Tools for international exchange of information on prior invasiveness, and why they are critical to pre-import screening

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The Invasive Species Specialist Group (ISSG)

- Established in 1994
- 160 members in 40 countries
- 3 regional co-chairs (Europe, Asia, North America)
- HQ at the University of Auckland, NZ
- 8 permanent staff + students

- Advocacy, policy and mainstreaming
- Demonstration projects and capacity building
- Networking and information exchange
“Information exchange is crucial for effective responses to invasive species problems” (CBD)

Prevention info:
• Records of invasiveness
• Global distributions of IAS
• Introduction and dispersal information
• Evidence of impacts
• Biology and ecology
• Taxonomic expertise and identification tools

Eradication and control info:
• Management strategies and techniques
• Case studies, sharing lessons learned

Shared problem species

Water hyacinth: Florida (USA), Kafu (Zambia), Lake Victoria (Kenya), Bhopal (India). Photos: Don Schmitz, M. Mumba, Aquarius Systems, Wisconsin, USA, Indian Inst. of Forest Management
Q. Does this species have an “innate” invasive capability?

“Yes, only one factor has consistently high correlation with invasiveness: whether or not the species is invasive elsewhere” (Wittenberg and Cock 2001).

• We need to know which species are invasive
• Who says?

Q. Is it likely to become invasive if introduced in a particular receiving environment? What would the likely impacts be?

• We need to know a lot more:
  – Traits, tolerances and requirements, key associations
  – Invasion case studies (spread, impacts, management)
  – Relevant factors about the receiving environment
The Conservation Commons

Free and open access to data, information and knowledge for conservation purposes

3 principles:
Open Access
Mutual Benefit

Rights and Responsibilities:
• Attribution
• Original integrity preserved
• Comply with contributor’s conditions of use

http://conservationcommons.org

Global Invasive Species Information Network (GISIN)
A distributed network of invasive species databases

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Comprehensive, information on 500 of the world’s worst invasive species from local sources

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Reference list of known invasives with annotations providing evidence of introduction and invasion

I3N databases in 14 Latin American Countries.
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Local, national, regional and international invasive species databases
e.g. NISbase, FishBase, CABI ISC, DAISIE, PIER, Poland, Cook Islands, etc.
Global Register of Invasive Species

GRIS is global reference list of invasive species. It contains annotated records of introduction and invasion from authoritative sources, and can be used for:

- Coarse pre-screening of proposed imports
- Input for risk assessment procedures
- Prioritising management activities
- Providing global data for monitoring and analysis
- Help with writing import health standards, setting up border control and quarantine measures & guiding funding decisions
- An invasive species reporting mechanism
- Tagging IAS in observation and collection data

GRIS is not a risk assessment

GRIS records of prior invasiveness have 4 components:

1. Source metadata, citation / references
2. Scientific names and synonyms in a taxonomic dictionary
3. Location names in geographic dictionary
4. Annotations for a taxon in a location:
   - Occurrence
   - Origin
   - Invasiveness
   - Type of harm (environmental, human health, economic)
   - Verbatim information from data source
Global Register of Invasive Species - Lists of Invasive Taxa

Details for:


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Current status:

A prototype developed in early 2007 by the IUCN SSC Invasive Species Specialist Group and Charles Copp (Environmental Information Management) under a contract with Defenders of Wildlife.

It currently contains 38,606 geographic records for 16,051 taxa.

GRIS was able to identify 302 (13.5%) species with records of invasiveness or disease risk amongst 2,241 animal species imported into the United States between 2000 and 2004.

The Global Biodiversity Information Facility (GBIF) have provided a letter endorsing the high scientific merit of the proposed work and its overall impact.
GRIS needs USD 200,000 to transform the current prototype into an online service, and to add large datasets which will make it more representative.

- GRIS will be linked to biodiversity and nomenclatural databases.
- GRIS will be linked to GISIN for invasive species data.
- We expect GRIS to become a recommended standard tool for nations to use in conducting coarse pre-import screening of proposed imports.
The Global Invasive Species Database

www.issg.org/database

- All taxa from micro-organisms to animals and plants
- Aims to increase public awareness about introduced species that negatively impact biodiversity and livelihoods
- Aims to facilitate effective prevention and management activities by improving access to authoritative information.
- CD-ROM version available
GISD summary statistics

• 500+ invasive species profiles
• 100 new profiles & 100 updates per year
• Annual budget: USD 320,000 per year
• 2 full-time staff, 1 student equivalent and IT support
• Strong support from providers and users
• Repository for data (in French) from the French Overseas Territories
• Key provider of biodiversity-related content to the CABI ISC

“The most detailed and accurate data on IAS at the global scale” (Kümpel and Baillie, 2007. Report to the CBD. Options for a global indicator on trends in IAS).

Global Invasive Species Database

Search on species name, country, habitat or organism type
Combination searches, taxonomic search, 100WW

Global Invasive Species Database is managed by the Invasive Species Specialist Group (ISSG) of the Global Invasive Species Commission. It was developed as part of the global initiative on invasive species led by the Global Invasive Species Programme (GISP) and is supported through partnerships with the National Biological Information Infrastructure (NBII), the Natural History Museum, and the University of Queensland.

The database provides global information on invasive alien species to scientists, resource managers, decision makers and interested individuals. It focuses on invasive alien species that threaten native biodiversity and species of economic groups that impact people and plants. Species information is either supplied by or reviewed by expert committees from around the world. Information is also as the database is continually being populated with new information, please check back for updates. If you have questions or comments, please visit the help section.
Search on “North America”

324 species that have been introduced to North America, 42 that include records stating that their origin is uncertain, 56 that are native to North America and invasive somewhere else.

Search on invasive mammals in USA

Signals the presence of USA eradication records (cattle, goats, etc.)
Emerald ash borer

- Colonises and kills ash trees in the *Fraxinus* genus.
- Warning about the potential damage if it spreads throughout the entire range of ash in North America.
- Information that any life stage (eggs, larvae, pupae and adults) can be moved with raw wood and bark, infested nursery stock, lumber, firewood, etc.
- International prevention measures, and biological and chemical control options.
Agrilus planipennis (insect)

Details of this species in Ohio:
- Status: Alien
- Administration: Agronomy
- Environment: Forested
- Source: EPPO, 2003

Initial Date: 2003

Introduction: Unintentional (accidentally)

Species Notes for this Location:
In 2000, the emerald ash borer was found in 5 counties of Ohio. The spread of the beetle has been traced to infested logs, firewood, and nursery stock (Hermes et al., 2005).

Management Notes for this Location:

Physical: The Ohio Department of Agriculture initiated an eradication program, involving the removal of more than 10,000 ash trees in 2005 miles radius around the infection zone. This was completed by 2005, before adult beetles could emerge. All trees were removed; it was not possible to identify if a tree was infected or not, and so all trees were treated and inoculated.

Chemical: In April 2006, all trees just outside the infected zone were treated with the systemic insecticide imidacloprid, to kill any young that may emerge from eggs laid outside of the infected zone. Currently, it is not recommended that ash trees in Ohio be treated with imidacloprid, based on the interaction between the biology of the insect and regulatory issues associated with the application program in North America (Hermes et al., 2005).

Location Note:

Impact:
- Economic: Unknown
  - The Ohio Department of Natural Resources estimates that there are more than 3.6 billion ash trees in Ohio, with a standing timber value of more than $1 billion. Ash is an important landscape and nursery species. Eradication costs for the localized epidemics in Lucas county, in April 2003 was over $100,000 (Hermes et al., 2005).

Last Modified: 1944/09/19 12:35:33 AM

Agrilus planipennis (insect)

Management Information:

Prevention measures: To prevent the spread of this insect, infected ash trees should be removed from the infected area. This can be done by cutting off the branches and then burning the trunk. The infected soil should be removed and disposed of properly. Ash trees should not be imported into Ohio from areas where this insect is present.

Control measures: The Department of Agriculture recommends the use of chemical sprays to control the spread of this insect. The sprays can be applied to the trees to kill the larvae and pupae. The best time to apply the sprays is during the summer months, when the larvae are most active. The sprays can be applied to the soil around the base of the tree to prevent the spread of the insect.

Location Specific Management Information:

Ohio: United States (USA)
- The ash tree borer was detected in northern Illinois, prior to 2000. The Illinois Department of Agriculture has been monitoring this insect for years and has not found any in Ohio. The Department of Agriculture recommends that ash trees should be removed if they are infested with this insect. The larvae can be killed by cutting off the branches and then burning the trunk. The infected soil should be removed and disposed of properly. Ash trees should not be imported into Ohio from areas where this insect is present.

Wisconsin: United States (USA)
- The infected ash trees are currently being monitored by the Department of Agriculture. The Department of Agriculture recommends that ash trees should be removed if they are infested with this insect. The larvae can be killed by cutting off the branches and then burning the trunk. The infected soil should be removed and disposed of properly. Ash trees should not be imported into Ohio from areas where this insect is present.

Michigan: United States (USA)
- The infected ash trees are currently being monitored by the Department of Agriculture. The Department of Agriculture recommends that ash trees should be removed if they are infested with this insect. The larvae can be killed by cutting off the branches and then burning the trunk. The infected soil should be removed and disposed of properly. Ash trees should not be imported into Ohio from areas where this insect is present.
Information for prevention

Generic:
- Examples of Biosecurity strategies
- Links to national and regional legislation (e.g. import health standards)
- Protocols for risk assessment
- Case studies of how introduction decisions are made in practice

Species-specific:
- Records of invasion
- Information on pest status of species throughout its introduced range
- Case studies on early detection and rapid response
- Risk assessments from around the world

Management guidelines

**Mustela vison** (American mink)

1. General Considerations
   - Timing / cost of control
   - Potential for eradication
2. Monitoring / Tracking
   - Tracking tunnels
   - Field surveys
   - Mink rafts
3. Preventative Measures
   - Exclusion fencing
   - Mink farm regulations (prevention of escape)
4. Physical Control
   - Trapping
   - European case studies
5. Biological Control
   - Facilitation of otter recovery
6. Educational Awareness
   - Education of the public
7. Integrative Management
   - Restoration of environment / habitat
8. Research
   - Population modelling
9. Humane Considerations
   - Ethical dilemmas
10. Legislation
Agrilus planipennis (Index)

Management Information


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Information-rich

I3N databases in 14 Latin American Countries.
I3N training in Asia and Africa
CABI & USDA – A Joint Initiative
Invasive Species Compendium

1000 detailed species descriptions in Phase 1
2000 detailed descriptions in Phase 2
8000 detailed species descriptions in all
Compendia
Tens of thousands of other species in outline
descriptions
Authoritative and peer-reviewed content

Scope includes all taxa of invasive species, species of
quarantine concern, weeds, crop & forest pests, terrestrial
aquatic, aquaculture species and animal diseases

Content comes from CABI & Partners

Disease map examples at

Compendia at
http://www.cabicompendium.org

Material from partners includes:
GISD – 75 Profiles
USDA-ARS – 100 invasive fungi (for next phase)
EPPO
OIE
PIER, etc…
Content links to large bibliographic databases

Contains 200,000 relevant abstracts, many linked to full text
Potential to include more:
There are over 7 million articles in CAB Abstracts

Development Schedule

July 2008
– Alpha version of ISC, containing datasheets, images, a library, search & browse functionality, linkage to CAB Abstracts, improved updating, content shared with other CABI Compendia

By end 2008
– Review of alpha version and positioning for future development
– Focus on doubling relevant content by commissioning and linkages, Beta version

By end 2009
– Improved searching & content, full launch
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Global Invasive Species Information Network (GISIN) in a Nutshell

- Distributed network
- Framework that allows invasive species databases to be accessed by other servers
- Facilitates use of data from a variety of providers
- Standardize and integrate data
A brief history of GISIN [http://www.gisinetwork.org]

2002: CBD designates GISP as an International Thematic Focal Point on IAS under the Clearing-House Mechanism.
2004: Global Experts Meeting to implement GISIN (Baltimore)

2006: Invasive Alien Species Profile Schema development funded by CBD
2007: Test implementation of data sharing protocol at the GISIN portal
2008: 1st data providers workshop, June 2008, Athens, Georgia

GISIN will facilitate the exchange of the following data types:

- Source metadata
- Taxon Location Date Language
- BioStatus Impacts Dispersal Management
- Occurrence data Species profile URLs
How can GISIN help?

Find relevant information on invasive species
- Check lists and distribution records
- Profile URLs – general info on a species
- Species occurrence data

Facilitate the exchange of IAS data
- Expose IAS data to consumers
  e.g. biodiversity databases can leverage native/alien data and invasiveness data
  e.g. GRIS and GISD can regularly harvest data
- Improve access to data e.g. for analyses and modeling
  e.g predicting potential distribution

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DAISIE: European inventory completed in 2008
10,822 introduced species (57% are terrestrial plants)
10% invasive
Identifying major patterns in European alien species
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I3N Invasive Alien Species Database
Freely available Microsoft Access based database template for collecting information on invasive species taxonomy and description, introduction pathways, characteristics, impacts, control methods, occurrences, contacts, projects, and references.
I3N Invasive Alien Species Database

- Data can be exported in Extensible Markup Language (XML) report files.
- Report files are standardized according to the I3N XML schemas for metadata.
- Report files can be harvested and served on the Internet through participant Web sites or using the I3N Web Templates (currently under development) or via GISIN.
- The I3N Database is available in Spanish, Portuguese, and English.

Comprehensive Invasive Species Information System (CISIS)

ISSG and its partners are preparing a major initiative aimed at securing GEF funding to build on existing services, and to address geographic and taxonomic information gaps.

- Resource centre (tools, services, guidelines, donors, etc.)
- Advice and referral service such as that operated by ISSG
- GISD, GRIS, GISIN
- I3N databases developed by IABIN
- Invasive Species Compendium developed by CABI?
- Partnerships with GISP, TNC, BioNet International, others

The CISIS will be the subject of a ‘Knowledge Café’ event at the World Conservation Congress (Oct 2008)
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List servers: Aliens-L

- Dedicated to IAS information and related issues
- Focus on environmental invasive species
- Searchable archive
- Practitioners helping each other
e.g. does anyone have info about these tropical fish that someone is proposing for import?
- Unmoderated and grassroots
- 600 subscribers
- It works!

To subscribe:
aliens-l-join@indaba.iucn.org
List servers: PestNet

- Prompt advice and information on the identification and management of plant pests
e.g. use Urea to reduce application rate of Glyphosate
- Links sub-regions with taxonomists and plant protection specialists world wide
- Archives
- List of databases

To subscribe:
PestNet-subscribe@yahoogroups.com

Conclusion

- IAS management requires International information exchange (as well as local, national and regional)
- Prior invasiveness information is crucial
- Structured as well as “grass roots” approaches are required
- Conservation information must be freely shared
- We welcome assistance – partnerships, resources
### Different types of funding

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<tr>
<th>Geographic</th>
<th>Thematic</th>
<th>Core</th>
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<tr>
<td>Donors who support the creation of information about the IAS that impact their region.</td>
<td>Donors who support the creation of information about pressing issues.</td>
<td>Donors who support the GISD infrastructure.</td>
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<td>e.g. Funding available to focus on invasive species in North America, Oceania, Australasia and French and UK overseas territories.</td>
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<td>• IAS impacts on threatened species</td>
<td>• NBII</td>
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<td>• Invasive species as biofuel crops</td>
<td>• University of Auckland</td>
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<td>• Wildlife diseases and their vectors</td>
<td>• Manaaki Whenua-Landcare Research</td>
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<td></td>
<td>• Invasive species and climate change</td>
<td>• Comprehensive IAS Information System (CISIS)</td>
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<td>• Marine IAS</td>
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GISD profiles benefit many different stakeholders.
Global Invasive Species Database donors and supporters

**International focus:**
- CAB International
- Critical Ecosystem Partnership Fund
- Defenders of Wildlife
- Initiative on Invasive Species in Overseas Territories (French Committee of IUCN)
- IUCN The World Conservation Union
- La Fondation d'Entreprise TOTAL
- Royal Society for the Protection of Birds
- The GEF as part of GISP Phase I
- The Ocean Biogeographic Info System
- Taiwan Conservation Fund
- World Bank

**Regional focus:**
- Birdlife International (Pacific)
- New Zealand Agency for International Development (NZAID)
- The Pacific Development and Conservation Trust (PDCT)

**National focus:**
- ASB Community Trust
- Biodiversity Network Japan (BNJ)
- Biosecurity New Zealand
- Manaaki Whenua-Landcare Research
- National Biological Information Infrastructure (NBII)
- Terrestrial and Freshwater Biodiversity Information System (TFBIS)
- University of Auckland
- US Fish and Wildlife Service