

The Invasive Species Compendium: A Resource for expert knowledge on Invasive Species in the world and the USA

Training to FICMNEW



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www.cabi.org

KNOWLEDGE FOR LIFE



Global Challenge of Invasive Species is nationally recognized in the USA

President's Executive Orders on invasive species (1999, 2016)

- * Creates a National Invasive Species Council
- * Mandates a Natl. Inv. Spp. Management Plan (2016)
- * Mandates all 45 federal agencies to prevent and manage inv. spp.

Recognize that invasives have significant negative impacts on:

- * Natural ecosystems (affecting environmental quality and biodiversity)
- * Managed ecosystems (e.g., agriculture, forestry, fisheries, agroforestry, aquaculture, horticulture...)
- * The economy
- * Human and animal health.



Science-based Resources for Invasive Species Work

1. **National Invasive Species Information Center**
www.invasivespeciesinfo.gov
2. **Invasive Species Compendium**
www.cabi.org/ISC (today's training on the ISC)



Invasive Species Compendium (ISC)

- Knowledge is key to addressing invasive species
- ISC is a key resource to collate and share information
- ISC is global, science-based, updated weekly
- Covers natural and managed ecosystems (not human pathogens)
- Over 10,000 invasive species in all taxa, and growing
- Free to users, fully funded (\$4.75 M initial cost)
- Focus is on species from any country, from any taxa, with the highest invasiveness and negative impacts

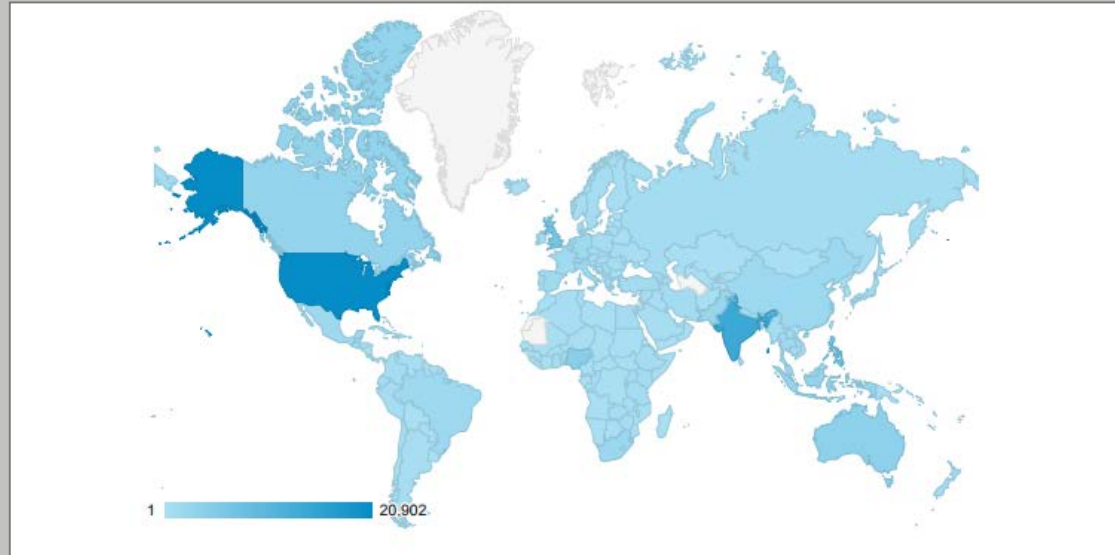
www.cabi.org/ISC



Visitors to the ISC

8 Jan-7 Feb 2017 (one month)

107,898 sessions
by 81,176 users
in 220 countries



Country ?	Sessions ? ↓	Users ?
1. United States	20,899 (19.44%)	15,677 (19.30%)
2. India	13,767 (12.81%)	11,157 (13.73%)
3. Philippines	7,235 (6.73%)	5,735 (7.06%)
4. United Kingdom	5,868 (5.46%)	4,549 (5.60%)
5. Nigeria	4,171 (3.88%)	3,146 (3.87%)
6. Australia	3,533 (3.29%)	2,653 (3.27%)
7. Canada	2,803 (2.61%)	2,101 (2.59%)
8. Indonesia	2,797 (2.60%)	1,862 (2.29%)
9. Pakistan	2,157 (2.01%)	1,610 (1.98%)
10. South Africa	1,762 (1.64%)	1,320 (1.62%)





Invasive Species Compendium



Key policy issues of interest to FICMNEW addressed by the ISC:

- Increase food security (for people and wildlife)
- Increase biosecurity
- Assess/minimize use of invasive species for bioenergy
- Facilitate/maximize agricultural and forest products trade
- Avoid extinctions and protect biological diversity
- Facilitate and comply with federal and state legislation, with environmental, forest and agricultural policy, and regulations
- Assess/mitigate impact of invasives as result of "climate change"

Look for opportunities to link issues to use the ISC in the prevention, early detection/rapid response, control, and research of invasive species



Invasive Species Compendium

The Datasheets in the ISC



Elements of an invasive species datasheet

- **Identity**
Names, scientific and vernacular, in all languages;
notes on taxonomy
- **Geographic distribution** and updated maps
History of introduction and spread;
phytosanitary risk
- **Biology and ecology**
Habitat; genetics; reproduction; physiology;
nutrition; habitat associations; environmental
requirements (climate, soil and water tolerance);
dispersal (pathways, trade, vectors); natural
enemies



Invasive Species Compendium



Elements of an invasive species datasheet

- **Impacts**
 - Economic; social; environmental: to habitats and to biodiversity (threatened species)
 - Summary of invasiveness
- **Management**
 - **Prevention; control** (cultural, mechanical, biological, chemical, genetic); utilization; **eradication**; containment; surveillance; **ecosystem restoration**
- **Gaps in knowledge / Research needs**
- **References**
- **Illustrations**



Invasive Species Compendium

Strategies to maximize use of the ISC



1. Use ISC information to assess climate change

- * The ISC search capability can be used with reference to existing resources such as WorldClim (www.worldclim.org) climate projection models.
- * A book on Invasive Species and Climate Change (CABI, 2014) includes a chapter highlighting the use of the ISC in determining the impact of climate on invasive species biology

2. Add ISC to other websites to promote its dissemination and use.

- * Federal agencies websites (USFS, ARS, APHIS, NRCS, PLANTS, NIFA, USFWS, EPA, USGS) and Federal coordinating committees websites (FICMNEW, ITAP, ANSTF)
 - * State websites, University websites (EDDMapS, etc.)
 - * NGO websites



Invasive Species Compendium

Strategies to maximize ISC use



3. Promote ISC training (webinars)

4. Use ISC to link to and enhance federal and state databases

5. Enhance ISC by providing more IS datasheets

* USDA/APHIS-Smithsonian are preparing ISC datasheets (ds) on 1,250 invasive plants in Caribbean islands. Of the 570 ds done (PR, USVI, Dominican Republic, Haiti, Cuba, Jamaica) 220 ds were available in the ISC (by Oct 2016).

* USDA prepares ds on invasives causing extinction to ESA listed & candidate species. There are over 5,400 species pairs (a pair is one inv. spp. that affects one endangered, threatened or candidate spp. ICE adds to an existing IS ds a table with information on the endangered, threatened or candidate spp. affected. Over 200 ds had been updated (Sept. 2015). We prepare a ds for an inv. spp. causing extinction if it is not in the ISC.

ISC users

- Environmental management
- Agriculture, aquaculture, mariculture, forestry, grazing, land management, urban parks, water management (inland, coastal or oceanic)
- Biosecurity
- Commerce and quarantine
- Formulation of legislation, policy, regulations, budget
- Extension service; technical schools
- Training
- Research
- Technical development
- Industries related to land or water use
- Marketing and marketing research

How can agencies, landowners, NGO's, farmers, and universities use the information in the ISC?

- Prevent, control or eradicate inv. spp. on their lands and waters.
- Use information for National Environmental Policy Act Environmental Assessment or Environmental Impact Statements (Federal or state documents).
- Use information for Endangered Species Act Section 7 Consultations and state ESA regulations.
- Inform scientific research; and inform technical assistance by state DNRs and Dept. Agriculture, NRCS, ARS, USFS, or universities' Extension Service.
- Anticipate IS impacts to lands, waters, species and ecosystems due to climate change.



Invasive Species Compendium

Datasheets, maps, images, abstracts and full text on invasive species of the world

Datasheets

Abstracts

Full Text

Library

Glossary

More Resources

Search Invasive Species Compendium

Smart searches



My ISC

Search over 9,000 Datasheets and over 190,000 Abstracts

Enter keyword or phrase

Filter by type

Search

Advanced Bibliographic Search

Advanced Datasheet Search

Latest content

Recent

Mark: All / None

Datasheet



Neolecanium cornuparvum (magnolia scale)

Magnolia scale, *Neolecanium cornuparvum*, is a scale insect that is native to the eastern USA, where it is a widely distributed pest...

Datasheet



Olea europaea subsp. europaea (European olive)

O. europaea subsp. *europaea*, the cultivated olive, is native to Africa and temperate Asia as well as southern Europe. It...

My ISC Account

Create and export short lists
Create bibliography

Save content
Articles, books, reviews and more...

Save searches
Monitor the latest content

Content types

- Abstract
- CABI Hosted Full Text
- Datasheet
- Datasheet (Basic)
- Datasheet (Full)
- Glossary

Using the ISC: How to copy ISC information for your specific use?

1. Go to www.cabi.org/ISC
2. Type name of a species and go to a full datasheet; look for the green rectangle at the bottom of the initial page of the ds; click GENERATE REPORT
3. With the cursor, mark the blue title of the sections in the IS datasheet you want to copy.
4. Go to green arrows in the center of the page; click the left to right arrow. Repeat. (If interested in many sections, click 'All Sections' and remove those unwanted using the left-facing arrow). When finished,
5. Select grey button at the right of the page to "GENERATE" report with data, maps, illustrations.
6. Copy it in a WORD file in your computer. Edit your report. Print and use.
7. Cite the ISC in your report as a source of information.

Use ISC data to prepare an EA or EIS under NEPA on invasive species for a proposed project.

1. Go to ISC (www.cabi.org/ISC)

2. Find the



Click '**Datasheets**' button on the content-type menu bar. Type name of your state in search box (ex: Virginia). Click the 'Search' button. Select the datasheet on Virginia, under 'Index', select 'List of Species CSV Output'. Click green button 'Download CSV file' to retrieve a spreadsheet of species that can be sorted on taxonomic terms or Full/Basic datasheets.

3. Request potential inv. spp. that may come into your state from neighboring states:

From the Home page, click 'Advanced Datasheet search'. Type in your State name NOT contiguous state name (District of Columbia NOT Virginia). Hit search. The list of inv. spp. in DC that are NOT in VA will appear. Save this by clicking 'Export records'. This search only interrogates 'Full' datasheet. For a more thorough test, compare downloaded lists of species from the datasheets on neighboring state. Repeat for each of the contiguous states to your state.

4. Request the list of threatened species for your project:

Threatened species affected by those potential inv. spp. from your state or neighbouring states are listed on the respective invasive species datasheets.

Use ISC data to prepare an ESA Section 7 Consultation for a proposed project.

1. Go to ISC (www.cabi.org/ISC)
2. Select filter by type: full or basic ds. Search for invasive species in all the states under the Section 7 consultation. Save the list of those invasive species.
3. **Request the list of threatened species** for your project:
Threatened species affected by those inv. spp. in your list are listed on the respective invasive species datasheets. Look them up. Make a list and save it. Proceed to analyze for the Section 7 consultation.

Use ISC to prepare information for research

Situation A: Who is working on this inv. spp.?

1. Go to ISC (www.cabi.org/ISC)
2. Type the name of the inv. spp.
3. Hit Search. If datasheet not immediately visible, filter by Full or Basic datasheet, the spp. ds will appear, click on it.
4. Look in the Index for “Natural Enemies”; click on it; save it.
5. Look in the Index for “Notes on natural enemies”, click; save.
6. Or create a ‘Datasheet Report’ with those sections selected and save.
7. Get names of other scientists from the publications.

Situation B: What research needs to be done on this spp.?

1. Go to ISC (www.cabi.org/ISC)
2. Type the name of the inv. spp.
3. Hit Search. If datasheet not immediately visible, filter by Full or Basic datasheet, spp. ds will appear, click on it.
4. Look in the Index for the “Gaps in knowledge/Research needs”, click on it.

Use ISC data to prepare information for research...

Situation C: A biological control scientist asks: who are the natural enemies of this inv. spp.?

1. Go to ISC (www.cabi.org/ISC)
2. Type the name of the inv. spp.
3. Hit Search. If datasheet not immediately visible, filter by Full or Basic datasheet, the spp. ds will appear, click on it.
4. Look in the Index for “Natural Enemies”; click on it. Save it.
5. Look in the Index for “Notes on natural enemies”, click; save.

Situation D: A biocontrol scientist asks: What are host(s)?

1. Go to ISC (www.cabi.org/ISC)
2. Type the name of the inv. spp.
3. Hit Search. If datasheet not immediately visible, filter by Full or Basic datasheet, the spp. ds will appear, click on it.
4. Look in the Index for “Host Animals” or “Host Plants”, click on it; save information.
5. Or create a ‘Datasheet Report’ with the relevant section selected and save.

Use ISC to prepare an inv. spp. ACTION ALERT in a case of an early detection and rapid response to a new inv. spp infestation

1. Go to ISC (www.cabi.org/ISC)
2. Type the name of the inv. spp.
Select filter by type: full and basic ds.
3. Hit Search. The inv. spp. ds will appear, click on it.
4. Look in the Index for the sections that you want to include in the ACTION ALERT, such as “Pictures, Identity, Summary of Invasiveness, Description, Risk of Introduction, Hosts/Species Affected, Pathway Causes, Pathway Vectors, Detection, Similarity to other Species, Control”. Create a ‘Datasheet Report’ with those sections, copy the sections into your own Word Document in your computer.
5. Edit your ACTION ALERT. Cite the ISC in your report as a source of information. Print and disseminate to partners.

Use ISC data to prepare information for technical assistance from NRCS, USFS or universities Extension Service agents to farmers, foresters and others

1. Go to ISC (www.cabi.org/ISC)
2. Write common or scientific name of inv. spp. Hit Search. If datasheet not immediately visible, filter by Full or Basic datasheet, the ds will appear; click on it.
3. Look at the bottom of the “Summary” section and click on the green rectangle that says “Generate report”.
5. On the left rectangle, with the cursor mark the blue title of the sections in the IS datasheet you want to copy (or use ‘All Sections’ button). Go to green arrows in the center of the page; click left to right arrow. Repeat. When finished, select grey button to “GENERATE” report with data, maps, illustrations.
6. Copy it in a WORD file in your computer. Edit your report. Print and use.
7. Cite the ISC in your report as a source of information.



Invasive Species Compendium



Use ISC to assess/anticipate inv. spp. impacts on lands, waters, ecosystems or species due to climate change (use current distribution, biology & ecology to understand/assess clim. chg. scenario(s))

- **Assess the current and future range of an IS**
- **What are the IS in my country? In my USA state?**
- **Which other IS may come with climate change under specific scenarios?**
- **Analyzing pathway(s) for IS in the ecosystem after climate changes**
- **Analyzing IS by habitat after climate changes**

Use ISC data to understand/assess Clim. Chg. scenario(s)

Assess the current and future range of an inv. spp.

1. Go to ISC (www.cabi.org/ISC)
2. Type in your inv. spp. common or scientific name. Hit Search. Hit the name of that datasheet to open it.
3. Click “ more information” under the world map. Larger regional maps will appear.
4. Transfer all information related to temperature, soils, precipitation, altitude, etc. into Google Earth (click Download KML file) or Excel file (click Download CVS file) under the main World Map.
5. Do an initial scenario of the inv. spp. in the current climate. It will show the current range of the spp. and the area with the characteristics for the spp. to expand.
6. Add your own additional climate information layers to Google Earth and extrapolate to investigate different climate change scenarios (by comparing against changing temp or rainfall or other parameters).
7. Compare scenarios.

Use ISC data to understand/assess climate change scenario(s)

- **What are the inv. spp. in my country? In my USA state?**
 1. Go to ISC (www.cabi.org/ISC)
 2. Click '**Datasheets**' button on the content-type menu bar (= 'Datasheets', 'Abstracts', 'Full Text', etc.). Type name of your state in search box. Click the 'Search' button. Select the datasheet.
 3. A list of the invasive species already in the ISC for your country will be available under heading, 'List of species'.
 4. Copy and save, or click green rectangle, 'Download CSV file'. The tabular list presented on the datasheet only includes species with a 'Full' datasheet; the CSV file includes species covered by both 'Full' and 'Basic' datasheets.

Example: Florida



Invasive Species Compendium



Which other IS may come with climate change under specific scenarios?

1. Go to ISC (www.cabi.org/ISC)
2. Use a climate map, many are freely available on-line (e.g. current and predictive climate maps using the Köppen-Geiger climate classification available at <http://koeppen-geiger.vu-wien.ac.at/> - other useful mapping data can be downloaded from WWF Terrestrial Ecoregions of the World (<https://www.worldwildlife.org/publications/terrestrial-ecoregions-of-the-world>), to identify climate zones of interest in your state or country.

Use the same climate map to identify other states/countries with the same climate zone classifications and use the ISC to identify invasive species in those states/countries that are not in your state/country.

A similar procedure with predictive climate maps (e.g. those available from the Köppen-Geiger website given above) could be used to identify potential future invaders under different climate change scenarios.

Example:

1. Type the name of the other country of concern NOT in your state or country. Hit Search.

Example: Dominican Republic NOT Puerto Rico.
This is Scenario One.

2. Change parameters for Clim Chg scenario 2. Ex: 10 degrees F warmer, 12 more in. of rain. Run that scenario.

3. Type in the name of your state or country (USA) NOT in the other country of concern. Hit Search.

Example: Dominican Republic NOT Puerto Rico.
This is Scenario Two.

4. Compare Scenario One to scenario Two.

- **Analyzing pathway(s) for IS in the ecosystem after climate changes**

1. Go to ISC (www.cabi.org/ISC)
2. Go to Advanced datasheet search; click.
3. Go to the bottom of the page and click on “Search Help Page”.
4. Under the title “Expert Search”, click on the “Controlled Vocabulary pdf”. Save this pdf to your computer.
5. Look at item 3: PATHWAY for the wording to use in your search.

Example: Type in the search box: All invasive species transported/spread by “Mail/post” in Florida. Hit Search. List of inv. spp. using this pathway in FL will appear.

Use ISC to understand/assess clim. chg scenario(s)

- **Analyzing IS by habitat**

1. Go to ISC (www.cabi.org/ISC)
2. Click 'Advanced Datasheet Search' link under the main search input box. Click on it.
3. Click on "Search Help Page" (at the bottom) to find other ways to do search on the ISC ([native spp](#), [inv. spp](#), [pathways](#), [habitat](#), [hosts](#), [subset of spp. by taxa](#), etc.)
4. Type in the search box (the name of the country of concern NOT your state or country) AND "HAB freshwater"
4. Hit Search.

Example: (Dominican Republic NOT Puerto Rico) AND "HAB freshwater"

User manuals

- User manuals with helpful tips on how to use the Compendium are available via the ISC 'More resources' page
- Manuals were produced for a dissemination and user training project
- Direct link to Manuals: <http://www.cabi.org/isc/more-resources/outreachproject/>



USDA invites FICMNEW agency members and other partners to use the ISC and implement these strategies to better inform your work on invasive species.

Questions?

Please contact:

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