INTERNATIONAL BIOHERBICIDE GROUP

IBG NEWS

VOL. 11 NO. 2 **December 2002**

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THE CHAIRMAN'S COMMENTS

On behalf of the International Bioherbicide Group, I wish you all a happy and successful New Year. We begin the new year with two prominent workshops featuring biological control of weeds by plant pathogens. The first, "Biocontrol of Weeds with Pathogens," is organized by Dr. Graeme Bourdot and it will be held on February 1, 2003, prior to the International Congress of Plant Pathology 2003 in Christchurch, New Zealand. The second, "VI International Bioherbicide Workshop," organized by Dr. Maurizio Vurro, will be held on April 27, 2003, as a pre-conference workshop to the XI Symposium on Biological Control of Weeds in Canberra, Australia. We expect a good turn out of participants and many new and highly interesting presentations by workers from around the world. I am looking forward to these meetings and the chance to renew old acquaintances and to make new ones.

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MEETINGS

Bioherbicides: The Next Generation

Canberra, April 27th, 2003

(satellite IBG Workshop at the XI International Symposium on Biological Control of Weeds)

Tentative Programme

Morning session: invited speakers

9:00 – 13:15

- Strategies for enhancing efficacy of biocontrol agents. *David Sands*
- Are transgenic plants offering a more attractive option than bioherbicides for weed control? *Louise Morin*
- Marketing issues relating to bioherbicides: Is the niche-market target a viable option? *TBA*

Break

- Will the organic farming industry accept bioherbicides and if so is the market big enough to justify further development of this technology? *TBA*
- Where did it go wrong? Why is the concept of bioherbicide suffering from limited success? *Alan Watson*
- What should the next generation of bioherbicide looks like? *Raghavan Charudattan*

Afternoon Session: Offered speakers

15:00 – 18:30

- Microencapsulation: an answer to the formulation quandary? *A.T. Chittick, G.J. Ash, R.A. Kennedy and J.D.I. Harper*
- Novel formulation for bioherbicides. *B. Auld*
- Biological control of aquatic weeds of rice in Australia using *Rhynchosporium alismatis*. *Gavin J. Ash, E.J. Cother, F.G. Jahromi, W. Pitt, V.M. Lanoiselet and S. Cliquet*
- Evaluation of *Ascochyta caulina* for biological control of *Chenopodium album*. *R. Ghorbani, C. Leifert and W. Seel*
- Survey of diseases of alligator weed in eastern Australia for their bioherbicide potential. *B.R. Hennecke, R.L. Gilbert and B.A. Auld*

Break

- Evaluating *Fusarium tumidum* and *Chondrostereum purpureum* as mycoherbicides for gorse. *G. A. Hurrell, G. W. Bourdôt, J. Barton (nee Fröhlich) and A. Gianotti*
- The potential of *Chondrostereum purpureum* as a mycoherbicide for the control of alien invasive tree species in South Africa. *M. Serdani and C.L. Lennox*
- *Phomopsis amaranthicola* as a post-emergence bioherbicide in peppers (*Capsicum annuum* and *C. frutescens*) and eggplant (*Solanum melongena*). *J. P. Morales-Payan, R. Charudattan, W. M. Stall, and J. T. DeValerio*
- Assessment of *Dactylaria higginsii* as a postemergence bioherbicide for purple nutsedge (*Cyperus rotundus*) in bell pepper (*Capsicum annuum*). *J. P. Morales-Payan, R. Charudattan, W. M. Stall and J. T. DeValerio*
- Evaluation of the efficiency of *Cercospora caricis* for control of purple nutsedge. *S. C. M. Mello and E. A. Teixeira*

- Microbes and microbial products for biological control of parasitic plants. *M. Vurro, A. Boari, A. Evidente, M. Abouzeid and A. Andolfi*

General discussion - Concluding remarks
18:30 – 19:00

Posters
- Tobacco mild green mosaic virus: a virus-based bioherbicide. *R. Charudattan, M. Elliott, J.T. DeValerio, E. Hiebert and M.E. Pettersen (poster)*

Sixth International Workshop on Plant Growth-Promoting Rhizobacteria

The Sixth International Workshop on Plant Growth-Promoting Rhizobacteria is scheduled for 5 - 10 October 2003 in India. Please view the following web site:
http://www.ag.auburn.edu/india

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Multistate Research Project, S-1001

The annual meeting of the Multistate Research Project, S-1001, Development of Plant Pathogens for Biological Control of Weeds, will be held on February 9, 2003, 8:00 a.m. to 5:00 p.m., in room City Terrace 11, Adams Mark Hotel, 225 Coastline Drive, Jacksonville, Florida 32202, USA. This meeting is held in conjunction with the annual meeting of the Weed Science Society of America.

The following is the tentative agenda:

8:00 – 8:30 a.m.	Registration
8:30 – 8:45 a.m.	Introductions
8:45 – 9:00 a.m.	Opening Remarks – R. Charudattan, Chair
9:00 – 9:30 a.m.	Administrative Advisor's Remarks – Gregory Weidemann, University of Arkansas, Fayetteville
9:30 – 10:00 a.m.	CSREES Representative's Remarks – James Parochetti, USDA-CSREES, Washington, DC
10:00 – 10:30 a.m.	Break

10:30 – 11:00 a.m.	Reports by Objectives: - The Objective Leader identified below will coordinate presentation of reports from each participating state/unit and prepare a consolidated report for inclusion in the Annual Report
	Objective 1-A. Development of Dactylaria higginsii as a bioherbicide for nutsedges (Cyperus spp.) – Erin Rosskopf / Camilla Yandoc, USDA-ARS, Ft. Pierce, FL
11:00 – 11:30 a.m.	Objective 1-B. Development of Microsphaeropsis amaranthi and Phomopsis amaranthicola as broad-spectrum bioherbicides to control pigweeds – R. Charudattan, University of Florida, Gainesville
11:30 – 12:00 a.m.	Objective 1-C. A multiple-pathogen approach to control several weedy grasses – S. Chandramohan, University of Florida, Gainesville
12:00 – 1:30 p.m.	Lunch Break – on your own
1:30 – 2:00 p.m.	Reports, continued:
	Objective 1-D. Myrothecium verrucaria as a broad-spectrum bioherbicide for purslanes, spurges, kudzu, and other weeds – Doug Boyette, USDA-ARS, Stoneville, MS
2:00 – 2:30 p.m.	Objective 1-E. Development of Pseudomonas syringae pv. tagetis as a bioherbicide for weeds in the Asteraceae – Donald Daigle, USDA-ARS, New Orleans, LA
2:30 – 3:00 p.m.	Objective 2: To develop and evaluate formulations to improve performance and standardization of selected bioherbicides - Donald Daigle
3:00 – 3:30 p.m.	Objective 3: To evaluate bioherbicides in multistate field trials in different crops and as alternatives to methyl bromide – Erin Rosskopf / Camilla Yandoc
3:30 – 4:00 p.m.	Objective 4: To safely enhance the virulence of bioherbicides by selection of variants of the plant pathogen that overproduce a target amino acid – David Sands / Alice Pilgeram, Montana State University, Bozeman
4:00 – 4:45 p.m.	Reports from the nonmember participants and industries
4:45 – 4:50 p.m.	Concluding remarks – Chair, Secretary, Administrative Advisor, and or CSREES Representative
4:50 – 5:00 p.m.	Venue for next year's meeting and other administrative details.

The meeting is open and everyone is welcome to attend.

Raghavan Charudattan, Chair, S-1001 Group - rc@mail.ifas.ufl.edu

PEOPLE & PLACES

Dr. **Susanne Vogelgsang** has joined a Swiss national research centre (NCCR Plant Survival: http://www.unine.ch/nccr) to coordinate its activities in knowledge and technology transfer. Susanne establishes contacts between NCCR researchers and partners to foster the exploitation of research results into the development of sustainable plant protection methods in natural and agricultural ecosystems.

Before coming to NCCR Plant Survival, Susanne held a Visiting Fellowship at the Pacific Forestry Centre (Victoria, BC, Canada) where she conducted research towards the biological control of the forestry weeds salal (*Gaultheria shallon* Pursh.) and *Rubus* species.

Besides her exciting management responsibilities, Susanne keeps a foot in biological weed control through a newly launched collaborative research project between Prof. Raffaele Tabacchi (University of Neuchâtel, Switzerland) and Prof. Alan K. Watson (McGill University, Canada). The project focuses on the phytotoxic compounds of the fungus *Phomopsis convolvulus* (e.g. convolvulanic acid and convolvulol), a potential bioherbicide of *Convolvulus arvensis*. Utilising a newly established collection of *P. convolvulus* isolates, the effect of growth media on the production of phytotoxic metabolites will be evaluated. In addition, isolates with variable phytotoxin profiles will be tested on a number of accessions of *C. arvensis*. The results of this project will contribute to further optimise the inoculum production and field application procedure.

Susanne Vogelgsang - susanne.vogelgsang@unine.ch

Neve-Yaar Research Center, Volcani Center, ARO, Israel

Research position in Weed Research Dept.

Research description

Research at the agrotechnical and/or chemical and/or physiological level in the area of weed control.
Define and identify the problems in cooperation with other researchers, extension services and other local research centers.
Preparation and submission of research proposals for competitive grants, local and international, including cooperation with other researchers. Active initiation of research to be conducted in cooperation with other scientists in Israel and abroad. Report research results for supported grants and publish results via professional meetings and in scientific journals. Active participation in local and international professional meetings and functions. Membership in professional societies.

Candidate qualification
1. Israeli citizenship.
2. PhD in agriculture science, post Doctorate advantage.
3. Deep knowledge of Israeli weeds and weed control in vegetables and other field crops.
4. Knowledge and experience in conducting field experiments and in plant research: anatomy, physiology and biochemical aspects.
5. Residence in vicinity of Neve Ya'ar (20 km distance approximately).

Other conditions
Candidates will be evaluated for this position by a special committee.
There will be a trial period for the candidate, during which a special committee will supervise the candidate. The final decision for tenure will by granted by the professional committee of the ARO.

Candidates are requested to send CV, list of publications, recommendations (Doctorate supervisor, post-Doctorate and other places of work) by April 1st 2003, to Dr. Yephet Ben-Yephet, Plant Protection Director, Volcani Center Bet-Dagan 50250 or To Fax: 972-3-9604180.

Joseph Hershenhorn - josephhe@volcani.agri.gov.il

Dr. **Simon Shamoun** organized and chaired a workshop- "Biology, Ecology and Management of Dwarf Mistletoes" at the 50th annual meeting of the Western International Forest Disease Work Conference "WIFDWC" at Powell River, BC, Canada, during October, 2002. In addition, he presented a scientific oral paper at this workshop.

On February, 2003, Dr. Shamoun will attend as an "invited speaker" to the 8th International Congress of Plant Pathology (ICPP) at Christchurch, New Zealand. Simon will present a scientific paper "Biological control approach for management of dwarf mistletoes" at the plenary session "Management of Forest Diseases". In addition, Dr. Shamoun will attend the "Biocontrol Workshop" which is organized by Dr. Bourdot at Christchurch, New Zealand. Simon will present a scientific oral paper on "Development and registration of *Chondrostereum purpureum*, and an up-date on mycoherbicide research projects in progress".

Shamoun, Simon" <sshamoun@PFC.Forestry.CA

BIOHERBICIDE RESEARCH - STATUS REPORTS

Pacific Forestry Centre, Victoria, B.C.

Dr Raj Prasad at the Pacific Forestry Centre, Victoria, B.C. has been conducting research on Ecology, Biology and Management of Exotic (Invasive) Weeds on federal lands where some of these (*Cytisus scoparius, Ulex europaeus, Daphne laureola* and *Hedera helix*) are posing serious threats to native species particularly in the rare and endangered Garry Oak (*Quercus garrayana*) Ecosystems. Many ornamentals were introduced into North America for various beneficial purposes but some of these alien plants have escaped, expanded their range and invaded into the new environment beyond usefulness. Thus, they have facilitated ecosystem changes and displaced native organisms through habitat alterations or simply by competition for space, light, water and nutrients. Therefore, an effort is being made to arrest their spread and several options of control are being tested: the bioherbicide approach by deployment of the fungus *Chondrostereum purpureum* is showing some promise in reducing the resprouting behavior in scotch broom and gorse. Its treatments have been applied on *D. laureola* and *H. helix* as well and soon we will find out how this bioherbicide affects them.

Figures. Left: infestation of Gorse (*Ulex europaeus*, brown areas) and Scotch Broom (*Cytisus scoparius*, yellow areas). Middle: Daphne (*Daphne laureola*). Right: Ivy (*Hedera helix*)

Raj Prasad - rprasad@PFC.Forestry.CA

The Shamoun's BioControl Research Laboratory- Canadian Forest Service, Pacific Forestry Centre, Victoria, British Columbia, Canada

In August, 2002, three research field trials were conducted on Vancouver Island- near Spider Lake to evaluate formulation products of the following biocontrol agents: *Colletotrichum gleoeospiorides, Neonectria neomacrospora*, and multiple agents approach, respectively, for control of western hemlock dwarf mistletoe (*Arceuthobium tsugense).* Data are being collected on monthly basis to assess the potential use of the above mentioned biocontrol agents.

Dr. Simon Francis Shamoun and his research partner Dr. Bart J. van der Kamp (Professor & Chairman- UBC-Forest Sciences) received a research grant from the BC Forest Investment Initiative (FII) to continue their collaborative research program -- Development of biological control agents for management of the forest disease "Dwarf Mistletoe" in partial harvesting sites of BC forests.

Dr. Simon Francis Shamoun and his research partner Dr. Bart J. van der Kamp continue their supervision of three graduate students at UBC/CFS-PFC: 1)Tod Ramsfield (completed his Ph.D degree at UBC- Forest Sciences; Dr. Ramsfield has joined the Forest Research Institute as a Research Scientist in New Zeland); 2) Lea Rietman- continuing her M.Sc. research project at UBC- Forest Sciences; and 3) Sue Askew- continuing her M.Sc. research work at UBC- Forest Sciences.

For the first time, "Two Novel Tissue Culture Systems" were developed in Dr. Shamoun's lab. On "Weedy *Rubus* spp." and western hemlock dwarf mistletoe, to investigate the host-pathogen interaction at cellular levels and to test the phytotoxins effects. Results are published in the International Journal of Plant Sciences and *In vitro*, Organ and Tissue Culture Journal. For more information, on these publications, please, contact Dr. Shamoun.

Dr. Shamoun and his graduate students (Grace Sumampong- M.Sc. candidate-SFU- Biological Sciences and Jennifer Wilkin- M.Sc. candidate- UBC- Forest Genetics), post-doctoral fellow (Dr. Steven Zhao- NSERC Visiting Fellow), are continuing research and development of biological control agents for management of weedy *Rubus* spp. and salal (*Gaultheria shallon*). Funding for these projects are provided by Weyerhaeuser Canada, Science Council BC, Western Forest Products, and CFS-PFC.

Dr. Shamoun and his research technician Cheryl Konoff (currently, on maternity leave and been replaced by Holly Williams- research technician term), are continuing research work on "Elucidation of the resistance mechanisms of big leaf maple/aspen to infection by *Chondrostereum purpureum*. In addition, assessing the efficacy, environmental impact/ fate and risk analyses of using *C. purpureum.*

A formal US and Canada Patents were filed by Drs. Shamoun & Vogelgsang on " Formulation and delivery technologies of the biocontrol agent *Valdensinia heterodoxa* for management of salal- (*Gaultheria shallon*).

As a member of the supervisory committee, Dr. Shamoun attended the final Ph.D defense examination for Elisa Becker at the University of Victoria- Dept. of Biology. The examination took place at UVIIC on December 17, 2002. Dr. Becker defended her Ph.D work on "Systematics, efficacy and population structure and genetic diversity of the biocontrol agent *Chondrostereum purpureum".*

As a member of the supervisory committee, Dr. Shamoun attended a Ph.D candidacy examination for Mr. Philippe Tanguay at UBC- Dept. of Wood Science. Mr. Tanguay's PhD work is related to biocontrol of sap stain fungi (*Ophiostoma ulmi*) by using albino mutant isolates.

As a member of the supervisory committee, Dr. Shamoun attended the Ph.D candidacy examination for Mr. Brad Temple at UVIC- Dept. of Biology. Mr. Temple's Ph.D work is related to "Transformation of *Ophiostoma ulmi* and the use of tissue culture techniques for studying elm-*O. ulmi* interaction".

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NSW Agriculture, Orange Agricultural Institute

New Bioherbicide Formulation

A novel bioherbicide formulation has recently been disclosed in Australian Patent Provisional Application No.2002952094 "Bioherbicidal Formulations" invented by Prof. Bruce Auld of NSW Agriculture's Orange Agricultural Institute and Sydney University. The formulation is a water-in-oil-in-water (WOW) emulsion. The complex emulsion is made up of microscopic oil droplets that contain water in a continuous phase of water. It reduces dew dependence in bioherbicides. It has advantages over other formulations in that it is liquid, contains less than 5% oil and can be sprayed with conventional equipment. Details of the formulation will be published in a forthcoming invited paper in the journal, Weed Biology and Management (Blackwell Publishing).

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All-Russian Research Institute of Plant Protection (Saint-Petersburg, Russia)

Our group continues a work on the development of bioherbicides to control noxious weeds in Russia under general direction of Prof. Mark Levitin.

Accordingly to the institutional working plan, Dr. Elena Gasich studies mycobiota of weeds of Russian Federation and allied countries. In this year, she performed identification of diseases of weeds sampled in Stavropol region. Dr. Alexander Berestetski began a study of a new pathogen of Canada thistle, *Stagonospora cirsii*, which causes very large necrotic leaf spots on this weed. His student, Nadia Parkhomenko is developing technology for inoculum production of *Ascochyta tussilaginis*, a potential agent for biocontrol of perennial sowthistle (*Sonchus arvense*). This fungus produces microsclerotia in pure culture, and this kind of propagules could be used to store the infection material and subsequent inoculum production.

Since 2002 we have been involved in a 3-year new project on the chemistry of phytotoxic substances of microbial origin to develop ecologically safe herbicides. Our collaborator is Technological University (Saint-Petersburg). Our main objectives are selection of fungal strains with strong phytotoxic activity, optimization of biotests and phytotoxin production. Dr. Berestetski is responsible for isolation and identification of fungi causing diseases of perennial weeds, and maintenance of the culture collection. Dr. Tatiana Gagkaeva and Ms. Irina Bilder have begun screening strains on phytotoxic activity. To date, the collection consists of 200 strains of fungi pathogenic for *Cirsium arvense* and *Sonchus arvensis*, 120 strains were evaluated. Among them, about 10% demonstrated the high activity.

Our group has taken part in Federal Program for control of narcotic plants, *Cannabis sativa* and *Papaver somniferum*. In 2002, we undertook intensive surveys in South Russia and adjacent countries to find and isolate

causal agents of their diseases. The main pathogen of *Papaver* spp. was *Dendriphyon penicillatum.* A causal agent of leaf spot, *Septoria cannabis* was found the most common disease of *Cannabis* spp. In 2003, the culture collection will be tested on pathogenicity for their host plants. The most aggressive pathogens will be studied further to determine optimal conditions for inoculation.

At last, Drs. Elena Gasich and Alexander Berestetski visited Laboratory of Biocontrol at Institute of Applied Microbiology (Harbin, People's Republic of China) to establish contacts in development of bioherbicides. They gave general information on bioherbicide research in Russia and collected samples of diseased weeds. Some of them were very interesting (e.g. *Septoria atriplicis* on *Chenopodium album* and *Ramularia* sp. on *Amaranthus* spp.). In next years, Chinese colleagues plan to visit our institute. The organization of our life in Harbin was very beautiful, and we are very thankful to Dr. LiJing for invitation and culture program in Harbin and Beijing.

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Myco-Forestis Corporation

Myco-Forestis Corporation is a private Canadian company with office and laboratory facilities located in L' Assomption, Quebec. The company's mission is to research, develop and commercialize, value added biological products and services, which support sustainable forest management. Myco-Forestis is therefore very pleased to have registered the first microbial product for use in deciduous vegetation management.

Following many years of research and development, including numerous pilot and pre-commercial scale efficacy trials, application was made to the Pest Management Regulatory Agency (PMRA) of Health Canada for registration of a selected strain (designated as HQ1) of *C. purpureum* for use in forest vegetation management. This objective was achieved in January 2002, with the registration of Myco-Tech™ Paste containing *C. purpureum* (HQ1). Following publication of the Proposed Regulatory Decision Document and allowing a period of time for public comment, the PMRA has subsequently converted the initial limited-term registration to full registration status.

According to the product label, Myco-Tech™ is registered for "Inhibition of regrowth on cut stumps of deciduous tree species, in right-of-way and conifer release management situations". The approved area of use includes boreal and mixed forest regions in all provinces of Canada, east of the Rocky Mountains. The specific efficacy claim, states that a single topical application to a cut stump will inhibit sprouting and regrowth on birch, pin-cherry, poplar/aspen as well as red and sugar maple.

In the many product development and commercial applications conducted since the initial registration submission, Myco-Tech™ has demonstrated excellent efficacy on labelled and additional species, and has shown a major benefit by significantly increasing the efficiency of mechanical vegetation management operations. As such, Myco-Tech™ provides right-of-way and forestry vegetation managers, with a viable, reduced risk alternative to chemical herbicides. At present, Myco-Forestis is enthusiastically preparing for its second season of sales and marketing and is encouraged by the high level of interest that Myco-Tech™ has generated.

Submitted by;
Brian Ure, Ph.D. Manager of Regulatory Affairs (bure@sympatico.ca)

For additional information regarding Myco-Forestis Corporation and Myco-Tech™, please contact M. Norbert Major (nmajor@myco-forestis.ca)

CLASSICAL BIOLOGICAL CONTROL OF WEEDS WITH PATHOGENS

Defining safety zones for bioherbicides using dispersal models

Plurivorous plant pathogens that are air-dispersed may often have qualities that make them good candidates for development as bioherbicides. However, these pathogens can produce airborne spores that may result in added disease risk to non-target plants. These pathogens may however be used as bioherbicides providing a safety distance is observed. The spatial pattern of this safety zone cannot easily be determined empirically but may be simulated by linking models of spore escape and dispersion from natural and biocontrol sources. These models can be applied to other aerially dispersed pathogens intended as bioherbicides. Moreover, these models and methods may be useful to quantify dispersal of airborne pollen particles in the discipline of Aerobiology.

De Jong et al. (2002) wrote a physical-mathematical paper entitled: "A model of the escape of *Sclerotinia sclerotiorum* ascospores from pasture, Ecological Modelling 150, 83-105". The model includes ideas from models for barley and rice and is freely available. You may wish to send a request for a PDF file to meindert.dejong@wur.nl who would be glad to forward this file as an attachment (Acrobat Version 5 is needed). Alternatively you may download this file yourself from: http://www.geocities.com/biosanitation/ by clicking Innovation and Model. And from: http://www.geocities/meindertdejong/ MDJ is available upon invitation to deliver the software Sporesim in person to your university/institute.

To estimate the atmospheric density of spores, we linked the model Sporesim to a Gaussian plume model, as implemented in the air quality management computer program PC-STACKS. Subsequently, we determined safety zones.

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Weed Problem: *Miconia calvescens*, miconia

Outside of its native range in Central and South America, miconia *Miconia calvescens* DC (Melastomataceae) has become an invasive weed in only two areas worldwide, namely, Hawaii and Tahiti. And probably for that reason, miconia has not garnered much attention. In early 1996, Robert Barreto of the University of Viçosa, Viçosa, Brazil, shipped various fungi isolated from diseased miconia plants to the Hawaii Department of Agriculture (HDOA) in Honolulu. After undergoing pathogenicity tests and host range tests, the HDOA received approval to release the pathogen *Colletotrichum gloeosporioides* f. sp. *miconiae* on the Big Island of Hawaii where it became established and was subsequently released on the Island of Maui. Has it been a successful biocontrol agent in Hawaii? In 2000, an attempt was made to quantify the effects of the fungus on the growth of miconia plants in situ. Over 500 miconia plants in 6 different locations were statistically challenged (sized, measured, classed), and inoculated with *C. g. miconiae* spores or maintained as control groups. The results were also statistically challenging, because the inoculated plants actually responded with an increase in growth. Although some researchers explained it as a natural response to a stressed condition (defoliation by *C. g. miconiae*), it skewed the results. Data was taken for over one year, but the funding ceased, and the project ended, somewhat unsettled. The *C. g. miconiae* has also competed with funded and volunteer eradication groups armed with machetes and helicopters rigged with herbicide spray equipment.

A few miconia populations have been eliminated and fungal test/release sites have been "raided" by these groups. It is difficult to protest because the goal in Hawaii is to eradicate miconia. And considering the nature of this

invasive, it is difficult to argue that point. Perhaps with time, the fungus (and miconia) will remain while we all have otherwise passed on for one reason or another.

Through the collaborative efforts of the HDOA and Jean-Yves Meyer, Ecologist with the Gouvernement de Polynésie française, the *C. g. miconiae* was released at a site on the Island of Tahiti (Tahiti Iti) in April 2000. An assessment was made in the summer of 2002, and Meyer found that every miconia plant within a 2 km radius was infected with the fungus. The fungus causes typical anthracnose leaf spots (Fig.1), causing premature defoliation, but it also kills young tender seedlings, especially germinating seeds (demonstrated by *in vitro* tests at HDOA lab). The miconia seed bank can be enormous and nearly everlasting.

The situation in Tahiti is ideal for the intended use of *C. g. miconiae*, where the miconia population level has reached solid stands and is too widespread for conventional control/eradication methods. Unlike the situation in Hawaii, there are no eradication groups armed with tools for miconia destruction. The climate in Tahiti is also quite suitable for fungal activity– rainy and wet. In October 2002, another release of the fungus was made on the island of Tahiti (Tahiti Nui). Meyer now intends to rear the fungus in Tahiti for future continued releases.

Figure. Infected miconia seedlings in understory of natural forest at the Taravao Plateau, Tahiti, October 2002, where the fungus was released in April 2000. Infected miconia leaves 5-6 meters in the upper canopy serve as a source of inoculum for these plants below

Weed Problem: *Pennisetum setaceum*, fountain grass

The biological control of weeds world is a small one if you're a plant pathologist. But it is an effectively close-knit one, which has been advantageous for the HDOA. Through the efforts of Simon Shamoun, Canadian Forest Service, Victoria BC, Canada, the HDOA contacted Mohammed El Wakil of the University of Mansoura, Mansoura, Egypt, for collaboration on the search for biological control agents for fountain grass.

This collaboration was successful in receiving a grant from the U.S./Egypt Joint Fund for Science and Technology for explorations of Egypt, part of the native range of fountain grass. The exploration is scheduled to begin in early 2003, followed by an exchange of visits between researchers in Egypt and Hawaii.

Weed problem: *Lantana camara*

Sometimes we get lucky. Two months ago a rust disease on lantana was discovered on the Big Island of Hawaii. It has been tentatively identified as *Puccinia lantanae* based on symptomatology and the lack of urediniospore production (only teliospores present). The HDOA has released a number of insects since time immemorial for the control of lantana in Hawaii but the weed has fought them off and still flourishes. It is speculation that the disease was introduced on commercial lantana importations to the Big Island from Florida. The disease site is adjacent to commercial importers. Sometimes we get lucky!

Eloise M.Killgore - eloisekillgore@yahoo.com

Departamento de Fitopatologia, Universidade Federal de Viçosa, BRAZIL

Miconia calvescens

Claudine D. S. Seixas has finished her Ph.D. on pathogens of miconia. Her work was concentrated on a leaf gall nematode and the fungus *Coccodiella miconiae.* Although these organisms represent potential candidates for introduction into Hawaii and French Polynesia they proved considerably difficult to handle. Both survive only in fresh leaf material and appear to be highly host-specific. Plants of the miconia biotype present in Hawaii couldn't be infected with populations of those pathogens from Brazil. *Coccodiella* was heavily hyperparasitized in the field. Eight different fungal mycoparasites were found attacking it. It is expected that the introduction of the correct strain of this fungus, into the Pacific islands where miconia became invasive, free from such hyperparasites, will result in even higher levels of damage than already observed in the native range of the weed. DNA studies are now being performed in Hawaii in order to compare *Miconia calvescens* from different origins in the Neotropics with invasive populations in Hawaii. At present it is suspected that plants from the Andes and Costa Rica will prove to be similar to Hawaiian plants and dissimilar from Brazilian populations.

Pereskia aculeata

Although a popular fence plant with edible spinach-like foliage in Brazil, this neotropical cactus became an aggressive invader of many areas of South Africa where it was declared a weed subjected to herbicide registration and biocontrol investigations. Arthropods from the centre of origin have been introduced but levels of control were not regarded as sufficient. Occasional observations of diseases on this cactus were made by R.W. Barreto and resulted in: a) the finding of a new species of *Pseudocercospora* attacking its foliage; b) the elucidation of the full life-cycle of the rust *Uromyces pereskiae* – a highly damaging pathogen which is probably specific to this host. A funding scheme for further work is being studied by Martin Hill PPRI – South Africa.

Commelina benghalensis

Denise C. Lustosa continues her work on the development of a mycoherbicide against *C. benghalensis*, as part of her Ph.D. programme.

Mitracarpus hirtus

Invasion by this member of the Rubiaceae native from Brazil is causing concern to agriculture authorities in Papua New Guinea. Preliminary studies have carried out by Olinto L. Pereira have shown that there are five fungal diseases attacking this host in Viçosa and its vicinities. The most damaging of these pathogens is an undescribed mycrocyclic species of *Puccinia.* The potential of this rust for classical biocontrol of this plant appears very good. Funding for further work would be welcomed!

Euphorbia heterophylla

Katia L. Nechet has finished her Ph.D. research work on three fungal pathogens of milk-weed, one of the worst weeds of soybean plantations. This is a renewed attempt of exploiting the Brazilian mycobiota of this weed as a source of biocontrol agents. Nearly twenty years ago the first programme in the field of bioherbicides in Brazil was started by J. T. Yorinori aiming at controlling this weed. Initial results with the fungus *Bipolaris euphorbiae* were very promising but because of a combination of problems unrelated to the fungus potential the work was interrupted. K. Nechet's results indicate clearly that the mycoherbicide approach for the biocontrol of this weed is very promising.

Schinus terebinthifolius

Brazilian pepper tree, Florida holly or Christmas berry is a serious invader of Florida, Australia and several oceanic islands. A survey of the fungal pathogens of this plant is being conducted as part of the M.Sc. programme of Ana Beatriz V. Faria. Twelve fungal species have already been collected as part of the preliminary surveys, some representing potential classical biocontrol candidates, several representing new taxa.

Mycovellosiella sp. 1
Mycovellosiella sp. 2
Pseudocercospora sp.
Meliola sp.
Phyllosticta sp.
Myrothecium sp.
Septoria sp.
Erythrogloeum sp.
Colletotrichum sp.
Corticium sp.
Pestalotiopsis sp.
Phoma sp.

Pathogenicity of *Septoria*, *Myrothecium* and *Pseudocercospora* to the biotype of *S. terebinthifolius* from Florida has already been confirmed.

Fungal pathogens of Neotropical aquatic weeds

A search for pathogens of *Eichhornia crassipes* was undertaken in two areas of Mato Grosso do Sul (Brazil). The "pantanal" a big seasonaly flooded area in the borders of Brazil, Bolívia and Paraguay, was suggested as a possible centre of origin of this pantropical weed. Although plant diversity, as indicated by the simultaneous presence of the three flower morphs of *E. crassipes*, was great, the pathobiota of the weed in the surveyed area was very limited, suggesting that new searches should be oriented towards other regions in the Neotropics. During this search two diseases were observed on *Hymenachne amplexicaulis*, an amphibious grass that was recently listed among the top 20 worst weeds in Australia.

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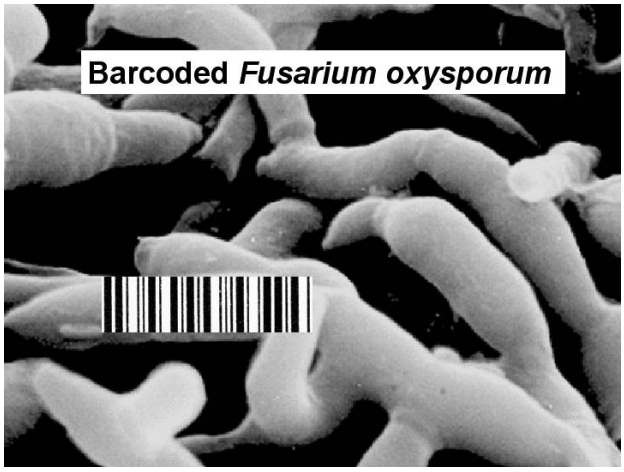
PUBLICATIONS



The paper "Universal inheritable barcodes for identifying organisms. Trends in Plant Science 7:542-544, 2002" resulted from my answer to a question asked at the International Biocontrol Group satellite meeting in Foz a few years ago. I was asked whether I "really thought biocontrol agents should be transgenic". My answer was that "all should be transgenic, so that they could be traced in the environment, even if transformed just with a nonsense non-coding sequence". I then thought about how this might be done easily, and BiobarcodesTM were born. They may be important for strain protection, but more importantly for issues of liability – if someone's crop gets sick, they will blame the neighboring farmer who used a mycoherbicide. It would be simple to PCR DNA from a lesion from the sick crop plant with the Biobarcode Universal Primers, and ascertain if the mycoherbicide may be present,

and sequence the band if one appears, and compare the sequence with the database, to ascertain what code is present, if it is the sequence in the mycoherbicide.

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Towards Ecologically Based Weed Management Systems in Vineyards.

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Weed control is important in vineyard management to maintain vine plant vigour and productivity. Weeds under the vine canopy are usually controlled using herbicides. The increasing threat of herbicide resistance, and a current drive towards lowering chemical inputs for grape production, provides an opportunity for the development of novel approaches, for weed management. The aim of this project is to isolate deleterious rhizosphere inhabiting bacteria with the potential to develop commercial products for weed control. Weeds targeted in this project include annual ryegrass (*Lolium rigidum* Gaudin), wild radish (*Raphanus raphanistrum* Linneo) and capeweed (*Artotheca calendula* Linneo). A total of 442 rhizosphere bacteria have been isolated using selective (Pseudomonas, Sands and Rovira) and non-selective (tryptic soy and nutrient agar) media. To date, 125 have been screened for effects on weeds individually, and in combination, in the laboratory and glasshouse. Three isolates have deleterious effects on weeds and have been characterised in detail and identified as *Pseudomonas fluorescens* 1, *Pseudomonas fluorescens* 2 and one as *Alcaligenes xylosoxidans*. The *Pseudomonas fluorescens* 1 produces hydrogen cyanide (HCN), an inhibitor of plant roots. These isolates are being screened for effects on other weed species, annual species commonly sown in vineyards as cover crops (eg. *Trifolium* spp.) and vine rootlings.

This article was published in the 13th Australian Weed Conference Paper and Proceedings held in Perth Western Australia 6-8 September 2002.

Other papers

Magnussen, S, Vogelgsang, S, Shamoun, SF. Non-linear mixed models for repeated data assessment of time and temperature effects on conidia production in the fungus *Valdensinia heterodoxa. BioControl*, in press.

Vogelgsang, S & Shamoun, SF (2002) Growth, sporulation, and conidia discharge of *Valdensinia heterodoxa*, a foliar pathogen of salal, as influenced by temperature and photoperiod *in vitro*. *Mycological Research* 106: 480-490.

EDITOR'S CORNER

Dear Friends and Collegues,

Many thanks to all the people who, as usual, have collaborated once more to prepare this issue of our bulletin. I hope it will be useful for your activities, and you will enjoy it, and will give always your help to prepare the future issues.

I wish you all a prosperous and happy new year.

I want here to commemorate a colleague and friend, Dr. **Azam E. Idris**, who lived in Bari with his family for one year and worked, as a visiting scientist in my Institute, on metabolites of parasitic weed pathogens, until last July. He tragically passed away in his country few days ago, in a desperate and heroic attempt to save one of his daughters in the water of Nile river. I will always remember his kindness and good manners, and his strong wish to ensure a better life to his four wonderful children.

Maurizio Vurro