

Inside this issue:

| | |
|----------------------------------|------|
| National Collections | 1 |
| Biosystematics | 2-6 |
| Pesticide Science | 7 |
| Plant Pathology and Microbiology | 8 |
| Weeds Research | 9-13 |
| Technology Transfer | 14 |

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PLANT PROTECTION NEWS

Newsletter of the Plant Protection Research Institute (PPRI), an institute in the Natural Resources and Engineering Division of the Agricultural Research Council (ARC)

National Collections –New Facility

The PPRI Biosystematics Division comprising the National Collections of Arachnids, Insects, Nematodes, and Fungi has now relocated to its new premises on the Roodeplaat East campus on the KwaMhlanga Road.

The new building was custom-designed to meet international standards for collection storage. Great attention has been paid to guarantee the safety of the collections. Access control, alarm systems, and perimeter fencing ensure that the building is secured against intruders. The installation of sophisticated fire-detection and elimination systems, including an on-site water reservoir, form an elaborate mechanism to protect the building and its irreplaceable biological reference resources. Power outages are coped with by an on-site generator and dedicated network plugs.

Rooms housing alcohol collections have been designed to reduce the risk of fires with special flooring and concrete ceilings, whereas live fungal culture collections are maintained in a controlled environment. Temperature control systems ensure that the specimens are housed at the optimum conditions, and this extends to each office which makes for a very pleasant working environment. Each scientist and technician has their own laboratory office fitted with benches and cabinets to suit their particular needs, and there is extensive built-in storage for literature collections. Great care was taken with the ergonomics of the building to ensure that each scientist sits in an office located across the passage from the collection for which they are responsible.

Individual sections house specialised specimen preparation and extraction rooms. Dedicated molecular techniques rooms, and digital photographic rooms are available to all sections. A special vault also ensures the safety of irreplaceable type specimens.

The building consists of three wings. The National Collection of Insects is in front, the National Collections of the Arachnids and Nematodes are in the middle, and the National Collection of Fungi is at the back.



The Arachnida wet collection



The Mite Collection



Nematology slide and literature collection



Hymenoptera collection room (National Collection of Insects)



National Collection of Fungi

Biosystematics

Visit to the Berlin Museum

Examining type material is essential for taxonomic research. During the early part of the last century several German bee taxonomists described numerous species from Africa, in particular southern and East Africa. Most of their type material is housed in the *Museum für Naturkunde* in Berlin, Germany. Before 1994 South African scientists were not allowed to correspond with their East German colleagues, making good taxonomic work almost impossible. Today Connal Eardley, of the Biosystematics Division, has a very good working relationship with Dr Frank Koch, of the Berlin Museum. During 2009 they received funds through the South Africa/Germany bilateral agreement for reciprocal visits.

We do not have a sawfly taxonomist in Africa. However, Frank works on Afrotropical sawflies. His research is mostly on the southern African fauna, thereby contributing otherwise unavailable taxonomic capacity to documenting our biodiversity. He has, in the past, helped with the identification of two alien invasive species recently introduced into South Africa.

During November, Connal visited the Berlin Museum to study leafcutter bees. Leafcutter bees all belong to the genus *Megachile*. This is the biggest Afrotropical bee genus, and the species are important pollinators. One of the world's most successful pollination management projects is the pollination of lucerne in North America using the alfalfa leafcutter bee.

Berlin Museum has the type material of 69 species that occur in southern Africa. In addition, they have identified material of 252 species and several hundred unidentified specimens. It is impossible to produce a good revision of *Megachile* without visiting this Museum.

To enable the achievement of the project goals, Thabo Phasoana accompanied Connal as a young scientist. He had worked for ARC-PPRI on short-term contracts, and his technical ability made him an ideal candidate for photographing the types. During the visit Thabo learned that he was successful in obtaining a permanent position in the ARC-PPRI, and had to venture to Stellenbosch two days after his return to South Africa.

The trip was a great success. All the goals were achieved. In addition, Connal and Frank agreed to write two joint articles dealing with bees that Frank collected in South Africa during previous visits. Thus the trip should result in one very thick revision of *Megachile*, and two shorter articles.

Contact: Dr Connal Eardley at EardleyC@arc.agric.za



Connal Eardley and Frank Koch

The International Union for Biological Sciences meeting in Cape Town

The International Commission for Plant Bee Relations (ICPBR) is a member of the International Union for Biological Sciences (IUBS). As pollinators in both natural and agro-ecosystems are becoming fewer, pollination management has become more important. Consequently the ICPBR is becoming more active, and a new committee has been appointed of which Connal Eardley is the Vice Chair of the ICPBR.

In this capacity he attended the IUBS General Assembly at the University of the Western Cape in October, as well as representing the ARC at this important meeting. Many new contacts were made with both local and overseas scientists. South Africa is actively involved in the IUBS, and we look forward to ARC-PPRI benefiting in the future from this meeting.

Dr Connal Eardley visited the IZIKO South African museum to study their bee collection for a few days after the IUBS General Assembly at the Museum.

Contact: Dr Connal Eardley at EardleyC@arc.agric.za

Visiting Acarologist



Left-right: Jacob den Heyer, Ansie Dippenaar-Schoeman and Eddie Ueckermann

Prof Jacob den Heyer, Emeritus Professor of Qwa Qwa University, and a well known expert on the predatory mite family, Cunaxidae, is a research associate at the National Collection of Arachnids.

He was the first visitor to the Mite Collection in the new building. Prof. Den Heyer is collaborating with Dr Ueckermann on the mite superfamily Bdelloidea which includes the Cunaxidae, and is rendering a valuable service to the upgrading of the Bdelloidea in the NCA. Since the start of this collaboration in the late 1990s he has published 6 papers (describing nine new genera and 14 new species), with two papers pending. During his visits, he has also done many identifications for us. He was recently invited to Brazil for three months to train a PhD student in the systematics of the Cunaxidae. We are honoured that we are still able to draw from his wealth of experience.

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Biosystematics (continued)

SANC bids Matthews farewell

It is with great sadness that we bid Matthews Mathabathe farewell. Matthews has, for the past ten years, been a well respected and inspirational staff member at the South African National Collection of Insects, but has decided that it is finally time to retire for a second time.

A former employee of the Transvaal Museum, where his entire career was spent as a preparator of beetles in their Entomology Department, he came out of retirement to work for us, "because he missed the beetles". We welcomed him with open arms as we had a vast backlog of unpinned beetle specimens. He was passionate about his work, and regarded the pinning of each specimen as a work of art. This was evident when one looked at the row upon row of painstakingly pinned beetles lined up on his pinning boards. All in all he managed to pin a staggering average of 10 000 specimens a year. Matthews, we salute you as a friend, as an inspiration and, ultimately, as a gentleman. Thank you for the contribution you have made towards enhancing our beetle collection, and science as whole. Go well.

Contact: Beth Grobbelaar at GrobbelaarB@arc.agric.za



Matthews hard at work with a pinning board in foreground
(Photo: E. Grobbelaar)



Matthews Mathabathe and Beth Grobbelaar saying goodbye
(Photo: R.Urban)

Collaboration with Nematologist presently studying in Gent

Dr. Antoinette Swart (Nematology Unit) and Dr Candice Jansen van Rensburg, a lecturer in the Department of Zoology and Entomology at the University of the Free State are working together on a nematode project. Candice is currently doing an M.Sc. in Nematology at the University of Ghent, Belgium. Apart from her courses on subjects such as nematode morphology, nematodes as model organisms, general nematode biology and interactions, molecular techniques and virus vectors, she must also do a dissertation in 2010 on nematodes from her country of origin.

She and Antoinette decided that a study on the nematodes of Bakwena Cave at Irene will fulfil all the requirements for her dissertation, especially as nematodes from caves are fairly understudied in South Africa. Candice submitted her proposal, which was accepted, and she will be working with Antoinette Swart and Prof. Wilfrida Decraemer from University of Gent, Belgium who will be her study leader.

The aims of her project will be to: identify nematodes from the Bakwena cave to species level; 2) to describe new species found from the different habitats within the cave; 3) determine if there is any associated distribution pattern of nematodes within the cave; 4) determine if anything can be said about the "health" of the caves using nematodes as ecological indicators.

The nematode samples from the cave have been taken for a year, on a monthly basis (January – December 2009), by Antoinette Swart as member of the The South African Karst Ecology Study Group. After her studies, Candice plans to start a Nematology Laboratory (Nematode taxonomy) at the University of the Free State in the Zoology and Entomology Department.

Contact: Dr Antoinette Swart at SwartA@arc.agric.za



Antoinette and the team at the entrance of the cave

Radio

In 2009 a record number of radio talks (68) on spiders by Dr Ansie Dippenaar were broadcast. As part of the "Hoe verklaar jy dit" panel of RSG, 16 programmes were recorded to be broadcast throughout the year on Sundays. A total of 50 live recordings were broadcast weekly on Radio Laeveld, as well as invited talks on RSG (*Vrae uit die Natuur*), Talk Radio 702 en Radio Rippel. This is an important way of communicating to the public the science undertaken at the ARC.

Biosystematics (continued)

Public participation growing in SANSA

The South African National Survey of Arachnida (SANSA) has again illustrated the enormous interest from the public in natural sciences. Numerous people, ranging from school children to retirees, have contacted us volunteering to participate. Participation occurs on different levels.

Collecting: many people are interested in collecting specimens for us. We provide the bottles and the know-how, and they do the collecting. Presently, material from >30 collectors is streaming in from all over the country, providing us with much needed distribution records and specimens. Other activities from the public include participation in survey work in the field, and making farms and reserves available for collecting purposes.

Photography: with the availability of modern, digital cameras, many more people are taking photographs. There is great interest in the on-line Virtual Museum of SANSA, and with > 250 photographers contributing, the images are streaming in on a daily basis. The Virtual Museum started in 2007, with 283 species entries represented by >600 photographs recorded in that year. In 2008, the number increased to 619 species with > 1200 images and, in 2009, 820 species entries with >1600 images were recorded.

Not only are much-needed images of the species and their distributions obtained, but the photographs also provide very important biological data on prey, web building, egg sac construction, and mating. Several photographers provide data on a daily or weekly basis, and this has already resulted in the publication of several short research communications. The Virtual Museum is also becoming an excellent identification tool which enables the public to learn more about spiders and other arachnids. (To find the Virtual Museum: go to www.arc.agric.za, see quick link SANSA and then VIRTUAL MUSEUM). The excellent images have also become a very important photographic source for the series of guides that are planned for the South African arachnid fauna.

Radio talks and other media: the interest in spiders resulted in a record number of radio talks. During 2009 alone, 64 radio programmes and one TV programme dealing with spiders and other arachnids were broadcast. Several reports on spiders appeared in newspapers, and invitations were received from universities, schools, and societies to present lectures.

Products: the interest in reading matter on the arachnids has also increased during the last few years, and requests for the CDs, handbooks and posters available from ARC-PPRI have increased during 2009. The poster series is especially popular, with the first one printed already out of stock.

Contact: Ansie Dippenaar-Schoeman at DippenaarA@arc.agric.za

Dr Ansie Dippenaar-Schoeman was invited to participate in a National Science Foundation project in the USA dealing with a Global Inventory and Phylogenetic revision of Scorpions.

EXAMPLES FROM VIRTUAL MUSEUM



Action photo of male and female flower crab spiders taken by Martie Rheeders



A philodromid (possible new species) feeding. Photograph taken by Wolf Avni



One of the more than 300 web photographs taken by Allen Jones

Biosystematics (continued)

National Arachnida Survey - a wealth of information

One of the aims of the South African National Survey of Arachnida (SANSA), is to consolidate all the available South African arachnid data into one database. This includes all published records housed in 27 collections. With this wealth of data available, important biodiversity issues can be addressed.

National species list: for the first time, catalogues of the Solifugae, Pseudoscorpiones, Amblypygi and Opiliones are available for South Africa. An annotated checklist for the >2000 spiders species will be available at the end of March.

Threatened species: SANSA forms part of the Threatened Species Programme (TSP) of the South African National Biodiversity Institute (SANBI). Red data listing of a large group of spiders is underway which will be completed by the end of 2010.

National Spatial Biodiversity Assessment (NSBA): SANBI will be undertaking a further assessment in 2010—the last one was done in 2004. With the information available in the SANSA database, the arachnid species endemic to South Africa will be included in the analysis for the first time.

Biodiversity information policy framework: as part of this framework, SANBI is looking at the digital access to sensitive taxon data. Ansie Dippenaar-Schoeman, as project leader of SANSA, was invited to join the Sensitive Species Working Group.

Alien and Invasive species: SANBI has been tasked with compiling lists of alien and invasive species for the Alien Invasive Species Regulations. Inputs will be made from the SANSA data. Information sheets on alien spiders and mite species have also been compiled for a handbook that will be published in 2010.

South African Biodiversity Information Facility (SABIF): The aim of SABIF is to contribute to South Africa's sustainable development by facilitating access to biodiversity and related information via the internet. SANSA has received funding from SABIF to compile complete datasets, which will soon be available on their website.

Species in conserved areas: SANSA has projects running for most of the South African National Parks, and is also involved in > 30 surveys presently running in other conserved areas. Fifteen papers containing important baseline information on the biodiversity of these areas have already been published, with several in preparation. The SANSA information facility contains a complete dataset of what is presently known from conserved areas.

Species in agro-ecosystems: SANSA has large datasets of spiders in agroecosystems collected over a 40-year period. This will eventually feed into the SANBI Functional System project.

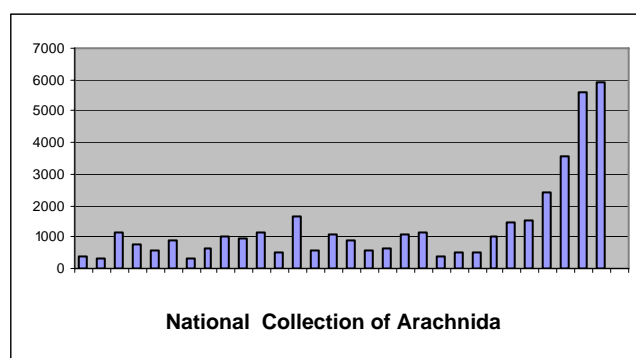
Contact: *Ansie Dippenaar-Schoeman* at DippenaarA@arc.agric.za



National Collection of Arachnida—wet collection



Material from the SANSA surveys which still requires identification



Entries into the National Collection of Arachnida from 1979 to 2009, with the last three years showing the dramatic increase

Biosystematics

Leafhoppers associated with grasslands of South Africa - Grassland Biome endemics

Michael Stiller of the National Collection of Insects is a specialist of leafhoppers and in one of his projects he accesses the leafhopper diversity of the Grassland Biome. Leafhoppers are sap-sucking insects, which feed on grass or shrubs and trees, and occasionally are found throughout the temperate and tropical regions of the world. All species have hind legs modified for jumping, and are covered with hairs that allow them to spread a secretion over the body that acts as a water repellent and carrier of pheromones. Some species have a cosmopolitan distribution, and some are pests or vectors of plant viruses and phytoplasmas. They have an incomplete metamorphosis and have various host associations varying from very wide to very narrow ranges. The distribution of grassland leafhoppers probably depends on host plant availability and condition, and other factors, such as suitable breeding conditions.

Some trends have become apparent after more than 10 years of surveys of leafhoppers in grasslands in South Africa. For instance the Grassland Biome has a large number of endemic leafhoppers. The Savanna Biome of South Africa has more leafhopper species than the Grassland Biome, but that are all very widely distributed and feed on grass in this and any other biome and with many having a wide distribution throughout Africa. In the Grassland Biome the Centres of Plant Endemism appear also to have a high leafhopper species diversity and some species of leafhoppers appear follow the floristic linkages between the Fynbos and Grassland Biomes.

More than 300 species of grass-feeding leafhoppers have been recorded from South Africa so far. This number includes 200 species in the Savanna Biome and about 110 endemic species in the Grassland Biome. The Fynbos Biome has been well examined and contains about 200 species.

Traditionally a sweepnet was used to collect specimens from plants, but other trapping methods such as pitfalls, pan traps and the mechanized suction device (DVac™ and various converted home and garden suction machines) facilitate the collection process.

Ongoing research continues to describe the large number of new genera and species that are associated with the Grassland Biome. Recent research on the genus *Vilargus* recognized eight species, of which one is abundant and widely distributed in the in the Grassland Biome and occasionally in the Fynbos Biome, and the other species are known from a few records in the Grassland Biome, and found in a wide range of grassland habitats.

Other charismatic leafhoppers belong to the genus *Drakensbergena*. Their size is considered large, ranging from 4–11 mm, and all species are short winged, without hind wings. Eighteen species are known thus far mainly from high altitudes of the Drakensberg.. Grasses such as *Festuca* spp and *Merxmüllera* spp are the feeding plants of some of these leafhoppers but most have a wide range of host grasses.

Contact Michael Stiller at Stillerm@arc.agric.za



Member of the genus *Vilargus*



Member of the genus *Drakensbergena*



A new species that still needs to be describe



Martin sampling with a DVac in the grassland



Pesticide Science

Environmental risk assessment of Red-billed Quelea control operations in Botswana

In collaboration with the University of Greenwich Natural Resources International (NRI-UK), the ARC-PPRI-Quelea Research Programme (QRP) has been part of the SADC ICART project, *Environmental impact assessment of Red-billed Quelea operations in Botswana and Tanzania and mass capture of quelea as food for poor people and source of income*.

The QRP conducted environmental impact assessments of quelea control operations in Botswana during May & June 2009. The Botswana Ministry of Agriculture annually controls quelea colonies and roosting sites to prevent damage to small grain crops (i.e. sorghum, millet and wheat), using chemical (fenthion and/or cyanophos) as well as explosion control methods. Chemical control is performed by using either vehicle mounted sprayers or fixed wing aircraft. Explosion control operations are conducted using fuel-air bombs consisting of 4 l of fuel and one dynamite gel stick per bomb. Up to 400 such fuel-air bombs are used per hectare.

Initial explosion survey results indicated that mortalities were occurring in many non-target animals—avian, mammalian, reptilian, and invertebrate fatalities were recorded. Vegetation and habitats were also being destroyed. Serum and plasma cholinesterase levels were analysed under field conditions to determine the toxicological effects on birds, livestock, small mammals, and humans. Blood samples were also collected to detect the levels of organophosphate pesticides.

Training courses were presented to quelea managers and operators in Pandamatenga, Serowe, and Gaborone on sprayer calibration, cut line and sprayer orientation, and spraying techniques. Course participants had to perform hands-on calibration exercises and present their results to the group. Participants were also trained to perform droplet capture techniques.

The research data will be used to refine management of quelea control operations, and to minimise environmental impacts.

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Non-target species killed during operations



Explosion control operations are conducted using fuel-air bombs

Plant Pathology and Microbiology

Training in Oyster mushroom production

Oyster mushrooms are sought after gourmet mushrooms with great potential in South Africa. They have the unique quality to convert agricultural waste into a nutritious product, which is especially high in protein.

Owing to public demand, two courses in the production of oyster mushrooms were held.

- The first took place at the University of Fort Hare. Both staff and students from the Faculty of Science and Agriculture attended the course which was held during October 2009. In future, oyster mushroom production will be included under special topics in their curriculum. The Dean of the Faculty Science and Agriculture, Dr Jan Raats, was very pleased that such a training workshop took place as he wants to incorporate oyster mushroom farming in their envisaged Agri-Parks.
- The second was a three day course, held as part of the Mushroom Farming for Gauteng Project at ARC-PPRI's Roodeplaat Campus near Pretoria during November 2009. This project is financially supported by the Gauteng Department of Agriculture and Rural Development. The course was attended by farmers as well as extension officers from the Department.

Contact: Ms Jessica Maimela at MaimelaJ@arc.agric.za or Dr Susan Koch at KochS@arc.agric.za



Yellow oyster mushrooms



Normal oyster mushrooms



Pink oyster mushrooms



Dried oyster mushrooms

Weed Research

SAPIA surveys in the south-western Cape

During October 2009, Lesley Henderson and Hildegard Klein undertook roadside surveys for the Southern African Plant Invaders Atlas (SAPIA) project in the south-western Cape. The main focus of the survey was on new, emerging invasive species, particularly ornamentals that have spread from gardens in the Overstrand District and Cape Peninsula. The Overstrand District stretches along the coastline from Gansbaai in the east to Rooiels in the west, and includes the towns of Hermanus, Kleinmond, Betty's Bay, and Pringle Bay. This beautiful coastline boasts some of South Africa's most beautiful scenery and irreplaceable fynbos. The biodiversity of the fynbos in this region is threatened by habitat destruction, through the burgeoning development of holiday homes and infestations of invasive alien plants. In a single small stretch of wetland in Kleinmond (photo 1), 18 species of alien plants were recorded. All had spread from neighbouring gardens. Species include the following:

- New Zealand Christmas tree (*Metrosideros excelsa*) (photo 2), an ornamental tree, hedge and windbreak plant. It invades and overtops fynbos on moist, peaty soils. This is a proposed category 1 plant under NEMBA in the Overstrand District. It requires urgent control.
- Australian bottlebrush (*Callistemon* sp.) (photo 3), with its bright red flowers. This species is one of several emerging invasive bottlebrushes in the fynbos.
- New Zealand flax (*Phormium tenax*) (photo 4).
- Willow hakea (*Hakea salicifolia*) (photo 5).
- Kangaroo paws (*Anigozanthos flavidus*) (photo 6) have been cleared from the wetland, but cultivated plants in a nearby holiday resort are a source of seed for further invasion.



5. Willow hakea (*Hakea salicifolia*)



6 a & b. Kangaroo paws (*Anigozanthos flavidus*)
(Photos by Tessa Oliver)



1. A stretch of wetland near Kleinmond in which 18 species of ornamental alien plants were recorded



2. New Zealand Christmas tree (*Metrosideros excelsa*)



3. Australian bottlebrush (*Callistemon* sp.)



4. New Zealand flax (*Phormium tenax*)

Weed Research (continued)

SAPIA surveys in the south-western Cape (cont.)

The indigenous Bloodroot (*Wachendorfia thyrsiflora*) (photo 7), closely related to Kangaroo paws, grows abundantly in the Kleinmond wetland and should be cultivated in preference to the invasive Australian species.

Other emerging invasive species in the south-western Cape include:

- Coastal banksia (*Banksia integrifolia*) (photo 8), an Australian species belonging to the Protea family, has escaped from gardens. Its woody, cone-like fruits release many wind-dispersed seeds as soon as the fruits are mature.
- Valerian (*Centranthus ruber*), native to the Mediterranean, a garden ornamental with pink, white, or reddish flowers (photos 9a & b show it spreading on the lower slopes of Chapman's Peak overlooking Hout Bay).
- Red-flowering tea tree (*Melaleuca hypericifolia*) (photos 10a & b), is naturalized in the same locality.



7. The indigenous Bloodroot (*Wachendorfia thyrsiflora*), which should be cultivated in this area in preference to alien species



9 a & b. Valerian (*Centranthus ruber*)



8 a & b. Coastal banksia (*Banksia integrifolia*)



Weed Research (continued)

SAPIA surveys in the south-western Cape (cont.)

- Stiff-leaved bottlebrush (*Callistemon rigidus*) (photo 11a & b), and Weeping bottlebrush (*C. viminalis*) are invading wetlands.
- Mirror bush (*Coprosma repens*) (photo 12), native to New Zealand, is a garden escape in coastal districts. It is dispersed by birds.
- Spanish broom (*Spartium junceum*) (photo 13) is wide-spread, but still mainly confined to roadsides and should be actively controlled before it invades fynbos on a large scale.
- Manatokas (*Myoporum montanum* and *M. insulare*) (photos 14a & b) invade coastal bush. Photo 14a was taken at Cape Agulhas where Manatokas and Rooikrans (*Acacia cyclops*) form a vegetation mosaic.

Gardeners in the Overstrand district need to take notice of the invasive tendencies of these ornamental species, particularly of all Australian Myrtaceae.

Contact: Lesley Henderson at L.Henderson@sanbi.org.za



10 a & b. Red-flowering tea tree (*Melaleuca hypericifolia*)



11 a & b. Stiff-leaved bottlebrush (*Callistemon rigidus*)



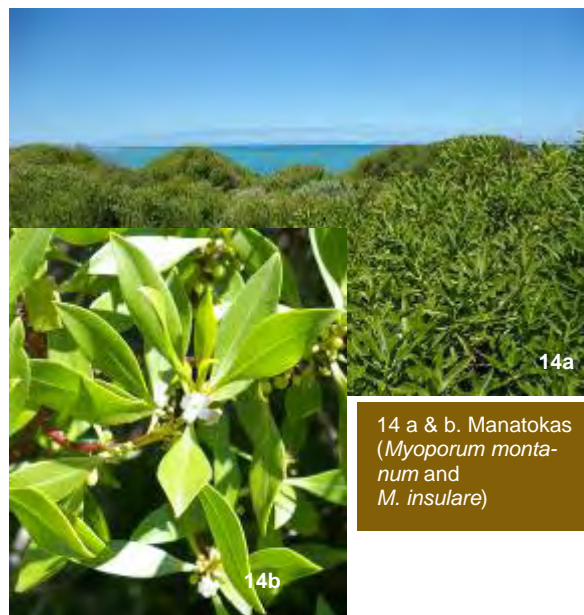
12. Mirror bush (*Coprosma repens*)

Weed Research (continued)

SAPIA surveys in the south-western Cape (cont)



13. Spanish broom (*Spartium junceum*)



14 a & b. Manatokas (*Myoporum montanum* and *M. insulare*)

Refurbished weed pathogen quarantine facility

The Weed Pathology Unit of the ARC-PPRI, based in Stellenbosch, is the only research group in the country involved in the search for, and introduction of, pathogens (mainly fungi) for the biological control of alien invasive weeds in South Africa. This unit forms an integral part of the Weeds Division which has three further quarantine facilities—all for insect agents. A major component of the research undertaken is host specificity testing of potential biocontrol agents in quarantine facilities. Only once potential agents are proven to be suitably host specific, is permission for release sought from the relevant government departments.

Cape Action for People and the Environment (C.A.P.E.) is a partnership of government and civil society aimed at conserving and restoring the biodiversity of the greater Cape Floristic Region (CFR) and the adjacent marine environment. Through the Invasive Alien Species (IAS) component of C.A.P.E., international funding was obtained from the Global Environmental Fund (G.E.F.) to refurbish and upgrade the weed pathogen quarantine facility at PPRI, Stellenbosch campus. This facility was originally built in the early 1980s when only a single weed pathologist, Dr Mike Morris, was employed. Since then the Weed Pathology Unit has grown to include four researchers and two technical assistance posts, and the existing facilities were bursting at the seams. One particular difficulty was having a single, small laboratory to do all research, including culturing fungi (requiring sterile conditions) in the same space used to work with potted plants (a source of numerous contaminants). An additional plant inoculation laboratory (6 x 6 m) and three growth rooms (each 2 x 3 m) have been constructed and equipped, greatly expanding the space available for research as well as allowing for epidemiological research to be conducted under quarantine conditions. The original laboratory will now be refurbished as a clean laboratory for culturing fungi only.

Construction began in June 2009, and was completed in October. Heavy rain experienced during the winter impeded progress, as did the wait for the air conditioning units for the growth rooms. The air conditioners had to be custom-built to maintain the rooms at temperatures set from 10 to 30°C, regardless of the outside temperatures. These rooms get natural light with glass windows set in the walls, and clear polycarbonate roof and ceiling. The new facilities were constructed on either side of the existing quarantine facility passage, with the roof of the new rooms bridging over the old passage.

The partnerships forged within C.A.P.E. will provide a forum to prioritise which invasive alien weeds of the CFR to target with biological control in the future, and also to devise new funding strategies. The opportunities afforded for future research are exciting, and all members of the Weed Pathology Unit are looking forward to using the new facilities.

Contact: Dr Alan Wood at wooda@arc.agric.za



Construction begins on the additional laboratory



Completed laboratory: though the door will be sealed, it allows large equipment to be moved in or out on occasion

Weed Research (continued)

Weed biocontrol at the Sunday Tribune Garden and Leisure Show

The annual *Sunday Tribune* Garden and Leisure Show, one of the largest in the country, was held at the Royal Agricultural Showgrounds in Pietermaritzburg from 25-27 September 2009. A 900m² hall (Hall 2) at the Pietermaritzburg Show was allocated by the Royal Agricultural Society (RAS), the hosts of the garden show, at no cost to stakeholders interested in promoting issues related to invasive alien plants (IAPs) and the "Plant Me Instead" campaign. This is an initiative of the *Working for Water* Nurseries Partnership Programme to promote the sale and planting of indigenous and/or non-invasive plants in gardens. The hall was branded as the "Stop the Spread – Plant Me Instead" Hall, and featured stalls by Ezemvelo KZN Wildlife, Wildlife and Environment Society of South Africa (WESSA), South African National Biodiversity Institute (SANBI), and several indigenous landscaping companies. The Stellenbosch and Rietondale ARC-PPRI laboratories sent examples of released, established biocontrol agents, while local contributors included the University of KwaZulu-Natal and the South African Sugarcane Research Institute (SASRI) in association with the *Working for Water* programme.

The stand consisted of backing boards with posters, trestle tables with tubs of aquatic weeds and their biocontrol agents, potted IAPs, and cut plant material. A microscope allowed members of the public to view agents up close.

Biocontrol agents on display included the newly-released insects *Longitarsus bethae* (root-boring beetle) and *Coelocephalapion camarae* (petiole-galling weevil), both on Lantana (*Lantana camara*); *Anthonomus santacruzi* (flowerbud-boring weevil) on Bugweed (*Solanum mauritianum*); and *Carvalhotingis visenda* (leaf sap-sucking bug) and *Hylaeogena jureceki* (leaf-mining jewel beetle) on Cat's claw (*Macfadyena unguis-cati*).

A display of Australian IAPs, their biocontrol agents and/or damage included, *inter alia*, the rust fungus (stem-galler), *Uromycladium tepperianum*, on Port Jackson willow (*Acacia saligna*); the flower-galling midge, *Dasineura dielsi*, on Rooikrans (*Acacia cyclops*); flower-galling wasps (*Trichilogaster* spp.) on *A. longifolia* and *A. pycnantha*; and the fruit-boring weevil, *Erytenna consputa*, on *Hakea sericea*.

Agents feeding inside seeds included the weevil, *Melanterius maculatus*, on *A. mearnsii* and *A. podalyriifolia* as well as the bruchid beetle, *Acanthoscelides macrophthalmus*, on *Leucaena leucocephala*.

Biocontrol agents on aquatic weeds included *Neohydronomus affinis* (leaf-mining weevil) on Water lettuce (*Pistia stratiotes*), *Neochetina eichhorniae* and *N. bruchi* (petiole-boring weevils) on Water hyacinth (*Eichhornia crassipes*), *Cyrtobagous salviniae* (rhizome-tunnelling weevil) on Kariba weed (*Salvinia molesta*), *Lysathia* sp. (leaf-feeding beetle) on Parrot's feather (*Myriophyllum aquaticum*) and *Stenopelmus rufinus* (frond-feeding weevil) on Red water fern (*Azolla filiculoides*).

A culture of the beetle, *Phenrica guerini*, which feeds on the leaves of Barbados gooseberry (*Pereskia aculeata*) and is currently being mass-reared for release by SASRI, was also displayed.

The stall was manned by staff from the ARC-PPRI Cedara unit. Public interest was generally high, and the PPRI personnel fielded a good number of questions on various topics. Many of those interested were well-informed and had previous experience of biocontrol. The new Cat's claw agents as well as the Bugweed weevil received considerable interest, presumably because they are problematic in the KZN Midlands. Mr Ayanda Nzimande was called for an impromptu interview on IAPs with Ukhozi FM at their mobile studio outside the hall.

The stall and the weed biocontrol displays were a success and promoted the idea of weed biocontrol among the show-going public, as well as showcasing cooperation between the various institutions.

Contact: Dr Costas Zachariades at ZachariadesC@arc.agric.za



The stall of the Cedara Weeds Unit showcasing the biological control of IAPs from around the country



Mr Ayanda Nzimande discussing some of the bio-control agents with a visitor

Congratulations



To Hildegard Klein who has been awarded her MSc degree with distinction from the University of Cape Town.

Hildegard's supervisor at UCT was Prof.

John Hoffmann, and Dr Stefan Naser guided and co-supervised her research —both before and after his retirement.

The title of the MSc thesis was "Wasps (Hymenoptera: Chalcidoidea) associated with galls in seed-capsules of *Eucalyptus camaldulensis* (Myrtaceae) in South Africa: Species composition, trophic relationships and effects".

Technology Transfer

Scientific publications

EARDLEY, C. 2009. A revision of the southern African species of *Meliturcula* Friese (Hymenoptera: Andrenidae: Panurginae). *Zootaxa* 2261: 39-51.

EARDLEY, C. 2009. First record of the tribe Biastini from the Afrotropical Region (Hymenoptera: Apidae). *Zootaxa* 2264: 65-68.

GILLOMEE, J.H. & MILLAR, I.M. 2009. The woolly whitefly, *Aleurothrixus floccosus* (Maskell) (Hemiptera: Aleyrodidae), a potentially serious citrus pest, recorded from South Africa. *African Entomology* 17: 232-233.

SUNG, I-H., A. DUBITZKY, A., EARDLEY, C. & YAMANE, S. 2009. Description and biological notes of *Ctenoplectra* bees from Southeast Asia and Taiwan (Hymenoptera: Apidae: Ctenoplectrini) with a new species from North Borneo. *Entomological Science* 12: 324-340.

UECKERMANN, E.A., JALAEIAN, M., SABOORI, A & SEYEDOLESLAMI, H. 2009. Re-description of *Thphlodromus* (*Anthoseius*) *khosrovensis*, first record for Iran (Acari: Phytoseiidae). *Acarologia* 49 (1-2): 23-27.

Talks and lectures

GORDON J.A., 2009. Biological control of weeds - history, principles and examples. Lecture to final-year Nature Conservation students. Cape Peninsula University of Technology.

MALEBANA P.S., 2009. Storage and rodent control practices in participating countries, as well as the pre- and post-harvest damage assessments, based on storage facility data collected in Tanzania, Swaziland, Namibia and South Africa during 2008 and 2009.. Ecorat final workshop. Namibia National Museum. Namibia.

MALEBANA P.S., 2009. Breeding of common insect pests on grain storage and rodent management. University of Venda.

MALEBANA P.S., 2009. Introduction of traditional grain storage and pesticides. Eco-technology meeting. Sekhukhune ward 31.

Radio

STALS, R. 2009. Radio interview: *Radio Rippel*, programme 'Van Kaap tot Kenia'. Interview about invasive organisms in general and in particular about the invasive harlequin lady beetle [live broadcast, 03 November 2009].

STALS, R. 2009. Radio interview: *Radio 2000*, programme 'The Green Debate'. Interview about invasive organisms in general and in particular about the invasive harlequin lady beetle [live broadcast, 11 November 2009].

STALS, R. 2009. Radio interview: *Radio Sonder Grense*, programme 'Ekoforum' (SABC). Follow-up interview about the invasive harlequin lady beetle [pre-recorded; broadcast 29 November 2009].

The three representatives who presented lectures in the Cape; Ms Riana Jacobs-Venter (back), Ms Petro Marais (front) and Dr Janine Kelly (middle)

National Collections received funding for digitisation of collections

The Biosystematics Division is proud that all of its applications for seed funding from the South African Biodiversity Information Facility (SABIF) for digitisation have been successful. This initiative was initiated by the Parties to the Convention on Biological Diversity (CBD) and requested participating countries to make primary data, collected with specimens and housed in collections, on biodiversity available on-line. The Global Biodiversity Information Facility (GBIF) was established to facilitate this exercise. South Africa, as a signatory of the CBD, joined GBIF to foster compliance with the CBD agreement and, in compliance with GBIF, set up a South African node (SABIF). The SABIF initiative is driven by the South African National Biodiversity Institute (SANBI), and financed by the Department of Science and Technology (DST) from annual funds made available to facilitate the digitizing of these primary data. The Biosystematics Division are the custodians of several National Collections that contain primary collecting data. These data on biodiversity are associated with specimens in the ARC's National Collections. A substantial amount of these data have been captured into electronic relational databases. Over the last few years, several collections within the ARC received funding from SABIF. We are honoured to continue this meaningful and important relationship. The successful applications are listed below.

- *Digitization of specimen data from the ARC National Collection of Fungi: Herbarium collection (PREM)*. Overseen by Ms Riana Jacobs-Venter, and awarded R100 000
- *National Collection of Nematodes and South African Plant-Parasitic Nematode Survey*. Overseen by Dr Mariette Marias, and awarded R86 400
- *The South African National Survey of Arachnida: Consolidation of Data*. Overseen by Dr Ansie Dipenaar, and awarded R60 000
- *The databasing of Chalcidoidea (Parasitic Hymenoptera) collection at the ARC Plant Protection Research Institute*. Overseen By Dr Janine Kelly, and awarded R23 750

During December 2009, a meeting was held at Kirstenbosch in Cape Town to provide the successful applicants with the grant disbursement. In addition, each representative was asked to prepare a 10-minute presentation on their proposed submitted programme and associated projects. This meeting was sponsored by SANBI, and attended by Ms Riana Jacobs-Venter (Mycology), Ms Petro Marais (Arachnology) and Dr Janine Kelly (Parasitic Hymenoptera).

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