe Polyphénols and the Phytochemical Society of Europe. For further information contact Prof. P.J. Lea, Division of Biological Sciences, Institute of Environmental and Biological Sciences, Lancaster University, Lancaster LA1 4YO, United Kingdom.

**VIII INTERNATIONAL CONGRESS OF PLANT TISSUE AND CELL TISSUE:** Firenze, Italy, 1994 July 12-17. For information on the exhibition and circulars contact the Congress Secretariat, Viale G. Milton 81, 50129 Firenze, Italy. (Telephone 39.55.476377, FAX 39.55.476393)

**NATURAL PRODUCTS RESEARCH** (Joint meeting of the Phytochemical Society of Europe, the American Society of Pharmacognosy, L'Association Française pour l'Enseignement et la Recherche en Pharmacognosie and die Gesellschaft für Arzneipflanzenforschung: Halifax, Nova Scotia, 1994 July 31-August 4. For information contact Prof. R.F. Chandler, Director, College of Pharmacy, Dalhousie University, Halifax, NS, Canada B3H 3J5 (Telephone 902 494-2097, FAX 902 494-1396)

**ALLELOPATHY IN SUSTAINABLE AGRICULTURE, FORESTRY AND ENVIRONMENT:** Indian Society of Allelopathy, 2nd National Symposium: J.N. Vyas University, Jodhpur, India, 1994 September 6-8. Contact Dr. Shamsheer S. Narwal, Organizing Secretary, Department of Agronomy, CCS Haryana Agricultural University, Hisar-125 004, Haryana, India. (Telephone 91-1662-73721, Ext. 4268, FAX 91-1662-73552)

**PROTEIN PHOSPHORYLATION** (Joint meeting of the Phytochemical Society of Europe, the Industrial and Biotechnology Group of the Biochemical Society, and the Plant Metabolism Group of the Society for Experimental Biology): Bristol, UK, 1994 September 12-14. Topics will include surveys of reversible protein phosphorylation and the role of protein kinases and phosphatases in cellular registration in plants, the role of phosphorylation in controlling plant metabolism, cell cycle regulation, and protein phosphorylation in signalling and control of development. Contact Dr. R. Hooley,

Dr. N.G. Halford or Prof. P. Shewry, AFRC Institute of Arable Crops, Long Ashton Research Station, Bristol BS18 9AF, UK. (Telephone 44-275 392181, FAX 44-275-394281)

**EVOLUTIONARY AND ECOLOGICAL PROCESSES UNDERLYING BIODIVERSITY:** Aussois, France, 1994 November 7-11. The conference will be held in an alpine ski resort hotel owned by the Centre National de la Recherche Scientifique, and attendance will be limited to ca. 60 scientists, half of them invited speakers and the other half selected from applicants by the chairperson. Cost for selected applicants will be ca. FRF3700. Applications should be sent to Jaques Blondell, CNRS, Centre d'Ecologie Fonctionnelle et Evolutive, Centre Louis Emberger, BP 5051, F-34033 Montpellier Cedex, France. (Telephone 33 67 61 32 01, FAX 33 67 41 21 38)

**VIII INTERNATIONAL SYMPOSIUM ON TOXIC MICROORGANISMS:** Molecular Approaches to Food Safety Issues Involving Toxic Microorganisms: Peoria, Illinois, 1994 November 15-17. The symposium will include topic sessions on systematics, diagnostics, epidemiology, biosynthesis, pathogenesis and cellular regulation involving molecular approaches. Presentations will cover bacterial toxins, mycotoxins and marine toxins. Contact Dr. Mary Ann Dombrink-Kurtzman, National Center for Agricultural Utilization Research, 1815 N. University St., Peoria, IL 61604, U.S.A. (Telephone 309 681-6254, FAX 309 681-6686)

**MASS SPECTROMETRY:** Swansea, UK, 1995 September. Contact Dr. C.J. Smith, Department of Biochemistry, University College of Swansea, Singleton Park, Swansea SA2 8PP, UK. (Telephone 44-(0)792-295378, FAX 44-(0)792-295447)

**PHYTOCHEMISTRY OF FRUITS AND VEGETABLES:** Murcia, Spain, 1995 September. Contact Dr. F.A. Tomás-Barberán, CSIC, Centro de Edafología y Biología Aplicada del Segura, Apartado 4195, Murcia 30080, Spain.

**CHEMICAL ECOLOGY:** 12th meeting of the International Society of Chemical Ecology, near Santiago, Chile, 1995 October 2-6. Among topics to be covered are chirality and bioactivity, plant and insect semiochemicals in pest management, multitrophic interactions, and nitrogen compounds in plant-herbivore interactions. Contact Dr. Hermann M. Niemeyer, Departamento de Ciencias Ecologicas, Fac. de Ciencias, Univ. de Chile, Casilla 653, Santiago, Chile. E-mail: niemeyer@abello. (Telephone 56-2-271-1116 or 271-7503)

**PRINCIPLES REGULATING THE BIOSYNTHESIS AND STORAGE OF SECONDARY METABOLITES:** Halle, Germany, 1996 October/September. Prof. B. Diettrich, Institut für Pharmazeutische Biologie, Martin-Luther-Universität, Weinbergweg 15, PSF 8, D-06120 Halle, Germany.

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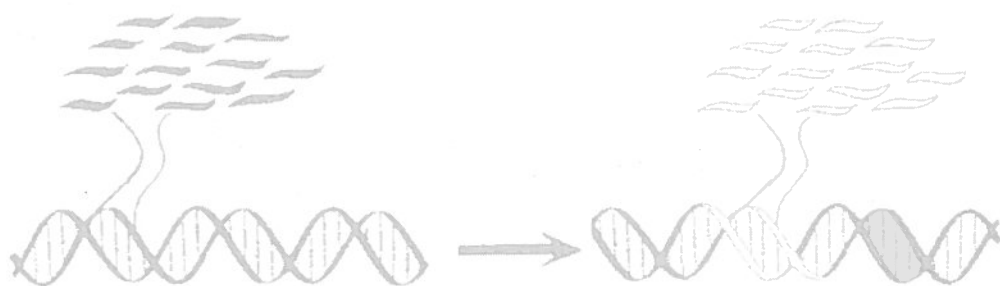
PHYTOCHEMICAL SOCIETY OF NORTH AMERICA

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# Newsletter

• Volume 34, Number 2 • November 1994 •

## PSNA Executive Committee 1994-95

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## PSNA Advisory Committee

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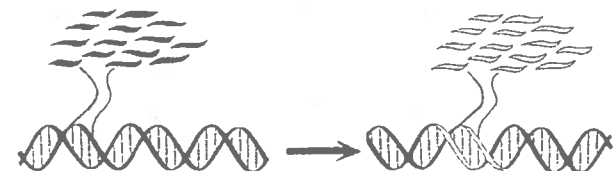
Dr. Jonathan Poulton (1995, Chair)  
Dr. David Seigler (1996)  
Dr. Brian Ellis (1997)

Dr. Murray Isman (1998)  
Dr. James Saunders (1999)

## PSNA Newsletter

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Editor: **Dr. Alicja M. Zobel**  
Associate Editor: **Dr. Stewart A. Brown**



The Phytochemical Society of North America is a nonprofit scientific organization whose membership (currently over 400) is open to anyone with an interest in Phytochemistry, the role of plant substances, and related fields. Annual membership dues are U.S. \$20.00 for regular members and \$10.00 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 to the Society Secretary. Annual dues and changes in addresses should be sent to the Society Treasurer.

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## From the Editor

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### *Correction*

The Editor very much regrets that, on account of one of those nasty gremlins which specialize in tormenting journalists of all stripes, the first digit '3' of the volume numbers on all issues of the *Newsletter* published since the start of the previous volume has been omitted, i.e. in volumes 33, and 34 No. 1. Will you please, therefore, manually insert the missing '3' in the appropriate places of your file copies of these issues? We apologize most sincerely for the inconvenience.

The PSNA now has a new executive following the results of the balloting announced at Mexico City. You will see the changes listed on the opposite page and in the report of the annual business meeting. Congratulations to John Arason as he assumes the President's chair, to Klaus Fischer of Louisiana State University on his taking office as President Elect, and to James Saunders as

he joins the Advisory Committee.

An amendment to the bylaws passed earlier this year authorizes the editor to appoint an associate editor to assist in the publication of the *Newsletter*. I have asked my colleague Stew Brown to take on this job, and he is now listed on the opposite page. Stew has actually been working behind the scenes since I became editor, and I welcome him on stage officially at this time.

As is customary, this issue contains reports on the annual meeting, including the minutes of the business meeting and of the executive committee meeting. Photos of the Mexico City meeting are given in the usual two-page spread.

In August I attended a meeting on natural products in Halifax, organized by four different societies: American Society of Pharmacognosy, Association Française pour l'Enseignement et la Recherche en Pharmacognosie, Gesellschaft für Arzneipflanzenforschung and the PSE, at which each of the organizers advertised its own upcoming meetings. I got the

idea of advertising PSNA meetings in this way, and did so at this Halifax meeting. I thought it would have been very useful to have had our posters on display. Frank Chandler, the host of the Halifax meeting, very willingly announced at the beginning of the first session the upcoming PSNA in Mexico, and offered a display for our poster on the announcement board. From that I got the idea that each of our members could be an "ambassador" for the upcoming PSNA meeting. This would be feasible if the PSNA secretary gets the poster of the next PSNA meeting and a list of members who would be willing to announce our meetings at particular symposia which they attend. This idea was accepted at the Executive Committee meeting, and at present the secretary has 500 posters for the 1995 Sault Ste Marie meeting. Please let me know of any meeting at which you would be willing to act in this capacity, and an adequate number of posters will be sent. ■

# PSNA Annual Meeting,

## *Minutes of the Executive Committee Meeting*

The meeting began at 5:15 p.m. with James Saunders, Kelsey Downum, John Arnason, Susan McCormick, Alicja Zobel and John Romeo present. Organizers of this meeting, Rachel Mata and of the 1995 meeting, Mamdouh Abou-Zaid were invited for the first part to present brief reports on their meetings.

John Arnason and Rachel Mata reported on the expenses of the present meeting, which were no higher than those of previous meetings, and emphasized that this was a good start toward joining participants from Mexico, the United States and Canada, in that 40% of the speakers and 30% of the registrants were Mexican. A larger than usual number of European countries were represented. This year the invited speakers are not receiving expense rebates from the Treasurer unless they present their chapter for *Recent Advances*. Editor-in-Chief John Romeo emphasized that this will speed up publication of the volume for this meeting, and stated that he would meet with the invited speakers the following day before the start of the plenary sessions.

John Romeo reported that negotiations with Plenum Press on the *Recent Advances* contract are still in progress. Updated information on the negotiations by previous Editor-in-Chief Helen Stafford, dated 1994 10 14, were tabled and are summarized as follows:

*Recent Advances in Phytochemistry*, Volume 28: *Genetic Engineering of Plant Secondary Metabolism*, has just been published. The usual delays were encountered in taking delivery of the symposium speakers' completed manuscripts. There is a new contract with Plenum, with an increase from \$4 to \$6 per page. New Editor-in-Chief John Romeo may have to explore with Plenum a means of their using the computer diskettes we send to them. Also to be explored is the possibility of handling all figures with disc programs rather than with glossy or laser prints. Efforts to standardize submissions to the editor on diskettes have not been particularly successful, and it was doubted that authors would be able or willing to use Plenum's system. However, the use of computers, as opposed to typing on special 'blue-ruled' sheets offers advantages in permitting more extensive revisions of tables and text. Expenses totaling \$1456.27 were report-

ed, and the balance of over \$700 from the special fund for editing has been returned to the Treasurer.

Kelsey Downum reported that PSNA life member Prof. Eric Conn has been awarded the Pergamon Prize (as announced elsewhere in this issue of the *Newsletter*).

Kelsey Downum reported the responses of the membership to the suggestion of adding mini-symposia to the program of future meetings. The idea behind this is to make an additional one or two subjects, diversifying from the topic of the main symposium, to attract more specialized members of our Society to participate more frequently in our meetings. For the upcoming meeting in Sault Ste Marie, an idea for such a mini-symposium would be molecular aspects of phytochemistry, and he promised to approach potential organizer Vincenzo De Luca. Such a mini-symposium would not involve extra money, and would take one afternoon of 15-minute oral presentations and round table discussion. Other subjects suggested were biological action of natural products, biochemistry of natural products and particular groups of natural products, e.g., alkaloids. He proposed that we ask members of our Society to suggest additional topics.

After a counting of the ballots for election of the President-Elect it was announced that Dr. Klaus Fischer had been elected. A lengthy discussion ensued on upcoming meetings. For the 1995 meeting the Executive Committee voted to add PSNA Treasurer Susan McCormick to the organizing committee. The global sum of the invited speakers' expenses was decided to be not more than \$9000, which is a compromise between the difficult economic situation and the need to sustain a high level of quality of the symposium lectures, which in turn affects the quality of *Recent Advances*, a major source of the Society's income. Kelsey Downum offered to revise the handout for the organizers of future meetings as an aid to their management of the financial aspects.

The 1996 New Orleans meeting will most probably have as its symposium topic applied phytochemistry, but no mini-symposium subject has yet been chosen. The Executive Committee would like to have responses on this subject from the membership. The 1997 meeting will most probably be a joint meeting with the Phytochemical Society of Europe, which will be negotiated both with respect to

financial and other arrangements by John Romeo. The subject will most likely be communication of the plant with its environment, and a late April scheduling of the meeting is being considered.

The offer of Murray Isman to organize the next joint meeting between our Society and the Society for Chemical Ecology in British Columbia in 1997 or 1998 will depend on the outcome of the negotiations with the PSE.

Treasurer Susan McCormick presented her final financial report, which was accepted. (See elsewhere in this issue.)

Secretary Alicja Zobel suggested an additional role for PSNA members. With their agreement they could become "ambassadors" for upcoming meetings, and advertise them in other meetings in which they participate. (See further information under *From the Editor*.)

Kelsey Downum reported the results of the 1994 election. Nikolaus Fischer is the new President-Elect, and James Saunders becomes the new member of the PSNA Advisory Committee. ■

## *Minutes of the 34th Annual Business Meeting*

The 1994 business meeting of the PSNA was called to order on August 16 at 19:00. President Kelsey Downum thanked Rachel Mata, Guillermo Delgado, Rogelio Pereda-Miranda and John Arnason for their efforts in organizing this meeting, and reported that the finances for the present meeting were in good order. The role of this meeting was fulfilled in bringing North American phytochemists together, as ca. 35% of the registrants were Mexican.

It was moved and seconded that the minutes of the 1993 business meeting be accepted as published in the *Newsletter* of October, 1993. Secretary Alicja Zobel reported that some changes in the *Newletter* format have been instituted, and that she would like to get more advice about further changes. In spite of the transfer of publishing and mailing into "expensive" Canada the costs have not increased significantly because of the current favourable exchange rate of the Canadian dollar. The members were reminded about the possibility of publishing reports on subjects in which the laboratories of individual members are involved. New mailing lists



# Mexico City, 1994

including electronic mail have been issued this year.

The secretary asked about members of the PSNA who would like to volunteer as "ambassadors" of the Society. She would appreciate knowing of meetings in which such members are going to participate and would be willing to convey information about upcoming PSNA meetings. In a few weeks she would be getting 600 posters from the organizers of the 1995 Sault Ste Marie meeting, and could send the required number to any ambassador. The role of the PSNA member will be to ask the organizer to announce the PSNA meeting during an information session, or at least to display a poster on an announcement board.

The secretary expressed regrets about the absence from this meeting of our two "professional" photographers, Connie Nozzolillo and Bruce Stowe, and asked other photographers present to try to capture the precious moments of the warm atmosphere of discussion during the current meeting. She announced a contest for the best picture of this meeting, and promised the prize of having it identified in the next *Newsletter*, but next year some additional prize might be awarded.

Treasurer Susan McCormick distributed copies of the interim financial report (reprinted in this issue) and the report was accepted.

Editor-in-Chief John Romeo reported that *Recent Advances in Phytochemistry*, Volume 27, was published on schedule. The next one, from this meeting, should be even easier to publish, because most of the invited speakers brought their completed manuscripts with them, and have already handed them to the editor during the special meeting before the first morning session. They had been informed that the Society would not pay their expenses without first having received the manuscripts.

President Kelsey Downum announced that eight students and postdoctoral fellows received travel awards:

Lauralyn Beaverson, Florida International University  
Clifford Beninger, Natural Resources Canada  
Charles L. Cantrell, Louisiana State University  
Sylvia Debenedetti, Universidad de Buenos Aires

Fabricio Medina-Bolivar, Pennsylvania State University

Donna J. Leaman, University of Ottawa  
Cindy Odgers, Glendale, AZ

Jinghai Wen, University of Missouri-St. Louis

The committee to select the best student oral presentation and poster have chosen two award winners whose names will be announced at the banquet (Biographies will appear in the next issue — Ed.).

President Kelsey Downum thanked members of the Advisory Committee for their service to the Society. He reported on the 1995 meeting in Sault Ste Marie on August 15-17, with the subject planned to be plant-insect interactions. He elaborated on the answers of the members to his questionnaire about what would persuade them attend our meetings more often. Apart from the difficult economic situation the main reason was dislike of meetings having only one symposium topic unrelated to their research interests. The idea of organizing mini-symposia (one or two) on subjects remote from the main topic could inspire some members to attend. The concern from the audience that it might increase costs was allayed by the response that the speakers in the mini-symposia would not receive remuneration. Their organizer would have a half day allotted for each mini-symposium, which would consist of 15-minute presentations. The president promised to discuss with Dr. Vincenzo De Luca the matter of organizing such a mini-symposium on molecular aspects of phytochemistry next year in Sault Ste Marie. Other titles for mini-symposia were suggested: biological action of natural products, biochemistry of natural products and focus on a particular group of secondary metabolites. Other ideas from the membership are welcome.

The president listed possible locations for future meetings. In 1996 it will be in New Orleans, with a topic in applied phytochemistry, and in 1997 there will most likely be a joint meeting with the Phytochemical Society of Europe in Liege, with the topic of plant communication with the environment. This will be contingent upon an agreement being reached with the PSE on the matter of publishing the symposium papers in *Recent Advances* by the PSNA, and the division of

organizing costs. John Romeo has been conducting the negotiations.

Murray Isman offered to organize a joint meeting with the Society for Chemical Ecology, as one such meeting had been held successfully in Quebec. If the joint meeting with the PSE does not materialize, the joint meeting with the SCE could be in 1997, otherwise the following year.

The president was honoured to announce that long-time PSNA member Eric Conn has been awarded the Pergamon Prize for outstanding contributions to phytochemistry, which will be presented to him at next year's meeting, since he is not present this year. But he suggested that the money of the prize should be transferred immediately to the recipient.

During further discussion, it was mentioned that the existence of high standards for the invited lecturers is proving expensive for the Society. It was pointed out that much of the Society's income derives from sales of *Recent Advances*, but Isman suggested that reducing payment to the speakers is unlikely to increase rejections by them, because publication of their chapters in *Recent Advances* is in itself prestigious. The suggestion of the Executive Committee that meeting organizers have an upper limit of \$9000 for all invited speakers was accepted. A motion that treasurer Susan McCormick be included in the organizing committee was also accepted.

The president reported that the proposed changes in the constitution and bylaws to remove all gender references had been accepted. Also accepted was the bylaw change permitting the *Newsletter* editor to appoint an associate editor. The secretary suggested that Stewart Brown be appointed to this position.

Kelsey Downum announced the results of the ballot counts, that the new president-elect will be Klaus Fischer. The new member of the PSNA Advisory Committee will be Jim Saunders.

The meeting was turned over to the new president, John Arason, who thanked Kelsey Downum for his accomplishments as PSNA president, and moved that the meeting be adjourned.

Respectfully submitted,  
Alicja M. Zobel  
Secretary

# Results of the PSNA

In June, I circulated a questionnaire to PSNA members in Canada, the US and Mexico. The questions involved two topics of concern that frequently arose in discussions that I had with PSNA members while I was PSNA Vice President and President. The topics of most concern to me were the lack of participation by PSNA members at annual meetings and my perception of a growing dissatisfaction by members with the format of annual meetings - specifically the format and topics of the annual symposium. The questionnaire was intended to: i) determine why more members don't attend annual meetings on a regular basis; ii) evaluate member satisfaction with the present meeting format; and iii) establish whether members would be open to a revised meeting format designed to encourage broader participation by the membership.

A total of 325 questionnaires were circulated. Ninety members had responded by 01 September 1994 - a 28% return. A synopsis of the results of the questionnaire is given below, followed by the questions, the total number of responses to each question and the percentage answering in each category.

## Synopsis

A majority of members returning their questionnaires indicated that they did not attend annual meetings on a regular basis (76% of those responding). Attendance at other meetings (39%), cost (21%) and lack of interest in symposium topics (19%) were the most frequently cited reasons for not attending annual meetings on a regular basis. Of the PSNA members

that do not attend annual meetings regularly, 66% indicated that they would attend on a regular basis if the symposium topic(s) were more relevant to their research interests.

Although 55% of those responding to the questionnaire indicated that they were "happy" with the present PSNA symposium format (i.e., one symposium topic with 10-12 speakers), 80% said that they would favor a format that would include one major symposium (for publication in *Rec. Adv. in Phytochem.*) and several, unpublished mini-symposia covering a range of phytochemical topics. Four general areas of interest were identified based on the range of suggested topics expressed by the membership - biological action of secondary metabolites, biochemistry/molecular biology, phytochemistry of secondary metabolism and applied phytochemistry/biotechnology.

**1. Do you attend PSNA meetings on a regular basis (3 meetings during the last 5 years)?**

YES - 24% NO - 76%

Total number of responses - 87

**2. If you answered NO to question #1, what is the main reason for not attending PSNA meetings on a regular basis (indicate any that may apply).**

Attend other meetings - 39%

Attendance at other meetings is more rewarding - 10%

Symposium topics are not of interest - 19%

I have not been a member for 5 years - 10%

Other (e.g., cost) - 21%

Total number of responses - 115

**3. If you answered NO to question #1, would you attend annual meetings on a regular basis if the symposium topic(s) were more relevant to your research interests?**

YES - 66% NO - 26%

Total number of responses - 65

**4. Are you happy with the present PSNA symposium format (i.e., one symposium topic with 10-12 speakers)?**

YES - 55% NO - 38%

Total number of responses - 78

**5. Would you favor a symposium format that would include one major symposium (for publication in *Recent Advances in Phytochemistry*) and several, unpublished mini-symposia covering a range of phytochemical topics?**

YES - 80% NO - 17%

Total number of responses - 76

**6. If you would favor a revised format such as suggested in question #5, what general areas of phytochemistry would you like to see represented (e.g., isolation/identification, biochemistry of secondary metabolism, chemical ecology, biotechnology, etc.)?**

Suggestions fell into four general categories:

Biological action of 2<sup>o</sup> metabolites

Biochemistry/Molecular Biology

Phytochemistry of 2<sup>o</sup> metabolism

Applied Phytochemistry/Biotechnology

# Questionnaire

Based on this information, I made the following recommendations to the PSNA Executive Committee at our meeting in Mexico City:

I. Modify the format of the annual meetings to include both "major" and "mini-symposia".

A. Continue to sponsor one "major" symposium at annual PSNA meetings

1. 10-12 invited speakers to present talks (45-50 min) on common theme

2. invited speakers will submit a chapter for publication in *Recent Advances in Phytochemistry*

3. after submission of their manuscripts, speakers will receive financial compensation from the Society for "some" or "all" of travel-related expenses to attend the annual meeting.

B. Offer 1 or 2 "mini-symposia"

1. mini-symposia will be composed of 5-6 participants presenting 20-30 min talks

2. participants may be invited in advance by the organizer or selected from submitted abstracts in area related to mini-symposium topic

3. participants will not be paid, but their meeting registration will be waived

4. mini-symposia will not be published

4. mini-symposium topics should be distinct from the major symposium topic to encourage broad participation by membership

C. Topics for major and mini-symposia should be rotated on a regular basis to assure diversity and to encourage broad participation by the membership.

II. Continue "Best Student Paper" and "Best Student Poster" competition.

III. Hold poster sessions during the day to encourage attendance.

IV. Initiate the above at Sault Ste. Marie meeting in 1995.

The above recommendations were discussed at the PSNA Business Meeting in Mexico City and it was decided to implement them on a limited basis at the Sault Ste. Marie meeting in August, 1995.

In addition to the major symposium "Phytochemical Redundancy in Ecological Interactions," Vince DeLuca has been invited to organize the first "mini-symposium" in the area of molecular biology of secondary metabolism. Both symposia will be advertised in flyers about the meeting.

In closing, I would like to thank the members of the PSNA and the PSNA Executive Committee for their feedback and encouraging words over the past year. I look forward to being a member of the PSNA for many years to come and am confident that the PSNA will survive any perceived challenges in the future. The Society is changing and I hope that some of the issues were discussed in Mexico City will help the Society adjust to these changing times. Finally, I would like to wish Dr. J. Thor Arnason, the new PSNA President, the best of luck over the next year. ■

*Kelsey R. Downum*

## Eric Conn is Awarded Pergamon Prize

PSNA life member and former President, Eric Conn, Professor Emeritus at the University of California, Davis, has received this year's Pergamon Prize, given annually to an outstanding phytochemist. The prize consists of a medal and \$5000. Eric has had a long and notable career and has made many contributions to the field of biosynthesis of secondary products in plants, being perhaps most renowned for his discovery in the early 1960s, with Jane Koukol, of phenylalanine ammonia-lyase, a central enzyme in the formation of the many phenylpropanoid plant products. The PSNA is proud to offer its hearty congratulations to Eric for this recognition. ■

## Journal News

### *Chemoecology*

Birkhäuser Publishers has taken over the journal *Chemoecology* from Thieme Publishers beginning with Volume 4, August, 1993. The journal, which will appear quarterly, will be available to PSNA members at a reduced subscription price of US\$98 instead of \$198, a discount of over 50%. We expect to publish a formal announcement from Birkhäuser next issue.

### *Phytochemistry*

Elsevier Science, publisher of *Phytochemistry*, has announced that the 1995 subscription price to PSNA members will be US \$150.

# Mexico City A





# Annual Meeting



# Final Financial Report

(01 January 1993 - 31 December 1993)

## Receipts

Membership dues	\$ 5,731.66
Plenum Publishing royalties on RAP	4,558.22
Plenum Publishing secretarial expenses and page charges	7,832.00
Interest on Checking Account	122.23
Rental of Mailing lists	100.00
Reimbursement 1992 meeting	3,101.23
Reimbursement 1992 Best Poster	200.00
Transfer from savings	10,000.00
<b>Total Receipts</b>	<b>\$31,645.34</b>

## Expenditures

<b>Meetings</b>	
Advance for 1993 Meeting	\$12,000.00
EC travel 1993	366.50
Speaker Travel - 1993	652.55
Advance for 1994 Meeting	3,000.00
<b>Executive Committee Expenses</b>	
Secretarial	4,000.00
Editor-in-Chief	2,000.00
Treasurer	1,880.68
Checking account service charges	66.60
<b>Total Expenditures</b>	<b>\$23,966.33</b>

## Summary

Savings (interest)	\$ 1,424.73
Savings (early withdrawal penalty)	-51.23
Checking - Receipts	31,645.34
Checking - Expenditures	-23,966.33
<b>Net Gain</b>	<b>\$ 9,052.51</b>
<b>Assets</b>	
Checking	\$ 8267.79
Savings	18,854.49
<b>Total</b>	<b>\$27,122.28</b>

# Interim Financial Report

(01 January 1994 - 10 August 1994)

## Receipts

Membership dues	\$ 5,348.47
Plenum Publishing royalties on RAP	3693.30
Plenum Publishing secretarial expenses and page charges	1907.00
Interest on Checking Account	78.60
Rental of Mailing lists	300.00
Reimbursement- 1993 meeting	7,287.88
Reimbursement Editor-in Chief Account	703.61
Transfer from savings	6,050.58
<b>Total Receipts</b>	<b>\$26,586.20</b>

## Expenditures

<b>Meetings</b>	
Speaker Travel - 1993	\$ 437.00
<b>Executive Committee Expenses</b>	
Secretarial	2,000.00
Treasurer	1,329.39
Transfer to Savings	15,000.00
Checking account service charges	57.58
<b>Total Expenditures</b>	<b>\$18,823.97</b>

## Summary

Savings (interest)	\$ 558.99
Savings (early withdrawal penalty)	-358.00
Checking - Receipts	26,586.20
Checking - Expenditures	-18,823.97
<b>Net Gain</b>	<b>\$ 7,763.22</b>
<b>Assets</b>	
Checking	\$ 16,030.02
Savings	28,000.00
<b>Total</b>	<b>\$ 44,030.02</b>



# 2nd Joint Meeting of the Phytochemical Societies of Europe and North America, Miami Beach, Florida, USA

(8-12 August 1992)

## Revenue

### Registration

76 @ \$100 ea. (reg. member)	\$ 7,600
26 @ \$50 ea. (students)	1,300.00
20 @ \$15 ea. (accomp. persons)	300.00
42 @ \$20.00 (nonmembers & late reg.)	840.00
80 @ \$30 ea (banquet)	2,400.00
Advanced payments for lodging	5,363.73

### Donations

FIU - College of Arts & Sciences	4,484.10*
USDA	2,000.00
PC Inc.	100.00
Env. Growth Chambers	100.00

Interest (on checking account) 126.36

PSNA Contributions 14,880.88

**Total** **\$39,495.07**

## Expenses

### Invited Speakers

Travel, Lodging & meals \$15,721.02

### Organizational Costs

Secretarial services	1,843.86
Printing costs	1,013.55
Supplies	311.61
Postage	1,065.35
Courier services	327.97
Display board rentals	891.00
Audio/visual equipment	195.00
University vehicle	288.10

### Hotel

Opening reception	1,326.20
Banquet	3,275.30
Coffee breaks	3,128.40

Advanced payments	5,363.73
Gratuities for meeting services	256.00

FTG Tour	
Buses	700.00
Box lunches	483.75

Best Poster Awards	203.00
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**Total** **\$36,393.84**

**Returned to PSNA Treasury** **\$3,101.23**

**Final cost to the Society** **\$11,779.65**

\*In addition to financial considerations, FIU also provided a variety of in-kind contributions worth approx. \$1,500.00 (telephone/fax, use of audio visual equipment and Florida tax-exempt status).

## Recent Advances in Phytochemistry Summary of Royalties

Volume	Number sold	Royalty
27	398	\$2,847.63
26	46	416.15
25	27	211.13
24	7	52.14
23	2	15.44
22	6	35.13
21		0.00
20	5	32.80
19	3	14.40
18		0.00
1-17	1	83.62
<b>Total</b>		<b>\$3,693.30</b>

# 1993 PSNA Meeting Receipts and Expenditures

Receipts		Expenditures		Speaker Travel	
Blackwell Contribution	\$ 200.00	Postage	425.83	Speaker Travel	652.55
Pioneer Contribution	1,000.00	Flyers	760.34	Speaker Travel	437.00
Registration Fees	14,543.00	Poster Boards	1,171.00	Asilomar Deposit	1,500.00
<b>Total Receipts</b>	<b>15,743.00</b>	Aquarium Trip	5,803.00	<b>Total Expenditures</b>	<b>\$ 25,044.67</b>
		Wine	583.77	<b>Total Receipts</b>	<b>\$15,743.00</b>
		Name Tags	256.17	<b>Total Expenditures</b>	<b>25,044.67</b>
		Buses	255.00	<b>Final Cost</b>	<b>\$9,301.67</b>
		Student Travel Awards	2,400.00	<b>to the Society</b>	
		Asilomar Fees	2,165.90		
		Service Charges	58.29		
		<b>Total expenditures</b>	<b>\$22,455.12</b>		
		<b>from California Accounts</b>			

## PSNA Membership Data (11 August, 1994)

members	current total	current regular	current student	current (non-paying)	new 1994 members	1993	1993M	1993M current**	1992M	
US	271	216	160	28	24	7	44	10	9	20
Canada	66	50	29	11	10	4	12	4	2	20
Non US/Canada	81	64	57	3	0	3	3	3	4	3
<b>Total</b>	<b>418</b>	<b>330</b>	<b>250</b>	<b>42</b>	<b>34</b>	<b>14</b>	<b>59</b>	<b>17</b>	<b>15</b>	<b>43</b>
1993*	408	301					61 (1992)	46 (1992M)		

	Year	Members	USA	Canada	Foreign	Students
*1993 data at time of 1993 meeting (July '93)	1986	359	279	40	40	38
** current dues paid through 1994	1987	334	258	42	34	35
1993M membership as part of meeting attendance	1988	391	297	49	45	51
1992M membership as part of meeting attendance	1989	411	317	43	51	53
did not pay 1993 dues	1990	425	311	64	50	53
1993M-1994 attended 1993 meeting and paid 1994 dues	1991	403	294	57	52	45
	1992	396	289	55	52	50

## Nariyuki Ishimura

1935-1993

**P**rof. Nariyuki Ishimura, a distinguished plant biochemist and Dean, Faculty of Science, Kumamoto University, Japan, succumbed to injuries resulting from a fall, last December 27. He was the author of over 100 scientific papers on various aspects of flavonoid and phenolic chemistry and biochemistry (in English) as well as a textbook on plant physiology (in Japanese). After receiving his doctorate from Tokyo Kyoiku University in 1965 he spent three years in Australia with Dr. W.E. Hillis. Upon his return to Japan he joined the Department of Biology at Kumamoto, becoming a full Professor in 1974, chairman of the department in 1986 and Dean of the Faculty in 1993. From his earliest days as a student of botany at Toyama University, where he obtained his BSc and MSc, the anthocyanin pigments — their distribution, chemical nature and biosynthesis — were his major research interest. This is not surprising, given that his teachers were Dr. M. Shibata and Dr. K. Hayashi. Pigments were also his avocation; under the tutelage of his wife, Mari, a talented award-winning artist, he used his spare moments to transfer the mountain scenery he loved to canvas. A friendly, enthusiastic, generous, kind and hospitable person, Dr. Ishimura will be greatly missed by all who knew him.

*Constance Nozzolillo*

# Upcoming Meetings

## Phytochemical Society of North America

The 1995 meeting will be held in Sault Ste. Marie, Ontario, on August 15-17, and the symposium topic previously announced has been expanded to "Phytochemical redundancy in ecological interactions". The theme will stress the diversity, overlap and variety of plant chemical defenses against biological stress including insects, fungi and large herbivores. Invited speakers are May R. Berenbaum, Rex Cates, Kelsey Downum, Ray Hammerschmidt, Pierre Escoubas, Murray B. Isman, Bruce B. Jarvis, Richard L. Lindroth, Simon Mole, Adolf Nahrstedt, Malcolm R. Siegel, J. Alan A. Renwick and Scott Uknes. A poster giving full details is included in this mailing, and you are requested to display it at your institution. Please note that an added feature of this meeting will be a mini-symposium, being organized by Vincenzo De Luca, to deal with molecular aspects of phytochemistry. More details will be forthcoming in the next issue.

## Other Meetings of Interest

### Evolutionary and Ecological Processes Underlying Biodiversity

Aussois, France, 1994 November 7-11. The conference will be held in an alpine ski resort hotel owned by the Centre National de la Recherche Scientifique, and attendance will be limited to *ca.* 60 scientists, half of them invited speakers and the other half selected from applicants by the chairperson. Cost for selected applicants will be *ca.* FRF3700. Applications should be sent to Jaques Blondell, CNRS, Centre d'Ecologie Fonctionnelle et Evolutive, Centre Louis Emberger, BP 5051, F-34033 Montpellier Cedex, France.

(Telephone 33 67 61 32 01,  
FAX 33 67 41 21 38)

### VIII International Symposium on Toxic Microorganisms

Molecular Approaches to Food Safety Issues Involving Toxic Microorganisms: Peoria, Illinois, 1994 November 15-17. The symposium will include topic sessions on systematics, diagnostics, epidemiology, biosynthesis, pathogenesis and cellular regulation involving molecular approaches. Presentations will cover bacterial toxins, mycotoxins and marine toxins. Contact Dr. Mary Ann Dombrink-Kurtzman, National Center for Agricultural Utilization Research, 1815 N. University St., Peoria, IL 61604, U.S.A. (Telephone 309 681-6254, FAX 309 681- 6686)

### Keystone Symposium; Plant Cell Biology

Mechanisms, Molecular Machinery, Signals and Pathways: Taos, New Mexico, 1995 January 7-13. Topics include protein sorting, channels and pumps, the cytoskeletal system, cell-cell communication, intracellular signaling, cytoplasmic regulatory mechanisms, the cell surface and extracellular matrix, and plant cell division. Contact Keystone Symposia, Drawer 1630, Silverthorne, CO 80498, U.S.A. (Telephone 303 262-1230)

### Gordon Research Conference

Temperature Stresses in Plants: Oxnard, California, 1995 January 29-February 3. Topics will include whole plant responses to temperature stress, effects of temperature on photosynthesis, mechanisms of sensing temperature, temperature stress proteins, links between temperature and drought stress, breeding for temperature stress tolerance, role of membranes in

# Upcoming Meetings

temperature stress tolerance, and life at extreme temperatures. Contact Dr. Carol B. Storm, Director, Gordon Research Conferences, University of Rhode Island, Box 984, West Kingston, RI 02892-0984, U.S.A. (Telephone 401 783-4011, FAX 401 783-7644)

## **Keystone Symposia, Concurrent Meetings**

Hilton Head, South Carolina, 1995 March 26-April 1. (1) **Frontiers of Plant Morphogenesis.** The issues will concern the broad area of the interface between the cytoskeleton, cell wall and plasma membrane in morphogenesis, and how new insights can be synthesized using molecular, cellular and biochemical approaches. (2) **Signal Transduction in Plants.** Several recent developments which have strongly impacted research in this area are the dramatic explosion in our knowledge of the molecular, cellular and developmental biology of plants, genetic approaches using model systems, use of PCR to clone plant homologues of components of signal transduction systems in microbes and animals, and purification and cloning of the first putative plant receptors. Contact Keystone Symposia, Drawer 1630, Silverthorne, CO 80498, U.S.A. (Telephone 303 262-1230)

## **International Symposium on Weed and Crop Resistance to Herbicides**

University of Cordoba, Spain, 1995 April 3-6. Jointly sponsored by the European Weed Research Society and the Spanish Weed Science Society. General topics: herbicide target sites and resistance mechanisms associated with them, resistance mechanisms associated with herbicide metabolism and detoxification, other resistance mechanisms, biotechnological approaches to develop herbicide resistance in crops, integrated mechanical, chemical

and biological methods for weed control. Deadline for abstracts January 30. Contact Dr. J. Jorrián, Departamento de Bioquímica y Biología Molecular, University of Cordoba, Apartado 3048, Cordoba, Spain. (Telephone 57-218439, FAX 57-218563)

## **7th International Symposium on Preharvest Sprouting in Cereals**

Abashiri, Hokkaido, Japan, 1995 July 2-7. Specific topics will include: physiology and molecular biology of grain development and germination; influence of environmental, physical and agronomic factors on sprouting; genetics and plant breeding; effects of sprouting damage on cereal end products. Contact the Secretariat, 7th International Symposium on Preharvest Sprouting in Cereals, Kitami Agricultural Experiment Station, Kunneppu, Hokkaido 099-14, Japan (Telephone 0157-47-21-46), or M.K. Walker-Simmons, USDA-ARS, 209 Johnson Hall, Washington State University, Pullman, WA 99164-6420 U.S.A. (Telephone 509 335-8696, FAX 509 335-8674, e-mail [simmons@wsuvm1.edu](mailto:simmons@wsuvm1.edu))

## **9th International Rapeseed Congress**

Cambridge, England, 1995 July 4-7. Contact Dennis Kimber, 44 Church Street, Haslingfield, Cambridge CB3 7JE, England.

## **European Symposium on Photomorphogenesis in Plants**

Sitges, Barcelona, Spain, 1995 July 9-15. Specific topics will include Blue-UV light photoreception, phytochrome properties and phytochrome genes, photoregulation of gene expression, signal transduction in photomorphogenesis, photocontrol of plant growth, photomorphogenesis in lower plants and photomorphogenesis in natural conditions. Contact Dr. Carmen Bergareche, Departamento de Biología

Vegetal, Facultat de Biologia, Diagonal 645, 08028 Barcelona, Spain. (Telephone 34-3-4021464, FAX 34-3-4112842)

## **15th International Conference on Plant Growth Substances**

Minneapolis, Minnesota, 1995 July 14-18. Held in conjunction with the Plant Growth Regulator Society of America. Twenty symposia are planned, each consisting of 3-5 speakers, on topics including hormone biosynthesis, hormone metabolism, tropisms, flowering, hormone perception/sensitivity, and interactions of hormones with other signaling systems. Plenary sessions will cover signal transduction, integration of growth processes, hormonally regulated gene expression, and generation of fundamental knowledge and applications using transgenic plants. There will be posters and workshops. Contact Gary Gardner, Department of Horticultural Science, University of Minnesota, 305 Alderman Hall, St. Paul, MN 55108, U.S.A. (FAX 612 624-3606, e-mail [ggardner@maroon.tc.umn.edu](mailto:ggardner@maroon.tc.umn.edu))

## **Saponins: Chemistry and Biological Activity**

Chicago, 1995 August 20-25. American Chemical Society Symposium No. 582. Contact Dr. George R. Waller, Dept. of Biochemistry and Molecular Biology, Oklahoma State University, Stillwater, OK 74078-0454, U.S.A. (Telephone 405 744-6692, FAX 405 744-7799)

## **Mass Spectrometry:**

### **Swansea, UK, March 27-30**

Contact Dr. C.J. Smith, Department of Biochemistry, University College of Swansea, Singleton Park, Swansea SA2 8PP, UK. (Telephone 44-(0) 792-295447)