



# Pacific Invasive Species Battler Series

## FIND ANSWERS ONLINE TO COMMON INVASIVE SPECIES QUESTIONS



**SPREP**  
Secretariat of the Pacific Regional  
Environment Programme



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*Our vision: A resilient Pacific environment sustaining our livelihoods and natural heritage in harmony with our cultures*

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## Dear Invasive Species Battler,

We are a diverse bunch of people in the Pacific region, which spans a third of the earth's surface and encompasses about half of the global sea surface. We have ~2,000 different languages and ~30,000 islands. Pacific ecosystems are one of the world's biodiversity hotspots, with a large number of species found only in the Pacific and nowhere else. In fact, there are 2,189 single-country endemic species recorded to date. Of these species, 5.8 per cent are already extinct or exist only in captivity. A further 45 per cent are at risk of extinction. We face some of the highest extinction rates in the world.

The largest cause of extinction of single-country endemic species in the Pacific is the impact of invasive species. Invasives also severely impact our economies, ability to trade, sustainable development, health, ecosystem services, and the resilience of our ecosystems to respond to natural disasters. Fortunately, we can do something about it.

Even in our diverse region, we share many things in common. We are island people, we are self-reliant, and we rely heavily on our environment to support our livelihoods. We also share many common invasive species issues as we are ultimately connected. Sharing what we learn regionally benefits us and our families economically, culturally, and in our daily lives. The "Invasive Species Battler" series has been developed to share what we have learned about common invasive species issues in the region, with information and case studies that can assist you to make a decision about what to do next or where to go for further information.

The SPREP Invasive Species Programme aims to provide technical, institutional, and financial support to regional invasive species programmes in coordination with other regional bodies. We coordinate the Pacific Invasive Learning Network (PILN), a network of practitioners battling invasive species, and the Pacific Invasives Partnership (PIP), the umbrella regional coordinating body for agencies working on invasive species in more than one Pacific country.

For knowledge resources, outreach tools, and more information on SPREP, the Invasive Species Programme, PILN, and PIP, please visit the SPREP website: [www.sprep.org](http://www.sprep.org)

Thank you for your efforts,  
SPREP Invasive Species Team



### About This Guide

The invasive species battler has a difficult job. Many of the management solutions for invasive species require a broad base of information to determine the best way to approach an issue and determine if the approach is feasible. Likely questions a battler will face are: what is that species? How did it get here and where will it go next? Is it a risk to our environment or other important national asset? Where else is this species found and what did they do about it? This guide was developed to assist the invasive species battler in accessing information to answer these questions and decide about management action.

SPREP thanks Shyama Pagad from the Invasive Species Specialist Group (ISSG) for drafting this guide. The ISSG performs a vital role in storing and making available invasive species data for the Pacific.



## Where can I get information to help me identify a plant, animal, or disease?

Identification of species is a critical first step in invasive species management. The best way to identify a plant, animal, or disease is to ask an expert, either through your environment ministry, a local NGO, a consultant, or a SPREP invasive species specialist.

If you do not have access to an expert right away, high-resolution images are very helpful for identification of species. You can send images of the species to networks as identified later in this booklet, or you can use online resources, including picture galleries and identification keys, to identify species.



### Sample species: Ivy gourd



Photo: Ivy gourd, a common weed, pictured in Tongatapu, Tonga. © Tau'olunga

Ivy gourd (*Coccinea grandis*) is a noxious vine that smothers vegetation and other objects, forming a dense canopy. It acts as a host for melon fly and is a reservoir for other crop pests, possibly including ring spot virus. It has become invasive in several Pacific countries where it is a severe pest in gardens, on utility poles, roadsides, and in natural areas.

## Using Online Sources

The key to ensuring accuracy and quality of information you receive from online sources is to ensure you use reliable and reputable information from known organisations, experts, and initiatives.

Several invasive species databases provide images and information to help with identification, such as the [Global Invasive Species Database \(GISD\)](#), [CABI Invasive Species Compendium](#) and the thematic [Pacific Island Ecosystems at Risk \(PIER\)](#) and [FishBase](#).

The [Global Invasive Alien Species Information Partnership](#) collates GISD, CABI, and other data sources in one interface, along with providing reports, tools, a forum, and more to assist practitioners.

[PIAkey \(Pacific Invasive Ant key\)](#) is an electronic guide that can assist in the identification of Pacific Invasive Ants. Follow this link <http://itp.lucidcentral.org/id/ant/pia/Introduction.html> to view diagnostic charts, comparison charts, video clips, and an image gallery of high-resolution images. The site includes a video tutorial on how to use the Pacific Invasive Ant key.

Pacific Ant Group Discussion List can also facilitate contact with experts in cases where additional confirmation is required. For more information, e-mail [pag-l@lists.hawaii.edu](mailto:pag-l@lists.hawaii.edu)

[Database of Island Invasive Species Eradications](#) is specific to eradication as a management choice. The DIISE provides detailed information to practitioners on individual eradication events.



### Sample species: Little fire ant

The little fire ant (*Wasmannia auropunctata*) might be the greatest ant species threat in the Pacific region. In addition to its painful sting, it reduces populations of flying and tree-dwelling insects, including spider species.

The Pacific Invasive Ant Toolkit can help you respond to fire ants or other species.



Photo: Plegadis, Wiki Commons

## What networks can I use to get support?

There are helpful and active support networks of experts and practitioners in the Pacific region who can assist in identifying species, using best practices, and answering practical questions.

The **Pacific Invasives Learning Network (PILN)** was established to empower effective invasive species management through a participant-driven network that meets priority needs, rapidly shares skills and resources, provides links to technical expertise, increases information exchange, and accelerates on-the-ground action.

PILN, facilitated through SPREP, serves Teams of Pacific Island agencies responsible for invasives management, including agencies responsible for agriculture and natural resource management, international trade and border control, as well as environment and conservation.



[www.sprep.org/piln](http://www.sprep.org/piln)

**PestNet** is an email network focused on plant protection and quarantine. It is free to members. Messages with requests and images can be submitted to the moderator of the list, who will circulate it.



[www.pestnet.org/PestNet.aspx](http://www.pestnet.org/PestNet.aspx)

Responses are normally received in a day or two. PestNet also offers a service where specimens can be submitted for identification.

PestNet provides valuable practical information on how to sample, handle, label, and mail samples.

**Aliens-L of the IUCN Invasive Species Specialist Group** is an email network of global IAS experts, practitioners and researchers who can help you identify a plant, animal or disease. Images can be posted on the list and requests sent for assistance. To become a member of the Aliens-L list, send a request to Aliens-L at this link: <https://list.auckland.ac.nz/sympa/subscribe/aliens-l>

## Where can I find information about pathways and vectors of introduction and spread of invasive species?

Species that become invasive are usually species that have moved along an invasion pathway and entered a country, island, site, or ecosystem where they are not native. Identification of these invasion pathways (e.g. aquaculture, forestry, or nursery trade) and the vectors or means by which they move (such as ships, airplanes, cargo, vehicles, and humans) are critical to prevention of biological invasions.

The two well-known sources of global invasive species information—the [Global Invasive Species Database \(GISD\)](#) and the [CABI Invasive Species Compendium](#)—provide detailed information on pathways of introduction and spread.

There are two types of information on pathways/vectors, both of which are provided in these two sources.

- **Introduction type:** whether the species has been intentionally/deliberately or unintentionally/accidentally introduced
- **Pathway/vector:** whether the species was released, escaped from containment or captivity, was a contaminant or a stowaway, or spread through corridors such as canals and waterways

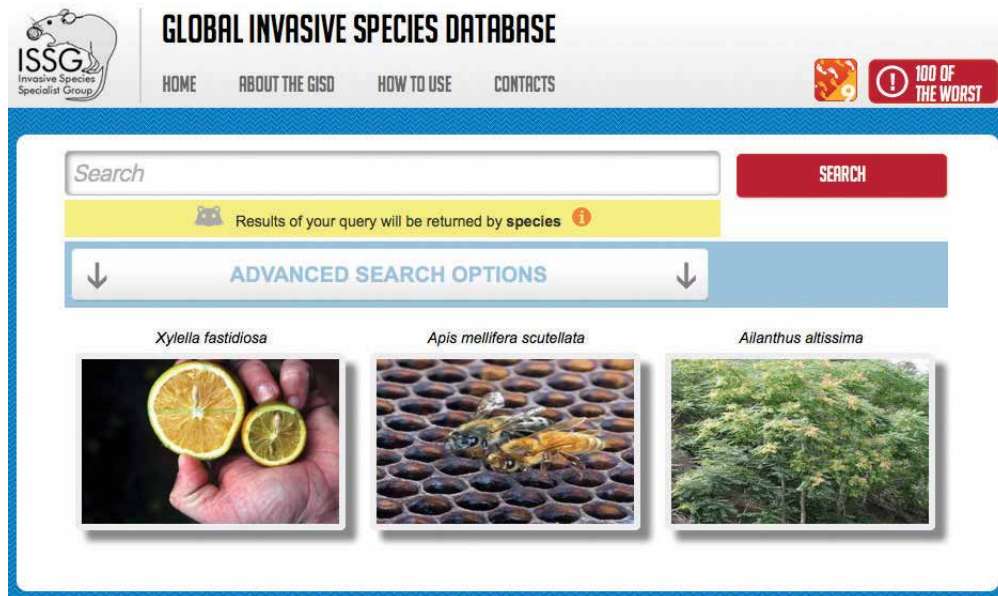
The GISD and CABI ISC feature IAS information as species profiles which include information on species ecology, distribution, impacts, management, and pathways/vectors of introduction, including type of introduction where known.





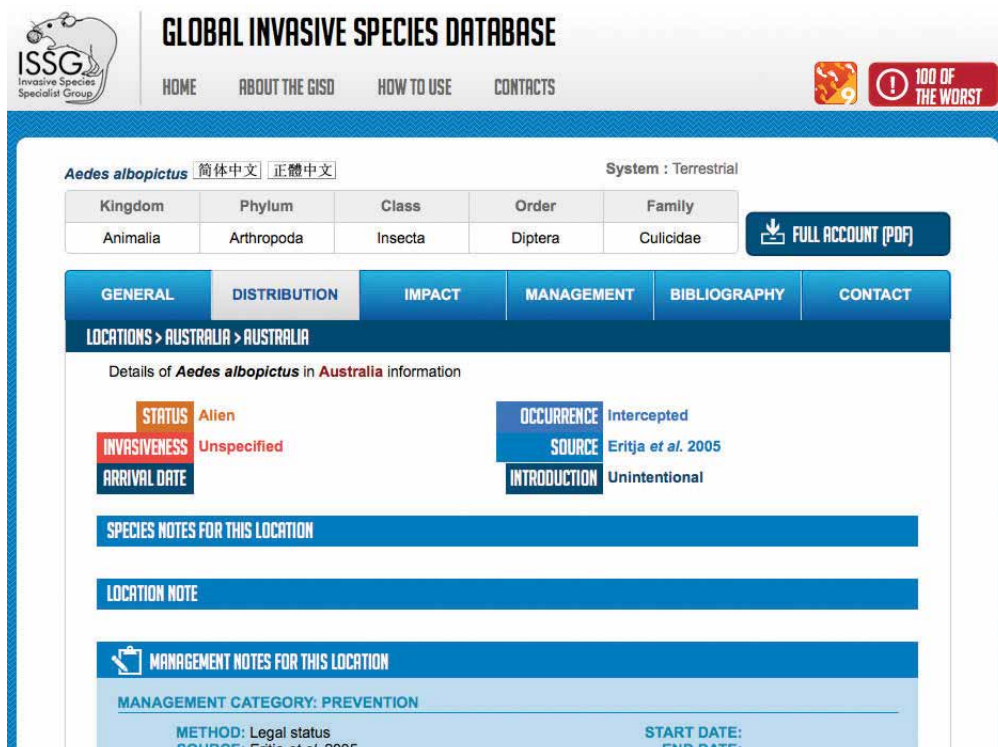
## Global Invasive Species Database

Enter the name of the species (e.g. Asian tiger mosquito *Aedes albopictus*) in the Search bar (see figure below).



[www.iucngisd.org/gisd/](http://www.iucngisd.org/gisd/)

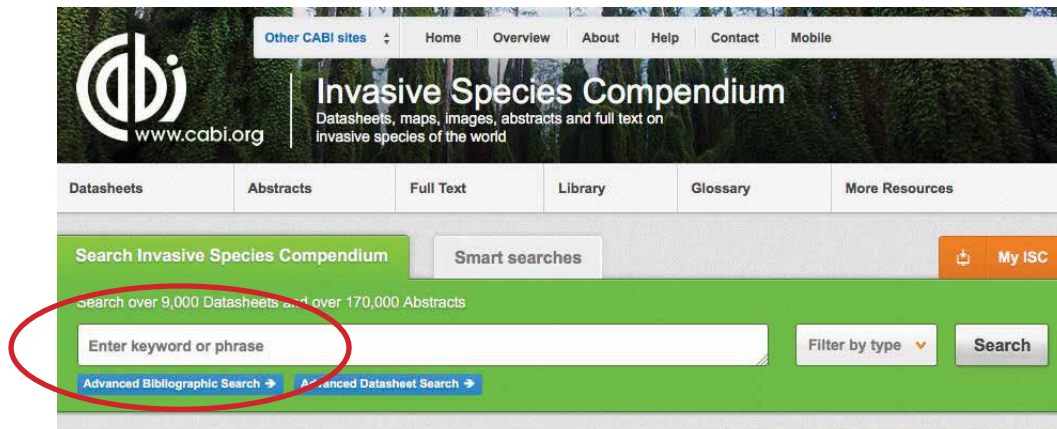
This opens up the species profile pages. Pathway information is provided under two headings. Information on 'type of introduction' is available from the distribution pages. For example, for *Aedes albopictus* in Australia:



<http://www.iucngisd.org/gisd/species.php?sc=109>

## CABI Invasive Species Compendium

Search for a species datasheet by entering the name of the species in the Search bar (see figure below).



[www.cabi.org/isc/](http://www.cabi.org/isc/)

Information on pathways/vectors is available by selecting the following three tabs from the list of information available for each species.

- Means of movement and dispersal
- Pathway Causes
- Pathway Vectors

For example, below is the profile and information on pathways/vectors for the Asian tiger mosquito.

The image shows the profile page for 'Aedes albopictus (Asian tiger mosquito)'. The page is divided into two main sections: 'Index' and 'Summary'. The 'Index' section lists various categories of information available for this species, including 'Pictures', 'Identity', 'Summary of Invasiveness', 'Taxonomic Tree', 'Description', 'Distribution', 'Distribution Table', 'Habitat', 'Habitat List', 'Host Animals', 'Species Vectored', 'Biology and Ecology', 'Means of Movement and Dispersal', 'Pathway Causes', 'Pathway Vectors', 'Plant Trade', 'Impact Summary', 'Impact', and 'Risk and Impact Factors'. The 'Summary' section provides key details: 'Last modified 04 February 2016', 'Datasheet Type(s) Invasive Species', 'Vector of Animal Disease', 'Host Animal', 'Preferred Scientific Name Aedes albopictus', 'Preferred Common Name Asian tiger mosquito', and 'Taxonomic Tree' (Domain: Eukaryota, Kingdom: Metazoa, Phylum: Arthropoda, Subphylum: Uniramia, Class: Insecta). There are two images: a close-up photograph of the mosquito on a green leaf and a world map showing the distribution of the species. Both images have 'More information' links below them.

[www.cabi.org/isc/datasheet/94897](http://www.cabi.org/isc/datasheet/94897)

## How do I find out if an invasive species poses a high risk to my country or to our native species and ecosystems?

A good way to start is by conducting a risk assessment for the specific species, which would assist in identifying the level of risk, either high or low, to the species, ecosystems, and their services in your country.

Tools, processes, and models of **Risk Assessment** are procedures that are used to assess and classify potentially invasive species into categories such as 'restricted', 'prohibited', 'permitted', etc. Risk assessment documents also describe the level of possible negative impacts these species may have on the country or ecosystem of concern.

Risk assessment tools, processes, and models can be used to:

- assess the risk of importation of species, e.g. the weed potential of proposed plant imports;
- model and predict the establishment and spread of potentially invasive species, including climate matching; and
- assess the risk posed by pathways/vectors of introduction and spread of potentially invasive species.



### Examples of Pacific Risk Assessments

[Pacific Island Ecosystems at Risk \(PIER\)](#) is a premier database and resource of inventories and descriptions of plant species that harm ecosystems in the Pacific Region. PIER also includes links to [prepared Weed Risk Assessments](#) of close to 1,900 alien and potentially invasive plant species (the majority of which have been prepared for the Pacific region) that are valuable to an invasive species practitioner.

Another valuable resource is the [Hawai'i Pacific Weed Risk Assessment Site](#). More than 1,650 plants have been screened to date. The assessments have been prepared by botanists answering close to 50 questions about the ecology, biology, and known invasive tendencies of plants. The score predicts if a species is likely to be invasive and the level of harm to Hawai'i and any other Pacific island sharing similar climates.

## Search on PIER site

There are two ways to access Risk Assessments on the PIER website. The PIER site has a dedicated webpage for Risk Assessments at [www.hear.org/pier/wralist.htm](http://www.hear.org/pier/wralist.htm)

The table (see below) lists the scientific name of the species followed by the taxonomic Family of that species, its common name, a link to the actual risk assessment, the country or area for which the risk assessment was conducted, and the score obtained. Risk assessments have been conducted for the Pacific, Hawaii, Florida (USA), and Australia. The risk assessment scores from other areas are still a good indication of the risk level of that species for your area.

Following the score is a recommendation describing the 'risk level' posed by the species, for example, 'low risk', 'high risk', and 'evaluate'. Information on the risk assessments is provided at the link on the top left corner above the Table. The information document outlines the recommendations and what each of them mean.

### Pacific Island Ecosystems at Risk (PIER)

#### Risk Assessments

[Information](#) on Risk Assessments

Scientific Name	Family	Common name	Risk assessment	Country or Area	Score	Recommendation
<a href="#">Abelia x grandiflora</a>	Caprifoliaceae	glossy abelia	<a href="#">Assessment</a>	Pacific	-13	low risk
<a href="#">Abelmoschus manihot</a>	Malvaceae	manioc hibiscus	<a href="#">Assessment</a>	Pacific	1	low risk*
<a href="#">Abies fraseri</a>	Pinaceae	Fraser fir	<a href="#">Assessment</a>	Pacific	3	evaluate
<a href="#">Abies grandis</a>	Pinaceae	grand fir	<a href="#">Assessment</a>	Pacific	1	evaluate
<a href="#">Abies guatemalensis</a>	Pinaceae	Guatemalan Fir	<a href="#">Assessment</a>	Pacific	-2	low risk
<a href="#">Abies nordmanniana</a>	Pinaceae	Nordmann fir	<a href="#">Assessment</a>	Pacific	2	evaluate
<a href="#">Abies procera</a>	Pinaceae	noble fir	<a href="#">Assessment</a>	Pacific	1	evaluate
<a href="#">Abies religiosa</a>	Pinaceae	sacred fir	<a href="#">Assessment</a>	Pacific	-2	low risk
<a href="#">Abrus precatorius</a>	Fabaceae	rosary pea	<a href="#">Assessment</a>	U.S. (Florida)	16	reject
<a href="#">Abutilon grandifolium</a>	Malvaceae	Hairy abutilon	<a href="#">Assessment</a>	Pacific	6	low risk*
<a href="#">Abutilon megapotamicum</a>	Malvaceae	trailing abutilon	<a href="#">Assessment</a>	U.S. (Florida)	2	evaluate
<a href="#">Abutilon hirtum</a>	Malvaceae	Florida Keys Indian mallow	<a href="#">Assessment</a>	U.S. (Florida)	5	reject*
<a href="#">Abutilon theophrasti</a>	Malvaceae	velvet leaf	<a href="#">Assessment</a>	Australia	15	reject
<a href="#">Acacia auriculiformis</a>	Fabaceae	earleaf acacia	<a href="#">Assessment</a>	Pacific	13	high risk
<a href="#">Acacia cochliacantha</a>	Fabaceae	boat thorn acacia	<a href="#">Assessment</a>	Pacific	10	high risk
<a href="#">Acacia confusa</a>	Fabaceae	Formosan koa	<a href="#">Assessment</a>	Pacific	10	high risk

Links to Risk Assessments are also provided on the Species datasheet (e.g. [see the page on Silver Wattle \*Acacia dealbata\*](#) below). Here, "Risk assessment results" lists the score followed by a link to the Risk Assessment.

### Pacific Island Ecosystems at Risk (PIER)

[ [back](#) ] [ [PIER species lists](#) ] [ [PIER home](#) ]

#### **Acacia auriculiformis**

A.Cunn. ex Benth., Fabaceae



Click on an image for info to BIGGER PICTURES

Present on Pacific Islands? **yes**

Primarily a threat at high elevations? **no**

Risk assessment results: **High risk, score: 13** ([Go to the risk assessment](#))

Common name(s): [[more details](#)]

Chinese: da ye xiang si

English: auri, black wattle, Darwin black wattle, earleaf acacia, earpod wattle, northern black wattle, Papuan wattle, tan wattle

French: acacia auriculé

Māori (Cook Islands): sikasia

Pohnpeian: tubkehñ pweimwahu

Habit: **tree**

**Description:** "Trees, evergreen, to 20 m tall. Bark gray-white, smooth. Branches pendulous; branchlets angular, glabrous, with conspicuous lenticels. Phyllodes falcate-oblong, 10-20 x 1.5-4 (-6) cm, conspicuous main veins 3 or 4, both ends attenuate. Spikes 1 to several, fasciculate, axillary or terminal, 3.5-8 cm. Flowers orange-yellow. Calyx 0.5-1 mm, shallowly dentate. Petals obovate, 1.5-2 mm. Filaments 2.5-4 mm. Ovary densely puberulent. Legume contorted when mature, 5-8 x 0.8-1.2 cm, valves woody. Seeds ca. 12, black, ca. 5 x 3.5 mm" ([Flora of China online](#)).

**Habitat/ecology:** A commonly planted forestry tree. Can become naturalized where planted. An environmental pest in southern Florida (Hammer, 1996: p. 24)

**Propagation:** Seed

**Native range:** Northern Australia, Papua New Guinea, eastern Indonesia (GRIN).

**Presence:**

## Where can I find detailed information about species distributions?

It is important to have up-to-date knowledge of where species are, their impact mechanisms and outcomes, and management options available to prevent their introduction, eradicate them when possible, and manage established infestations. Information on distribution of species in different location types, including country, island, site, and water body, is available from global (e.g. GISD and CABI ISC) and thematic databases (e.g. PIER for plants; FishBase for fresh- or brackish-water fish species; SealifeBase for marine species).

GISD, CABI ISC, and PIER provide detailed distribution of invasive species at country, island, and site level. Information on both native and alien range is provided in a tabular form and can be downloaded from the site in different formats, such as 'comma separated value' (csv) format. You can view some examples by following these links:

See the distribution of the Black rat (*Rattus rattus*) in the GISD.

<http://www.iucngisd.org/gisd/species.php?sc=19>

- Click on the Distribution tab at the top; selecting a country will open pages with more detailed distribution information in that country, including status of the species (alien/invasive) in that location and its management where information is available.

See the distribution of merremia vine (*Merremia peltata*) in the CABI Invasive Species Compendium at [www.cabi.org/isc/datasheet/33476](http://www.cabi.org/isc/datasheet/33476)

- Selecting the Distribution tab will open the distribution table that provides, status of the species (alien/invasive), and occurrence information. This table can be downloaded.

See list of species in Pacific island nations and islands at [www.hear.org/pier/locations/cts.htm](http://www.hear.org/pier/locations/cts.htm)

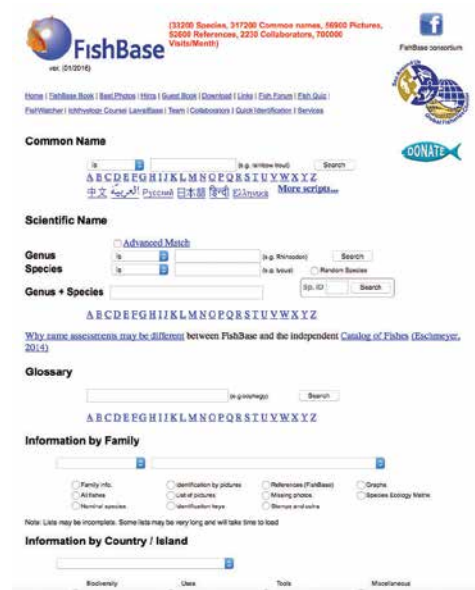
- PIER focuses on plant species in the Pacific and Pacific Rim countries. Distribution records of IAS in Pacific island nations including in islands are available both through selection of country or island name and by viewing the species datasheet.

### FishBase and SealifeBase

These two databases are dedicated not to alien and invasive species but to all fish and aquatic and marine organisms.

You can search for occurrences of introduced and invasive species by selecting a country from the dropdown menu and then selecting an attribute (in this case Introduction or Invasiveness). The resulting table lists all alien fish and known invasive fish present in that country.

The FishBase search page is at [www.fishbase.org/search.php](http://www.fishbase.org/search.php)



## How can I get information on management, prevention, and preventative measures?

Information on the management of invasive species is available from the Invasive Species Battler Resource Base ([www.sprep.org/piln/resource-base](http://www.sprep.org/piln/resource-base)) and several databases, such as DIISE, GISD, CABI, and GIASIPartnership.

These online sources contain data but also guides, decision-making tools, examples of outreach materials, and other resources for you to use directly or as inspiration for the products you need.



# Additional Resources

The Battler Resource Base contains information materials and resources for battling invasive species: [www.sprep.org/piln/resource-base](http://www.sprep.org/piln/resource-base)

You can contact the Invasive Species Programme through the SPREP website: [www.sprep.org/Invasive-Species/bem-invasive-species](http://www.sprep.org/Invasive-Species/bem-invasive-species)

## Invasive Species Databases and related information resources

Invasive Battler Resource Base  
[www.sprep.org/ias/resource-base](http://www.sprep.org/ias/resource-base)

Global Invasive Species Database (GISD)  
[www.issg.org/database/welcome/](http://www.issg.org/database/welcome/)

CABI Invasive Species Compendium (CABI ISC)  
<http://sites.cabi.org/isc/about/>

Pacific Island Ecosystems at Risk (PIER)  
[www.hear.org/pier/](http://www.hear.org/pier/)

Database on Introduction of Aquatic Species (DIAS)  
[www.fao.org/fishery/topic/14786/en](http://www.fao.org/fishery/topic/14786/en)

World Register of Marine Introduced Species (WRIMS) [www.marinespecies.org/introduced/](http://www.marinespecies.org/introduced/)

Global Register of Introduced and Invasive Species (GRIIS) [www.griis.org/](http://www.griis.org/)

Island Biodiversity and Invasive Species Database (IBIS) <http://ibis.fos.auckland.ac.nz/>

Database of Island Invasive Species Eradication (DIISE) <http://diise.islandconservation.org/>

Threatened Island Biodiversity Database (TIB)  
<http://tib.islandconservation.org/>

Guidelines Toolkits and Training Course material from the Global Invasive Species Programme  
[www.issg.org/gisp.htm](http://www.issg.org/gisp.htm)

Pacific Invasive Ant Key (PIAKey)  
<http://itp.lucidcentral.org/id/ant/pia/index.html>

Resource Kit for Rodent and Cat Eradication  
<http://rce.pacificinvasivesinitiative.org/>

## Native and Threatened Species Information

IUCN Red List of Threatened Species  
[www.iucnredlist.org/search](http://www.iucnredlist.org/search)

## Species Taxonomy

Global Biodiversity Information Facility (GBIF)  
[www.gbif.org/](http://www.gbif.org/)

Catalogue of Life  
[www.catalogueoflife.org](http://www.catalogueoflife.org)

Integrated Taxonomic Information System (ITIS)  
[www.itis.gov/](http://www.itis.gov/)

**Thematic Databases** – provide information on distribution of introduced and invasive species

FishBase  
[www.fishbase.org/](http://www.fishbase.org/)

SeaLifeBase  
[www.sealifebase.org/](http://www.sealifebase.org/)

BirdLife International Datazone  
[www.sealifebase.org/](http://www.sealifebase.org/)

AlgaeBase  
[www.algaebase.org/](http://www.algaebase.org/)

AntBase  
<http://antbase.org/>

Avibase  
<http://avibase.bsc-eoc.org/avibase.jsp?lang=EN>  
[World Register of Marine Species \(WoRMS\)](http://www.marinespecies.org/aphia.php?p=search)  
[www.marinespecies.org/aphia.php?p=search](http://www.marinespecies.org/aphia.php?p=search)

Pacific Invasive Ant Toolkit  
[www.sprep.org/piln/resource-base](http://www.sprep.org/piln/resource-base)

## Other

Google Scholar is a useful web search engine to search for scholarly articles on invasive species and related topics

<https://scholar.google.com>



# Join the Fight

Protect our islands from invasive species



Håfa Adåi

Aloha

Mogetin

Rahn Anim

Iokwe

Alii

Kaselehlle Len Wo

Mauri

Ekawomir Omo

Mālō te ma'uli

Halo

Tālofa nī

Halo

Tālofa

Halo

Tālofa

Ni sa Bula Fakaalofa lahi atu

Bonjour

Mālō e lelei

Kia Orana

Ia Orana

Bonjour

Hello

Kia Ora

