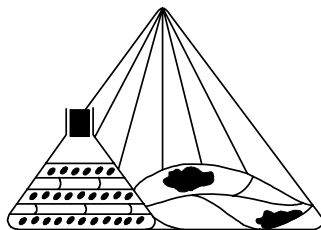


INTERNATIONAL BIOHERBICIDE GROUP

IBG NEWS



VOL. 7 NO. 1 *Electronic Version*

June 1998

THE CHAIRMAN'S COMMENTS

Firstly let me thank Louise Morin who is retiring as Newsletter editor after 5 years. Louise has done an outstanding job in terms of newsletter production and recent electronic distribution. However one of her main achievements was to extract news and information from reluctant contributors who felt too busy or too lazy! Thanks again Louise for a job well done.

Many of us will be meeting at the IV International Bioherbicide Workshop in Glasgow soon. I look forward to renewing "auld acquaintances" and making new ones. Many thanks to Mike Burge and Mike Greaves for organising the workshop. At the end of the workshop I will hand over the Chairmanship of IBG to Alan Watson and we will appoint a new Vice Chairman.

I would like to thank everyone who has supported IBG and wish you all well in your future research and also give Alan my best wishes for his role with IBG into the future.

Bruce Auld

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FUTURE NEWSLETTER EDITOR

*** to be announced***

WANTED: NEW EDITOR FOR IBG NEWS

The steering committee of the International Bioherbicide Group is looking for a new editor for its six-monthly newsletter to replace Dr. Louise Morin who has been editor of IBG News since August 1993. Louise has now completed her term as editor. Please contact the current Chairman, Dr. Bruce Auld (address above), if you are interested in taking over the editorship. It's a great opportunity to get the news first hand and to establish contacts.

IV INTERNATIONAL BIOHERBICIDE WORKSHOP

“Interaction Between Chemical and Microbial Herbicides”

University of Strathclyde, Glasgow, Scotland, UK.

6-7 August 1998

The workshop will comprise three sessions with oral papers (Thursday am and Friday am and pm). Posters will be adjacent to the lecture room and there will be ample time for viewing these. There will be a bus excursion on Thursday pm to view some Highland scenery, taking in a whisky distillery and maybe one of our bracken control trial sites. The bus tour will continue to Ross Priory, a historic building owned by the University of Strathclyde as a recreation and small conference facility, on the shore of Loch Lomond for the informal workshop dinner.

For more information please contact Dr. Doreen Main University of Strathclyde, Dept. of Bioscience and Biotechnology, The Todd Centre, 31 Taylor St., Glasgow G4 0NR
E-mail: d.main@strath.ac.uk Tel: 44 141 548 3824; Fax: 44 141 553 4115

PROVISIONAL PROGRAMME

Wednesday 5th August:

15.00 -19.00 Registration in Lord Todd Conference Room

Thursday 6th August:

8.45 Welcome and announcements: Mike Burge

8.50 Opening remarks: Bruce Auld

SESSION 1: CLASSICAL CONTROL; TERMINOLOGY

Chairperson Harry Evans

9.00 B.R. Henneke & M.K. Seir

Combining the classical and the mycoherbicide approaches for *Phloeospora mimosae-pigrae* as a biocontrol agent for *Mimosa pigra* in Australia.

9.20 G. L. Ash, N.S. Crump, R. Raman & A. Nikandrow

Implications of genetic diversity on the biological control of saffron thistle in Australia.

9.40 A. Caesar

Insect/plant pathogen synergisms: the key to achieving biological control of perennial weeds.

10.00 N.S. Crump, E.J. Cother & G.L. Ash

Terms and definitions in microbial weed control.

10.20 - 11.00 TEA & POSTERS

SESSION 2: PROJECTS IN LATE STAGES

Chairperson Bruce Auld

11.00 S.A. Green

A bioherbicide for dandelion - an example of collaborative research.

11.20 S. Imaizumi & T. Fujimori

The bacterium *Xanthomonas campestris* pv. *poae* to control *Poa annua*.

11.40 S.F. Shamoun & W.E. Hintz

Development and registration of *Chondrostereum purpureum* as a mycoherbicide for hardwood weeds in conifer reforestation sites and utility rights of way.

12.00 M.J. Morris, A.R. Wood & A. Den Breëyen

Development and registration of a fungal inoculant to prevent re-growth of cut wattle stumps in South Africa, and a brief overview of other bioherbicide projects currently in progress.

12.20 - 12.50 Discussion

12.50 -12.55 Announcements

12.55 - 13.30 LUNCH & POSTERS

14.00 Bus departs for tour and dinner at Ross Priory

Friday 7th August:

SESSION 3: CHEMICAL ADJUVANTS TO MYCOHERBICIDES (1)

Chairperson Don Daigle

9.00 S. Boyetchko

Evaluation of deleterious rhizobacteria for biological control of grassy weeds.

9.20 S. Brebaum & G.J. Boland

Influence of selected adjuvants on disease severity caused by *Phoma herbarum* on *Taraxacum officinale*.

9.40 S.F. Shamoun & C. Oleskevich

Indigenous fungi as potential biological control agents for invasive *Rubus* spp. in Canadian forests.

10.00 P.J. Schnick & G.J. Boland

Herbicide applications predispose dandelion to potential mycoherbicides.

10.20 - 11.00 TEA & POSTERS

SESSION 4: CHEMICAL ADJUVANTS TO MYCOHERBICIDES (2)

Chairperson Mike Greaves

11.00 P.J. Schnick, S.M. Stewart-Wade & G.J. Boland Sequential application of sub-lethal rates of 2,4-D and a mycoherbicide for the control of dandelion in Ontario.

11.20 D. Main & M.N. Burge

Progress in formulating a mycoherbicide for bracken - optimisation of spray droplet size.

11.40 R.C. Ostrowski

The use of *Alternaria* sp. nova as an agent to control dodder (*Cuscuta* sp.) and observations on a germination stimulant used to control white rot of *Allium*.

12.00 - 12.30 Discussion

12.30 - 13.30 LUNCH & POSTERS

SESSION 5: CHEMICAL ADJUVANTS TO MYCOHERBICIDES (3)

Chairperson Piet Scheepens

14.00 H.K. Abbas

Control of various common cocklebur (*Xanthium strumarium* L.) biotypes by pathogens.

14.20 B.A. Auld

A multifaceted attack on *Xanthium spinosum*.

14.40 R.W. Barreto, A.W.V. Pomella, R. Charudattan & M.P. do Nascimento

Studies on *Nimbya alternantherae*, a potential biocontrol agent for *Alternanthera philoxeroides* (alligatorweed).

15.00- 15.30 TEA & POSTERS

15.50 Concluding Remarks, Bruce Auld

POSTERS

- K. L. Bailey, K. Mortensen, S. M. Boyetchko, L. L. Jones-Flory, J. Derby & T. Davidson. Selection criteria for surveying and screening microbial agents for biological weed control.
- D. J. Daigle, W. J. Connick Jr., C. D. Boyette, M. P. Lovisa, K. S. Williams & M. Watson. Formulating "Pesta" for biocontrol agents: problems and answers in scaling up production.
- J. Fröhlich, L. Morin & A. Gianotti. Viability and pathogenicity of dried spores of the potential biocontrol agent *Fusarium tumidum*.
- R. Ghorbani, J. Lawrie, M.P. Greaves, W. Seel & C. Leifert. Evaluation of *Alternaria* for biological control of *Amaranthus reflexus* L.
- J. W. Gronwald, K. L. Plaisance, D. R. Johnson & D. L. Wyse. *Pseudomonas syringae* pv. *tagetis* as a biological control agent for weeds: population dynamics in leaves of hosts and non-host species.
- S. D. Hetherington, B. Auld & H. E. Smith. Integrating herbicides and the biological control fungus *Drechslera avenacea* for wild oat control.
- J. Lawrie, N. M. Western, V. Down & M. P. Greaves. Optimising spray application of microbial herbicides.
- E.M. Mendi, P. C. Scheepens, W. Van der Zwerde & C. Leifert. Investigation into formulation and dew period requirement of *Ascochyta caulii* fungus as a potential herbicide for controlling of *Chenopodium album* (fat hen).
- L. Morin, A.F. Gianotti & D.R. Lauren. Mycotoxin production and pathogenicity of *Fusarium tumidum*, a candidate bioherbicide for gorse and broom in New Zealand.
- I. Mutinda, R. T. V. Fox, P. Bailey, R. Coles & T. Wicks. The use of *Cercospora resedae* in the control of *Reseda* spp.
- R. Prasad. Biological control of forest weeds by a mycoherbicide agent (*Chondrostereum purpureum*).
- M.K. Seir & B. R. Henneke. Fungal pathogens as potential biocontrol agents of *Mimosa pigra* in Australia, with particular reference to the rust *Diabole cubense*.
- S. M. Stewart-Wade, S. Green, M. P. Teshler, I.B. Teshler, G. Boland, A. K. Watson & M. P. Sampson. Collaborative field evaluation of fungal pathogens for biological control of dandelion in Canada.
- N. Van Tuat, H. A. M.Trung, S. D .Hetherington & B. Auld. Potential bioherbicide for *Echinochloa* in Vietnam.
- W. Zhang, T. M. Wolf, K. L. Bailey, K.Mortensen & S.M. Boyetchko. Guidelines for selection of adjuvants in bioherbicide formulations.

UPCOMING MEETINGS

4th International Bioherbicide Workshop, University of Strathclyde, Glasgow, Scotland, UK.

6-7 August 1998

See above for more details

7th International Congress of Plant Pathology, Edinburgh, UK, 9-14 August 1998.

Contact: P.R. Scott, Division of Crop Protection and Genetics, CAB International, Wallingford, Oxon OX10 8DE, UK.

Fax: +44 1491 833508, E-mail: p.scott@cabi.org

An evening workshop is scheduled during the Congress on 'Beneficial uses of plant pathogens, biological control of weeds'.

For more information contact the organizers Drs W. L. Bruckart (bruckart@asrr.arsusda.gov) and S. Shamoun.

(sshamoun@pfc.forestry.ca)

6th International Mycological Congress, Jerusalem, Israel, 23-28 August 1998

Contact: Secretariat, Sixth International Mycological Congress, PO Box 50006, Tel Aviv 61500, Israel.

Joint Meeting of the American Phytopathological Society and the Entomological Society of America

Las Vegas, Nevada, USA, 8-12 November 1998

Contact: Joan Schimml, 3340 Pilot Knob Rd., St. Paul, Minnesota 55121-2097, USA. Fax: +1 612 454 0766,

E-mail: ZZZ6882@vz.cis.umn.edu. Web site: <http://www.lasvegas24hours.com/>

2nd Asia-Pacific Crop Protection Conference; International Symposium on Recent Advances in the Control of Insects Pests, Diseases & Weeds, Juhu, Mumbai, India, 18-19 February 1999

Contact: P.P. Dave, Pesticide Manufacturers & Formulators Association of India, B-4, Anand Co-op. Housing Society, Sitladevi Temple Road, Mahim (W.), Mumbai - 400016. Fax: 91-22-4376856, E-mail: pmfai@bom4.vsnl.net.in

14th International Plant Protection Congress, Jerusalem, Israel, 25-30 July 1999

Contact: Congress Secretariat, O.O. 50006, Tel Aviv 61500, Israel. Fax: +972 3 514 0077 or 517 5674, E-mail: ippc@kenes.com Web site: <http://www.kenes.co.il/IPPC>

Annual Meeting of the Mycological Society (concurrent with the 14th International Botanical Congress)

Saint Louis, MO, USA, 1-7 August 1999

Web site: <http://www.erin.toronto.edu/soc/msa>

Joint Meeting of the American Phytopathological Society and the Canadian Phytopathological Society

Montréal, Québec, Canada, 6-12 August 1999.

Web site: <http://www.cum.qc.ca/octgm/>

12th Biennial Conference of the Australasian Plant Pathology Society

Canberra, Australia, 27 September-1 October 1999

Contact: Louise Morin (see address on page 1)

PEOPLE & PLACES

Recent appointments

Dr. David Johnson has moved from the University of Minnesota to Encore Technologies in Minnetonka, MN. Encore is a small biotech company that manufactures biopesticide products, including Collego.

Dr. Wenming Zhang has recently joined the Alberta Research Council, Vegreville, as a research scientist. In collaboration with the Weed Biocontrol Group at Agriculture and Agri-Food Canada, Saskatoon, Wenming is working on the development of pathogenic fungi as bioherbicides for control of cleavers and chickweed. Other target weeds in his program include Canada thistle, perennial sow thistle, and stinkweed.

Dr. Susanne Vogelgsang completed her Ph.D. thesis on 'Field bindweed control with *Phomopsis convolvulus*' in March 1998 at McGill University in Canada. Susanne has moved to Fribourg, Switzerland to take up a Postdoc position in the group of Drs Heinz Müller-Schärer and Jozef Frantzen.

Dr. Sarah Green, undertook her Ph.D at Lincoln University, New Zealand where she investigated the potential of a bioherbicide for control of the giant buttercup (*Ranunculus acris*) in dairy pastures. After successful completion of her Ph.D in 1995 she took up a post-doctoral fellowship at the Nova Scotia Agricultural College with Prof. Glen Sampson to work on the development of a bioherbicide for control of dandelion and other weeds in turfgrass. This project involved collaboration with the universities of Guelph and McGill and industrial partners Dow AgroSciences and Saskatchewan Wheat Pool. Sarah arrived at Agriculture and Agri-Food Canada Saskatoon Research Centre in April 1998 as an NSERC Government Laboratory Visiting Fellow to work with Drs Karen Bailey, Sue Boyetchko and Knud Mortensen on biological control of Canada thistle and grassy weed species.

Dr. Erin N. Roskopf successfully completed her Ph.D. program in Dr. Charudattan's lab at the University of Florida and recently joined the USDA-ARS' newly reconstituted "methyl-bromide alternatives" group in Ft. Pierce, Florida. The major focus of Erin's studies will be bioherbicides.

Mike Greaves is pleased to announce the arrival of a new member of the biocontrol team at Long Ashton Research Station, Bristol, UK. The Institute is a partner in a new European Community-funded project on the control of *Chenopodium album* by *Ascochyta caulina*. The project is led by Piet Scheepens at AB_DLO, Wageningen, Holland and includes laboratories from Norway, Switzerland, Italy and Scotland. The work at Long Ashton will focus on formulation and spray application of the fungus to optimise efficacy in the field. Lindsay Dutton has been appointed to work on the project. Lindsay gained her B.Sc in Environmental Biology at the University of the West of England in Bristol before joining the Crop Pathology Group at Long Ashton on studies of diseases in biomass willow crops where she gained experience of field experiments that will be valuable in the new work.

Dr. Chang Yong Chen received his Master's degree (1990) and Ph.D. (1994) in plant pathology from the University of Toronto under the direction of Dr. M.C. Heath. From January 1994 to May 1995, he worked with Dr. Barbara Howlett as a PDF in the Department of Botany, University of Melbourne, Australia where he studied the genetics of *Leptosphaeria maculans*, the blackleg fungus of *Brassica* spp. and investigated the molecular basis of resistance of different *Brassica* spp.

From June 1995 to August 1997, Dr. Chen worked with Dr. Seguin-Swartz (Agriculture and Agri-Food Canada, Saskatoon) as an NSERC Visiting Fellow on the molecular interactions between the blackleg fungus and oilseed plant. In September 1997, he joined the weed biocontrol group of Agriculture and Agri-Food Canada in Saskatoon where he has been working as a term research scientist to develop genetically improved fungal pathogens as bioherbicides.

Dr. Gabriela S. Wyss, Ph.D., Swiss Federal Institute of Technology, student of Dr. Martin Wolfe, Dr. Heinz Müller-Schärer, and Dr. Jozef Frantzen, has recently joined Dr. Charudattan's group at the University of Florida as a Postdoc to work on the development of *Dactylaria higginsii* (*Cyperus* pathogen) and *Phomopsis amaranthicola* (*Amaranthus* pathogen). Dr. Wyss will be involved with semi-commercial field trials, inoculum production, formulation, and integrated control systems.

Visiting scientists

Dr. L.P. Kauraw (National Research Centre for Weed Science (ICAR), Jabalpur), Dr. Sabitha Doraiswamy (Tamil Nadu Agricultural University, Coimbatore) and Dr. P. Sreerama Kumar (Project Directorate of Biological Control, Bangalore) attended a course at CABI Bioscience UK Centre (Ascot) on the 'Biological Control and Management of Parthenium Weed' between 17th March - 3rd April 1998. This was a component of the RNRRS (DFID, UK) project 'Developing strategies for the control of Parthenium weed in India using fungal pathogens' and focused on working with the two rust pathogens *Puccinia melampodii* and *P. abrupta* var. *partheniicola*, which are being evaluated as classical biological control agents in the UK. At the end of this course the visiting scientists attended the British Mycological Society international symposium on the Future of Fungi in the Control of Pests, Weeds and Diseases at the University of Southampton 5th - 9th April 1998.

Dr. Raj Prasad of the Pacific Forestry Centre, Victoria, Canada recently attended the annual meetings of the Western Society of Weed Science at Kona, Hawaii, and presented a paper entitled 'Impacts of and biological control of scotch broom by bioherbicides in British Columbia'. He then toured the field sites with Patrick Connant to examine the biological control of gorse by *Tetranychus lintearis* and *Apion ulicis* on Hawaii island.

NEW INITIATIVES

Collaborative project between Germany-Israel-Palestine

A new trilateral project between Germany, Israel and Palestine funded by DFG (Deutsche Forschungsgemeinschaft) has been initiated in June 1998 for two years with the option for extension. The project is entitled 'Understanding the complex chemical and biological interactions between crop plants, parasitic broomrapes, and phytopathogenic microorganisms of broomrapes'. The partnership involved Jonathan Gressel, Weizmann Institute of Science, Hani Daraghmi, Palestinian Institute for Arid land and Environmental Studies, Sameer Barghouti, University of Jerusalem, and Joachim Sauerborn (coordinator), University of Giessen (Germany). (Source: J. Sauerborn)

Water hyacinth mycoherbicide initiative for africa

A collaborative programme of R&D to develop a mycoherbicide for control of water hyacinth in Africa has been proposed by CABI BIOSCIENCE, Biopesticides Programme. The initiative, which is currently seeking funding from a consortium of donors led by DANIDA (Denmark), brings together expertise from the University of Mansoura, Egypt (Prof M Zaharan and Dr. Y Shabana), the Department of Research and Specialist Services, Ministry of Agriculture, Zimbabwe (Dr. B Mpofu), the Plant Protection Research Institute, South Africa (Dr. H Zimmerman), the International Institute of Tropical Agriculture, Benin (Dr. C Lomer) and the Institute of Seed Pathology, Denmark (Dr. H Hansen) with CABI BIOSCIENCE (Dr. H Evans and Dr. D Dent). This international programme, which is due to start in January 1999, aims to build on the extensive body of work that has been undertaken to date and looks forward to complimenting and collaborating with existing initiatives, particularly those being undertaken in the Neotropics by Dr. Charudattan (University of Florida) and co-workers in Brazil. Several *Alternaria* and *Fusarium* species have already been reported from diseased water hyacinth in East Africa and these genera will be targeted during the initial surveys in the Lake Victoria catchment area. For further details, please contact Harry Evans (H.Evans@CABI.org) or David Dent (D.Dent@CABI.org), fax: + 44 (0)1491829123. (Source: J. Harris)

GRADUATE STUDENTS

PLEASE send us your name and address with a short description of your project

I. K. Mutinda, The University of Reading, UK

Project (Ph.D.): Evaluating *Cercospora resedae* as a potential biological control agent against Resedaceae weeds.

Description: The weeds included in this study were *Reseda lutea*, *R. luteola*, *R. alba* and *R. odorata* (ornamental). *Reseda lutea* is a deep-rooted perennial weed of crops and pastures in South Australia. It occurs widely throughout the temperate regions of the world, especially as a weed escaping from cultivated land. It is spreading and is not controlled by cultivation, grazing, mowing or most selective herbicides. A potential biocontrol agent was selected from a number of fungal pathogens and evaluated under various conditions on seedlings and mature plants. The fungus does not appear to be specific to one

species of *Reseda*, but it has not been recorded as infecting any other family other than the Resedaceae. Preliminary pathogenicity tests were carried out to investigate the potential of the leaf pathogen *Cercospora resedae* for the bioherbicidal control of *Reseda* spp. Isolates were obtained from infected leaves harvested in Portugal, Israel, Spain and Australia. The variation in growth and sporulation of the isolates was determined at 22 & 27°C on a range of media. Cultures could be stored on silica gel, freeze-dried or stored under sterile water for 3 months. Foliar sprays of *C. resedae* (water suspensions) were applied to the test plants in glasshouses set at 22 & 27°C (16 h light) and controlled environment cabinets at 27°C (10 h light). In addition, plants were wounded with fine carborundum prior to the foliar spray; sprayed with a surfactant-fungus or herbicide-fungus cocktail. Mature plants were less susceptible than seedlings at 22°C. Disease incidence on mature plants and seedlings was relatively high in some cases, but severity was quite low at 22°C. Seedlings of *R. lutea* and *R. alba* were less susceptible than those of *R. luteola* at 22°C. A number of experiments investigated ways of increasing the severity of the disease. 'Passaging' did not cause a significant increase in the level of disease on *R. lutea*, *R. alba* and *R. luteola* at 22°C. The application of surfactants did not seem to have a significant effect on the level of disease, but wounding seemed to enhance the infection slightly at 22°C. Although disease incidence did not increase significantly on *R. lutea* seedlings under controlled environment conditions at 27°C (10 h light), severity was considerably higher. Inundation (two applications) at 27°C (10 h light), also gave promising results. And the herbicide-fungus cocktail seemed to be quite effective at 27°C (16 h light). The moderate-high level of damage caused by some isolates of *C. resedae* under controlled environments is encouraging. However, the low level of damage caused by the majority of the isolates under glasshouse conditions suggests that other techniques and formulations must be tried to increase the effect of the fungus. Severe disease development in the field is likely to be limited by environmental constraints, such as insufficient dew to support conidial germination and infection of the weeds. Studies on interactions between *C. resedae* and currently available insect biological control agents could be performed in the future if *C. resedae* significantly affects *Reseda* spp. in the field. Meanwhile, an integrated approach using low doses of selective herbicides seems to offer the best hope.

Supervisor: Dr. R. T. V. Fox

Alan W. V. Pomella, Departamento de Fitopatologia, Universidade Federal de Viçosa, Viçosa, mg. Brazil.

Project (Ph.D.): Evaluation of the biocontrol potential of fungal pathogens of *Cyperus rotundus* (purple nutsedge) and *Alternanthera philoxeroides* (alligatorweed).

Supervisor: Dr. R. Barreto

José Maurício Pereira, Departamento de Fitopatologia, Universidade Federal de Viçosa, Viçosa, mg. Brazil.

Project (Ph.D.): Studies on selected fungal pathogens of *Lantana camara* as classical biocontrol agents.

Supervisor: Dr. R. Barreto

Studies completed

Susanne Vogelgsang, McGill University, Ste. Anne-de-Bellevue, Québec, Canada.

Project (Ph.D. 1998): Pre-emergence efficacy of *Phomopsis convolvulus* Ormeno to control field bindweed (*Convolvulus arvensis* L.).

Supervisors: Drs Alan K. Watson and Karl Hurlle

José Maurício Pereira, Departamento de Fitopatologia, Universidade Federal de Viçosa, Viçosa, mg. Brazil.

Project (M.Sc. 1997): The pathogenic mycobiota associated to the weed *Lantana camara* L. with particular reference to the state of Minas Gerais - Brazil.

Supervisor: Dr. R. Barreto

Rogério E. Hanada, Departamento de Fitopatologia, Universidade Federal de Viçosa, Viçosa, mg. Brazil.

Project (M.Sc. 1998): Fungi for the biocontrol of aquatic weeds.

Description: This dissertation involved an intensive survey in the Amazon for fungal pathogens of *Eichhornia crassipes* (water hyacinth), *Eichhornia azurea* (anchored water hyacinth) and *Paspalum repens* as well as studies of fungi collected on *Myriophyllum aquaticum* in Southern Brazil.

Supervisor: Dr. R. Barreto

BIOHERBICIDE RESEARCH - STATUS REPORTS

This is by no means a complete account of all research projects on bioherbicides.

University of Florida, Plant Pathology Department, Gainesville, FL, USA

Mr. Alan Pomella, a Ph.D. student from Universidade Federal de Viçosa, Brazil (Dr. Robert Barreto and Dr. R. Charudattan, co-chairs) will complete his one-year research program at the University of Florida in Gainesville and return to Viçosa in August. Alan's Ph.D. work involves the development of a *Duosporium* sp. as a biocontrol agent for *Cyperus* spp. In his spare time, Alan has isolated and tested *Nimbya alternantherae* (= *Alternaria alternantherae*) as a bioherbicide for alligatorweed

(*Alternanthera philoxeroides*). He has developed elegant methods to mass produce, process, and store inoculum (of both *Duosporium* and *Nimbya*).

Jim DeValerio (Senior Biologist) and Dr. Charudattan are currently coordinating various field trials involving *Dactylaria higginsii*, *Phomopsis amaranthicola*, *Ralstonia (=Pseudomonas) solanacearum* (for tropical soda apple, *Solanum viarum*).

The following students and their projects are progressing well and portions of their works have appeared (and will continue to appear) in the meeting abstracts of the Weed Science Society of America and the American Phytopathological Society: S. Chandramohan (India; control of several grasses in citrus with a cocktail of pathogenic fungi); Dauri Tessmann (Brazil; molecular and phenotypic characterization of *Cercospora* spp. from waterhyacinth); Camilla Yandoc (Philippines; development of a bioherbicide to control cogongrass); Angela Vincent (USA; some new approaches to control waterhyacinth); Matt Petterson (USA; biological control of tropical soda apple).

Dr. Margaret Smither-Kopperl, postdoctoral associate, in association with Dr. Richard Berger and Dr. Charudattan have developed bioassay systems and epidemiological models to study the relationship of inoculum-host contacts in underwater pathosystems. The first paper from this study has appeared in *Phytopathology* 88:382, 1998. (Source: R. Charudattan)

Agriculture and Agri-Food Canada, Saskatoon Research Centre, Saskatoon, Saskatchewan, CANADA

Survey for fungi and bacteria: Surveys for fungal pathogens of Canada thistle, wild oats and green foxtail are continuing. Both foliar and soilborne pathogens are being evaluated. In addition, selection criteria and screening methods for fungal pathogens were developed by the weed biocontrol group. Choice of survey and evaluation methods were established and a new screening and evaluation process was developed. The screening system considers the growth characteristics in culture, infection site on host, inoculum level and severity of disease, and consistency of pathogen-host response. Research efforts for isolating and screening rhizobacterial strains for biological control of grassy weeds from weed suppressive soils is continuing. A culture collection of over 200 bacteria has been established; three bacterial strains are being extensively evaluated under controlled environment and field conditions.

Formulation - foliar fungal agents: Principles for selection of adjuvants used in bioherbicide formulations are being developed. Fungal species from each of the genera *Colletotrichum*, *Phoma*, *Fusarium*, and *Alternaria* were selected to characterise their compatibility with common laboratory surfactants. Tween 20, Tween 40, Tween 80, Tergitol 9, Tergitol 10, sorbitol, and gelatin were evaluated. Conidial germination varied with the surfactant, surfactant concentration, the fungal pathogen, and the inoculum density. Tween 40 and Tween 80 were compatible with all fungi; gelatin was compatible with *Phoma* and *Fusarium*; sorbitol was compatible with *Fusarium* and *Alternaria*. Self-inhibition of conidia was released in *Colletotrichum* with Tween 80; gelatin had similar effects on *Phoma*. Tergitol was detrimental to conidial germination for most fungal species, while Tween 40 and Tween 80 had the mildest effects. In general, fungi belonging to the Coelomycetes were more sensitive to adjuvants than those belonging to the Hyphomycetes.

Formulation - rhizobacteria: In 1997, field trials were conducted to evaluate several granular formulations, including peat prills and clay formulations for control of green foxtail and wild oats. Generally, formulation of bacteria in peat prills provided significant reductions in weed emergence (30-35% reduction) and aboveground biomass (30% reduction) while the clay formulations did not reduce weed emergence or biomass. However, one bacterial strain formulated in the clay formulation reduced biomass of green foxtail by approximately 30%, but weed emergence was not affected. Efforts on improving these formulations are continuing and field trials will be conducted in 1998.

Mass production of fungi: As most of the fungi we are working with do not grow well in liquid culture, technology is being developed to produce these agents on solid substrate culture. A key factor in sporulation of these agents depends on the amount of aeration (oxygenation) and length of time in the liquid phase prior to spreading on the solid surfaces.

Mass production of bacteria: Fermentation studies were conducted to determine the nutritional requirements of specific rhizobacterial isolates with weed suppressive properties. Shake flask-culture tests incorporating various nutrients that lead to significant biological control activity in combination with mass production of bacterial cells was undertaken. Specific carbon and amino acid combinations that provide optimum activity of each bacterial isolate are currently being selected. In addition, phase kinetic studies are being conducted to evaluate the growth rate of bacteria for scale-up from shake flask to 5 and 10 L fermentors. (Source: S. Boyetchko, K. Bailey, K. Mortensen, T. Wolf & W. Zhang)

All-Russian Research Institute for Plant Protection, St.Petersburg-Pushkin, RUSSIA

A study of the mycobiota of weeds has been undertaken since 1996 under financial support of Russian Fund of Basic Research (project "Mycobiota of weeds of European part of Russia", supervisors: Prof. Nina P. Cherepanova and Prof. Mark M. Levitin). The surveys were carried out in seventeen areas of the Russian Federation (Belgorod, Volgograd, Vologda, Voronezh, Kursk, Leningrad, Moscow, Nizhni Novgorod, Novgorod, Oryol, Pskov, Rostov, Saratov, Tambov, Krasnodar territory, Northern Caucasus and in Kareliya). About 2500 samples of diseased weeds were collected and 448 species of micromycetes were identified. About 250 isolates of micromycetes were isolated in pure culture. The information was lodged

in the system “Mycobiota of weed plants” (Mycweed) developed by Dr. V. Zharov, which contains information on more than 2000 specimens of plants and associated micromycetes. The system is supplied with databases on the taxonomy of plants and micromycetes, and maps providing information on the ecological and geographical distribution of the pairs “weed - phytopathogen” and their spatial-temporary dynamics. Mycobiota of the troublesome weeds, *Sonchus arvensis*, *Cirsium arvense*, *Convolvulus arvensis*, and *Galinsoga parviflora* was studied in more detail. A study of some aspects of the biology and ecology (ontogenesis, conditions for culturing and inoculation, host range etc.) was carried out for the pathogens, *Ascochyta tussilaginis*, *Ramularia cirsii*, *Septoria cirsii*, *S. calystegiae*, *S. convolvuli*, *S. longispora*, and *Colletotrichum gloeosporioides* attacking the weeds mentioned above.

(Source: J. Titova, A. Berestetsky & E. Gasich)

Zoological Institute of Russian Academy of Sciences, St. Petersburg, RUSSIA

In 1998 the Biocontrol Group of the Zoological Institute has started a new research project in collaboration with the Montana State University (USA) on a two-year project entitled ‘Montana noxious weed grant program’. The main goal of this project is to find specific plant pathogens and insects against Canada thistle (*Cirsium arvense*) and Leafy spurge (*Euphorbia esula*). (Source: S. Reznik)

New Zealand Pastoral Agriculture Research Institute (AgResearch), Lincoln, NEW ZEALAND

AgResearch is beginning two new weed biocontrol projects in July 1998:

The fungus *Chondrostereum purpureum* will be investigated for control of the woody weed gorse (*Ulex europaeus*). The outcome of this 12-month project will be insight into the potential of this commonly occurring fungus, as a biological herbicide for controlling NZ’s most important scrub weed. This insight will come from greenhouse tests replicated in the North and South Islands (at Ruakura and Lincoln) in which a simple formulation (based on existing knowledge) of several wild strains of *C. purpureum* collected in Canterbury will be applied to gorse seedlings representing a range of North and South Island ecotypes of the weed. Wounding and humidity treatments will assist in defining the potential of the fungus for gorse control and the future developmental path.

The fungus *Sclerotinia sclerotiorum* will be investigated as a possible bioherbicide for ragwort (*Senecio jacobaea*). A slurry formulation developed by Crop Care Holdings NZ Ltd. for Californian thistle (*Cirsium arvense*) will be tested, using a range of naturally occurring strains. If successful, the project will go on to look study interactions between phytophagous insects that have been introduced as biocontrol agents, and the fungus with a view to integrating these forms of biocontrol. (Source: G. Bourdôt)

CLASSICAL BIOLOGICAL CONTROL OF WEEDS WITH PATHOGENS

Department of Primary Industry and Fisheries, Weeds/Biocontrol Section, & CSIRO Entomology, Darwin, NT, AUSTRALIA

The wet season is over in Northern Australia and so is the season for the *Mimosa pigra* pathogen, *Phloeospora mimosae-pigrae*. Several aerial applications have been carried out at three different mimosa infested river systems as part of the establishment program of the pathogen in Northern Australia. The aerial application enables us to create large focus points of diseased areas amongst the 800 km² of dense monospecific stands of *M. pigra* in the floodplains of Northern Australia. Severe symptoms have developed at some of the release sites and the activity of the pathogen will be monitored.

The mimosa dry season rust *Diabole cubensis* is about to be released on a medium-scale after successful field experiments during the dry season 97. Spore production during the wet season was carried out at CSIRO Entomology in Brisbane and spores have been stored in liquid nitrogen. Axenic culturing experiments are currently underway at DPI&F, Darwin. (Source: B. Hennecke)

Departamento de Fitopatologia, Universidade Federal de Viçosa, BRAZIL

Cooperative agreement between The Research Corporation of the University of Hawaii and the Fundação Arthur Bernardes. “Studies on potential biocontrol agents of *Miconia calvescens* DC from Brazil”.

Surveys started in 1996. The introduction of a specific forma specialis of *Colletotrichum gloeosporioides* into Hawaii in two sites (July 1997) was followed by unusual dry weather conditions and although established the fungus failed (until now) to produce a significant impact on the weed populations. Host range studies of a second fungal pathogen (*Pseudocercospora miconiae*), carried out by Eloise Killgore (Hawai’i Department of Agriculture) in quarantine, are well advanced. Surveys in Brazil are still being made and recently a very damaging witches broom disease, of still unknown aetiology, was found. A leaf spot causing nematode is also being investigated. A survey trip to Central America is now being planned.

New project

Funds from the FAPEMIG (Research supporting foundation of the state of Minas Gerais) were approved for a 2-month survey of the mycobiota of *Eichhornia crassipes* (water hyacinth) in the rivers São Francisco and Doce. The first record of water hyacinth in history was from the river São Francisco in Flora Brasiliensis. Although many authors refer to the Amazon as the centre of origin of water hyacinth, a survey undertaken last year by R. Hanada along the Solimões and the Amazonas yielded a very poor mycobiota associated to this host. This suggests that the centre of origin of this species may be located elsewhere. This was similar to the results obtained for a survey undertaken in the state of Rio de Janeiro in 1988-89. Considering that other potential centres of origin in Brazil should also be investigated this proposal was then submitted.

New target weeds

Other possible targets for future projects for which preliminary surveys of the mycobiota are being made are: *Schinus terebinthifolius* (Brazilian pepper tree), *Tagetes minuta*, *Mimosa invisa*, *Commelina benghalensis* and *Calotropis procera*. (Source: R. Barreto)

PLACEMENT

Post Doctorate opportunity

It is likely that a Post Doctoral position will be funded in the near future with a tenure of 12 to 18 months, to be located with the bioherbicide group at Orange, NSW, Australia. The position will be to work on a seed-borne fungus for control of annual grasses.

If you are interested in this likely position your expressions of interest should be directed to:

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READERS' CORNER

Please feel free to use this section to ask questions and express your opinions, concerns, ideas, etc. regarding the field of weed biological control in general.

EDITOR'S CORNER

Thank you all for your contributions to this issue of IBG News. I also wish to extend my thanks to everyone who contributed over the last 5 years. Without your collaboration it would have been impossible to produce this newsletter. This is my last word as editor of IBG News... it's time for some new blood. It has been good to maintain contact with so many of you and I hope that you have been satisfied with the newsletter. Hopefully the new editor will create a Web Home Page to host IBG News in the future. This new medium will likely expand our readership and promote more extensively the field of bioherbicide research. Best wishes to everyone! Louise