

# ***ALIENS***

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## **Little Fire Ant in Tahiti and Miconia in New Caledonia: French connection to tackle “new” invasions in South Pacific Islands**

A collaboration between French Polynesia and New Caledonia, two French overseas territories in the Pacific Ocean, has started in 2005 on the management of two highly invasive species: the tree *Miconia calvescens* (Melastomataceae), considered one of the most aggressive plant invaders in tropical islands; and the little fire ant, *Wasmannia auropunctata*, one of the most noxious ant species in tropical countries and islands, “newly” found in New Caledonia and Tahiti, respectively. Both species are native to Central and South America and belong to the 100 world’s worst invasive alien species according to IUCN.

When *W. auropunctata*, also called “fourmi électrique” in New Caledonia where it has been an agricultural and environmental nuisance since the 1960’s (Jourdan *et al.* 2002), was identified by Rudolph Putoa, entomologist of the Department of Agriculture of French Polynesia, in October 2004, the ant had already invaded about 70 ha in a housing development of Mahina district and in the neighbouring gulches (located in the northern part of Tahiti). According to the inhabitants interviewed in February 2005 during the field-survey of the second author (invited by the Government of French Polynesia), they remember having noticed (and being painfully stung) by this tiny orange slow-moving ant as early as 1995, i.e. ten years before its “discovery”. But none of them informed authorities because of a lack of an identified early warning overseeing structure. The introduction may have taken place earlier, in the early 1990’s or even in the 1980’s. Tahitian ant specimens examined in the insect collection of the Bishop Museum in Honolulu in 2004 by Paul Krushelnycky of the University of California at Berkeley and labelled as *Tetramorium simillimum* were identified by him as *Wasmannia auropunctata*! These previously misidentified ants were collected in 1977 in the district of Punaauia (western part of Tahiti). Thus, the noxious ant may have remained unnoticed for 20-30 years in Tahiti. Preliminary field-surveys we have conducted in February 2005, based on phone calls and meetings with local informants, revealed that the ant is also present in the neighbouring district of Papenoo (7 km distant from Mahina). The most probable original source of contamination may be New Caledonia as there are good shipping and airline connections between these two French overseas territories, even if Wallis and Futuna would also be a potential sources of propagules (in the context of an ancient Tahiti contamination hypothesis). This issue will be resolved through genetic markers use into Tahitian populations. The pathway of entrance remains unknown: the ant colony (queens and workers) was probably introduced with potted ornamental plants.

The small tree *Miconia calvescens* was introduced in the 1970’s by Lucien Lavoix, a former active horticulturist, in his 800 ha private property and botanical garden located in the heights of Nouméa between 250-550m elevation below

Continued Page 4

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# CONTENTS

Tahiti and New Caledonia	1
General Disclaimer	2
Notes	2
From the Database Manager	3
Publications	3,4
Alien Invasive Plant (Nepal)	5
Update on Herbivore Eradication (Galapagos)	8
Horticultural Code in Scotland	9
Exotic Lizards in Florida	10
Notes	11
Publications	11
IAS at 5th World Parks Congress	12
Lessons from Pacific Plant Surveys	14
IAS Websites in South America	16
Notes	17
IAS Threats at Landscape Level	18
Gaps and Inconsistencies	19
Gaps and Priorities (Marine)	20
Notes	20
Scientific Challenges IAS Plants	21
Publications	23
Centre of Excellence	24
Notes	25
Publications	26
Subscriptions	27
General Information	28



## GENERAL DISCLAIMER

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## Launch of the Centre for Biodiversity and Biosecurity (CBB), Auckland (New Zealand) August, 2005

The Centre for Biodiversity and Biosecurity was officially launched by the Auckland Conservator for the Department of Conservation, Sean Goddard on 22 August, 2005. The Centre (CBB) is a joint initiative of The University of Auckland and Landcare Research, based at the University's Tamaki Campus. It brings together the complementary expertise of both organisations in biosecurity, biodiversity and conservation, and is a focus for research aimed at maintaining biosecurity and understanding and conserving the biodiversity of New Zealand and the wider South Pacific region. The ISSG team, based at the University of Auckland, is part of this new centre, providing additional strengths through the wide ISSG/IUCN networks. Director of the CBB is Professor Mick Clout (University of Auckland and Chair of ISSG) and Chair of the CBB Board is Dr Dave Choquenot (Landcare Research).

## From ISSG's Database Manager: A brief update on the current status of the Global Invasive Species Database

The Global Invasive Species Database (GISD) is a free, online searchable source of information about species that negatively impact biodiversity. The GISD aims to increase public awareness about invasive species and to facilitate effective prevention and management activities by disseminating specialist's knowledge and experience to a broad global audience (<http://www.issg.org/database>).

The international profile of the GISD is growing rapidly. The GISD was cited in a Wall Street Journal article on carp fishing on February 15 and was also mentioned in the March 2005 edition of National Geographic magazine (see the feature article or visit:

<http://magma.nationalgeographic.com/ngm/0503/feature5/index.html>). Maj De Poorter, the Invasive Species Specialist Group (ISSG) coordinator, was interviewed on CNN in February 2005 about the GISD and the CNN Website now includes a link to the "100 of the world's worst alien invasive species" booklet (<http://www.issg.org/booklet.pdf>).

With more than 350 invasive species profiles completed, the database currently receives an average of 50,000 hits per day (700 unique visitors per day). With such a lot of interest being shown in the GISD, we would like to move as quickly as possible from the 300+ profiles currently available to a medium-term target of 3000. Current funding levels allow us to create only 100 new profiles per year. We need to increase that rate substantially in order to meet our audiences' expectations.

Other recent GISD developments include deep links to the Red List and RAMSAR databases where invasive species are identified as threats, and support for initiatives on weeds of Mediterranean-type ecosystems and invasive species in French overseas territories. ISSG contributions to development of the GISIN include development of an exchange standard for sharing IAS information (see the draft Invasive Species Profile Schema at <https://www.biodiv.org/doc/restricted/gisin/default.aspx> (Login: ias Password: ias2)). We have also shared our extensive experience in locating and evaluating IAS information from many diverse sources for use by a broad international audience. We have renewed our longstanding agreement with the US Geological Survey's National Biological Information Infrastructure to review and upload invasive species profiles they create (<http://invasivespecies.nbi.gov>), and the GISD has been included in the New Zealand/USA bilateral climate change programme. We take these developments as strong evidence that the work we are doing with the GISD is highly valued. None of this would be possible without the wonderful support of ISSG members and other invasive species experts around the world who create or review content for the Global Invasive Species Database – they are the real intelligence of the GISD.

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## PUBLICATIONS

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### Special issue of the Journal of Risk Analysis

Some of the titles included in this issue:

- Risk Assessment for Invasive Species
- Assessing the Risk of Invasive Spread in Fragmented Landscapes
- Projecting Rates of Spread for Invasive Species
- Establishment Risks for Invasive Species
- What Can Decision Analysis Do for Invasive Species Management?
- Risk Analysis for Invasive Species: General Framework and Research Needs

Abstracts are available at

<http://www.blackwell-synergy.com/links/toc/risk/24/4>

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## PUBLICATIONS

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### Protected Areas and IAS: US Park Science Magazine issue on Invasives

The Volume 22 (2) edition of the Park Science journal (published by the National Park Service, U.S. Department of the Interior) featured invasive species extensively.

To view the issue you can go to <http://www2.nature.nps.gov/parksci/>. Click on "Past Issues" (top left) and you will be able to view the complete Volume 22, (2) 2004.

It has many interesting articles on invasives issues in National Parks and also on marine invasives; the role of fire and invasives; forest invasives; management partnerships to counter invasives and many more.



### Invasive Aquatic Plants book (South Africa)

The Agricultural Research Council plant Protection Research Institute announces the publication of a new book, “*Invasive Aquatic Plants*”, by Lesley Henderson and Carina J. Cilliers.

It is a guide for the identification of 21 species of invasive aquatic and wetland plants in South Africa. It features biological control of the five worst aquatic weeds: water hyacinth, red water fern, salvinia, water lettuce and parrot’s feather. The book is printed in A5 format and is illustrated, with 100 colour photos, 22 line drawings and 24 distribution maps. The pages are colour coded for easy identification, dividing the aquatic species according to their growth forms.

This publication has been sponsored by the Water Research Commission and the Working for Water Programme of the Department of Water Affairs and Forestry. It can be ordered from the Agricultural Research Council webpage:

<http://www.arc-aii.agric.za/v-arcroot/institutes/ppri/main/publications/books/aquatic.htm>

Further information:

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Source: Publishers

the Mount Malaoui. The origin was most likely Tahiti where *Miconia* was introduced in 1937 in a botanical garden and where it covers now two-thirds of the island, more than 70 000 ha, and threatens the native flora (Meyer & Florence, 1996). Ten years ago, Lucien’s son Raymond Lavoix who now owns the garden believed that there were only a few reproductive trees and a hundred of plants (pers. comm. to the first author in 1994). During a field-survey in March 2005 of the first author (invited by the Government of New Caledonia) to assess the *Miconia* situation, we found dense stands of reproductive trees (up to 30 trees/100 m<sup>2</sup>) in a 2 ha invaded core area, carpets of seedlings and isolated trees mainly in treefall gaps, forest edges and wet gulches of a nearly pristine lowland tropical rainforest. By the end of 2004, more than 3,000 plants (including 1,000 trees) were destroyed (by individual herbicide treatment) by Rémy Amice and Jean Qapitro of the Plant Protection Branch (SIVAP) of the Government of New Caledonia within a 120 ha area.

These two cases illustrate (1) the increasing inter-island transport of species (the so-called “globalization



phenomenon”) in the Pacific Ocean during recent decades; (2) the lack of strong and coordinated border control to detect and stop the introduction of invasive alien species in both French overseas territories; (3) the existence of a lag phase period between the date of introduction and the first reports of invasion that characterize most invasion events. Invasive alien species can remain unnoticed for decades before their expansion is noticed; (4) finally, they illustrate the

inherent difficulty of tackling emerging/potential/nascent invasive species without a good knowledge of their identity, and without a good prevention/early warning system. To prevent repetition of such cases, public information/education and involvement of local people seems crucial for reporting of new pests and for avoiding the illegal introduction of potentially noxious species. Also needed is effective legislation to dissuade the – culturally undisciplined!- French Pacific islanders from bringing home exotic species.

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## Alien Invasive Plant (*Eupatorium* species – *Banmara*, *Banmasa*) in Nepal

### Introduction

Nepal has a long history of introduction of non-native species, especially species proven productive elsewhere and offering potential economic benefits. *Tamarindus indica* (*imali*), originally from Africa, was believed as the first introduced and cultivated alien species in 126 B.C. – 220 A.D. in Turkey (Yan *et al.* 2001) and it gradually dispersed towards China through the ‘Silk Road’ during that time and now it has naturalised in Nepal. British mostly contributed to the introduction of some economically important plants from almost all the continents in the 19<sup>th</sup> century (Islam 1991). At the same time, there was hope that alien tree species *Tectona grandis* (*teak*), *Albizia* spp. (*siris*), etc. were introduced for their timber potential or for watershed protection in Nepal. Some of the very common fruit trees like *Litchi chinensis* (*litchi*), *Annas sativus* (*pineapple*), *Cocos nucifera* (*coconut*) etc. were also introduced as were most of the pulses and oil yielding plants (Das 1982). Similarly, vegetables like *Cucurbita* spp. (*cucurbits*), *Raphnus sativus* (*radish*), *Solanum tuberosum* (*potato*), *Daucus carota* (*carrot*), etc. came from other countries and have been naturalised. *Eupatorium odoratum* (*banmara*), *E. adenophorum* (*banmasa*), *Lantana camara* (*banphada*), *Eichhornia crassipes* (*jalkumbhi*) etc. were first introduced as ornamental plants and they are now well established and aggressively colonised, which are noxious weeds of forests, wetlands and wastelands.

In the 20<sup>th</sup> century, the country’s economic development including growth in trade and transportation systems made the pathways for the introduction and colonisation of alien species. This trend continued to be the same and some species like *Leucaena leucocephala* (*ipil*), *Eucalyptus camaldulensis* (*masala*), *Acacia auriculoformis* (*watal*), *Cassia occidentalis* (*chakor*), *C. siamea*, *Samania saman* etc. were getting preferences in the plantation. Hillsides and even Terai region were sown with the woody legume species *L. leucocephala* to cover soils laid bare by intensive deforestation. Afforestation with alien trees was initially driven by the belief that such plantings were beneficial to the environment, and trees were often planted to repair damaged ecosystems (Kunwar 2003). However, in recent decades, realisation has grown of the significant impacts of these alien species.

Considering the conservation of Earth’s biodiversity, the Convention on Biological Diversity (CBD), to which Nepal and 177 other countries are party, calls governments to prevent the introduction, control or eradication of those alien species that threaten ecosystems, habitats or species (Article 8h). However, approaches taken to combat this biological process and even the biological information are clearly inadequate to deal with the onslaughts of alien invasive species in Nepal. Accurate predictions of community susceptibility to invasion remain elusive yet.

S N	Sample districts	No. of quadrats laid	Frequency (%)	Density Pl/m <sup>2</sup>
<b>Eastern Nepal</b>				
1.	Sunsari (Tarhara and Baraha region)	34	60.25	3.97
2.	Sankhuwasabha (Lower Arun valley)	172	40.67	2.46
<b>Central Nepal</b>			<b>50.46</b>	<b>3.21</b>
3.	Nuwakot (Bidur)	36	77.77	9.77
4.	Chitwan (Ramnagar, Pipara and Shaktikhor)	40	72.5	7.57
5.	Dolakha (Charikot and Mudhe)	36	75	6.58
6.	Rasuwa (Dhunche)	36	77.77	6
7.	Bara (Pathlaiya)	52	4.68	0.73
<b>Western Nepal</b>			<b>61.54</b>	<b>6.13</b>
8.	Kaski (Hemja and Lahachok)	60	83.83	9.93
9.	Palpa (Dovan and Tansen )	40	70	8.67
10.	Kapilbastu (Taulihawa, Pipara and Rajpur)	40	67.5	4.10
11.	Dang (Lamahi, Lalmatiya)	40	52.5	2.7
12.	Banke (Kusum, Samsargunj)	48	0	0.0
13.	Bardia (Mulghat, Hattikhal)	48	0	0.0
14.	Kailali (Geta, Godawari, Dhangadi)	48	0	0.0
			<b>39.11</b>	<b>3.62</b>

**Table 1. Sample districts along with the dynamics of *Eupatorium* species**

In this context, no story of the ecosystems of Nepal will be complete or comprehensive without taking a note of well-established alien forest weeds *Eupatorium odoratum* and *E. adenophorum* (Forest killer – *banmara* or *banmasa*). Therefore, this is an attempt to analyse the impacts of these two *Eupatorium* species in Nepal.

A total of 14 sample districts (Sankhuwasabha, Sunsari, Nuwakot, Rasuwa, Dolakha, Bara, Chitwan, Kaski, Kapilbastu, Palpa, Dang, Banke, Bardia and Kailali) were randomly selected and the dynamics of *Eupatorium* species assessed by quadrat methods. Altogether 730 quadrats (each measuring 1m x 1m) were laid in community and government managed forests, common property lands, roadsides and riverine lands. Elevation range of the study sites varies from 150m to 2760 m above sea level.

### Results and Discussion

The genus *Eupatorium* is represented by five species in Nepal (Hara *et al.* 1982) viz. *E. adenophorum*, *E. cannabinum*, *E. capillifolium*, *E. chinense* and *E. odoratum* out of which two namely *E. adenophorum* and *E. odoratum* are highly undesirable (Singh 1979). *Eupatorium* species have a remarkable range of altitudinal distribution (800 m to 2,000 m) in Nepal (Sharma and K.C. 1977), which overlaps with human settlements. *E. odoratum* and *E. adenophorum* are now aggressively colonising on abandoned slopes in tropical and subtropical zones as well as in lower temperate zone.. They have now been reported from various parts of Nepal from 150 m to 2,500 m, on uninhabited slopes after slash and burn cultivation, fallow lands and disturbed forests.

*E. adenophorum* was introduced in India after 1498 (Biswas 1934) and it is likely that it became introduced into Nepal from India through the eastern border (Banerji 1958) probably before 1950. It is now common in the eastern and central parts of Nepal and gradually spreads towards western Nepal. Particularly, central Nepal has been highly invaded. Introduction from the eastern border of Nepal has been facilitated because eastern Nepal, an advanced region in terms of economy and agriculture, contributed to such rapid and massive spread of *Eupatorium* species through the import of biological inputs, fertilisers, seeds and saplings, agricultural implements and practices, etc. The once slow, erratic, and small-scale transfer has shifted to a rapid and large-scale translocation due to the species' aggressively colonising nature. It occurred in transitional zones with adequate moisture and enhanced by disturbance,. This could be easily seen in disturbed forest site and forest fringe areas. Roads or trails, which usually occur in transition areas, are

often characterised as conduits for the transport/spread or dispersal of alien plants (Kotanen *et al.* 1998).

*Eupatorium* is an enormous problem in transitional zones and swamp forests which are being invaded by dense monoculture stands, with little understorey except for *Eupatorium* seedlings. The frequency, intensity, magnitude, spatial patterns, or scale of disturbances will likely lead to faster replacement of native species by exotic species (Yan *et al.* 2001). The alien invasive species (*Ageratum conyzoides*, *Eupatorium* species, *Imperata cylindrica* etc.) grow luxuriantly in sunny exposed wasteland (Kunwar *et al.* 2001) because they propagate through wind dispersal method and sprout heavily through vegetative means. The invasive effects of these species become compounded because of their growth mode and the reproductive strategy. Moreover, the cattle pressure - with severe grazing and trampling has allowed the sprouting of noxious *Eupatorium* species. Massive invasion and spread has also been facilitated by their allelopathic nature (Chettri 1986).



Photo: Ripu M. Kunwar

The biotic resistance hypothesis (BRH) argues that diverse communities are highly competitive and readily resist invasion because the interactions with native species, including natural enemies, limit invaders' impacts (Darwin 1859). Interior parts of the forest that are less diverse are more vulnerable to ecological invasion (Vitousek *et al.* 1996). The distribution and composition of biodiversity and local forest resources were affected directly by the *Eupatorium* species. They affected the availability of forest resources, such as timber and non-timber forest products to people who live in forests, and who entirely rely upon local resources found in them. This caused a change in the local people's utilisation/harvesting patterns and livelihood strategies.

Neither cattle nor goats eat *Eupatorium* species and areas traditionally used for grazing can therefore no longer be

used. Thus grazing on many of these areas has become impossible and villagers have to walk further in search for grazing areas. This increased distance has meant a big burden in the time the local villagers have to use to reach adequate grazing grounds for their livestock nourishing. Another economic impact on the local farmers is the heavy financial cost of controlling the weeds. Though the *Eupatorium* species have pesticidal properties (Chettri 1986), their uses have been practiced in few areas of Nepal and none of the uses have been commercialised.

*Eupatorium* species are able to dominate the understory, to strangle saplings and to suppress native species. They support fire outbreaks, alter water and nutrient availability, tourism and recreational use of resources and heritages. The reduced stream flow obviously has unfavourable impacts on aquatic biota. Most impacts are detrimental to the invaded systems and threaten sustained functioning and the provision of important ecosystem services. Similarly, fresh landslides or areas with deep gully cutting and open grasslands are also encroached by invasive species. *Eupatorium* is a widespread and most troublesome weed that reduces the production of standing crops (Banerji 1958), inhibits growth and may even kill native species.

*Eupatorium* species are also boon in disguise because they reduce soil erosion of simple nature. They have been used as green manure during the spring, when the plant is heavily laden with leaves. In some part of the country, they have been treated as cattle bedding material. Local people apply the fresh juice of *Eupatorium* leaves to stop bleeding from cuts and wounds (Chaudhary *et al.* 2001). Dried *Eupatorium* may be burnt to yield potash rich fertiliser. They possess some medicinal values – leaves when boiled and taken, cure severe stomach ache, and the apical leaves when made into paste and slaked with lime and applied on the cuts, stops bleeding.

Biological control of *Eupatorium* species using *Procecidochares utilis* gallfly has been carried out throughout the world including Nepal. It was successful in Hawaii, USA and elsewhere (Bess and Haramota 1971), however, the control from gallfly has not yet been successful in Nepal.

“Best management practices” should include removal of known invasive species, and their use should be discouraged. It is now widely accepted that the control of alien invasive species is not a short-term or once – off effort. It requires detailed surveillance and ongoing monitoring, investigation and research into the most suitable long-term control options and the maintenance of a control strategy once put in place. Much effort is devoted to controlling them after they are established, but a better understanding of why species become invasive offers the possibility of taking pre-emptive measures (Clay 2003).

### Conclusion

*Eupatorium* species have gradually moved west due to the rapidly invasive and aggressively colonising nature. They are unpalatable and aggressively distributed and make

it difficult for the native species to thrive. Better understanding of why species become invasive, removal of invasive species and discouragement of their uses offer the best options for controlling measures.

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## PROJECT ISABELA: UPDATE ON INTRODUCED HERBIVORE ERADICATIONS IN THE GALÁPAGOS ISLANDS

Large-scale conservation efforts are underway on the Galápagos archipelago. Conceived in 1997 and funded in November 2001 by GEF/UNDP (along with additional funding from the Galápagos National Park, Charles Darwin Foundation, Charles Darwin Friends of Galápagos Organizations, and others), Project Isabela includes the largest insular goat eradication campaign to date. To date, two removals have been completed; two others are in progress. After being twice wrongly declared eradicated, revised ground-hunting techniques and an intensive monitoring program has removed goats from Pinta Island (5,941 ha, Campbell *et al.* 2004). On Santiago Island (57,941 ha), introduced pigs were removed by combining a systematic poisoning campaign and a sustained ground-hunting effort (Cruz *et al.* 2005). Learning from these two eradications, Project Isabela is now tackling larger and more complex eradication campaigns in the archipelago.

Goats are currently being removed from Santiago Island and the northern section of Isabela Island (213,096 ha). Donkeys are concurrently being removed from both islands. By leveraging existing and developing new technologies and techniques these large-scale eradications are progressing swiftly. These techniques and technologies include 1) integrating geographic information systems (GIS) tools into all aspects of the campaign, 2) revised ground-hunting techniques, 3) aerial hunting by helicopter, and 4) and advanced Judas goat techniques. Santiago Island is now free of donkeys, and the goat eradication has entered the Judas goat phase, with over 100 Judas goats deployed. On Isabela, aerial hunting has swiftly reduced much of the island to Judas level. In 2005, over 600 Judas goats will be deployed on Isabela.

The Galápagos archipelago has a long history of introduced mammals, with many species beating Darwin to the islands. That history is now being reversed, and ecosystem recovery has been swift and widespread. If the Santiago and Isabela are successful, goat will remain only on inhabited islands. Feral cats have been recently removed from Baltra Island (2,544 ha) with a systematic poisoning and ground-hunting campaign. These conservation actions are large steps toward reversing the damage wrought by introduced species on the Galapagos Islands.

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<sup>5</sup>Natural and Rural Systems Management, University of Queensland, Gatton, Australia

<sup>6</sup>United Nations Development Program, Quito, Ecuador  
Josh Donlan's email: [cjd34@cornell.edu](mailto:cjd34@cornell.edu)

Photo: Javier Calzada



## Horticultural Code of Practice Launched in Scotland

A new code of practice calling on gardeners to act responsibly to protect Scotland's natural heritage and safeguard the economic and amenity value of the countryside was published on 1 June 2005.

Deputy Environment Minister Lewis Macdonald launched The Horticultural Code of Practice for Scotland at Dobbies Garden World at Lasswade in Midlothian.

The Code urges gardeners to:

- ◆ know what you are buying and planting, and be aware of the potential risks;
- ◆ dispose of all plant and garden waste responsibly - never fly-tip;
- ◆ keep garden plants in the garden - don't spread garden varieties in the wild.

The full text of the Code is on the Scottish Executive website at [www.scottishexecutive.gov.uk/invasivespecies](http://www.scottishexecutive.gov.uk/invasivespecies). A leaflet summarising the key points of the Code has also been produced.

The core components of the Code were produced in co-operation with the UK Department for the Environment, Food and Rural Affairs (DEFRA) and the Welsh Assembly Government. The working group which helped draw up the details of the Code included representatives from the Garden Centres Association, the Horticultural Trades Association, the Royal Horticultural Society, Gardening Which?, the Ornamental and Aquatic Trades Association, the National Trust, Plantlife International, and the Royal Botanic Gardens (Kew).

The development of Codes of Practice was one of the key recommendations arising out of a Review of Non-native Species Policy, published in March 2003. The report recommended that Codes of Practice should be developed in a participative fashion for all relevant sectors, to help prevent introductions of invasive non-native species. The Horticultural Code of Practice is the first to be developed.

The use of non-native plants has provided great benefits to the horticultural, agricultural and forestry sectors. Many of the most economically important species in Scotland are non-natives, as are the vast majority of species used by gardeners. However, non-native species can do immense ecological and economic damage if allowed to get out of control and spread in the wild. None of the invasive plants currently found in Scotland have been introduced with the deliberate intention of causing harm to native wildlife or economic interests. This is true even of the most notorious species, such as Japanese knotweed, giant hogweed or *Rhododendron ponticum*. All were originally imported for legitimate gardening purposes, before the ecological dangers were fully appreciated. It is therefore vital that gardeners and horticulturalists understand the risks associated with the inappropriate use of potentially invasive plants and act responsibly in order to avoid new problems for the future.

The Code is voluntary. It aims to promote a standard of reasonable and responsible behaviour that, if followed carefully, will help protect Scotland's environment by preventing the spread of invasive non-native species into the countryside. There are already legal provisions in force which make it an offence to spread certain invasive species in the wild (in particular Japanese knotweed and giant hogweed). To support enforcement, the new Code is being designated for the purposes of new Section 14B of the Wildlife and Countryside Act 1981 (inserted into the Act by last year's Nature Conservation (Scotland) Act). This means that the Scottish courts will be able to make use of the Code in a similar way to the Highway Code in motoring cases. Non-compliance with the Horticultural Code will not in itself be an offence, but it will provide a common reference point in dealing

with questions such as whether the accused acted responsibly or exercised due diligence.

The Nature Conservation (Scotland) Act 2004 introduced a number of new measures to tackle non-native species:

- ◆ New offences of releasing or allowing the escape of a hybrid of any animal or plant which is not ordinarily resident in and is not a regular visitor to Great Britain in a wild state. Species found in Scotland on Schedule 9 include grey squirrel, Sika deer, signal crayfish, Japanese knotweed and giant hogweed. "Pure" examples of these species were already controlled under the existing Wildlife and Countryside Act. The new measure extends the controls to hybrids.

- ◆ New offences of possessing, advertising for sale, selling offering for sale, exposing for sale, transporting for sale any animal or plant specified in an order made by Scottish Ministers. No species are currently listed, but Ministers intend to consult further on the use of this power.

- ◆ Penalties, on summary conviction, were increased to include imprisonment for up to six months and/or a fine not exceeding £40,000. On conviction on indictment, the penalties are an "unlimited" fine (ie whatever the court feels to be commensurate with the offence) and/or a 2 year prison sentence.

Source: Press Release 1/06/2005 by Scottish Executive



## Exotic Pet Lizard Finds Island Paradise in Florida: Can Ig-eradication Succeed?

According to the IUCN/SSC Iguana Specialist Group ([www.iucn-isg.org](http://www.iucn-isg.org)) the iguanas of the world are among the most endangered of earth's creatures, primarily because much of their habitat has been eliminated by human development or severely degraded by invasive species. In the West Indies, for example, iguanas are threatened by introduced mammals, including such perennial alien favorites as the mongoose, rats, and feral cats.

So, try not to judge "iggy" too harshly as you read on...

### Iguanas are common in Florida

The Florida Fish and Wildlife Conservation Commission reports forty-seven introduced reptile species in the state, including three iguanas recognized as established (species followed by date of first record): green or common iguana (*Iguana iguana*), 1966; Mexican spinytail iguana (*Ctenosaura pectinata*), 1972; black spinytail iguana (*Ctenosaura similis*), 1978. Not surprisingly, these introductions are traced to escaped or released pets.

According to the American Pet Products Manufacturing Association, almost four million households in the United States in 2000 contained one or more pet reptiles or amphibians, totaling about nine million pets, of which approximately 1.62 million were iguanas. Reptiles are long-lived and grow continuously; a six-inch juvenile becoming a six-foot adult over several years. "Folks buy the critters when they are adorable little lizard babies and panic when they begin to grow like Godzilla," said a Florida agricultural extension agent. Too often, the irresponsible owner dumps "Godzilla" in the wild. While it is illegal to release exotic animals in Florida, enforcement is next to impossible.

In Florida, there is also the 'hurricane-facilitated' release problem, such as with Hurricane Andrew in 1992, which destroyed numerous exotic pet facilities in Miami-Dade County. The Port of Miami is the primary arrival point for exotic pets in the US. Anecdotal evidence suggests that iguanas were

less common before Hurricane Andrew. As one animal shelter director put it, "No one really noticed them and then all of a sudden they are everywhere." This "sudden" population boom may be the result of the hurricane causing a release of a "critical mass" of breeding individuals into the wild. Or this may be another case of a "lag time" often observed in invasive species as they acclimate to new environments. Of course, while the iguanas were moving in, human population grew in Florida from six to sixteen million, which may be a factor in the increased human/lizard interface.

Media reports have speculated that perhaps thousands to hundreds of thousands of feral iguanas now roam the countryside of Palm Beach, Broward, Miami-Dade, and Monroe counties (what is generally considered "South Florida"). Iguanas are also established on the west coast of Florida. For most people, the primary complaint is iguanas consuming their gardens. Other news articles have cited complaints about iguanas inside houses shredding insulation, scratching and chewing holes in screens and siding, nesting in crawl spaces, and occasionally dying inside homes and offices. The general news story is that iguanas are a nuisance.

### No worries, mate?

So what effect do these large voracious lizards have on Florida's natural environment? No one knows. Lizards of the sub-family Iguaninae are generally herbivorous. The green iguana is typically folivorous, while the spiny-tailed iguanas prefer legume fruits. However, according to the *Animal Planet* web page, *Ctenosaura* species are also known to have a diverse carnivorous diet that consists of small animals. They are known to eat rodents, bats, lizards, frogs, small birds, spiders, a variety of insects, and even eggs of their own young. This may be the basis for speculation that iguanas in Florida could have a serious impact on nesting shorebirds and sea turtles, but there is no research on this issue. In fact, research on invasive animals (particularly when compared to inva-

sive plants and insects) is exceptionally sparse.

This lack of evidence should not lead to a lack of concern. Little was known about the brown tree snake (*Boiga irregularis*) when it first arrived in Guam. That introduction did not turn out well. Whether the iguanas could achieve a similar wide-ranging detrimental effect on Florida's biodiversity is unknown. But available information does indicate an opportunistic feeding behavior (at least in the spiny-tailed group) that poses a threat to native plant and animal species.

### Gasparilla Island: Iggy in a nutshell

The State of Florida web page advertising the Gasparilla Island-Boca Grande Trail (the state's first rail-to-trail), offers "there's always something interesting to see. In fact, you may even encounter an iguana crossing the trail. Descendants of released or escaped pets, iguanas have resided on the island for as much as twenty-five years."

Residents of Boca Grande are not buying it. In a recent town meeting, occupants of this west coast town reached a consensus that the lizards had overstayed their welcome. But the discussion, as reported in the November 19, 2004 *Boca Beacon*, revealed no easy answers. County officials pointed out that state animal cruelty laws prevented the iguanas from being gassed or drowned. Poisoned bait would also take native reptiles. Shooting them, while popular with the audience, "does create some problems," one official observed. "While it would be impossible to eliminate the iguana population," another noted, "they could be controlled. It's going to take everyone involved to do it. It's going to take money from the county and money from elsewhere to try to eradicate them."

The audience was reminded "in 1992, there was talk about an iguana removal program, and it got shot down here." When attempts to trap iguanas were made in the early 1990s, a local environmental activist organized a suc-

cessful petition drive to protect the spiny reptiles. Freed from natural, or human, predators, the lizards found the island to indeed be a paradise of proliferation. Now the residents are faced with a likely response of too little, too late.

Sadly, this story is repeated around the planet each day. Global trade continues to regularly introduce exotic organisms to new locations, both intentionally and by accident. While only a small number of introduced species become established, or later, invasive, you could ask the residents of Boca Grande, Florida, "Would you like to try *another* iguana?" Their response would likely convey the attitude that is needed to address the invasive species problem today.

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## NOTES

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### Report: Biological Invasions in Inland Waters meeting Italy, May, 2005

Several presentations from the meeting are reported at: [www.dbag.unifi.it/inwat](http://www.dbag.unifi.it/inwat). Many have links to the PowerPoint presentations that were made at the meeting.

Some examples of the presentations included are:

- Francesca Gherardi :Discussion on bioinvasions: scientific appeal and political urgency
- Stephan Gollasch: Marine vs. freshwater invaders - is shipping the key vector for species introductions to Europe?
- Vadim Panov, Yuri Dgebuadze, Tamara Shiganova, Andrew Filippov, Vladimir Shestakov,
- Dan Minchin: A risk assessment of biological invasions: inland waterways of Europe - the northern invasion corridor case study.

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## PUBLICATIONS

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"*Reclaiming lost provinces: A century of weed biological control in Queensland*" can be ordered via the Queensland Department of Natural Resources and Mines website: [http://www.nrm.qld.gov.au/pests/news\\_publications/publications/biocontrol\\_book.html](http://www.nrm.qld.gov.au/pests/news_publications/publications/biocontrol_book.html)

Drawing on extensive historical data, this new book explores a century of weed biological control in Queensland—on prickly pear, Bathurst and Noogoora burr, water hyacinth, salvinia, groundsel bush, parthenium, rubber vine and lantana. You can contact the author at:

[Craig.Walton@nrm.qld.gov.au](mailto:Craig.Walton@nrm.qld.gov.au)

Source: Queensland Government website [http://www.nrm.qld.gov.au/pests/news\\_publications/publications/biocontrol\\_book.html](http://www.nrm.qld.gov.au/pests/news_publications/publications/biocontrol_book.html)

### Australian Biosecurity Group call for urgent national action to combat pest and weed invasion



A new 10 point plan to stop the spread of some of the world's most aggressive weeds and pests, if adopted, would prevent the potential devastation of native species and multi-million dollar eradication costs.

*Invasive Weeds, Pests and Diseases: Solutions to Secure Australia*, has been prepared by the Australian Biosecurity Group, convened by the premier national invasive species research bodies - the Invasive Animals Cooperative Research Centre and the Cooperative Research Centre for Australian Weed Management (Weeds CRC) - and WWF-Australia. The plan is a comprehensive policy solution to the growing menace posed by invasive pests, weeds and diseases. The Group have presented its plan as part of their negotiations to develop options for a new national invasive species system by October 2005.

The booklet is available online at: [http://www.wwf.org.au/News\\_and\\_information/Publications/PDF/Policies\\_position/ABGInvasiveSolutions.pdf](http://www.wwf.org.au/News_and_information/Publications/PDF/Policies_position/ABGInvasiveSolutions.pdf)

Source: Press Release, 27 July 2005



## 5<sup>th</sup> World Parks Congress (Durban September 2003): Need to manage IAS in Protected Areas is recognised

### IAS management recognised as an emerging issue

At the 5<sup>th</sup> World Parks Congress (Durban September 2003), Management of IAS was recognised as an emerging issue:

- “Management of IAS is a priority issue and must be mainstreamed into all aspects of Protected Area (PA) management.
- The wider audience of Protected Area managers, stakeholders and governments need urgently to be made aware of the serious implications for biodiversity, PA conservation and livelihoods that result from lack of recognition of the IAS problem and failure to address it.
- Promoting awareness of solutions to the IAS problem and ensuring capacity to implement effective, ecosystem based methods must be integrated into PA management programs
- In addition to the consideration of benefits beyond boundaries, the impacts flowing into both marine and terrestrial PAs from external sources must be addressed.”

Invasive alien species were also mentioned (briefly) in Recommendation 5.04 (Building Comprehensive and Effective Protected Area Systems), Recommendation 5.05 (Climate Change and Protected Areas) and Recommendation 5.18 (Management Effectiveness Evaluation to support Protected Area Management).

### Management Effectiveness stream Invasive Alien Species Workshop

Session leaders: Maj De Poorter, ISSG and Geoffrey Howard IUCN EARO, Session rapporteur: John Mauremootoo (Mauritian Wildlife Foundation)

#### Overall conclusion

The workshop participants re-emphasized the urgency of dealing with Invasive Alien Species (IAS) in protected areas: at this very moment many further species are facing extinction, protected area values are threatened and communities are facing drastic livelihood deterioration unless IAS are addressed. Almost all protected areas are currently facing significant IAS issues even if there is not widespread awareness of this. In spite of the seriousness of the problem, there are good reasons for optimism, as methodologies and knowledge are increasing and improving rapidly, and solutions for fighting back and for preventing further biological invasions exist and improve continuously. However, lack of awareness of the issues and/or of the solutions available threatens to perpetuate IAS problems. Management of IAS, must be mainstreamed, as support from governments, agencies, PA managers and local communities are crucial for successful prevention, eradication and control of IAS.

#### 1. Main recommendation from workshop participants

Management of invasive alien species (IAS) in Protected Areas (marine as well as terrestrial) must be considered a priority and IAS issues must be mainstreamed into all aspects of PA management, including effectiveness monitoring. IAS Management is best carried out using the ecosystem approach. Protected area managers and other stakeholders should urgently be made aware of the serious implications for biodiversity, PA management and livelihoods that result from lack of recognition of the IAS problem and failure to address and prevent it. Awareness that solutions exist and ensuring capacity to implement effective IAS management should become part of standard operating practices in PAs. In addition to the consideration of “benefits beyond boundaries”, the concept of “impacts from across boundaries” must be addressed in IAS management in PAs.

Especially for Marine PAs, a “cross boundary” approach to management will be necessary, considering the interconnectedness of the oceans and the need to prevent invasions at their source. This must include integration of management for all vectors and pathways. MPA management must include monitoring regimes (in the zone of influence rather than only the MPA itself) for early detection coupled with response plans for incursion management.

Considering the relatively recent recognition of IAS in the marine realm there is an urgent need for both multi- and bi-lateral organizations

to support comprehensive technical cooperation programmes to build the necessary IAS management capacity.

#### Presentations

*J. McNeely of IUCN, Gland (Switzerland)* presented an introduction to the issue: an overview of the wide spread taxonomically of invasive alien species (IAS) and of their impacts including to Protected Areas. International instruments and programmes that are in existence to address them were also covered.

*Geoffrey Howard IUCN EARO, Nairobi (Kenya)* in his talk “Managing Invasive Species in Protected Areas” presented practical methods and approaches to address the IAS issue in Protected Areas, including prevention, surveillance, eradication and control. His main messages included: there are invasive species in most Protected Areas around the world; they affect biodiversity, its conservation, PA management and livelihoods – sometimes very seriously - if unmanaged; there is need for awareness and information about the identity and threats of these species; there are solutions to IAS and their impacts; IAS should be mainstreamed in PA management; IAS are best



managed in an ecosystem approach; the concept of “impacts from across boundaries” must be addressed in IAS management in PAs.

*Musonda Mumba, University College, London (UK)* presented a case study from Africa: “*Mimosa pigra* invasion - The case of the Kafue Fats Floodplain, in Lochinvar National Park, Zambia”. She highlighted the need for a decision to be made to manage the weed, and to learn from others that have dealt with it (e.g. Australia); She explained the need for some “monitoring” in protected areas to review the biodiversity status

*John Mauremootoo, Mauritius Wildlife Foundation, Mauritius (Africa)* presented a second case study on Africa, focussing on Mauritius. He explained the current situation: only very little of the native forest remains, and it is severely threatened by IAS. He discussed options to upscale management, including technical issues as well as awareness. He expressed the conviction that it is still possible to work towards a future where ecosystems will have recovered – rather than an option where a “zoo” like situation exists with some highly managed areas surrounded by “seas of invasion”.

*Lynn Jackson, Global Invasive Species Programme (GISP), Capetown (South Africa)*, in her presentation “*The Global Invasive Species Programme and Protected Areas*” presented some graphic examples of how PAs are affected by IAS worldwide. She also explained GISP’s Programme, and the ways in which it can assist with the management of IAS issues.

*Maj De Poorter, Invasive Species Specialist Group of IUCN’s SSC, Auckland (New Zealand)* in her talk “*Invasive Alien Species Management - There is always SOMETHING you can do*” reinforced the fact that sooner or later ANY PA will have to face invasive alien species as a management issue, and emphasised the urgency connected with IAS issues: species extinctions are going on right now and livelihoods are badly affected. She gave case studies illustrating how it is possible to cooperate at many levels, not least the level of “peers helping peers” – concluding that while resources available may be drastically different from one PA to another, there is always something that can be done right now to improve the situation.

*Xie Yan, Institute of Zoology, CAS (Chinese Academy of Sciences)* in her presentation “*management of Invasive Alien Species in Nature Reserves in China*” explained how in China IAS occur in almost every watershed and ecosystem and represent most taxonomic groups, and are considered the second most important threat to biodiversity in China. She went on to explain how IAS are a major concern in Nature Reserves, and how a lot of activities in nature reserves actually encourage the spread of IAS, including the use of alien plants for vegetation restoration or soil stabilisation. In addition, endangered species are often artificially bred in areas where they do not occur naturally, or in areas where mixing with natural populations leads to problems. She concluded with explaining the ex-

tensive recommendations that have been provided by the Ecoscurity Task Force of the China Council for International Cooperation on Environment and Development.

*Steve Raaymakers of IMO* in his presentation “*Preventing Pests in Paradise* - Impacts and Management of Invasive Aquatic Species in Marine Protected Areas”, started by reminding the audience that invasive alien species are one of the four main threats to the world’s oceans. They spread e.g. through canal developments - opening ‘transfer corridors’, through the movement of large marine structures such as drilling platforms and floating-docks, by floating marine debris (e.g. discarded/lost fishing gear and plastics), the escape and/or release of species from private and public aquaria, intentional and accidental introductions for fisheries and aquaculture purposes, the movement of vessels between water bodies by land-transport (e.g. private recreational craft on trailers), species range expansion due to global climate change and shipping. He gave the example of how 3-10 billion tonnes of ballast is transferred globally per year by shipping with 7,000 species of microbes, plants and animals carried globally, causing biodiversity, health and economic impacts. There is currently no international action to address IAS transfer via canals, fouling or climate change. FAO and ICES have guidelines for ‘fisheries’ introductions but they are often poorly implemented and often at odds with fishery development projects. IMO is very active in addressing the ballast water vector, including Guidelines since 1993 (poorly implemented), the new Convention (2004), and the GloBallast Programme (GEF funded, technical cooperation with developing countries). Many things can be done to significantly reduce introductions (shore-side and ship-board) - GloBallast is implementing a large range of activities at demonstration sites globally. He concluded with the following recommendations: IAS must be part of the MPA agenda; border-lines on a map will not protect MPA from invasive alien species - thinking ‘beyond boundaries’ should also include the origin of impacts; ‘Cross-boundary’, integrated, ‘total oceans’ management is required; More action is required by relevant groups to effectively address non-shipping vectors; Partnerships should be established between IMO/GloBallast and these groups to address all vectors in an integrated way.

*Maj De Poorter*

*See also page 14*

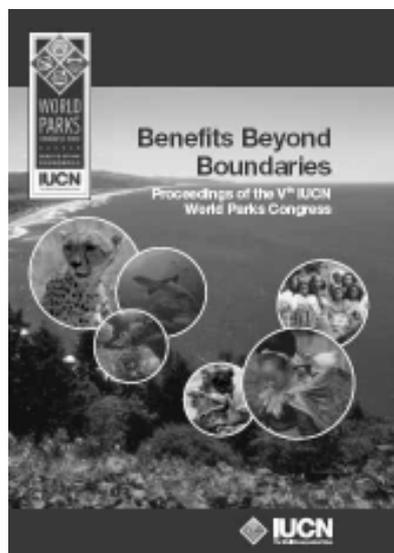


Geoffrey Howard, IUCN East African Regional Office

## Benefits Beyond Boundaries Proceedings of the Vth IUCN World Parks Congress

The World Parks Congress held in September 2003 was considered one of the most successful conservation events ever organised by IUCN. Nearly 3,000 delegates from all over the world, who had concerns in Protected Areas, attended from all around the world. The proceedings have now been published which highlights the wide range of expertise of participants and their wealth of experience. They can be obtained either by contacting the IUCN's Publication Services Unit at [books@iucn.org](mailto:books@iucn.org), or online at [www.iucn.org/bookstore](http://www.iucn.org/bookstore).

Additional information:  
<http://www.iucn.org/themes/wcpa/>



## World Parks Congress CD available

ISSG have copies of the 5<sup>th</sup> World Parks Congress CDs on Evaluating Management Effectiveness: Maintaining Protected Areas for Now and the Future, which feature workshop outlines, papers and PowerPoint presentations, as well as recommendations made. This includes the IAS session which was held at the World Park Congress.

If you would like a CD, please contact us at [ISSG@auckland.ac.nz](mailto:ISSG@auckland.ac.nz)



## SURVEYING PACIFIC ISLANDS FOR INVASIVE PLANTS: LESSONS LEARNED

Beginning a program to manage invasive plant species can seem like an overwhelming task. Where do you start? What are the problem species? Which species are the biggest threats? Where are they located? Which problems do you attack first? How can scarce resources (time, people, money, etc.) be allocated most effectively?

A good place to begin to answer such questions is to conduct a baseline survey. At the request of Pacific island countries and territories, the US Forest Service has sponsored a number of surveys. These surveys were intended to find out which species were present and, within the limits of time and money available, their location and extent. The information is intended to be used by island governments and invasive species committees in planning invasive species management programs. So far, surveys under this program have been conducted for the principal islands of Palau, the Federated States of Micronesia, Guam, the Commonwealth of the Northern Mariana Islands, Kiribati, Tonga, Niue, Samoa, American Samoa and the Cook Islands.

Following are some tips on conducting surveys, based on our experience:

**Focus on the major problem areas.** The survey should be designed to search out problem species in an efficient manner that is consistent with the objectives of a management program. In our experience, the severity of the invasive plant problem is directly related to ease of access from the outside world and the length of time of that access. For example, Guam has been a transportation hub since the Spanish began using it as a stopping point for the Manila Galleons in the 1500s as well as a focal point of military and tourist activity. The more remote and inaccessible an island, generally the fewer invasive species. Also, invasive species usually spread to outer islands from the transportation hub, so giving priority to the island that is the major access point and transportation center will find most of the problem species. On the other hand, emphasis might need to be given to a particularly sensitive area, such as a national park, even though it might be located on one of the less accessible islands.

**Search the literature.** Many islands or island groups have had botanical surveys in the past. For example, botanists from the Smithsonian Institution surveyed most of the islands in Micronesia after World War II. While much of this information is quite old, it is still very useful. If an introduced species was recorded by a botanical survey, chances are quite good that it is still there and you will know to look for it. Also, many of these surveys recorded local names, which is quite useful in talking to local people, as most of them are not familiar with scientific names. Finally, literature on

invasive species problems on similar islands or climatic types can give you a good idea of species that are likely to be a problem if they are found.

**Look where people are or have been.** While some species are truly accidental introductions, a number of studies have shown that by far the largest number are introduced for ornamental, agricultural or forestry purposes. Many invasives also are favored by disturbance. Even accidental introductions are usually a result of human activity, so look for invaders along roads and trails, near habitation, or wherever activity has taken place and you will find most of the invasive species in short order. A particularly fruitful strategy is to walk the streets of towns and villages and look into yards to see what is planted. Botanical gardens, agricultural experiment stations and ornamental nurseries are also locations where new introductions can commonly be found.

**Survey for all species.** In our first surveys, we just surveyed for species of “environmental concern”. However, this led to endless discussions about whether a species might or might not be affecting natural and semi-natural ecosystems. In our later surveys, we just surveyed for all invasive plants, which really didn’t take much more time, gave the whole picture of the problem, and was more useful to the island governments.

**Look for known problems.** A large number of plant species are known invaders of tropical ecosystems. We go to survey an island prepared with a checklist that includes all the known invaders that are supposed to be there (from the literature) and all the rest of the species that we know might be potential problems. For the first few hours we are finding and checking off species like mad. Once we get these recorded, we then search for the more obscure ones

**But watch out for “island surprises”.** On almost all islands we find at least one “island surprise”. These are species that are either not previously known to be invasive or are not causing much of a problem on other islands. For whatever reason, they have found an ecological niche to their liking and are doing well on a particular island.

**Use local expertise to the maximum.** Local people may not be scientists, but they know which plants are causing them problems. We always ask the island government to have foresters and agricultural agents work with us and they guide us to many introductions. Members of environmental groups are also often very knowledgeable and helpful. We also talk to villagers as we travel around and many times they show us problem species.

**Involve all the players.** Management of invasive plant species involves many players, from individuals to a number of government agencies to non-governmental organizations. When we visit an island we try to involve as many of them as possible, not only to help us but also to encourage them to work together. If they haven’t already done so, we usually suggest they form an invasive species com-

mittee to plan and coordinate invasive species management activities.

**Use the survey to raise local awareness.** The local people educate us about problem species, but we also use the survey as a training opportunity for the participants. We also usually find a great deal of curiosity as to what we’re doing, and this is an opportunity to talk to people about invasive species and what can be done to prevent and manage them. We’ve even occasionally given radio or TV interviews.

**Use the survey to get the overall picture; return to focus on specific problems.** The first priority should be to get an overall assessment of the situation so that a general strategy and plan of action can be developed. Many species will need additional assessment work to determine their extent, impact, and the feasibility of management or control.

**Provide the resulting information in a comprehensive but easy to use form.** We provide the government and cooperators a report listing the species found (and not found) by location, general observations and recommendations, and specific recommendations by species and by island (or other geographic location). In addition, using information from our Pacific island database, we provide a list of species that are present on neighboring islands that have not yet appeared on the surveyed islands—information that is highly useful to quarantine officers in excluding new species. We also provide information that is needed for internal quarantine operations. Finally, all the information collected is incorporated into the Pacific Island Ecosystems at Risk database, web site and CD, which provides information on each invasive plant species (see <http://www.hear.org/pier/>).

**Follow up with surveillance and periodic resurveys.** A survey provides baseline information at the time that it is done. All you have to do is look at some of the literature to see how rapidly information can become outdated. Thus, it’s essential that a surveillance program be set up and maintained and periodic resurveys be done.

The above are some of the “tricks of the trade” we’ve learned in our Pacific surveys. Surveys are not an end unto themselves, but an essential beginning point for developing a planned course of action to manage invasive plant species.

*Jim Space  
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Pacific Island Ecosystems at Risk Project  
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## Invasive Alien Species Websites in South America

Awareness of impacts and threats posed by invasive alien species is growing in South America, but still far from generating enough action to solve existing problems. Although signatories to the Convention on Biological Diversity, most countries in the continent lack national assessments of species, and do not recognize official lists of species that can drive decision-making and trigger more action. There are practically no books on biological invasions in Spanish or Portuguese. Even the classic book by Charles Elton on biological invasions has never been translated into Portuguese. As most of the population barely reads English, scientific literature is not accessible, and even for those who do, it is hard to find in bookstores. The web is the best place to go, and there are, fortunately, many consistent websites specializing on invasions. There are no publications directed to the general public for awareness, neither to managers or technical staff. Biological invasions is a Science ignored by nearly all schools and universities.

In the Americas, information from published and unpublished accounts and databases on invasive species is scattered in locations and formats not easily accessible even to local users. The Invasives Information Network (I3N) of the Inter-American Biodiversity Information Network, sponsored by the United States Department of State and the U.S. Geological Survey, created a distributed network of catalogs of invasive species lists, experts, projects and datasets. Software tools to assist with cataloguing and distributed searching were developed by the U.S. National Biological Information Infrastructure, Universidad Nacional del Sur in Argentina and Instituto Hórus / The Nature Conservancy in Brazil. I3N is composed of in-country information providers working towards the use of common standards. Each provider controls its information, though information is documented and posted in a standard format. The public can search the records for free from a single Web page: [http://www.iabin-us.org/projects/i3n/i3n\\_project.html](http://www.iabin-us.org/projects/i3n/i3n_project.html).

Several I3N members have their own websites, two of which are highlighted below. Other South American countries' I3N websites include:

<http://www.ambiente.gov.ec/AMBIENTE/i3n2000/I3N.htm> and <http://www.seam.gov.py/i3n/index.htm>

In Brazil, the Horus Institute for Environmental Conservation and Development was founded in 2002 with a mission dedicated to fighting biological invasions. In October of the same year, a website was created to make information available in the Portuguese language and disseminate information on invasive alien species. A national survey was started at the time by The Nature Conservancy and the Horus Institute for Brazil. The Horus website has become an indicator of interest in the topic: visitors increased ten-fold in two years' time. The average 2,000 hits per month until the end of 2003 increased to 5,000 in March 2004, to an average of 8 to 10,000 hits a month after November 2004 and over 25,000 hits by mid-2005.

The Horus Institute website holds a constantly updated list of invasive alien species present in Brazil, with fact sheets for each of the nearly 180 species that make data available on species characteristics, native range, history of introduction, impacts, control methods, places of occurrence in the country, scientific references and related projects. The website provides information on the mission and work developed by the Institute, articles,

media records on invasions, legal regulations, contacts, useful links, and a photo gallery of invasive species present in Brazil.

Another clear indicator of growing interest on biological invasions is the media. Articles and interviews on invasive species have been published in national magazines, major newspapers and educational TV programs. Two species are driving wide public attention to the topic: the Giant African Snail *Achatina fulica*, widespread all over the country, and the Golden Mussel *Limnoperma fortunei*, which currently makes the largest hydro power plant in the world stop periodically to clear water pipes and structures. Unfortunately, these now draw attention for incurring impacts to human interests, including health issues. Concern for invasions in the natural environment is still low on the learning curve.

The Universidad del Sur in Argentina holds a website on invasive alien species for the country at <http://www.uns.edu.ar/inbiar>. The website provides access to three national databases on invasive alien species, experts and projects, developed in 2002 as part of the I3N (IABIN Invasives Information Network). The IAS database includes 28 fields that can be grouped under six information categories: 1- taxonomic identification of the species, 2- information about the species in its natural distribution area (geographic distribution, abundance and environments occupied by



each species within its range of origin), 3- biological characteristics (diet, reproduction, dispersal and biological form), 4- characteristics of the invasion (date and reason for introduction in the country, economic uses, distribution range in Argentina, localities where it behaves as invasive, present tendency towards invasion and population situation), 5- effects of invasion/management strategies (impacts on biodiversity, economic activities and human health, control actions and methods used) and 6- bibliography and observations.

This is the first extensive database on invasive species, researchers and projects on the topic in Argentina, and the only one online and regularly updated. The ultimate goal of the work was to gather data to be used by researchers, natural protected areas managers and other experts from public agencies and non-governmental associations interested in the problem to promote rational management of invasive species. Up to the present, the database includes a total of 402 exotic or cryptogenic species (362 + 44), of which 218 are plants, 5 algae or fungi, 55 chordates (50 vertebrates and 5 urochordates) and 124 invertebrates. Visitors to this website may search in each database using one or more criteria. For example, the fields determined as search filters in the invasive species database include latin name, kingdom, phylum or division, class, order and family, as well as natural distribution range and reason for introduction. Experts may be searched for by name or specialized field, and projects by person in charge. The website also includes general information on the problem of biological invasions, a description of the IABIN and I3N, links to other sites devoted to invasive species, a description of the criteria adopted in our work and complementary texts on exotic fungi and parasites.

The Instituto de Investigación de Recursos Biológicos Alexander von Humboldt in Colombia developed a database as a part of an initiative to map invasive species present in Colombia. The database on biological invasions is still under construction and not yet available on the website.

It will provide the opportunity to consult all related information regarding ecology, impacts and places of occurrence of invasive species in Colombia. The initiative proposed and coordinated by the Humboldt Institute looks for consolidated unified bases to establish information exchange and compile standardized information in collaboration with different researchers and institutions.

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Silvia Ziller. Photo: M De Poorter

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## NOTES

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### **Electronic pest advice comes to the Caribbean**

A new email-based network will help users find out more about pests and plant diseases in the Caribbean. CariPestNet, an advice and information network hosted on the Internet, has been launched to enable farmers, researchers and others to have rapid access to expert information about plant protection. The service, which is free, offers a discussion forum on issues such as pest outbreaks, biological control and quarantine concerns. A website, under construction, will enable users to link up with scientists to answer questions.

The network is being set up by the Caribbean taxonomic network, CARINET, with funding from CTA. It will be broadly modelled on PestNet, which links the Pacific and Southeast Asian regions with plant protection specialists worldwide. Some 40 scientists act as resource points for PestNet, which has received some 2,000 messages since it was launched 4 years ago.

The network offers an archive service, and members can also send in samples of pests for identification by experts, either with photographs or by mailing specimens of the insects, weeds or diseased material.

A database of digital images of pests, diseases and weeds that have been submitted by PestNet members can be searched on the website. Users can join both the CariPestNet and the PestNet networks either by email or via the Yahoo!@Groups website.

To subscribe to PestNet, send a blank email to: [PestNet-subscribe@yahoogroups.com](mailto:PestNet-subscribe@yahoogroups.com) or go to: [www.groups.yahoo.com/group/pestnet/](http://www.groups.yahoo.com/group/pestnet/) and follow the instructions for new or existing members

To subscribe to CariPestNet, send a blank email to: [caripestnet-subscribe@yahoogroups.com](mailto:caripestnet-subscribe@yahoogroups.com) or go to: [www.groups.yahoo.com/group/caripestnet/](http://www.groups.yahoo.com/group/caripestnet/)

*Email for PestNet:*  
*Wilco@PestNet.org*  
*Website: www.pestnet.org*

*Email for CariPestNet:*  
*carinet@trinidad.net*

Source: "Spore, Information for agricultural development in ACP countries". Number 110, April 2004. (also: [http://spore.cta.int/spore110/spore110\\_brief.html#brief7](http://spore.cta.int/spore110/spore110_brief.html#brief7))

## Towards an Integrated Methodology for Assessing the Threats to Biodiversity from Invasive Species at the Landscape-level

Human-induced global environmental change arising primarily from changes in land cover and land use as well as greenhouse gas-related climate change is indelibly modifying natural systems. Additionally, the global transport of plant species for the horticultural and nursery trades has facilitated the escape from cultivation and gardens of many non-native invasive species. As a result, the conservation of national and region-specific biodiversity is at risk.

Future land-use changes at the landscape-level via urban expansion are expected to open new areas to the urban exotic planting regime and associated green waste disposal mechanisms which are conducive to the establishment and spread of invasive pest plants. Fragmentation is likely to increase the edge exposure of natural areas to invasion from surrounding land. Furthermore, climate change acting primarily on temperature and precipitation regimes is likely to extend the climatic suitability for several invasive pest plants, particularly vigorous tropical invasives. While there are also the direct effects of increased atmospheric carbon dioxide CO<sub>2</sub> concentrations on plant growth and performance, which can be tested experimentally, this is beyond the scope of the present study.

It is therefore pertinent to develop capabilities for including the combined effects of climate change and land-use change in risk assessments of invasive pest plants. This research aims to develop spatially explicit scenarios of selected invasive pest plants with a view to decision support for regional conservation and biosecurity stakeholders. Some of the preliminary species of interest are *Tradescantia fluminensis* (wandering Jew), *Ageratina riparia* (mistflower), *Hedyechium gardnerianum* (Kahili ginger) and *Araujia sericifera* (mothplant).

The use of Integrated Assessment Modelling (IAM) as an assessment

tool allows the interactions between the impacts of climate change (systemic: related to the dynamic global physical systems) to be placed in the context of land use change at the landscape-level (cumulative: aggregated from more local/regional effects). This will involve the development of a suitable land use change scenario generator and use of existing modelling capabilities for spatially explicit scenarios for climate change in New Zealand.

The overall framework into which the various components and models will be integrated is the CLIMACTS Open-Framework Modelling System, developed at the University of Waikato, New Zealand. Within the modelling system, climate change patterns produced by General Circulation Models (GCMs) - three-dimensional mathematical models that represent physical and dynamical processes that are responsible for climate (IPCC, WGI, 2001) - are scaled with time-dependent changes in global temperature derived for a range of greenhouse gas emissions scenarios for different climate sensitivities. These patterns of climate change are used to perturb spatial climatologies as provided through local climatology data layers at appropriate spatial resolutions. These modi-

fied climate layers will be used to project the future distribution scenarios of the invasive species of interest. Cellular Automata techniques will be used in developing the spatial land use change scenarios for the case study region.

A Case Study approach will be used to incorporate species-specific information at the landscape-level within a selected region in New Zealand. This will provide a context for interpreting and analysing *in situ* species specific data and patterns, landscape features and invasion potential, biosecurity and biodiversity strategies at the regional level, and land use changes. It is expected that the Integrated Assessment Model and methodology specific to invasive pest plants will provide useful generic knowledge for incorporating climate change and land use change considerations into strategic biosecurity planning.

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*Figure 1 Framework for the integration of climate change and land use change scenarios for impact assessment on selected invasive pest plants in New Zealand*

# CONVENTION ON BIOLOGICAL DIVERSITY: GAPS AND INCONSISTENCIES IN THE INTERNATIONAL REGULATORY FRAMEWORK IN RELATION TO INVASIVE ALIEN SPECIES - REPORT

In its decision VII/13, the Convention on biological Diversity (CBD) Conference of the Parties (2004) noted that specific gaps in the international regulatory frameworks at global, regional and national levels persist, and requested SBSTTA (the subsidiary body on scientific, technical and technological advice) to “*establish an ad hoc technical expert group to address gaps and inconsistencies in the international regulatory framework at global and regional levels, in particular the specific gaps identified in paragraph 7 of decision VII/13*”. The Subsidiary Body established the ad hoc technical expert group at its tenth meeting, and the Executive Secretary convened it to meet in Auckland from 16 to 20 May 2005, with the generous support from the Government of New Zealand. The full report of the meeting contains a large number of recommendations for possible actions to address gaps and inconsistencies in the international regulatory framework in relation to invasive alien species..

The main conclusions of the meeting of the Ad Hoc Technical Expert Group (AHTEG), as contained in its report, are as follows:

## Main conclusions

1) Actions taken to address invasive alien species need to be taken at the right level(s), which might be international, regional, national and/or sub-national. Regional (including sub-regional) actions may be particularly appropriate in many cases.

2) In many cases, problems are not caused by gaps in the international regulatory framework, but actually lie with inadequate implementation at national level.

3) Gaps in the international regulatory framework do not necessarily limit the ability of governments to address such gaps at national level.

4) For most pathways for the introduction and spread of invasive alien species, the most important factor influencing implementation of article 8(h) is national capacity.

5) Collaboration among international bodies and instruments is important in the context of addressing issues related to invasive alien species.

6) A significant general gap in the international regulatory framework relates to lack of international standards to address animals that are invasive alien species but are not pests of plants under the International Plant Protection Convention. Some of the specific gaps identified in this report, including in particular various conveyances as pathways for invasive alien animals, could be viewed as subsets of this broader issue. Options to deal with this general gap include:

(a) Expansion of the mandate of the World Organisation for Animal Health (OIE) beyond a limited number of animal diseases;

(b) Development of a new instrument or binding requirements under an existing agreement or agreements such as the Convention on Biological

Diversity or other appropriate frameworks;

(c) Development of non-binding guidance.

7) Further consideration of these options is appropriate, and should involve relevant international bodies and instruments.

8) Other major gaps in the international regulatory framework relate to hull fouling and civil air transport. For both of these gaps, relevant international organizations are in the process of addressing the issue of invasive alien species to varying degrees.

9) Specific gaps and inconsistencies were also identified for particular aspects of the following pathways: Aquaculture / Mariculture, Ballast water, Military activities, Emergency relief, aid and response, International development assistance, Scientific research, Tourists, Pets, aquarium species, live bait and live food, Biocontrol agents, *Ex-situ* animal breeding programmes, Incentive schemes (including carbon credits), Inter-basin water transfer and canals, Unintended protection of invasive alien species, Inconsistency in terminology.

10) Specific actions have been proposed for each of the above gaps and inconsistencies, often involving the following: Implementation of existing international agreements, Regional approaches, Action by national government agencies, Collaboration among government agencies, Collaboration among international bodies and instruments, Sharing of best practices, Development of codes of practice, Education and public awareness.

The AHTEG noted that at national level, Governments have responsibilities related to export of species that may invade neighbouring states. Also, actions or inactions at national level may result in unintentional introductions of invasive alien species into other States.

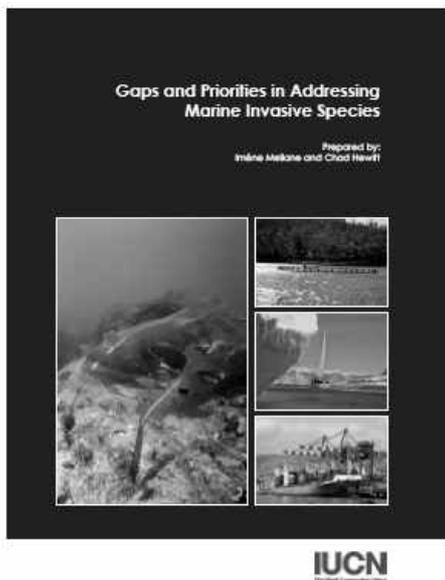
Full report: UNEP/CBD/SBSTTA/11/INF/4

<http://www.biodiv.org/doc/meetings/sbstta/sbstta-11/information/sbstta-11-inf-04-en.doc>

Note by Executive Secretary: UNEP/CBD/SBSTTA/11/16

<http://www.biodiv.org/doc/meetings/sbstta/sbstta-11/official/sbstta-11-16-en.doc>





### **CBD Related matters: Gaps and Priorities in addressing marine invasive species**

In discussing the gaps in the international regulatory framework for invasive alien species, the AHTEG noted that other expert meetings under the Convention on Biological Diversity (e.g., the Workshop on the Joint Work Programme on Marine and Coastal Invasive Alien Species) or elsewhere may address particular pathways in more detail. IUCN was represented at that meeting by Imène Meliane from the Global Marine Programme. In order to constructively contribute to the debate, IUCN prepared an information document that identifies the major existing gaps in international efforts on marine invasive species and outlines the most urgent actions that need to be addressed. The document “*Gaps and Priorities in addressing marine invasive species*” covers 1) IUCN’s work on marine alien invasive species 2) significant and priority gaps related to on-going work on marine invasive alien species and 3) specific activities that would usefully be part of the joint global work plan.

The IUCN information document can be downloaded from the IUCN Global Marine Programme at:  
[http://www.iucn.org/themes/marine/pdf/Marine%20AIS\\_GAPS-PRIORITIES.pdf](http://www.iucn.org/themes/marine/pdf/Marine%20AIS_GAPS-PRIORITIES.pdf)

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## *NOTES*

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### **Announcement - September 2006 – NEOBIOTA Conference**

#### Biological Invasions from Ecology to Conservation

The 4th European Conference of the working group NEOBIOTA on Biological Invasions - from Ecology to Conservation will take place in Vienna (Austria), 27-29. September 2006.

Organised by the Austrian Federal Environment Agency Ltd and the German Federal Agency for Nature Conservation, everyone interested in biological invasions (ecologists, conservation agencies, and stake-holders), is invited to share thoughts and new results for all organisms (pathogens, plants, fungi, animals) and habitats (marine, freshwater and terrestrial ecosystems).

#### Conference Topics:

- Conservation of Biodiversity
- Prevention and Monitoring
- Control and Eradication Measures
- Pathways and Vectors
- Policy and Legislation
- Awareness Building
  
- Ecology of Invasive Alien Species
- Distribution and Abundance
- Patterns and Processes
- Impact and Risk Assessment
- Human and Animal Health Impact

Further information and registration:  
[www.umweltbundesamt.at/neobiota](http://www.umweltbundesamt.at/neobiota)

## SCIENTIFIC CHALLENGES IN THE FIELD OF INVASIVE ALIEN PLANT MANAGEMENT

The Working for Water programme is a government initiative addressing the problem of invasive alien plants. Its name captures the programme's focus on job creation in support of an important ecosystem service (the protection of water supplies threatened by invasive alien plants). The invasion of ecosystems by alien species that are knowingly or accidentally introduced to new areas is a problem of global significance.

These invasions can alter the composition, structure and functioning of ecosystems and affect their capacity to deliver a range of benefits to humanity.

South Africans have long recognised the problem of invasive alien plants, and almost two decades have passed since the first detailed synthesis of the ecology and management of invasive alien species was produced in South Africa<sup>1</sup>. Others have followed<sup>2-5</sup>, but these were all largely academic. More recently, the issue of alien plant invasions has taken on a new energy, fuelled by generous funding that has become available for the Working for Water programme. This has taken the field into new dimension – from academic debate to large-scale implementation. There is no doubt that South African science, and scientists, have played a pivotal role in this metamorphosis. But there are new challenges facing scientists, now that the problem is widely recognised, in that there is a large and growing expectation that science should deliver immediate, practical solutions to many management problems.

Initially, the prime argument for the establishment of the Working for Water programme was the prediction that these invasions would have severe impacts on surface water resources<sup>6</sup>. Initial funding from the South African Department of Water Affairs and Forestry, aimed at the prevention of these putative impacts, has been combined with further generous funding from the government's allocation to poverty relief. This intervention has created thousands of employment opportunities, and enhanced the lives of poor people in impoverished rural areas. The programme's perceived success in delivery has seen it grow, rapidly, from strength to strength. By the end of the 2001/02 financial year, the programme had invested R1.59 billion in clearing programmes during its first seven years of existence<sup>7</sup>, making it arguably the largest environmental programme on the African continent.

Rapid growth comes at a cost. Initially, due to a need to focus on implementation, there was little opportunity to consolidate existing understanding regarding the ecology of invasive species, the threats that they posed to the environment, and the options for control. The nature of the funding (for poverty relief) also meant that there was a strong focus on getting most of the funds through to poor people, a new challenge for managers of alien plant control projects. However, the programme has more recently in-

vested funds (amounting to R42 million over the past 3 years, or roughly 2.5% of the current annual programme budget) into much-needed research aimed at supporting development and implementation.

Research in this field can be rewarding. Invasions by introduced species, and landscape-scale clearing operations, provide scientists with ready-made experiments in ecology, and they can and have offered opportunities for expanding fundamental ecological understanding. However, the expenditure of large sums of money in a developing country that has real and immediate needs cannot be justified by such apparently esoteric goals, and scientists are being asked more pressing questions. These include whether or not the predictions of significant benefits arising from the control of invasive alien plants can be substantiated by good science, and whether or not further expenditure on research will be justified by the delivery of solutions that will significantly reduce the threat of invasive alien plants, or increase the efficiency of their control. Funders also want to know whether or not investments in research will drive transformation in a way that will build essential and relevant scientific capacity in post-apartheid South Africa.

Past and ongoing research has provided a basis on which to build. There remains a need to expand our fundamental understanding of the processes that underlie invasions and the effects that they have. Such studies are needed to underpin more holistic assessments related to the problem. Some examples are:

- The sum total of impacts (and benefits where these might exist) associated with invasive alien plants, and how these vary for different species and in different geographic areas (necessary for prioritisation);
- The means whereby the benefits that arise from costly control programmes can be expanded, for example by using the opportunity to create employment, and to utilize the plant material made available from clearing operations (necessary to decrease the costs of control);
- The development of the means to identify species that pose serious threats at an early stage, given that new species are entering the country continuously;
- The development of arguments to justify implementation of measures to control or eradicate "emerging" problem species (given that problems with existing, and obvious, infestations will take priority, and that the prevention of a problem is unlikely to earn political kudos for those funding it);
- The means to deal with the significant conflicts of interest that arise when invasive alien species also provide important benefits in some areas. This question relates both to the expression of objective and unbiased information based on good science, as well as to seeking solutions (for example the propagation of sterile cultivars, or

the reduction of invasive potential through introducing seed-feeding insects); and

- The means for the combining and integrating of skills from different disciplines in order address the problems of invasive alien plants in a holistic manner, and to develop integrated solutions. The field of resource economics, for example, needs to incorporate the inputs from ecologists, hydrologists, engineers and social scientists into economic simulations that can inform decision-makers of the full consequences of invasions and the benefits of control.

The Working for Water programme's activities provide extraordinary opportunities for innovative experimentation and research. The range of ecosystems in which clearing projects are located, and the scale of operations, combine to offer opportunities that would rarely be found anywhere else. We have not yet fully capitalised on these prospects, and this remains a largely unexploited opportunity for scientists.

There are also issues of research capacity that need to be addressed, urgently. The bulk of research funding from Working for Water (50% over the past 3 years) has been directed at biological control. In South Africa, biological control has been practiced since 1910, and South Africa's biological control scientists form a relatively small, united and committed community. They have conducted collaborative research over the past 30 years, and have an impressive track record, with many weeds having been effectively brought under control. Recent research<sup>8</sup> has indicated that the economic returns from biological control research (in terms of environmental impacts prevented), compared to costs of research, ranged from 34:1 to 4333:1. These returns on investment are phenomenal, and the achievements of South Africa's biological control scientists have not gone unnoticed. The National Science and Technology Forum, in its recent science & technology awards for 2001, awarded the Weeds Research Division of the Plant Protection Research Institute (Agricultural Research Council) the award for the organization that made the most significant contribution to science, engineering and technology over the last 10 years in South Africa – a significant achievement in the face of stiff competition. The Weeds Research Division has staff and facilities that represent an asset of strategic national importance, and one that is delivering hundreds of Rands of benefits for every Rand spent on research. Recent trends in the Agricultural Research Council have seen this capacity coming under growing threat, as the Council does not have the capacity to maintain the facilities and staff, and to make use of significant business opportunities. It is in the national interest to ensure that these trends are reversed.

The Working for Water programme has been the subject of a recent comprehensive review and the preliminary findings were reported at the research symposium<sup>9</sup>. The programme's achievements were seen as significant in the context of the lack of an enabling legal and institutional environment for the management of invasive alien species. The programme's rationale was seen to be sound from

ecological, social and economic perspectives. However, the reviewers were of the opinion that improved accountability through the clarification of mandate, effective partnerships with government, and more efficient institutional arrangements were urgently required. The way in which the programme addresses these issues will be crucial for it to be able to build on its early and remarkable successes. The existence of the Working for Water programme is due to the vision and hard work of many people. Political support was necessary for the creation of the programme, and the vision, leadership and support of the previous Minister of Water Affairs and Forestry, Prof. Kader Asmal, was vital in this regard. His successor (Mr Ronnie Kasrils), and the Ministers of Environmental Affairs and Tourism (Mr Valli Moosa) and of Agriculture and Land Affairs (Ms Thoko Didiza) have continued to provide essential support for the programme. Dr Guy Preston, the Programme Leader, has, for over 8 years, provided the leadership and tireless perseverance necessary for the programme to succeed. Support for research was an essential part of the programme's success. In this regard, Dr Christo Marais (Working for Water's manager of scientific services), and his staff (Ahmed Khan, Mthembeni Khumalo, Nceba Ngcobo and Pumla Ndaba) are thanked for their unstinting support. My colleague Prof. Dave Richardson has provided valuable support in the conceptualisation of this review issue. There is no doubt that the Working for Water programme has, through its funding of relevant research, created the stimulus for continued achievements in this field by South African scientists.

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# PUBLICATIONS

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## Introduction and Spread of Invasive Species Symposium, Berlin (Germany) June 2005

Proceedings of the Symposium, held in June 2005 at Humboldt University, Berlin, Germany and organised jointly with Deutsche Phytomedizinische Gesellschaft (DPG) and The British Crop Production Council (BCPC), have been published and are available on the BCPC website at: [www.bcpc.org](http://www.bcpc.org) Click onto the Bookshop option and then the Proceedings icon.

In recent years, national and international environmental policy and legislation have begun to reflect the fact that invasive species are considered to be the second largest reason for biodiversity loss worldwide.

In addition to the direct ecological risks they pose, invasive species of pests, pathogens and weeds are of increasing importance in a more and more "borderless" Europe, within cropping and natural situations.

Some invasive pests are rapidly extending their natural range within Europe: how can we detect potentially invasive species at an early stage? Do we have appropriate monitoring and information exchange systems?

Currently beneficial alien species (introduced, for example, as beneficial insects or micro-organisms) are exchanged between European states, virtually without real limitations. Since they are, in fact, introduced from abroad, is this ecologically risky?

Generally, what role does trade play in heightening the risk of introductions resulting from the exchange of goods? Should attention be paid to alien species in the quality-



control procedures of goods, perhaps even at the point of production?

Official phytosanitary regulations, inspection and alert systems should protect people, production and nature from negative impacts of alien species. In the EU, for example, the activities of authorities are being harmonised. However, are the recently introduced quarantine structures already effective and are they working optimally? What might be required for the future?

The Symposium brought specialists from research, consultancy, trade and administration together. Their discussions widened views across the selected foci of the large spectrum of invasive alien species.

For more information: [www.bcpc.org](http://www.bcpc.org)

## **SOUTH AFRICAN CENTRE OF EXCELLENCE A WELCOME THREAT TO INVASIVE SPECIES**

In recent years the bleak statistics regarding the range and rate of spread of invasive species and the extent of their impact have become familiar to many scientists, policy-makers and members of the public. Over the last 350 years, 8,750 plant species have been introduced into South Africa alone. Of these, 180 have become invasive and, according to recent calculations; have spread over ten million hectares in South Africa. The Department of Water Affairs and Forestry estimates that 7% of South Africa's potential water resource is used by invasive plants. The importance of these facts is exacerbated by South Africa being an arid country with limited arable land. Invasive species also influence water quality, increase the risk and intensity of veldt fires and floods and alter the functioning of indigenous plant and animal communities.

The challenges facing especially developing countries in the fight against invasive species should not be discounted. It is clear that a pro-active approach, emphasizing regional collaboration, networking, technical capacity building and preventative measures is the key to giving nations a head start.

One collaborative effort aimed at addressing these challenges is the Department of Science and Technology and National Research Foundation funded Centre of Excellence for Invasion Biology (C-I-B), launched in 2004 at the University of Stellenbosch. The C-I-B is one of six Centres of Excellence, which are aimed at building scientific capacity and producing world class research in fields that contribute to the well-being of all South Africans.

The C-I-B seeks not only to understand the biodiversity consequences of biological invasions, but also to provide the scientific information required to help reduce the rate of spread and impact of invasive alien species. Professor Steven Chown, the C-I-B's director, noted that; "Invasions are not only costly, but they carry severe long-term threats to biodiversity, ecosystem services and ultimately to human quality of life". In order to achieve its goals, the C-I-B, along with other role players, is assisting the national government in preparing a framework for the implementation of the National Environmental Management: Biodiversity Act (No. 10 of 2004).

C-I-B research focuses on understanding the consequences of biological invasions in all South African biomes, including the sub-Antarctic Prince Edward Islands. Research at the C-I-B will cover all aspects of invasion biology, including biodiversity and ecosystem functioning, climate change, community ecology, fire ecology, ecosystem services, conservation planning, macro-ecology, landscape ecology, marine biology, pollination biology, risk assessment, spatial modelling and seed bank research.

Core scientific questions to be answered through the C-I-B's research include why some species are more successful invaders than others; how invasions alter ecosystem struc-



ture and functioning, and ultimately ecosystem services; and how scientific information can be put to work to inform policy makers and assist in practical, day to day decision-making by managers.

Student training and education at all levels, from undergraduate to the post-doctoral level as well as in-service training form another key element of the C-I-B strategy. C-I-B graduates will contribute to a skilled workforce that can address the biodiversity impacts of biological invasion in South Africa and elsewhere.

The C-I-B also hopes to play a key role in the mainstreaming of biodiversity issues into school learning programmes. We have initiated an outreach programme in previously disadvantaged rural and urban communities, providing skills development and information and communication technologies to assist teachers in building scientific capacity. The three other key performance areas of the C-I-B are networking, knowledge brokerage and service provision.

Although the C-I-B is housed at the University of Stellenbosch, student training and research is carried out by a network of researchers at several South African universities, including the Universities of Cape Town, Pretoria, and KwaZulu-Natal, Walter Sisulu University (formerly the University of the Transkei) and other research and development institutions, such as the Centre for Scientific and Industrial Research. The C-I-B is also developing partnerships with a wide range of organisations in South Africa and abroad that are concerned with biodiversity and the risks posed by biological invasions. This will increase the knowledge base on invasive species over a broad section of land- and seascapes across South Africa.

South Africa is a signatory to the Convention on Biological Diversity (CBD). In the CBD mission statement, parties commit themselves to achieving, by 2010, a significant reduction in the current rate of biodiversity loss at the global, regional and national level. The establishment of the C-I-B is another way in which South Africa, through the University of Stellenbosch and its partners, can contribute to achieving this goal.

For more information, please visit [www.sun.ac.za/cib](http://www.sun.ac.za/cib)

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# NOTES

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## **Report: International Workshop on Invasive Plants in the Mediterranean Type Regions of the World Mèze, May 2005, Montpellier, France**

All of the Powerpoint presentations from the Workshop are available at:

[http://www.eppo.org/MEETINGS/2005\\_meetings/workshop\\_invasive/workshop.htm](http://www.eppo.org/MEETINGS/2005_meetings/workshop_invasive/workshop.htm)

### **Session 1: Listing invasive plants and criteria, state of the art.**

Setting priorities for invasive alien plant management in South Africa, *Dave Richardson et al., South Africa*

Development of a ranked inventory of invasive plants that threaten wildlands in the Western US, *Joe Di Tomaso, USA*

A proposed method of selection and prioritisation of invasive plants in the French Mediterranean area, *Sarah Brunel, Jean-Marc Tison, France*

A review on geomatic tools for assessing, inventorying and mapping alien plant invasions in the Mediterranean basin, *Giuseppe Brundu, Italy*

Alien plants in Mediterranean ecosystems in the Americas : comparing species richness and composition at local and regional scale, *Ramiro Bustamante, Chile*

Actual knowledge on the invasive plants in Morocco, *Abdelkader Taleb, Morocco*

The Global Invasive Species Database (GISD) and the international exchange of invasive species information: using global expertise to help in the fight against invasive alien species, *Michael Browne et al., New Zealand*

### **Session 2: Prevention, dealing with introductions and spread of invasive plants (through horticulture, agriculture, forestry and landscape management).**

Changing attitudes to plant introduction and invasives, *Vernon Heywood, England*

Invasive alien plants in Europe - how can they be regulated? *Gritta Schrader, Germany*

Importation of exotic organisms - Legislation and regulations in the UE and in France (UE), *Dominique Coutinot, France*

Invasive plant species in Portugal, *Hélia Marchante, Portugal*

Engaging the horticulture industry in the process of reducing invasions by exotic plants in wildlands, *Valerie Vartanian, USA*

“Don’t plant a pest” initiative, *Joe Di Tomaso, USA*

Working with horticulture and landscape professions in the Mediterranean French area. The opinion and experience of a horticulturist, *Olivier Filippi, Sarah Brunel, France*

### **Session 3: Communication, education and awareness-raising on invasive alien plants.**

Invasive Species: A biological or a human problem? *Jeffrey MacNeely, Switzerland*

A sociological analyse of biological invasions in Mediterranean France, *Cecilia Claeys-Mekdade, France*

The “salinisation of weeds” in Australia. Can invasive plants please stand up! *Peter Martin, Australia*

Weedbuster Week - a national weeds awareness program in Australia, *Sandy Lloyd, Australia*

Potential threat of *Solanum elaeagnifolium* Cav. to the Tunisian fields, *Mounir Mekki, Tunisia*

### **Session 4: Management of invasive plants.**

The European strategy on invasive alien species, *Piero Genovesi, Italia*

Evaluating the costs and benefits of yellow starthistle (*Centaurea solstitialis*) control in California under uncertainty, *Karen Jetter, USA*

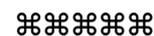
Integration of state weed programs and community-based weed councils in California, *Steve Schoenig, USA*

Invasive alien plants and coastal landscape quality, *Maria Appiani, Italy*

Eradication of *Carpobrotus* in Minorca, *Pere Fraga, Spain*

Biological control of Mediterranean invaders: getting a quicker bang for you buck! *René Sforza, Andy Sheppard, France*

The Cooperative Islands Initiative: “Turning back the tide of invasions”, *Alan Saunders, New Zealand*



## **Invasive Species in Africa**

There is a new website which focuses on forest invasive species in Africa. The website has been created by African specialists at the initiative of the Forest Invasive Species Network for Africa (FISNA), and is hosted by FAO.

Features include information on new outbreaks of invasive pest species and woody species. It also provides references, publications and other links related to invasive species in Africa.

View this link for the press release:

<http://www.fao.org/newsroom/en/news/2005/100308/>

# PUBLICATIONS

## Invasive Alien Species – A new synthesis

Edited by: Harold Mooney, Richard Mack, Jeffrey McNeely, Laurie Neville, Peter Johan Schei, Jeffrey Waage

*Invasive Alien Species* is the final report of GISP's first phase of operation, in which authorities from more than thirty countries worked to examine invasions as a worldwide environmental hazard. The book brings together the world's leading scientists and researchers involved with invasive alien species to offer a comprehensive summary and synthesis of the current state of knowledge on the subject.

Invasive alien species represent a criti-

## Nature out of Place - Biological Invasions in the Global Age

Though the forests are still green and the lakes full of water, an unending stream of invasions is changing many ecosystems around the world from productive, tightly integrated webs of native species to loose assemblages of stressed native species and aggressive invaders. The earth is becoming what author David Quammen has called a "planet of weeds."

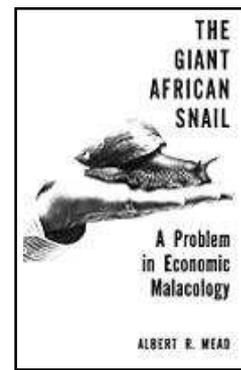
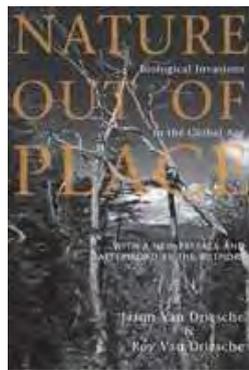
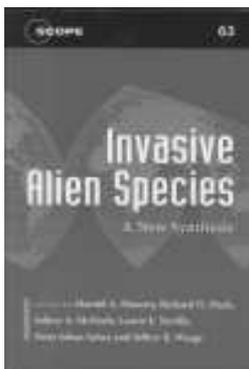
*Nature Out of Place* brings this devastating but overlooked crisis to the forefront of public consciousness by offering a fascinating exploration of its causes and consequences, along

diverse, to the characteristics of effective invaders, to procedures and policies that can help prevent future invasions. The book ends with a number of specific suggestions for ways that individuals can help reduce the impacts of invasive species, and offers resources for further information.

By bringing the problem of invasive species to life for readers at all levels, *Nature Out of Place* will play an essential role in the vital effort to raise public awareness of this ongoing ecological crisis.

*Nature out of Place* is published by Island Press and is available from their website: [www.islandpress.org/books](http://www.islandpress.org/books)

Source: Publishers



cal threat to natural ecosystems and native biodiversity, as well as to human economic vitality and health. The knowledge gained to date in understanding and combating invasive alien species can form a useful basis on which to build strategies for controlling or minimising the effects in the future. *Invasive Alien Species* is an essential reference for the international community of investigators concerned with biological invasions.

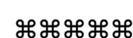
*Invasive Alien Species* is published by Island Press for US\$70.00 and can be obtained from their website at: [www.islandpress.org/books](http://www.islandpress.org/books)

with a thoughtful and practical consideration of what can be done about it. The father and son team of Jason and Roy Van Driesche offer a unique combination of narratives that highlight specific locations and problems along with comprehensive explanations of the underlying scientific and policy issues. Chapters examine Hawaii, where introduced feral pigs are destroying the islands' native forests; zebra mussel invasion in the rivers of Ohio; the decades-long effort to eradicate an invasive weed on the Great Plains; and a story about the restoration of both ecological and human history in an urban natural area. In-depth background chapters explain topics ranging from how ecosystems become

## Giant African Snail book and other books on line (HEAR)

"*The Giant African Snail: A Problem in Economic Malacology*" (Albert R. Mead, 1961) (RE: the species *Achatina fulica*) is now available online at: <http://www.hear.org/books/tgas1961/>

Also online: the full text of the book entitled "*Alien plant invasions in native ecosystems of Hawaii: Management and Research*" (1992; Stone, Smith, & Tunison [eds.]) at: <http://www.hear.org/books/apineh1992/>



# PUBLICATIONS

## Development Assistance and IAS in Freshwater Systems in SE Asia

A Report and Resource Guide for the US Agency for International Development has been published (March 2005) on “*Linkages between Development Assistance and Invasive Alien Species in Freshwater Systems in Southeast Asia*”.

It has been written by Alexis Gutiérrez and Jamie Reaser on behalf of GISP (Global Invasive Species Programme).

Available from Alexis Gutiérrez

Email: [alexis.gutierrez@noaa.gov](mailto:alexis.gutierrez@noaa.gov)

or through the GISP website at: [www.gisp.org](http://www.gisp.org)

Editors Comments: “*Given the pervasive problem of invasive alien species worldwide, especially in freshwater ecosystems, it is heartening to see a report like this. The report contains a wealth of information, including information on the increasing attempts to use native fish species for aquaculture – a critical step in preventing further biological invasions.*”



## Invasive Alien Species in Hungary

A 24 page booklet on invasive alien species in Hungary's protected areas is available online.

It is edited by the Authority for Nature Conservation, Ministry of Environment and Water in Hungary and is based on the Hungarian presentation on invasive alien species held at the Second Intergovernmental Conference “*Biodiversity in Europe*” in Budapest, February, 2002.

It includes the situation in Hungary, as well as the European and wider context and plans for the future. The booklet is illustrated throughout with colourful photographs.

You can find the book at:

[http://www.ktm.hu/cimig/documents/1231\\_invazivfajokangol\\_2\\_3.pdf](http://www.ktm.hu/cimig/documents/1231_invazivfajokangol_2_3.pdf)



## ALIENS Subscriptions

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**Aliens is the bi-annual newsletter of the Invasive Species Specialist Group (ISSG).** Its role is to put researchers, managers and/or practitioners in contact with each other and to publish information and news of alien invasive species and issues. Contributions should focus on conservation issues rather than economic, health or agricultural aspects of alien invasions. News of upcoming conferences, reports, and news of publications are also welcome, especially where they are of major international relevance. Please send your contributions, marked "for consideration for *Aliens*" to [m.depoorter@auckland.ac.nz](mailto:m.depoorter@auckland.ac.nz)

The New Zealand-based **Invasive Species Specialist Group (ISSG)** is a specialist group of the Species Survival Commission (SSC) of the World Conservation Union (IUCN). It is chaired by Mick Clout. The goals of the ISSG are to *reduce threats to natural ecosystems and the native species they contain - by increasing awareness of alien invasions and of ways to prevent, control or eradicate them.*

**Aliens-L is a listserv dedicated to invasive species.** It allows users to freely seek and share information on alien invasive species and issues, and the threats posed by them to the Earth's biodiversity. To subscribe, send an email without a subject header to: [Aliens-L-join@indaba.iucn.org](mailto:Aliens-L-join@indaba.iucn.org) OR [listadmin@indaba.iucn.org](mailto:listadmin@indaba.iucn.org) with the message: subscribe Aliens-L. When you have subscribed you will receive a message with instructions for using the list. Most subscribers are English speaking, however, if you would like your message translated into English before posting it, please contact [m.depoorter@auckland.ac.nz](mailto:m.depoorter@auckland.ac.nz) (we can currently deal with short messages in Spanish, Italian, Dutch, French and Arabic).

**Cooperative Initiative on Invasive Alien Species on Islands.** The aims of the Cooperative Initiative on Invasive Island Alien Species on Islands are: to enhance empowerment and capacity in key areas of invasive alien species (IAS) management on islands; to facilitate cooperation and sharing of expertise; to help enable local, national and regional entities to identify invasive alien species problems, work out solutions and implement them resulting in improvement in the conservation of island biological diversity. ISSG will undertake the facilitation of this initiative, in partnership with New Zealand (as a Party to Convention on Bio-

logical Diversity (CBD)) and under the umbrella of the Global Invasive Species Programme (GISP). This initiative is a recent development, and any interested individuals or institutions/agencies are encouraged to participate.

**The Global Invasive Species Database** is freely available on online at [www.issg.org/database](http://www.issg.org/database) and mirrored at [www.invasivespecies.net/database](http://www.invasivespecies.net/database). The development of the database, and the provision of content for it, is ongoing. Priorities range from a focus on the some of the world's worst invasive species to a focus on areas where information and resources are comparatively scarce, including small-island developing states and other islands. The database has images and descriptions for a wide variety of invasive species. Records for these species include information on the ecology, impacts, distribution and pathways of the species, and most importantly, information on management methods as well as contact details of experts that can offer further advice. The database also provides links to numerous other sources of information. A major contribution is provided by IAS experts, researchers and managers who provide information or act as reviewers on a voluntary basis.

**IUCN Guidelines for the Prevention of Biodiversity Loss Caused by Alien Invasive Species** <http://iucn.org/themes/ssc/pubs/policy/invasivesEng.htm>

**ISSG Office:** *Centre for Biodiversity and Biosecurity University of Auckland (Tamaki Campus) Private Bag 92 019, Auckland, New Zealand Phone: #64 9 3737 599 x85210 Fax: #64 9 3737 042 (Attention: ISSG) E-mail: ISSG@auckland.ac.nz for general inquiries. E-mail: m.depoorter@auckland.ac.nz to contact Aliens Editor, or IAS mainstreaming or policy queries. E-mail: a.saunders@auckland.ac.nz for more information on the Cooperative Initiative on Island Alien Invasive Species. E-mail: m.browne@auckland.ac.nz to contact the Global Invasive Species Database Manager.*

Websites: ISSG: [www.issg.org](http://www.issg.org)  
IUCN: [www.iucn.org](http://www.iucn.org)

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**IUCN**

The World Conservation Union

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Manaaki Whenua-Landcare Research Limited  
University of Auckland, Centre for Biodiversity and Biosecurity  
The New Zealand Department of Conservation  
The Pacific Development and Conservation Trust  
National Biological Information Infrastructure (NBII), USA