

ALIENS

Number 22 2005



Stewardship of Public Lands and "Parknering" in the Management of Exotic Herpetofauna in Florida (USA)

Florida's state park system is one of the largest in the United States, with 159 parks spanning greater than 293,403ha, including 160.9km of pristine, sandy beach. These public or trust lands are immensely popular with residents and tourists wishing to connect with Florida's unique and striking natural legacy. The mission of the Florida state park system is, in part, to maintain these resources as intact natural systems. The diminishment of natural areas surrounding parks and a growing accumulation of mostly tropical exotic species and plants and animals adds to the challenge of this mission in Florida. A subset of the exotic biota in Florida is the 45 species comprising the exotic herpetofauna (Meshaka *et al.*, 2004; Meshaka, 2006). Most are lizards, especially anoles and geckos. Most are small-bodied, early-maturing, and insectivorous. Typically, they are strongly associated with humans and disturbed habitat, southern Florida is their center of distribution, and their association is somehow tied to the pet trade.

Florida parks, even those with a minimum of disturbed habitats and buildings, are not immune to colonization by exotic amphibians and reptiles. Some species have received extensive study in public lands by private researchers, as in the case of the Cuban treefrog (*Osteopilus septentrionalis*) (Meshaka, 2001) and two geckos of the genus *Hemidactylus* (Meshaka and Moody, 1996; Meshaka, 2000, 2001). Official attention has even been garnered to address large and potentially dangerous exotic species, like the Nile monitor (*Varanus niloticus*) and Burmese python (*Python molurus bivittatus*) in public lands by the United States Department of Agriculture and the United States Department of the Interior.

We speak here to a recent and effective approach to the management of exotic species through a partnering, the "Parknership" program, between Florida state parks and researchers from other institutions, such as universities, who through field projects within this venue, provide peer-reviewed, published ecological information pertaining to one or more of the following questions:

- Why or why not a species succeeds?
- What are its impacts on other species, both exotic and native?
- How, if at all, it can be controlled or eradicated?

It is precisely those sorts of data as a tangible product that provide the information necessary to make informed policy decisions, which in turn, help the public lands meet what can otherwise be a vexing mission goal of maintaining natural systems in the face of exotic species that live in and around these parks. The second tangible product of this program has been the hands-on training for young ecologists interested in Florida ecology, herpetology, colonization theory, wildlife management, and conservation.

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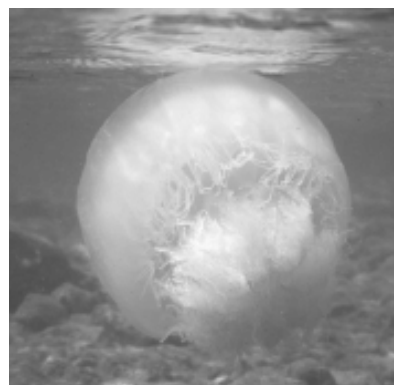
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*From the editor:
We regret the delays
in the production of
Aliens 22 and
apologise for any
inconvenience caused.*



“ZOOM on the Invasives” photo competition:

New, blue, and venomous: *Rhopilema nomadica* invades Mediterranean beaches. FINALIST

Mel COOPER, ISRAEL

Continued from page 1

Two case studies illustrate these points. Building upon studies on the colonization dynamics of the three exotic species noted above, the “Parknership” program conducted a building survey with volunteers at Savannas Preserve State Park. Results of the intensive two month study, published one year later (Meshaka *et al.*, 2005a), quantified the abundance of exotic species as well as the concomitant dearth of two native treefrogs, approximated the age of gecko colonization, and corroborated the instability of exotic *Hemidactylus* assemblages. A similar pair of studies was subsequently conducted on buildings at Florida Atlantic University with an FAU Wilkes Honors College student and at John U. Lloyd Beach State Park (JULBSP) with an individual who was both an undergraduate student at Florida International University and a park ranger at JULBSP. Published within one year of completion (Meshaka *et al.*, 2006), this study quantified building herpetofaunal abundance and corroborated patterns of exotic species turnover, but also noted phenomena that could serve to stall or accelerate the faunal replacement process on these buildings. Presently, we are designing a Florida Keys-wide survey of geckos in nine state parks that dot the full length of the Florida Keys, with the goals of quantifying presence on buildings and natural habitat as well as the rate of insular dispersal of what can be up to seven species, which range in size from the diminutive ocellated gecko (*Sphaerodactylus argus*) to the brutish tokay gecko (*Gekko gecko*).

Our second case study concerns the far less secretive and heliothermic (sun-heat seeking) northern curlytail lizard (*Leiocephalus carinatus armouri*). Interest in this species by the “Parknership” program began with a review of its colonization dynamics (Smith and Engeman, 2004) and southern tri-county survey (Smith *et al.*, 2004), which included reports of the species in state parks. Subsequently, a student intern assisted in a northern coastal tri-county survey for this species (Meshaka *et al.*, 2005b). Thanks to sufficient monthly samples collected during a full year we now have near completion a manuscript concerning growth and reproduction of the species in the centre of its Florida range. Recent published notes and those in press, document natural history observations of the species and noteworthy geographic records. Because we consider several of the coastal state parks to be at risk to the northern curlytail, we continue to pay attention to it with the goal of being proactive rather than reactionary with respect to its potential colonization attempts in coastal public lands.

What are we up to now? The green iguana (*Iguana iguana*), common in disturbed hammock (subtropical coastal woodland) settings in southern Florida, is a demonstrable menace at the 70.9ha Hugh Taylor Birch State Park, thanks in part to the floral disturbance following recent hurricanes and to the recent removal of 160 raccoons (Smith and Engeman, 2002), a super-abundant mid-level carnivore with negligible predators of its own. We are coordinating a project of intense life history study and removal of specimens, which together meet our “Parknership” goals

of public land management useful studies. We are proud to be able to share in this newsletter the status of the “Parknership” approach to remediation of exotic species colonization problems on public trust lands. Perhaps, a measure of its success will be in its applicability to the trust lands of any country with similar exotic species challenges as we have in the state parks of Florida.

References

- Meshaka, W.E., Jr. 2000. Colonisation dynamics of two exotic geckos (*Hemidactylus garnotii* and *H. mabouia*) in Everglades National Park. *Journal of Herpetology* 34:163-168.
- Meshaka, W.E., Jr. 2001. The Cuban Treefrog: Life History of a Successful Colonizing Species. University Press of Florida, Gainesville, FL. 191 pp.
- Meshaka, W.E., Jr. 2006. An update on the list of Florida’s exotic amphibian and reptile species. *Journal of Kansas Herpetology In Press*.
- Meshaka, W.E., Jr., B.P. Butterfield, and J.B. Hauge. 2004. The Exotic Amphibians and Reptiles of Florida. Krieger Publishing Company, Malabar, FL. 155 pp.
- Meshaka, W.E., Jr., and B.A. Moody. 1996. The Old World tropical house gecko (*Hemidactylus mabouia*) on the Dry Tortugas. *Florida Scientist* 59:115-117.
- Meshaka, W.E., Jr., H.T. Smith, R.G. Severson, and M.A. Severson. 2005a. Spatial picture of a gecko assemblage in flux. *Florida Scientist* 68:53-55.
- Meshaka, W.E., Jr., H.T. Smith, R.M. Engeman, C.L. Dean, J.A. Moore, and W.E. O’Brien. 2005b. The geographically contiguous and expanding coastal range of the northern curlytail lizard (*Leiocephalus carinatus armouri*) in Florida. *Southeastern Naturalist* 4:521-526.
- Meshaka, W.E., Jr., H.L. Cress, K.L. Kingsland, H.T. Smith, S.A. Fitchett, J.A. Moore, and E.M. Cowan. 2006. *Hemidactylus* (exotic house geckos) assemblage dynamics on South Florida buildings. *Journal of Kansas Herpetology* 17:7-8.
- Smith, M.M., H.T. Smith, and R.M. Engeman. 2004. Extensive contiguous north-south range expansion of the original population of an invasive lizard in Florida. *International Biodeterioration and Biodegradation* 54:261-264.
- Smith, H.T., and R.M. Engeman. 2002. An extraordinary raccoon, *Procyon lotor*, density at an urban park. *Canadian Field Naturalist* 116:636-639.
- Smith, H.T., and R.M. Engeman. 2004. A review of the colonization dynamics of the northern curly-tailed lizard (*Leiocephalus carinatus armouri*) in Florida. *Florida Field Naturalist* 32:107-113.

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NOVEMBER 2004 IUCN WORLD CONSERVATION CONGRESS (WCC) AND INVASIVE ALIEN SPECIES

The World Conservation Congress (WCC) is the general assembly of IUCN members, which takes place every three to four years. The Congress combines the business of the Union with technical conservation fora and provides an opportunity for the sharing of information and experience among IUCN's worldwide constituency of members, Commission members, stakeholders and partner organizations. The Congress encompasses three principal elements: conducting the business of the Union, assessing the work of IUCN Commissions and taking stock of conservation. The 3rd WCC took place in Bangkok, Thailand, in November 2004.

The ISSG team present included Mick Clout (Chair), Maj De Poorter (Coordinator), Michael Browne (Database manager), Piero Genovesi (ISSG Europe) as well as many members of ISSG, in a variety of capacities. Activities which ISSG organised or participated in included:

- Two presentations given during the during the SSC Commission days, as well as a presentation in the Conservation Commons session, two at the Global Synthesis workshop, and a contribution to the GISP launch
- A booth in the Atrium zone, with information, newsletters and other publications, self-running presentations, and live demonstrations of the Global Invasive Species Database
- A half day Training workshop "Invasive alien species management for practitioners in gumboots, flip flops or suit and tie: there is always something you can do!" - an introduction to understanding various ways of preventing as well as fighting back against invasive alien species

The Council of Europe and ISSG (through Piero Genovesi) organised a "round table" session to discuss further options for future work in the context of the European Strategy on Invasive Alien Species, adopted by all European countries in December 2003 (see box).

The Global Invasive Species Programme (GISP) used the "Conservation Platform" venue to launch its new partnerships, products and initiatives. Several GISP secretariat and Board members "manned" the eye-catching high profile GISP booth.

The World Conservation Forum sessions on "Biodiversity Loss and Species Extinction - Managing risk in a changing world" had two sessions on the sub-theme *Invasive alien species and biodiversity - Coping with aliens* (see box). These were organised by Geoffrey Howard (IUCN East Africa Regional Office) and Imene Meliane (IUCN Global Marine Programme).

Recommendation: One recommendation was adopted on Invasive species: RECWCC3.090 Implementation of the

"European Strategy on Invasive Alien Species" (see page 6).

"Zoom on the Invasives": a photo competition was organised by Imene Meliane of the Global Marine programme, called "Zoom on the Invasives,". It drew more than 80 entries, helping to raise awareness of the problem. The ten finalists were exhibited at the WCC and the winner announced. The Finalist photographs are printed throughout this issue of *Aliens*.

INVASIVE ALIEN SPECIES AND BIODIVERSITY - COPING WITH ALIENS

Subtheme of the sessions on "Biodiversity Loss and Species Extinction - Managing risk in a changing world" of the World Conservation Forum:

- *A global perspective on biological invasions - impacts on ecosystems and economies* by Mark Lonsdale

- *Management of Invasive Alien Species: An Asian perspective on the way forward* by Channa N.B. Bambaradeniya

- *Invasive species - a global issue, with global solutions* by Phoebe Barnard and Lynn Jackson

- *Special Invasive Alien Species Issues: challenges for the marine systems* by Marnie L. Campbell and Chad L. Hewitt

- *Prevention: Marine biodiversity threatened by Ballast water transported by ships; curbing the threat* by Cato C. ten Hallers-Tjabbes

- *Action against Invasive Species on Islands* by M. N. Clout and C. M. Denny

- *Precaution and invasive alien species: challenges at the interface of the trade and environment regimes* by Rosie Cooney

- *Biodiversity challenges for invaded wetland ecosystems in Africa: The case of the Kafue Flats floodplain system in southern Zambia* by Musonda Mumba

- *Invasive Alien Species: Agriculture and Development* by D. K. Rangi

- *Aquatic Invasive Species Monitoring and Early Warning in Marine Managed Areas* by Alexis Gutierrez, Sharanya Krishna Prasad and Linda Shaw

- *Invasive Alien Species Prevention Strategies and the International Trade Regime* by Greg Foote and Stas Burgiel

- *Impacts of *Mimosa pigra* on wetlands of the lower Mekong Basin* by Tran Triet

Proceedings at: http://www.iucn.org/congress/2004/wcforum/forum_th_biodiversity-proceed.htm

European IAS Strategy Implementation - World Conservation Congress Workshop

A synthetic report on the outcomes of the roundtable concerning the European Strategy on Invasive Alien Species, which took place at the 3rd IUCN World Conservation Congress – 18th November 2004 can be found at:
<http://www.iucn.org/congress/programme/forum-programme.cfm?toi=event-list&shown=KM#point7>

The European Strategy on Invasive Alien Species, adopted by all European countries in December 2003, provides a unique opportunity for a coordinated approach at regional scale to address the threats posed by invasions. The aim of the roundtable was to discuss options for future work. This was organised by the Council of Europe and ISSG (Piero Genovesi).

Key conclusions

- The free trade system of Europe limits the ability to respond to invasions. Inaction by many states is also due to limited awareness and inadequacy of many legal and policy tools in this specific regard
- The supranational legislative system of Europe – with centralized responsibility on trade, agriculture, fishery, forestry etc. - provides opportunities for more effective regional action.
- Europe urgently needs to revise its regulatory systems, and to develop technical tools such as inventories of alien species, lists of experts and contact specialists, reports on cases of successful prevention

Key recommendations

- European states and institutions are called to be more active on prevention and mitigation of this threat, also supporting the implementation of the “European Strategy on Invasive Alien Species”
- In the implementation of the Strategy, European States and Institutions shall consider revision of existing regulations and development of new ones.

In their actions, European States and Institutions shall promote participation of all societal sectors directly or indirectly involved in the movement and management of alien species.



“ZOOM on the Invasives” photo competition:

Bald cypress smothered by Old World climbing fern, *Lygodium microphyllum*; Jonathan Dickinson State Park, Florida.
FIRST PLACE

Scott KAM, USA

RECOMMENDATION ON INVASIVE ALIEN SPECIES AT THE 2004 IUCN WORLD CONSERVATION CONGRESS

REC 3.090 Implementation of the European Strategy on Invasive Alien Species

WELCOMING the adoption by the Standing Committee of the Bern Convention (Strasbourg, 4 December 2003) of the *European Strategy on Invasive Alien Species*, developed in cooperation with the Invasive Species Specialist Group of the IUCN Species Survival Commission (SSC);

RECALLING that Recommendation 2.67 *Invasive alien species* adopted by the 2nd IUCN World Conservation Congress (Amman, 2000) expressed concern on the threats posed by invasive alien species (IAS);

RECALLING that Recommendation 99 on the *European Strategy on Invasive Alien Species* adopted by the Standing Committee of the Bern Convention (4 December, 2003) recommends Parties to draw-up and implement national strategies on IAS, taking into account the *European Strategy on Invasive Alien Species*;

RECALLING the recognition, at the Vth IUCN World Parks Congress – WPC (Durban, 2003), that “Management of IAS is a priority issue and must be mainstreamed into all aspects of Protected Area (PA) management” (*WPC Emerging Issues, No. 7*);

RECALLING that Paragraph 44(i) of the *Plan of Implementation* of the World Summit on Sustainable Development (Johannesburg, 2002) calls for countries to “Strengthen national, regional and international efforts to control invasive alien species, which are one of the main causes of biodiversity loss, and encourage the development of effective work programmes on invasive alien species at all levels”;

FURTHER RECALLING that the issue of IAS with a biodiversity impact has recently been recognized in the context of the Convention on Biological Diversity (CBD), International Maritime Organization (IMO), the Convention on Wetlands (Ramsar, 1971), the International Plant Protection Convention (IPPC) and other international instruments;

CONCERNED that IAS constitute one of the most serious threats to biodiversity and ecosystem integrity as well as a threat to sustainable development;

RECOGNIZING that many nations have a growing awareness of the need to address IAS threats, but that their capacity to respond is often limited because of inadequate legal and institutional frameworks; and

NOTING that a coordinated implementation of the

measures recommended by the *European Strategy on Invasive Alien Species* will help prevent new unwanted introductions in Europe and will mitigate the impacts caused by IAS in the region;

The World Conservation Congress at its 3rd Session in Bangkok, Thailand, 17–25 November 2004:

1. CALLS ON European countries to develop and implement national strategies or action plans based on the *European Strategy on Invasive Alien Species* and to increase cooperation in addressing the threats posed by invasive alien species (IAS);
2. CALLS ON the European Union to support the implementation of the *European Strategy on Invasive Alien Species* at the regional level and to strengthen regional capacity and cooperation to deal with IAS issues;
3. URGES all governments to foster increased cooperation on IAS issues between government agencies dealing with environment and agriculture issues at national and regional levels, as well as to foster increased cooperation and consultation between government agencies and all other relevant stakeholders on these matters;
4. URGES governments, institutions and civil society to increase their efforts to mainstream IAS management into conservation as well as into sustainable development programmes and initiatives; and
5. URGES all stakeholders to maximize exchanges of information and expertise on IAS and to support national, regional and international initiatives that contribute to this.

The Department of State, United States, provided the following statement for the record: State and agency members United States refrained from engaging in deliberations on this motion and took no national government position on the motion as adopted for reasons given in the US General Statement on the IUCN Resolution Process.

All WCC recommendations and Resolutions can be downloaded in English, French or Spanish respectively, at:
http://www.iucn.org/congress/2004/members/submitted_motions.htm
http://www.iucn.org/congress/2004/members/submitted_motions_fr.htm
http://www.iucn.org/congress/2004/members/submitted_motions_es.htm



PUBLICATIONS

***Invaders From the Sea* – a documentary from the International Maritime Organisation**

Every day thousands of species are in transit around the globe held in the ballast water of ships. Some of the most damaging Invasive Alien Species ever seen have been transported to new areas in ballast water so this pathway is a major concern to people involved in trying to reduce the spread of IAS. The International Maritime Organisation (IMO) is working hard to improve methods of ballast water handling and therefore reduce the number of organisms transported by this pathway. The latest initiative from the IMO is a DVD entitled *Invaders from the Sea*. This documentary was filmed by the Natural History Unit at the BBC and it focuses on 3 invasive species which have had major effects on the ecosystems where they have been introduced and the people who rely on those ecosystems for their food and livelihoods. *Invaders from the Sea* is intended to raise public awareness about the scale of the problem posed by marine IAS and to introduce some of the schemes aimed at reducing the problem.

The documentary will be distributed by IMO through the United Nations film distribution channels in developing countries, while BBC Worldwide has the exclusive rights to distribute it in the developed countries.

For further information

media@imo.org

or

http://www.imo.org/Newsroom/mainframe.asp?topic_id=1320&doc_id=6235.



“ZOOM on the Invasives” photo competition:
Biocontrol - Cinnabar moth *Tyria jacobaeae* feeding on leaves and flowers of the noxious weed, tansy ragwort *Senecio jacobaea*, Castle Rock, Washington, USA. FINALIST

Kathy Keatley GARVEY, USA



Aquatic Invasions

European journal on biological invasions

Aquatic Invasions is a new online journal focusing on biological invasions of the inland and coastal waters of geographic Europe. The journal provides the opportunity for timely publication of first records of biological invaders, for consideration in risk assessments, early warning systems and eradication programmes. Technical reports and other accounts not publishable in regular scientific journals, including large datasets of aquatic invasive species records from monitoring and biological surveys will also be available.

The journal is published on behalf of the International Association of Theoretical and Applied Limnology (SIL) under the auspices of the European Research Network on Aquatic Invasive Species (ERNAIS) and the Editorial Board of *Aquatic Invasions* represents an international team of key European experts in biological invasions.

Issues of *Aquatic Invasions* are available online at <http://www.aquaticinvasions.ru>

New contributions are welcome. Manuscripts relevant to inland waters invasions may be submitted to Vadim E. Panov (rbic@zin.ru), manuscripts concerning invasions in coastal waters to Stephan Gollasch (SGollasch@aol.com).

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THE NEW NOISY NEIGHBOURS

Impacts of alien house geckos on endemics in Mauritius

Anyone who has visited the tropics or sub-tropics is likely to have heard the distinctive call of a gecko, particularly after the sunset. More often than not the call is being emitted by one or a few species of gecko that are grouped under the general name of house gecko, because of their affinity with human dwellings. This anthropogenic tendency has meant that people have inadvertently moved them to new locations. One of the most vocal and frequently moved geckos has been the common house gecko, *Hemidactylus frenatus* (Fig. 1), which is now established in at least 87 locations around the world outside of its natural range in Asia and the Indo-Pacific. Many of these new locations have been small remote islands in the Pacific and Indian Oceans.

Where the common house gecko has been introduced to islands of the Pacific Ocean, researchers have shown that this lizard has been responsible for the competitive displacement of other similar sized or smaller gecko species in urban and suburban environments. It was shown that habitat simplification and clumped food resources around artificial light sources as a result of urbanisation have enabled the common house gecko to gain an indirect competitive advantage over other nocturnal gecko species. However, hitherto the competitive impact of the common house gecko had only been considered for generalist species inhabiting urban and suburban habitats. Little was known of the common house geckos' impact on endemic species in natural and disturbed/semi-natural habitats, such as on the Indian Ocean island of Mauritius.

Mauritius once maintained one of the richest endemic reptile diversities known, but owing to extensive habitat destruction and the impact of introduced species, most notably predatory mammals, more than 60% of the main

islands reptile species were lost. Yet habitat destruction and the presence of introduced predatory mammals could not fully explain the current abundance and distribution of some lizard species, which led to the suggestion that the introduced common house gecko may be partly responsible. Over the past three years I have investigated the role of this introduced gecko in the decline of the similar sized endemic ornate day gecko, *Phelsuma ornata*, and the extirpation of the endemic night geckos: the smaller lesser night gecko, *Nactus coindemirensis*, the similar sized Durrell's night gecko, *N. durrelli*, and the slightly larger Serpent Island night gecko, *N. serpensinsula* (Fig. 2).

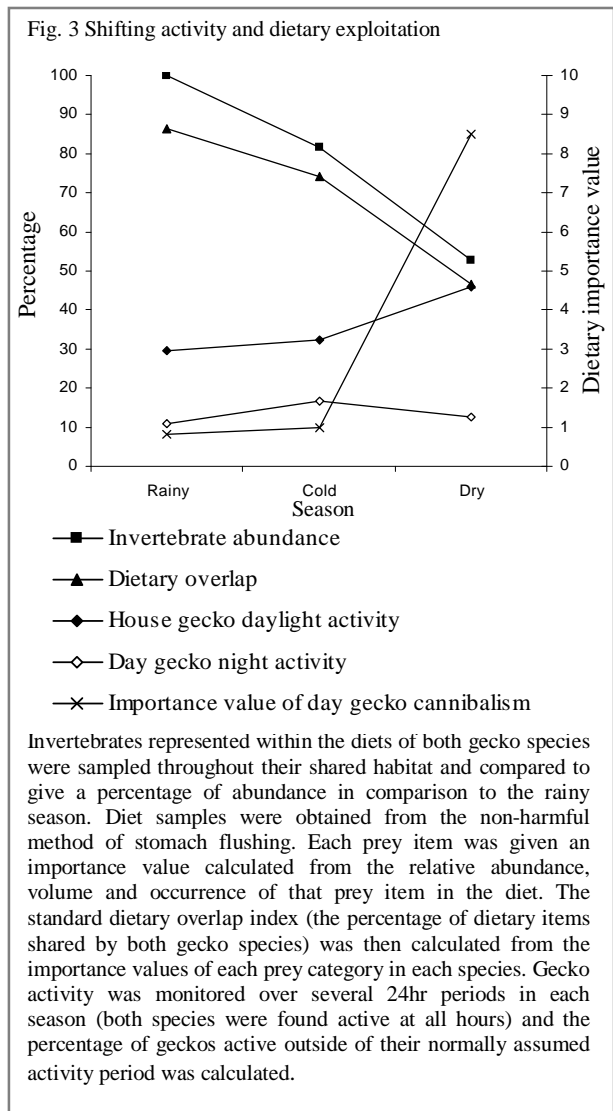
From my initial research determining the extent to which the house gecko had penetrated habitats utilised by the ornate day gecko, I discovered that areas of forest dominated by non-native vegetation maintained less than 20% of the number of day geckos than in adjacent areas dominated by native vegetation. Conversely differences in native and non-native vegetation had no impact upon the abundance of the house gecko, which penetrated and utilised all habitats including those favoured by the day gecko. Whilst it was apparent that loss of native habitat was a major factor in the decline of ornate day gecko populations, further research established that the house gecko was having a more subtle impact. I demonstrated that as invertebrate prey resources became more limited over the year from the rainy to the dry season the predominantly nocturnal house gecko increased its activity in daylight hours (Fig. 3), such that it disproportionately depleted food items that were shared with the ornate day gecko. The ornate day gecko was therefore forced to select different prey items, such that the overlap in diet between the two gecko species decreased, however as a result of this, the day gecko increased its tendency for cannibalism (Fig. 3).

Fig. 1 The common house gecko, *Hemidactylus frenatus* (Photo:N Cole)



Fig. 2 Clockwise from top left: the ornate day gecko, *Phelsuma ornata*; the lesser night gecko, *Nactus coindemirensis*; Durrell's night gecko, *N. durrelli*; and the Serpent Island night gecko, *N. serpensinsula* (Photo:N Cole)

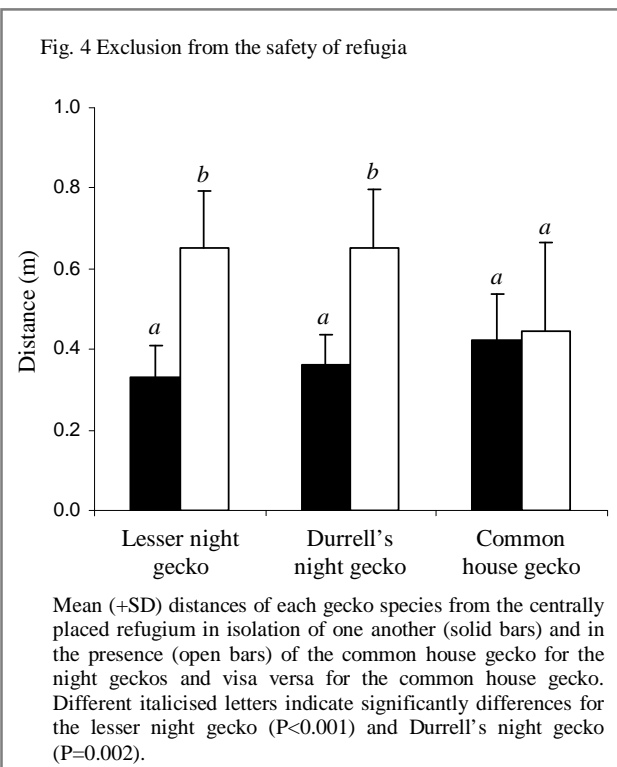




night gecko and the Serpent Island night gecko were restricted to one offshore island each. Evidence of co-existence with mammalian predators and their existence in extremely barren habitats demonstrated that the usual impacts were not the sole cause of their decline. In fact, given that the night geckos only existed on the few islands that had not yet been invaded by the house gecko indicated that it was the prime suspect. I therefore investigated the likely mechanisms by which the house gecko had caused the complete exclusion of the night geckos. For each species I collected data on their macro- and microhabitat preferences by comparing sites with and without geckos, their thermal requirements and the thermal properties of their habitat, and finally their diet. The house geckos were shown to occupy the same macro- and microhabitat variables as the night geckos, preferring west facing, sheltered, vertical rock faces. All four species chose predominantly the same refugium type, which consisted of cavities and crevices in the bedrock and all positioned themselves at similar distances to them when active. The entrance size of the cavities and crevices utilised by the house gecko and the lesser night gecko were no different and although the other two night gecko species chose slightly larger entrances these would not have excluded the house gecko. The thermal behaviour of each species was the same and all chose microhabitats that had higher substrate temperatures than elsewhere. The house gecko also consumed similar prey items to the night geckos, but owing to the smaller size of the lesser night gecko the prey items it consumed were smaller than those selected by the house gecko. It therefore appeared that following the initial invasion of the house gecko competition would have possibly been intense at the microhabitat scale particularly in terms of positions from refugia, refugium type and thermal properties of the substrate. It is also likely that competition

I also investigated whether the geckos were exposing one another to potentially new and harmful parasites. No evidence was found for cross transmission of parasites between host species, despite them frequently coming into contact with each other, their faeces and consuming similar potential intermediate invertebrate host species. However, on islands where the two species occurred together the ornate day geckos became more susceptible to infection by their own parasites, in particular a gut nematode and an ectoparasitic pterygosomatid mite. Furthermore, the mite was also shown to have a negative impact upon gecko body condition. The long term effects of both dietary exploitation and increased parasite susceptibility of ornate day gecko populations in the presence of house gecko is unknown, but is likely to be detrimental, particularly in the face of further habitat alteration.

Unlike the ornate day geckos, which are still found in coastal areas of Mauritius and several of the offshore islands the night geckos have a much more restricted range. Sub-fossil remains show that the night geckos were once found throughout Mauritius, but had undergone a catastrophic decline. The lesser night gecko population was fragmented to just three offshore island populations, whilst Durrell's



for similar prey items with the two larger night geckos may have existed. Identification of all prey items in the diets highlighted the tendency for the house gecko to predate upon lizards, such as juvenile shore skinks, *Cryptoblepharus boutoni*. This skink is roughly the same size as the lesser night gecko and juveniles of the other two night geckos, which could have also posed as potential prey items for the house gecko.

Interaction experiments were then set up in outdoor arenas, each with a centrally placed refugium, to test whether the house gecko did indeed compete with the night geckos for space. Positions of each gecko species from each centrally placed refugium were recorded in isolation of and with the house gecko. Given the potential sensitivity of removing Serpent Island night geckos from the population for this experiment they were not included. In the presence of the house gecko the night geckos were forced from their refugia and occupied positions more than twice the distance from the refugia than when on their own (Fig. 4). The house geckos caused these shifts through aggressive interactions, with no detectable change in their own preferred positions from refugia or use of refugia. These aggressive interactions caused the loss of tails, toes and skin of the night geckos. The lesser night geckos were also preyed upon. This suggested that when house geckos first invaded Mauritius they would have excluded the night geckos from their preferred habitats increasing their risk to predation by native birds and reptiles, and introduced mammals. Being forced from refugia would have also exposed them to adverse weather conditions, such as heavy rains and cyclones that frequent the region. Even in the absence of predators house geckos would have preyed the smaller night geckos.

The ability of the house gecko to persist outside of its natural range in both disturbed and undisturbed habitats

poses a great threat to the survival of ecologically similar endemic geckos within some of the most important global biodiversity hotspots. Unfortunately there are no available techniques for eradicating small invasive geckos, such as house geckos, particularly once they have established. Nevertheless, the discovery of a new lesser night gecko population on an island inhabited by the house gecko may hold the key in preventing its colonisation of particular habitats. The night gecko population was restricted to just over 200m² of volcanic tuff rock, which was surrounded, but not occupied by house geckos. I found that the toe pads of house geckos, which grip through van der Waals forces, became clogged with the numerous loose particles on the rock surface preventing adequate grip. The lesser night geckos, which have slender clawed toes penetrated all the loose particles to the underlying more stable rock allowing them access to this habitat type. Similar rocks or manmade substrates with a loose particulate surface could be used to replicate habitats or to build barriers to exclude the house gecko. This discovery offers the first means of enabling night geckos and possibly other small saxicolous lizards that are potentially threatened from the ongoing spread of the house gecko to survive its impact. However the best conservation measure available is to prevent the introduction in the first place.

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“ZOOM on the Invasives” photo competition:

Jellyfish aplenty, but no fish - alien jellyfish, *Rhopilema nomadica*, swarming in the Mediterranean coast off Haifa Bay, Israel. **THIRD PLACE**

Bella GALIL, ISRAEL

AN ADDITIONAL RECORD OF THE HORSESHOE CRAB *LIMULUS POLYPHEMUS* IN THE NORTH SEA

The horseshoe crab *Limulus polyphemus* (Linnaeus, 1758) is native to the Atlantic coast of North America, from Nova Scotia to Yucatan (Holthuis, 1950). It was introduced into the North Sea with an initial finding either off Terschelling (The Netherlands) or from the coast of North Wales in 1873 (Southwell 1873, Holthuis 1950, Wolff 1977). It took more than 100 years for additional findings, off the German and Danish coasts (Wolff 1977, Nehring & Leuchs, 1999, Jensen & Knudsen

(Lloyd 1874, Holthuis 1950). For the records, in the 1960s/70s, Wolff (1977) assumed that several individuals were brought from the coast of the USA by seaman and then thrown overboard when the vessel passed through the North Sea. The individuals may have reached the coast due to active migration resulting in single records (Nehring & Leuchs 1999).

The two distinct findings in the 1870s and 1960s/70s of a few individuals in the region indicate that the species was

into Europe which resulted in his PhD (Gollasch 1996) which is the first thesis world-wide based on ballast water sampling.

Literature cited

- Gollasch, S. 1996. Untersuchungen des Arteintrages durch den internationalen Schiffsverkehr unter besonderer Berücksichtigung nichtheimischer Arten. Diss., Univ. Hamburg; Verlag Dr. Kovac, Hamburg, 314 pp.
- Gollasch, S., Macdonald, E., Belson, S., Botnen, H., Christensen, J., Hamer, J., Houvenaghel, G., Jelmert, A., Lucas, I., Masson, D., McCollin, T., Olenin, S., Persson, A., Wallentinus, I., Wetsteyn, B. & Wittling, T. (2002): Life in Ballast Tanks. 217-231 pp. In: Leppäkoski, E., Gollasch, S. & Olenin, S. (eds.): Invasive Aquatic Species of Europe: Distribution, Impacts and Management. KLUWER Academic Publishers, Dordrecht, The Netherlands. 583 pp.
- Holthuis, L.B. 1950. Decapoda. A. Natantia, Macrura Reptantia, Anomura en Stomatopoda. Fauna van Nederland 15, 1-120
- Jensen, K. & Knudsen, J. 2005. A summary of alien marine invertebrates in Danish waters. Oceanological and Hydrobiological Studies. Vol. XXXIV, Supplement 1, 137-162
- Lloyd, W.A. 1874. On the occurrence of *Limulus polyphemus* off the coast of Holland, and on the transmission of aquarium animals. Zoologist, Series 2(9), 3845-3855
- Nehring, S. & H. Leuchs 1999. Neozoa (Makrobenthos) an der deutschen Nordseeküste. Eine Übersicht. Bundesanstalt für Gewässerkunde, Koblenz. 131 pp.
- Southwell, T. 1873. King crab off the Dutch coast. Zoologist 2(8), 3740
- Wolff, T. 1977. The Horseshoe Crab (*Limulus polyphemus*) in North European waters. Vidensk. Meddr Dansk Naturh. Foren. 140, 39-52
- Wolff, W.J. 2005. Non-indigenous marine and estuarine species in The Netherlands. Zoologische Mededelingen. 79-1, 1-116

The finding was made by the author when 10 years old..... the basis for the author's interest in biological invasions was initiated.

2005). So far, more than 20 individuals have been caught, but it is assumed that these represent only a small fraction of the original numbers released (Wolff 1977). Recent records have not been reported (Wolff 2005).

The introduction vector is not clear. Larvae of *L. polyphemus* could have been transported by ballast water and subsequently released into the North Sea. Wolff (1977) mentioned that larvae of *L. polyphemus* are able to swim, but do not usually occur pelagically and he concludes that ballast water transport is highly improbable. Larvae of the horseshoe crab were never found in ballast water sampling studies (Gollasch *et al.* 2002).

Jensen & Knudsen (2005) state that the species was imported for aquaculture purposes at Helgoland (German Wadden Sea) around 1860. Another suggestion is that a Mr. Hagenbeck (who later founded the Hagenbeck Zoo in Hamburg, Germany) imported quantities of the species in the 1860s for the aquarium trade (Nehring & Leuchs 1999). Lloyd (1874) states that he and others imported individual species from New York to Hamburg for the same reason. Not all animals could be sold so the remainder were deliberately released near Helgoland, Germany, in 1866

likely introduced twice without establishment (Nehring & Leuchs 1999). Wolff (1977) assumes that the Wadden Sea poses a suitable habitat for the species and that reproduction seems likely.

This account is meant to add to our known records of horseshoe crabs in the North Sea. In August 1970 one live individual of the species was found on a beach south of Westerland on the west coast of the German Island, Sylt, near to the Danish border. This represents the only finding from this island. The finding was made by the author when 10 years old. Species identification by a school boy may be questioned; however, the species is very different from all other species found in the area and prior to this finding Gollasch spent many vacations on this island "studying" the invertebrate fauna. It is, therefore, believed that the finding could not be misinterpreted.

Lastly, since it became clear that the horseshoe crab is not native in German waters, the basis for the author's interest in biological invasions was initiated. He continued to follow this interest by studying marine biology and eventually became the first researcher to carry out a shipping study to proof biological introductions

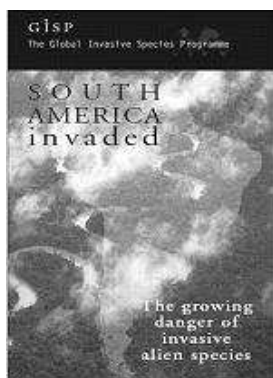
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PUBLICATIONS

GISP Guide to Invasive Species in South America

The continent of South America has a huge variety of different habitats and is home to more than 20% of the World's plant species. All this is under threat from invasive alien species yet to date the presence of IAS has largely been ignored. *South America Invaded* is the latest in the series of reports on IAS around the continents of the world published by the GISP and has a Foreword by ISSG member Dr. Silvia Ziller. In addition to detailing IAS that are threatening South America the publication also contains a section highlighting species that started out in South America and are now invasive in other areas of the World.

South America Invaded can be downloaded from <http://www.gisp.org/publications/invaded/index.asp>.



IAS in Europe – IUCN Regional Office for Europe Newsletter 8

The Regional Office for Europe (ROfE) is a branch of The World Conservation Union (IUCN) global network. The Office publishes regular newsletters featuring contributions from IUCN members. Newsletter 8 (2005) focuses its attention on the issue of IAS in Pan-Europe and contains articles from many European members of the ISSG. Piero Genovesi (Chair of the European section of the ISSG) draws attention to some of the IAS threatening biodiversity in Europe and Dr Ruth Waters (Senior Species Officer for English Nature) outlines some of the issues specifically faced in England and how English Nature plans to tackle them over the next five years, while Maj De Poorter (Coordinator ISSG) highlights several IAS examples.

The newsletter is available online at: http://www.iucn.org/places/europe/rofe/documents/Rofe%20News_Vol8_english.pdf.

Print copies from:
IUCN RoFE
Louis Schmidt Boulevard 64
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Brussels in Brief: Invasive Species Policy in Europe

Brussels in Brief is a regular publication from the IUCN produced by the Institute for European Environmental Policy (IEEP). Volume 8 of *Brussels in Brief* focuses on the issue of IAS in Europe and the legislation that is in place to help halt their spread and reduce their effects. The issue also highlights some of the worst invasives in Europe and the threat of marine IAS.

The newsletter can be downloaded from http://www.iucn.org/places/europe/rofe/documents/BrusselsInBrief_vol8_2005.pdf.

Our Global Environment

“Our Global Environment – A health perspective” has been published as a resource for courses in environmental health and/or human ecology.

The book focuses mainly on how human health is affected by the impact of humans in the 21st century. It includes a section on the introduction of invasive species and how they have directly or indirectly affected people's livelihoods and health

The book is available from: Waveland press, Inc at: <http://www.waveland.com/Titles/Nadakavukaren.htm>



STRAW OR SCALY TREE FERN *CYATHEA COOPERI* (HOOK. EX F. MUELL.) DOMIN IN NEW ZEALAND

Introduction

The New Zealand botanical region has 10-11 native tree fern species. These plants form a characteristic part of the vegetation and are very much part of the national psyche. For example, the ponga or silver fern (*Cyathea dealbata* (G. Forster) Swartz) is the NZ national emblem favoured by sports teams.

These plants are often regarded as primaeval in appearance and indeed the fossil record suggests that the tree fern form has been present since before the Triassic (Large & Braggins 2004). Yet terms like primaeval or primitive should not imply that these plants are unsuccessful in terms of dispersal and as colonisers of humid disturbed sites. For example, the native *Cyathea medullaris* (G Forster) Swartz may form a monoculture and inhibit competing plants. Like many other plant groups, certain tree ferns can become weed species outside of their natural range.

Internationally, the Australian *Cyathea cooperi* (Hook. ex F. Muell.) Domin is arguably the second most common tree fern in cultivation after *Dicksonia antarctica* Labillardière. This popularity is a reflection of its ease of cultivation and aesthetic appeal. Cultivars of *C. cooperi* are even recognised, including names such as Brentwood, Robusta, Kalgoorie Gold and Emerald Beauty.

Cyathea cooperi naturally ranges from north-eastern Queensland to New South Wales and is naturalised in Western Australia. Although the habitat of this tree fern is warmer temperate to subtropical rainforest, this species grows in a wide variety of conditions, including dryer slopes than most other tree ferns. It has even been overwintered in the United Kingdom, although it is not regarded as cold hardy. Heavy frosts may kill off all fronds but plants have been known to recover (Jones and Clemesha 1976, Chaffey 1999)

With its relatively wide tolerance, *Cyathea cooperi* has become naturalised in Mauritius, South Africa

and Hawai'i (arriving on the island of O'ahu most likely during the 1950's). Since its advent this tree fern has become one of Hawai'i's more important invasive species (see Medeiros *et al* 1992 and Loope *et al* 1992) with the potential to seriously alter habitat. Although the species has been formally declared a noxious weed by the state and its horticultural distribution halted, this species continues to be an aggressive invasive. Efforts to control its dispersal and growth until recently were limited to Haleakala National Park. In the Pacific *Cyathea cooperi* is naturalised in French Polynesia where it is also regarded as an environmental threat.



Photo: Mark Large

Over the last 15 -20 years many new tree fern species have been introduced to New Zealand as garden and landscape plants (see Van der Mast & Hobbs 1998). This is particularly true in the Auckland region where *Cyathea brownii* Domin, *C. tomentosissima* Copeland and *Dicksonia antarctica* are now found in garden centres. Indeed many of these tree ferns make good garden specimens. However, the introduced *Cyathea cooperi* should be regarded with caution.

This species has been regarded as naturalised in New Zealand since the mid 1990's (see Heenan *et al* 1998) yet in Auckland it is still a frequent plant in garden centres. Its use in horticul-

ture is also promoted in the literature (e.g. Van der Mast & Hobbs 1998) and it has even been used in native plantings instead of seemingly suitable native species (It might be assumed that this is because it has been wrongly identified as native).

Conclusion

It is not always first apparent whether new garden introductions have a potential to become invasive. The international record of *C. cooperi* suggests that it is a prime candidate given an initial critical mass. Future climatic change particularly in the north of New Zealand may also enhance its ability to establish.

In the course of a season a mature tree fern may produce up to 2kg of spore material (see Large & Braggins, 2004). Given this prolific production of spores from each plant, it is likely that it is only a matter of time before this fern will be seen more frequently in the wild.

Clearly correct identification of this species and its distinction from the native taxa is important, as is the recognition of young plants. Prohibition of material for sale in garden centres (as in Hawai'i) may also be desirable if we are to prevent further spread.

Description and identification

Cyathea cooperi (W. J. Hooker ex F. von Mueller) Domin, 1929.

Sphaeropteris cooperi (W. J. Hooker ex F. von Mueller) Tryon, 1970.

Alsophila cooperi W. J. Hooker ex F. von Mueller, 1866.

Adult Description: A medium to large, fast growing tree-fern, named after Sir Daniel Cooper, first speaker of the NSW legislature and curator of the Botanical Society of London in the 19th century.

The trunk is tall and erect, slender to stout 10–12 m in height and ca. 15 cm in diameter. The trunk is often covered in ovoid scars left by fallen fronds. Stipe bases do not usually persist (except in fast growing plants). Fronds are bi- to tri-pinnate and may reach ca. 4–6 m long. In older plants the fronds

tend to form a tight rosette at the top of the trunk. The stipe and rachis are greenish to dark brown-black and may have regular wart-like protrusions. Scales may be small dark red to pale brown with spiny margins or are more usually large and silky-white with smaller red to black marginal spines. Sori occur singularly, or in rows of up to 10. Indusia are absent.

Key characteristics

Cyathea cooperi may be distinguished from the native New Zealand species of tree fern by the presence of long white and short red-brown scales covering stipe bases, particularly towards the crown. These scales may bear very small reddish to blackish spines along the edges. Unfurling crossiers are also conspicuously covered in silky white scales.

Within New Zealand the only likely confusion could be with the also introduced, *C. brownii* from Norfolk Island. The latter species tends to be somewhat more robust (however individual plants may vary). It also differs from *C. cooperi* in having pale light brown scales with marginal spines or with white to brown edges.

References

Chaffy, C.H. 1999: *Australian Ferns: growing them successfully*. Kangaroo Press NSW.

Heenan, P.B.; Breitwieser, I.; Glenny, D.S.; de Lange, P.J. & Brownsey, P.J. 1998: Checklist of dicotyledons and pteridophytes naturalised or casual in New Zealand: additional records 1994-1996. *New Zealand Journal of Botany* 36: 155-162.

Jones, D.L. & Clemesha, S.C. 1976: *Australian Ferns and Fern Allies*. Reed, Wellington.

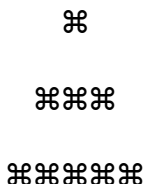
Large, M.F. & Braggins, J.E. 2004: *Tree Ferns*. Timber Press, Oregon USA.

Loope, L. L., Nagata, R. J. & Medeiros, A. C. 1992: Alien plants in Haleakala National Park. Pages 551-576 in C. P. Stone, C. W. Smith, and J. T. Tunison, eds. *Alien plant invasion in native ecosystems of Hawai'i: Management and Research*. Cooperative National Park Resources Study Unit, University of Hawai'i Press, Honolulu.

Medeiros, A. C., Loope, L. L. Flynn, T. Anderson, S. J. Cuddihy, L. W. & Wilson, K. A. 1992: Notes on the status of an invasive Australian tree fern (*Cyathea cooperi*) in Hawaiian rain forests. *American Fern Journal* 82 (1):27-33.

Van der Mast, S. & Hobbs, J. 1998: *Ferns for New Zealand Gardens*. Godwit, Auckland.

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“ZOOM on the Invasives” photo competition:

Tension of pre-predation, Ohau, New Zealand. FINALIST
 David J. MUDGE, NEW ZEALAND

A Mountain of Kudzu, North Carolina, USA. FINALIST
 Martin BERGOFFEN, USA



SCIENCE-BASED “PARKNERSHIP” TO EFFICIENTLY AND EFFECTIVELY PROTECT SPECIAL HABITATS IN FLORIDA FROM FERAL SWINE

Swine adversely affect the environment in most of the places around the world where they have been introduced into the wild, often making their removal the key to protecting many special habitats, particularly wetlands. Their initial introduction to Florida in 1539 by DeSoto was followed by many others. Today, swine flourish and cause widespread damage. A highly successful collaborative “Parknership” approach among UDSA/APHIS/Wildlife Services - Florida Operations, UDSA/APHIS/Wildlife Services - National Wildlife Research Center, and the Florida Park Service has produced practical and valuable methods for enhancing swine removal efforts. We highlight those research thrusts here.

Monitoring swine populations is vital to their management. The logistical and theoretical difficulties associated with density estimation methods typically make indices of abundance the only practical means to operationally monitor swine (e.g., Choquenot *et al.* 1996). We have been using an easily-applied passive tracking index (PTI) with good statistical properties to monitor swine distribution and relative abundance (Engeman *et al.* 2001). This low-tech method places tracking plots throughout the area of interest. At each plot, the number of swine intrusions into the plot is recorded for two consecutive days (the plots are resurfaced between days). The PTI and associated variance are calculated according to Engeman (2005), where a mixed linear model describes the number of intrusions on each plot each day. The mean number of track intrusions on each plot is calculated for each day, and the index value is the mean of the daily means. Adding to index’s robustness, the variance formula was derived without assuming independence among plots or days (Engeman 2005). Applications of the method have included 1) optimizing the timing and strategy for swine removal, 2) minimizing labor by identifying areas where swine removal would have maximal effect, 3) assessing efficacy of removal efforts, and 4) detecting re-invasion and identifying directions from which re-invasion occurs.

Reduction in swine damage is the ultimate objective for swine removal, making quantification of damage necessary to evaluate control success. Variability among habitats required different damage sampling methods for different circumstances. A quadrat sampling methodology was used in conjunction with the PTI population surveys to estimate the amount of swine damaged habitat (Engeman *et al.* 2003). Each tracking plot location defined the location for 2 damage assessment plots, 1m outward from each road edge. Each damage plot was a 5x1 m rectangle, established by folding a 1x1m PVC pipe square. String placed in a “+” sign across the square divided it into 4 equal quadrants. Thus, damage was measured over 20 0.25m² quadrants for each of the 5x1m plots, providing repeatability within 5%.

Where it was possible to follow a straight-line transect, damage was sampled on transects spaced through the area. This was particularly effective for assessing damage to the exposed portion of an imperiled basin marsh system. Tape measure transects were placed perpendicularly from the water’s edge to the interface with surrounding upland vegetation (Engeman *et al.* 2004b). Each transect’s total distance was measured, as was the distance directly on the transect that was damaged by swine. This amount could represent a single damage patch or combined distances from multiple patches. The estimated damage was the damage length’s proportion of the transect length.

Besides estimating the quantity of swine damaged habitat, we monetarily valued the damage. Determining values for protected habitats is not straight-forward (nor precise). Engeman *et al.* (2004a) discussed a variety of ways to apply monetary values to rare animal species and habitats. Special habitats such as wetlands have limited “market value”, and if such habitat is selectively protected, the market value diminishes further (King 1998). The use of contingent valuation surveys tend to provide abstract appraisals of value (King 1998), and rarely form the basis for policy decisions (Adamowicz 2004). The most defensible, logical, and applicable valuation for swine damaged habitat was expenditure data for permitted wetland mitigation projects in the United States. Such data represent an empirical demonstration of willingness-to-pay value. King (1998) presented the dollar amounts per unit-area spent in restoration attempts for a spectrum of wetland habitats. Those numbers represent the dollar amounts that environmental regulators, and to a degree elected governments, have allowed permit applicants to spend to replace lost wetland services and values (King 1998). For our economic assessments, we identified the dollar value for habitats in our swine damage circumstances from the studies cited in King (1998).

Estimation of the amount and value of swine damage allowed economic evaluations of swine control using benefit-cost analyses (BCA). The BCA approach involved estimating the monetary value of the benefits of damage saved versus the costs measured in damage lost plus control costs. Benefit-cost ratios (BCRs) were calculated using the standard format of the ratio of benefits to costs (e.g., Boardman *et al.* 1996). $BCR > 1$ implies the rewards for swine removal exceeded the costs. Universally, the economic analyses demonstrated enormous benefit-cost ratios for swine removal.

Each area of research has contributed positively to the efficacy, efficiency, and perception of swine removal efforts. The PTI is an effective tool for planning and assessing swine removal efforts, and for follow-up monitoring to determine if and where additional control is needed. Pro-

tection and improvement of habitats have been the ultimate goals of our swine removal efforts. Therefore, reliable and practical means to estimate damage levels have provided true evaluations of the need and efficacy of swine control. The ability to value the habitat has provided an effectual tool for evaluating conservation approaches. Economic analyses can greatly assist managers on how most efficiently and effectively to allocate limited funds towards habitat conservation. Ultimately, many conservation funding decisions are made on a political level by people without high levels of training in biological sciences. Placing conservation issues in an economic context can greatly enlighten the political decision making process.

References:

- Adamowicz, W. 2004. What's it Worth? An Examination of Historical Trends and Future Directions in Environmental Valuation. *Australian Journal of Agricultural and Resource Economics* 48:419-443.
- Boardman, A. E., D.H. Greenberg, A.R. Vining and D.L. Weimer. 1996. *Cost-Benefit Analysis: Concepts and Practice*. Prentice Hall, Upper Saddle River, New Jersey.
- Choquenot, D., J. McIlroy and T. Korn. 1996. *Managing Vertebrate Pests: Feral Pigs*. Canberra, ACT, Australia: Bureau of Resource Sciences, Australian Government Publishing Service
- Engeman, R.M. 2005. A methodological and analytical paradigm for indexing animal populations applicable to many species and observation methods. *Wildlife Research*. 32:203-210.
- Engeman, R.M., B. Constantin, M. Nelson, J. Woolard, J. Bourassa, 2001. Monitoring changes in feral swine population and spatial distribution of activity. *Environmental Conservation*. 28:235-240
- Engeman, R.M., S.A. Shwiff, H.T. Smith and B. Constantin. 2004a. Monetary valuation of rare species and imperiled habitats as a basis for economically evaluating conservation approaches. *Endangered Species Update*. 21:66-73.
- Engeman, R.M., H.T. Smith, R. Severson, M.A. Severson, J. Woolard, S.A. Shwiff, B. Constantin and D. Griffin. 2004b. Damage reduction estimates and benefit-cost values for feral swine control from the last remnant of a basin marsh system in Florida. *Environmental Conservation*. 31:207-211.
- Engeman, R.M., H.T. Smith, S.A. Shwiff, B. Constantin, M. Nelson, D. Griffin and J. Woolard. 2003. Prevalence and economic value of feral swine damage to native habitat in three Florida state parks. *Environmental Conservation* 30:319-324.
- King, D. 1998. The dollar value of wetlands: trap set, bait taken, don't swallow. *National Wetlands Newsletter*. July-August: 7-11.

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NOTES

NOBANIS: A new tool to combat invasive alien species

The NOBANIS Internet portal on invasive alien species was opened in November 2005.

The new portal is an important gateway to data on invasive alien species in Northern and Central Europe. The portal is based on the latest scientific knowledge about invasive alien species. The portal can be used by all interested parties - administrators, journalists and scientists alike.

The new searchable database answers questions such as what alien species are present as well as how, when and why a species was introduced to the region. Information on the status, invasiveness and impact of the alien invasive species is available for each country that is a member of the NOBANIS portal (see below). Maps covering the entire region are available to show the distribution of species which are a particular problem to the environment and livelihoods.

NOBANIS is a network of environmental administrators from the Northern, Baltic and Central European countries working with invasive alien species. The current members of the NOBANIS project are: Denmark, Estonia, Faroe Islands, Finland, Germany, Greenland, Iceland, Latvia, Lithuania, Norway, Poland and Sweden. NOBANIS is financed by the Nordic Council of Ministers and the participating countries' environmental authorities.

In the future, details on management and control of the most invasive species will be included on the portal.

Visit the portal at: <http://www.artportalen.se/nobanis/>

Source: *Inger R. Weidema
Danish Forest and Nature Agency
Ministry of the Environment
Email: Irw@sns.dk*

“ZOOM on the Invasives” photo competition:

Water hyacinth
Eichhornia crassipes infesting river Oueme, Benin
 .SECOND PLACE.

Fen BEED, UK



INVASIVE ALIEN SPECIES MANAGEMENT ACTIVITIES IMPLEMENTED BY IUCN IN SRI LANKA

Sri Lanka, though being a small island of 65,610 km², a wide range of topographic and climatic variation has resulted in a multitude of ecosystems, and a high species diversity. The island has been recognized as one of the ‘biodiversity hotspots’ of global significance, due to the presence of many unique species whose natural habitats have been lost to a great extent. Several anthropogenic factors have contributed to the degradation and deterioration of natural habitats and ecosystems. The threats to natural biodiversity in the island have been further aggravated by the introduction and spread of invasive alien plant and animal species. Observations made during the past decade have enabled to document about 25 species of invasive alien animals and 40 species of invasive alien plants spreading in natural and semi-natural ecosystems in the different biogeographic zones of Sri Lanka. The impacts of these alien invaders include direct destruction of native species, replacement of native vegetation and pests/weeds of agricultural crops. At present, aqua-culturists, aquarium traders and horticulturists are the main sources that contribute to the introduction and spread of new IAS in the island.

Several activities related to the management of IAS in Sri Lanka have been initiated by IUCN over the past five years. These could be briefly explained under the following sub-topics:

Compilation of information on IAS in Sri Lanka

Information on IAS, including their current spread/

distribution, biological/socio-economic impacts and ecological aspects is being compiled and updated on a regular basis, through the review of secondary information, and also through primary field observations of ecologists attached to IUCN. This has also enabled to prepare and update lists/inventories of IAS in Sri Lanka

Awareness raising

IUCN has conducted several awareness programmes on IAS for various stakeholders over the past five years, including NGOs, school/university students, government officials, aquarists, horticulturists and the media. Awareness material on IAS have been developed in the local language, and circulated among the above stakeholders. IUCN was also able to organize several national and regional workshops on IAS, which has helped to generate further awareness and support from relevant government agencies to implement IAS management activities.

Development of proposals to manage IAS

At present, a proposal on strengthening partnerships for effective management of IAS in Sri Lanka is being developed by IUCN, as a PDF A medium scale project to be funded by UNDP GEF. The project focuses on developing the capacity of relevant institutions to manage IAS, raise awareness and implement pilot research on the control of prioritized IAS in the island.

Provision of technical assistance for IAS control projects

Staff members attached to IUCN are also providing

technical support to the Department of Wildlife Conservation, who have initiated IAS control programmes in two national parks in Sri Lanka; the Udawalawe National Park (control of *Lantana camara*) and the Bundala National Park (control of *Opuntia dillennii* and *Prosopis juliflora*). Similar support is being provided to the Coast Conservation Department, who have initiated a programme to control *Opuntia* and *Prosopis* in the southern coastal zone. NGOs also contact IUCN on a regular basis, for technical guidance on IAS control projects implemented at a local level.

Implementation of research on IAS

Research projects on the ecology and impacts of IAS is also coordinated and supervised by IUCN staff, in collaboration with local universities. These include both undergraduate and post-graduate research projects.

Support policy initiatives related to IAS

IUCN is currently working in close collaboration with the Ministry of Environment and Natural Resources, to develop relevant policies to facilitate the management of IAS, and promote inter-agency collaboration to address this issue. A National Invasive Alien Species Management Committee has already been established under the above Ministry, to coordinate the IAS management activities in Sri Lanka. A national strategy and action plan for the management of IAS is currently being developed. The need to manage IAS has been incorporated and clearly highlighted in recent policy documents related to conservation, including the national wetland conservation policy, and the revised biodiversity conservation action plan.

Channa Bambaradeniya
IUCN Sri Lanka Country Office
cnb@iucnsl.org

NOTES

International Plant Health Risk Analysis Workshop, 24 - 28 October 2005, Niagara Falls, Canada

An international workshop on plant health Pest Risk Analysis (PRA) was held to address issues and find solutions to problems faced by people involved in PRA around the world. The workshop was attended by 145 delegates representing 63 different countries.

The workshop provided an opportunity to:

- explore methods and procedures for applying the IPPC's PRA standards
- share experiences on how to use PRA as a decision making tool
- present tools for completing PRAs
- strengthen international PRA expertise and communication
- build a collaborative international PRA network.

Presentations and break-out group exercises from the 2005 International Plant Health Risk Analysis workshop have been posted at: <https://www.ippc.int/servlet/CDSServlet?status=ND01ODQ1NSY2PWVuJmZPSomMzc9a29z>

You can also navigate to this page by:

1. Going to www.ippc.int
2. Clicking on the tab "IPPC Publications"
3. In the list of topics on the left-hand side of the page, click on "Workshop papers"
4. Clicking on the sub-topic "2005 - Plant health risk analysis"

If you experience any difficulties in accessing the presentations, please e-mail ippc@fao.org

We need YOUR support!

The Invasive Species Specialist Group (ISSG) is a specialist group of the Species Survival Commission (SSC) of the World Conservation Union (IUCN). 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.

The office of ISSG is based at the University of Auckland, New Zealand. For more information on our activities, see back cover. The staff of the ISSG office are financially supported solely through our own efforts at fundraising – we need YOUR support.

Cheques can be made payable to "IUCN Invasive Species Specialist Group – University of Auckland" and sent to Maj De Poorter, ISSG/SGGES, University of Auckland (Tamaki Campus), Private Bag 92019, Auckland, 1142, New Zealand. Please write "Donation to ISSG" on the back.

If you wish to use a Credit Card, please email the ISSG office with the following details: Credit Card number and type, i.e. Visa, Master Card, American Express, etc. Expiry date on Card. Name on Card.

Donations may be tax deductible (depending on your country), given that our legal entity is through the University of Auckland.

ALIEN BIRDS IN THE KRUGER NATIONAL PARK REVISITED

The Kruger National Park (KNP) is well known for its bird diversity, with over 500 species having been recorded to date. However, three species of less desired birds have also been observed. These include the Indian myna (*Acridotheres tristis*), house sparrow (*Passer domesticus*) and Indian house crow (*Corvus splendens*). In the February 2001 issue (Number 1, Volume 3) of the Prickly Pear newsletter we reported on the first observation of Indian mynas in KNP. Although efforts have been made to control the mynas where observed in the KNP, the house sparrow is not subject to control measures. As none of the species have been listed as major biodiversity threats to the KNP currently, no research is being conducted on either impacts or control measures. However, early detection and eradication of Indian mynas will remain a high priority, and vigilance is required from all.

Three sightings of Indian mynas have been recorded in the KNP. The first two were during October 2000 and both sightings were of a single pair. Two birds were again seen (by I. J. Whyte) in September 2003 at the Game Capture bomas at Skukuza. Repeated searches for them thereafter were unsuccessful. Indian mynas are indigenous to the Indian subcontinent and have been exported to many parts of the world. They compete aggressively with many indigenous species for nesting and feeding sites and greatly

affect the biodiversity of an area. Although currently not a problem in the KNP, the increase in numbers in towns surrounding the KNP and number of sightings reported is cause for concern.

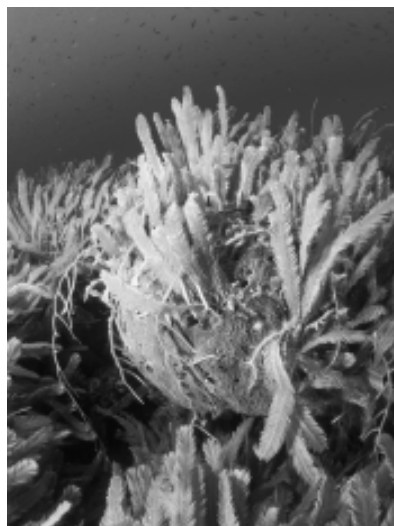
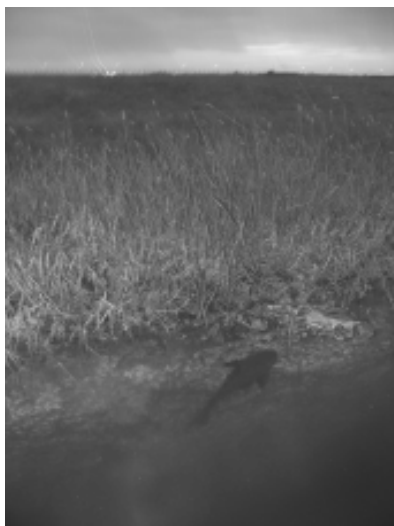
The house sparrow was introduced to Southern Africa, via Durban and East London, from Europe. The house sparrow is now widespread throughout the subcontinent, particularly in cities, towns and settlements. In the KNP the house sparrow is found in most tourist rest camps, bushveld camps and larger picnic spots; in fact at almost every site where people live. They are reported to be sedentary and therefore do not roam far from their nesting sites. Thus these birds are only likely to compete with birds in the built up areas for nesting sites.

An Indian house crow was seen in Satara Rest Camp in February 1988 and destroyed by the ranger. No further records of house crows have been made from the KNP.

Llewellyn Foxcroft,
Email: LlewellynF@sanparks.org

Excerpt from: *Alien bird species in the Kruger National Park*, In: *A status report of invasive alien species and management in the Kruger National Park*.

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Sucker-mouth Catfish, Florida, USA
Adam STERN, USA

&

Caulerpa taxifolia invading Mediterranean Seascapes, Cap Martin, France
David LUQUET, FRANCE

FINALISTS

GUIDELINES FOR APPLYING THE PRECAUTIONARY PRINCIPLE

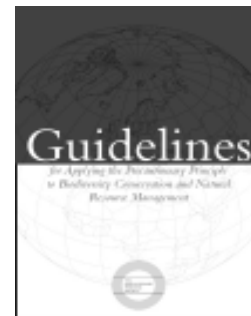
Over the last few years IUCN has been working with Fauna & Flora International, Resource Africa, and TRAFFIC in the Precautionary Principle Project - exploring the meaning and implementation of precaution across biodiversity conservation and Natural Resource Management (NRM). We are now delighted to announce that final *Guidelines for Applying the Precautionary Principle to Biodiversity Conservation and Natural Resource Management* are now available in English, French and Spanish at www.pprinciple.net, and copies of a more detailed, printed colour brochure can be sent on request. It is hoped that these will be widely adopted and used in a broad range of biodiversity conservation and NRM contexts where uncertainty and precaution are relevant issues, including invasive alien species; sustainable use, management and trade of wildlife; forestry; fisheries; wetlands management and protected area management.

In the invasive species context, as in other areas, decision-makers must grapple with poor or incomplete data, inherent unpredictability, and ignorance. There is frequently a high level of uncertainty surrounding the risks of entry, invasiveness, and the threats of environmental, economic or social damage posed by particular species or pathways. Providing clear scientific evidence in advance of the invasive potential of a specific alien species, or of the range of species which could enter unintentionally, will often be unfeasible. For obvious reasons, once there is empirical information available on the invasiveness of an organism in a particular country or area, it will usually be too late to prevent invasion. Prediction of the impacts of introducing a new organism (often poorly understood itself) into an ecosystem is inherently problematic: uncertainty derives not just from incomplete, inaccurate or missing data but from the inherently unpredictable behaviour of complex

OUTPUTS OF PRECAUTIONARY PRINCIPLE PROJECT

1) Guidelines for Applying the Precautionary Principle

Illustrated and annotated guidance for decision-makers, researchers, and practitioners in conservation and NRM.
http://www.pprinciple.net/PP%20Guidelines_espanol.pdf
http://www.pprinciple.net/PP%20Guidelines_francais.pdf
http://www.pprinciple.net/PP%20Guidelines_english.pdf



2) Book: Biodiversity and the Precautionary Principle

Case studies and analyses on application of the PP from around the world, by specialists in biology, conservation, resource policy, economics, and law.

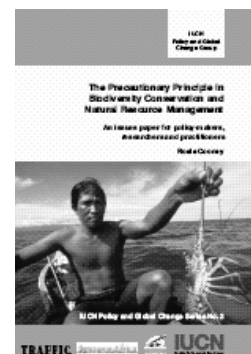
Biodiversity and the Precautionary Principle: Risk and Uncertainty in Conservation and Sustainable Use (Ed by Cooney and Dickson), Published by Earthscan, London (<http://shop.earthscan.co.uk>). Paperback ISBN 1844072770, Hardback ISBN 1844072762, Publication date: November 2005, 272 pages; 234 x 156mm; Figures, tables, maps, index



3) Issues paper for policy-makers, researchers and practitioners

Investigating the practical and theoretical issues surrounding the application and impacts of the precautionary principle.

The Precautionary Principle in Biodiversity Conservation and Natural Resource Management: An issues paper for policy-makers, researchers and practitioners. IUCN, Gland, Switzerland and Cambridge, UK. xi + 51pp. ISBN: 2-8317-0810-9



...In the invasive species context, as in other areas, decision-makers must grapple with poor or incomplete data...

NOTES

systems such as ecosystems. While research has focussed for some decades on seeking to understand the biology of invasiveness, this is currently not a reliably predictive science, and is unlikely to be in the foreseeable future.

How decision-making responds to this uncertainty has a major impact on its success in achieving environmental and sustainable development objectives, in the context of invasives as in many other areas. Waiting until there is clear or unambiguous evidence of a threat will often mean it is too late to prevent serious, costly or irreversible environmental harm. The precautionary principle/approach is a major policy response to recognition of this situation. It urges action *in advance* of certainty about threats, supporting anticipatory, preventative action against *potential* harm. In the invasives context the precautionary approach has been widely incorporated into international guidance on invasives, including the CBD Guiding Principles, its “Jakarta Mandate” on marine and coastal biodiversity, and guidance developed by the Bern Convention and the African-Eurasian Waterbird Agreement. However, precaution remains controversial, particularly in the context of trade measures. More broadly, despite widespread obligations to apply the precautionary principle in many areas of conservation and NRM, there often appears little evidence that it is being applied, and in some cases evidence that is being applied in a counter-productive or inequitable manner. Guidance on its application into practice has been badly needed

These new Guidelines represent the first set of guidance for the precautionary principle in biodiversity conservation and NRM. They have been developed by The Precautionary Principle Project with extensive input from a wide range of experts and stakeholders from different regions, sectors, disciplines and perspectives They were

finalised at an international workshop in Florida in July 2005, after over two years of work and consultation including regional workshops in Africa, Asia and Latin America (see regional workshop reports at www.pprinciple.net/publications_outputs.html). A large set of case studies was carried out, including studies on Weed Risk Assessment in Australia (authored by Tim Low, a member of ISSG), the international forest regime, Impact Assessment, trophy hunting in Central Asia, sea turtles in Costa Rica, parrots in Argentina, and forest management in the USA and Uganda, as well as analyses which highlight issues of equity, economics, livelihoods, science and politics. The case studies and Guidelines form the book *Biodiversity and the Precautionary Principle: Risk and Uncertainty in Conservation and Sustainable Use* (ed by Cooney and Dickson), can be obtained from Earthscan, London (<http://shop.earthscan.co.uk>).

These Guidelines seek to provide clear, coherent guidance on precaution and dealing with uncertainty.

Please note that the Guidelines should not be taken as necessarily representing the view of IUCN or other collaborating organisations, and are currently under review by the IUCN Council.

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Editorial note: Rosie Cooney's presentation "Precaution and invasive alien species: challenges at the interface of the trade and environment regimes" is available online (see box on page 4)

£3.3 MILLION FOR RUDDY DUCK ERADICATION

A £3.34 million, five-year project to address the threat to European wildlife posed by ruddy duck populations settled in Britain was announced in October 2005. It has been jointly funded by the Department for Environment, Food and Rural Affairs (DEFRA) and the European Commission, with Defra contributing £2.03 million of the total costs. Biodiversity Minister Jim Knight stated that the control program would make a major contribution to protecting the declining populations of white-headed ducks. “Non-native invasive species are a major problem throughout Europe, and ruddy ducks are no exception,” he said. “If the threat of ruddy ducks is removed, Spain’s globally-threatened white-headed ducks will have a much brighter future.

Ruddy ducks were introduced to the UK from North America in the 1940s, and the current population in the wild is estimated to be around 6000 birds. There are an estimated 500,000 ruddy ducks in their native North America. Ruddy ducks interbreed with white-headed ducks, whose Western European population of around 2700 birds are all found in Spain. The interbred offspring are fertile, and therefore pose an increasing threat to the white-headed duck, which could lead to its extinction. Without the presence of ruddy ducks, the White-headed duck population in Spain is thought to be self-sustaining. Evidence suggests that most, if not all, ruddy ducks found in the rest of Europe are derived from the UK populations so eradicating the UK population of ruddy ducks will remove the source and make future eradications in the rest of Europe easier.

Source: News release, UK Department for Environment, Food and Rural Affairs (DEFRA), 12 October 2005

NOTES

Workshop on ragweed in Braunschweig, Germany

On 28 November 2005 an interdisciplinary workshop with circa 30 participants from Germany and Switzerland from the sectors plant protection, allergology, meteorology and pollen warning, nature protection and University research took place in the Federal Biological Research Centre for Agriculture and Forestry (BBA) Braunschweig. It was organised and chaired by the Department of Plant Health. The aim of the workshop was the exchange of scientific information and discussion between the concerned disciplines and especially the discussion on the necessity of specific measures against ragweed (*Ambrosia artemisiifolia*), their feasibility in Germany and how these measures could be implemented.

A. artemisiifolia originated in North America. In Germany it occurs only sporadically and mostly inconstantly until now. An increase is suspected as the species - especially in the last decade - has spread in several neighbouring countries, primarily by human activities. In the USA and in Hungary it is an economically important weed, furthermore it is very problematic that pollen of ragweed are triggers of allergies.

In particular the following questions have been discussed:

- What are the consequences?
- Estimation of the dispersal and establishment in Germany now and in future?
- What are the pathways for dispersal?
- Are control measures necessary?
- Are there appropriate methods for measures?

Conclusions

The participants of the workshop agree that because of damaging effects on human health and on agriculture a further entry and spread must be guarded. Research into the biology of the species and into control methods is needed to prevent the further spread of the species and to reduce its effects on the environment and human health.

Shortened from text provided by:

Uwe Starfinger and Gritta Schrader
Translation: Elke Vogt-Arndt

Further information: Email: g.schrader@bba.de

Extra AUS\$1 million for 11 projects to Defeat the Weed Menace

The Australian Government is continuing to target weeds across Australia with the announcement in October 2005 of nearly a million dollars in funding for 11 projects under its new Defeating the Weed Menace Program. The projects are in addition to 25, worth \$1.8 million, already announced.

Australian Environment Minister, Senator Ian Campbell, and Conservation Minister, Senator Ian Macdonald, stated that the list of projects was the second under the Government's \$40million election commitment to tackle weeds. Senator Macdonald said the extra eight, on-ground projects, and three national research projects, would receive \$1million. "Defeating the Weed Menace is targeting Australia's most significant weeds in the field and, at the same time, supporting significant Research & Development into the weeds problem," Senator Macdonald said. "Weeds are a significant cost to the economy, something like \$4 billion a year, and pose one of the greatest threats to Australia's unique plants and animals."

Senator Campbell stated that the new projects would help manage and control a number of Australia's most significant weeds, including lantana, rubber vine, serrated tussock, *Mimosa pigra*, parthenium weed, blackberry and bridal creeper. "Although land management, including weeds, is the responsibility of the States and Territories, the Australian Government is providing national leadership in this important area," Senator Campbell said. "This is too big a problem for governments to leave to chance."

Source: Joint Media Release Australian Minister for the Environment and Heritage Senator the Hon. Ian Campbell and Senator Ian Macdonald Australian Minister for Fisheries, Forestry and Conservation, 7 September 2005





“ZOOM on the Invasives” photo competition:
 Dam and Doom – Aerial view of water hyacinth carpet in the Kafue Gorge Dam,
 Zambia. FINALIST

Musonda MUMBA, ZAMBIA

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ISSG office Email: ISSG@auckland.ac.nz

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

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 OR 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.

The Cooperative Initiative on Invasive Alien Species on Islands (CII) is a global initiative. With requests from Pacific countries for more coordinated and cooperative approaches to addressing invasive species threats the, "Pacific Invasives Initiative" or PII became the first programme of the CII to be funded. The goal of the PII is to conserve island biodiversity and enhance the sustainability of livelihoods of men, women and youth in the Pacific. Activities are focused on raising awareness of invasive species issues, building capacity in the region to manage invasives and facilitating cooperative approaches to achieve and sustain desired outcomes. Website: <http://www.issg.org/cii/PII/index.html>. An important objective of the PII is to enhance and augment the activities of other initiatives and programmes in the Pacific and elsewhere. The CII will be expanded beyond the South Pacific in collaboration with other countries, programmes and partners. As of late 2005 a number of demonstration Projects

will have been initiated as part of the PII.

The Global Invasive Species Database is freely available online at www.issg.org/database and mirrored at www.invasivespecies.net/database. The development of the database, and the provision of content for it, is ongoing. Priorities range from a focus on 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>

Guías para la Prevención de Pérdidas de Diversidad Biológica Ocasionadas por Especies Exóticas Invasoras: <http://www.iucn.org/themes/ssc/publications/policy/invasivesSp.htm>

Lignes directrices de l'IUCN pour la prévention de la perte de diversité biologique causée par des espèces exotiques envahissantes: <http://www.iucn.org/themes/ssc/publications/policy/invasivesFr.htm>

ISSG Office: *Centre for Biodiversity and Biosecurity University of Auckland (Tamaki Campus) Private Bag 92 019, Auckland, 1142, 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; E-mail: a.saunders@auckland.ac.nz for more information on the CII; E-mail: m.browne@auckland.ac.nz to contact the Global Invasive Species Database Manager. Websites: ISSG: www.issg.org IUCN: www.iucn.org*

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SPECIES SURVIVAL COMMISSION

The following organisations are gratefully acknowledged for their support of the work of the Invasive Species Specialist Group:

- Critical Ecosystem Partnership Fund
- US State Department
- NZAID (New Zealand Agency for International Development)
- Manaaki Whenua-Landcare Research Limited
- University of Auckland, Centre for Biodiversity and Biosecurity
- The New Zealand Department of Conservation
- National Biological Information Infrastructure (NBII), USA