



User Guide

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The Background Problem

Quarantine and plant health are critical to the economic, social, human health and environmental well-being of Australia and its neighbours. Rapid recognition of Emergency Plant Pests is critical to ensure appropriate response strategies are implemented. However, the capacity to deliver effective quarantine management is declining due to the aging and non-replacement of the world's existing taxonomic expertise.

From a plant health and quarantine perspective, this brings an increasing risk that incursions will go unrecognised or be diagnosed too late to be contained.

Molecular diagnostics (targeted DNA probes instead of a museum-based taxonomist) has merits, but is not the complete answer, particularly for initial diagnostic screening, heightening industry/public awareness and education.

Each day AQIS inspectors collect hundreds of exotic intercepts. All require immediate determinations as to whether or not to release, fumigate or destroy the affected cargo.

These time and money decisions have major impacts on our import and export effectiveness.

An Innovative Vision

PaDIL combines leading edge technology in light microscopy, digital imaging and image manipulation. Utilising an innovative, non-molecular mechanism, it provides 'virtual specimens' of a type only previously possible using low-power scanning-electron microscopy.

A series of images is captured, each providing an in-focus image of part of the photographed organism.

Each series of images is then combined to create a single new image, built from only the in-focus pixels from each individual image.

Specimens are shown in true-life colour.

Destructive preparation of specimens is not required.

Diagnostic images show the user the best orientation to view the specimen.

Results allow a user with a microscope to focus on different parts of the viewed organism, simultaneously comparing what they see against a single PaDIL image.

Operating costs after equipment purchase are negligible.

All images are copyright free for non-commercial purposes.

PaDIL's Integrated Solution

PaDIL helps alleviate the loss of real-world expertise through the generation of shared 'virtual' expertise.

- Virtual collections of high quality digital images, illustrated diagnostic keys and on-line tutorials overcome the expense of maintaining centralised technical reference collections.
- Images and illustrations are focussed on key diagnostic features as defined by taxonomists..
- Diagnostic reference material, normally locked away in collections around the world, is available to a much larger group of users.
- Reliance on taxonomic expertise is reduced, particularly where diagnosis is aimed at a limited group of target species (i.e. pest species on a quarantine target list).
- Taxonomists and scientists involved with biosecurity and plant health are driving species selection (targeted species lists) and character image capture selection (through interpretation of higher rank and specific keys).

These combined attributes make PaDIL an innovative tool to help with this growing problem.

PaDIL Road Map

The PaDIL Home Page

The screenshot shows the PaDIL Home Page layout. Callout 1 points to the search bar, callout 2 to the 'Advanced Search Search Tips' link, callout 3 to the 'VIEW PESTS' menu item, callout 4 to the 'VIEW DISEASES' menu item, callout 5 to the PaDIL logo, and callout 6 to the footer navigation links.

PaDIL - Pests and Diseases Image Library

Offering high-quality colour diagnostic images and information on pests and diseases along with a number of comparative native species. PaDIL helps protect against invasive threats to Australia's economy, environment, human health and amenity.

Guarding against pest and disease invasion is a key component of Australia's National Plant Health Strategy and the National Prevention and Management of Marine Pest Incursions. Rapid recognition of Emergency Plant Pests and Marine Pests is critical to ensure appropriate response strategies are implemented. PaDIL is one tool that can greatly enhance this process.

PaDIL offers pest and disease recognition without the use of scientific keys.

IMAGE FEATURES

- Overview
- Diagnostic
- Comparative
- True colour
- Zoom
- Many copyright free

SEARCH FEATURES

- Keyword
- Advanced
- Name
- Host
- Distribution
- Fact sheets
- Email search results

Exotic Pests Hotline
1800 084 881

Participants | Species List | Copyright | Legal disclaimer | Help | Feedback | Content Editors

Australia Government
Department of Agriculture,
Fisheries and Forestry

Plant Health
AUSTRALIA

MUSEUM VICTORIA

QUT

CRC PLANT biosecurity

- 1 Simple Search ... see page 6
- 2 Advanced Search ... see page 11
- 3 Menu Bar – View Pests ... see page 14
- 4 Menu Bar – View Diseases ... see page 14
- 5 Link Home ... see page 20
- 6 Bottom Tool Bar ... see page 20

Species Content Pages

What information can I find on the species content page?

The screenshot shows a PaDIL Species Content Page for a pest. The page is annotated with red text and arrows pointing to various features:

- Outputs:** Located at the top right, pointing to the search bar and utility links like 'Print Friendly Fact Sheet' and 'Email to a Friend'.
- Nomenclature:** Located in the top navigation bar, pointing to the 'Bugs' tab.
- Pest Status:** Located in the top navigation bar, pointing to the 'Status' tab.
- Active Image:** A large central image placeholder with the text 'Active Image'.
- Additional images:** A label with two arrows pointing to the 'Diagnostic Images', 'Overview Images', and 'Other Images' sections.
- Diagnostic assistance:** A label pointing to the 'Caption: Australia:' and 'Source:' fields.
- Internal links:** A label pointing to the 'PaDIL Links:' section.
- Webpage details:** A label pointing to the 'Specimen contact point:', 'Citation:', 'Created Date:', and 'Last Updated:' fields.
- Additional resources:** A label with two arrows pointing to the footer navigation bar containing links like 'Acknowledgements', 'Distribution', 'Hosts', etc.

Nomenclature – Scientific and the primary common name of the organism

Pest Status – Is this pest exotic, native or introduced into Australia?

Active Image – One main image of the organism

Additional Images – Other images of the organism, click on these to transfer to the active image. Diagnostic images of characters are located in the top box; Overview or habitus images are available in the middle box; Additional images, usually opposite sex or immature stages, are available in the lower box.

Diagnostic assistance – diagnostic description of organism, may contain comparative notes, keys, live footage or DNA datasets

Internal links – links to other related or similar species on PaDIL

Webpage details – citation details of current webpage

Additional resources – Toolbar of links to other information

Outputs – Output functions enabling printing or emailing of current page.

See pages 6-9

Nomenclature

Each species page will be displayed in the same format as described above. The nomenclature of the organism is located in the top left hand corner of the species content page.

Species Content Page	
Bugs	sycamore lace bug <i>Corythucha ciliata</i> (Say) (Hemiptera: Tingidae: Tinginae)

The broad group which this organism fits is stated in bold, **Bugs** in the example above. To the right of this is the most widely accepted common name of the organism (e.g. Sycamore lace bug). Below the common name is the scientific name followed by the author, followed by the taxonomy. Eg. Scientific name: *Corythucha ciliata*; Author: (Say); Taxonomy: Hemiptera (order), Tingidae (family), Tinginae (subfamily).

The taxonomy plays an important role in locating this species via the menu bar. The target species menu allows you to view groups of organisms together. The sycamore lace bug from the example above will display with other bugs from the family Tingidae.

Other common names, scientific names and synonyms can be found by clicking on the 'other names' link on the bottom toolbar.



Status

The status box is located to the right of the nomenclature information.

Status Exotic (but present in Australia)	Status Native to Australia
--	--------------------------------------

Species which are exotic to Australia are identified by red text. Native species are denoted in green text. There are many categories within Native and Exotic, this information will help you identify those species currently present and established in Australia from those which have not been found here.

Images


A large image is displayed directly below the nomenclature on the left hand side of each species content page. This image has been nominated by the original page author to be displayed initially. You can change the image by clicking on the thumbnail images within the diagnostic, overview or other images sections to the right of the active image.

Below the image in the active image box is a caption, which usually contains the label data of the specimen in the photograph and the name of the photographer and their affiliation.

Species Content Page[Print Friendly Fact Sheet](#)
[Email to a Friend](#)



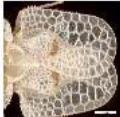


Bugs sycamore lace bug <i>Corythucha ciliata</i> (Say) (Hemiptera: Tingidae: Tinginae)	Status Exotic (but present in Australia)
--	---

Dorsal view - female[Zoomify](#)
VIEW LARGER IMAGE






Caption: Australia: New South Wales, Sydney May 2007, Dave Britton.
Source: Ken Walker [Museum Victoria](#)

Diagnostic Images

Overview Images



Zoomify

Directly above the active image is general orientation description (e.g. dorsal view) and sex, if known, of the organism photographed. There will also be one or two links available. The first will be labelled 'Zoomify'. Clicking on this will open a new page where you will be able to interactively zoom in and out of the image, move around and view the image as if it were under a microscope in front of you. Not all images are able to be Zoomified, if not, the link will not be present. Please note, you will need to have ActiveX enabled on your computer.

View Larger Image

Below Zoomify is a link to view larger image. Clicking on this link or anywhere within the image will open this image at full size within the browser. You are unable to interact with this image as you are in Zoomify.

Diagnostic Images

Images within this section are those illustrating the diagnostic features of the organism. For pests, these images are usually of the characters used to identify the organism; Bacteria and Fungi have mainly host symptom images and characters; Viruses have mainly host symptoms, occasionally the vector.

Overview Images

For pests, overview images are usually whole body dorsal, lateral and ventral images. For bacteria and fungi, overview images can be additional to the diagnostic images, or more general images.

Other images

For pests, other images can contain images to help you compare between species, images of the opposite sex to the main diagnostic images or images to illustrate scale.

Diagnostic Assistance

Below the main or active image is a text box for diagnostic detail, primarily descriptive text. This can contain a diagnostic or taxonomic description, key characters, description of symptoms, and identification keys to species that occur on PaDIL. This section often contains links to live footage of the organism, databases of images or DNA sequences.

Internal links

Links located under the PaDIL links heading are direct linkages to other species already on PaDIL. The species links are usually related or similar and include exotic and native species. These links enable quick comparison of species to help identify exotic species. To return to your original species, click the back arrow button.

Webpage Details

The webpage details will provide you with information on the original author of the page, a contact point for the specimen, a citation to referencing to the current page and details on the page creation and last updated dates.

Additional Resources

[Acknowledgements](#) | [Distribution](#) | [Hosts](#) | [Web Links](#) | [Linkouts](#) | [Other Names](#) | [Diagnostic Images](#) | [Google Maps](#)

The bottom toolbar contains additional information about the organism, each of these headings links to a new page of information.

Acknowledgements

This page usually contains acknowledgment of assistance in image acquisition, specimen loan or assistance in collation of the information within the species content page.

Distribution

Distribution information is in two formats; the first is a list of regions in which this organism is present, the second is a notes section describing in more detail the geographic distribution of the organism.

Hosts

Host information is presented in three sections; the first is an overview, a broad category of host types (e.g. forestry, horticulture), the second is host types (e.g. fresh fruit, cut flowers) and the third section is a more specific description of the host and may contain a list of recorded species. These sections enable quick and accurate searching within the 'advanced search function' see page 11.

References

This page contains a bibliographic reference list to the information contained within the species content page or recommended further reading.

Web links

The web links page contains 'hard-coded' or direct links to external pages on the World Wide Web. These pages have been recommended by the author of the species content page, however, PaDIL has no control of the content or currency of the web page. These links may be broken, if the linked-to page is modified or removed.

Link outs

Link outs are very different from web links. Link outs provided links to search engines located on the web. Click this link will take you to a list of search engines, selecting one from the list will initiate a query within the search engine using the species name of the page you are currently viewing without you having to retype the name. To return to the species content page after visiting link outs, click the back button on the browser toolbar.

Other Names

As described in the Nomenclature section (page 6), this page lists all known common names and synonymies of the species.

Diagnostic Images

The Diagnostic images link will take you back to the main opening page of the species.

Google Maps (if present)

Clicking on the Google Maps link will open the Google Maps interface within your browser and display a map image of one or multiple specimen data points. This information is taken from the label data of some specimens. Within the displayed image you can zoom in or out using the scale slider on the left hand side of the image. In the top right of image you can toggle between map, satellite photograph or hybrid (map overlaid on satellite photograph). Clicking on individual data points will give you detailed collection information and usually a representative photograph of the species. Please note, not all species within PaDIL have Google maps enabled.

Outputs



Located on the top right hand side of the Species Content Page are two links, Print friendly factsheet, and email to a friend.

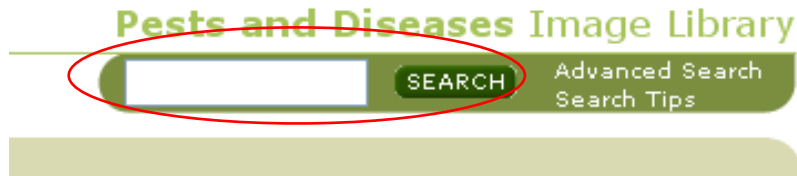
Clicking on the '*Print friendly fact sheet*' link will take you to a printable version of the species content page you are currently viewing. Within this page, all of the photos are included with the host, distribution, nomenclature, status and citation information.

Clicking on '*Email to a friend*' will take you to a form to complete. A URL link is automatically embedded into the email which when clicked will take the recipient directly to the species web page. This function is available from all PaDIL pages, including comparative tables and search results.

Performing a Simple Search

Searching within PaDIL is easy! There are many ways to search to find the information you need quickly!

In the top left hand corner of any PaDIL page is a search box,



To perform a search simply type in a search term, such as an organisms common or genus or species name or host, then click the search button.

Example

I would like to see a list of rice pests and diseases.

Type in 'rice' in the white search box



Click Search

The resulting page will have a list of all of the rice pests and diseases found on PaDIL

The screenshot displays the search results page for 'rice'. The page has a green header with the PaDIL logo and a search bar. A left-hand navigation menu lists categories like 'ABOUT', 'VIEW PESTS', and 'VIEW DISEASES'. The main content area shows a list of pests and diseases, each with a small image, scientific name, and distribution information.

Image	Common Name	Scientific Name	Distribution
	African white stem borer	<i>Maliarpha separatella</i>	Exotic (absent from Australia)
	Armyworm	<i>Mythimna unipuncta</i>	Exotic (absent from Australia) High Impact Pest Species
	Asiatic pink stem borer	<i>Sesamia inferens</i>	Exotic (absent from Australia)
	Banded Cucumber Beetle	<i>Diabrotica balteata</i>	Exotic (absent from Australia) Pest Species
	flat grain beetle	<i>Cryptolestes ferrugineus</i>	Exotic (but present in Australia)
	Gold-dust weevil	<i>Hypomeces squamosus</i>	Exotic (absent from Australia)

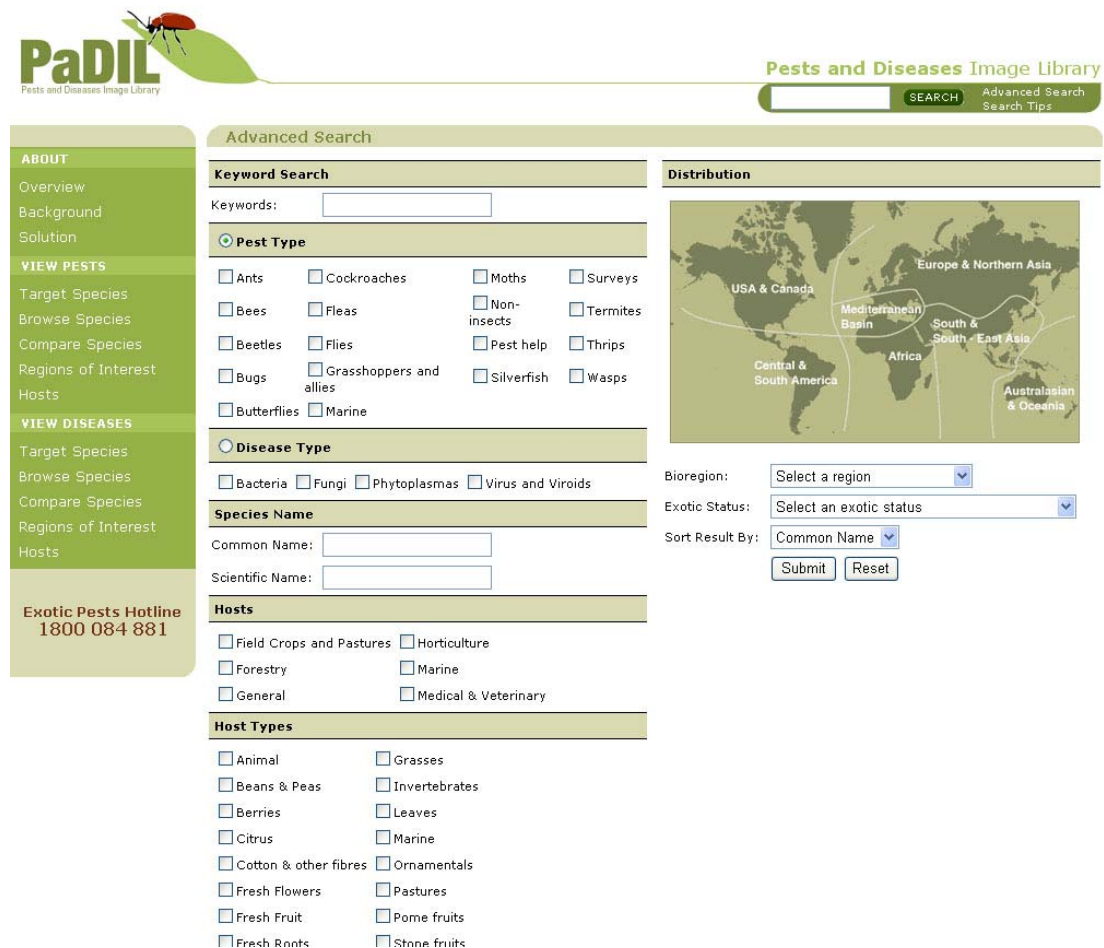
Performing an Advanced Search

Performing an advanced search enables you to narrow down your results by selecting multiple fields of information.

Click on Advanced Search, located beside the simple search button in the top left hand corner of any PaDIL page.



The Advanced Search Page:

A screenshot of the PaDIL Advanced Search page. The page features a green header with the PaDIL logo and a search bar. A left sidebar contains navigation links for 'ABOUT', 'VIEW PESTS', and 'VIEW DISEASES'. The main content area is titled 'Advanced Search' and includes several filter sections: 'Keyword Search' with a text input; 'Pest Type' with checkboxes for Ants, Bees, Beetles, Bugs, Butterflies, Cockroaches, Fleas, Flies, Grasshoppers and allies, Marine, Moths, Non-insects, Pest help, Silverfish, Surveys, Termites, and Wasps; 'Disease Type' with checkboxes for Bacteria, Fungi, Phytoplasmas, and Virus and Viroids; 'Species Name' with 'Common Name' and 'Scientific Name' input fields; 'Hosts' with checkboxes for Field Crops and Pastures, Forestry, General, Horticulture, Marine, and Medical & Veterinary; and 'Host Types' with checkboxes for Animal, Beans & Peas, Berries, Citrus, Cotton & other fibres, Fresh Flowers, Fresh Fruit, Fresh Roots, Grasses, Invertebrates, Leaves, Marine, Ornamentals, Pastures, Pome fruits, and Stone fruits. To the right, a 'Distribution' section shows a world map with regional labels and a dropdown menu for 'Bioregion'. Below the map are dropdown menus for 'Exotic Status' and 'Sort Result By' (set to 'Common Name'), along with 'Submit' and 'Reset' buttons.

To perform an advanced search you can complete as many or as few fields as necessary, then click 'submit'.

Example 1

I would like to see beetles attacking Bamboo in South East Asia.

Click on Advanced Search



Within the Keyword field type 'Bamboo'; Within the Pest type field click 'Beetles' and within the Regions field either click the map selecting 'South & South-east Asia' or pick from the drop down list, then click 'submit'.

PaDIL
Pests and Diseases Image Library

Pests and Diseases Image Library

Advanced Search

Keyword Search
Keywords:

Pest Type
 Beetles
 Ants Cockroaches Moths Surveys
 Bees Fleas Non-insects Termites
 Flies Pest help Thrips
 Grasshoppers and allies Silverfish Wasps
 Butterflies Marine

Disease Type
 Bacteria Fungi Phytoplasmas Virus and Viroids

Species Name
Common Name:
Scientific Name:

Hosts
 Field Crops and Pastures Horticulture
 Forestry Marine
 General Medical & Veterinary

Host Types
 Animal Grasses
 Beans & Peas Invertebrates
 Berries Leaves
 Citrus Marine
 Cotton & other fibres Ornamentals
 Fresh Flowers Pastures
 Fresh Fruit Pome fruits
 Fresh Roots Stone fruits

Distribution

World map showing regions: USA & Canada, Europe & Northern Asia, Mediterranean Basin, South & South-east Asia, Africa, Central & South America, Australasian & Oceania.

Bioregion:
Exotic Status:
Sort Result By:

Exotic Pests Hotline
1800 084 881

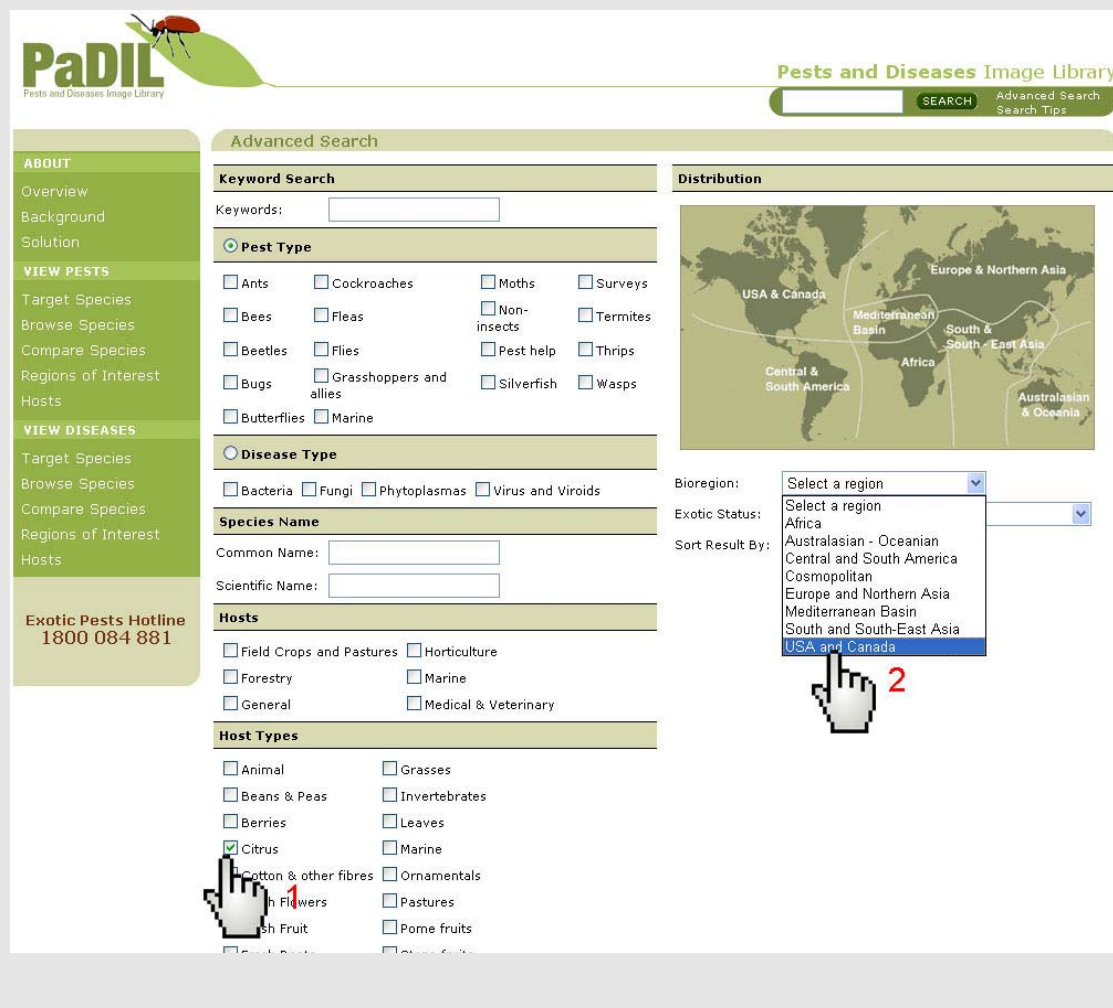
Example 2

I would like to see Citrus pests know to occur in the USA and Canada.

Click on Advanced Search



Within the Host Types field select 'Citrus' and within the Region select 'USA and Canada' or select from the drop down list, then click 'submit'.

A screenshot of the PaDIL Advanced Search page. The page is divided into several sections: a left sidebar with navigation links, a central 'Advanced Search' form, and a right 'Distribution' section with a world map. In the 'Host Types' section, 'Citrus' is selected with a red '1' and a hand cursor. In the 'Bioregion' dropdown menu, 'USA and Canada' is selected with a red '2' and a hand cursor. The 'Species Name' fields are empty. The 'Disease Type' section has 'Bacteria', 'Fungi', 'Phytoplasmas', and 'Virus and Viroids' selected. The 'Hosts' section has 'Field Crops and Pastures', 'Forestry', and 'General' selected. The 'Host Types' section has 'Citrus' selected. The 'Distribution' section shows a world map with regions labeled: USA & Canada, Europe & Northern Asia, Mediterranean Basin, South & South-East Asia, Africa, Central & South America, and Australasian & Oceania.

Menu Bar



The green menu bar located on the left hand side of the page is present on every PaDIL page you will visit. This enables you to move quickly through the whole website.

Clicking on each of the menu items under either *View Pests* or *View Diseases* will open up another list of options. These are grouped under common names of similar organisms, e.g. Ants, Bees, Beetles, Bugs...

Lists containing large groups of organisms will open up further to a list of family groups, e.g. Beetles will open up to display links to Anobiids, Anthicids, Anthribids, Bostrichids...

Clicking on any of the links within these expanding menus will take you to a result page displaying all of the organisms on PaDIL which fit under the grouping selected.

Main menu items

Target Species

The target species menu displays taxonomic groupings of organisms. The results page selected will only show those organisms in a particular group.

Browse Species

The browse species menu opens to display common or scientific name options. Selecting one of these links will display every pest or disease in PaDIL alphabetically by either their common or scientific name.

Compare Species

The compare species menu opens similarly to the target species list, displaying groups of pests or diseases, selecting one of the groups will display a pre-packaged comparative table. For more information see comparative image tables on page 15.

Regions of Interest

The region of interest menu displays geographic regions, which can be selected to display all pests or diseases from the chosen region.

Hosts

The host menu allows you to select broad host types, which will open to display pests or diseases of a particular host type.

Search Results

All searches using the Simple or Advanced Search functions or the drop down lists in the main navigation menu return results in the same format.

PaDIL
Pests and Diseases Image Library

Pests and Diseases Image Library
SEARCH Advanced Search Search Tips

Browse Species By - Wasps [Email to a Friend](#)

Sort by: [Common Name](#) | [Scientific Name](#) | [Taxonomy](#) [View as One Page](#) | [Select All](#) / [Deselect All](#)

	Parasitoid <i>Diachasmimorpha kraussii</i> (Fullaway) Hymenoptera: Braconidae Species Content Page	(Select to compare) <input type="checkbox"/> Native to Australia Beneficial Species
	Parasitoid <i>Diachasmimorpha hageni</i> (Fullaway) Hymenoptera: Braconidae Species Content Page	(Select to compare) <input type="checkbox"/> Exotic (absent from Australia) Beneficial Species
	Parasitoid <i>Diachasmimorpha longicaudata</i> (Ashmead) Hymenoptera: Braconidae Species Content Page	(Select to compare) <input type="checkbox"/> Exotic (established in Australia) Beneficial Species
	Parasitoid <i>Diachasmimorpha tryoni</i> (Cameron) Hymenoptera: Braconidae Species Content Page	(Select to compare) <input type="checkbox"/> Native to Australia Beneficial Species
	Parasitoid <i>Fopius ferrari</i> Carmichael & Wharton (Hymenoptera: Braconidae) Species Content Page	(Select to compare) <input type="checkbox"/> Exotic (absent from Australia) Beneficial Species
	Parasitoid <i>Fopius arisanus</i> (Sonan) Hymenoptera: Braconidae Species Content Page	(Select to compare) <input type="checkbox"/> Exotic (established in Australia) Beneficial Species

The results return displaying three images as well as the organism details. Clicking on any of the images or the blue 'Species Content Page' link will take you to the species page.

Group **Name** **Taxonomy** **Status** **Compare**

Parasitoid
Diachasmimorpha hageni
(Fullaway)
Hymenoptera: Braconidae
[Species Content Page](#)

([Select to compare](#))
Exotic (absent from Australia) Beneficial Species

For more information on Group, Name, Taxonomy and Status, please see the relevant sections within this guide.

Browse Species By - Bugs [Email to a Friend](#)

Sort by: [Common Name](#) | [Scientific Name](#) | [Taxonomy](#) [View as One Page](#) | [Select All](#) / [Deselect All](#)

1 2 3 4 5 6 7 8 9 10 ...

Search results can continue over multiple pages. You can view the subsequent pages by clicking on the relevant page number in the top bar, this is also repeated on the bottom bar. To view all results on one page, click 'View as one page'. Please note, with a larger number of organisms

You can sort the results by Common Name, Scientific Name or Taxonomy by clicking on the relevant link at the top left hand side of the page.

Compare Species

To compare images of multiple species within a search page, check the compare boxes or as many or as few species as you require. To select all species on the page, click the 'select all' link in the top right. To view your selection, scroll down the page to end of the results, and click 'Compare'

Compare selected species [COMPARE](#)

PaDIL will generate an option table, which will display your species selection and then give you option of which images you would like PaDIL to display. Here, again you can click as many or as few as you require. Then click 'Compare'

Compare Pest Images

You have chosen to compare the following species:

- Parasitoid - *Diachasmimorpha kraussii*
- Parasitoid - *Diachasmimorpha hageni*
- Parasitoid - *Diachasmimorpha longicaudata*

Diagnostic views:

- Abdomen Head Front Head Side Thorax Above Thorax Side
 Fore Wing

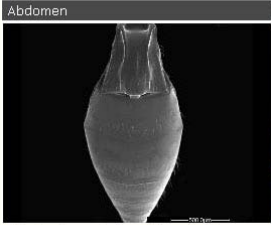
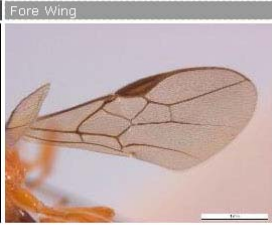
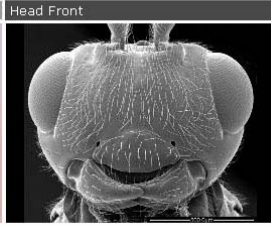
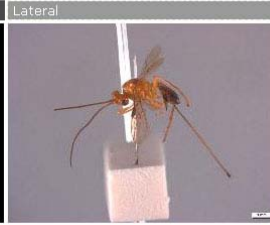


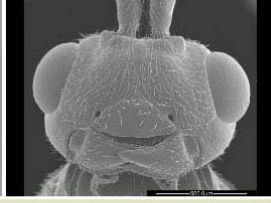





Overview views:

- Dorsal Lateral

[Compare](#)

Your results will be displayed. You can go directly to each species page by clicking on any images, or the species name.

Comparative - Images / Descriptions / Hosts / Distribution [Email to a Friend](#)

Abdomen	Fore Wing	Head Front	Lateral
			
<i>Diachasmimorpha hageni</i> Parasitoid			
			
<i>Diachasmimorpha kraussii</i> Parasitoid			
			
<i>Diachasmimorpha longicaudata</i> Parasitoid			

The compare species function not only allow you to view images, you can click on the links in the top tool bar to view Descriptions, Hosts and Distribution information.

Example

Compare 2 *Dinoderus* species.

Use a simple search, type in 'Dinoderus'. Numerous results will return.

PaDIL
Pests and Diseases Image Library

Pests and Diseases Image Library

SEARCH Advanced Search Search Tips

Sort by: [Common Name](#) | [Scientific Name](#) | [Taxonomy](#) [View as One Page](#) | [Select All](#) / [Deselect All](#) [Email to a Friend](#)

			<p>auger beetle <i>Dinoderus bifoveolatus</i> (Wollaston) (Coleoptera: Bostrichidae: Dinoderinae) Species Content Page</p> <p>(Select to compare) <input type="checkbox"/></p> <p>Exotic (absent from Australia)</p>
			<p>auger beetle <i>Dinoderus brevis</i> Horn, 1878 (Coleoptera: Bostrichidae: Dinoderinae) Species Content Page</p> <p>(Select to compare) <input type="checkbox"/></p> <p>Exotic (absent from Australia) Pest Species</p>
			<p>auger beetle <i>Dinoderus ocellaris</i> Stephens, 1830 (Coleoptera: Bostrichidae: Dinoderinae) Species Content Page</p> <p>(Select to compare) <input type="checkbox"/></p> <p>Exotic (absent from Australia) Pest Species</p>
			<p>Ghoon borer <i>Dinoderus minutus</i> (Fabricius, 1775) (Coleoptera: Bostrichidae: Dinoderinae) Species Content Page</p> <p>(Select to compare) <input type="checkbox"/></p> <p>Exotic (but present in Australia)</p>
			<p>Japanese Shot-hole Borer <i>Dinoderus japonicus</i> Lesne, 1895 (Coleoptera: Bostrichidae: Dinoderinae) Species Content Page</p> <p>(Select to compare) <input type="checkbox"/></p> <p>Exotic (absent from Australia) Pest Species</p>
			<p>Larger grain borer <i>Prostephanus truncatus</i> (Horn, 1878) (Coleoptera: Bostrichidae: Dinoderinae) Species Content Page</p> <p>(Select to compare) <input type="checkbox"/></p> <p>Exotic (absent from Australia) Pest Species</p>

[Select All](#) / [Deselect All](#)

Select 2 species to compare, by clicking the compare boxes, then scroll down and click 'Compare'.

			<p>auger beetle <i>Dinoderus bifoveolatus</i> (Wollaston) (Coleoptera: Bostrichidae: Dinoderinae) Species Content Page</p> <p>(Select to compare) <input type="checkbox"/></p> <p>Exotic (absent from Australia)</p>
			<p>auger beetle <i>Dinoderus minutus</i> (Fabricius, 1775) (Coleoptera: Bostrichidae: Dinoderinae) Species Content Page</p> <p>(Select to compare) <input checked="" type="checkbox"/></p> <p>Exotic (but present in Australia)</p> <p>1</p>
			<p>Japanese Shot-hole Borer <i>Dinoderus japonicus</i> Lesne, 1895 (Coleoptera: Bostrichidae: Dinoderinae) Species Content Page</p> <p>(Select to compare) <input checked="" type="checkbox"/></p> <p>Exotic (absent from Australia) Pest Species</p> <p>2</p>
			<p>Larger grain borer <i>Prostephanus truncatus</i> (Horn, 1878) (Coleoptera: Bostrichidae: Dinoderinae) Species Content Page</p> <p>(Select to compare) <input type="checkbox"/></p> <p>Exotic (absent from Australia) Pest Species</p>

[Select All](#) / [Deselect All](#)

Compare selected species **COMPARE**

3

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An option table will be returned, stating the species you selected to compare and options of which images you would like to view.

Select some image types you would like to view, and then click 'Compare'.

Compare Pest Images

You have chosen to compare the following species:

- Ghoon borer - *Dinoderus minutus*
- Japanese Shot-hole Borer - *Dinoderus japonicus*

Diagnostic views:

Antenna Head Front Pronotum Tarsi Thorax Side

Elytra Head Side







Overview view:

Dorsal Lateral Ventral

1 2 3 4

The results will return...

Comparative - Images / Descriptions / Hosts / Distribution ✉ Email to a Friend

Head Side	Pronotum	Dorsal
		
<i>Dinoderus japonicus</i> Japanese Shot-hole Borer		
		
<i>Dinoderus minutus</i> Ghoon borer		

Click on the links on the top bar to view comparative tables of descriptions, host and distribution.

Comparative - Images / [Descriptions](#) / [Hosts](#) / [Distribution](#) [✉ Email to a Friend](#)

Adult body length 3-4mm; body colour dark brown or brownish black, antennae and legs reddish brown. Antennae 11-segmented; 3 segmented club and 6 segmented funicle; foretarsus with second basal segment distinctly longer than segments 3 and 4; scutellum nearly square; pronotum with anterior marginal teeth 6 each side and acutely rounded at apices, middle two almost contiguous and more prominent than the other teeth.

Dinoderus japonicus Japanese Shot-hole Borer

Length 2.0-3.7 mm, anterior marginal teeth 6-8 conspicuously large, acutely rounded at the apices and distinctly separated, middle two more widely separated and slightly larger. Puncturation of disc of elytra nearly in longitudinal rows; hairs in apical declivity numerous, dense and reddish, middle two teeth of anterior marginal teeth close and not separated by a wide flat area, body long, elytra distinctly more than 1.5 x as long as pronotum.

Dinoderus minutus Ghoon borer

Comparative - Images / [Descriptions](#) / [Hosts](#) / [Distribution](#) [✉ Email to a Friend](#)

Attacks post-harvest bamboos, damages on harvested culms and finished bamboo products; *Phyllostachys* species, mostly *P. viridis*, and *Pleioblastus* species.

Dinoderus japonicus Japanese Shot-hole Borer

Dinoderus japonicus, *D. minutus*, *D. ocellaris* and *D. brevis* are responsible for over 90% of insect damages on harvested culms and finished bamboo products.

Both adults and larvae feed inside felled culms. Adults burrow through wounds or cut ends into the culm and make horizontal tunnels around culms, where eggs are deposited. Larvae bore longitudinally in the culm resulting in numerous criss-crossing tunnels.

Hosts include: *Bambusa bambos*, *B. polymorpha*, *B. textilis*, *B. vulgaris*, *Dendrocalamus giganteus*, *D. hamiltonii*, *D. strictus*, *Phyllostachys pervariabilis*, *P. pubescens*.

Dinoderus minutus Ghoon borer

Comparative - Images / [Descriptions](#) / [Hosts](#) / [Distribution](#) [✉ Email to a Friend](#)

Widespread in almost all bamboo-growing countries in Japan, Korea China and USA

Dinoderus japonicus Japanese Shot-hole Borer

Established in all bioregions including Australia.

Dinoderus minutus Ghoon borer

To open any species page at any time, click on the species name located below the information or images.

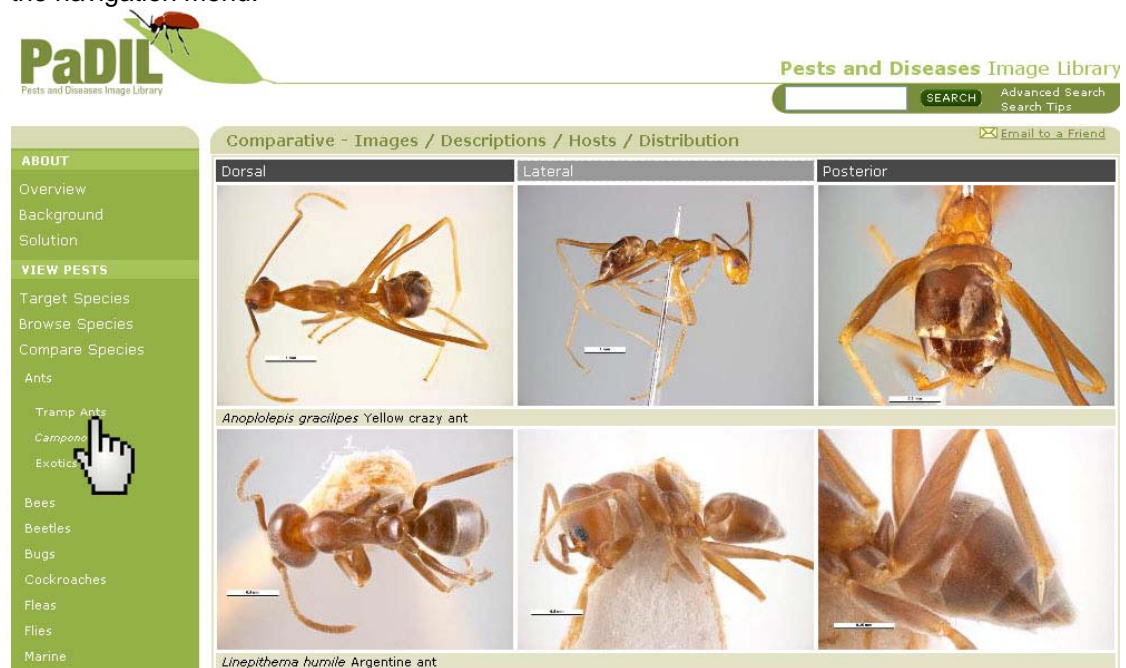
Email to a friend

[✉ Email to a Friend](#)

You can email ANY results table to any search to a friend at any time by clicking 'Email to a friend' and completing the a few details. This will send an email containing a link, which when clicked will return to the exact search results. This is a handy tool as you no longer need to describe the steps to return those results.

Comparative Image Tables

A number of 'pre-packaged' tables have been developed within PaDIL. These are either commonly constructed tables or specially constructed by the authors to illustrate a certain group of species. To view a 'pre-packaged' comparative table, select 'Compare Species' from the navigation menu.



The screenshot displays the PaDIL website interface. At the top left is the PaDIL logo (Pests and Diseases Image Library) featuring a red ant on a green leaf. To the right is the 'Pests and Diseases Image Library' header with a search bar and 'SEARCH' button, and links for 'Advanced Search' and 'Search Tips'. Below the header is a navigation menu with 'ABOUT' (Overview, Background, Solution) and 'VIEW PESTS' (Target Species, Browse Species, Compare Species, Ants, Tramp Ants, Camponotus, Exotic, Bees, Beetles, Bugs, Cockroaches, Fleas, Flies, Marine). A mouse cursor is pointing at 'Exotic'. The main content area is titled 'Comparative - Images / Descriptions / Hosts / Distribution' and includes an 'Email to a Friend' link. It contains a grid of six images of ants, arranged in two rows and three columns. The columns are labeled 'Dorsal', 'Lateral', and 'Posterior'. The top row shows *Anoplolepis gracilipes* Yellow crazy ant, and the bottom row shows *Linepithema humile* Argentine ant. Each image includes a scale bar.

From the comparative table, you have the same functionality as if you made the table yourself; you can view descriptions, host and distribution information.

Link Home



Click on the PaDIL logo in the top left hand corner of all PaDIL pages will directly take you back to the main home page.

Bottom Toolbar

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Participants

This link provides details of participants and contributors to the development of the PaDIL website.

Species List

The species list page displays all species currently on PaDIL, initially sorted alphabetically by Common Name, however, clicking on the main headings of Scientific Name, Common Name or Taxonomy, you are able to resort this list.

Copyright

Details regarding the copyright of the images and resources contained within the PaDIL website.

Legal disclaimer

A legal disclaimer regarding the accuracy of information, responsibilities, compliance and purpose of the PaDIL website.

Help

The help page is a guide with quick tips on utilising PaDIL.

Feedback

A portal to provide feedback to the designers and developers of the PaDIL website.

Content Editors

A link for editors of the PaDIL website. This area is password protected.

Revision

Show me beetles attacking Bamboo in South-east Asia.
Sort the results by Scientific Name.
Compare 4 *Dinoderus* species
Open a species page.
Enlarge an image.
Zoomify an image.
Return to the results page, view the distribution information.
Email the results to a friend.

Well done, you have successfully navigated around PaDIL.