THE CANADIAN BOTANICAL ASSOCIATION

BULLETIN

DE L'ASSOCIATION BOTANIQUE DU CANADA

November / novembre 1998 31(4) Montréal

Patron / Président d'honneur
His Excellency the Right Honourable / Son excellence le très honorable
Roméo Leblanc, P.C., C.C., C.M.M., C.D.
Governor General of Canada / Gouverneur général du Canada

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Call for nominations for the George Lawson and Mary E. Elliot Medals

The annual meeting for 1999 will be held in St. Louis in conjunction with the XVI International Botanical Congress. Some brief information concerning the congress is presented by the CBA president, Denis Barabé, on page 55 of this issue of the Bulletin. Further information will be forthcoming in the next issue (résumés of papers, registration, awards, bursaries, etc.). However, we must already set the wheels in motion for the nominations for the George Lawson and Mary E. Elliot Medals. Both medals are important for the development and visibility of the Canadian Botanical Association. We invite all members to make nominations for these important awards in order to highlight the scientific activity of Canadian botanists.

The George Lawson medal is awarded to a botanist who has made an exceptional lifetime contribution to the development of plant biology in Canada. This recognition may be based on the overall academic career of the nominee or on a particularly outstanding achievement such as the pubication of book. The Mary E. Elliot medal is awarded to an individual CBA member who has given particularly active service to the Association. For more information concerning these awards, please contact Denis Barabé. The final date for submitting nominees is January 31, 1999.

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Appel de candidatures pour les prix Georges Lawson et Mary E. Elliot

Le prochain congrès de l'ABC aura lieu en août 1999 à St. Louis dans le cadre du XVI International Botanical Congress. Vous trouverez à la page 55 du présent bulletin, quelques informations sur ce congrès de la part du président de l'ABC, Denis Barabé. De plus amples informations seront fournies dans le prochain bulletin (résumés des présentations, inscription, prix , bourses, etc.). Mais il faut penser dès maintenant à soumettre des candidatures pour les prix Georges Lawson et Mary E. Elliott. Ces prix sont deux éléments importants pour le développement et le rayonnement de l'Association botanique du Canada. Ils reflètent le dynamisme de notre association. Il est donc essentiel que les membres de l'association présentent des candidatures pour ces prix afin de mettre en valeur les activités scientifiques des botanistes canadiens.

Le prix Georges Lawson est remis à une personne qui a contribué de façon exceptionnelle au développement de la biologie végétale. Le prix peut-être décerné pour l'ensemble d'une carrière ou pour une réalisation particulière de grande envergure, par exemple un livre. Le prix Mary E. Elliot est décerné à un membre qui a participé activement au développement de l'Association botanique du Canada. Pour obtenir de plus amples renseignements concernant ces prix, veuillez contacter Denis Barabé. La date limite pour soumettre des candidatures est le 31 janvier 1999.

Denis Lauzer

Editors / La rédaction

Editor / rédacteur
Denis Lauzer
Assistant editor / rédacteur adjoint
Stuart Hay

Institut de recherche en biologie végétale
(Université de Montréal / Jardin botanique de Montréal)
4101, rue Sherbrooke Est
Montréal, Québec
H1X 2B2
Téléphone : (514) 872-8494
Télécopieur : (514) 872-9406
Courrier électronique : denis.lauzer@umontreal.ca

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Information for submitting texts / Soumission des textes

Texts and illustrations for the Bulletin must be sent to the Editor preferably via the electronic mail (attached file) or on a diskette. Texts should be saved under "Word" and illustrations under the "TIFF" format.
If you have any question about text submission please contact the Editor.

Les textes et les illustrations pour le bulletin doivent de préférence être envoyés par courrier électronique (sous forme de fichier attaché) ou encore sur une disquette.
Les textes doivent être enregistrés sous « Word » et les illustrations sous le format « TIFF ».
N'hézitez pas à contacter le rédacteur pour toute information sur l'envoi de documents.

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CBA Bulletin / Bulletin de l'ABC

The CBA Bulletin is issued quarterly (February, May, August, November) and sent to all CBA members.
Le Bulletin de l'ABC paraît quatre fois par année (février, mai, août, novembre) et est envoyé à tous les membres de l'ABC.

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To ensure continuous delivery of the Bulletin please notify the Treasurer promptly of any change of address.
Veuillez communiquer tout changement d'adresse au trésorier afin de recevoir tous les numéros du bulletin.

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If you have any comments or suggetions about the Bulletin, please contact the Editor at the above address.
Si vous avez des commentaires ou suggestions concernant le bulletin, veuillez s'il-vous-plait contacter le rédacteur à l'adresse mentionnée plus haut.

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Texts for the February issue must be received before January 1, 1999. Les textes pour le bulletin de février doivent arriver au plus tard le 1er janvier 1999.

CBA Section and Committee Chairs

Section Chairs (1998-2000)

Ecology
Dr. Ed Reekie
Biology Department
Acadia University
Wolfville, NS, B0P 1X0
ereekie@ace.acadiau.ca
Tel. : (902) 585-1162; fax : (902) 542-3466

Mycology
Dr. Melanie Jones
Okanagan University College
3333 College Way
Kelowna, BC, V1V 1V7
mjones@okcins.okanagan.bc.ca
Tel. : (604) 762-5445; fax : (604) 470-6005

Structure & Development
Dr. Ron Dengler
Life Sciences Division
University of Toronto at Scarborough
1265 Military Trail
Scarborough, ON, M1C 1A4
dengler@tsunami.scar.utoronto.ca
Tel : (416) 287-7426; fax : (416) 287-7642

Systematics & Phytogeography
Dr. Luc Brouillet
Institut de recherche en biologie végétale
4101, rue Sherbrooke Est
Montréal, QC, H1X 2B2
luc.brouillet@umontreal.ca
Tel. : (514) 872-8490; fax : (514) 872-9406

Committee Chairs (1998-2000)

Conservation
Dr. Pam Krannitz
Pacific Wildlife Research Centre
5421 Robertson Road, R.R. 1
Delta, BC, V4K 3N2
pam.krannitz@ec.gc.ca
Tel. : (604) 946-4676; fax : (604) 946-7022

Science Policy
Dr. Joe Gerrath
Department of Botany
University of Guelph
Guelph, ON, N1G 2W1
jfgerrat@uoguelph.ca
Tel. : (519) 824-4120; fax : (519) 767-1991

Development
Dr. Vipen Sawhney
Department of Biology
Univeristy of Saskatchewan
Saskatoon, SK, S7N 5E2
sawhney@admin.usask.ca
Tel. : (306) 966-4417; fax : (306) 966-4461

Membership
Dr. Hugues Massicotte
Forestry Program
Faculty of Natural Resources and Environmental Studies
University of Northern British Columbia
Prince George, BC, V2N 4Z9
hugues@unbc.ca
Tel. : (250) 960-5813; fax : (250) 960-5538

XVI International Botanical Congress
St. Louis (Missouri) August 1-7, 1er au 7 août, 1999.

The annual meeting of the CBA will be held in conjunction with the XVI International Botanical Congress in St. Louis, Missouri, from the 1st to the 7th of August, 1999. For more detailed information about the congress we invite you to consult this web site:

http://www.ibc99.org

Scientific Program

For those not participating in one of the symposiums, you should be aware that only poster presentations will be accepted outside the formal sessions. The final date for the submission of résumés is April 1st (consult the web site of the IBC). I would like to thank the CBA members who are organizing or participating in the symposiums. These efforts contribute to the international visibility of our Association. Incidently, the CBA is contributing financially to some of the symposiums

CBA General Assembly

The general assembly of the CBA will be held during the congress on Thursday, August 5th, at 7h30 (AM!). The location of the assembly will be announced in the general program of the IBC. The timing for the assembly was the only moment when a locale could be reserved without conflicting with other acitivites (conferences, banquets, excursions, etc.).

Social Event

There will be a joint social get-together of the participating botanical societies - the Botanical Society of America, the Sociedad Bótanica of México and the Canadian Botanical Association. This will be a good occasion to meet colleagues from the U. S. and Mexico. It is also during this get-together that the recipients of the George Lawson medal, the Mary Elliot medal, and the Cinq-Mars award will be announced. More information will be given in the next issue.

Lionel Cinq-Mars Award

Exceptionally this year, because the scientific presentations can only be given as posters at the IBC, the Lionel Cinq-Mars prize will be awarded to the best poster presented by a student. Additional information about this award will be given in the next issue of the Bulletin.

Special travel bursaries for students

This year, there will be a total of 12 travel bursaries (including the two John Macoun bursaries), worth $ 500 each, to encourage students to attend the IBC. The funds for 10 of these bursaries come from the local organizing committee of last summer's annual meeting in Saskatoon. The guidelines for eligibility will be published in the next issue.

Section Meetings

Exceptionally in 1999, no section meetings are planned to be held at the congress. If, however, any of the section heads should wish to organize a meeting of his or her section, they should communicate with me in order to reserve a room.

Executive Meeting

A meeting of the outgoing executive is planned to be held before the IBC and another for the incoming executive will be held after the congress. The dates and venue have yet to be decided.

Denis Barabé, CBA President.

Le prochain congrès annuel de l'ABC se tiendra pendant le XVI International Botanical Congress qui aura lieu à St. Louis, Missouri, du 1er au 7 août 1999. Pour obtenir de plus amples informations sur ce congrès nous vous invitons à consulter le site web suivant :

http://www.ibc99.org

Le programme scientifique

Pour ceux qui ne participent pas à un symposium, seuls les poster seront acceptés. La date limite pour la réception des résumés est le 1er avril 1999 (voir le site web de l'IBC). J'aimerais remercier les membres de l'ABC qui ont organisé ou qui participent à des symposiums. Cela contribue au rayonnement international de notre association. D'ailleurs, l'ABC supporte financièrement quelques-uns de ces symposiums.

Assemblée générale annuelle de l'ABC

L'assemblée générale annuelle de l'ABC aura lieu le jeudi 5 août 1999, à 7h30 (le matin!) sur le site de l'ICB. L'endroit sera annoncé dans le programme général de l'ICB. C'est le seul moment où les salles étaient disponibles et qui n'entrait pas en conflit avec d'autres activités (conférences, banquets, sorties, etc.).

Rencontre sociale

Il y aura une rencontre sociale entre les trois sociétés suivantes: la Botanical Society of America, la Sociedad Bótanica de México et l'Association botanique du Canada. Cette rencontre aura lieu le jeudi 5 août vers 19h00, au Missouri Botanical Garden. Il s'agit là d'une bonne occasion pour rencontrer nos collègues des États-Unis et du Mexique. C'est aussi lors de cette rencontre que les prix décernés par l'ABC (médaille Georges Lawson, médaille Mary E. Elliot, prix Lionel Cinq-Mars, etc.) seront remis. Des informations supplémentaires seront données dans le prochain numéro du Bulletin.

Le Prix Lionel-Cinq-Mars

Étant donné que les contributions scientifiques se feront uniquement sous forme de poster à l'IBC, le prix lionel Cinq-Mars sera décerné exceptionnelement cette année au meilleur poster étudiant. Des informations seront données dans le prochain numéro du Bulletin.

Bourses spéciales de voyage pour les étudiants

Cette année, il y aura un total de 12 bourses de voyage (incluant deux bourses de voyage John Macoun), de 500 $ chacune, pour participer à l'IBC (St. Louis). Les fonds pour payer dix de ces bourses proviennent du comité local responsable de l'organisation du Congrès annuel de l'ABC qui a eu lieu à Saskatoon l'été dernier. Les critères d'éligibilité pour ces bourses seront publiés dans le prochain numéro du Bulletin.

Réunion des sections de l'ABC.

Exceptionnellement l'année prochaine, il n'y aura pas de réunions des sections de l'ABC. Si des responsables de sections veulent organiser une réunion de leur section à l'IBC, je leur demanderais de communiquer avec moi afin que nous réserviions une salle dans l'édifice où aura lieu le Congrès.

Réunion du conseil d'administration de l'ABC.

Une réunion pour le conseil d'administration sortant est prévue avant le début du Congrès et une autre pour le Conseil d'administration à venir est prévue à la fin du Congrès. Les dates et l'endroit restent à déterminer

Denis Barabé, président de l'ABC.

The November issue of the Bulletin will from now on include the news from the Section and Committee Chairs. I encourage all Chairs to send me their texts for that issue. The Editor.

Ecology Section

1. Rowe Prize

Four nominations were received for the award this year. The judges agreed on a winner but it was a difficult choice. To increase the profile of the award, it was agreed that the competition should be advertized more widely. In this regard, it was agreed that in addition to sending letters to the heads of Biology Departments this year we would:

(a) Unite with the other sections and advertize all student prizes in one CBA mailing, as well as announcing the prizes in all issues of the Bulletin;

(b) Send personal letters to Canadian plant ecologists describing the award;

(c) Ask members of the ecology section executive to search the literature for possible nominees for the award.

2. Lionel Cinq-Mars Award

Christine Maxwell and Diane Fahselt (alternate) will represent the section next year. Because there will be no student talks at the International Congress, judges will evaluate student posters. In the absence of a Section meeting, the Section executive will approach potential judges for CBA 2000 at the Congress.

3. Symposium topics for future meetings

1999: Three topics have been proposed to the Congress, and accepted:

(a) Phenological responses to climate change. Organizers: Elisabeth Beaubien and Tim Sparks;

(b) Seed population dynamics. Organizer: Paul Cavers;

(c) Purple loosestrife. Organizer: Peter Nosko.

2000: Sand dune ecology. Organizer: Anwar Maun.

2001: Ecological implications of forest management. Possible organizers: Kate Frego and Mark Roberts.

4. Ecology Section Executive

Because a section meeting will not be held in 1999, the terms of the executive were extended till 2000, and two new members were added. Current executive of the Ecology Section consists of: Ed Reekie (Chair), Kate Frego (Secretary), Elisabeth Beaubien, Paul Cavers, Peter Nosko, Pam Krannitz and Anwar Maun.

5. Web Page

Section members are invited to e-mail any suggestions they have for what to include on our web page to Ed Reekie (ereekie@ace.acadiau.ca). He will collate and organize the information and pass it on to Jerry Chmielewski who will update our web site. Some current suggestions include a membership list with links to home pages and links to our favourite ecological web sites.

6. EMAN Sampling Protocol

We have been asked by some of our members to prepare a position paper on the permanent biodiversity plot system proposed by EMAN in its monitoring network. All researchers involved with the network will be requested to use the same protocol, which was developed by the Smithsonian Institute for tropical trees. Four members have volunteered to review the protocol: Liette Vasseur, Pam Krannitz, Elisabeth Beaubien and Ed Reekie. Any members who wish to voice their opinion, may do so by e-mailing comments to Ed Reekie (ereekie@.acadiau.ca).

7. Directory of Canadian Plant Ecologists

To facilitate the recruitment of new members and to assist in publicizing the Rowe award, we have decided to compile a list of Canadian plant ecologists. Ed Reekie will organize the effort, with the help of regional representatives: Julie Hrapko - Edmonton area, Elisabeth Beaubien - Alberta, Liette Vasseur - Maritimes, Quebec, Paul Cavers - Ontario, and Duane Peltzer - Saskatchewan. Volunteers for regions not yet represented are requested.

Kate Frego, Secretary, **Ed Reekie**, Chair, Ecology Section.

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Mycology section

Research on the fungi was well-represented at the recent annual meeting of CBA at the University of Saskatchewan in Saskatoon. There were two oral paper sessions in mycology and a number of posters on fungi as well. Dr. Michael Shaw delivered the Luella K. Weresub Memorial Lecture entitled "Fungi: The Good, the Bad and the Ugly". He did not illustrate the ugly but of course, we know why. Who could find a fungus that is "ugly"?

There were 14 members present for a rousing mycology section meeting chaired by Shannon Berch on behalf of Melanie Jones. It was agreed that the Mycology Section needs more publicity through the Bulletin and "The Web". Randy Currah pointed out that The Weresub Award needs more applicants. This year Mr. Sean Abbott from the University of Alberta received the Weresub award. Activities by the Mycology Section for the coming year will include the publication in the Bulletin of an updated list of Mycologists in Canada and their research expertise and a list of Canadian graduate students working with

the fungi. The Mycological Society of America (MSA) will be meeting in St. Louis, Missouri at the International Botanical Congress (IBC) with CBA and the Botanical Society of America. We decided not to organize a Weresub Lecture in St. Louis in 1999. Several mycology symposia have been arranged through MSA. Dr. Linda Kohn at the Erindale Campus of the University of Toronto is our MSA contact. A local mycologist will be invited to give the Weresub lecture at CBA - CSPP 2000 in London, Ontario. Since we are meeting jointly with plant physiologists, we thought an eco-physiological symposium on mycorrhizal functioning might be appropriate.

James Traquair, Mycology Section Chair.

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Systematics & Phytogeography Section

Minutes from the Systematics & Phytogeography section, 1998 CBA Annual Meeting, University of Saskatchewan, 29 June 1998.
Present: James Phipps, Gerry Allen, Jerry Chmielewski, Luc Brouillet, C.C. Chinnappa, Sylvia Taylor, John McNeill, Keith Winterhalder, Vernon Harms, Julie Hrapko.
Chair: John McNeill (in the absence of William Crins).
Secretary: Sylvia Taylor (in the absence of Laurie Consaul).

1. Porsild Award

There was much discussion regarding the difficulty of getting nominations for the Porsild Award, which has never been presented. It was noted that few academic positons have been filled by systematists and there are few graduate students. It was suggested that the CBA Board of Directors prepare a simple 1-page document regarding all the section prizes for students. This is to be used as a publicity statement, which could be sent to the following, plus any other possible suitable sites:
a) All relevant departments at all universities and university colleges in Canada;
b) Put on the web site;
c)Published in every issue of the CBA Bulletin;
d)Submitted to Bot. Soc. America for publication in their journal.

In addition, it was suggested that all members of CBA be encouraged to submit potential nominations for the awards to the relevant section chairs. The new Chairperson and Secretary were requested to update and maintain the list of Canadian systematists as an additional source of information.

2. Canadian Museum of Nature

Luc Brouillet reported that the Canadian Museum of Nature is interested in making new contact with the scientific community. A representative will address the CBA AGM on June 30, 1998. Luc felt that S&P and CBA should develop closer ties with the Museum and try to improve the situation of the constant circle of Ottawa advisors giving advice to Ottawa groups. At the moment they want a policy for maintaining the collections, and want a representative from CBA to be nominated to the collections committee. Bernard Baum has already been appointed as a research advisor to the Museum, so steps in the right direction may be being made.

It was recommended that members of S&P take a close look at a Museum report that will be available at the CBA AGM. They should contact the new Chairperson of the section with any concerns or comments. These will then be brought to the attention of the Past-President of CBA as a matter of Science Policy.

3. International Botanical Congress

Luc Brouillet reported that he will be involved in one FNA-related Systematics Symposium at the IBC in St. Louis. John McNeill reported that he understands that the program is fairly heavily weighted towards Evolution and Systematics, and the organizers may have to encourage other disciplines. The symposia are settled but workshops may be developed to cover these other areas.

4. Nominations - Chairperson and Secretary

a) Chairperson; Luc Brouillet was nominated by Jerry Chmielewski; seconded C.C. Chinnappa. Elected unanimously.
b) Co-Secretaries: Sylvia Taylor volunteered to take Minutes at the AGM and to prepare reports. Gerry Allen volunteered to deal with e-mail matters such as the Systematists List.

5. Cinq-Mars Judges

One judge required for posters at St. Louis, 1998: Sylvia Taylor, John McNeill alternate. John McNeill said that student members of CBA must be reminded that applications for poster submissions for St. Louis have a much earlier deadline than usual.

6. Conservation Committee

Keith Winterhalder reminded everyone that the Conservation Committee would meet at 4:30 PM.

7. CBA/ABC Web Site

The site includes a page for each section, and these are presently empty apart from the title. Luc Brouillet, Sylvia Taylor and Gerry Allen will put together information and send it to Jerry Chmielewski who is in charge of this part of the web site. Information on the Porsild Award will be included, even though it is also mentioned in the main site.

Sylvia Taylor.

Conservation Committee

As newly appointed chair of the conservation committee, let me invite you to participate and become involved in botanical conservation throughout Canada. At the annual meeting this past summer, attendees decided to change the format of the conservation committee to promote involvement at a local grass roots level. We would like to see about 3 or 4 conservation representatives from each province/region. They would look out for local issues that would benefit from support from the CBA/ABC. For example, we already acted on one issue: Creditview wetland is a botanically important wetland that is in threat of being drained and developed. There is already a local residents group that is actively pursuing its protection. Dianne Fahselt, who became aware of the issue, consulted with experienced and knowledgeable ecologists who have intensively studied this wetland and others, and on the basis of their expert input submitted a letter expressing a position that the CBA might support. I edited and signed the letter, and sent it on to CBA/ABC president Denis Barabé who also edited and signed the letter. I faxed the letter to the Mayor of Mississauga, with copies going to the local activists, a reporter and other council members.

Do you know of any issues that would benefit from our support? Do you know of any people who are connected to botanical conservation in your region that would be great watchdogs but who are not members of the CBA/ABC? They would also be welcome to participate. The idea would be that the person who feels strongly about a conservation issue would raise the issue as a candidate for CBA/ABC support. The regional CBA/ABC head representative and perhaps me, the chair, would investigate and verify the need and benefit for a letter from CBA/ABC. Along with the watchdog, each region's committee would be involved in formulating a response, and would base that response on the best scientific data available. The committee may also recommend that data be collected to better assess the proper action to take.

In addition to responding to problems that arise, we should also consider topics for position papers. The formulation of position papers is a proactive measure on potential topics of controversy. For example, we currently have a position paper regarding "Transplantation as a means of preservation". The basic tenet of this document is that transplantation of rare species from land that is about to be developed is not an effective means of conserving that species. Position papers obviate the need for lengthy discussion when not much time is available for determining what should be the best response.

I look forward to hearing from you with your suggestions regarding who could be involved and what issues are important to you!

Pam Krannitz, Research Scientist, Environment Canada.

Projet de maîtrise / Masters degree project

Projet(s) de maîtrise
Biologie, écologie et production de la sphaigne
(à compter de janvier ou mai 1999)

Nous sommes à la recherche d'étudiant(e)s intéressé(e)s à faire des études supérieures dans le cadre d'un projet de partenariat entre l'Université Laval (Département de Phytologie, FSAA), l'Université de Waterloo (Wetlands Research Centre) et l'industrie.

La sphaigne, bryophyte qui domine et caractérise les tourbières des régions boréales, est reconnue pour sa remarquable capacité à retenir et emmagasiner l'eau. Depuis quelques années, une compagnie canadienne fabrique un carton absorbant fait à base de sphaigne. Ce projet vise à déterminer s'il est possible de cultiver la sphaigne sur une base renouvelable pour la production de ce carton.

Sujets d'études potentiels:

-Étude des facteurs influencant le taux de production des sphaignes

-Impact et contrôle des pathogènes

-Évaluation de différents modes d'irrigation et de couverts utilisés pour hâter l'établissement des sphaignes

Financement ou complément de bourse offert

Tout(e) candidat(e) intéressé(e), possédant ou non une bourse est priée de communiquer avec :

Line Rochefort (professeure spécialisée en écologie végétale) ou **Suzanne Campeau** (professionnelle de recherche)
Département de Phytologie,
Faculté des Sciences de l'Agriculture et de l'Alimentation
Université Laval, Sainte-Foy, QC G1K 7P4
Line.Rochefort@plg.ulaval.ca
tél : (418) 656-2131 poste 5052; fax : (418) 656-7856.

Working on Roots? We'd Like to Know!

We'd like to hear from anyone whose research involves plant roots. We are assembling a listing of root researchers in Canada for information purposes (who are we? what are our interests?), with a view to promoting the exchange of information informally and formally (perhaps via symposia at national/regional meetings), encouraging research collaboration, and perhaps developing ways to publicize the nature and importance of our work. The completed directory will be circulated to all interested individuals; general access will be provided via the internet.

If you would like to be included, please send either one of us a message (e-mail or post) including your name, position, address, and a short statement of research interests (reference to a recent publication would be helpful). Thank you for your assistance.

Moira Galway, Assistant Professor, Department of Biology, St. Francis Xavier University, P.O. Box 5000, Antigonish, NS B2G 2W5. e-mail: mgalway@stfx.ca

Frederique Guinel, Assistant Professor, Department of Biology, Wilfrid Laurier University,Waterloo, ON N2L 3C5. e-mail: fguinel@mach1.wlu.ca

Poorly Known Economic Plants of Canada. 19. Yarrow, *Achillea millefolium* L.

E. Small and P.M. Catling, *Eastern Cereal and Oilseed Research Centre, Agriculture and Agri-Food Canada, Saunders Bldg., Central Experimental Farm, Ottawa K1A 0C6.*

Common Names: Yarrow, Milfoil. French: achillée millefeuille, herbe à dinde. (The name "yarrow" is a corruption of an Anglo-Saxon name. "Yarrow" refers chiefly to *A. millefolium*, but is also sometimes used for related species. The name milfoil, which refers to the finely dissected foliage, is a corruption of *millefolium*, meaning thousand-leaved, originally from Latin and Greek.)

The generic name *Achillea* is usually interpreted as a reference to Achilles, the legendary Greek hero of the Trojan War (about 1200 B.C.) as reported in Homer's epic poem, Iliad. He is said to have used the foliage of yarrow to stanch the flow of blood from wounded fellow soldiers. Achilles, the mortal son of Thetis, was dipped by his heel into a sacred fire to burn away his mortality. Unfortunately his heel, not bathed in the fire, remained vulnerable to injury. Subsequently he was struck in the heel by an arrow, which killed him, thereafter providing a metaphor for an area of weakness in something that is otherwise invulnerable. A less romantic interpretation of the genus name is that it commemorates a Greek doctor named Achilles who recorded the medicinal uses of the plant.

Achillea millefolium occurs mostly in temperate and boreal zones of the Northern Hemisphere, and to a lesser extent in more southern regions. It is a very variable and widespread species, for which a satisfactory infraspecific classification is not available. Diploid, tetraploid, and hexaploid plants (respectively with 18, 36, and 54 chromosomes) are known. In Canada the hexaploids occur mainly in the East, and appear to represent weedy plants introduced from Europe. Indigenous Canadian *A. millefolium* is often segregated into several species. Two such segregates, *A. lanulosa* Nutt. (= *A. millefolium* var. *lanulosa* (Nutt.) Piper) and *A. borealis* Bong. (= *A. millefolium* var. *borealis* (Bong.) Farw.), occur mostly as tetraploid (also as hexaploid) plants across Canada; unlike the former, the latter variant is mostly absent from the southern prairies and southern Ontario and Quebec, while more frequent in the north, in alpine regions, and along both seacoasts. Neither chromosome number nor morphological features are consistently helpful in distinguishing the major indigenous Canadian variants, which are best simply assigned to *A. millefolium sensu lato*. As the venerable Harvard botanist M.L. Fernald put it a half century ago, yarrow is still "sadly in need of a well-balanced study, its intricacies not properly understood." One of the more interesting variants that recent studies have supported as distinct is ssp. *megacephala* (Raup) Argus. It is one of several taxa (including *Stellaria arenicola*, *Deschampsia mackenzieana* and *Salix salicicola* that are endemic to the Athabasca sand dunes on the south shore of Lake





Athabasca in northwestern Saskatchewan. The distinctive taxa occurring in this region are believed to have evolved recently, during the holocene.

Yarrow occurs in a wide variety of natural habitats, such as tundra meadows, saline flats, salt marshes, sand dunes, edges of woods, rocky outcrops, and cliffs. This species appears to be Canada's second most common weed (although not really noxious), surpassed only by the dandelion. It is often found as a weed of open areas, such as pastures, meadows, lawns, roadsides, and waste ground. It does not tolerate shade well, but grows very well on poor soils. Yarrow may occur beside lake shores and stream edges, but is quite drought-tolerant. Its ability to withstand dry conditions is due in part to a deep, extensive root system. Yarrow has been a favorite subject of investigation of students of genecology, who have demonstrated numerous ecotypes, highly specialized to existence in particular habitats. For example genetically-short plants occur in some frequently cut lawns and classic studies of climatic races in plants were based on *Achillea*.

Yarrow plants are strongly aromatic, long-lived perennial herbs, 10-100 (typically 30-60) cm tall, with highly dissected leaves to 15 cm long, and flowers in a flat-topped corymb. As with most members of the Aster family, what appears to be a single, small flower about 5 mm across, is actually a flower head, often including outer ray flowers and inner disc flowers. The blooms are usually white, with pink, magenta, and red occasionally found. The flowers, appearing in July and August, are self-incompatible and pollinated by insects. The "seeds", actually small, dry indehiscent fruits about 2 mm long, mature in August and September, and are probably (like many other plants apparently lacking special dispersal adaptations) disseminated by adhesion to wet animals, by blowing over snow surfaces, and in other ways. They are not equipped with the parachute-like pappus that enables effective wind dispersal in many members of the Aster family. Yarrow overwinters in cold climates as a dormant rosette. The plant spreads from a much-branched rhizome system.

Yarrow is a very popular ornamental plant, and there are numerous attractive cultivars (many of which are hybrids) with deeply colored flowers. In some areas, it is recommended as a groundcover to control soil erosion on slopes and hillsides. Its capacity to spread by rhizomes makes it valuable for this application. It is ironic that yarrow is also recommended as a low-maintenance, infrequently mowed lawn, as vigorous attempts are often made to eliminate it from lawns, where low-growing ecotypes are capable of blooming under the lawn mower blades. Yarrow is widely used for dried and fresh flower arrangements, valued for the feathery, fernlike foliage and pungency.

Despite its bitter taste, some domestic livestock (notably sheep) and deer consume yarrow. The French name herbe à dinde reflects previous use of the plant as chicken feed. Cows grazing on yarrow may produce dairy products with an undesirable flavor, but cattle seem to avoid it. Young yarrow leaves are sometimes consumed (cooked or fresh) in salads (large amounts are said to turn urine brown). The leaves and flowers are used to flavour liqueurs, and were once substituted for hops to flavor beer.

A reported case of the death of a calf following ingestion of a single plant is often cited, but this is possibly an incorrect interpretation, since the plant does appear to be consumed regularly by grazing animals. "Yarrow dermatitis" involves itching and inflammatory changes in the skin with the formation of vesicles. This is sometimes accompanied by development of photosensitivity (i.e. the condition is triggered by sunlight). Those with allergies to the Asteraceae (Compositae) family, such

as susceptibility to ragweed hayfever, should be on guard for allergic reactions to any type of exposure to yarrow - even simply drinking of a herbal tea. Except for occasional cases of hayfever and dermatitis, yarrow is generally considered non-toxic. Nevertheless, as with most medicinal herbs, large doses and prolonged use are inadvisable and can be dangerous.Yarrow should be avoided during pregnancy, because it may stimulate the uterus. High doses may interfere with anticoagulant and hypo- or hypertensive therapies. Caution has also been recommended for epileptic patients.

In addition to food and ornamental usage, yarrow has been employed as a tobacco, snuff, and hair rinse reputed to brighten blonde hair. Yarrow also has insecticidal constituents, and this is consistent with its reputation as an insect-repelling garden plant that dissuades visits from some ants, flies, and beetles. Yarrow was once used in Ireland for love divination: young girls would cultivate a yarrow plant and subsequently place it beneath their pillow so that they would dream of their sweetheart. The closest that research has come to supporting this use is the finding that the volatile oil of Yarrow causes a sexual response in male cockroaches. In France and Ireland yarrow is one of the herbs of St. John (John the Baptist, Christian martyr born on June 24), and on St. John's Eve (June 23, time of traditional European midsummer celebration) the Irish hang it in their houses to avert illness.

Unearthed fossil pollen from ancient burial caves has been interpreted as evidence of prehistoric use of the herb. Ancient Chinese sages are said to have selected yarrow stalks at random as a means of consulting the oracles of the I Ching (Book of Changes; a compendium alleged to contain the wisdom of thousands of years of human history).

Yarrow has been used medicinally for millenia in both North America and Europe. Its reputation for healing wounds led to such common names as stanchweed, bloodwort, soldier's woundwort, nosebleed, and carpenter's grass. Principal traditional uses besides stopping the flow of blood from wounds included treatment of fevers, the common cold, diarrhea, dysentery, and hypertension. Yarrow has also been used in folk medicine as a cure for toothache, earache, and diseases of the lungs, bladder and kidneys. Today, it is employed internally (as a tea, tincture or pill) to treat gastrointestinal complaints (inflammation, diarrhea, flatulence, cramps), and as a bitter aromatic (to stimulate appetite); and externally in poultices, lotions and bath preparations. Yarrow is present in more than 20 pharmaceutical products marketed in Canada, and is very popular in commercial European herbal remedies.

Well over a hundred chemicals have been characterized in yarrow. Of greatest interest are the sesquiterpene lactones, present in a volatile oil. A metabolic derivative of these, azulene, was once thought to be the constituent primarily responsible for the antiinflammatory and antipruritic properties of yarrow; however, the medicinal value could be due to chamazulene, the sesquiterpene lactones, or other constituents such as tannins, menthol, camphor, sterols and tripterpenes. The antispasmodic activity of yarrow could be due to its flavonoids. The alkaloid achilleine is an active hemostatic agent, and may explain the traditional uses of checking bleeding of wounds and sores. It has been hypothesized that the salicylic acid derivatives eugenol, menthol, or similar compounds may produce local analgesia and reduction of fever. The presence of thujone, a known abortifacient, might explain some traditional uses of yarrow associated with the female reproductive system (however, thujone is usually present only in limited amounts). There is evidence of taxonomic and geographical differences in content of these chemicals, but documentation with herbarium vouchers has been poor, and considerable additional analysis is needed. The important constituent chamazule appears to be present in tetraploid plants only. Some have claimed that American plants are more effective medicinally than European plants.

Most commercial supplies of medicinal yarrow are obtained from Europe. Yarrow is considered to be a minor essential oil crop, but nevertheless the annual world production of oil is substantial -about 800 tonnes, estimated to have a value of (U.S. $) 88 million. Features of yarrow make it easy to adapt as a crop. Germination percentages are generally high, and the seeds only need to be scattered on the soil surface. Seeds sown in the autumn germinate in spring, produce sturdy rosettes the first year and reach mature flowering size in the second year. Since they are perennial, the plants grow back after harvesting of above-ground parts. An additional potential benefit is the production of nectar by some genotypes sufficient for honey production. With its capability for regional adaptation and ability to grow in poor soils of various moisture regimes, Yarrow is a relatively undemanding crop, that can be grown throughout much of Canada. Effective selection of cultivars will require careful attention to genotypic variation, especially with regard to chemical composition.

The following publications have not yet been spoken for. If you are willing to review one of these books please contact the editor at the address indicated at the beginning of the bulletin (page 54). On request we will send you the book you wish to review.

Plant Family Album, an interactive botanical review Vol. 1 The Rosidae (CD ROM)
by M.J. Waterway and H.C. Rimmer
McGill University, 1997

Pollen Biotechnology for Crop Production and Improvement
by K.R. Shivana and V.K. Sawhney
Cambridge University Press, 1997

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Plants life histories - Ecology, phylogeny and evolution

By J.Silvertown, M. Franco and J.L. Harper
Cambridge University Press
New York, 1997
(US $ 29,95 paperback)

This book represents the contribution of several plant ecologists from around the world under the supervision of three editors Silvertown, Franco and Harper. The work originates from the conviction that several issues regarding phylogeny and life histories traits needed to be re-examined in the light of better understanding of evolutionary and ecological theories. This book represents an excellent review of the literature integrating phylogenetic perspectives into ecological and evolutionary theories. Phylogenetic connections between taxa can influence results and interpretations of studies in ecology or evolution. This book elaborates on the importance of the relationships between plant life histories and phylogeny. The main question is how to deal with common ancestry to life history traits in ecological and evolutionary studies of different taxa.

The first chapter presents the general hypotheses that should be tested to take into account phylogenetic aspects in ecological and evolutionary studies. Although this first chapter is quite difficult to read and may discourage several people, Silvertown and Dodd efficiently expose the hypotheses that should be tested in such studies in order to develop more solid concepts in plant life histories. Unfortunately, some basic information may be missing for readers not familiar with this topic. Chapter 2 continues on a similar tangent, but looks more precisely at techniques to evaluate phylogenetic relationships. There is some repetition in these first chapters, which could have been avoided. On a practical side, it would have been interesting to have a more elaborate explanation of TreeBase, a tool used to increase access to phylogenetic data analysis. Some aspects related to chapters 1 and 2 are employed in chapter 3 with the comparison of native and alien floras in the British Isles. This chapter helps make a link between the theory and the practice.

The remainder of the book is divided into four parts, each examining an aspect of life history of plants. The first section looks at reproductive traits as they are related to fitness. In chapter 4, written by Barrett, Harder and Worley, the pace of the book changes with the integration of ecological and evolutionary perspectives into studies in life history traits. Schoen, Morgan and Bataillon (chapter 5) make a transition from reproductive ecology, already discussed by Barrett et al., to reproductive evolutionary ecology. Updated data in molecular genetic variation are nicely integrated into the evolutionary theory used in reproduction ecology. Hamrick and Godt, in chapter 6, continue to elaborate on genetic variation and life history traits. This chapter appears to be a follow up from other manuscripts published by these authors. Although new data have been added to this chapter, no new interpretation or analytical techniques are used to go further with such data.

The next part of the book deals with seeds, from ecological to evolutionary significance. Dormancy (chapter 7) and dispersal (chapter 8) are the two important aspects of seed ecology examined in regard to seed size. Westoby, Leishman and Lord (chapter 8) challenge the others in this book about phylogenetic analysis and the concern of pseudo-replication. Interestingly this aspect is not really examined until this chapter. The authors give a new flavour to the book making data analyses and interpretations more challenging. In chapter 9, Venable attempts to bring together seed ecology, mainly seed size, and other life history traits. This chapter remains highly theoretical and although data may not be currently available, insights of what can be expected should have been given.

From sexual reproduction, the next part of the book deals with clonal propagation and vegetative growth. Van Groenendael et al. gives a review of comparative studies of clonal plants. This chapter is an extension of the review written by Mogie and Hutchings but, in the present analysis, the authors use 2300 plant species of central Europe. The chapter is very interesting but a few editorial changes should be prescribed to maintain the quality of the book. In chapter 11, Franco and Silvertown successfully brings together several of the aspects discussed in the previous chapters. Probably because the authors of this chapter are also editors of the book, this chapter efficiently examined how demographic growth relates to life histories, using a phylogenetic approach. They show that life history variation in plants may be quite complex but may follow the theoretical expectations found in several other organisms. The

authors suggest that future comparative studies are necessary to better understand covariation of life history traits. The last chapter of this part, written by Sibly, is a review of the theory on life history evolution in heterogeneous environments. This chapter should have been an important one to integrate the previous theories but unfortunately some parts are not well delivered. Several editorial errors lead the reader to believe that this chapter was written at the last minute. Equations especially should be verified for errors before publication.

Finally the last part of the book looks at how interactions such as insect-plant (chapter 13), symbiosis (chapter 14) and competition (chapter 15) may influence ecological and evolutionary aspects of plant life histories. In all chapters, what is apparent is that we cannot examine correlation between traits in a phylogenetic perspective without considering the interactions that other organisms have with plants. This aspect is very well exposed in the last chapter where Goldberg discusses the importance of the type of plants in competition and trait correlations. This last chapter is excellent in bringing the link between the theory and the application of this knowledge in the view of anthropogenic change of the environment.

In summary, this book can be looked at as a very important review of how different approaches in ecology, evolution and phylogeny can be integrated into life histories to better understand how plants can survive in changing environment. Although some chapters are tedious in terms of reading or understanding, this book can be recommended for researchers comparing different taxa from an ecological or evolutionary view. The only suggestions that I would have proposed to the editors would be to be careful about editorial errors in some chapters and a change in the title. Why not "Phylogeny and life histories: Plant ecology and evolution"? It would reflect more the importance of phylogeny in this book that what the title presumes.

Liette Vasseur, Department of Biology and Environmental Studies Program, Saint-Mary's University, Halifax.

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Molecular Embryology of Flowering Plants

by V. Raghavan
Cambridge University Press
New York, 1997
(US $ 150,00)

Plant embryology, like other branches of developmental biology is, and has been for the last 20 years, in the midst of an exciting revolution in which cellular and organismal observations and interpretations are being infused with genetic and molecular insights. The revolution is based on fundamentally new information at levels of organization previously unavailable and by increasingly sensitive investigative technologies. These changes raise difficult questions for authors and editors attempting to provide up-to-date texts. Has the 'revolution' proceeded far enough to warrant a whole new presentation? Just how much peripheral and traditional discussion should one include to make a complete story? Is there enough new information to warrant a text devoted to this new insight? How much of the new interpretation should be represented in the book's title?

Dr. Raghavan, a long-time contributor to developmental botany and author of earlier books on plant embryology, made some deliberate choices to these questions in the preparation of this work. In addition to essential sections (44%) on (1) Zygotic embryogenesis (Four chapters: (a) Developmental biology of the endosperm, (b) Embryogenesis and physiology of growth of embryos (c) Genetic and molecular analysis of embryogenesis and (d) Storage protein synthesis in developing embryos) and (2) Adventive embryogenesis (Two chapters: (a) Somatic embryogenesis and (b) Embryogenic development of pollen grains) he has included discussions of peripheral areas (53%) dealing with flower structure and function: (1) Gametogenesis (five chapters) and (2) Pollination (four chapters) . The remainder (3%) includes a brief introduction. His method, throughout, is to review, sometimes in considerable detail, the earlier non-molecular insights and developmental interpretations and then complete each section with a discussion of the molecular and genetic contributions. These sections are detailed and current.

Not surprisingly then, this is a large book with 531 pages (25x 17cm) of two-column text. It presents a current interpretation of many topics in developmental botany, with enough details of the original research to obviate the necessity of going to the original literature in many cases. If further details are required, appropriate references (<4800) are available. The text is well written, free of typographical and spelling errors and appropriately illustrated with line drawings and black and white half-tones. In fact, this is a very fine presentation of many features of plant reproductive development and embryology. It is about the details of development as uncovered by observation and experiment with little space given to the presentation of concepts and unifying principles.

The book's title, however, is misleading. The amount of information presently available on the "molecular and genetic" aspects of plant embryology is not large and could be nicely handled in a much smaller edition. The level of traditional information on plant embryology presented in this text plus the amount of space given to the discussion of peripheral topics of plant flower development swamps the material that one might expect with the present title.

Despite this reservation, however, Dr. Raghavan is to be congratulated for the preparation of very useful reference

work and a rich source of information in plant development. It should become an indispensable and well-worn reference source in offices and labs of developmental botanists throughout the world.

Richard Greyson, Vancouver.

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European Vegetation Survey: Case Studies

Edited by L. Mucina, S. Pignati, J. S. Rodwell, J.H.J. Schaminée and M. Chytry (Special Features in Vegetation Science 14) Opulus Press, Uppsala, 1997 (300 SEK)

(English translation follows the French text)

Il s'agit d'une réimpression de 10 contributions publiées dans la revue Folia Geobotanica & Phytotaxonomica, présentées, en mars 1996, au 5e atelier de l'Association internationale de la science de la végétation. Ces ateliers, organisés depuis 1992, réunissent à chaque printemps, à Rome, un groupe de phytosociologues dans le but d'encourager des études synthétiques de la végétation d'Europe et la révision ainsi que l'unification des concepts syntaxonomiques et nomenclaturaux.

Les contributions réunies dans ce livre traitent de la classification phytosociologique des communautés végétales telle que préconisée par l'école de Braun-Blanquet, appellée aussi sigmatiste du nom de la Sigma (Station internationale de géobotanique méditerrannéenne et alpine), ou de Zürich-Montpellier. La plupart présentent des synopsis des syntaxa supérieurs (classe, ordre, alliance) de la végétation européenne. Selon Rodwell *et al.*, qui ont écrit l'introduction de ce volume, l'intérêt de telles études réside essentiellement dans le fait qu'elles fournissent le cadre nécessaire à la multitude de travaux plus détaillés qui foisonnent dans la littérature.

Dans la première contribution, Mucina présente un catalogue des classes de la végétation de l'Europe, en établissant leurs noms corrects selon les principes du Code de la nomenclature phytosociologique (Barkman *et al.*, 1986), leurs synonymes et la liste des espèces qui les caractérisent. Le groupe de travail sur la classification de la végétation européenne a adopté ce catalogue comme cadre d'élaboration du système des alliances. Une des premières tentatives en ce sens est présentée dans ce livre par Valachovic *et al.* qui ont préparé un essai de classification des ordres et alliances de la classe *Thlaspietea rotundifolii.*

Un autre groupe de contributions provient des pays européens où les recherches phytosociologiques sont moins nombreuses ou entreprises au moyen de méthodes différentes, comme le Royaume-Uni, l'ancienne URSS, la Scandinavie et la Grèce. Ainsi, Diekmann traite des problèmes de classification de certaines alliances décrites en Suède, alors que Dimopoulos *et al.* présentent une étude de la végétation des rochers des montagnes grecques.

Enfin, le troisième groupe de travaux illustre les problèmes auxquels sont confrontés les pays dotés d'une longue tradition phytosociologique et qui ont accumulé de grandes quantités de données disparates nécessitant un effort de révision, d'unification et de modernisation en conformité avec les concepts syntaxonomiques et nomenclaturaux actuels. Des exemples de ce type de travaux sont présentés par Carni qui traite de la végétation des bordures forestières de la Slovénie, par Chytry sur les chênaies thermophiles de la République tchèque, par Punz & Mucina sur la végétation des sols métallifères des Alpes orientales, par Loidi *et al.* sur les landes du Nord de l'Espagne et par Grebner sur les pelouses calcaires du Nord-Est des Alpes.

L'intérêt de ce livre, pour les lecteurs canadiens, réside dans le fait que plusieurs classes décrites s'étendent également en Amérique du Nord. Il s'agit surtout de la végétation specialisée comme la végétation aquatique (*Lemnetea, Ruppietea, Zosteretea*), la végétation des tourbières (*Oxycocco-Sphagnetea*), la végétation côtière (*Cakiletea, Ammophiletea*), la végétation arctique et alpine (*Loiseleurio-Vaccinietea, Salicetea herbaceae, Juncetea trifidi*), mais aussi de la végétation synanthropique (*Epilobietea angustifolii*), et celle des forêts boréales (*Vaccinio-Piceetea*). Plus concrètement, les nombreux travaux phytosociologiques réalisés au Québec, mériteraient d'être synthétisée et rendus conformes aux prescriptions du Code de nomenclature phytosociologique, comme cela a été dèjà fait pour les groupements forestiers et périforestiers des Cantons de l'Est par Ansseau & Grandtner (1986, 1988). La similitude des problèmes est d'autant plus garande que la plupart des études phytosociologiques québecoises ont été réalisés avec la méthode de Braun-Blanquet. Dans ce sens, ce livre peut s'avérer fort utile. Son prix de 300 couronnes suédoises et toutefois prohibitif.

Miroslav M. Grandtner, Département des sciences du bois et de la forêt, Université Laval, Québec.

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This book is a reprinting of 10 papers (first published in Folia Geobotanica & Phytotaxonomica) that were presented in March 1996 at the 5th annual workshop of the International Association of Vegetation Science. These meetings have been organized annually in Rome since 1992 in order to bring together phytosociologists in an effort to encourage a synthesis of studies of the vegetation in Europe as well as the revision and harmonisation of concepts in syntaxonomy and nomenclature .

The papers brought together in this book treat the phytosociolgical classification of vegetation communites as under-

stood by the Braun Blanquet (Zurich-Montpellier) school. Most of the papers present a synopsis of higher syntaxa (classes, orders, alliances) in the classification of vegetation in Europe. According to Rodwell *et al.*, who wrote the introduction to this work, the main interest of such contributions lies in the fact that they provide necessary structure for the multitude of more detailed studies that abound in the literature.

In the first paper, Mucina presents a repertoire of classes of vegetation in Europe, indicating the correct names according to the nomenclatural Code for phytosociology (Barkman *et al.* 1986). A list of synonyms and the list of characteristic species is also given. The working committee on the classification of European vegetation has adopted this repertoire as the framework for establishing a system of alliances. One of the first attempts in this regard is presented in the book by Valachovic et al. who make a tentative classification of the orders and alliances of the class *Thlaspieta rotundifolii*.

Another group of papers comes from European countries such as Great Britain, the former Soviet Union, Scandinavia and Greece where there is less research going on in phytosociology, or where different methods have been employed. Diekman, for instance, talks of the problems of classification of alliances in Sweden. Dimopoulos et al. present a study of the vegetation of rock barrens in Greece.

A third group consists of studies from countries with a long history of phytosociologcal research. Here the great quantity of disparate infomation that has accumulated is in need of revsion and harmonisation to bring it up to date with current nomenclature and syntaxonomy. Examples of this were presented by Carni who studied the vegetation of forest edges in Slovenia, by Chytry on the thermophile Oak forests of the Czek Republic, by Punz & Mucina on the vegetation on metaliferous soils of the Eastern Alpes, by Loidi *et al.* on the barrens of northern Spain, and by Grebner on the calcareous turf-meadows of the Northeastern Alpes

Of particular interest to Canadian readers are the classes of vegetation that also pertain to North America. This concerns mostly special vegetation types such as aquatic vegetation (*Lemnetea*, *Ruppietea*, *Zosteretea*), bogs (*Oxycocco-Sphagnetea*), coastal vegetation (*Cakiletea*, *Ammophiletea*), arctic-alpine vegetation (*Loiseleurio-Vaccinietea*, *Salicetea herbaceae*, *Juncetea trifidi*), but also synanthropic vegetation (*Epilobietea angustifolii*), and boreal forests (*Vaccinio-Piceetea*). As for the situation in Québec, the numerous studies in phytosociology that have been done here should be synthesized and brought into accordance with the nomenclature of the Code as has been done with the forest vegetation of the Eastern Townships by Ansseau & Grandtner (1986, 1988). The similiarity with problems in Europe is quite obvious in view of the fact that most of the phytosociological work done in Québec has been done using the Braun-Blanquet method. In this sense, this book could be very useful. The cost of 300 Swedish Crowns is, however, quite prohibative.

Translation, **Stuart Hay,** IRBV, Universtité de Montréal

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Plant Functional Types:
their relevance to ecosystems properties and global change

(International Geosphere-Biosphere Programme Book Series 1)

by T.M. Smith,
H.H. Shugart & F.I. Woodward
Cambridge University Press
New York, 1997
[US $ 80,00 (hardback)
US $ 44,95 (paperback)]

It is human nature to classify. Linnaeus, for example, provided us with the highly efficient binomial system. Using this universally accepted system of organisation we know that there are approximately 260,000 plant species on Earth. Yet, species are going extinct, mainly due to human-induced habitat destruction, apparently at a higher rate than at any time in the geological record. We are also not sure what affect global climate change will have on future plant distribution patters, and resulting ecosystem properties. Therefore, 260,000 becomes a prohibitive number when it comes to investigating the environmental and biotic effects facing each and every plant. We do not have the time or money to conduct demographic, autecological studies on every plant species. The challenge facing ecologists then is to simplify the problem by effectively grouping plants into broad categories (functional types), which would allow for the development of predictive models. This book is therefore a much needed compilation, with the objective of introducing the concept of functional types and illustrating a number of different approaches.

Plant Functional Types is 369 pages long, includes eighteen chapters and is broken down into five parts: (1) history; (2) theory; (3) local application; (4) global application; and, (5) consequences and limitations. The wide variety of opinions expressed in this book reflects some of the confusion and disagreement surrounding the issue of plant functional types. Some researchers (e.g. Shugart, Ch2; Woodward and Kelly, Ch3; Walker, Ch5; Scholes et al., Ch13) advocate a top-down, environment-driven approach to functional grouping. The sort of information required is the range of plants along environmental gradients. Other researchers (e.g. Gitay and Noble, Ch1; Westoby and Leishman, Ch6; Grime et al. Ch7; Bond, Ch9) pre-

fer a bottom-up, plant-trait driven approach. Some are very sophisticated (e.g. Grime et al.), but can also be time-consuming.

The primary objective, or basic utility, of developing functional groups is prediction. Can we predict and model the outcome of an environmental event (e.g. drought) on a plant community using functional types? This book gives us several good examples which indicate that this is possible in some environments at both the small scale (e.g. Grime et al., Scholes et al.) and the large scale (e.g. Cramer, Leemans)

A general consensus among the contributors was that the final functional grouping must depend on the question. For example, Bond (Ch9), working in the Cape fynbos, noted that despite fynbos having the highest diversity per unit area in the world (Table 9.1), the species could be grouped within the same functional type. In other words, there is a lot of redundancy. A severe loss in biodiversity might therefore have little effect on the representation of functional types in the landscape, and possibly little effect on ecosystem function. Mooney (Ch17) discusses the possible implications of loss of biodiversity to ecosystem function. A similar example is shown by Lauenroth *et al.* (Ch12). In this case, although two graminoids in semi-arid environments could be grouped into the same functional type, their differences are large enough to cause ecosystem function to differ significantly depending on relative dominance. Smith (Ch16) presents models which simulate similar limitations of aggregating species into functional categories.

Overall, this is an important book for all plant ecologists, whether student, researcher, professor or land manager. It is difficult for such a wide ranging collection of papers from researchers around the world to maintain a balanced and thorough coverage. Some vegetation types (e.g. semi-arid grasslands) were much better represented than others (e.g. wetlands). However, I recommend it for the simple reason that it pulls together much of the current thinking on plant functional types (a somewhat neglected field in the recent past). Even though I disagreed with some of the methods and ideas presented, this book presents the breadth of the field and the associated problems. The disparate views highlight future work needed. In particular, it will be necessary to compare the spectrum of functional types in local floras in various parts of the world. I would also like to see a universal framework from which we can develop functional types, along the lines of Linnaeus' binomial system. The reward is potentially enormous. As Walker (Ch5) states "a complete, global analysis of plant functional types would be analogous to the periodic classification of the elements".

Lauchlan Fraser, Department of Biology, University of Ottawa.

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Indicator Plant Species in Canadian Forests
Plantes indicatrices des forêts canadiennes

by G.S. Ringius and R.A. Sims
Natural Resources Canada,
Canadian Forest Service
(Cdn $ 19,95; hardback $ 39,95)

This book, simultaneously published in English and in French, was produced under supervision of the steering committee of the Ecological Land Classification of the Canadian Forest Service. Funding for this effort was provided by the federal Green Plan (le Plan vert fédéral). It is great to see a tangible product of this plan available to the public, as its funds were mainly allocated to the projects of federal government scientists. The English version of this book is distributed by UBC Press, whereas the French version is distributed by Les Presses de l'Université Laval.

The concept of indicator plants is not new, but the authors begin their introduction with the statement that "Forest resource managers in Canada are just beginning to recognize the value of many forest floor and understory plant species for assessing forest site quality". The rationale for using indicator plant species is that direct analyses of site quality are time consuming and expensive (ex. soil analyses, soil moisture measurements), whereas recording the presence of indicator plant species is relatively easy. Furthermore, an indicator plant species integrates the various factors conducive of site productivity over at least an entire growing season. In this respect the information it yields may often be superior to that of one-time samples, particularly in the case of soil nitrogen and soil moisture. Nevertheless, one hopes that the indicator value of each indicator species has been tested through some of these direct ecological factor measurements, however imperfect some may be. Anecdotal evidence will not suffice if forest management activities, aimed at some future economic gain, are to be directed in part by the use of indicator plant species. Fortunately, the book is based on recent research that has correlated field measured ecological variables to plant species occurrence and abundance.

The English and French versions of this book are small in format (18 cm x 15 cm, 217 pages), which makes them easy to carry around in the field. Each species included in the book is described over two facing pages. The text is divided into several sections, covering the ecology of the species (Indicator Value/Significance to Forest Management; Distribution and Habitat), its botanical description and notes on known cultural or wildlife uses (including edibility or toxicity). The text is clear and informative, and free of superfluous jargon (a glossary defines some basic terms). The line drawing illustrations are excellent, and convey more information than the colour pho-

tographs of most field guides. A Canadian distribution map and an edatopic grid complete the information.

What is an edatopic grid? I first became aware of this descriptive tool in British Columbia, where it originated from the work of Vladimir Krajina and his students. The grid represents combinations of soil moisture regime (on its vertical axis: dry, fresh, moist, wet) and soil nutrient regime (on its horizontal axis: poor, medium, rich). The shaded cells of the grid represent the combinations of factors of which the indicator plant species is supposed to be an indicator. I found that in a vast majority of cases the edatopic grids in this guide corresponded very well with my own cross-Canada field experience. However, proper assessments are difficult for wide ranging species, as climatic factors come into play.

What about the species chosen for this book? A selection of only 80 is described: 38 shrubs (tall shrubs to creeping species), 20 herbs and grasses, 10 ferns and fern allies, 12 mosses and lichens. Although the authors clearly state that their book is not meant to be exhaustive, it is definitely one of its drawbacks. A similar book done for each major forest region of Canada would have been more useful, as more species relevant to one particular region could have been presented. There are 16 species restricted to British Columbia which are of no use to foresters and ecologists in Eastern Canada, and even far more than that which are of no use to foresters and ecologists working on the West Coast. The latter are better served by the «Indicator Plants of Coastal British Columbia» (Klinka et al. 1989; UBC Press). This problem limits the usefulness of these guides for professional forest managers. However, they will be of interest to a wider public interested in forests and plants, as well as for university students enrolled in forestry and ecology courses.

I found at least half a dozen species that were indicators of wet and poor soil conditions, or bog conditions. These conditions are easily identifiable in the field and are not recommended as sites worthy of forest management efforts. A similar argument can be made for dry and poor sites. Fewer species from these extreme conditions, and more from the more desirable conditions for tree growth would have had more appeal for foresters. Again, the inclusion of these species will be of greater interest to a more popular audience.

La version française de ce livre est le fruit d'un excellent travail de traduction. Seul le terme «édaphotopique» m'agace. Pourquoi ne pas avoir traduit directement de l'anglais «edatopic» à «édatopique»? Il s'agit d'un mot inventé de toutes façons. Malgré les chercheurs francophones du Service canadien des forêts qui ont siégé sur le comité qui a supervisé la rédaction de ce livre, il n'y a aucune référence à des travaux de classification écologique des sites provenant du Québec. Pourtant ces travaux ont grandement contribué à notre compréhension des exigences écologiques des plantes forestières. Par exemple, les travaux de Jones *et al.* pour la ceinture d'argile du nord-est de l'Ontario sont cités, mais pas ceux de Bergeron *et al.* dans la même ceinture d'argile en Abitibi. On se retrouve donc ainsi avec une seule moitié de ceinture! C'est dommage.

Malgré ses problèmes, inhérents aux choix initiaux qui ont quidé sa rédaction, ce livre est très bien fait et devrait servir un public général intéressé aux forêts et aux plantes, ainsi que les étudiants universitaires en foresterie et en écologie. On ne peut souhaiter que des volumes semblables soient produits pour des régions forestières plus homogènes, les rendant plus utiles pour les aménagistes professionnels. Ce premier livre est un premier pas dans la bonne voie.

This book is an excellent step in the right direction. Let us hope the work begun will continue, and not wait for another Green Plan.

Daniel Gagnon, Groupe de recherche en écologie forestière interuniversitaire, Université du Québec à Montréal

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Reaching for the Sun: How Plants Work

by J. King
Cambridge University Press
New York 1997
(US $ 16,95 paperback,
US $ 54,95 hardback)

There has long been a need for a readable volume on how plants work, and John King has valiantly produced one for us, instead of spending a summer on the golf course or preparing another specialist paper in botany. As universities continue to retreat from their botany programs, one is reminded of the need for general education of both students and the public about plants. As the frontespiece says "We are totally dependent upon them for food; we cultivate them for our pleasure; and we have used them in vast numbers of ways down the centuries to our advantage." But biology departments such as my neighbours at Carleton University persist in designing departments that convey to students through their faculty composition that oxygen, crops, forests, wetlands, algae and other photosynthetic organisms are irrelevant to the progress of science and well-being of humanity.

In this slim volume of just over 200 pages, King explores the basic issue of how plants grow and develop. Topics include photosynthesis, respiration, nutrition, secondary metabolites, dormancy, and senescence. Each chapter is a generally well-written summary of the field as it relates to plant growth and development. We are given considerable information on the scientific development of plant nutrition, water relations and hormone controls on growth, although I would have enjoyed an even

more liberal serving of history and botany. Writing for a general audience is never easy for those of us trained in the intricacies of scholarly communication, and while King has risen to the challenge, he has occasionally fallen a little short. How to reference a general book is always a challenge; either one proves ones' scientific prowess with endless citations and intimidating footnotes, or one raises the ire of colleagues by presuming to write without acknowledging their high achievements in science. King has bravely taken the latter route, assuming that most general readers really do not care who did the study or where it was published. (How many people who have heard of the Ten Commandments recall who carried them down the mountain?) In a few cases, however, this approach produces frustrations for the professional. For example after several times waxing eloquent on the magnificent insights of Borthwich and Hendricks in the discovery of red/far-red effects on plants, I was irritated to see that neither individual was cited in the references. Nor was I entirely clear why this particular piece of work was so much more brilliant and insightful than other studies, such as those of von Helmont, who, mercifully, is given due credit for his important discovery that plants do not consume soil in their growth.

Of course there are oversights, for this book is certainly focused upon plants as mechanisms. There is little attention given to life cycles and alternation of generations, and virtually none to ecological interactions such as competition, mutualism and predation. Nor is the topic of plant evolution and diversification covered. From my humble perspective as an ecologist, this leads to some significant oversights, for the alternation of generations, plant diversity, and plant-animal mutualisms, are surely such dramatic features of plant life that any introductory series of essays ought to pay some homage to them. King, however, has stuck to the theme of mechanistic approaches to plant growth. In doing so, he has kept to his topic, but in my opinion, may have sacrificed some of his audience and some of the important topics in introductory botany. Further, this approach has forced him to assert rather than demonstrate that plants are important to humanity. Perhaps a colleague will be inspired to write a companion volume on ecology.

The treatment of evolution is, alas, much less than satisfactory. It is, of course, often difficult to give a public lecture or write a popular book that does not imply that organisms have intention. None-the-less, in spite of the difficulty, this is exactly what we must do, if only to deal with the ever-present misinterpretations and caricatures propagated by Creationists. Too often important evolutionary principles are side-stepped in this book. At first I thought that it was simply a problem of writing clearly, but then I began to suspect that even King misunderstands. On the topic of allelopathic compounds he says

"What is doubtful is whether the production of any one of these chemicals is a deliberate strategy developed by a plant specifically for the purpose of preventing competition. The more likely answer is that the chance formation of a compound with toxic properties is perpetuated through succeeding generations because its production gives some advantage to the plant that can form it over the neighbour that cannot (p. 184)."

But the latter sentence describes, fairly concisely, the process of evolution through natural selection. At best, King missed the opportunity to describe exactly how natural selection works; at worst, he is unclear on the matter himself. Perhaps these sections can be clarified in future editions; they would benefit from re-writing in the context of Richard Dawkins' important books on the topic of selfish genes in evolution..

One hopes that the sales will justify a second edition. Perhaps then these matters can be addressed. A chapter on the importance of plants for humanity would then be a useful addition. In the interim, this highly readible little book is a fine gift for the annoying relative who asks "And just what is it that you do anyway?"

Paul Keddy, Department of Biology, University of Ottawa.

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The Biotech Century

by Jeremy Rifkin

Amazon.com, 1998

(US $ 24,95)

In *The Biotech Century*, Jeremy Rifkin describes the "operational matrix" currently pushing new biotechnologies into the marketplace. This matrix has created "a framework for a new economic era" to replace economic structures of the waning industrial era. Although he does not clearly define biotechnology, Rifkin seems to include most products and services involving manipulation at the genetic level. His operational matrix consists of seven strands: (1) recombinant DNA techniques; (2) life patents; (3) globalised commerce and trade; (4) genomics and mapping; (5) sociobiology; (6) information technology, especially as applied to the above; and (7) new ideas about nature that challenge the current "neo-Darwinian citadel".

Apart from two introductory sections and a final "personal note", the book consists of seven chapters, one for each strand in the matrix. These chapters are, particularly in the first part of the book, long lists of examples and cases which Rifkin uses to convince readers that each of the strands in the operational matrix are indeed here and operating at full force.

These lists and details are captivating and Rifkin touches on some important and persistent debates around biotechnology. For example, he discusses the pervasive and powerful role of multi-national corporations in all levels of biotechnology research, development and commercialisation. He points out

potential environmental hazards such as gene flow, and health hazards such as toxicity and new allergens. He outlines the possible erosion of our privacy and "personhood" through genetic screening and therapies. Rifkin also argues against the notion that rDNA techniques are merely an extension of 'conventional' biotechnologies. Rather, he states, genetic engineering "represents something qualitatively new", a theme he picks up in the last chapter.

These are all urgent issues which merit further debate and meaningful two-way discussion among scientists, industry, governments and all other willing members of society. In fact, Rifkin points out in his introduction that "the most important issue at hand is to make the new science and technology an issue of considerable public attention". Granted, "attention" does not necessarily imply or require meaningful consultation. Yet given the strength of this statement, it is disappointing that Rifkin does not return to this "most important issue" of public participation until the final two pages of the book.

On the contrary, we are pummelled with a steady barrage of biotechnology products and servicesætechnologies that are already on the market or are firmly entrenched in the cogs of the operational matrix. In fact, Rifkin presents his "matrix" as a kind of juggernaut. We can neither resist nor control the future direction of biotechnology and we are therefore confronted with a serious dilemma. Who should we trust to steer the course of this powerful and, it would seem, ultimately desirable technology?

Contrary to what many people might expect of Rifkin, who has to date been an outspoken activist and critic of genetic engineering, this book is not a consistent argument against biotechnology. Rather Rifkin speaks in qualified, guarded terms and does not hesitate to remind us of the many promised benefits of the impending Biotech Century.

Rifkin states at the outset that he intends to "let the information speak for itself". While this may seem a fair approach, he takes it too far. Readers, especially those unfamiliar with biotechnology and the complex issues it raises, are given no theoretical or analytical framework on which to base their decisions. We are left with a host of genetically engineered organisms and armful of new technologies but are not sure what to do with them! The book and readers would benefit from a sustained, structured argument.

The final chapter, Reinventing Nature, is in some respects an exception. Here Rifkin raises the important point that science and technologies are not value free. He argues that socially engrained ideas about nature influence and justify new technologies: Social structures, technologies, and scientific theories shape views of nature, and vice versa in a circular process of positive feedback. In fact, Rifkin contends (with others) that our new "cosmology" is one of cybernetics, where organisms are viewed not as machines, nor as passive subjects of natural selection. Rather, living beings are self-organising and self-adjusting units of information processing and feedback capabilities. It is this worldview, he argues, that justifies re-programming nature at the "information" or genetic level. He writes that "...people will become convinced that genetic engineering technologies, practices, and products are simply an amplification of nature's own operating principles and therefore both justifiable and inevitable". Indeed, Rifkin makes this point so effectively that it appears he has convinced himself. He warns of the arrogance and "artifice" of our molecular creativity, yet also speaks of a "responsibility" or compulsion to fulfil the new evolutionary program.

The final Personal Note sketches complex ethical questions such as appropriate use of power, obligations to future generations, the balance of harm and respect for life. Unfortunately Rifkin does not elaborate on these issues, although he does express a belief that invasive and destructive types of biotechnologies are in fact neither inevitable nor desirable; in the coming century we may choose more ecologically appropriate biotechnologies. Had this vision been illustrated more convincing and consistently, we might be left with a greater sense optimism and empowerment. As it is, Rifkin's parting invitation for "rich and robust conversation" æundoubtedly the central and largely ignored issueæmay strike readers as forced or insincere. He has left the door open only a crack, yet has constructed a daunting and unstoppable operational matrix on the other side. If science and technology are indeed social and ethical processes, as Rifkin suggests, it follows that all scientists have a responsibility to engage in meaningful discussion both within and beyond their research communities, and to actively address the difficult, crucial questions about how *and if* we will enter the "Biotech Century."

Katherine Barrett, Botany Department, University of British Columbia, Vancouver.

The Botanical Electronic Newsletter (BEN)

The Botanical Electronic Newsletter is a brief and often humourous collection of notes assembled by Adolf Ceska of Victoria BC and sent out by email 2-3 times/ month. Subjects range from life history tidbits on certain species and recognition of botanists, to info on newly described species and reviews of current books / CD's. Treat yourself and subscribe. Above all- don't miss the April 1 edition!

Submissions, subscriptions, etc.: aceska@victoria.tc.ca

BEN is archived at:

http://www.ou.edu/cas/botany-micro/ben/

Elisabeth Beaubien, Devonian Botanic Garden, University of Alberta.

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Un site WEB sur les arbres
(A WEB Site on Trees)

Le Dictionnaire mondial des arbres en préparation à l'Université Laval, par Miroslav Grandtner, a depuis peu son site 3w. Conçu et entretenu par Pierre Laplante, du Département de géographie de l'Université du Québec à Rimouski, ce site permet la recherche, en anglais et en français, dans les champs suivants: nom latin, nom de famille, répartition, hauteur, type de feuillage, écologie (lumière, eau du sol, substrat, réaction du sol), utilisation (aspect culturel, usage médicinal, danger d'extinction, aliments, fourrage, bois de chauffage et charbon de bois, matériaux non ligneux, plantation, pâtes et papiers, amélioration du sol et de l'environnement, bois, toxicité), synonymes latins, noms anglais, français, espagnols et autres noms, et le nom commercial. Faute de financement adéquat, le contenu du site est pour le moment limité aux taxons indigènes de l'Amérique du Nord dont le nom latin commence par les lettres A et B.

Le site peut être visité à l'adresse suivante :

WWW.WDT.QC.CA

Miroslav M. Grandtner, Université Laval.

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Caffeine and SIDS

Previous studies have shown that caffeine ingested during pregnancy can result in increased risk of miscarriage, lower birth weight, breathing problems in the infant and withdrawal symptoms in the baby. Some new research published in the Archives of Disease of Childhood indicates that babies produced by women who drink more than four cups of coffee per day are more likely to die of SIDS (Sudden Infant Death Syndrome). This New Zealand study found that mothers of babies who died of SIDS where twice as likely to be heavy consumers of coffe, colas and tea.

(Source: Kitchener-Waterloo Record, Jan. 28, 1998)

Joe Gerrath, University of Guelph.

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El Nino and Plants

The current El Nino has been bad news for plants around the world. We first heard of its devastating effects last year when drought caused by El Nino resulted in large areas of Indonesian forests being burned. The resulting pall of smoke affected Hong Kong residents for many days. Although no longer in the newspapers so much, the Indonesian forests continue to burn. The Amazon region has had similar effects from the El Nino-induced drought conditions in this part of the world. Large fires have invaded normally wet areas of the rainforest. Elsewhere, fires in the savanna region of the Brazilian state of Roraima are estimated to have burned about 25 % of the surface area of the state. Canadians have not escaped the destructive forces of an El Nino. We all have seen the TV reports of the devastating freezing rain storm that covered much of eastern Ontario and southern Quebec with several centimeters of ice, snapping off branches and bringing down whole trees over a wide area. Even the unusually warm weather experienced by many areas of Canada this winter may be bad news for plants, because there may be increased survival of many plant pests.

(Compiled from many sources : TV, radio reports, various newspaper)

Joe Gerrath, University of Guelph.

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Plant sources of Melatonin

The sleep-inducing drug, melatonin, can no longer be bought over the counter in Canada. However, researchers at the University of Guelph have found that herbal sources may be able to supply effective quantities of melatonin for home treatment of insomnia. The herbs are feverfew, long used as a treatment for migraine, St. John,s wort, used as an antidepressant, and the traditional Chinese herb, huang-qin. Researchers are currently compiling information on the quantity of melatonin present in various samples of these herbs before recommending them as effective sources of the drug.

(Source: Kitchener-Waterloo Record, Feb. 14, 1998)

Joe Gerrath, University of Guelph.

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Prestigious Award

The Gold Veitch Memorial Medal has been awarded by the Royal Horticultural Society for 27 years. This year, for the first time, it has been awarded to a Canadian (o.k. ... he is a transplanted Brit.). Bruce Macdonald, director of the U.B.C. Botanical Garden for the past decade, was recently named the recipient of this medal, one of gardening's most coveted awards.
(Source: Kitchener-Waterloo Record, March 12, 1998)
Joe Gerrath, University of Guelph.

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The Chinese, Top 10

An article enumerating China's top ten scientific developments during 1997 include three botanical items. At the top of the top ten is the first mapping of the entire genome of rice. Another story concerning rice is the production of a transgenic strain that is resistant to herbicide. The third botanical item in the top ten is the publication of series of volumes on Chinese Flora and Chinese Cryptogams.
(Source: China Daily, Jan. 5, 1998)
Joe Gerrath, University of Guelph.

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Endangered Eastern Hemlocks

The hemlocks in the forests of eastern North America are being devastated by an introduced insect called the wooly adelgid, thought to have come from Japan in the 1950s. The parasite first appeared in Virginia and has now spread over a wide area from North Carolina to northern New England. This sucking insect can kill a tree within one to four years. Researchers are now trying experimental releases of a natural predator of adelgids, the black ladybug beetle. Interestingly, this beetle, *Pseudoscymnus tsugae*, is a previously unknown insect which was discovered in Japan during the search for natural predators of the wooly adelgid. Preliminary results from North American introductions of the beetle show that it has reduced populations of the adelgid by 47 to 100 % within 5 months after release into an experimental plot. The wooly adelgid has also been introduced into the forests of the Pacific coast (actually earlier than in eastern North America), but the hemlocks there appear to be resistant to it.
(Source: New York Times, Feb. 17, 1998)
Joe Gerrath, University of Guelph.

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Grapefruit Juice/Drug Synergy

Research has continued to elucidate the dangers of drinking grapefruit drugs at the same time as taking certain drugs. Grapefruit juice can increase the blood levels of certain drugs by as much as 6 times over levels attained in the absence of juice. The juice blocks the first phase of liver detoxification of the drug because a constituent called naringenin blocks the enzyme, cytochrome P450. Drugs which are dangerous when taken with grapefruit juice include the antihistamine terfenadine (Seldane), the calcium channel blocker nifedipine (Adalat), the anti-rejection drug cyclosporin, the sedative triazolam (Halcion) and prescription estrogens. Pills can be swallowed using water or orange juice, but grapefruit juice should be avoided within 24 hours before or after taking the drug.
(Source: Toronto Star, February 1998)
Joe Gerrath, University of Guelph.

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Berry Good for you

Black raspberries and blueberries are the latest fruit to be touted as anti-cancer agents. Research at the University of Illinois shows that blueberries have some of the highest levels of antioxidant compounds of any fruit or vegetable tested so far. Anthocyanins are thought to be the compounds effective in reducing cell damage. Researchers at Ohio State have found that rats fed black raspberries before being challenged with carcinogens have lower incidence of esophageal cancer. The active compound is thought to be ellagic acid, also present in strawberries, grapefruit and certain nuts.
(Sources: K-W Record, Jan. 28 and Globe & Mail, Apr. 11, 1998)
Joe Gerrath, University of Guelph.

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Anti-chlolera Taters

The idea of genetically engineering plants so that they would contain a vaccine appeared in a previous Plant Press item. Now, researchers at Loma Linda University have developed a potato that contains a vaccine against cholera. The problem is to get people in cholera-prone tropical areas to eat the potato (not a normal part of their diet). Perhaps the ubiquitous french fry will be the answer.
(Source: Globe & Mail, Apr. 11, 1998)
Joe Gerrath, University of Guelph.

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Tel. : (250) 960-5861; fax : (250) 960-5538; e-mail : youngj@unbc.ca
Paul Cavers, Dept. of Plant Science, University of Western Ontario, London, ON, N6A5B7.
Tel. : (519) 679-2111; fax : (250) 661-3935; e-mail : pcavers@julian.uwo.ca

Directors / directeurs (1997-1999)
Jerry G. Chmielewski, Dept. of Biology, Slippery Rock University, Slippery Rock, PA 16057.
Tel. : (724) 738-2489; fax : (724) 738-2188; e-mail : jerry.chmielewski@sru.edu
Bruce Ford, Dept. of Botany, University of Manitoba, Winnipeg, MB, R3T 2N2.
Tel. : (204) 474-6994; fax : (204) 261-8474; e-mail : bford@cc.umanitoba.ca
Sylvie Laliberté, Dép. des sciences biologiques, Université du Québec à Montréal, C.P. 8888, Succ. Centre-ville, Montréal, QC, H3C 3P8. Tel. : (514) 987-3963; fax : (514) 987-4647; e-mail : laliberte.sylvie@uqam.ca

Editor / rédacteur
Denis Lauzer, IRBV-Université de Montréal, 4101, rue Sherbrooke Est, Montréal, QC, H1X 2B2.
Tel. : (514) 872-8494; fax : (514) 872-9406; e-mail : denis.lauzer@umontreal .ca
Archivist / archiviste
Joe Gerrath - pro tem. Dept. of Botany, University of Guelph, Guelph, ON N1G 2W1.
Tel. : (519) 824-4120; fax : (519) 767-1991; e-mail : jfgerrat@uoguelph.ca

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1999
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2000
University of Western Ontario, London, Ontario
2001
Okanagan University College, Kelowna, British Columbia
2002
Meeting with BSA