



International Invasive Ant Management Workshop

HANDBOOK

27-29 APRIL 2010

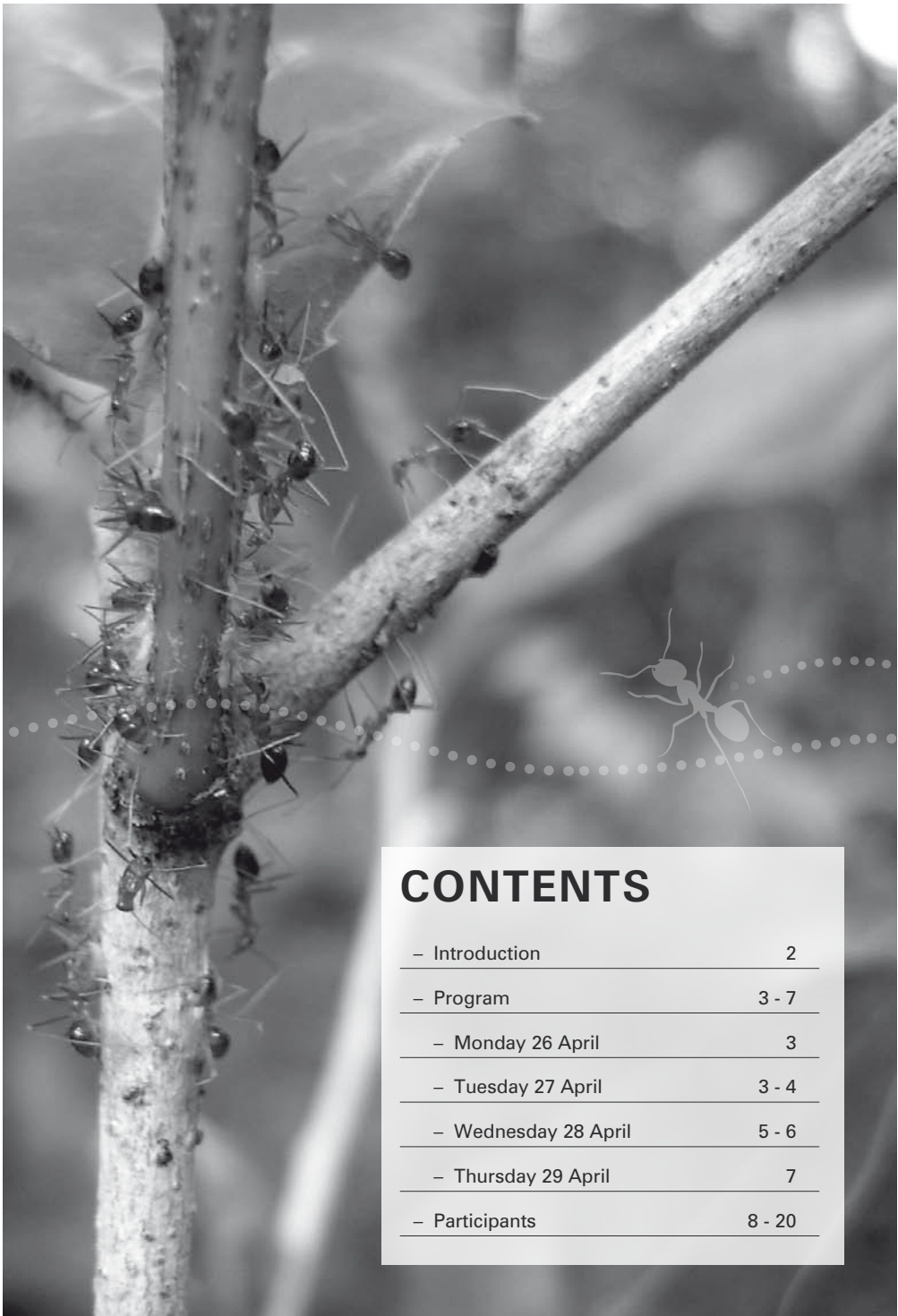
CSIRO Tropical Ecosystems Research Centre
Darwin, Northern Territory



SUMITOMO CHEMICAL



CSIRO



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INTRODUCTION

On behalf of the CSIRO Tropical Ecosystems Research Centre in Darwin I am delighted to welcome delegates to the International Invasive Ant Management Workshop.

The three day workshop from Tuesday April 27th to Thursday April 29th aims to facilitate networking among people from around the world involved in invasive ant management, as well as to improve the incorporation of research and ant biology into management. This event provides a perfect opportunity for researchers and managers to interact, share information and establish ongoing working relationships.

The workshop features 34 presentations by speakers from around the globe. A field trip on Thursday morning will give delegates the opportunity to view numerous invasive ant species established in northern Australia. The tour will include a visit to Howard Springs Nature Park, which has been the focus of years of invasive ant research. A tour of the world's most extensive collection of Australian ants at the CSIRO Darwin laboratory is also part of the program.

I hope you find the workshop enjoyable and highly stimulating, and gain knowledge that helps advance invasive ant management across the globe.

Ben Hoffmann
Workshop Organiser



PROGRAM

MONDAY 26 APRIL

5:30 pm **Informal reception**
Travelodge Mirambeena Resort, Darwin

TUESDAY 27 APRIL

8:45 - 8:50 am Welcome, housekeeping, overview of workshop objectives

8:50 - 9:10 am Why do we need this workshop?
BEN HOFFMANN

9:10 - 9:30 am Delegate introductions

9:30 - 10:00 am **KEYNOTE TALK**
Invasive ants in Hawaii and the Pacific: Biogeography, ecology,
and challenges in management and biosecurity
PAUL KRUSHELNYCKY

10:00 - 10:20 am Morning Tea

10:20 - 10:40 am Historic account of US experience
CHARLES BROWN

10:40 - 11:00 am New Zealand RIFA response
SHEREE CHRISTIAN

11:00 - 11:20 am Argentine ant management at Perth Zoo
MARC WIDMER

11:20 - 11:40 am Argentine ant eradication on Tiritiri Matangi Island,
New Zealand: A learning experience
CHRIS GREEN

11:40 - 12:00 pm Yellow crazy ant management on Christmas Island
CHRIS BOLAND

12:00 - 1:00 pm Lunch





TUESDAY 27 APRIL CONT.

1:00 - 1:20 pm	California RIFA program LES GREENBERG
1:20 - 1:40 pm	Argentine ant management on Santa Cruz island JOHN RANDALL
1:40 - 2:00 pm	Little fire ant management across the Pacific CAS VANDERWOUDE
2:00 - 2:20 pm	Argentine ant management in New Zealand DARREN WARD
2:20 - 2:40 pm	Persistent obstacles and lessons learned in ant management efforts in Hawaii PAUL KRUSHELNYCKY
2:40 - 3:00 pm	Afternoon tea
3:00 - 3:20 pm	Ant management in Tahiti MARYLINE SIMON
3:20 - 3:40 pm	Yellow crazy ant management in north-east Arnhem Land, NT BEN HOFFMANN
3:40 - 4:00 pm	Raspberry ant management ALEJANDRO CALIXTO
4:00 - 4:20 pm	Argentine ants and RIFA in Australia PETER DAVIS
5:00 - 8:00 pm	Drinks and dinner at the Darwin Sailing Club, Vesteys Beach, Darwin



WEDNESDAY 28 APRIL

8:45 - 8:50 am Housekeeping

8:50 - 9:20 am **KEYNOTE TALK**
International politics of shifting invasive ant risk offshore
SIMON O'CONNOR

9:20 - 9:40 am The value of ant interception records
ANDREW SUAREZ

9:40 - 10:00 am Quarantine on yachts entering New Zealand
HEATHER PEARSON

10:00 - 10:20 am Morning Tea

10:20 - 10:40 am Quarantine versus management
ANNE-MARIE CALCOTT

10:40 - 11:00 am AQIS strategies
MARY FINLAY-DONEY

11:00 - 11:20 am Demonstration of PIA key
ELI SARNAT

11:20 - 11:40 am Statistical based surveillance system
PETER WHITTLE

11:40 - 12:00 pm Predictive models and new surveillance and treatment methods
DANIEL SPRING

12:00 - 1:00 pm Lunch

1:00 - 1:20 pm Ant detection in New Zealand and initial response
OLWYN GREEN

1:20 - 1:50 pm **KEYNOTE TALK**
The ecology of ant invasions and implications for management
ANDREW SUAREZ





WEDNESDAY 28 APRIL CONT.

1:50 - 2:10 pm Incorporating ant biology into management
BEN HOFFMANN

2:00 - 2:20 pm The potential for self-sustaining biological control of fire ants and other invasive pest ants
SANFORD PORTER

2:20 - 2:40 pm Use of synthetic trail pheromones
HIRONORI SAKAMOTO

2:40 - 3:00 pm Afternoon tea

KEYNOTE TALK
3:00 - 3:20 pm The use and implications of genetics in border security and invasive ant management
PHIL LESTER

3:20 - 3:40 pm Yellow crazy ant genetics
SEIGO HIGASHI

3:40 - 4:00 pm Argentine ant genetics in Japan
MAKI INOUE

4:00 - 4:20 pm Farm experiences
GARRY WEBB

4:30 pm Transport to Travelodge Mirambeena Resort

6:30 - 9:00 pm **Workshop dinner**
The Jetty, Stokes Hill Wharf, Darwin



THURSDAY 29 APRIL

FIELD TRIP

8:30 - 9:30 am	Jack's Melon Farm, Vanderlin Drive, Berrimah
9:30 - 10:00 am	Ant biodiversity laboratory tour - CSIRO Darwin
10:00 - 10:20 am	Morning Tea
10:20 - 12:30 pm	Howard Springs Nature Park (includes lunch)
12:30 - 1:15 pm	Transport back to CSIRO

PRESENTATIONS

1:20 - 1:50 pm	Ant management in Queensland NEIL O'BRIEN
1:50 - 2:10 pm	Ant management in Queensland MARION LAWIE
2:00 - 2:20 pm	Bait and switch approach to RIFA ALEJANDRO CALIXTO
2:20 - 2:40 pm	RIFA detection & modelling PHIL LESTER
2:40 - 3:00 pm	Afternoon tea
3:00 - 3:20 pm	DuPont products PHIL RIDLEY
3:20 - 3:40 pm	Surveillance, Detection, and mitigation of <i>Lepisiota fraunfeldi</i> on Guam ROSS MILLER
3:40 - 4:00 pm	Ecological restoration following an eradication BEN HOFFMANN
4:20 - 4:40 pm	Transport to Vibe Hotel, Kitchener Drive, Darwin Waterfront





PARTICIPANTS

DR ALAN ANDERSEN

**CSIRO Sustainable Ecosystems, Tropical Ecosystems Research Centre,
PMB 44, Winnellie, NT 0822, Australia**

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Alan Andersen leads the Tropical savannas research group and is Officer-in-Charge of CSIRO's Tropical Ecosystems Research Centre in Darwin. Alan's research interests focus on three broad areas: ant community ecology; invertebrate bioindicators; and fire ecology and management.

MR CHRIS BOLAND

Christmas Island National Park, PO Box 867, Christmas Island, WA 6798, Australia

email: *christopher.boland@environment.gov.au*

Chris Boland manages a field team of 6-10 Christmas Island National Park staff to monitor and control the impacts of yellow crazy ant invasions on the island's biodiversity.

MR CHARLES BROWN

**United States Department of Agriculture, Animal and Plant Health Inspection Service,
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Charles Brown is the program manager for the USDA/APHIS Imported Fire Ant Quarantine.

MR SYLVERIO BULE

Department of Quarantine and Livestock Services, PMB 9095, Port-Vila, Vanuatu

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Sylverio Bule is currently working at the plant protection section with the department of Quarantine and Livestock Services in Vanuatu. For the last two years, he has been involved in the *Wasmannia auropunctata* eradication activities on Santo and Efate.



DR ALEJANDRO CALIXTO

**Texas A&M University, Department of Entomology, College Station,
Texas 77843-2150, USA**

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Alejandro Calixto works on the ecology and management of Red imported fire ants, Crazy ant and Argentine ants.

MS ANNE-MARIE CALLCOTT

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Anne-Marie Callcott's experience with invasive ants has been in applied methods development for detecting, regulating, and managing imported fire ants. Her work has supported the U.S. Federal IFA Quarantine by developing treatments for use in federally regulated items, such as nursery stock, and in managing distribution of biological control agents.

MS SHEREE CHRISTIAN

MAF Biosecurity New Zealand, PO Box 2526, Wellington 6011, New Zealand

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Sheree Christian has been working at MAF Biosecurity New Zealand for 4½ years, with the last 3 years as an Adviser in the Environmental and Marine Response Team, Post Border Directorate. Her primary responsibility is to manage environmental pest incursions of exotic ants, weeds and reptiles.

MR PETER DAVIS

**Department of Agriculture And Food WA, Locked Bag No.4 Bentley Delivery Centre,
Bentley, WA 6983, Australia**

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Peter Davis heads a biosecurity project aimed at the detection of exotic plant pests and emergency responses to incursions. He has a particular interest in developing and assessing baits for pest social insects including Argentine ants, Fire ants, Big-headed ants and European wasps. He is currently Chair of the Tramp Ant Scientific Advisory Panel.





DR JEROEN DEN HOLLANDER

Chevron Australia Pty Ltd, 250 St Georges Terrace, Perth, WA 6000, Australia

email: *jjye@chevron.com*

Jeroen Den Hollander is responsible for implementation of surveillance for non-indigenous species of vertebrates, invertebrates or plants which may be introduced to Barrow Island through Gorgon Project activities. He is responsible for development of the incursion response plan and action plans to control or eradicate any non-indigenous species which may establish on the Island.

MS MARY FINLAY-DONEY

Australian Quarantine and Inspection Service, PO Box 37846, Winnellie, NT 0821, Australia

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Mary Finlay-Doney is a quarantine entomologist working with Australian Quarantine in the Northern Territory. Prior to this, Mary was working in phytosanitary capacity building projects in south-east Asia. She studied at the University of Queensland and has research background in ecological theory and biological control.

DR CHRIS GREEN

Department of Conservation, Auckland Conservancy, Private Bag 68-908, Auckland, 1145, New Zealand

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Chris Green undertakes research and provides technical advice on a wide range of entomological issues/programmes for invertebrate conservation, including island restoration. He has led a 10 year programme to eradicate Argentine ants from a 14 hectare area on Tiritiri Matangi Island. This research management programme is very close to completion.

MS OLWYN GREEN

MAF, PO Box 2095, Auckland 1140, New Zealand

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Olwyn Green provides laboratory maintenance, diagnostic processing, routine diagnoses, field investigations, data management and, as necessary, the initial control and/or eradication of exotic pests affecting plants and/or the terrestrial environment. Olwyn is also responsible for curation of the insect reference collection, and for coordinating several surveillance programmes run by MAF.



DR LES GREENBERG

University of California, Riverside, 1542 Bellevue Road, Redlands 92373, USA

email: *les.greenberg@ucr.edu*

Les Greenberg works on the behaviour and control of Argentine ants and fire ants. He has been involved with the fire ant eradication program in California and is part of a new project to eradicate Argentine ants from Santa Cruz Island, California.

PROF SEIGO HIGASHI

Hokkaido University, Graduate School of Environmental Science A504, N10W5, Kita-ku, Sapporo City 060-0810, Japan

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Seigo Higashi has studied a supercolony of *Formica yessensis*, dominance hierarchy of some ponerine ants, ant-plant interactions, phylogeography of weaver ants, robber-like pollinators of bumblebees as well as other research since 1973. Currently, his focus is the applied aspects of invasive alien ant species such as yellow crazy ants, Argentine ants, RIFA etc. to prevent their invasion and/or expansion in Japan.

DR BEN HOFFMANN

CSIRO Sustainable Ecosystems, Tropical Ecosystems Research Centre, PMB 44, Winnellie, NT 0822, Australia

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Ben Hoffmann is a senior research scientist specialising in ants. He has researched invasive ant biology, ecology and management for over a decade. Ben coordinates multiple ant management programs throughout northern Australia, and is a member of advisory panels for all of Australia's large ant management programs.

DR YING HUANG

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Ying Huang has conducted a risk analysis of invasive ant into China from interception data collected from high risk cargo and containers from the past five years. The possible pathways of long distance spread of invasive fire ant were analysed, and quarantine measures in order to reduce the risk were determined.





DR MAKI INOUE

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Maki Inoue is a post-doc of the Invasive Alien Species Research Team at the National Institute for Environmental Studies. Her work has focused on the mechanism of supercolony formation of Argentine ants in Japan.

MS NAMI KITAMURA

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Nami Kitamura is a Master's student of Hokkaido University supervised by Prof. Seigo Higashi. Nami's research focuses on using DNA barcodes of *Solenopsis* species to identify the ants and prevent their invasion into international seaports and airports in Japan.

DR PAUL KRUSHELNYCKY

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Paul Krushelnycky is currently a research associate at the University of Hawaii, where he is focusing on invasive ant ecology and control, as well as other biological invasion and conservation topics.

MS MARION LAWIE

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Marion Lawie is the manager of Community Engagement for the Biosecurity Queensland Control Centre. Her role involves the delivery of national and agreed state eradication programs, including three invasive ant species.



MR ERIC LOÈVE

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Eric Loève is the Director of Fenua Animalia (major association for Animal Protection in Polynesia) which has been fighting the invasion of the Little fire ant since its official discovery on Tahiti in 2004. Fenua Animalia pushed both the Agriculture and Environment Departments to implement treatment campaigns. He is the author of the 2004-2009 Little fire ant distribution maps in Polynesia.

DR PHIL LESTER

**Victoria University of Wellington, School of Biological Sciences, PO Box 600,
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Phil Lester works on Invasive ants, community ecology, competition, and population genetics.

MR JOSEPH MANAUTÉ

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Joseph Manauté is the head manager of the Parc provincial de la Rivière Bleue (South Province government National Park) in charge of the administrative and financial management of the park, and responsible for the development of the park's *Wasmannia auropunctata* management plan.

DR ROSS MILLER

University of Guam, CNAS-WPTRC, University of Guam, Mangilao 96923, Guam

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Ross Miller, Professor of Entomology at the University of Guam, works on island biodiversity, invasive species, and host plant resistance. Much of Dr Miller's ant-related research deals with the impact of tramp ants in small island ecosystems, and with the effects of ant attendance on classical biological control.





DR TAKAHIRO MURAKAMI

**Hokkaido University of Education, 1-2 Hachimancho, Hakodate,
Hokkaido 0408567, Japan**

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Takahiro Murakami's interests lie in conservation ecology of invasive and agricultural pest ant species. His research group focuses on the control of sex determination system in invasive ant species. The goal of his research is to produce sex reversal or behaviourally modified individuals to control reproduction of fire ants and other invasive ant species.

MR JANA NAIR

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Jana Nair is a Monitoring Surveyor responsible for planning and conducting biosecurity slippage surveys at risk pathways. She presents results of surveys to Biosecurity New Zealand with recommendations for changes/improvements pertaining to that pathway.

MR NEIL O'BRIEN

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Neil O'Brien is the Director of the Biosecurity Queensland Control Centre, Biosecurity Queensland.

MR SIMON O'CONNOR

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Simon O'Connor has worked for the Ministry of Agriculture and Forestry, Biosecurity New Zealand, for seven years, initially in the invasive ant response and surveillance role, and more recently in a policy setting role. Prior to this he coordinated a 30 hectare *Pheidole megagephala* eradication in Kakadu National Park in the Northern Territory.



MRS HEATHER PEARSON

Ministry of Agriculture and Forestry, PO Box 2095, Auckland 1140, New Zealand

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Heather Pearson is an Incursion Investigator, responsible for initial investigations related to suspected exotic pests and diseases, and initiating control and/or containment actions while the suspect organism is identified. Incursion Investigators are also responsible for providing advice and managing, operational response objectives during exotic pest and disease responses.

MR RICHARD PIPER

Scientific Advisory Services, PO Box 1056, Tully, Queensland, 4854 Australia

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Richard Piper is a private consultant entomologist engaged in assisting primary producers, industry organizations and government agencies with independent advice on pest problems. His business activities include preparation of written guides and posters on quarantine threats including tramp ants.

DR SANFORD PORTER

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Sanford Porter studies the biology, ecology and biological control of the Red imported fire ant *Solenopsis invicta* for the U.S. Department of Agriculture's Agricultural Research Service.

MRS SHIREEN PRASAD

Secretariat of the Pacific Community, Private Mail Bag, Suva City +679, Fiji Islands

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Shireen Prasad is a science graduate from the University of the South Pacific and joined SPC in December 2005. She has a Postgraduate Diploma in Biotechnology. She is working on the ACIAR-funded project on *IPM in a Sustainable Production System for Brassica crops in Fiji and Samoa* and on the NZ-ODA funded project in collaboration with AgResearch of New Zealand, *Capacity building for Improved Management of Crop Pests in the South Pacific*. Shireen assists PICTs on biological control of pests and weeds, IPM and other methods of insect pest management. Her special interests are in gene mapping and DNA finger printing.





DR JOHN RANDALL

The Nature Conservancy, 402 West Broadway, Suite 1350, San Diego, California 92101, USA

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John Randall is the Nature Conservancy's Associate Science Director for California's South Coast & Deserts and leads a team of 5 scientists to identify priorities, develop strategies and assess effects of conservation efforts in southern California and northern Baja California. He is coordinating a collaborative project to eliminate Argentine ants from Santa Cruz Island.

DR PHIL RIDLEY

DuPont, Locked Bag 2067, North Ryde BC, NSW 1670, Australia

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Phil Ridley is the Asia Pacific Business Manager for DuPont Professional Products (Pest Control and Turf Products). He has over 20 years of pest control experience in academic, R&D and Marketing/Business roles. His PhD Thesis was on the foraging behaviour of leaf-cutting ants.

DR HIRONORI SAKAMOTO

Hokkaido University, Graduate School of Environmental Science A507, 10W5, Kita-ku, Sapporo City 060-0810, Hokkaido, Japan

email: *hirowol@ees.hokudai.ac.jp*

Hironori Sakamoto's research team are working on establishing a novel strategy of controlling Argentine ant (*Linepithema humile*) using synthetic trail pheromone Z9-16:Ald. Recently, his team achieved the pronounced reduction of Argentine ant abundance in Yokohama Port (eastern part of Japan) by a combination of synthetic trail pheromone and toxic baits.



DR ELI SARNAT

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Eli Sarnat is an ant taxonomist by training. His focus has been to create well-illustrated, user-friendly identification guides to invasive ant species. His first project was PIAkey, a guide to invasive ants of the Pacific Islands, and he is currently working on a similar guide to invasive ants of North America.

MS MARYLINE SIMON

Direction de L'Environnement de le Polyenie Francaise, PO Box 4562, Papeete, Tahiti 98713, French Polynesia

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Maryline Simon is responsible for *Wasmannia auropunctata* management in the Polynesian environmental service. She has been managing the organisation and coordination of control activities, including whole territory infested zones demarcation, infested zones treatment, treated zones controls and monitoring.

DR DANIEL SPRING

Australian Centre for Biodiversity, School of Biological Sciences, PO Box 18, Monash University, Victoria 3800 Australia

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Daniel Spring's research has focused on developing spatially explicit models to estimate eradication feasibility and compare alternative surveillance and treatment strategies. He is currently leading a research project on invasion spread modelling to assist Biosecurity Queensland Control Centre in their efforts to eradicate fire ants in and around Brisbane.

DR ANDREW SUAREZ

University of Illinois, 505 S. Goodwin Ave, Urbana, IL 61801, USA

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Andrew Suarez is an associate professor in the Department of Entomology at the University of Illinois. His interests lie in ant ecology, behaviour and evolution, particularly of invasive species.





MR DAVID TENAKAI

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David Tenakai is an entomologist with the National Agriculture Quarantine Inspection Authority of Papua New Guinea. His Masters degree from the University of Queensland focused on fruit fly studies. His work in PNG covers arthropod pest surveillance in borders and agricultural systems of PNG, pathway risk analysis of quarantine pests, post entry quarantine activities and containment, including for little fire ant eradication in PNG.

DR ALAN TYE

Secretariat of the Pacific Regional Environment Programme, PO Box 240, Apia, Samoa

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Alan Tye is the manager of the invasive species programme of SPREP, which serves its 21 Pacific Island member countries and territories.

DR CAS VANDERWOUDE

Hawaii department of Agriculture, 16 E. Lanikaula Street, Hilo, Hawaii 96720, USA

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Cas Vanderwoude is based in Hawaii and works as the State Ant Specialist through the University of Hawaii. He has worked in a number of locations throughout the Pacific region on invasive ants, biosecurity and training projects. In recent years, he has worked predominantly on control and eradication of *Wasmannia auropunctata*.

MR NACANIELI WAQA

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Nacanieli Waga joined SPC's Fruit Fly Project in 2002. In 2005, he moved and joined the SPC Biosecurity Unit, and has been very instrumental in the surveillance of ants to confirm/monitor species distribution in the Pacific including conducting trainings to NPPO's to augment their invasive ants 'early-detection-surveillance', identification, emergency response and management capacities.



MISS BELINDA WALTERS

CSIRO Sustainable Ecosystems, 25/10 Penina Cct, Cornubia, QLD 4130, Australia

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Belinda Walters is a technical officer with CSIRO Sustainable Ecosystems working in agricultural regions with a focus on landscape-scale impacts on biodiversity and ecological function. Ants are used in several research projects as indicators of environmental change.

DR DARREN WARD

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Darren Ward is an invertebrate ecologist and the curator of Hymenoptera (New Zealand Arthropod Collection).

MR GARRY WEBB

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Garry Webb is the General Manager of the Environmental Health Division of Sumitomo Chemical Australia. Garry has had over a decade of experience developing new baits for the Australasian region for a wide range of pest ant species. Much of Garry's experimental work has been embedded within many of Australia's large ant eradication programs.

DR PETER WHITTLE

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Peter Whittle trained as a plant pathologist and is now a biosecurity scientist of broad experience in research, policy, operations and regulation. Since 2007 he has been working in a team at the Queensland University of Technology to develop surveillance systems for non-indigenous species on Barrow Island for the Gorgon project.





MR MARC WIDMER

**WA Department of Agriculture and Food, 3 Baron-Hay Court, South Perth, WA 6101
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Marc Widmer has worked on social insects (ants, wasps, bees, and termites) for 25 years and specialises in ants. A large part of his job is in biosecurity where he is involved in programs such as European wasp eradication and surveillance, and eradication of serious pest insects such as exotic termites, wood borers and various tramp ants species.

MS YAN XU

**USDA APHIS IS Beijing office, No. 55, An Jia Lou Lu, Chaovang District, Beijing
100600, China**

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Yan Xu has a PhD in entomological ecology, focussing on pest risk analysis assisted by GIS. She established the first China Biological Invasive Website, which is an excellent resource for the Chinese fire ant control and management program.





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