UNIVERSITY OF ALBERTA MICROFUNGUS COLLECTION AND HERBARIUM (UAMH)

A Division of the Devonian Botanic Garden, Faculty of Agriculture, Forestry and Home Economics
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SUMMARY OF ACTIVITIES FOR 2000

Staff, Students

Professor (Curator) - **L. Sigler**
.66 FTE Devonian Botanic Garden/UAMH, Fac. Agriculture, Forestry & Home Economics
.33 FTE Medical Microbiology & Immunology, Fac. of Medicine
Consultant in Mycology, PLNA/UAH Microbiology & Public Health
& Adj. Prof. Biol. Sci.
Assistant Curator (.5 FTE Non-academic, .5 FTE trust, NSERC) - **A. Flis**
Technical or laboratory assistants (trust): -**A. Hashimoto** (full time), **R. Gibas** (part-time continuing)**, V. Jajczay** (casual)**, K. Rypien** (casual from Dec.), **M. Kelm** (casual to Mar.), **I. Tsuneda** (casual to Mar.)
Graduate student- **C. F. C. Gibas**
Volunteers - **R. von Tigerstrom**

Affiliate
R. Currah, Professor, Biological Sciences, Faculty of Science

Academic Teaching & Graduate Supervision

L. Sigler

- MMI 412 Special Project Course: Fungi in the Human Environment (course coordinator & instructor) [usually given as MMI 427; offered in 2000 at the Devonian Botanic Garden]
- MMI 240 Pathogenic Bacteriology (4 lectures)
- MMI 440 Medical Microbiology (1 lecture)
- BIOL 306 Biology of the Fungi (1 lecture)
- PHS 522 Principles of Toxicology (1 lecture)

Graduate Supervision (L. Sigler)
Connie Fe C. Gibas, Ph.D. program, Biological Sciences, Supervisors L. Sigler & R. Currah, Biol. Sci.

Graduate Supervisory(*) or Examination Committees (Sigler)
*Markus Thormann, Ph.D. candidate Biological Sciences, Supervisors S. Bailey & R. Currah
*Hyun Lee, Ph.D. candidate, Ag. Food Nutr. Science, Supervisor, J.P. Tewari
Pat Crane, Ph.D. defense, Biological Sciences, Supervisors R. Currah & Y. Hiratsuka

Professional Training and Extension Teaching

Professional Training (Workshops)

April	Invited speaker, "Molds and Their Impact on IAQ" Indoor Air Quality Workshop, Canadian Institute of Public Health Inspectors Conference 2000, Vancouver B.C., sponsored by Underwriters Lab. Inc.
June	Invited instructor workshop on "Filamentous Fungi from the Immunocompromised Host" for the International Association of Medical Laboratory Technologists 24th World Congress, Vancouver.

Professional Training (Individual)

February	1 day course for 1 individual (Univ. Alberta, Civil & Environmental Engineering)
Aug	5 day course for 1 individual (Univ. Wisconsin, Veterinary Medicine, Madison, WI)
Dec	14 day course for 1 individual (National Plant Quarantine Service, Anyang, Korea)
June	self-study of herbarium material (5 days) (M. Thormann, Bio. Sci.)

Cultures Received, Distributed and Accessioned

Cultures received for identification, deposit or in exchange (**Table 1**) **312**

Cultures distributed on request or in exchange (**Table 2**) **250**

Culture Collection and Herbarium Accessions

New accessions **236**

Total accessions..... **9913**

Information on Accessions available through print and on-line CATALOGUES

Catalogue of the University of Alberta Microfungus Collection and Herbarium. 3rd Edition. 1998
http://www.devonian.ualberta.ca/uamh/search.cfm

In-house and Collaborative Research

Refereed Journal Articles [See links on our web site]

1. Al-Mohsen*, I.Z., D.A. Sutton, L. Sigler, E. Almodovar, N. Mahboub, H. Frayha, S. Al-Hajjar, M.G. Rinaldi, T. Walsh. 2000. *Acrophialophora fusispora* brain abscess in a child with acute lymphoblastic leukemia. Review of cases and taxonomy. J. Clin. Microbiol. 38: 4569-4576.
*King Faisal Specialist Hospital & Research Center, Riyadh, Saudi Arabia

Abstract
A 12-year-old girl with acute lymphoblastic leukemia was referred to King Faisal Specialist Hospital and Research Center. The diagnosis without central nervous system (CNS) involvement was confirmed on admission, and chemotherapy was initiated according to the Children Cancer Group (CCG) 1882 protocol for high-risk-group leukemia. During neutropenia amphotericin B (AMB) (1 mg/kg of body weight/day) was initiated for presumed fungal infection when a computed tomography (CT) scan of the chest revealed multiple nodular densities. After 3 weeks of AMB therapy, a follow-up chest CT revealed progression of the pulmonary nodules. The patient subsequently suffered a seizure, and a CT scan of the brain was consistent with infarction or hemorrhage. Because of progression of pulmonary lesions while receiving AMB, antifungal therapy was changed to liposomal AMB (LAMB) (6 mg/kg/day). Despite 26 days of LAMB, the patient continued to have intermittent fever, and CT and magnetic resonance imaging of the brain demonstrated findings consistent with a brain abscess. Aspiration of brain abscess was performed and the Gomori methenamine silver stain was positive for hyphal elements. Culture of this material grew *Acrophialophora fusispora*. Lung biopsy showed necrotizing fungal pneumonia with negative culture. The dosage of LAMB was increased, and itraconazole (ITRA) was added; subsequently LAMB was discontinued and therapy was continued with ITRA alone. The patient demonstrated clinical and radiological improvement. In vitro, the isolate was susceptible to low concentrations of AMB and ITRA.

A. fusispora is a thermotolerant, fast-growing fungus with neurotropic potential. We report the first case of human infection involving the CNS. *Acrophialophora* resembles *Paecilomyces* but differs in having colonies that become dark and in the development of phialides along the sides or at the tips of echinulate brown conidiophores. Conidia are borne in long chains and are smooth or ornamented with fine-to-coarse echinulations, sometimes in spiral bands. The taxonomy of the genus *Acrophialophora* is reviewed, and *Acrophialophora nainiana* and *Acrophialophora levis* are considered as synonyms of *A. fusispora*.

2. Hemashettar*, B.M., Siddaramappa, B, Padhye, A.A., Sigler, L. and F. W. Chandler. 2000. White grain mycetoma caused by *Cylindrocarpon* sp. in India. J. Clin. Microbiol. 38:4288-4291.
*Departments of Microbiology, Venereology & Leprology, Jawaharlal Nehru Medical College, Belgaum, India.

Abstract
We describe a case of white grain eumycetoma of the foot of an Indian male caused by a slow-growing, poorly sporulating fungus that does not match any known agent of this infection. Histologic examination of a biopsy tissue specimen showed oval, lobular, white granules composed of hyaline, septate hyphae, and thick-walled chlamydospores. Culture of granules from a draining sinus yielded compact, very-slow-growing, poorly sporulating colonies producing a strong reddish brown pigment that diffused into the medium. The fungus was

identified as a *Cylindrocarpon* sp. based on the development of rare cylindrical conidia borne from solitary phialides lacking collarettes, in addition to chlamydospores formed singly or in short chains.

3. Sigler, L., T.C. Lumley, R.S. Currah. 2000. New species and records of saprophytic ascomycetes (Myxotrichaceae) from decaying logs in the boreal forest. Mycoscience 41:487-494.

Abstract
Decayed wood from fallen white spruce (*Picea glauca*) and trembling aspen (*Populus tremuloides)* collected in northeastern Alberta, Canada was the source of new isolates of species in the ascomycete genera *Gymnostellatospora* and *Pseudogymnoascus*. In addition to new reports of *G. japonica*, *G. frigida* and *P. roseus*, two new species are described. *G. canadensis* sp. nov. resembles *G. japonica* but differs in producing brown ascomata and in the formation of an arthroconidial anamorph. *G. subnuda* sp. nov. is distinct in lacking differentiated peridial hyphae. *G. alpina* was not found in decayed wood but is reviewed based on extralimital material. A dichotomous key to the five species of *Gymnostellatospora* is provided.

4. Kisla*, T.A., A. Cu-Unjieng, L. Sigler & J. Sugar. 2000. Medical management of *Beauveria bassiana* keratitis. Cornea 19:405-406. (listed as in press in 1999)
*University of Illinois at Chicago Eye Center, Department of Ophthalmology & Visual Sciences, Chicago

Abstract
PURPOSE: To describe a case of *Beauveria bassiana* keratitis and to discuss the management of this rare condition. METHODS: An 82-year-old woman underwent surgical repair of a graft wound dehiscence. Seven months later, shortly after the removal of sutures, the patient developed a fungal keratitis. *B. bassiana* was identified as the infecting organism. The patient was treated with topical natamycin and oral fluconazole. RESULTS: Following antifungal therapy, the corneal ulcer was eradicated, but the patient underwent repeat penetrating keratoplasty for decreased vision due to corneal edema. The graft remains clear and visual acuity is substantially improved. CONCLUSION: The medical management of *B. bassiana* keratitis has previously been unsuccessful. The use of topical natamycin combined with oral fluconazole in the management of this case is discussed.

5. Iwen*, P.C., L. Sigler, S. Tarantolo, D.A. Sutton, M.G. Rinaldi, R.P. Lackner, D.I. McCarthy & S.H. Hinrichs. 2000. Pulmonary infection caused by *Gymnascella hyalinospora* in a patient with acute myelogenous leukemia. J. Clin. Microbiol. 38:375-381. (listed as in press in 1999)
*Department of Pathology, University of Nebraska Medical Center, Omaha, Nebraska

Abstract
We report the first case of invasive pulmonary infection caused by the thermotolerant ascomycetous fungus *Gymnascella hyalinospora* in a 43-year-old female from the rural midwestern United States. The patient was diagnosed with acute myelogenous leukemia and treated with induction chemotherapy. She was discharged in stable condition with an absolute neutrophil count of 100 cells per microliter. Four days after discharge, she presented to the Cancer Clinic with fever and pancytopenia. A solitary pulmonary nodule was found in the right middle lobe which was resected by video-assisted thoracoscopy (VATHS). Histopathological examination revealed septate branching hyphae, suggesting a diagnosis of invasive aspergillosis; however, occasional yeast-like cells were also present. The culture grew a mold that appeared dull white with a slight brownish tint that failed to sporulate on standard media. The mold was found to be positive by the AccuProbe *Blastomyces dermatitidis* Culture ID Test (Gen-Probe Inc., San Diego, Calif.), but this result appeared to be incompatible with the morphology of the structures in tissue. The patient was removed from consideration for stem cell transplant and was treated for 6 weeks with amphotericin B (AmB), followed by itraconazole (Itr). A VATHS with biopsy performed 6 months later showed no evidence of mold infection. In vitro, the isolate appeared to be susceptible to AmB and resistant to fluconazole and 5-fluorocytosine. Results for Itr could not be obtained for the case isolate due to its failure to grow in polyethylene glycol used to solubilize the drug; however, MICs for a second isolate appeared to be elevated. The case isolate was subsequently identified as *G. hyalinospora* based on its formation of oblate, smooth-walled ascospores within yellow or yellow-green tufts of aerial hyphae on sporulation media. Repeat testing with the *Blastomyces* probe demonstrated false-positive results with the case isolate and a reference isolate *of G. hyalinospora*. This case demonstrates that both histopathologic and cultural features should be considered for the proper interpretation of this molecular test and extends the list of fungi recognized as a cause of human mycosis in immunocompromised patients.

Thesis And Publications Arising

6. Sean P. Abbott. 2000. Holomorph studies of the Microascaceae. Ph.D. pp 1-195.

7. Lumley, T.C., S.P. Abbott & R.C. Currah. 2000. Microscopic ascomycetes isolated from rotting wood in the boreal forest. Mycotaxon 74:395-414.

Abstract
During a survey of microfungi from rotting wood in northern Alberta forests, 49 species of ascomycetes, representing 24 genera, and 15 families in seven orders were recovered. Twenty-eight species are new reports for Alberta, 15 of which are new for Canada, and seven are new for North America. Twenty species have not been previously reported from wood. The most frequently isolated species were *Microascus albonigrescens* and *Gelasinospora tetrasperma*. Diversity and abundance of ascomycete microfungi suggest that these fungi are a more significant component of wood decay fungus communities than previously recognized.

8. Abbott, S.P. and L. Sigler. Heterothallism in the Microascaceae demonstrated by three species in the Scopulariopsis brevicaulis series. Mycologia (subm. Aug. 1, 2000)
9. Sean P. Abbott, T.C. Lumley and L. Sigler. Use of holomorph characters to delimit Microascus nidicola and M. soppii sp. nov., with notes on the genus Pithoascus. Mycologia (subm. Aug. 1, 2000)

Invited Talks and Published Abstracts

10. Sigler, L. 2000. Invited speaker, A thermophilic mould causing brain abscess. American Soc. Microbiology 9/F, speaker & co-convenor of session entitled "Clinical case presentations in fungal disease," Los Angeles, CA. [see publication listed as 1 above.]
11. Sigler, L. 2000. Invited speaker, "Case Presentations with Novel Fungal Etiologies," Medical Mycological Soc. of the Americas Annual Meeting., Los Angeles, CA
12. Sigler, L. & A. D. Thomas. 2000. *Nannizziopsis vriesii* causing cutaneous infection in Australian saltwater crocodiles. ASM Abstr. Z-6.
13. Kernaghan, G., L. Sigler & D. Khasa. 2000. Communities of root-associated fungi in northern conifer nurseries. MSA Ann. Mtg. Vermont.

Miscellaneous Non-Refereed Articles

14. Sigler L, Abbott SP, Summerbell RC. 1999. Letter to Editor. Med. Mycol. 37:79 (not reported in 1999)
15. Sigler, L. 2000. "Filamentous Fungi from the Immunocompromised Host." Workshop Manual for IAMLT 24th World Congress, Vancouver. 50 pp.

Depository and Advisory Services

Cultures are received for deposit, identification or verification. Additionally, we provide advice on fungus biology or significance of mold growth, and assistance with problems of fungal contamination or deterioration. Listed are some examples of individuals or agencies using these services in 2000.

- H. Bennypaul, Alberta Agriculture, Tree Nursery & Horticulture Centre, Edmonton, identification of fungi associated with saskatoons (Amelanchiers alnifolia)
- M. Bidochka, Trent Univ. Peterborough, ON, confirmed *Beauveria bassiana* from soil
- P. Blenis (P. Chow), Renewable Resources, Ag. For. Home Ec., U of A, deposit and taxonomy of *Pollaccia* species from shoot blight of aspen
- M. Thormann & A. Tsuneda, Biol. Sci., isolates from decomposing Sphagnum
- G. Kernaghan, Renewable Resources, U of A, isolates from white spruce seedlings in tree nursery
- J. David Reid, Robinson Memorial Hospital, Ravenna, Ohio – identification of a fungus isolated from pine pollen
- J. Sharma, Agriculture, University of Missouri-Columbia, Columbia, MO, deposit of isolates associated with germination of terrestrial orchid seeds in Missouri
- S. Stewart and L. Zettler, Biology Dept, Illinois College, Jacksonville, IL deposit of isolates associated with terrestrial orchids in Illinois
- J.L. Taboada, Parasitology and Mycology Unit, Microbiology Laboratory,, Hospital clinico Universitario de Santiago, Spain - confirmation and deposit of first isolate of *Onychocola canadensis* from Spain
- J. Vederas, Chemistry, U of A, purification and preservation of research isolates
- E. Woloshyn, Biological Sciences, U of A, verification, purification and preservation of fungi used in teaching genetics

Medical /Veterinary Reference Service

The following individuals or agencies sent isolates mainly for identification.

- H. Congly, Provincial Laboratory, Saskatchewan Health, Regina (3)
- A. Espinel-Ingroff, Medical Mycology Research Lab, Division of Infectious Disease, Richmond, Virginia, (12)
- S. Lock, Texas Department of Health, Austin, TX (33)
- W. Merz, Johns Hopkins Hospital, Baltimore, MD (1)
- A. Padhye, Centers for Disease Control, Atlanta, GA (2)
- R. Rennie, National Reference Centre, Microbiology & Public Health, Univ. of Alberta Hospitals, (33)
- M.G. Rinaldi, Fungus Testing Branch, Dept of Pathology, University of Texas at San Antonio (5)
- K. Rogers, Auckland Hospital, Auckland, NZ (13)
- G. St-Germain, Laboratorie de Sante Publique du Quebec, Ste-Anne-de Bellevue, PQ (12)
- R. Summerbell, Ontario Ministry of Health, (7)
- A.L. Thomas, Oonoonba Veterinary Lab, Townsville, Queensland, Australia (1)
- T. Walsh, National Institutes of Health, Bethesda, MD (2)
- A. Woodgyer, Microbiology, University of Melbourne, Melbourne, Australia (4)

Environmental

Federal, Provincial and private agencies or individuals contact us concerning assessment, significance and control of molds in the indoor environment. We examine air and bulk samples for presence of molds and evaluate numbers and types, and potential health hazards of exposure. In 2000, 65 reports were prepared on samples from homes and public buildings in Alberta and Saskatchewan. Agencies included U of A Occupational Health and Safety, Prince Albert Grand Council, Weyerhaeuser Saskatchewan Ltd., Main Street, Edmonton, Leonard Hirst & Miller Adjusters Ltd, Wade Engineering, environmental health inspectors for various regional health authorities, etc.

Visitors

February	Doris Haas, Hygiene Institut der Karl-Franzens Universitat, Graz, Austria
April	T. Byrne and A. Uzunovic, Forintek Canada Corp., Vancouver
June	G. St-Germain, Laboratorie de Sante Publique du Quebec, Ste-Anne-de Bellevue, PQ
	A. DiSalvo, Reno Nevada
August	J. Pare, DVM, Special Species Health, Department of Surgical Sciences, School of Veterinary Medicine, University of Wisconsin, Madison, WI
	J. Hess, DVM, Florida
	S. Kaminsky, Dept of Biology, Univ. Saskatchewan, Saskatoon, SK
September	F. Oberwinkler, Professor, Special Botany & Mycology, Director, Botanic Garden, University of Tübingen, Germany
December	I.-H. Hyun, National Plant Quarantine Service, Anyang, Korea

Talks, Travel

May	LS presented a poster, was speaker & co-convenor of session at American Society for Microbiology Annual Meetings, Los Angeles, CA.
April	LS was speaker at Canadian Institute of Public Health Inspectors Conference 2000, Vancouver B.C.
June	LS gave workshop at 24th World Congress, International Association of Medical Laboratory Technologists, Vancouver, BC

Miscellaneous Activities

Editorial Boards and peer review: L.S. completed a third term on the editorial board of the Journal of Clinical Microbiology (JCM), American Society for Microbiology; and continues on the editorial board of Journal of Medical Mycology. Fifteen manuscripts were reviewed, including 8 for JCM, 2 for Medical Mycology and 1 each for Mycological Research, Antimicrobial Agents & Chemotherapy, J. Investigative Dermatology, FEMS Microbiology Letters and presubmission review.

Member of NSERC Site visit team for proposed Industrial Research Chair at Carlton Univ., under the

University-Industry Projects Program; NSERC grant application (Plant Biology & Food Science) (1)

Current Offices and Committee work (LS)

- secretary for Canadian Society for Medical Mycology
- Committee on Culture Collections, Mycological Society of America (served as chair in 1999)
  Constraints on transport of cultures is a continuing concern to culture collections and users. One of the current objectives of this committee is to alleviate some of these constraints in order to improve user access to these scientific resources.
- member of the committee on Postal, Quarantine and Safety Regulations, World Federation Culture Collections
  This committee has been reestablished with a new chair and we are now compiling information on changes to regulations with goal of producing an updated report.
- member of the Selection Committee for the Roger Porter Award, American Academy of Microbiology
- member of advisory committee for National Reference Centre in Mycology, UAH Microbiol. & Public Health

Public Relations: An article on UAMH was published in FOLIO April 14 , Vol 37 (16) and a photograph was contributed to Science (288:243-244).

External Funding (Grants/Fees for Services)

New

EFF SAS Operating Taxonomy & epidemiology of fungi causing cutaneous disease in reptiles	4,830

Continuing

NSERC (renewal). Major Facilities Access (1999-2002). The University of Alberta Microfungus Collection and Herbarium (UAMH).	40,000
*NSERC Strategic. Biotechnology of ectomycorrhizae in the Canadian Prairie Provinces. (B.P. Dancik [PI], Renewable Resources, W.A. Ayer, Chemistry & L. Sigler) *Ended October 31, 2000.	99,500 (shared)
NSERC. Individual. Systematics of microfungi in the human environment.	28,875
Income from services	
cultures and identifications etc.	8,500
preservation (safe-deposit, freeze-drying or other)	5,000
environmental assessments and consultation	9,000
Consultation to UAH National Reference Centre (transfer from Microbiology & Public Health)	4,500

Publications Concerning UAMH Cultures or Assistance

16. Addy, H.D., Hambleton, S.,and Currah, R.S. 2000. Distribution and molecular characterization of the root endophyte *Phialocephala fortinii* along an environmental gradient in the boreal forest of Alberta. Mycol. Res. 104: 1213-1221.

17. Beaudette, L.A., Ward, O.P., Pickard, M.A. & Fedorak, P.M. 2000. Low surfactant concentration increases fungal mineralization of a polychlorinated biphenyl congener but has no effect on overall metabolism. Letters in Applied Microbiology. 30:155-160, 2000.

    Abstract
    Three white rot fungi were compared for their ability to attack polychlorinated biphenyl (PCB) congeners in the presence and absence of the non-ionic Triton X-100 or the anionic Dowfax 8390 surfactants at half their critical micelle concentrations. Neither surfactant affected PCB biodegradation monitored by gas chromatography but the release of 14CO2 from 2,4',5-(U-14C)trichlorobiphenyl by Trametes versicolor was stimulated 12% by Triton X-100. Since mineralization is the complete metabolism of the congener and biodegradation was measured as substrate disappearance, Triton X-100 is proposed to aid intracellular solubilization of 2,4',5-trichlorobiphenyl for complete oxidation by *T. versicolor*.

18. de Hoog, G.S. 1999. Ecology and evolution of black yeasts and their relatives. Studies in Mycology 43.

19. Hambleton, S., Huhtinen, and S. Currah, R.S. 1999. *Hymenoscyphus ericae:* a new record from western Canada. Mycol. Res. 103:1391-1397.

Abstract
The teleomorphic state of the ericoid mycorrhizal *Hymenoscyphus ericae* is known only from the type deposition. The production of both the teleomorph and anamorph by an isolate recovered from *Ledum groenlandicum* collected in an acidic peatland in Alberta, Canada, provided an opportunity to describe and illustrate the holomorph for a North American collection as a new record and as a supplement to the original diagnosis. It also provided further evidence that *Hymenoscyphus ericae* and *Scytalidium vaccinii* represent states of a single species, a hypothesis that previously had been tested using nuclear ribosomal DNA analysis. Appropriate cultural conditions and the use of molecular markers are advocated in order to facilitate the identification of mycorrhizal isolates which often remain sterile in pure culture.

20. Haugland, R.A., Vesper, S.J., and Wymer, L.J. 1999. Quantitative measurement of *Stachybotrys chartarum* conidia using real time detection of PCR products with the TaqMan® fluorogenic probe system. Molecular and Cellular Probes 13: 329-340.

Abstract
The occurrence of *Stachybotrys chartarum* in indoor environments has been associated with a number of human health concerns, including fatal pulmonary haemosiderosis in infants. Currently used culture-based and microscopic methods of fungal species identification are poorly suited to providing quick and accurate estimates of airborne human exposures to the toxin containing conidia of this organism. In this study, real-time polymerase chain reaction (PCR) product analysis using the TaqMan(R) fluorogenic probe system and an Applied Biosystems Prism(R) model 7700 sequence detection instrument (model 7700) was applied to the specific detection of *S. chartarum* ribosomal DNA (rDNA) sequences. Based upon this assay and a recently reported comparative cycle threshold method for quantifying target DNA sequences using data from the model 7700, a simple method for the direct quantification of *S. chartarum* conidia was developed. In analyses of samples containing several different strains and from two to over 2 X 105 cells, this method consistently provided quantitative estimates of *S. chartarum* conidia that were within a one-fold range (50-200%) of those determined on the basis of direct microscopic counts in a haemocytometer. The method showed a similar level of agreement with direct counting in the quantification of *S. chartarum* conidia in air samples collected from several contaminated homes.

21. Hosoe, T., Nozawa, K., Lumley, T.C., Currah, R.S., Fukushima, K., Takizawa, K., Miyaji, M., and Kawai, K. 1999. Tetranorditerpene lactones, potent antifungal antibiotics for human pathogenic yeasts, from a unique species of *Oidiodendron*. Chem. Pharm. Bull. 47 (11): 1591-1597.

Abstract
The culture filtrate of a fungus isolated from decaying Picea glauca wood and tentatively identified as Oidiodendron cf, truncatum showed strong antibiotic activity against the pathogenic yeast, Candida albicans. Four new tetranorditerpenoids, oidiodendrolides A (3), B (4), and C (5) and oidiodendronic acid (7) were isolated along with three known tetranorditerpenoids, LL-Z1271 alpha(=PR1387) (1), PR1388 (2), and acrostalidic acid (6), from rice fermented by the above fungus. The structures of oidiodendrolides A (3), B (4), and C (5) and oidiodendronic acid (7) were established on the basis of spectroscopic and chemical investigations. The antifungal activity of the above tetranorditerpenoids against the pathogenic yeasts, Candida albicans and Cryptococcus neoformans is discussed.

22. Marcia Monreal, S.M. Berch, and Mary Berbee. 1999. Molecular diversity of ericoid mycorrhizal fungi. Can. J. Bot. 77: 1580-1594

Abstract
Using restriction fragment length polymorphism (RFLP) patterns from two ribosomal internal transcribed spacers (ITS) and DNA sequences from ITS2, we characterized ericoid mycorrhizal fungal isolates from culture collections. With a synoptic key to RFLP patterns, we divided 34 mycorrhizal or root-associated isolates into 16 groups. RFLP patterns were identical when fungal specific primers were used to amplify DNA from pure fungal cultures and in vitro mycorrhizae. Sequence analysis clustered 23 of 24 mycorrhizal isolates into two larger groups: the Oidiodendron group and the Hymenoscyphus group. The Oidiodendron group included genetically uniform, conidiating fungi. The Hymenoscyphus group encompassed more diversity and included other discomycetes (Leotiales) as well as sterile, unidentifiable mycorrhizal isolates from four RFLP groups. Results from our field site on Vancouver Island, British Columbia, Canada, suggest that several ericoid mycorrhizal fungi can coexist in a single root of Gaultheria shallon Pursh and that our molecular data base is not yet complete. From sixty 3-mm root sections, we cultured four genetically different fungi that formed mycorrhizae in resynthesis experiments and sequence analysis showed that one of these differed from all previously known ericoid mycorrhizal fungi.

23. Parry, R.A.; McLean, C.B.; Alderton, M.R.; Coloe, P.J.; Lawrie, A.C. 2000. Polyclonal antisera to epacrid mycorrhizae and to Hymenoscyphus ericae display specificity. Can. J. Bot. 78:841-850.

Abstract
Three polyclonal antisera produced in mice were used to investigate specificity and cross-reactivity between ericaceous and epacridaceous mycorrhizal fungi. One antiserum was to a culture of Hymenoscyphus ericae (Read) Korf and Kernan, the fungal endophyte of Calluna vulgaris (L.) Hull (Ericaceae). The other two were to peloton preparations from roots of Epacris impressa Labill. (Epacridaceae) from two sites (Cranbourne and Grampians) in Victoria, Australia. By immunofluorescence, all three antisera recognised H. ericae but not Oidiodendron griseum Roback, suggesting a serological relationship with the former endophyte. They also recognised 10 of the 12 fungal isolates tested, from mycorrhizal roots of E. impressa (Cranbourne), and all 4 isolates from Astroloma pinifolium (R. Br.) Benth. (Epacridaceae) (Grampians). Furthermore, none of the antisera recognised any of the nine common soil-inhabiting fungi selected for screening. Antisera recognised only unmelanized hyphae on epacrid and other plant roots taken from the wild. With plants from Cranbourne, all antisera except the Grampians antiserum recognised hyphae only on epacrid roots, demonstrating specificity. Hyphae on other plant roots were not recognised by any of the antisera. With plants from the Grampians, all antisera recognised some hyphae on both epacrid and other plant roots, except in two instances. The immunogold labelling indicates that the antisera are specific for fungi and do not recognise the plant. Since the fungal isolate forms true mycorrhizal structures, this suggests that there is a serological similarity between fungi forming epacrid mycorrhiza and those (H. ericae) forming ericoid mycorrhiza.

24. Porter, B.R., Gallimore, W.A., and Reese, P.B. 1999. Steroid transformations with *Exophiala jeanselmei* var. *lecanii-corni* and. *Ceratocystis paradoxa.* Steroids 64: 770-779.

Abstract
The fungi Exophiala jeanselmei var. lecanii-corni [IMI (International Mycological Institute) 312989, UAMH (University of Alberta Microfungus Collection and Herbarium) 8783] and Ceratocystis paradoxa (IMI 374529, UAMH 8784) have been examined for their potential in steroid biotransformation. The study has determined that E. jeanselmei var. lecanii-corni effected overall anti-Markovnikov hydration on dehydroisoandrosterone, and side-chain degradation on a variety of pregnanes. Both ascomycetes were found to carry out redox reactions of alcohols and ketones as well as 1,4 reduction of alpha,beta-unsaturated carbonyl systems.

25. Tsuneda, A., Thormann, M.N., and R.S. Currah. 2000. *Scleroconidioma*, a new genus of dematiaceous Hyphomycetes. Can. J. Bot. 78:1294-1298.

Abstract
Scleroconidioma sphagnicola gen.nov. et sp.nov. (Hyphomycetes) is described from necrotic patches of Sphagnum fuscum (Schimp.) Klinggr. found in a bog in Alberta, Canada. In the leaves of the host and in culture the fungus forms minute dematiaceous stromata. Hyaline, bacilliform conidia are extruded in succession from papillate conidiogenous cells that develop on the stroma surface. Hyaline bacilliform conidia, as well as a more variable and pigmented conidial type, also arise from short conidiogenous cells or directly from vegetative hyphae in culture. Discrete tufts of white, setiform hyphae also form on agar media and constitute an additional distinctive feature of the new taxon.

26. Weete, J.D., Shewmaker, F., and Gandhi, S.R. 1998. Gamma-linolenic acid in zygomycetous fungi: *Syzygites megalocarpus*. Journal of the American Oil Chemists' Society 75: 1367-1372.

Abstract
The fatty acids of over 150 species and isolates of zygomycetous fungi were analyzed, and it was found that gamma-linolenic acid (GLA) composed 35 to 62% of the total fatty acids in several species, i.e., Circenella simplex, Mucor indicus, Syzygites megalocarpus (ATCC 18025), and Zygorhynchus moellierie A (UAMH 1556). Further study of S. megalocarpus showed that the total lipid content of the mycelium could be increased from 9.8% of the dry biomass to 20 to 25% when grown in a medium with a high carbon/nitrogen ratio. Under these conditions, the CLA content of the triacyglycerols increased during culture development even during the stationary phase, but remained relatively constant in the phospholipid fraction. Nonsaponifiable lipid represented 4% of the total lipid, and the major sterol among 14 others detected was ergosterol at 52% of the total. Phospholipids composed 7% of the total lipid with phosphatidylethanol-amine and phosphatidylcholine representing 53 and 39% of the total, respectively.

27. Wilson, M.R., Gallimore, W.A., and Reese, P.B. 1999. Steroid transformations with *Fusarium oxysporum* var. *cubense* and *Colletotrichum musae*. Steroids 64: 834-843.

Abstract
The utility of two locally isolated fungi, pathogenic to banana, for steroid biotransformation has been studied. The deuteromycetes Fusarium oxysporum var, cubense (IMI 326069, UAMH 9013) and Colletotrichum musae (IMI 374528, UAMH 8929) had not been examined previously for this potential. In general, F. oxysporum var, cubense effected 7 alpha hydroxylation on 3 beta-hydroxy-Delta(5)-steroids, 6 beta, 12 beta, and 15 alpha hydroxylation on steroidal-4-ene-3-ones, side-chain degradation on 17 alpha,21-dihydroxypregnene-3,20-diones, and 15 alpha hydroxylation on estrone. Both strains were shown to perform redox reactions on alcohols and ketones.

28. Udagawa, S., and Uchiyama, S. 1999. Taxonomic studies on new or critical fungi of non-pathogenic *Onygenales*. Mycoscience 40: 277-290.

Table 1. Cultures Received in 2000

Person, industry or culture collection and address	*Reason for shipment*	*Total*
1. Apotex Fermentation Inc., Winnipeg, MB	ID	2
2. Bennypaul, H., Alberta Agriculture, Food and Rural Development, Edmonton, AB	ID	10
3. Bidochka, M., Trent University, Peterborough, ON	ID	1
4. Blenis, P. (Chow, P.), Renewable Resources, Univ. Alberta, Edmonton, AB	D	18
5. CBS, Utrecht, The Netherlands	R	3
6. Centers for Disease Controls (CDC), Atlanta, GA	D	2
7. Congly, H., Provincial Lab., Saskatchewan Health, Regina, SK	D / ID	3
8. Currah, R. S. (Thormann, M.), Biological Sciences, Univ. Alberta, Edmonton, AB	D / ID	12
9. Espinel-Ingroff, A., Medical Mycol. Res. Lab., Virginia Commonwealth Univ., VA	ID	12
10. Guarro, J., Universitat Rovira i Virgili, Reus, Spain	ID	2
11. Kernaghan, G., Renewable Resources, Univ. Alberta, Edmonton, AB	D / ID	7
12. Llovo-Toboada, J., Hospital Clinical Univ. Santiago, Santiago, Spain	D	2
13. McGinnis, M., Pathology, Univ. Texas Medical Branch, Galveston, TX	D	2
14. Merz, W., Johns Hopkins Hospital, Baltimore, MD	D / ID	1
15. Pare, J., Univ. Wisconsin, Madison, WI	ID	15
16. PhilomBios Inc., Saskatoon, SK	ID	2
17. Reid, J., Univ. Manitoba, Winnipeg, MB	D	55
18. Reid, J.D., Robinson Memorial Hospital, Ravenna, Ohio	ID	2
19. Rennie, R., UAH, Provincial Lab, Edmonton, AB	D / ID	33
20. Rinaldi, M. (Sutton, D.), Univ. Texas Health Science Center, San Antonio, TX	ID	5
21. Rogers, K., Auckland Hospital, Auckland, New Zealand	ID	13
22. Sharma, J., Univ. Missouri-Columbia, Columbia, MO	D	6
23. St-Germain, G., Lab de Sante Publique du Quebec, St. Anne de Bellevue, PQ	ID	12
24. Stewart, S.L., Illinois College, Jacksonville, IL	D	2
25. Summerbell, R. Ontario Ministry of Health, Etobicoke, ON	D / ID	7
26. Texas Dept. of Health, Austin, TX	ID	33
27. Thomas, A., Oonoonba Veterinary Laboratory, Townsville, Australia	ID	1
28. Tsuneda, A. (Currah, R.), Biological Sciences, Univ. Alberta, Edmonton, AB	D	2
29. Tudzynski, B., Institute of Botany, Univ. Munster, Munster, Germany	D	8
30. Uchiyama, S., Tsukuba Res. Inst., Banya Pharmaceutical Co. Ltd., Tsukuba, Japan	D	13
31. Vederas, J. (J. Sorensen), Chemistry, Univ. Alberta, Edmonton, AB	D / Pr	5
32. Vissiennon, T., Universitat Leipzig, Leipzig, Germany	ID	1
33. Walsh, T., Clinical Center, National Institutes of Health, Bethesda, MD	ID	2
34. Woloshyn, E., Biological Sciences, Univ. Alberta, Edmonton, AB	D	7
35. Woodgyer, A., Microbiol. Diagnostic Unit, Univ. Melbourne, Melbourne, Australia	D / ID	4
36. Zettler, L.W., Biology, Illinois College, Jacksonville, IL	D	7

Total cultures received from:

Internal (Univ. Alberta/UA Hospitals)	84
External (North America & International)	228

Total cultures received 312

Codes: D - Deposit, ID - Identification, Pr - Preservation Service, R - Requested, SD – Safe Deposit,

Table 2. Cultures Distributed in 2000

Person or industry or culture collection and address	***Reason for shipment***	***Total***
1. Bennypaul, H., Alberta Agriculture, Food and Rural Development, Edmonton, AB	P	8
2. Buchanan, I. (Ikehata, K.), Civil & Environmental. Engineering, Univ. Alberta	BR / EZ	13
3. Burgess, T., FABI, Univ. Pretoria, Pretoria, South Africa	T	7
4. Chakravarty, P., Renewable Resources, Univ. Alberta, Edmonton, AB	M	2
5. Currah, R., Biological Sciences, Univ. Alberta, Edmonton, AB	T / Te	30
6. daSilva Lacaz, C., Fac. Medicina da Univ. de Sao Paulo, Sao Paulo, Brazil	T	4
7. Enogen Inc. (Belmont, L.), Salinas, CA	M	2
8. Florian, M.L., Royal BC Museum, Victoria, BC	Te	4
9. Gilbertson, J., Plant Pathology, Univ. Arizona, Tucson, AZ	ID	2
10. Glass, A. (Varga, A.), Botany, UBC, Vancouver, BC	MR	2
11. GAP EnviroMicrobial Services Inc., London, ON	T	1
12. Hambleton, S., Agriculture Canada, Ottawa, ON	MB / T	4
13. Haugland, R., US Environmental Protection Agency, Cincinnati, Ohio	MB	12
14. Kernaghan, G., Renewable Resources, Univ. Alberta, Edmonton, AB	MB	4
15. Kim, S.H., Wood Science, UBC, Vancouver, BC	BD	2
16. Lawrie, A., Applied Biology & Biotechnology, RMIT Univ., Melbourne, Australia	MR	3
17. Makkar, N., Monsanto, Chesterfield, MO	M	44
18. Masse, P., College Lionel-Graulx, Sainte-Therese, PQ	BD	1
19. McKemy, J., USDA, ARS SBML, Beltsville, MD	MB	2
20. Melkic, A., Integrated Exploration Inc., Guelph, ON	T	1
21. O'Neill, J., Plant Ecology, Smithsonian Institution, Edgewater, MD	MR	1
22. Otto Norwald (Held, A.), Hamburg, Germany	M	27
23. Peterson, S., Agricultural Res. Service, Peoria, IL	ID	2
24. Philip, L., Biology Dept., Okanagan University College, Kelowna, BC	MR	3
25. Pickard, M., Biological Sciences, Univ. Alberta, Edmonton, AB	BD / EZ	10
26. Rennie, R.(Sand, C.), UAH, Edmonton, AB	ID / D	8
27. Robinson, T., Univ. Ulster, Londonderry, Northern Ireland	BD	5
28. Sinclair, M., Microcheck, Northfield, VT	T	2
29. Singh, B., Agriculture & Agri-Food Canada, London, ON	EZ	1
30. Smith, K., Univ. Lethbridge, Lethbridge, AB	P	2
31. Smith, M., Biology Dept., Carleton University, Ottawa, ON	B	2
32. Sonoki, S., Environmental Health, Azabu University, Sagamihara Kanagawa, Japan	M	5
33. Summerbell, R., CBS, Utrecht, The Netherlands,	MB / REQ	16
34. Tan, C.S., CBS, Utrecht, The Netherlands,	D	3
35. Tewari, J.P. (Dansereau, B.), Agriculture, Food & Nutritional Sci., Univ. Alberta,	P	3
36. Untereiner, W., Botany, Brandon University, Brandon, MB	T	1
37. Vandamme, E., Lab for Industrial Microbiology and Biocatalysis, Gent, Belgium	M	1
38. Vederas, J.C. (Sorensen, J.), Chemistry, Univ. Alberta, Edmonton, AB	FD(45) Pr(4)	5
39. Woloshyn, E., Biological Sciences, Univ. Alberta, Edmonton, AB	Pr (10)	5

Total cultures distributed to:

Internal (Univ. Alberta/UA Hospitals)	80
External (North America & International)	170
Total cultures distributed	**250**

Codes: B- Biocontrol, BD - Biodeterioration, BR- Bioremediation, D- Deposit, EZ- Enzyme, FD -Freeze dry Preservation Service, ID – Identification, M - Metabolites, MB- Molecular biology, MR- Mycorrhizae, P - Pathogenicity, Pr– Other Preservation Service, REQ- Requested, T- Taxonomy, TE - Teaching.