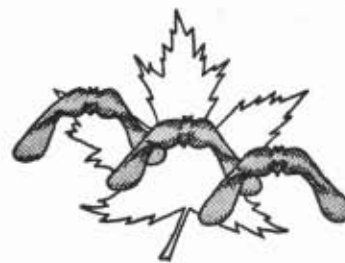


BULLETIN



L'ASSOCIATION BOTANIQUE DU CANADA

April 1974

Volume 7 Number 2

Waterloo

THE 1974 ANNUAL MEETING AT TEMPE, ARIZONA

Arrangements for this meeting are now well advanced and the programme is nearly complete. Eight symposia are planned on the following topics:

- Teaching with fungi
- Secondary Metabolites
- Wide ranging species
- Evolution of flagella
- Population dynamics
- Co-evolution of parasites and symbionts
- Evolution of Gymnosperms

A copy of the completed programme will be included with this Bulletin. Abstracts of papers being presented by members of the CBA/ABC are printed in this issue of the Bulletin.

It is hoped that as many of our members as possible will attend this meeting despite the "energy crisis". Efforts are being made to arrange group flights to Tempe for those who wish to use them and a note on this is included elsewhere in this issue of the Bulletin. The meeting promises to be an outstanding one with many well known participants from other societies in North America. Add to this the exotic venue and we have the ingredients for success - so please plan to join us at Tempe!

GROUP FLIGHTS TO TEMPE

Anyone interested in group flights from Ottawa, Toronto or Vancouver to the joint CBA/ABC meetings at Tempe in June should send their name and the dates of their planned/desired travel to:

J.C. Ritchie,
Chairman, Division of Life Sciences,
Scarborough College,
1265 Military Trail,
WEST HILL, Ontario.
M1C 1A4.

N.R.C. GRANT SELECTION COMMITTEES

Members are invited to make recommendations for membership of the following National Research Council grant selection committees:- Cell Biology, Plant Biology, Population Biology. Recommendations should be sent to Dr. Taylor A. Steeves, Dept. of Biology, University of Saskatchewan, Saskatoon, Saskatchewan.

OFFICERS OF THE ASSOCIATION-CALL FOR NOMINATIONS

Members are reminded that nominations for the following officers of the CBA/ABC are required:-

- President
- Vice-President
- Secretary
- 3 Directors

A circular letter was sent to all our members recently. Your cooperation in submitting nominations is requested.

RESOLUTIONS to be presented at the Annual Meetings

Be it resolved that in all future Northern Development contracts supported by the Federal Government (on Crown Land), specifically those involving construction and associated disturbance of the terrain, provision be made either before or during construction, for the collection and documentation by qualified biologists of any naturally preserved biological material discovered on the construction sites. This would in particular apply to fossil or semi-fossil deposits valuable in palynological work.

Signed: - Dr. J.H. McAndrews
Dr. C.J. Marchant
Dr. J.R. Maze
Dr. R.L. Taylor

WILL YOU HELP?

The request from the Committee on Rare and Endangered Species in our flora (see January 1974 Bulletin) has met with only a modest response as yet. We urgently need the assistance of members of the association if this worthwhile project is to be successful. If you have any information on species of plants which are becoming increasingly rare in your area, or which are endangered or perhaps extinct, please get in touch with a member of the committee. For people who prefer to supply information on standardized forms, these are available from members of the committee or from Dr. J.K. Morton, Dept. of Biology, University of Waterloo, Waterloo, Ontario, N2L 3G1

OH! FOR THE DAYS OF THE PONY EXPRESS!

A sufficient number of members sent us information on the length of time it took for the Post Office to deliver The Bulletin. We now

have a pretty good picture of the efficiency of that organization in handling this type of mail.

Toronto	7 days
Ottawa	10 days
Quebec	18 days
St. John's, Nfld	16 days
Edmonton	18 days
Vancouver	30 days

Clearly the Canadian Post Office does not subscribe to the motto of its counterpart south of the border "Neither snow nor rain nor heat nor gloom of night stays these couriers from the swift completion of their appointed rounds"! (Motto over General Post Office in New York) - may be it has been too hot in Canada recently! The delays experienced with the January issue are not exceptional. We have been aware for some time that all was not well but we did not have adequate data to support such an opinion. The current issue of the Bulletin will probably be sent to several provinces by first class mail in view of the importance of early delivery of this issue. This will add considerably to our expenses and it is unlikely that it can become normal practice.

ECOLOGICAL RESERVES

During the final year of funding for the Terrestrial Conservation Section of the International Biological Programme (IBP-CT), a contract has been awarded by IBP-CT to a C.B.A. member, Dr. Everett B. Peterson, for the purpose of promoting the concept of ecological reserves. The broad objective is to obtain long-term financial support for the continued inventory and check-sheeting of proposed ecological reserve sites. An equally important requirement is to find a permanent administrative "home" for a program that would provide for the management and use of established ecological reserves.

Those members of C.B.A. who have been active in IBP-CT over the past few years will be fully aware of the difficulties facing further development of a national ecological reserves system. To assist in the task before us, any interested C.B.A. members are urged to contact: Everett B. Peterson, Western Ecological Services Ltd., 211 - 11 Fairway Drive, Edmonton, T6J 3S6, Telephone (403) 434-4105. Your suggestions are particularly invited on approaches that you think should be pursued in the search for more permanent financial and administrative support of a national system of ecological reserves.

INTERNATIONAL SYMPOSIUM ON THE BIOLOGY AND MANAGEMENT OF MANGROVES

Because of the increasing amount of research on and utilization of mangroves throughout the tropics, a symposium has been organized to bring together the interested people. The symposium is designed to report on basic aspects of mangrove biology and utilization of mangrove areas by man and to provide a forum in which conflicts in use of mangroves can be considered.

The Symposium will be held at the East-West Centre in Honolulu, Hawaii on October 8-11, 1974. Program outline:

- | | |
|-------------|----------------------------|
| I. Biology: | A. General Aspects |
| | B. Biogeography |
| | C. Geology and Soils |
| | D. Morphology and Taxonomy |

E. Physiology
F. Ecosystem Analysis

- | | |
|-----------------|--|
| II. Management: | A. Forestry |
| | B. Shellfisheries |
| | C. Finfisheries |
| | D. Agriculture |
| III. Conflicts: | A. Natural vs. Social Values |
| | B. Methods for Resolution of Conflicts |

All papers presented at the Symposium will be published in the proceedings.

For more information write to:-

Dr. Gerald E. Walsh
U.S. Environmental Protection Agency
Gulf Breeze Environmental Research Laboratory
Gulf Breeze, Florida 32561

XII INTERNATIONAL BOTANICAL CONGRESS - LENINGRAD-1975

Group Charter Flight arrangements are being explored for the Association. Any member who is interested in taking part in such a travel plan should write to:

J.C. Ritchie
Chairman, Division of Life Sciences
Scarborough College,
1265 Military Trail, West Hill, Ontario

Please indicate whether or not you plan to take part in the post-Congress excursions.

The tentative dates for the Congress are July 3 - 10.

THE UNESCO PROGRAM ON MAN AND THE BIOSPHERE (MAB) IN CANADA.

Development of the MAB Program since the report in the Bulletin of July 1973 has been rather slow but progress can be reported.

1. The Working Group for developing the framework for Sub-Program 1:

how to achieve a desirable pattern of human settlement, land use and environmental quality in the circumstances of increasing population, urbanization and industrialization, particularly in the Great Lakes-St. Lawrence lowlands;

has been formed and it is expected that the report from this Working Group will be ready for distribution in early summer. Later this year a National Workshop will be organized for discussing the framework and to further define the objectives to be met in this Sub-Program.

2. Similarly the Working Group on Sub-Program 2:

how to achieve maximum benefit and avoid adverse effects on human social structures, wildlife, soil and water quality, in an age of increasingly intensive agricultural and forestry management practices (including fertilizer and pesticide use and waste disposal) - the regional focus to be on areas of the most significant productivity; is expected to have a report circulated during the summer with the objective of a National Workshop in the fall.

3. Because of the difficulties associated with the MAB Program to this date, development of the other two Sub-Programs will not commence before the latter part of this year.

4. Questions of funding for MAB research are continually being asked. It should be clearly understood that there are no funds earmarked

"MAB". It is expected that most MAB projects will be funded through the already existing channels. Any projects designated as "MAB", will receive help to obtain funding if this proves necessary.

5. It is quite likely that some projects will be too big, or will be outside the mandate of any one agency, to obtain funding through the usual channels. Under these circumstances it is expected that preliminary development of such a project will be done through the feasibility studies grants, and operational funding through bloc grants but details have not yet been worked out.

6. It could be asked why MAB should continue if there are no funds at this time to allure possible researchers. There are several reasons researchers may wish to support the Program:

- a) The MAB concept is taking leading role in developing trans-disciplinary research directed at social/environmental problems and therefore is worthy of support;
- b) Within the MAB Program there is an opportunity for additional international exposure and information exchange;
- c) There is a desire among many researchers to apply their work to "relevant" issues and MAB appears to offer a useful vehicle for identifying these issues;
- d) Within the context of MAB, the insistence that social and natural scientists from all levels of government, university and the private sector be brought together at all stages of planning and execution, is seen as making sure the research is "relevant";

7. In order to clarify certain points in the Prospectus for Canada/MAB, the MAB committees are working on "guidelines" or "criteria" for the development of MAB projects. They have not been completed yet, but will be available well before the first National Workshop. These guidelines will be used in developing the "framework" for each sub-program as well as for informing prospective researchers of the aims and directions of each of the sub-programs.

8. Besides the Prospectus for Canada/MAB, there are now available 11 reports in the MAB Series and another 4 or 5 are expected within the next three months. Those already published are as follows:

1. International Co-ordinating Council of the Programme on Man and the Biosphere. First session. Paris, 9-19 November, 1971.
2. Expert panel on the role of systems analysis and modelling approaches in the Man and the Biosphere Programme (MAB). Paris, 18-20 April, 1972.
3. Expert panel on Project 1: Ecological effects of increasing human activities on tropical and subtropical forest ecosystems. Paris, 16-18 May, 1972.
4. Expert panel on Project 12: Interactions between environmental transformations and genetic and demographic changes. Paris, 23-25 May, 1972.
5. Expert panel on Project 5: Ecological effects of human activities on the value and resources of lakes, marshes, rivers, deltas, estuaries and coastal zones. London, 19-22 September, 1972.
6. Expert panel on Project 3: Impact of human activities and land use practices on grazing lands: savanna, grassland (from temperate to arid areas), tundra. Montpellier, 2-7 October, 1972.

7. Expert panel on educational activities under the Man and Biosphere Programme (MAB). Paris, 5-8 December, 1972.
8. Expert panel on Project 6: Impact of human activities on mountain ecosystems. Salzburg, 29 January - 4 February 1973
9. Expert panel on Project 13: Perception of environmental quality. Paris, 26-29 March, 1973.
10. International Co-ordinating Council of the Programme on Man and the Biosphere. Second session. Paris, 10-19 April, 1973.
11. Expert panel on Project 7: Ecology and rational use of island ecosystems. Paris, 26-28 June, 1973.

These documents are published in both French and English and copies are available from the MAB secretariat.

Patricia Roberts-Pichette,
Executive Secretary,
Canadian MAB Programme

PUBLICATIONS

The plantains (Plantago) of Canada by Bassett, I. John, 1973, Research Branch, Canada Department of Agriculture, Monograph no. 7, 47 pp., 15,4 X 22,9 cm, 17 illus., paper cover, obtainable from Information Division, Canada Department of Agriculture, Ottawa, K1A 0C7. (A monograph of the 16 species of Plantago native or introduced in Canada and of Littorella americana; synonymy, typification, common names, illustrations (excellent!), maps of geographical distribution provided in addition to the technical description and the notes on taxonomy, history, distribution, pollen, chromosomes and biosystematics).

- from Taxon Nov, 1973

Man-Made Lakes: Their Problems and Environmental Effects. Published by the American Geophysical Union. 113 papers from the international symposium held in Knoxville, Tennessee, May 3-7, 1971, which was organized by COWAR of ICSU. 900 pp. \$30.00 Publication expected for December 1973. Eds. W.C. Ackermann; Gilbert White; E.B. Worthington. Contact: American Geophysical Union, 1710 L Street, N.W., Washington, D.C. 20036.

"World Directory of Environmental Organizations." Published by the Sierra Club (USA). A major new source of data on environmental groups, this directory can be ordered from: Sierra Club Special Contributions, P.O. Box 7959, Rincon Annex, San Francisco, California 94120, USA. \$7.50.

Key to the Quaternary Pollen and Spores of the Great Lakes Region - by J.H. McAndrews, A.A. Berti & G. Norris. Royal Ontario Museum, Life Sciences Miscellaneous Publications, Toronto University Press 1973. Price \$2.50. This work consists of a key to the pollen and spores of this region with photographic illustrations made under the light microscope. It will prove a very useful reference work for workers in Quaternary and contemporary palynology.

PERSONALIA

Rolf Mathews recently received a Ph.D. from the University of British Columbia with a thesis entitled: "Paleoecology of postglacial sediments in the Fraser Lowland region of British Columbia". Interesting results include the discovery of subfossil bryophytes in cores

from Marion Lake of the UBC Forest, and 3 palynological zones reflecting marked changes in vegetation, particularly about 10,000 yrs. B.P. Rolf is currently studying postglacial successions in northern England and Scotland as a NRC Postdoctorate Fellow with Dr. R.G. West in the Botany Dept. at Cambridge University.

Mr. C.H. Hand, died 8 January, 1974 at Chatham, Ontario. He was a High School teacher there and was very active in the Kent Nature Club. Mr. Hand was widely known among Bryologists as a collector and exchanger of specimens.

Mr. James A. Hancock has recently defended his M.Sc. thesis (Biology Department, Memorial University) on The distribution, ecology, and life history of Buxbaumia aphylla Hedw. in Newfoundland.

POSITIONS AVAILABLE

UNIVERSITY OF WATERLOO. Department of Biology. Applications are invited for the post of: ASSISTANT PROFESSOR IN BIOLOGY: PRIMARY TEACHING RESPONSIBILITIES IN AREA OF FLORAL MORPHOLOGY TAXONOMY AND EVOLUTION. RESEARCH INTERESTS IN FLOWERING PLANTS OR BRYOPHYTES-BIOSYSTEMATICS, CHEMOTAXONOMY, PHYTOGEOGRAPHY OR PALYNOLOGY. Definite-term appointment, initially two years. Qualifications: Ph.D. Minimum salary \$13,100 per annum. Applications including curriculum vitae and names of three referees should be sent to Dr. J.K. Morton, Chairman, Department of Biology, University of Waterloo, Waterloo, Canada. N2L 3G1.

GRADUATE STUDIES IN FLOWERING PLANT TAXONOMY AND GENE-ECOLOGY

Applications will be considered from potential graduate students interested in the Canadian flora - in aspects of taxonomy,

cytology, gene-ecology and distribution. Write to Dr. J.K. Morton, Department of Biology, University of Waterloo, Waterloo, Ontario N2L 3G1.

A NEW JOURNAL ON AGRO-ECOSYSTEMS

An international journal on the subject of Agro-Ecosystems under the sponsorship of the International Association for Ecology is planned for publication next year. Publisher of the Journal will be Elsevier Scientific Publications in Amsterdam.

The new journal will be concerned with ecological interactions within and between agricultural and managed forest systems. Such man-managed environments - agro-ecosystems - pose ecological problems through interactions between crops and grazing animals, between life and the domesticated organisms; also in the impact of agricultural ecosystems on other parts of the environment (e.g., through erosion and leaching of nutrients into lakes and waterways), and in activities that impinge on the agricultural systems from outside (e.g., industrial pollution, outdoor recreation).

Papers concerned with ecological interactions affecting or affected by agriculture and forest practice will be encouraged but it is not intended that the journal will accept papers directly concerned with the specialist areas of soil, crop and livestock husbandry.

Editor-in-Chief is Professor Dr. John Harper (Bangor, Wales), Associate Editor is Dr. P. Gruys (Leiden, Netherlands).

For more information write to:-
International Association for Ecology
Laboratory of Limnology
University of Wisconsin
Madison, Wisconsin 53706 USA

A GUIDE TO GRADUATE STUDENTS AND GRADUATE STUDIES IN BOTANY IN CANADA

compiled by Claude Richard
Agriculture Canada
Ste-Foy, Quebec

(Name on left is graduate student, that on right is supervisor)

UNIVERSITY OF ACADIA - DEPARTMENT OF BOTANY

Taxonomy, Ecology and Life History Studies in the genus *Ceramium*.
GARBARY, J.W. David

McLACHLAN, J. & GRUND, D.

Disc Electrophoresis: Applied to *Rhodotorula* sp. yeast taxonomy.
MINER, James Albert

GRUND, Darryl W.

UNIVERSITY OF ALBERTA - DEPARTMENT OF BOTANY

Energy and Water relations and photosynthesis in Western High Arctic.
ADDISON, Paul Andrew

BLISS, L.C.

Physiological studies on selected diatom species.
BELIVEAU, David John

HICKMAN, M.

Toxicity Regulation in the Blue-Green Alga *Anabaena flos-aquae* (Lyngb.) de Bréb.
CARMICHAEL, Wayne William

GORHAM, Paul R.

- Embryo sac development and fertilization in *Peperomia* spp.
DOBSON, Sane E. CASS, D.D.
- Plant succession in regard to a fluctuating water regime in the Peace-Athabasca Delta, Alberta.
DOHERTY, Michael Joseph Patrick LA ROZ, G.H.
- One-carbon metabolism in ageing carrot tissue slices.
FEDEC, Paul COSSINS, E.A.
- Systematic study of *Smelowskia calycina* (Stephan) C.A. Meyer in North America.
GREENE, Craig W. PACKER, J.G.
- Autecological study of *Cassiope tetragona* (L.) D.Don and *Cassiope mertensiana* (Bong.) D.Don with special reference to water relations and frost hardiness.
HARTER, John Edward BLISS, Laurence C.
- Translocation in the Phloem of *Heracleum lanatum*.
HODDINOTT, John GORHAM, Paul R.
- Taxonomic studies in *Potentilla pensylvanica* L.
KOHLI, Brij Lal PACKER, J.G.
- Dryas octopetala* and tundra ecosystems in the Bald Hills, Jasper National Park.
KUCCHAR, Peter LA ROI, G.H.
- Vegetation of the Heart Lake area, district of Mackenzie, Northwest Territories.
TALBOT, Stephen S. LA ROI, G.H.
- Biochemistry of incompatibility in *Lythrum salicaria*.
TALBOT, Carolyn O. CASS, David D.
- Growth and development of polypores in the genus *Hirschioporus*.
TRAQUAIR, James Alvin KENNEDY, Lorene L.
- Ecophysiology of Black Spruce (*Picea mariana*).
VAN ZINDEREN BAKKER, Eduard Meine MAYO, J.M.
- Female gametophyte nutrition in *Pisum sativum*.
WIATR, Stanley M. CASS, David D.
- Ecophysiologic studies of *Dryas integrifolia* in a controlled environment.
HARTGERINK, Antoinette P. MAYO, J.M.

UNIVERSITY OF BRITISH COLUMBIA - DEPARTMENT OF BOTANY

- Physiology, with regard to nitrogen fixation, of relationship between *Paspalum notatum* & *Azotobacter paspali*.
HART, Alan TREGUNNA, E.B.
- Studies in plant proteins: disc electrophoresis of albumins and globulins of mature seeds from *Lasthenia* (Compositae) isolation, characterization, and amino acid sequence of *Sambucus ferredoxin*.
ALTOSAAR, Illimar BOHM, B.A. & TAYLOR, I.E.P.
- Phytogeocoenoses in the Boreal Forest of British Columbia.
ANNAS, Richard M. KRAJINA, V.J.
- Physiological and biochemical studies of the parasitic red alga *Janczewskia gardneri*.
COURT, Gary J. TAYLOR, I.E.P.
- Fungal decay processes.
DOLINER, Laura Hope BANDONI, R.J.
- The hepaticae of Southwestern British Columbia.
GODFREY, Judith L. SCHOFIELD, W.B.
- The Biology of *Harveyella mirabilis* (Rhodophyceae, Choreocolaceae, Cryptonemiales).
GOFF, Lynda June COLE, K.M.
- Systematics of British Columbia species of *Hieracium* (Asteraceae).
GUPPY, Geraldine A. TAYLOR, Roy L.
- Some aspects of the ecology of two species of *Porphyra* (Rhodophyta).
HAWKES, Michael William SCAGEL, R.F.

- The palynology of coastal bogs in Southwestern British Columbia.
HEBDA, Richard Joseph ROUSE, Glenn
- Fungal ultrastructure - Evolutionary survey of spore production in the Choanephoraceae (Phycomycetes)
HIGHAM, Michael COLE, K. & BANDONI, R.J.
- Phenolic metabolism in algae.
LANDYMORE, Arthur F. TOWERS, G.H.N.
- Analysis of Intertidal *Fucus* communities: Plant-Animal Interactions.
NASSICHUK, Michael D. FOREMAN, R.E.
- Saprolegnia* infections of Pacific Salmon.
NEISH, Gordon Arthur HUGHES, Gilbert C.
- Phytogeography of Lichens of the Islands of Georgia Strait, British Columbia.
NOBLE, Willa Jane SCHOFIELD, W.B.
- The Biology of *Nodularia* (Cyanophyceae).
NORDIN, Richard Nels STEIN, J.R.
- Systematics and Taxonomy of *Saxifraga refidula* and *occidentalis* in the Columbia River area.
PERKINS, Ethen BEAMISH, K.I.
- Interaction between photosynthesis and photoperiodic control.
PAWAN KUMAR, Bassi TREGUNNA, E.B.
- Recent advance in plant breeding.
PICK KIEW, Ling PERSON, C.
- The relation of reproductive biology to the structure and function of four plant communities.
POJAR, Jim BEAMISH, K.I.
- Field and Cultural Studies on Conigenous Macromycetes (*Strobilurus*, *Baeospora*, *Ciboria* etc.).
REDHEAD, Scott A. BANDONI, Robert J.
- Cryptococcal virulence related to cell wall and capsule chemistry.
ROSS, Adriane TAYLOR, I.E.P.
- Cytotaxonomy of the genus *Bidens* in the Pacific Northwest.
STIRLING, Caroline Jane MARCHANT, C.J.
- Field and cultural studies of species of the green algal genus *Ulva* along the Pacific North American Coast.
TANNER, Christopher Eugene SCAGEL, R.F.
- Accumulation, use and distribution of Lipids during zoosporogenesis in the Bull kelp *Nereocystis* and possible input into marine food chains.
WALKER, David Cabot BISALPUTRA, Thana

UNIVERSITY OF BRITISH COLUMBIA - DEPARTMENT OF PLANT SCIENCE

- Pollution effects on plant population interactions.
BENNETT, James P. RUNECKLES, V.C.
- Modeling of the grazing systems in the Eastern grasslands of Columbia, South America.
HILTON, James Engelsen BRINK, U.C.
- The nature and quantity of certain non-protein constituents in grassland sedges.
PARMAR, Sohan S. BRINK, V.C.
- Plant adaptation to ozone.
ROSEN, Peter Mark RUNECKLES, V.C.
- Genetic investigation of growth component stages at two temperature regimes and selection for earliness in tomatoes.
LI, Thomas HORNBY, C.A.
- Host parasite relations of rusts studied using in vitro systems including protoplasts.
LANE, W. David SHAW, M.
- Mechanism of photosynthetic inhibition in bean leaf by nitrogen dioxide.
SRIVASTAVA, Hari S. JOLLIFFE, P.A. & RUNECKLES, V.C.

A new diagnostic technique for *Corynebacterium sepedonicum*, causative agent of ring rot in potato.
COLE, Anabel COPEMAN, Bob

Effects of ozone on host-parasitic relations.
RESH, Howard Martin RUNECKLES, V.C.

Interaction between two unrelated fungus transmitted, viruses, tobacco necrosis virus and cucumber necrosis virus, in doubly infected plants.
PEKKALA, David HAMILTON, R.I.

BROCK UNIVERSITY - DEPARTMENT OF BIOLOGICAL SCIENCES

The response of the photosynthetic apparatus to ionizing radiation.
CORLETT, John Thomas URSINO, D.J.

Gamma-radiation induced changes in the magnitude and patterns of translocation in Soybean.
SCHEFSKI, Hans URSINO, D.

Structure, function and composition of host-parasite interface in a mycoparasite.
LETOURNEAU, Denis MANOCHA, M.S.

Host-parasite relationships in a mycoparasite: biochemical studies - lipid composition + membrane structure.
DEVEN, John Michael MANOCHA, M.S.

Biochemical studies on the hypersensitive reaction of hosts to TMV infection.
STOBBS, Lorne W. MANOCHA, M.S.

Burn succession and productivity in a Northern Boreal Forest.
MCDONALD, Don BANFIELD, A.W.F.

UNIVERSITY OF CALGARY - DEPARTMENT OF BIOLOGY

Biochemical studies on the effect of water stress in *Avena* seeds.
AKALEHIYWOT, Teshome BEWELY, J.D.

The effects of flooding and cytokinins on hormone and enzyme levels of *Helianthus annuus*.
WAMPLE, Robert Lee REID, David M.

The lichen genus *Ramalina* (Usneaceae) of Alberta, Saskatchewan and Manitoba.
MATTHEWS, Eileen BIRD, C.D.

Mapping the long range effects of SO₂ emissions from sour gas processing plants in Alberta using lichens.
CASE, James William BIRD, Charles D.

UNIVERSITY OF CARLETON - DEPARTMENT OF BIOLOGY

Studies of snow pack winter roars near Shingle Point, Northeastern Yukon Territory - geobotanical effects and natural revegetation.
IRONSIDE, Gary Reginald LAMBERT, Y.D.H.

Development of galactosidase in *Cucurbita* leaves.
RAUTHAN, Budhi Singh WEBB, J.A.

Taxonomy and biosystematics of the genus *Rumex* in North America.
DAWSON, John Ernest McNEILL, John

UNIVERSITY OF GUELPH - DEPARTMENT OF BOTANY AND GENETICS

Nitrogen fixation by Cyarophytes in the Bay of Quinte, Ontario
PAINTER, D.Scott GERRATH, J.

Plant species diversity as an index of ecosystem resiliency in Southern Ontario.
STEVENS, Denis G. SMITH, D.W.

Changes in quantity and nutritive quality of the food species of gamebird and browsing animals in S. Ontario following controlled burning.
JAMES, Terence David SMITH, D.W.

Pre- and Post-germination development of cranberry and blueberry seeds.
BRISSON, Jean C. PETERSON, R.L.

Selected ecological effects of tordon herbicide on a Great Lakes forest clear-cut.
SUFFLING, Roger SMITH, D.W.

Studies of mycorrhizal fungi: vegetation: substratum relations in sand dunes.
KURG, Catherine Jane SMITH, D.W.

UNIVERSITY OF GUELPH - DEPARTMENT OF ENVIRONMENTAL BIOLOGY

Some aspects of the taxonomy of fall *Panicum*.
HAMIWKA, Wira ALEX, J.F.

The ecology and biological control of St. John's-wort (*Hypericum perforatum* L.) in southern Ontario.
DOUGAN, James M. ALEX, J.F.

Evaluation of systemic fungicides for therapy of cereal rusts.
CHIN, May Yumei EDGINGTON, L.V.

Symplastic movement of a new fungicide.
SMALL, Lyal W. EDGINGTON, L.V.

Epidemiology of turnip mosaic virus (TuMV) in rape.
EVERTSEN, Johannes A. EVANS, I.R.

Effect of the fungus *Fusarium* and *Verticillium* on endogenous levels of cytokinins in tomatoes.
PATRICK, Terrence W. FLETCHER, R.A.

Endogenous cytokinin levels in aging cucumber cotyledons.
POKU, John A. FLETCHER, R.A.

Systemic control of root nodule nematode in potato.
DE WILDT, Petrus P.W. FUSHTEY, S.G.

Genetic variability in *Ascochyta fabae*.
DUNNIGAN, A. Ann MacNEILL, B.H.

Reduction of spray drift in roadside spraying.
ALLEN, Bryan M. STEPHENSON, G.R.

Chemotaxonomy of *Fusarium*.
NICHOLSON, Dorothy S. MacNEILL, B.H.

Photosynthetic recovery in relation to atrazine metabolism in several taxonomic groups of grasses.
JENSEN, Klaus I. STEPHENSON, G.R.

Soil factors influencing metribuzin activity.
SHAROM, Mohamed S. STEPHENSON, G.R.

Rusty root disease of carrot in Ontario.
KALU, Ngwanma N. SUTTON, J.C.

Mycorrhizae in sand dunes near Lake Huron.
SHEPPARD, Brian A. SUTTON, J.C.

Environmental factors on the chemical control of *Poa annua* in turf.
INGRATTA, Robert G. SWITZER, C.M.

UNIVERSITY OF GUELPH - DEPARTMENT OF HORTICULTURAL SCIENCE

Induced mutations in ornamentals propagated by leaf cuttings.
BROWN, Joan L. HARNEY, P.M.

The mechanism of differential sensitivity of potato cultivars to treatment with the herbicide Sencor.
HINKS, Thomas Gary WAYWELL, C.G.

Seasonal and diurnal root growth patterns of certain woody plants.
KHATAMIAN, Houchang HILTON, R.J.

Propagation by another culture and leaf cuttings in *Pelargonium X Hortorum* Bailey.
SMITH, Darrell W. HARNEY, Patricia M.

The reproductive physiology of the short-day onion cultivars in West Africa.
UZO, Joseph O. ORMROD, D.P.

Induced mutations.
JANAKIRAMAN, Raj HARNEY, P.M.

The morphological response of *Fragaria* spp. to various enogenous growth regulators and environmental conditions.

ANDREW, Lenore Alice

ORMROD, D.P.

Crop tolerance inheritance of *Lycopersicon esculentum* Mul. genotypes and Metribuzin phytotoxic interactions, in the breeding of field tomatoes.

VINCENT, Souza Machado

NONNECKE, Dr.

Flower bud abortion in Poinsettia (*Euphorbia pulcherrima*).

THOMPSTONE, Peter Erwin

BARRETT, R.E.

UNIVERSITE LAVAL - DÉPARTEMENT D'AGROBIOLOGIE

Aspects mycologiques et histopathologiques du dépérissement des tiges de *Vaccinium angustifolium* Ait.

BRISSE, Jean-Denis

PAUZE, Fernand J.

Some aspects of the embryology of *Vaccinium angustifolium* Ait.

HSIUNG, William Yu-Deng

PAUZE, Fernand J.

UNIVERSITE LAVAL - DÉPARTEMENT DE BIOLOGIE

Etude radiographique et ultrastructurale de l'action de l'actinomycine D sur le nucléole de cellules végétales.

VANCOILLIE, Raymond

LAFONTAINE, J.G.

Production des algues marines benthiques de Cap-à-l'Orignal.

BRETON-PROVENCHER, Micheline

CARDINAL, André

La végétation phytoplanctonique du Saguenay.

HELDENSTEIN, Marie-Christine

CARDINAL, André

Composition et succession des associations phytoplanctoniques de l'estuaire maritime du St-Laurent.

RINGUET, Isabelle

CARDINAL, André

Production primaire et secondaire dans le fjord du Saguenay.

COTE, Raynald

LACROIX, Guy

Relations entre la composition spectrale de la lumière et les caractéristiques biochimiques de quelques algues phytoplanctoniques.

MARANDA, Lucie

LACROIX, Guy & T. PLATT

Ultrastructure du noyau d'*Astasia longa* au cours du cycle cellulaire.

CHALY, Nathalie

LAFONTAINE, Jean-Gabriel

Caractérisation biochimique de la chromatine de cellules végétales.

NADEAU, Paul

LAFONTAINE, Jean-Gabriel

Etude physico-chimique de la chromatine.

LARUE, Hélène

PALLOTTA, Dominick

UNIVERSITE LAVAL - DÉPARTEMENT D'ÉCOLOGIE ET DE PÉDOLOGIE

Construction d'un modèle de simulation en écologie.

CAUBOUÉ, Madeleine

LAFOND, A.

Photointerpretation et cartographie écologiques automatiques: applications aux territoires semi-arctiques et arctiques de la Peninsula Québec-Labrador.

DUCRUC, Jean-Pierre

LAFOND, A.

Etude sur la physiologie des endomycorrhizes à vésicules et arbuscules.

FURLAN, Valentin

FORTIN, J.

Etude écologique de la réserve potentielle du lac Chicobi, Guyenne, Abitibi-Ouest.

GAUDREAU, Léopold

GRANDTNER, M.

Etude écologique de la végétation forestière du Parc National Forillon.

MAJCEN, Zoran

GRANDTNER, M.

Rendement en semences des différents niveaux de la cime du pin gris.

BEAUDOIN, R.

PARROT, L.

Les cédrières du Québec....

BLANCHET, B.

GRANDTNER, M.

- Définitions écologiques des unités de cartographie du Témiscamingue.
BROWN, J.L. GRANDTNER, M.
- Dégradation de la matière ligneuse dans différents types de sol.
COUTURE, M. FORTIN, J.
- Etude écodynamique de la végétation du comté de Lévis.
DOTON, D. GRANDTNER, M.
- Distribution des ectomycorrhizes chez le sapin baumier (aspects anatomiques, morphologiques et physiologiques).
LANGLOIS, C.G. FORTIN, J.
- Etude écologique des Tourbières du parc des Laurentides.
GAUTHIER, R. GRANDTNER, M.
- Biologie des Thécamoebiens des sols forestiers.
GRAVEL, G. FORTIN, J.
- Etude écologique de la végétation du M^t Mégantic.
MARCOTTE, G. GRANDTNER, M.
- Etude génécologique chez le noyer cendré et son intérêt au reboisement.
ROBERT, D. PARROT, L.
- Influence de substances toxiques sur des micro-organismes produites par les arbres.
THIBAUT, J.R. FORTIN, J. & SMIRNOFF, V.
- Influence de la fertilisation sur les ectomycorrhizes du sapin baumier.
TETRAULT, J.P. FORTIN, J. & BERNIER, B.

UNIVERSITE LAVAL - DÉPARTEMENT DE PHYTOECNIE

- Succession secondaire et espèces indicatrices des formations herbacées de deux types de sol du comté de Lévis.
AMYOT, André DESCHENES, J.M. & PAYETTE, Serge
- Incorporation d'ARN exogène par les chloroplastes isolés de blé.
ASSELIN, Alain TRUDEL, Marc.-J.
- Etude écologique des pessières à Poste de la Baleine.
AUDET, René PAYETTE, Serge
- Effet de l'acide 2-chloroéthylphosphonique sur la maturation de la tomate.
BELANGER, Bruno TRUDEL, Marc.-J.
- Courbes de productivité de 3 légumineuses fourragères.
BERTRAND, Jean GERVAIS, Paul
- Détermination du potentiel productif chez certaines plantes cultivées.
BOUCHARD, Majella TRUDEL, Marc.-J.
- Etude écologique du Mont Jacques Cartier.
BOUDREAU, Francis PAYETTE, Serge
- La chute des fleurs chez *Vicia faba* L.
CLICHE, Mario GAUTHIER, Fernand-M.
- Facteurs de résistance à *Septoria avenae*.
COUTURE, Luc LACHANCE, R.O. & PELLETIER, Gilles
- Relation entre la neige et la végétation à Poste à la Baleine, Nouveau Québec.
FILION, Louise PAYETTE, Serge
- Etude phytogéographique et écologique des marais du St-Laurent, Lac St-Pierre-Matane.
GAUTHIER, Benoît LAVOIE, Victorin
- Rôle des lipides dans le mécanisme de la résistance des plantes au froid.
GRENIER, Gilles THERRIEN, H.P. & WILLWMOT, C.
- Régulation hormonale du grageonnement chez le mil.
HSIUNG, William Yu-Deng TRUDEL, M.J. & ST-PIERRE, J.C.
- Fongicides endotherapiques en relation avec le riz et autres plantes tropicales.
KHLOK, Seng Heang LACHANCE, R.O.

- Courbes de productivité de certaines céréales fourragères.
McELROY, Arthur GERVAIS, Paul
- Relations entre le climat et la croissance des végétaux.
MOINEAU, Denis DESCHENES, J.M. & CHEVRETTE, J.E.
- Etude écologique au golfe de Richmond, Nouveau-Québec.
OUZILLEAU, Jacques PAYETTE, Serge
- Etude de la dynamique de la végétation des paises du Nouveau-Québec.
SAMSON, Hélène PAYETTE, Serge
- Sélection d'hybrides de *Vaccinium corymbosum* et de *V. angustifolium* en vue de produire une ou des variétés de bleuets géants adaptés à notre climat.
TENNIER, Michel GAUTHIER, Fernand-M.
- Résistance au froid des rhododendrons mesurée par la méthode de la conductivité électrique.
OUELLET, Denise GAUTHIER, F.M. & VAN DEN HENDE, R.

McGILL UNIVERSITY - DEPARTMENT OF AGRONOMY

- Spatial arrangement and population effects in sorghum, maize and turnips.
FRANCIS, Thomas Roy GENDRON, G.
- Breeding and genetic studies in rapeseed (*Brassica napus* L.).
LABOKE, Damas Quirine LAWSON, N.C.
- Breeding of potatoes (*Solanum tuberosum*) for lowland tropics.
WARNOCK, Willard Borden KLINCK, H.R.
- The natural resource factors of Nevis (West Indies) and their role in beef production systems with special emphasis on fodder supplies.
EDWARDS, Linnell Malinson STEPPLER, H.A.

McGILL UNIVERSITY - DEPARTMENT OF BIOLOGY

- Isoenzymes in cell cultures derived from different parts of single bean plants (*Phaseolus vulgaris* L. var. *contender*).
ARNISON, Paul BOLL, W.
- Theoretical morphology.
BERNIER, Réjane SATTLER, Rolf
- The life cycle and cytology of rhizophlyctis.
BOYLAN, Brendan WILSON, C.M.
- Physical and chemical properties of pea cellulose.
BYRNE, Henry MacLACHLAN, G.A.
- Characterization of the buffer-soluble Cellulase from peas.
CHRISTOU, Nicholas MacLACHLAN, G.A.
- Theoretical and practical investigation of the phenomenon of "congenital fusion" as described in plant morphology, with special attention to epiphyllus stems and flowers.
DICKINSON, Timothy SATTLER, Rolf
- Extracellular polysaccharide in cell cultures of bush bean (*Phaseolus vulgaris* L. var. *contender*).
MANTE, Seth BOLL, W.
- Comparative floral morphology of the *Helobiae*.
POSLYSZNY, Usher SATTLER, Rolf
- Morphological, physiological and biochemical comparisons between cell cultures derived from different parts of single bean plants (*Phaseolus vulgaris* L. var. *contender*).
SEIN, Khin Maugn BOLL, W.
- Computer modelling of physiological processes in plants.
VOWINCKEL, Thomas BOLL, W.

McMASTER UNIVERSITY - DEPARTMENT OF BIOLOGY

- Hydrolysis of endosperm proteins in germinating maize.
HARVEY, B.M.R. OAKS, B.A.

Growth of nuclei in interphase: analysis of growth patterns in marked populations of proliferating cells of *Vicia faba* root meristems.

JAYA, Ghosh

DAVIDSON, D.

Ecology of *Alectoria ochroleuca* and *Cetraria nivalis* on Hudson Bay coastal raised beaches.

LARSON, Douglas William

KERSHAW, K.A.

Genetic control of recombination in *Neurospora*.

LOMBARD, Anne-Marie

THRELKELD, Dr.

The effect of soil temperature on plant cover in the Hudson Bay lowlands.

MCGREGOR, Cameron A.

KERSHAW, K.A.

Biomass productivity and related factors in a hypereutrophic marsh ecosystem.

BACCHUS, Herman M.

HARRIS, G.P.

UNIVERSITY OF MANITOBA - DEPARTMENT OF PLANT SCIENCE

Genetic studies in wild rice.

GUTEK, Larry Henry

CLARK, K.W.

Faba bean (*Vicia faba*); studies on the percentage outcrossing and optimum time of harvest.

WILSON, Alexander John

EVANS, Dr.

Cytology of Triticale.

SCOLES, Graham John

KALTSIKES, P.J.

MEMORIAL UNIVERSITY - DEPARTMENT OF BIOLOGY

Genetic control of pathogenicity in the Smut Fungus, *Ustilago hordei* (Pers.) Lagerhe.

FREAKE, Gerald Wayne

EMARA, Y.A.

The distribution, ecology and life history of *Bauhinia acuta* Nedw. in Newfoundland.

HANCOCK, James A.

BRASSARD, Guy R.

Cellular physiology of seed germination in *Allium cepa* L.

PAYNE, Jeremiah F.

BAL, Arya K.

Quantitative classification of plant communities in Newfoundland in relation to ungulates.

MERCER, W. Eugene

OLSEN, O.A.

A phytosociological and morphological classification of Peatlands in eastern Newfoundland.

WELLS, Edward Doyle

PELLETTE, F.C.

UNIVERSITE DE MONTREAL - DÉPARTEMENT DES SCIENCES BIOLOGIQUES

Concaulescences et gamophyllies atypiques dans le genre *Lonicera* (Caprifoliacees).

LAMOND, Michel (J.-Adrien)

VIETH, Joachim

Etude critique avec cartes de distribution de la flore arctique et subarctique de la péninsule Québec-Labrador.

LEGAULT, Albert

ROULEAU, Ernest

Inventaire de la végétation des rivières Dartmouth et York dans le comté de Gaspé.

BRODEUR, Denis

ROULEAU, Ernest

Etude comparée des principaux effets teratogènes induits sur l'*Antirrhinum* par la morphactine IT3456.

PICARD, Jacques

VIETH, Joachim

Contribution à l'étude des Sparganiaceae Rudolphi en Amérique du Nord.

HEBERT, Louis-Philippe

ROULEAU, Ernest

La concaulescence de *Cuphea ignea* (Lythracées).

SARRAZIN-GAGNON, Andrée

VIETH, Joachim

Physiologie de l'absorption de l'eau par les racines d'*Allium cepa*.

BERARD, Luce

CAILLOUX, Marcel

UNIVERSITY OF NEW BRUNSWICK - DEPARTMENT OF BIOLOGY

Morphogenetic and developmental studies of *Chondrus* Stackh.

CHEN, Lawrence C.-M.

TAYLOR, A.R.A.

Nutrient budget changes following fire in the Acadian Forest region.

MACLEAN, David Andrew

WEIN, Ross W.

Fungal degradation of lignin in wastes from pulp and paper mill.
STRANG, Sharon WHITNEY, Norman J.

Nutrient budget changes following fire in Arctic plant communities.
WEBER, Michael Gunter WEIN, R.W.

UNIVERSITE DU QUEBEC A CHICOUTIMI - DÉPARTEMENT DES SCIENCES PURES

Recherches paléophytogéographiques dans le Québec méridional, par l'analyse pollinique.
RICHARD, Pierre (J.H.) VAN CAMPO, M.

UNIVERSITE DU QUEBEC A MONTREAL - DÉPARTEMENT DE CHIMIE

Substances biologiquement actives dans *Dirca palustris*.
CARREAU, Gilles DRWESKI, André

UNIVERSITE DU QUEBEC A MONTREAL - DÉPARTEMENT DES SCIENCES BIOLOGIQUES

Etudes écologiques et floristiques comprises du marécage de la Rivière du Sud, Cté Iberville.
FOURNIER, Jean-Jacques HAMEL, Claude

QUEEN'S UNIVERSITY - DEPARTMENT OF BIOLOGY

Pollen content of river water.
STANLING, Robert CROWDER, Adèle

Pollen ray and vegetation in Wilton Creek Basin.
CUDDY, Don GOOD, H.M.

Divalent cation transport in mycelial fungus - relationship to phosphate metabolism.
PATON, William H.N. BUDD, K.

A study of the pyruvate dehydrogenase enzyme complex of etiolated Pea seedlings.
THOMPSON, R.A.Paul DENNIS, D.T.

La localisation intracellulaire de la nitrite réductase foliaire, critères d'intégrité chloroplastiques.
LABELLE, Richard CANVIN, D.T.

UNIVERSITY OF SASKATCHEWAN - DEPARTMENT OF BIOLOGY

Regulation of pyruvate kinases in *Fusarium*.
CLARKE, Margaret-Ann E. ZINK, M.W.

A study of the effect of alternaria species on Cruciferae.
DEGENHARDT, Keith J. MORRALL, R.A.A.

An ecological study of saxicolous lichens of the Saskatchewan Prairies.
HART, Robert Trevor SHEARD, J.W.

Aquatic macrophytes of Saskatchewan saline lakes.
HESELTINE, J.Michael HAMMER, U.T.

An ecological study of corticolous lichen communities in the southern boreal forest.
JESBERGER, James A. SHEARD, J.W.

Mitochondrial biogenesis in yeast.
LEUNG, Emily S.-C. RANK, G.H.

Experimental studies on the shoot apex of *Helianthus annuus*.
RENNIE, Patricia J. STEEVES, T.A.

The transport of amino acids across cell membranes.
SARGENT, Patricia A. KING, J.

UNIVERSITY OF SASKATCHEWAN - DEPARTMENT OF PLANT ECOLOGY

Effects of snow accumulation on prairie vegetation.
BENNETT, David L. ROWE, J.S.

Regeneration and environment of recent pulpwood cutovers in the southern boreal forest of Saskatchewan.
ANDERSON, Howard G. ROWE, J.S.

Models of succession in the sub arctic forest.
JOHNSON, Edward ROWE, J.S.

- The effect of grazing on surface mulch and organic matter distribution in the soil profile in natural grassland in Saskatchewan.

MARTENS, Harvey Edward

COUPLANT, R.T.

- Micrometeorological profiles and the microclimatology of a prairie grassland.

SPITTLEHOUSE, David

RIPLEY, E.A. & R.E. REDMAN

UNIVERSITE DE SHERBROOKE - DÉPARTEMENT DE BIOLOGIE

- Etude floristiques au Poste-de-la-Baleine (Great Whale), Baie d'Hudson.

FOREST, Philippe

LEGAULT, Albert

SIMON FRASER UNIVERSITY - DEPARTMENT OF BIOLOGY

- Mediation of indole-3-acetic acid in phloem transport of radioactive sucrose in *Phaseolus vulgaris*.

CLEMENTS, Sharon Jean

SRIVASTAVA, L.M.

- Factors influencing the expression of phytochrome-mediated germination of Grand Rapids lettuce (*Lactuca sativa* L.) seeds.

HSIAO, Andrew I-Hsiung

VIDAVER, W.

- Translocation strategy in *Macrocystis integrifolia* and *M. pyrifera* (Laminariales, Phaeophyceae).

LOBBAN, Christopher S.

DRVEHL, Louis D.

- Studies on effects of hormones on cambial activity and nuclear changes during xylem vessel differentiation.

LAI, Virginia H.Y.

SRIVASTAVA, L.M.

- A study of the sexuality and genetics of *Eudorina elegans* Ehrenberg.

HERBST, Diana Shawn

KEMP, C.L.

SIR GEORGE WILLIAMS UNIVERSITY - DEPARTMENT OF BIOLOGICAL SCIENCES

- Flavenoid compounds of flax seedlings identification and biosynthesis from ¹⁴C-labelled compounds.

THAKUR, Manohar Lal

IBRAHIM, R.K.

- Effect of sucrose and auxin on growth and lignification of tobacco callus tissue.

KUMAR, Suresh Atchuthan

IBRAHIM, R.K.

- A study of ribonucleic acid patterns of flax and tobacco tissue cultures.

RITTER, Leonard

IBRAHIM, R.K.

UNIVERSITY OF TORONTO - DEPARTMENT OF BOTANY

- Effect of naturally occurring inhibitors on survival of *Thielanopsis basicola* in soil.

LO, Amy.C.

PATRICK, Z.A.

- An ultrastructural and cytochemical characterization of microbodies in the green algae.

SILVERBERG, Ben Alexander

SAWA, Takashi

- The auto-ecology of the two centric diatoms *Melosira* and *Cyclotella* in Southern Ontario lakes.

BRYANT, Gordon Aldridge

SPANLING, C.

- Biotic factors affecting survival of *Thielanopsis basicola* in soil.

CLOUGH, Katherine S.

PATRICK, Z.A.

- A fire history of Barron Township, Algonquin Park.

CWYNAR, Les C.

ANDREWS, J.H.

- The role of pterocarpanoid compounds in disease resistance in red clover.

DUCZEK, Lorne

HIGGINS, U.J.

- Extracellular release in planktonic algae and bacteria.

DUNSTALL, Thomas G.

NALEWAJKO, C.

- Symplasmic transport in *Chara corallina*.

FISCHER, Richard A.

DAINTY, J.

- Bacterial spot of stone fruits.

HARPER, Douglas S.

PATRICK, Z.A.

- Contribution to the study of Coprophilous ascomycetes from East Africa.

KHAN, Rahmeth S.

CAIN, R.F.

- Biosystematics of *Epilobium* in Ontario.

PURCELL, Nancy Joan

GREAR, J.W.

- Taxonomy of *Lithospermum* in Ontario.
RAMCHARAN, Eugene K. McANDREWS, J.H.
- Synthesis of floridean starch in red algae - an ultrastructural and biochemical approach.
SHEATH, Robert Gordon HELLEBUST, J.A. & T. SAWA
- Lipid analysis of cellular fractions of *Vicia faba*.
SIMPSON, Ellen Elizabeth WILLIAMS, J.P.
- The effect of phosphorus-32 on the respiratory metabolism in the root tip of *Pisum sativum*.
MYERS, Ingrid Inta CHANDORKAR, K.R.
- The effect of phosphorus-32 radiation on the nucleic acid content of *Vicia faba* root tips.
KUDIRKA, Dalia Therese CHANDORKAR, K.R.
- Effect of carbon-14 radiation on photosynthesis in barley seedlings.
MYERS, Godfrey CHANDORKAR, K.R.
- Cytogenetic studies of *Tulbaghia* and *Trillium* species.
ROSS, Patricia Lee SARKAR, P.
- Baseline concentrations of heavy metals in river-mouth sediments of the Great Lakes.
FITCHKO, Yaroslav HUTCHINSON, T.C.
- Lipid metabolism in developing broad bean chloroplasts.
KHAN, Mobashsher Uddin WILLIAMS, J.P.
- The incorporation of $^{14}\text{CO}_2$ into the chloroplast lipids of *Vicia faba*.
WATSON, Garry R. WILLIAMS, J.P.
- A biosystematic study of the *Panicum lanuginosum* complex in Ontario.
CONNOLLY, Victoria CRUISE, J.E.
- Studies on the toxicity of an aqueous extract of crude oil to selected species of algae.
GRAHAM, John Edwin Smith HUTCHINSON, T.C.
- Ultrastructural and biochemical investigations into the nature of resistance of tomato varieties to *Cladosporium fulvum*.
LAZAROVITS, George HIGGINS, V.J.
- The water relations of hemlock.
TALBOT, Antony John DAINITY, J.
- A photosociological analysis of the forested regions of the Niagara escarpment.
CARLETON, Dale Frederick MAYCOCK, Paul F.
- The taxonomy of *Carex* series Lupulinae in Canada.
REZMICEK, Tony BALL, P.W.
- Effects of acid precipitation on the phytoplankton of two lakes in the Killarney region of Ontario.
YAN, Norman D. STOKES, P.

UNIVERSITY OF VICTORIA - DEPARTMENT OF BIOLOGY

- Studies of the biology of selected algae (Rhodophyta) of the N.E. Pacific with particular reference to growth, spore discharge, dispersal and survival.
ADAMS, Robert William AUSTIN, Alan
- A comparative study of the pollen of Douglas Fir (*Pseudotsuga menziesii*) and Maize (*Zea mays*).
BINDER, Wolfgang Dieter BALLANTYNE, D.J.
- Deep water surface sediment diatom assemblages of lakes of the insular lowlands of B.C.
BROWN, Sharon-D. HAGMEIER, E.M.
- Vegetation and environment at Long Beach: Phase I of the Pacific Rim National Park.
HARCOMBE, Andrew P. BELL, Marcus A.M.
- Pathway of carbon in *Aqualinderella fermentans* an obligately fermentative water mold.
STANLAKE, Michael G. PADEN, J.W.

UNIVERSITY OF WATERLOO - DEPARTMENT OF BIOLOGY

- Post-glacial history of Sunfish Lake from sediment analysis.
ADAMS, Robert DUTHIE, H.C.

- Mineral nutrition - ion uptake.
BREWER, Wayne L.J. DUMBROFF, E.B.
- Degradation of conifer needles in streams.
DRAPER, Marilyn KENDRICK, W.B.
- Cytogenetic studies in the genus *Mentha*.
FAGBEMI, Benjamin O. Babatunde MORTON, J.K.
- Fungal degradation of plastic.
KAVELMAN, Ruth KENDRICK, W.B.
- The cytology of *Cerastium* hybrids.
BOBBA, Ratna Kumari MORTON, J.K.
- Conidial states of *Ceratozystis*.
UPADHYAY, Harbansh Prasad KENDRICK, W.B.
- Development of *Coremium* in *Penicillium claviforme*.
VIMALA, Raghavan ZACHARIAH, K.
- Carbohydrate changes in sugar maple seedlings during the dormant season.
WALSH, Orville J. DUMBROFF, E.B.
- Effect of Dipyrinylium herbicides on non-target organisms.
SMITH, Eric MAYFIELD, C.I.
- Physiological characteristics of sugar maple during the dormant season.
BROWN, Daniel Charles DUMBROFF, E.B.
- Phytoplankton composition and productivity of lakes in the Matamek River Basin, Quebec.
JANUS, Lorraine DUTHIE, H.C.

UNIVERSITY OF WESTERN ONTARIO - DEPARTMENT OF PLANT SCIENCES

- Influence of chloronice on phycomycetes.
NOON, Jennifer HICKMAN, C.J.
- Ultrastructure and biochemistry of zoospores of *Phytophthora palmivora*.
BIMPONG, Christina E. HICKMAN, C.J.
- Light effects in the flowering of *Chenopodium rubrum*.
ANDREAE, Shirley HOPKINS, W.G.
- Numerical chemotaxonomy of the Arundinelleae (Gramineae).
LEONG, Yuek-Kwong PHIPPS, J.B.
- An empirical study of surface charge on intracellular membranes.
MARIN, Jeanne S. HOPKINS, W.G.
- Fungicidal treatment of corn seed.
MACDONALD, Bertram McKEEN, W.E.
- Pythium root rot of barley.
CONWAY, Timothy McKEEN, W.E.
- Hormones (*Gibberellius*) and floral morphogenesis in *Nigella damascene*.
RAMAN, K. GREYSON, R.I.
- A study of light reactions involved in the flowering of *Chenopodium rubrum* L. (ecotype 60° 47' N), a short day plant.
SAWHNEY, Ramma CUMMING, B.G. & C.J. HICKMAN
- Peroxidase isozymes from peanut cell suspension culture.
SRIVASTAVA, OM.P. VAN HUUSTEE, R.B.
- Aspects of the dispersal and fate of seeds of 3 species of *Polygonum* (Smartweeds) with respect to survival in riverbank habitats.
STANFORTH, Richard John CAVERS, Paul B.
- Some aspects of population dynamics of *Barbarea vulgaris* R.Br.
MACDONALD, Marilyn A. CAVERS, Paul B.
- Seed dispersal, germination, and seedling establishment of two melitoses, *Melilotus alba* Desr. and *Melilotus officinalis* L.
REMPEL, Erika CAVERS, Paul B.

- Studies on the population dynamics of *Rumex crispus* L. and *Rumex obtusifolius* L.
KELLY, Susan W. CAVERS, Paul B.
- Mathematical description of ecological succession.
VAN HULST, Robert ORLOCI, L.
- Numerical taxonomy of the genus *Graphium* and other possibly related genera of the fungi imperfecti of Ascomycetes.
DABINETT, Patrick E. WELLMAN, A.M.
- Chemotaxonomy of lichens.
FOSTER, Martha L. FAHSELT, D.
- Cell fusion and somatic nuclear division of basidiomycetes, *Ustilago violacea*.
POON, Ngok-Hung DAY, A.W.
- The effects of roadside salt on white cedar.
FOSTER, Alex C. MAUN, A.
- Multivariate approaches to natural variation in Jack Pine.
BESHIR, M.E. ORLOCI, L.
- Nutritional studies on *Cladophora glomerata*.
MOORE, Laurence Frank MCLARTY, D.A.
- Host-parasite relations of *Diplocarpon rosae* Wolf.
MARSHALL, John Ainsley MCKEEN, W.E.
- Variation among populations of *Rumex crispus* L.
HUME, Larry CAVERS, Paul B.
- Development and regeneration of the tomato leaf.
COLEMAN, Warren K. GREYSON, R.I.
- Bidirectional replication in the DNA of *Zea mays* as affected by the amount of heterochromatin.
ROBERT, Thomas WALDEN, D.B.
- Proteins in peanut cell cultures.
KOSSATZ V. Christine VAN HUYSTEE, R.B.
- Statistical studies on the distribution of grasses as indicators for centre(s) of evolutionary origin
BOMMAREDDI, Reddi V. PHIPPS, J.B.
- The uptake of adenine and utilization of research pools during germination of certain adenine mutants of *Neurospora crassa*.
PENDYALA, Lakshmi WELLMAN, A.M.
- The ultrastructure of resistance of barley of *Erysiphe graminis* f.p. *hordei*.
RIMMER, S. Roger MCKEEN, W.E.
- Field resistance mechanisms in potato to *Phytophthum infestans*.
PAIGNELL, Douglas C. HICKMAN, C.J.
- Regeneration in *Taraxacum officinale* Weber with special emphasis on the root system.
MANN, Henrietta CAVERS, Paul B.
- Fungal oxidation of gaseous hydrocarbons.
DAVIES, John Stephen WELLMAN, A.M. & J.E. ZAJIC

ABSTRACTS OF PAPERS
TO BE PRESENTED
BY CBA/ABC MEMBERS
AT THE JOINT ANNUAL
MEETINGS, TEMPE, ARIZONA
JUNE 1974

(an asterisk* denotes the person presenting the paper)

DEVELOPMENTAL SECTION

TIMOTHY DICKINSON* and ROLF SATTLER. Biology Department, McGill University, Montreal, Quebec, Canada. - Ontogeny and Interpretation of Epiphyllous Inflorescences.

The ontogenies of two epiphyllous inflorescences (in the genera *Phyllonoma* Willd. and *Helwingia* Willd.) have been studied, and found to involve contrasting patterns of growth. In the first case, a fertile axis is initiated on the leaf primordium well above the axil, apparently through remeristemization of cells of the adaxial side of the primordium. In the second case initiation occurs at the base of the leaf primordium, near the axil, and the resulting inflorescence primordium is then carried up by intercalary growth beneath its base and that of the leaf. These two patterns appear to account for a majority of the epiphyllous branch systems whose development has been studied. They are associated with a variety of morphological interpretations of the mature epiphyllous condition. It is argued that the requirements of the classical shoot theory for such interpretations are not justified, and that epiphyllous can be better understood in terms of changes in the position of organ initiation, and intercalary growth.

JOHN N. A. LOTT. Department of Biology, McMaster University, Hamilton, Ontario, Canada, L8S 4K1. - Dynamics of the Nuclear Envelope in the Cotyledons of *Cucurbita maxima*.

The frequency and distribution of nuclear pores in cotyledon mesophyll cells of *Cucurbita maxima* were studied from early stages of germination until cotyledon senescence. The number of nuclear pores per square micron of nuclear envelope surface area increases significantly when the cotyledon changes from a storage organ to a photosynthetic leaf. Subsequently the number of nuclear pores per square micron decreases with the onset of senescence. The number of nuclear pores per unit area of nuclear envelope thus changes with differing physiological states of the cotyledon cells. Data on the changes in nuclear volumes occurring during development will be presented. Temperature of seedling growth influences the number of nuclear pores per square micron of nuclear envelope. Plants grown under different temperatures to approximately the same morphological stage of development have significantly different numbers of nuclear pores per square micron of nuclear envelope. Plants grown under cooler temperatures have more nuclear pores per unit area than do plants grown under warmer conditions, even in cases where nuclear volumes are not significantly different between the plants grown at the two different temperatures.

USHER POSLUSZNY* and ROLF SATTLER. Department of Biology, McGill University, Montreal, Quebec, Canada. A Comparison of floral development in *Ruppia* and *Potamogeton*.

There has been much discussion in the past on the nature of the flower of *Ruppia* and the small dorsiventral outgrowth on its stamen connectives. It has been generally concluded that the flower of *Ruppia* is equivalent to the flower of *Potamogeton* and, specifically, that the small outgrowths of the connectives in *Ruppia* are homologous with the sterile appendages of the *Potamogeton* flower that have been shown to be sterile phyllomes. These conclusions have been based on mature flowers, since no developmental data have been available for the flower of *Ruppia* up to now. The floral development of *Ruppia maritima* was studied by investigating sequential stages of whole buds and later sectioning them to observe histological activity. This study determined that there was a remarkable difference between the development of the phyllome-like outgrowths in *Potamogeton* and *Ruppia*. In *Potamogeton* the appendages are initiated acropetally on the floral apex and develop like typical phyllomes, while in *Ruppia maritima* the connective outgrowth develops, unlike either a tepal or a bract, after stamen inception, in fact after the beginning of thecal differentiation. It results from growth very slightly abaxial to the tip of the stamen connective. Although it becomes dorsiventral, it differentiates no procambial tissue and consequently lacks any vascularization at maturity. In general it is similar to a vertical extension of the stamen connective in *Potamogeton densus*, and may be considered homologous to the latter.

KAZUO NAKAMURA* and DOUGLAS F. BRAY. Department of Biological Sciences, University of Lethbridge, Lethbridge, Alberta T1K 3M4, Canada. - Ultrastructure of Palmelloids in *Chlamydomonas eugametos* Induced by Chloroplatinic Acid.

In a study of the effects of various metal compounds on the unicellular green alga *Chlamydomonas eugametos* Moewus we have found that chloroplatinic acid induces palmelloid formation by preventing the liberation of dividing cells (Nakamura et al, Can. J. Bot., in press). Two possibilities can be invoked to explain the palmelloid condition: 1) the inhibition of flagellar function or the total loss of this structure 2) an abnormality in the production of cell wall or related material during cell division resulting in cohesion of daughter cells. Cells from exponentially growing cultures were inoculated and grown in medium containing 0.05 mM chloroplatinic acid. Electron microscopic examination of KMnO_4 and glutaraldehyde- OsO_4 fixed palmelloids revealed the multilayer nature of the cell walls following second division. Examination of freeze-etched specimens revealed palmelloid envelope material to be structurally similar to, and in some areas continuous with the cell walls of individual cells within the palmelloid. The cells themselves appeared normal, and the presence of a normal flagellar structure was confirmed. The above results support the hypothesis that the palmelloid condition of *C. eugametos* induced by chloroplatinic acid is due to an abnormality in cell wall formation rather than flagellar malfunction or loss.

N.P. BADENHUIZEN. Department of Botany, University of Toronto, Ontario. - The Fine Structure of the Giant Plastids of *Helleborus corsicus*, Willd.

The large proteinoplasts in the epidermal cells and those near the vascular bundles are characteristic for *H. corsicus*. In a young stage they show dispersed DNA-areas, then temporarily become amyloplasts. Finally they lose the starch, but still contain phosphorylase. A membrane-surrounded osmophilic globular structure with DNA-areas around it, develops at the periphery of the plastid. Its contents are easily expelled. Stomatal guard cells possess amyloplasts, as usual.

JAMES A. HANCOCK and GUY R. BRASSARD*.

Department of Biology, Memorial University, St. John's, Newfoundland, Canada. - Element

Content of Moss Sporophytes: *Buxbaumia aphylla*.

The mineral element content of plant tissues and substrates of the moss *Buxbaumia aphylla* were analyzed and represent the first data for bryophyte sporophytes. *Buxbaumia* concentrates boron, calcium, copper, lead, magnesium, manganese, nickel, phosphorus, potassium, silver, strontium, and zinc, to levels higher than those found in the associated soils. Silver, an element rare in bryophytes and previously found only in *Atrichum* and *Polytrichum*, was found in *Buxbaumia*.

Nancy G. Dengler * and Lynette B. MacKay, Department of Botany, University of Toronto, Toronto, Ontario-

The Leaf Anatomy of Beech, *Fagus grandifolia*.

Structural features related to the pathway of water movement in the leaf of beech, *Fagus grandifolia*, have been examined in conjunction with investigations on water relations. Cell surface areas and volumes were determined by projecting 2um serial sections, measuring with a map tracer, and multiplying cell perimeters by section thickness or by the trace-cut-weigh method. The average maximum distance over which water must move from the tracheary elements of the minor veins to the mesophyll cells is 60um, and each 6um length of vein (the average diameter of a palisade cell) supplies 33 cells. Lateral transport may be facilitated by bundle sheath cells which project from minor veins at right angles. The mesophyll cell walls may provide the pathway through which the bulk of the water moves; the volume occupied by the mesophyll cell walls is .02 cm³, or 4% of total leaf volume.

JANET R. DUGLE* and DENIS H. THIBAUT.

Atomic Energy of Canada Limited, Whiteshell Nuclear Research Establishment, Pinawa, Manitoba, Canada, ROE 1LO. - Pre-irradiation Study of Tree Size, Age and Growth in the Field Irradiator - Gamma Area.

Basic data on size, age and growth of stands of ten species of native Manitoba trees prior to chronic gamma irradiation are presented. Height can be predicted from circumference in balsam fir, birch, black ash, aspen, balsam poplar, jack pine, white spruce, upland black spruce, bog black spruce and larch. Age can be predicted from either circumference or height in balsam fir, aspen, white spruce, bog black spruce and larch. In black ash age can be predicted from circumference and in jack pine age can be predicted from height. Some influences of environmental factors were noted between stands.

VLADIMIR J. KRAJINA. Department of Botany, University of British Columbia, Vancouver, B.C., Canada V6T 1W5. - Progress of Ecological Reserves in British Columbia.

Since Ecological Reserves Act was passed on April 2, 1971, as chapter 16, Statutes of British Columbia, 1971 53 ecological reserves were established in British Columbia totalling 36,263.72 ha (89,608.24 acres). The largest ecological reserve amounts to 9,834.07 ha (24,300 acres). The average size of each ecological reserve is 684.23 ha (1,690.72 acres). These 53 ecological reserves were selected on the basis of 166 applications which were presented to the B.C. government through the British Columbia Ecological Reserves Committee which meets twice a year. It is hoped that many other ecological reserves will be added and many new proposals will be presented in 1974. Among the new proposals will be even the virgin forests on Vancouver Island, in which Douglas-fir grows nearly 90 m (300 feet) tall. This conservation work has been done in British Columbia mainly as a partial work of the sub-committee on conservation of terrestrial communities (CT) of the Canadian Committee for the International Biological Programme (CCIBP). Ecological reserves in British Columbia are located on crown lands outside of national or provincial parks.

JACK MAZE. Department of Botany, University of British Columbia, Vancouver, B.C. V6T 1W5, Canada. - Development and interpretation of the lodicules in *Andropogon gerardii* (Gramineae).

Lodicules are small organs at the base of the gynoecium, which at anthesis, take up water, swell, force open the lemma and palea, and hence facilitate pollination. Lodicules have been interpreted as: modified perianth, modified unspecified foliar structures, modified stems, or as organs without morphological equivalents. Lodicules first appear as a protuberance and undergo apical growth and intercalary growth at the attachment to the axis. Associated with initiation and apical growth are periclinal divisions in the protoderm. A second site of growth appears early in development, resulting in an increase in thickness and growth in length. As seen in cross section, the lodicules appear first at opposite sides of the axis and then initiation spreads to the mid-point. Later in development, marginal meristems appear. Apical growth involving periclinal divisions in the protoderm and marginal meristems are foliar features. The growth resulting in length and increased thickness is interpreted as an adaxial meristem and is hence a foliar feature. Initiation at opposite sides of the axis and subsequent spreading to the mid-point is seen also in the palea. Intercalary growth at the attachment is a unique developmental feature. The positional relationship between the lodicules (considered as a single unit) and the palea is that of opposite bracts. A similar positional relationship is seen between the functional lodicules (considered as a single unit) and the third lodicule in *Stipa*.

JOHN N. OWENS* and MARJE MOLDER. Department of Biology, University of Victoria, Victoria, British Columbia V8W 2Y2. - Cone Initiation and Development Before Dormancy in Yellow Cedar (*Chamaecyparis nootkatensis* (D. Don) Spach.).

Vegetative shoots initiate leaves and lateral branches continuously from mid-April until the end of September. No buds with bud scales are formed and the vegetative apex is enclosed by leaf primordia at various stages of development. Pollen cones are initiated on proximal vegetative shoots during a 3-week period from mid-June to early in July. Transition to a pollen-cone apex is marked by an increase in mitotic activity in the apex and the formation of a lateral branch in the axil of one

of the last-formed leaf primordia causing the apex to appear to branch dichotomously. The lateral branch remains at the base of the pollen cone and may resume growth the next year after the pollen cone is shed. Pollen-cone development continues until the end of September. Meiosis occurs during the last 2 weeks of August and pollen develops during September. Seed cones are initiated on newly-formed, distal axillary vegetative shoots during a 3-week period from late June to mid-July. Transition to a seed-cone apex is marked by an increase in mitotic activity followed by bract-scale initiation. Usually three ovules are initiated in the axil of each bract-scale. Seed-cone development is complete by early September and the seed cones become dormant.

EVA PIP* and J.M. STEWART. Department of Botany, University of Manitoba, Winnipeg, Manitoba R3T 2N2, Canada. - The Dynamics of Two Plant-Snail Interactions in Certain Aquatic Systems in Manitoba. In the areas studied thus far the bassomatophoran gastropods *Physa gyrina* and *Lymnaea stagnalis* have been found to be respectively associated with the aquatic macrophytes *Potamogeton pectinatus* and *P. richardsonii*. The two associations are significant during most of the active plant growing season but peak at times which appear related to the host plant's developmental stage. Where both associations occur in close proximity, they appear to be independent of each other. The two gastropod species comprise the bulk of the total molluscan grazer populations on the macrophytes. Such differential grazing probably reduces interspecific competition. It is suspected that species-specific plant-originated metabolites may be among the causative agents responsible for the differential distribution.

RICHARD T. RIDING* and ANDREW MACLEAN. Department of Biology, University of New Brunswick, Fredericton, New Brunswick. - The Short Shoot Apex of Vegetative and Mature Trees of *Pinus resinosa*.

One, 2, and 3 year-old needle fascicles were collected from dormant 7 and 42 year-old trees. The needle fascicles were sectioned longitudinally in the plane of the two needles and examined. The diameter of the needle fascicle, size of the shoot apex and number of primordia decreased as the age of the whorl sampled increased. There were also differences in the size and apparent zonation of the shoot apex between the vegetative and mature trees. The short shoot apices from the mature trees were larger and more lightly stained in the apical zone than in the peripheral zone; the apices from the younger trees stained uniformly. On a branch, the size of the short shoot apex decreased with age and the primordia around the apex became necrotic. In 3 year-old needle fascicles the apex was frequently not evident.

WILLIAM ROFF. Department of Biology, Queen's University, Kingston, Ontario. - Vegetation analysis of a *Typha* swamp in southeastern Ontario.

A *Typha* swamp with 5 major physiognomic dominants was sampled by means of belt transects crossing areas dominated by each of these 5 species. The data were classified subjectively and by means of a sum-of-squares polythetic agglomerative computer program. At a low level of the clustering procedure, groups of species dominated by 1 or 2 of the major dominants emerged. These groups corresponded to a large degree with those recognized subjectively. 2 groups dominated by *Calamagrostis*

canadensis (Michx.) Beauv. were confined largely to dry or barely flooded sites, and 2 *Typha* groups to a stand next to open water; the remaining groups occupied other flooded sites. The relationship of the dominants among themselves, and to some environmental factors, will be discussed.

J. STAN ROWE*

Department of Plant Ecology, University of Saskatchewan, Saskatoon, Saskatchewan. - Fire initiates lichen-rich peatlands in the Mackenzie River Valley, Northwest Territories.

Permafrost-cored peat plateaus are a common land-form in the upper Mackenzie Valley. Their surfaces, uplifted one or two meters above adjacent wet fens, are commonly vegetated by *Sphagnum fuscum*, *Ledum groenlandicum* and *Picea mariana*. The effect of intense fires is to kill the woody species and the *Sphagnum*, providing a surface congenial to the invasion first of cup lichens and then of fruticose lichens. In certain regions, large areas of organic terrain come to be completely dominated by white and yellow *Cladonia* and *Cetraria* species.

ERNEST SMALL*. Biosystematics Research Institute, Canada Agriculture, Ottawa KIA 0C6.

Eco-physiological Adaptations in Peat Bog Plants.

(1) Bog substrates (a) are often highly deficient in nutrient elements, particularly nitrogen, (b) sometimes contain potentially toxic levels of elements such as manganese, (c) are often waterlogged, and (d) are usually cold. (2) Bog species are often xeromorphic and evergreen. Studies were conducted on the nutrient, water, and photosynthetic relations of bog species in an attempt to clarify the relationships between (1) and (2). Water potential and transpiration characteristics of bog plants paralleled that of mesophytes, pointing out that the often advanced theory of "physiological drought" in the substrate constitutes an inadequate explanation of bog plant xeromorphy. Some evidence was found that bog species exclude potentially toxic manganese, and it appears this aspect of bog eco-physiology is unrelated to the morphological peculiarities of bog plants. Bog species in comparison to non-bog species, were found to have lower concentrations of nitrogen, and a lower ability to accumulate nitrogen, in the foliage, not to have a higher potential for reabsorbing nitrogen from the leaves prior to leaf abscission. The hypothesis is advanced that the increased time available (a consequence of higher reabsorption and of evergreenness) to use nitrogen photosynthetically before this nutrient element is recycled, is adaptive in bog evergreens because of the difficulty of acquiring nitrogen in bogs. Thus evergreenness (leaf perennality) is interpreted as an adaptive response to nutrient deficiency. Because evergreen leaves must survive the winter, it is plausible that the xeromorphy of bog species simply reflects adaptation to desiccation accompanying the winter season.

R. SUFFLING, D.W. SMITH, D. STEVENS, & T.S. DAI
Department of Botany and Genetics,
University of Guelph, Guelph, Ontario, Canada

Plant Community Age as an Index of Sensitivity
to Environmental Damage

Objective measures of environmental impact of proposed utility corridors are badly needed. While aesthetic, ecological and other indices may be objective, their comparison involves weighting and is thus a political value judgement. A scheme for objectively rating the ecological value of different areas is

suggested. Older plant communities are less quickly replaced upon destruction than younger ones, so that each community may be rated in comparison with the oldest one in the area. This is assigned a 'fractional age' of unity. Plant communities were considered to represent all ecosystem components. The 'proportional area' of each community may also be expressed as a fraction of one. The product of fractional age and fractional area gives a 'community sensitivity rating' and the sum of such values for a given sample represents an 'area sensitivity rating' (ASR). A comparison of ASR values for Luther Marsh (Wellington County, Ontario) with individual subjective ratings by three biologists showed no significant relationships whereas comparison with the average subjective ratings showed a significant but non-linear trend. Possible reasons for this are discussed.

CALVIN WEBB* and J.M. STEWART. Department of Botany, University of Manitoba R3T 2N2, Canada.
- Forest Composition at Pinawa, Manitoba in Relation to Substratum Nutrient Status.

The preliminary results of an evaluation of tree species composition, tree species dominance, and substratum nutrient status relationships of forested areas are assessed. Only nutrients a priori deemed most important quantitatively to tree growth have been investigated. Ultimately an assessment of the importance of nutrients as an environmental parameter is desirable, such data is especially valuable to practising field ecologists. Some results on the usefulness of the information statistic in such investigations are also presented.

PALEOECOLOGY SECTION

J. H. MCANDREWS AND R. J. ADAMS.*
Department of Botany, University of Toronto and Department of Geology, Royal Ontario Museum, Toronto, Ontario.
- Modern Pollen Deposition in Ontario: a trend surface analysis.

Contour maps of pollen percentages from 60 surface samples are compared with forest and land-use regions. Ambrosia and Quercus peak at 20 to 30% in the deciduous forest

and agricultural region of the south and decline to 0% at the southern boundary of the boreal forest. Fraxinus, Ostrya-Carpinus, Carya, Fagus, Ulmus and Gramineae show a similar northward trend from peaks of 2 to 6%. The Great Lakes-St. Lawrence forest region is characterized by peaks of Pinus (40%), Betula (20%), Acer (4%) and Tsuga (4%). The boreal forest region is characterized by a peak of Picea (40%) and Alnus (5%) that decrease to 0% southward.

PHYCOLOGY SECTION

LYNDA J. GOFF* and KATHLEEN COLE. Department of Botany, University of British Columbia, Vancouver, B.C. V6T 1W5, Canada. - Developmental Studies of the Red Algal Allopasite Harveyella mirabilis (Cryptonemiales).

Harveyella mirabilis has been described as a parasitic red alga and reported to occur in the northeast and northwest Atlantic oceans on Rhodomela confervoides and R. lycopodioides. It has been recently collected in Oregon, Washington and British Columbia on Odonthalia floccosa, O. washingtoniensis and R. larix. Field and culture studies reveal that the infection of the host by Harveyella carpospores and tetraspores occurs only in injured areas of the host. Each spore, after settling in the remnants of ruptured host cells, produces a single rhizoidal expansion which penetrates between exposed, loosely adjoined host medullary cells. This extension subsequently gives rise to a series of cells which ramify through the localized tissue region adjacent to the injury. In culture, vegetative pustules were observed within 75 days of sporulation. A 15 month field study of the life history of two British Columbian populations of H. mirabilis on O. floccosa has shown the reproductive cycling to be correlated to changes in measured environmental parameters. These data are compared to that of British and Scandinavian populations.

HEDY J. KLING*.
Department of Environment, Eutrophication Section, 501 University Crescent, Winnipeg 19, Manitoba.
Phytoplankton of Northern and Western Canadian Lakes.

Analysis of phytoplankton communities in a number of representative lakes from the arctic, sub-arctic, prairie and Canadian Shield areas of northern and western Canada, indicate a variation in plankton standing crops from less than 1000 mg/m³ in ultra-oligotrophic arctic and Canadian Shield lakes to maxima of more than 50,000 mg/m³ in highly eutrophic prairie lakes. Dominants varied from Chrysophyceae in oligotrophic lakes to Cyanophyta in eutrophic lakes.

D.T. WAITE*, Department of Biology, University of Saskatchewan, Regina, Saskatchewan; and
H.C. DUTHIE, Department of Biology, University of Waterloo, Waterloo, Ontario N2L 3G1, Canada. - The Seasonal Phytoplankton Succession Cycle in Sunfish Lake, Ontario.

Phytoplankton samples were taken at eight depths, from the surface to 10 m., at weekly intervals from 31 May to 25 October, 1971. A total of 40 different species were identified and enumerated with an inverted microscope. Simultaneous measurements of water temperature, daily light intensity and light absorption curves were made at each phytoplankton sampling depth. These data are combined, by multivariate analysis, to indicate the significance of physical environmental changes accompanying the seasonal phytoplankton cycle.

PHYSIOLOGY SECTION

Phillip E. Reynolds*, J. Raigosa and P. Trip. School of Forestry and Environmental Studies, Yale University, New Haven, Connecticut, 06511. - Qualitative and Quantitative Changes in First Products of Photosynthesis in Cecropia peltata as Related to Age.

Small leaf sections of Cecropia 4 and 10 wks. old were exposed to $^{14}\text{CO}_2$ for 10 or 30 secs., and immediately extracted in boiling 80% ETOH. Extracts were separated by descending paper chromatography, and radioactive spots located by radioautography. Percentages of radioactivity in each of the spots was determined by using a liquid scintillation counter. Four-wk. old Cecropia leaves given a 10-sec. exposure to $^{14}\text{CO}_2$ had 75.3% of all their radioactivity in various 5-sugar phosphates as compared with 13.2% in 10-wk. old tissues. For 10-wk. old tissues, 30.3% of all radioactivity occurred in sucrose and alanine. By contrast, 4-wk. old leaves only had 6.7% of their radioactivity in these products. Parallel distributions appear to hold for leaves exposed for 30 secs. Four-wk. old Cecropia leaves had 62.4% of their radioactivity in various 5-sugar phosphates as compared with 15.3% in 10-wk. old leaf tissues. For the latter, 60.4% of all radioactivity occurred in sucrose and alanine as compared with 8.0% in 4-wk. old tissues. For a 10-sec. exposure, Cecropia leaves 10-wks. old produced glucose (38.9%), whereas leaves 4-wks. old did not. The same situation held true for the 30-sec. exposure. In addition, for the 30-sec. exposure, aspartic acid, glycine and serine were produced by 4-wk. old leaf tissue but not in 10-wk. old tissue.

THOMAS VOWINCKEL*, WALTER C. OECHEL AND WILLIAM G. BOLL, Department of Biology, McGill University Montreal, P.Q., Canada. - Photosynthesis of Picea mariana at the Subarctic Treeline.

Field measurements of the diurnal rates of photosynthesis of black spruce, the dominant tree species at the timberline, were made during the summers of 1972 and 1973 at Schefferville, P.Q. (lat. 55°N). All relevant plant physiological and environmental parameters were also monitored.

Photosynthesis was measured with an open gas analysis system with temperature controlled cuvettes. Maximum daily rates were 2.5 - 3.5 mg CO_2 /day. Temperature was important during the summer months in affecting daily photosynthesis totals. The photosynthesis vs. needle temperature curve had an optimum of 15°C. Dark respiration rates were 0.2 - 0.4 mg CO_2 /gm DWT/hr at 15°C. The photosynthesis vs. light intensity curve was saturated at 0.8 ly/min (1.0 micro-einsteins/ cm^2 /sec, Phar). As a result heavy cloud cover considerably reduced instantaneous photosynthesis rates and affected daily totals.

Needle temperatures within the cuvette were 2 - 4°C above air temperature under full sunlight (1.3 ly/min). Needle temperatures under natural conditions were up to 7°C above Stevenson screen temperature, and fluctuated rapidly with changes in turbulence.

These field results have been used to construct a computer model, to predict variations in seasonal photosynthesis over 10 years at Schefferville, P.Q. from meteorological station data.

PHYTOCHEMICAL SECTION

R. TSAY and I. E. P. TAYLOR*

Department of Botany, University of British Columbia, Vancouver, B.C. V6T 1W5, Canada.

Changes in Isoenzymes, Proteins, and Amino Acids during Development of Funaria hygrometrica Hedw. Spores of Funaria hygrometrica were cultured on defined mineral agar medium. Changes in disc electrophoresis patterns of the isoenzymes of dehydrogenases, peroxidase and α -esterases were observed at 7 day intervals. The number of bands increased during development, and stable patterns were obtained after 8 weeks growth. Two esterases, four peroxidases, two formic dehydrogenases, two glutamic dehydrogenases, and three lactic dehydrogenases were identified. The number of malic dehydrogenases varied during development. All dehydrogenase electrophoregrams has a slow moving, thin, bright red, tetrazolium-positive band. This had the same mobility as the slow moving α -esterase band. Changes in enzyme patterns were correlated with changes in amino acid and protein fractions.

(Supported by NRC of Canada grant # A 5397)

WOODLAND, DENNIS W. Macdonald Campus, McGill University, Ste. Anne de Bellevue, P.Q., Canada. Cytological and phenolic relationships in the genus Urtica of North America.

There has been confusion in the species epithets applied to the genus Urtica in North America. This report shows that two chromosome number races and six taxa are present. Three annuals exist, all diploid ($2n = 26$) as follows: Urtica chamaedryoides, southeastern United States; U. gracilentia, southwest; U. urens, cosmopolitan; one polyploid perennial species with three subspecies: U. dioica ssp. dioica, tetraploid ($2n = 52$), mostly Greenland, St. Lawrence River drainage, south to South Carolina; U. dioica ssp. gracilis, a diploid ($2n = 26$) race on the east side of the Rocky Mountains to the Atlantic coast, a tetraploid ($2n = 52$) race mostly west of the Rockies; U. dioica ssp. holosericea, diploid in California and the Great Basin. Artificial hybrids within the diploid and tetraploid perennial taxa produced fertile F_1 's. Artificial hybrids between diploid and tetraploid taxa produced F_1 's with irregular chromosome pairing in the pollen mother cells and no seed set. Phenolic relationships support the classification of the perennial Urtica dioica into three groups.

SYSTEMATICS SECTION

M. A. MAUN* Department of Plant Sciences, University of Western Ontario, London, Canada. Ecological Interactions between Soybeans and Weed species in Agro-ecosystems.

The interaction between soybeans (*Glycine max*) and barnyardgrass (*Echinochloa crusgalii*) was commenced or terminated when soybean plants were 2, 3, 4, 5, 6, 7, 8, 9, and 10 weeks old. The reproductive efficiency of soybeans was not lowered if the competition continued until the plants were 3-4 weeks old. In fact there was a slight stimulation of growth due to co-operative interaction. The plants exhibiting this interaction were more leafy and slightly taller than control. This type of interaction was only visible for about a week after which the adverse effects of competition started to show. If the weeding of soybeans was delayed beyond 6 weeks, the productivity was drastically reduced. The plants became spindly with weak stems and bore few seeds. The nodulation capacity was also lowered. The growth and reproduction of barnyardgrass was also reduced due to the presence of soybeans. There was a decrease in dry matter by about 50 to 250 percent depending on the length of time, the plants were under competition. Similar adverse effects, on productivity of other weeds, were also observed.

JAMES B. PHIPPS. Department of Plant Sciences, The University of Western Ontario. - Optimising Grid Size in Phytogeographic Studies.

Recently much attention has been paid to quantifying procedures in biogeography with the aim of objectifying and making more precise biogeographical

zones and their limits and the comparisons of biotas. A problem arises, however, in dividing up large land areas into grid units of suitable size for sampling - results can vary considerably among a set of contrasted results invariant for mathematical method but unstable for grid size. This paper shows a method for optimizing grid size with an example from the distribution of Turkish poppies (*Papaver*). The method involves the selection of that size of grid square for which the variance of species' density is greatest.

B. V. REDDI and J. B. PHIPPS. Department of Plant Sciences, The University of Western Ontario, London, Ontario - Statistical Analysis of the Geographical Distribution of the Arundinelleae, Gramineae.

The Arundinelleae were studied statistically in order to objectively determine areas of high and low density of species. They are grasses of savanna and monsoon climates. The results confirm Phipps' earlier suggestion and clarify many details. Firstly, the distribution of *Arundinella* (plus *Jansenella*) is shown to be essentially distinct from the rest of the tribe. *Arundinella* is found in all continents with a tropical component, but its centre of distribution is in India and SE Asia. The remainder of the tribe is almost entirely African. Taking into account the latest information on continental drift, the differing ability of the diaspores of Arundinellean genera for long-distance dispersal and the overall inability of the tribe to penetrate cool climatic areas, deserts or tropical rain forest, then the tribe must have originated in Gondwanaland, perhaps on the African plate. The early evolution of *Arundinella* permitted it to spread widely but the confining of most of the tribe to Africa is to be predicated on a later date of origin.

TEACHING OF BOTANY SECTION

W.G. BARKER. Department of Botany and Genetics, University of Guelph, Guelph, Ont., N1G 2W1, Canada. - The "Biology Hour" Phenomenon.

During the past two years at the University of Guelph a weekly non credit no fee noon hour presentation has been made of current and controversial biological topics. These have of necessity (because of auditoria use) been restricted to a one hour period. Attendees have been invited to bring their lunch and to participate in the discussion. The series, entitled the "Biology Hour" is advertized by poster within the University and by TV, Radio and newspaper within the community. Now in its third season it is attended by between 300 - 600 persons at each session drawn from a university community of about 8,500 students in a city of 65,000. Perhaps 30 per cent of the audience is non-student. The program format consists of a continuing chairman who introduces the speaker (or film) of the day. The speaker restricts his remarks to 35-40 minutes and responds to questions to fill up the 55 minutes. Sample topics: Are Weeds Bad Guys?; Up-dating the Pill; A Whale of a Tale (Whales); We All Love Roses but do Roses Love You. The speakers are drawn from our own resources and it is now a status situation to speak on the Biology Hour.

DOUGLAS H. HAMLY and WILLIAM I. ILLMAN*.

Department of Biology, Carleton University, Ottawa, Ontario, K1S 5B6. - A Proposed Method for Recovery of the Intent of Ridgway Color Names based on a Permanent Standard.

Earlier analysis of the Ridgway Color Standards against Munsell standards demonstrated curious anomalies in these most widely used biological color name charts. The current work carries forward analysis of the most likely intent of each of the Ridgway chips and presents the data in such a way that workers may proceed from a Munsell notation to the most appropriate Ridgway color name if so desired.

WILLIAM I. ILLMAN. Department of Biology, Carleton University, Ottawa, Ontario, K1S 5B6. - Introducing Students to the Concept of Life Histories in the Plant Kingdom.

Early establishment of the notion of alternating haploid and diploid phases of vegetative development as a basic and primitive life-history strategy permits the student to comprehend the evolutionary tendencies towards modification and specialization in either or both of the ploidy phases in response to environmental challenges. Several models are available among algal groups to illustrate deviant response imposed by requirements for adaptation.

J.S. MAINI*

Canadian Forestry Service, Environment Canada, Ottawa, Ontario K1A 0H3. - Ecotour: Interpretation of landscape ecology for the general public.

The general public, concerned about ecological implications of industrial and urban activities, is getting increasingly involved in decision making processes at various levels of government. However, the general public and decision makers have somewhat limited understanding of ecological principals. The Canadian Forestry Service has initiated a program of preparing maps interpreting landscape ecology along 4500 - mile long Trans-Canada Highway. These educational maps with "ecogames", aimed at a family unit, integrate features of natural and human history that have shaped the landscape, and are designed to enhance the outdoor experience of the travellers. Better informed public should ultimately result in better decision making. A questionnaire, accompanying the first experimental map, to monitor audience response to the over-all concept and method of presenting information evoked overwhelming response in Canada, USA and overseas. The map is being used as a teaching aid in schools, universities and has possibilities in promoting educational tourism in certain areas.