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PLANT PROTECTION NEWS

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South African National Collection of Fungi: celebrating a centenary 1905-2005

The South African National Collection of Fungi, which houses approximately 60 000 specimens, is known nationally and internationally under the acronym PREM. The collection also includes material from outside South Africa and contains representatives of all the major groups of fungi excluding the yeasts and pathogens of larger animals and humans.

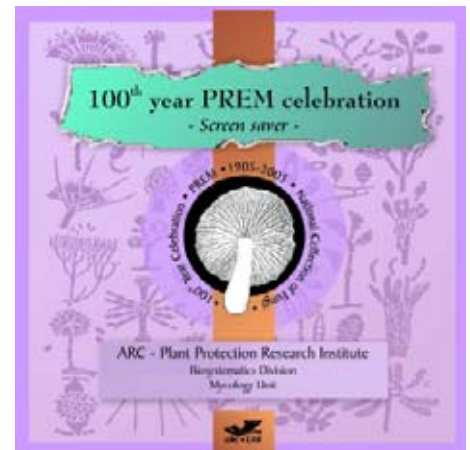
The collection was established in 1905, when South Africa was still a British colony. The vision and hard work of the earlier scientists associated with PREM, paved the way for the establishment of a number of present-day national research bodies. One of these, the Plant Protection Research Institute, is currently the custodian of the collection. Over time, activities at PREM were influenced by socio-economic and political events and most recently, the South African government's commitment to international biodiversity initiatives. Although the basic goals and needs to maintain PREM remained intact throughout, various phases in terms of research focus can be recognised over the past century.

In the early days the emphasis was on collecting and recording of fungi, then pioneering research was done on mycotoxins, and later there was an increased demand for public-good services and innovation. Now sophisticated molecular technologies are available to discover true phylogenetic relationships of fungi, a fundamental principle not previously possible to explore by any other means.

In collaboration with the *Centraal Bureau voor Schimmelcultures* The Netherlands, historical facts and details about the activities of the collection will be published in a special edition of the journal *Studies in Mycology* (early in 2006), to celebrate the centenary of this collection. Most of the historical facts have been accumulated by Alice P. Baxter, the previous curator of the collection. The success and future of natural history collections depends on continued support from governing bodies, appreciation for our biological heritage and on inputs from the scientific community.

Dr Isabel Rong (rongl@arc.agric.za)

The name PREM is derived from the city in which the collection is situated, Pretoria (PRE), and the M defines the collection as being mycological.



Vredehuis where PREM collection is housed

PPRI - Bee researchers receive recognition

Deciduous Fruit Producers Trust researcher of the year for 2005

Congratulations to **Mike Allsopp** who received an award from the Deciduous Fruit Producers Trust (DFPT) in the Western Cape. Mike was announced as the **DFPT researcher of the year for 2005** during the annual breakfast/lunch of the DFPT, held by the executive board, to which all the main role-players in the fruit industry are invited. These include large-scale farmers, extension officers, marketing and export people, researchers and administrators. Mike is very proud of this recognition by the industry for his contribution to pollination studies during the year.



Elize says: "Working with people is my passion in life. Seeing something happen in people's lives and being rewarded by seeing how they achieve things for themselves is an amazing part of my job. In fact, what I do doesn't feel like a job at all."

Tribute to 35 exceptional women

Recently the Impumelelo Innovations Award Trust highlighted 35 projects in a special issue devoted to exceptional women who have initiated or managed projects that have won Impumelelo awards.

One of these women is **Elize Lundall-Magnuson** of the Insect Ecology Division. Elize manages the Beekeeping for Poverty Relief programme, which is the biggest and first beekeeping development programme in the country. Although it is an initiative of the ARC, it has the firm backing of a number of national and provincial departments and is founded on a partnership between the departments of Arts, Culture, Science and Technology, Agriculture, Welfare and Forestry and Water Affairs. To date more than 40 projects have been initiated and more than 500 people trained, supplied with basic equipment and ongoing advice. To distinguish the honey that is produced from the conventional product it has been branded under the label "Inyosi Honey" which prides itself on its high standard.

Researcher obtains her MSc degree

Congratulations to **Annelize Lubbe**, an entomologist at the Insect Ecology Division, who obtained her MSc degree from the University of Pretoria. Her thesis was titled "The phenomenon of *Apis mellifera capensis* laying workers in *Apis mellifera scutellata* colonies in the summer rainfall region of South Africa."

African honeybee workers, *Apis mellifera scutellata*, can activate their ovaries under queenless conditions to produce male (haploid) offspring. In contrast, laying workers of the Cape honeybee, *Apis mellifera capensis*, produce female (diploid) offspring via thelytokous parthenogenesis. In the early 1990s colonies of *A. m. capensis* were transported into the distribution area of *A. m. scutellata* (corresponding to the summer rainfall region of South Africa), leading to the "capensis calamity". Laying workers of *A. m. capensis* invaded and killed colonies of *A. m. scutellata* leading to losses of thousands of commercial colonies (cont. p. 3).



A survey of the apiaries in the *A. m. scutellata* region was conducted over 18 months from 1997 to 1998, to determine the extent of the problem. It was found that the parasites were established in many apiaries throughout the distribution range of *A. m. scutellata*. As the problem seemed to be more severe with commercial and migratory beekeepers, the apiaries surveyed were divided into risk groups related to beekeeping practices. The low risk group included apiaries of beekeepers in areas that are separated from commercial beekeepers and their high risk activities. These low risk colonies were sedentary vs the migration to high risk areas e.g. Aloes, sunflower pollination areas, citrus and other fruit pollination areas of the high risk apiaries.

The apiaries were monitored and records of the colonies' condition were taken. Samples of workers were collected for dissection. It was found that the low risk group had a lower rate of infection, a higher production of brood and honey and a higher rate of survival over a 12 month period. The significant characteristics for identifying infection of a colony were determined as being the colour of the workers, the brood pattern, the presence of multiple eggs in cells and the presence of the queen. Indeed, the presence of dark workers with a black scutellum, an irregular brood pattern, the presence of multiple eggs in cells and the absence of queen were all prevalent in infected colonies. A sample of workers from all inspected colonies was dissected and the average ovariole counts

as well of the development stage of the ovaries proved to be significant variables in the diagnosis. Other variables eg. ovariole counts, spermatheca size, and aggression proved to be not significant, but in conjunction with other variables, could be used for diagnosis.

The genetic nature of the invasive parasitic population was determined using polymerase chain reaction (PCR) analysis. Nine loci were tested and the DNA fingerprints of all individuals sampled throughout the summer rainfall region were proved to be identical. This genetic identity led to the description of these individuals as a pseudoclone. In contrast, workers of *A. m. scutellata* were tested with the same loci and showed the normal distribution of an out-breeding population.

In order to investigate the spread of the parasite within an apiary, colonies were exposed to heavily infected hives and inspected regularly. Ninety five percent of the colonies had either died or absconded within 12 months. It is concluded that this phenomenon of social parasitism is the consequence of apicultural activities and that it can be managed by adopting low risk beekeeping practices.

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PPRI researcher serves on IPPC Technical Panel

Dr Esther van den Berg of the Nematode Unit of the Biosystematics Division was invited as a lead for the diagnostic protocols on Nematology of the FAO. She attended the 2nd meeting of the Technical Panel on Diagnostic Protocols, Malaysia, 5-9th December 2005

South Africa is a signatory to the World Trade Agreement on the Application of Sanitary and Phytosanitary Measures (WTO-SPS) as well as to the International Plant Protection Convention (IPPC). Being the international standard setting body for plant health, the purpose of IPPC is to coordinate global action for preventing the spread of pests and plant products in the international trade and to promote appropriate measures for their control. As signatory member of the above agreements. South Africa is obliged to participate in the standard-setting process.



Back row:- Lum Keng-Yeang, Jens-Georg Unger, Brent Larson, Gerard Clover, Asna Booty Othman. Front row:- Daphne Wright, Jane Chard, Ana Lia Terra, Esther van den Berg

In 2001 a Standards Committee was established to manage the standard-setting process for developing International Standards for Phytosanitary Measures (ISPMs). In 2004 the Technical Panel (TP) was set up to develop the diagnostic protocols for organisms of Phytosanitary Importance and it was decided that the TP would meet for the first

time in Penang, Malaysia in December 2005 to evaluate the first protocols. For this process seven experts for different groups of organisms were nominated. At the same time a list of expert scientists were chosen to act as the authors of these protocols and to assist the TP member in the drafting process.

During the past year early draft protocols for four nematode species viz. *Ditylenchus destructor* (potato tuber or potato rot nematode) *D. dipsaci*, (stem and bulb nematode), *Bursaphelenchus xylophilus* (pine wood nematode) and *Xiphinema elongatum* (virus vectors) were compiled.

The meeting was held at the Golden Sands Resort, 20 minutes northwest of Georgetown on the island of Penang on the west coast of Malaysia, with the nine panel members present viz. Asna Booty Othman – host (Malaysia); Jane Chard – IPPC Secretariat (UK); Gerard Clover (New Zealand); Brent Larson – IPPC Secretariat (Italy); Lum Keng-Yeang (Malaysia); Ana Lia Terra (Uruguay); Jens-Georg Unger – steward (Germany); Daphne Wright (UK) and Esther van den Berg (South Africa). At its first meeting in York in 2004 the TP identified nineteen pests for attention. Owing to various problems, only eleven pests were ready for discussion. The panel considered three draft protocols in detail (*Trogoderma granarium*, Tospoviruses and *Xanthomonas fragariae*). The nematode species *Ahpelenchoides besseyi*, *A. fargariae* and *A. ritzemabosi* were identified as the next group of species to be considered for diagnostic protocols after the next meeting of the TP which is scheduled for 16-20 October 2006, and will probably be held in Uruguay.

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Plant Protection Research Institute Initiatives

PPRI is well-known for the leading role it plays in several research fields in South Africa. Several National and International initiatives have been initiated at PPRI and are coordinated by PPRI researchers. In this issue we look at the South African National Survey of Arachnida (SANSA).

South African National Survey of Arachnida (SANSA)

At the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992, the world community recognized the necessity of continued economic growth while at the same time maintaining the integrity of the biosphere. In November 1995 South Africa ratified the Convention on Biological Diversity (CBD) that emanated from the convention. Signatories are obligated to develop a strategic plan for the conservation and sustainable use of biodiversity. To meet these goals requires an intensive national effort.

In 1997 the arachnologists of South Africa, under leadership of ARC-Plant Protection Research Institute decided to launch the "South African National Survey of Arachnida (SANSA)" in accordance with the country's obligations to the CBD. SANSA is an umbrella project dedicated to the unification and enhancement of biodiversity and systematic research on Arachnida in South Africa. As a national at-lassing programme it has several aims: 1) to collect, discover and describe and make an inventory of the arachnids in South Africa; 2) to analyse and synthesize the information into predictive classification systems; 3) to organize information in databases and to develop products in a usable form; 4) to use information to conserve existing diversity for future generations and to use these biological resources in a sustainable manner to ensure a fair and equitable sharing of benefits derived; 5) to inform and to train people on the importance of arachnids.

South Africa has a rich arachnid fauna with about 5000 known species, which represents 6% of the global arachnid diversity. Currently, 75% of the arachnids in South Africa are endemic to the country. Arachnids are abundant, speciose and relatively easy to collect. Most orders are sensitive to pollution and habitat destruction, and have traits that make them good biodiversity indicators. As with insects, arachnids are of significance to man. Members of most orders are predators, and are therefore beneficial, preying mainly on other arthropods. Only groups within the Acari are responsible for crop destruction or are potentially detrimental to the health of livestock and man.

A database has been developed at ARC to incorporate all data gathered during the SANSA survey. All published data are being entered into this database consisting of descriptive, behavioural and distribution records as well as images. Field collecting focuses on five main areas namely: biodiversity of the different biomes, conserved areas, agroecosystems, and provincial and urban diversity.

All the universities listed (in box) have students involved in spider projects. A total of more than 30 scientific and semi-scientific articles, as well as products such as books, CD-ROMs and posters, have already been released. TV presentations and radio talks help to educate and make the public aware of arachnids.



National Collection of Arachnida

At present 36 projects, that mainly focus on spiders, are conducted in association with the following institutions:

Universities: Free State, KwaZulu-Natal, Limpopo, North West, Pretoria, UCT, Venda and Transkei.

Museums: NRF-Transvaal Museum, National Museum in Bloemfontein and Iziko Museums in Cape Town.

Conservation agencies: Gauteng Nature Conservation, Western Cape Nature Conservation, KwaZulu-Natal Nature Conservation, SAN Parks and numerous nature reserves and other conservation agencies.

Science councils: ARC. **Government Departments:** Agriculture, Science and Technology and Water Affairs and Tourism.

Other: Inland Invertebrate Initiative, Spider Club and the public.

SANSA is now also affiliated with the South African Biodiversity Institute (SANBI) and a proposal has been submitted for funding for red data listing.

Huge interest is shown by the public to participate in SANSA. Road shows and talks are presented to schools and lecture series and training courses are presented to students and the public. Persons interested in becoming involved in this national survey can contact Ansie Dippenaar-Schoeman at DippenaarA@arc.agric.za

New appointments

Welcome to:

Matshidiso Maleka (Elline), the new HR Administrator stationed at Roodeplaat. Matshidiso is married and has three children. She has a B.Tech in Public Management, with Personnel Management as one of her majors. Before being transferred to PPRI she worked for OVI for sixteen years where she was shop steward for NE-HAWU. We hope she will enjoy working with us.



Elline Maleka



Refilwe Mnisi

Refilwe Mnisi, one of 90 applicants for the position, recently joined the Pesticide Analysis Laboratory of the Division Pesticide Science as a senior analyst. She has already established herself well in the Laboratory and through her good work is showing her great value to the ARC. Refilwe worked at the AECI Research Department from 1996 to 1998, which culminated in her obtaining the National Diploma in Analytical Chemistry in 1998 at the Technikon Northern Gauteng. In 1998, she joined the CSIR (Biochemtek), working as a chemical analyst until she joined PPRI.

Heinrich Klingenberg, an old face at PPRI but a new appointment. Heinrich has recently been employed by PPRI as financial manager. He grew up in Modimolle (Nylstroom) where he matriculated in 1993. He studied at RAU and obtained his BCom (Accounting). While working in Polokwane (Pietersburg) he obtained his Hons degree through UNISA. He worked in Pretoria and Mozambique before his appointment by PPRI.

Heinrich is crazy about sport and obtained Provincial colours for athletics and cricket while still at school. He is now a golf player with 9 handicap. He is unmarried and available!



Heinrich Klingenberg



Angela Bownes

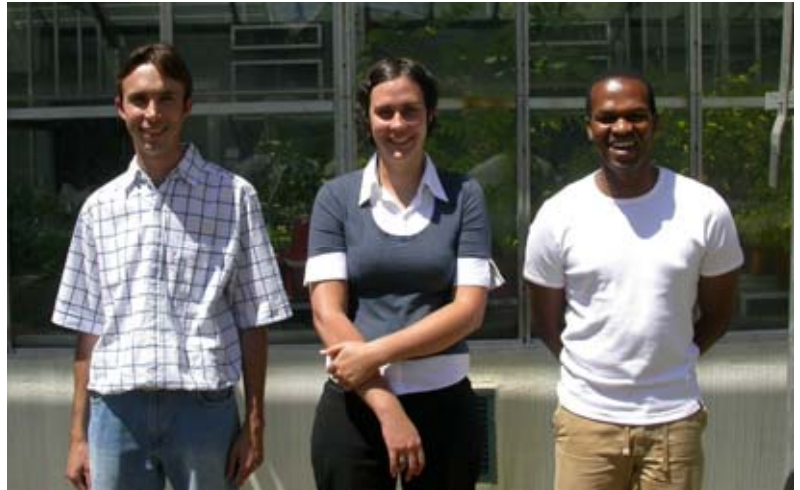
The Weeds Research Division was fortunate in acquiring **Angela Bownes** to strengthen its ranks. She was appointed beginning of December, as a researcher for the biological control of aquatic weeds. Like so many others in the Division, Angela graduated from Rhodes University, where she majored in Zoology and Entomology. According to her, she discovered Entomology almost by accident, not having been able to fit her first choice (Microbiology) into the time table, but was soon hooked. A lecture on the biocontrol of weeds by Prof. Pat Hulley awakened her passion for this research field, and she has no doubts that this is the right career for her. Having obtained a Masters degree, also from Rhodes, she went overseas and spent two years working her way through Europe. Back in South Africa, she enrolled for a PhD at Rhodes, with Prof. Martin Hill (ex-PPRI) and Dr Marcus Byrne (Wits University) as supervisors. The subject of her thesis will be the evaluation of the water hyacinth grasshopper, *Cornops aquaticus*, a new biocontrol agent that will (hopefully!) soon be released against water hyacinth. The practical work is being done at the PPRI weeds laboratories at Rietondale, Pretoria.

New appointments at the Weeds Division in Stellenbosch

The Weed Pathology Unit, Stellenbosch, is glad to have welcomed three researchers into its ranks in the last two years, replacing Alana den Breeyen, Cheryl Lennox and Cicelia van Rooi, all of whom had left for other pastures. They are **Estianne Retief** (joined Sep. 2004), **Khayaletu ('Khaya') Ntushelo** (Oct. 2005), and **Andries Fourie** (Nov. 2005).

Estianne, the youngest, completed her studies in Plant Pathology (BSc to MSc) at the end of 2004 at the University of Stellenbosch. Her thesis was on the "Molecular detection of *Phaemoniella chlamydospora* in grapevine nurseries", the causal agent of 'black goo', or Petri's disease, of grapevine trunks. She has taken on the surveying for suitable pathogens of *Chromolaena odorata*, as well as the host specificity testing of the rust fungus *Puccinia connoclinii* for the biological control of pompom weed (*Campuloclinium macrocephalum*).

Khaya did a BSc at the University of the Western Cape (1992-1995), but changed direction and graduated with a MSc in Plant Pathology from the University of Stellenbosch in 1998. His thesis was on "Comparative studies on genetic variability and fungicide resistance in *Tapesia yellundae*", the causal agent of eyespot of wheat. He then worked as a plant pathologist at the ARC-Small Grain Institute (1998-2003) doing research on *Fusarium* head blight of wheat. Between then and the time of joining the weed pathology team he did courses in genetics and bioinformatics at the University of Pretoria with a view to doing a PhD combining these fields. At PPRI he is now doing supplementary host specificity testing of *Puccinia melampodii*, a rust fungus already released in Australia for the biological control of *Parthenium hysterophorus*. He is also involved with surveying for suitable pathogens for use against *Pereskia aculeata*.



From left: Andries Fourie, Estianne Retief and Khaya Ntushelo

Andries has a BSc, majoring in biochemistry, but switched to do a MSc in Plant Pathology at the University of Pretoria, with his graduation in 2004. His thesis was about the "Biochemical mechanisms for tolerance of citrus root stocks against *Phytophthora nicotianae*". He worked for three years as a research assistant in the Plant Pathology department of the university between his degrees, doing research on various pathogens. Since joining PPRI, he has taken on the task of writing a manual on the biological control of *Hakea sericea*, compiling more than 20 years of research by various researchers into a one-stop practical guide for catchment managers, farmers and other land-users. He is also completing the host specificity testing of the rust fungus *Puccinia arechavaletae* intended for use against *Cardiospermum grandiflorum*.

All three bring a wide range of experience to the weed pathology team, in terms of both pathogens studied and of techniques used. The weed biocontrol community wishes them well in their new careers and is looking forward to a productive relationship. Congratulations also to Andries, who has just become married to Nerine - our best wishes in this the most important career of your life!

Welcome back



Simon Mamogale returned to his post of technical assistant at the National Collection of Insects on 1 November 2005. Simon has unfortunately been absent for the past six years on long disability leave, due to poor health. However, his condition has greatly improved and he is back, giving much needed technical support at Vredehuis.

Resignations

Olof O'Brien worked at the Mycology Unit, Vredehuis for 9 odd years. She specialized on the genera *Penicillium* and *Aspergillus* (identifications and research). She was the project leader of the collections (PREM and PPRI) until Riana Jacobs was appointed. She also handled the identification service for some time. She was also the project leader of the karnal bunt project, as well as of the survey on the composting fungi of the Kruger National Park. She was well organized and meticulous and made a huge contribution in setting up protocols for the culture collection, PREM collection, karnal bunt survey as well as the mycology courses presented annually. She had a very good sense of humour and we enjoyed working with her - she will be missed!

Jacolene Meyer, who was a member of the Virology lab at Roodeplaat, left us at the end of December to further her career in Nelspruit at Citrus Research International. Jacolene has been employed by Du Roi Invitrolab where she will do the banana virus indexing. She had been at PPRI for three years and handled the diagnostic service of the Virology division. Her colleagues at PPRI wish her all the best for her future. Her new contact details are: 013 759 8034 or e-mail at JM@cri.co.za

New Publications (October – December 2005)

Refereed publications

- CHARLESTON D.S., KFIR R., VET L.E.M. & DICKE M., 2005. Behavioural responses of diamondback moth *Plutella xylostella* (Lepidoptera: Plutellidae) to extracts derived from *Melia azedarach* and *Azadirachta indica*. *Bulletin of Entomological Research* 95: 457-465.
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MARAIS M., SWART A. & VAN DEN BERG E., 2005. Plantnematodes van die Afromontaan woud-veld-tipe. *SA Tydskrif vir Natuurwetenskap en Tegnologie* 24(4): 161

SWART A. & TIEDT C.R., 2005. *Heterodera schachtii* – besmetting van koollanderye in die Tarlton-omgewing. *SA Tydskrif vir Natuurwetenskap en Tegnologie* 24(4): 162.

VAN COLLER G.H., ENMAN S., LAMPRECHT S.C. & CROUS P.W., 2005. A new perspective on soilborne diseases of grapevines in nurseries. *Wineland* November: 102 - 105.

VOLSCHENK T. & MOORE J.A., Brak besproeiingswater kan met loging verbeter. *Landbouweekblad*. 28/10/2005.

Media

Radio talks

Members of PPRI are frequently asked to participate in radio talks on a variety of topics. During the period October – December a total of 13 radio talks were broadcast on research done at PPRI on arachnids by Ansie Dippenaar-Schoeman of the Spider Research Centre. These live broadcasts are transmitted every Wednesdays over *Radio Laevelt* at 16h30.

TV presentations

Dr Ansie Dippenaar-Schoeman promoted spiders as biological control agents in gardens in a programme of the TV series “*Groen*” on KYKNET in November 2005

Weed Buster Week

The Weed Buster Week exhibits at Cedara received media recognition, and articles on research by the PPRI Weeds Division appeared in the *Farmer's Weekly* magazine, local newspapers and on the television programme *50/50*. (See reports on page 14) & 15)

Congress contributions and talks at other meetings

BOWNES A., 2005. Cornops - are grassoppers safe?. Weeds Seminar. Weeds Division - PPRI.

EARDLEY C.D., 2005. Pollinator biodiversity conservation in Africa stimulates interest in bee taxonomy [poster]. CBD Technical Series 21: 120-121

CRAEMER C. 2005. A systematic appraisal of the Eriophyoidea: revision of the genus *Diptilomiopus* Nalepa, 1916 (Acari: Diptilomiopidae). University of Pretoria, Department of Zoology & Entomology, Departmental Research Reports, 24 - 25 November 2005, Pretoria.

DIPPENAAR-SCHOEMAN A.S., 2005. Spider research in South Africa. Lecture to students of the University of Pretoria Training College.

DIPPENAAR-SCHOEMAN A.S., 2005. Why spiders are so unique? Their passage through time. South African Society for Amateur Palaeontologists, October (monthly meeting).

HADDAD C.R., LOUW VDM S. & DIPPENAAR-SCHOEMAN A.S., 2005. The best of both worlds: polymorphic mimicry in the ant-like sac spider *Merenius alberti* Lessert (Araneae: Corinnidae). Postgraduate Seminar Day of the University of the Free State, 17 November, 2005, Bloemfontein.

KIESER M.E., 2005. ICOSAMP Annual Report to SADC (Mozambique 2005). SADC Plant Protection Technical Committee Meeting. SADC. Mozambique.

KLEIN H., 2005. Biocontrol of invasive weeds for practitioners. Meeting of the Invasive Plants Committee for Gauteng. DACEL.

MADIRE L.G., KIRSTEN J.F. & WILLIAMS H.E., 2005. *Liriomyza* sp. (Agromyzidae), a pest or a Potential Biological control agent for *Tecoma stans*? Weeds Division Seminar. ARC.

MARAIS M. & SWART A., 2005. Die wonder-wêreld van nematodes. Groblersdal Farmers Study Group Meeting.

STRATHIE L.W., 2005. Culturing and host-specificity testing of insect agents for parthenium in South Africa. Partners Planning & Training Workshop for IPM CRSP project on "Management of the Weed Parthenium (*Parthenium hysterophorus* L.) in Eastern and Southern Africa Using Integrated Cultural and Biological Control Measures". Virginia State University & Ethiopian Agricultural Research Institute. Ethiopia.

STRATHIE L.W., 2005. Overview of current research on parthenium in South Africa. Partners Planning & Training Workshop for IPM CRSP project on "Management of the Weed Parthenium (*Parthenium hysterophorus* L.) in Eastern and Southern Africa Using Integrated Cultural and Biological Control Measures". Virginia State University & Ethiopian Agricultural Research Institute. Ethiopia.

STRATHIE L.W., 2005. Biological control of *Parthenium hysterophorus* and Fynbos Weeds. Working for Water Media Day. Working for Water.

ZACHARIADES C. & BOWNES A., 2005. (i) Introduction to PPRI Cedara; (ii) Biological control of *Chromolaena odorata*. WfW Media Day at PPRI Cedara. PPRI.

News from the Divisions

Plant Pathology and Microbiology Division

Emerging oyster mushroom farmers

A Section 21 Company was established to assist emerging oyster mushroom farmers. From the oyster mushroom projects, some members were elected to serve as board members of the company called Amakhowa Growers. A two day training workshop was conducted in October 2005 to introduce them to principles, duties and expectations of the company as a whole. Dates were agreed on for the follow-up meetings and operational issues. For more information contact Yolise Pakela-Jezila (PakelaY@arc.agric.za).

New Contracts

The Soilborne Pathogen Unit secured a contract with the No-till Club of KZN and the Maize Trust to determine the cause of yield losses experienced by commercial and SRL no-till farmers in KZN. Trials will start in early January. This unit also secured a contract with the Winter Cereal trust to study the effect of fertilizers on the occurrence of Fusarium Crown Rot of Wheat.

For more information contact Dr Sandra Lamprecht (LamprechtS@arc.agric.za).

Biosystematics Division

Entomologist attends meeting in Montreal, Canada

Dr Connal Eardley attended the 11th Meeting of the Subsidiary Body on Scientific, Technical and Technological Advice of the Convention on Biological Diversity (SBSTTA11), held in Montreal, Canada, from 21 November to 2 December 2006. The Global Taxonomy Initiative (GTI) was on the agenda of this meeting. To increase awareness amongst the delegates of activities around the world in areas of concern to the Convention on Biological Diversity (CBD), a special poster session was held on "Success stories in implementation of the programmes of work on dry and sub-humid lands and the Global Taxonomy Initiative". Sixty posters were displayed, of which 35 were on taxonomy. Three of the latter were from South Africa, one of which was presented by C. Eardley titled "Pollinator biodiversity conservation in Africa stimulates interest in bee taxonomy". The other posters were from the South African National Biodiversity Institute (SANBI) and the University of KwaZuluNatal. For each poster, a short article was published in hard copy (CBD Technical Series 21).

South African taxonomists should note that South Africa is a member of the CBD, and that the GTI is a CBD programme which will be discussed at the next Conference of the Parties (COP8) to the CBD, to be held in March 2006. This is the forum where policy makers decide on our profession, and South Africa, as a signatory to the CBD, is obliged to abide by those decisions.

Dr Connal Eardley (EardleyC@arc.agric.za)

Training courses: Aphids

Three more introductory courses on aphid identification methods were presented during October and November 2005 by Ian Millar. Seventeen technicians and field officers, from several potato growing areas in South Africa, were taught how to recognize aphid species that are vectors of potato virus diseases. This knowledge will be used by them to monitor aphids occurring in and around potato fields, for crop pest management programmes. The training sessions were arranged through the organization "Potatoes South Africa".
Ian Millar (MillarI@arc.agric.za)

Well-known researcher visited the Mycology Unit

Prof John F Leslie from Kansas State University visited the Mycology Unit on the 31st of October 2005. Prof Leslie is world renowned for this work on fungal genetics and is also the organizer of the annual International *Fusarium* Workshop, held at Kansas State University, to which the researchers at the unit were invited. Prof Leslie kindly agreed to present a talk at PPRI dealing with the genus *Fusarium* and species concepts in fungi.



PPRI participates in research projects in the arid SAN PARKS

As part of the South African National Survey of Arachnida (SANSA), inventories of the Arachnida of South Africa are underway. The arachnids (spiders, scorpions, solifugids, amblypygids, opiliones and pseudoscorpions) constitute an abundant and highly successful group of invertebrate animals. In the past invertebrates were largely ignored in conservation endeavours. Meaningful conservation cannot take place if species involved are not known. Therefore, surveys of invertebrate fauna are becoming more important, especially in protected areas where conservation strategies are already in place. One of the projects of SANSA is to determine the arachnid species presently protected in the SANParks. The Spider Research Unit has had a registered project with the arid SANParks since January 2003.

The overall aim of this project, as part of SANSA, is: to collect, describe and make an inventory of the Arachnida species of the SANParks to determine the number of species already protected; to publish results in the form of checklists and taxonomic papers; to include data in the SANSA electronic database on arachnid fauna in protected areas.

Dr Ansie Dippenaar-Schoeman (DippenaarA@arc.agric.za)

Effect of Bt-cotton on spiders

Bt-cotton, containing and expressing genes from the soil bacterium *Bacillus thuringiensis*, is specifically toxic to lepidopteran larvae but little is known about its impact on predators such as spiders. The Spider Research Unit participated in a project of the University of Pretoria to determine the effect of Bt-cotton and endosulfan applications on spider populations. Surveys were undertaken over two cotton growing seasons (2001/2002 and 2002/2003) at Marble Hall, South-Africa. Plant dwelling spiders (n=227) were counted while scouting the plants. Ground dwelling spiders (n=3776) were collected with pitfall traps during the both seasons and identified to species level. The ground dwellers were represented by 21 families, 49 genera and 54 species. During the first season a total of 2 431 spiders were collected from the pitfall traps: 945 spiders from Bt-cotton and 1 486 from non Bt-cotton (control) plots, while in the second season a total of 780 were collected, 415 from Bt-cotton and 365 from the non Bt-cotton (control) plots. A total of 565 spiders were collected from the endosulfan sprayed non-Bt-cotton fields during the second season. The Lycosidae (n=2 359) comprise 62.5% of all spiders collected in the pitfall traps, followed by the Theridiidae (n=757) with 20.1% and Linyphiidae (n=342) with 9.1%. *Steatoda erigoniformis* (Theridiidae) (n=744) was the most abundant species representing 19.7% of all the spiders collected followed by *Pardosa clavipalpis* (Lycosidae) (n=624) with 16.5%, an undetermined *Trabea* sp. (Lycosidae) (n=592) with 15.7% and another lycosid *Pardosa crassipalpis* (n=543) with 14.4%. Neither Bt-cotton nor the application of endosulfan had apparent negative effects on ground or plant dwelling spiders in the field. Spiders should therefore be able to continue playing a role as biological control agents in Bt-cotton fields.

Dr Ansie Dippenaar-Schoeman (DippenaarA@arc.agric.za)

Biosystematics (continued)

Training courses: Ezemvelo

Dr Ansie Dippenaar-Schoeman was invited to present a weekend specialist training course at Ezemvelo Nature Reserve near Bronkhorstspuit as part of the specialist weekend courses funded by the Friends of Ezemvelo. The first course was presented in March 2005 and the second in October 2005. Ansie and her helpers spent a very enjoyable weekend at Ezemvelo catching spiders and teaching a group of very enthusiastic black students more about spiders. She was invited to present this course again in 2006.



Ansie and Petro Marais with the group.

Workshops on data cleaning

The National Collections at the Biosystematics Division are housing more than a million specimen records. At the moment the Global Biological Information Forum (GBIF) with SABIF, the South African counterpart, is an initiative to computerize all the primary data associated with each record in an effort to make this available to the world. Before this data can be used it needs to be organized and cleaned to fit global requirements. For the 2005-2006 period Dr Connal Eardley received funding from GBIF for his catalogue on African bees and Dr Isabel Rong received funding from SABIF to digitize the fungus collection.

On 27-28 October Dr Isabel Rong of the Mycology Unit attended a two day SABIF technical workshop at the University of Pretoria. Day one was dedicated to relational databases, their structure and their design. Day two was dedicated to: DIGIR, ABCD Schema, Darwin code and other software used for SABIF; data uploading in the SABIF portal; data quality and data cleaning.

Dr Arthur Chapman, a committee member of GBIF attending the workshop in Pretoria, offered to address the rest of the curators of the national collections at PPRI and the data system developers of ARC central office. A very successful workshop was held on 27 October at the Rietondale Campus and an informative mornings was spent discussing several aspects around databasing and data cleaning.



Drs Connal Eardley, Arthur Chapman and Ansie Dippenaar-Schoeman

Institute represented at important meeting in Denmark

Dr Gerhard Prinsloo represented the Institute at the recent annual meeting of the Major Systematic Entomology Facilities (MSEF) group, which was held in Copenhagen during October of last year. The MSEF is an international consortium of leading collections-based institutions concerned with biosystematic research and technology transfer in entomology. The eleven members of the group include some of the world's most renowned organizations of their kind, such as the Natural History Museum in London, the Smithsonian Institution in the USA and the Zoological Institute of the Russian Academy of Sciences. PPRI, which houses the National Collections of Insects, Arachnids, Nematodes and Fungi in its Biosystematics Division was fortunate in being invited to become a member of this consortium in 2001.

The aim of the MSEF is to promote collaboration between the world's leading biosystematics institutions in order to address the needs of end users of biosystematics information and products. This is done through the exchange of expert knowledge, research information and reference material, all of which are of importance to PPRI's Public Assets activities such as the development of its national collections and the rendering of diagnostic services. To this end various wide-ranging issues were dealt with during the two-day meeting, which was hosted by the Zoological Museum of Denmark. This meeting also provided the Institute with a unique opportunity to strengthen its ties with leading overseas organizations in the field of biosystematics and biodiversity.

Dr Gerhard Prinsloo (PrinslooG@arc.agric.za)

Insect Ecology Division

PPRI provides support in Tanzania

Ms Margaret Kieser, the coordinator of the ICOSAMP network (Information Core for Southern African Migrant Pests), was contracted to install the newly designed ICOSAMP computer software onto the computers at the Armyworm Forecasting & Control Services (AFS) in Arusha, Tanzania, and to train 2-3 AFS staff members on the use of the system during December 2005.

This training visit emanated from the ICOSAMP Migrant Pest Training Course held at PPRI in September 2005, when the donors (DFID) provided a small contract to expand the migrant pest data retrieval network to include the data collected by the AFS in Tanzania. One licensed ArcView 3.3 GIS (Geographical Information System) software package, and 3 ICOSAMP User Manuals were donated to Mr Wilfred Mushobozi, the Tanzania National Armyworm Coordinator, and he was given a comprehensive training on the installation process.

Various discussions were held to evaluate the possibilities of obtaining additional funding for:

- a. Integration of the existing Tanzania armyworm data into the ICOSAMP database,
- b. Expansion of the use of the ICOSAMP system to other regions in Tanzania, and
- c. Inclusion of ICOSAMP reporting methods, software, and training into a proposed AFS project in Mozambique, Malawi, and Zambia.



Tanzania migrant pest officers at ICOSAMP training session

Attendance at SADC Plant Protection Technical Committee Meeting

Ms Margaret Kieser of the Insect Ecology Division attended the 5th Annual SADC-FANR Plant Protection Technical Committee Meeting, held in Maputo, Mozambique from 11-13 November 2005.

The Meeting was attended by all Member States except Madagascar, Namibia, Tanzania, and Zambia, as well as representatives from CROPLIFE Eastern and Southern Africa, ICOSAMP, Dr. S. Sithole (consultancy for the development of the Policy for Managing Migrant Pests in SADC), and the SADC Secretariat.

Ms Kieser presented a report on the progress of ICOSAMP, and a summary of the migrant pest activity in the region during 2005. The CROPLIFE representative explained the structure of the organisation and its goals to prevent the stockpiling of pesticides in SADC. A team (J Cox & P Echessah) presented their consultancy findings on their analysis of the 'Maximum Residue levels (MRLs) in SADC.

The meeting was also used as an important forum to take stock of the current status of the phytosanitary situation in the SADC region, and preparation of a report for the upcoming AU/IAPSC meeting to be held in Cairo, Egypt, in February 2006.

Various recommendations were submitted via this committee to the SADC-FANR Secretariat.

Contact: [Margaret Kieser \(KieserM@arc.agric.za\)](mailto:Margaret.Kieser@arc.agric.za)



Delegates at meeting in Mozambique

Beekeeping activities

The Beekeeping Development for Poverty Relief team was very active in transfer of technologies to rural communities: a total of 10 field trips were undertaken to KwaZulu-Natal; Eastern Cape, Limpopo and Mpumalanga. Sidwell Banne also visited the Eastern Cape regarding the Transnet Foundation beekeeping project.

The beekeeping development projects at Goedverwacht and at Elandskloof in the Western Cape were visited and basic beekeeping skills were taught to community members on each occasion. In addition, the street children of TERE mission school in Somerset West were taught beekeeping on three occasions.

Pesticide Science Division

A new look to the Pesticide Analysis Laboratory

The Pesticide Analysis Laboratory is a most essential part of the core expertise of the Division. The Laboratory is involved in developing new analytical methods for quantitative analysis and confirmation of pesticide residues including insecticides, herbicides and fungicides in air, soil, water, plant material, animal material, foods and feeds as well as formulations and technical materials.

Recently, a new senior analyst, Ms Refilwe Mnisi, joined the laboratory team (see p. 5). Currently negotiations are underway for another senior analyst to join the Laboratory. Equipment-wise, the situation also looks great, with a considerable number of old laboratory equipment being currently replaced with new instruments. Particularly noteworthy will be the acquisition in the very near future of a new Agilent gas chromatograph and two detectors, namely, an electron capture detector (ECD) and a nitrogen-phosphorus detector (NPD), as well as a new Agilent gas chromatograph-mass spectrometer (GC-MS).



These powerful instruments will provide a new cutting edge to the Laboratory's capability in the market place. The Quality Assurance Programme is responsible for the formal implementation of the GLP quality assurance system in all applicable programmes within the Division, in line with the prescribed documented Organisation for Economic Co-operation and Development (OECD) guidelines. Understandably, all these Laboratory improvements greatly facilitate the acquisition of the compliance status to be issued in the near future by the South African National Accreditation System (SANAS), which is the good laboratory practice (GLP)-monitoring authority in South Africa.

Contact: Dr Eric Sandmann at SandmannE@arc.agric.za

Monitoring of pesticide residues in water holes in KwaZulu-Natal

New technology was initiated for monitoring pesticide residues occurring in the environment of the Makhathini Flats in KwaZulu-Natal, as well as in mothers' milk of rural farmers. These pesticide residues result from agriculture and malaria control. The technology provides an indicator of the degree of pesticide pollution in the area and will show the increasing impact of training given to minimize such pollution. Taking samples from water holes used by communities and analysing them for their pesticide residue content provides a good idea to what kinds of pesticides the communities are exposed to, over a period of time. Such exposure could express itself eventually into the appearance of such residues in breast milk. Thus a correlation can possibly be established between the pesticide residue content of drinking water samples and breast milk samples. A recent sampling trip to KwaZulu-Natal revealed how communities collect drinking water from a water hole (see photo), and how really scarce such water can be.

Samples of drinking water as well as breast milk and cow's milk were collected from 24 dwellings of community members who had been exposed to pesticides and from four huts located outside malaria spraying area that act as a reference area. These samples will be analysed for pesticide residues by the Division's Pesticide Analysis Laboratory.

Funded by the Medical Research Council (MRC), the effects of pesticides on human health after quelea control operations are being investigated. It is hoped that results of these studies will guide national quelea control policy and management of disposal of contaminated carcasses.

Refresher courses for rodent pest control officers

PPRI facilitated training workshops on the ecology, biology and control of commensal rodent pests at Roodeplaat (near Pretoria) and in Durbanville (Cape Town) during November and December 2005. The workshops were well attended by professional pest control operators and municipal environmental health inspectors. The main speaker was Adrian Meyer (The Acheta Partnership, U.K.), a world renowned authority on the control of rodents. Similar courses were held in Pretoria and Durban in June and earlier the year (February) specifically for provincial agricultural extension personnel and environmental health workers in Thohoyandou and Vryheid.

Migrant pest research: Quelea control

The redbilled quelea (*Quelea quelea* L.) are small granivorous birds (mass of 19 g) which are endemic to Southern Africa, and capable of causing widespread damage to small grain crops in this Region. The quelea are controlled by means of aerial spraying of an organophosphate pesticide over breeding and roosting sites and also by fuel-air explosions. Some of the control actions may lead to severe environmental damage and non-target mortalities.

The environmental impact of these types of control actions on the environment are investigated as well as the effect of airborne residues on surrounding areas. Several research projects have been established in collaboration with the National Department of Agriculture under the quelea research programme. The aim of the quelea research programme is to establish a Decision Support System for Integrated Quelea Management (DSSIQM) which would incorporate known as well as newly developed information and knowledge regarding quelea, into a sustainable quelea management system. In addition, the quelea research programme has developed applied research techniques such as high volume air-sampling for the detection and tracking of airborne organo-

Weeds Research Division

The Working for Water Programme for Building Research Capacity in the field of Biological Control of Weeds

The *Working for Water* Programme has made funding available for students and technicians to qualify themselves for a research career in the biological control of alien invasive plants. Professor Martin Hill of Rhodes University in Grahamstown was given the task of organizing a two-week course on biological control research. The first group to attend this course from 31 January to 11 February 2005 at Rhodes consisted mainly of PPRI technicians and technical assistants who are already involved with weed biocontrol. Apart from the theory of weed biocontrol, the course covered experimental design, data collection, analysis and the interpretation of results. The delegates were given group projects in order to provide hands-on experience on various aspects of biocontrol projects, and had to present the results of their projects at the end of their assignments. Some extra lessons on rocky shore ecology and estuarine ecology were also presented by Mr Sven Kaehler. Those who passed, were awarded certificates. They were then granted the opportunity to accompany their supervisors on a research trip to the country of origin of the weeds they are working on.

Most of the successful course participants have already undertaken their overseas training trips. Milly Gareeb and Phumza Vakela accompanied

Dr Stefan Nesor, Dr Alan Wood and Hester Williams to the USA and Mexico in September 2005, surveying for insects and pathogens of various subtropical weeds (see report below). During November 2005, Abraham Adonis, Keith Appollis and Reley Labahn gained experience in Australia, supervised by Tony Gordon and Fiona Impson, in collecting natural enemies on silky hakea and several Australian wattles. Also during November 2005, Lynnet Khumalo visited Jamaica with Dr Costas Zachariades and Lorraine Strathie, to survey for insects and pathogens on chromolaena. Phillimon Mpedi is about to leave for Argentina on 15 January 2006, where he will accompany Arne Witt and Dr Andrew McConnachie on a survey for natural enemies of various subtropical weeds including pompom weed, balloon vine, pereskia and lantana. Matlala Phenyé is still waiting for a suitable opportunity to gain experience on his weeds (balloon vine and lantana) in their country of origin. As we reported in the previous issue of *Plant Protection News*, another one of the planned trips ended tragically with a traffic accident that claimed the lives of two young weeds researchers, Hardi Oberholzer and Daniel Mafokoane. They are sorely missed.

The Weeds Division gratefully acknowledges the generous financial contribution by the *Working for Water Programme* that has made the Capacity Building Programme possible.

Matlala Phenyé (phenyem@arc.agric.za)



The participants to the first Rhodes University short course in the Biological control of Weeds. Standing (from left): Abraham Adonis, Prof. Martin Hill (Rhodes), Charles Willemse (Rhodes), Lynnet Khumalo, Phillimon Mpedi, Matlala Phenyé, Reley Labahn, Milly Gareeb, Phumza Vakele. Sitting: Keith Appollis, the late Daniel Mafokoane, Hélia Marchante (a student from Portugal).

Working for Water Media Day at Cedara

As a fore-runner to the *Working for Water* Weedbuster Week in October 2005, *Working for Water* KZN organized a Media Day for journalists on 5 October at Midmar Dam in KwaZulu-Natal Province. This was followed by a visit to the PPRI Weeds Division quarantine laboratories and facilities at Cedara, near Pietermaritzburg.

About 25 representatives from various print and television media, including *Farmer's Weekly* magazine, local newspapers such as *The Witness* and *The Mercury*, and *50/50* and *Agri-TV* television film crews, attended the event. Visitors were given an introductory talk by Dr Costas Zachariades, officer-in-charge of the PPRI

Weeds research station, before being taken on a tour of the quarantine laboratories, glasshouse and tunnel. Here, various displays, manned by staff of the research station, showed the research being conducted by PPRI on control of aquatic and terrestrial invasive alien plant species. This included biological control of *Chromolaena odorata*, *Parthenium hysterophorus* and *Campuloclinium macrocephalum* (pompom weed) - all being researched at the

Cedara laboratory - as well as biocontrol of cactus weeds and weeds of the fynbos region, in addition to chemical control methods. As a result of this publicity event, articles on research by the PPRI Weeds Division appeared in the *Farmer's Weekly* magazine, local newspapers and on the television programme *50/50*.

Lorraine Strathie (StrathieL@arc.agric.za).

Weeds Research Division (continued)

Survey for natural enemies of *Tecoma stans* in the USA

The small tree *Tecoma stans* (Bignoniaceae) – commonly known as yellow bells – is an emerging alien invasive weed in South Africa (as in other parts of the world in similar climatic regions). It has a reported natural distribution from northern Argentina along the Andes to Mexico and the southernmost USA, and into the Caribbean area.

Opportunistic observations on *T. stans* in central Mexico, Guatemala, southern Mexico and northern Argentina had previously revealed the presence of a gall rust fungus, but very few specialized phytophagous insects. In September 2005, an official survey and collection trip was undertaken by 3 scientists - Dr. Stefan Nesar, Dr. Alan Wood and Ms. Hester Williams - and 2 technicians - Ms. Phumza Vakele and Ms. Milly Gareeb. The inclusion of the 2 technicians formed part of the Capacity Building Programme initiated by *Working for Water* to build capacity amongst junior scientists in the field of biocontrol.

Because of difficulties in obtaining collecting permits for Mexico, the survey was undertaken in the USA in areas bordering with Mexico (southern California, Arizona, New Mexico, Texas) as well as Florida (from where the plant and rust fungi had been reported).

Various forms or varieties of *T. stans* were observed, including *T. stans* var. *stans*, *T. stans* var. *angustata* and *T. stans* var. *velutina*. However, due to uncertainty as to which characters are important in separating forms, it is difficult to confirm whether the "South African biotype" was found. It is certain that *T. stans* var. *angustata*, the only *T. stans* variety clearly indigenous to the southern USA, is not our biotype. Dr. Helmuth Zimmermann had suggested after an earlier visit to northern Mexico and Baja California (Mexico) that the plants occurring in southern Baja California were much closer to those in South Africa.

The range of associated natural enemies in southern USA appeared to be depauperate. Insect species found included seed-, flower- and leaf-feeders, a leaf-miner, sap-suckers and a flower-galler. The most promising of these is the seed-feeding lepidopteran, *Clydonopteron pomponius*.

Future surveys and collections should provisionally focus on Baja California, as well as on mainland areas of Mexico where similar plants may occur, and especially in regions where climatic conditions match invaded areas in South Africa.

This project is funded by the *Working for Water Programme*.

H Williams (williamsh@arc.agric.za) & S Nesar (nesers@arc.agric.za)

The narrow-leaved *Tecoma stans* var. *angustata* encountered in the western parts of the USA (above) differs from the form that is weedy in South Africa. One of the few natural enemies found was a midge that galls the flowers (below).



Working for Water and PPRI partnership stand wins silver at the Sunday Tribune Garden & Leisure Show

The PPRI Weeds Division research unit at Cedara, in partnership with the *Working for Water Programme* in KwaZulu-Natal, organized and manned two educational stands on invasive alien plants at the *Sunday Tribune Garden & Leisure Show*, at the Agricultural Showgrounds in Pietermaritzburg, from 7-9 October 2005.

Visitors of all ages showed great interest in both stands. A silver certificate in the commercial section was awarded to the *Working for Water*-PPRI partnership stand in the commercial hall that displayed several of the major invasive plant species of KZN, various established biological control agents for terrestrial and aquatic invasive plants, educational posters, and mechanical and chemical control equipment. A second display in the main hall, featuring a landscape arrangement of various indigenous and invasive plant species, to which PPRI had contributed most of the invasive alien plants, was awarded a bronze certificate.

Screens used in both displays demonstrated the secondary industry that utilizes black wattle from clearing operations for aesthetic and functional purposes in the garden and home.

Both stands were manned daily by staff of *Working for Water*, PPRI, and the invasive plant unit of the KZN Department of Agriculture and Environmental Affairs. This was an ideal opportunity to showcase research being conducted by PPRI Weeds Division, and for PPRI staff to interact directly with members of the public to increase awareness and education about invasive alien plants, current legislation and methods of control.



Lorraine Strathie (strathiel@arc.agric.za)

Weeds Research Division(continued)

PPRI field trip to Venezuela and Jamaica for bio-control of chromolaena

Chromolaena odorata (Asteraceae) is one of the world's worst weeds, and is a particular problem for developing countries in the Old World tropics and subtropics. Some regard it as South Africa's second-worst weed (CARA Category 1) and more is spent on control efforts than on any weed other than black wattle. Wherever this plant grows in the warmer eastern parts of South Africa, it suppresses the natural vegetation and reduces species diversity. Mechanical removal, fire and herbicides have been used to control chromolaena, but the financial, environmental and social costs of these are high. Biocontrol is recognised globally as the only sustainable solution to the problem of chromolaena invasion, but yet the ARC-PPRI is currently the only research organisation worldwide conducting research on new biocontrol agents. The Working for Water Programme, the Department of Water Affairs and Forestry, and the KZN provincial government are currently contributing a total of more than R1.5 million per annum towards research and implementation of chromolaena biocontrol. The South African programme has recently succeeded in establishing two agents, the defoliating moth *Pareuchaetes insulata* (Arctiidae) and the leaf-mining fly *Calycomyza eupatoriivora* (Agromyzidae) in the field in South Africa. However, more agents are needed to bring the weed under sufficient control, especially in the drier areas.

A second trip to the Caribbean region was thus undertaken in November 2005 by Ms Lorraine Strathie and Dr Costas Zachariades. They first visited northern Venezuela, which has a seasonally dry climate not dissimilar to the region of southern Africa invaded by chromolaena. Two potential insect agents for chromolaena are currently being targeted here. The stem tip-galling weevil *Conotrachelus reticulatus* (Curculionidae) and the stem tip-boring moth *Carmenta* n.sp. (Sesiidae) both have diapausing winter stages, considered important for the drier areas of South Africa invaded by chromolaena. The host ranges of both species were assessed in the field on this trip by inspecting several other species of Asteraceae in the vicinity of chromolaena plants with high levels of damage caused by these insects. Results are promising, as no damage was found on any species other than chromolaena. A culture of *Carmenta* was also collected for importation into South African quarantine, in an attempt to culture this difficult agent. In Venezuela, PPRI cooperates with the Museo del Instituto de Zoología Agrícola (MIZA) at the Universidad Central de Venezuela in the town of Maracay. A student at the university, Ms Oona Delgado, has been conducting research on both *C. reticulatus* and *Carmenta* over the past two years under the supervision of Prof. José Clavijo.



Lynnet Khumalo and Estianne Retief sampling chromolaena plants in Jamaica



Oona Delgado, a student from Venezuela, and Costas Zachariades, involved in field host range work on a natural enemy of chromolaena in Venezuela

Dr Zachariades continued on to Jamaica, where he was joined by Ms Estianne Retief, a researcher on chromolaena pathogens, as well as Ms Lynnet Khumalo, a technician on the chromolaena insect project, who had passed the Working for Water Short Course on Biological Control of Weeds and was therefore being sent on a training trip to the country of origin of the alien plant she is working on.

Although the native distribution of *C. odorata* stretches from the southern USA to northern Argentina, the species shows great variability in characteristics. The islands of the northern Caribbean, including Jamaica, have been identified as the likely origin of the form of chromolaena invading southern Africa. It is therefore important to collect insects and pathogens from this region, to ensure compatibility between plant and agent. Currently prioritised insects include the stem-tip boring fly *Melanagromyza eupatoriella* (Agromyzidae) and the stem-tip galling moths *Mescinia* n.sp. (Pyralidae) and *Dichrorampha* n.sp. (Tortricidae). Collections of *Mescinia* and *Dichrorampha* were made for importation into South African quarantine. *P. insulata* was also collected in order to boost the culture at the South African Sugar Research Institute mass-rearing facility. Ms Retief collected a variety of pathogens from the leaves of chromolaena in Jamaica, which she will attempt to culture in quarantine in South Africa. PPRI collaborates with the Life Sciences Department at the University of the West Indies in Jamaica, and a student, Ms Marsha Robinson, has just started research there on the host ranges of *M. eupatoriella* and *Mescinia*, under the supervision of Drs Dwight Robinson and Jane Cohen.

All in all, the trip was a great success. Good data as well as cultures of several species were collected, and ties between PPRI and the two collaborating institutions were strengthened. The opportunity granted to Ms Retief and Ms Khumalo to observe and survey for the natural enemies of chromolaena in its region of origin was most valuable in allowing them to better their understanding of the ecology of the plant and the potential for its control in southern Africa. *Dichrorampha* has successfully been reared in the quarantine laboratory for the first time, and host range testing can be initiated.

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Ex-researchers from PPRI honoured

As we reported in the previous issue of Plant Protection News, two recently retired entomologists from PPRI received recognition for their life-long work on insects. Dr Carina Cilliers and Dr Dick Brown were awarded Honorary Life Membership of the Entomological Society of Southern Africa in July 2005. Dr Brown's contribution to science was covered in that issue, and this time we will highlight Dr Carina Cilliers' career and achievements.

Dr Carina Cilliers

Carina Cilliers is well-known locally and abroad for her contribution to biological control, both in the field of agricultural pests and invasive alien plants.

Carina studied Botany, Zoology and Entomology at Pretoria University. She obtained her Masters degree on three wax scale species and their natural enemies at the same University. She later also enrolled there part-time and obtained the Higher Educational Diploma.

Her career started in Nelspruit, where she was employed at the forerunner of the ARC Institute for Tropical and Subtropical Crops. Soon she was "lured" to Pretoria, where she resumed research in the Biological Control Section of the Division of Entomology at the Parasite Laboratory of the old Division of Entomology of the Department of Agricultural Technical Services in Sunnyside, under the guidance of the late Drs Dave Annecke and Eric Bedford. Like for others in the field, they remained her main mentors. Carina played an important part with Dr Annecke and Dr Bedford, in bringing several of a complex of citrus pests under biological control in South Africa, thus breaking a vicious circle of ever increasing pesticide application. Her observations on parasitoids of a number of major local and introduced pests of citrus are still considered valuable today.

She and others in the Biological Control section worked with the late Dr S W Broodryk on the biological control of cotton pests. For a few years she was in charge of an integrated pest control programme on cotton, participating in observations and counting for days and days in the cotton fields. For a brief period she headed the section of Biological Control in PPRI.

The switch from pest control to weed control commenced in earnest in 1974 when Carina spent six months in Australia, partially funded by a Public Service bursary. She worked under the guidance of some of the most experienced weed biological control scientists under the leadership of Dr Ken Harley - she forged a lasting and rewarding association and friendship with those colleagues.

Upon her return to South Africa, she was put in charge of the biological control of lantana, a difficult project that she pursued with tenacity, with little funding and assistance and only make-shift quarantine facilities. She nevertheless introduced 16 species of natural enemies, six of which eventually established. She proved conclusively that some of them were curbing the growth and reducing the vigour of the weed along the Natal south coast and inland in the low lying subtropical areas of Mpumalanga, where large, dense lantana infestations have since become rare. This evaluation of the effect of the insects on the plant earned her a PhD from Rhodes University in 1982.

Since 1985, her research centred around controlling several floating aquatic weed species from South America. Two of these projects – targeting salvinia and water lettuce – resulted in rapid, unqualified success, while the beetle she had introduced against parrot's feather was also extremely effective. She was of the opinion that a second insect species was needed to prevent resurgences, and did fieldwork in Brazil, which helped to get a culture of the insect established for further work in quarantine.



A challenge, as daunting as that of lantana, was however to curb infestations of water hyacinth. Several factors prevented the established biological control agents from achieving satisfactory levels of control, in a scenario where governmental bodies repeatedly resorted to herbicide control in order to "finally eradicate the weed", and were not prepared to tolerate residual small weed populations which would sustain the insects. South Africa now has more species of natural enemies established on water hyacinth than any other country. Some of them were later supplied to China and to various countries in Africa, where successful control was achieved. With dedication Carina worked towards developing an integrated control project for water hyacinth locally, the most difficult part of which was to win over successive managers to giving biological control a fair chance.

Throughout her career, she was a passionate ambassador for biological control, and she excelled in guiding new workers, scholars and teachers. Her talks at meetings were typically spontaneous, much enjoyed, and remembered and talked about by many.

Carina's projects were challenging and demanding, but never dull, and constantly took her away from home, often for extended periods of time. Her dedication enabled her to make light of long journeys on her own and strenuous physical work under the most adverse conditions. Her good sense of humour allowed her to cope with difficult situations, which often occurred during her frequent train journeys in shared compartments (as prescribed then) to Durban for fieldwork over a period of years. Her diverse and imaginative entomological and botanical photographs have been used in several publications. She is the author of about 50 scientific papers and some popular articles, and also wrote, or contributed to, chapters in a number of scientific handbooks. She is co-author of two field guides: one on alien invasive aquatic plants and another one on mainly indigenous aquatic plants. She was a regular contributor to conferences in South Africa and abroad.

During 1993, she was honoured with the Dave Annecke Award for her achievements in weed science, and in 2002 the Southern African Weed Science Society once again paid tribute to her "Outstanding Service to Weed Science". This Institute presented her with the Director's Award for her association with PPRI 1960-2002.

Since her official retirement in 2002, she has remained active as an environmental consultant. She also still spends time at PPRI, sorting out her copious field data, or acting as an experienced advisor on aspects of problem water weeds. She helped Ms Rene Glen in compiling a list of aquatic plants in South Africa and is still involved voluntarily at the South African National Biodiversity Institute (SANBI) in compiling data.