

Invertebrates: invertebrate identification aids

Version 1.0



This specification was prepared by Warren Chinn in 2017.

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Disclaimer

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Picture books, web pages and diagnostic keys

Picture book identification involves comparing your specimens with images in a book or pamphlet. This method is perfectly adequate for primary sorting of bulk specimens—although there are a few groups that might be confusing, including harvestmen and spiders, caddis flies and moths, woodlice, pill millipedes and some centipedes. Many common invertebrates can be easily identified to species using pictures and simple diagrams, although it is when your survey requires more detail that diagnostic keys will be necessary. See [‘Picture books’](#) a list of picture book resources to help you to identify specimens.

Web-based keys can be an excellent way of ‘narrowing down’ a specimen to its taxonomic group or even species. There are many online keys published by museums and universities (especially Australian), but it is better to use New Zealand sources to hone your identification to genus and species. See [‘Web resources’](#) for a list of web-based keys.

Diagnostic keys are the most accurate method of identifying a specimen to species (if it isn’t something unknown). Using keys is time consuming and almost always requires a binocular microscope, good lighting, supporting media for the specimens (e.g. white sand) and the appropriate keys. Keys are usually couplet-style; that is, two alternative choices.

If, after using a set of keys, your specimen is still unidentified, it may be necessary to have a taxonomic specialist look. See [‘Taxonomic specialists’](#) for a list of invertebrate taxonomic specialists in New Zealand you could contact.

Handling specimens

When sorting large volumes of specimens, efficiency and accuracy are required. For wet specimens (those pickled in alcohol), begin by ‘carding off’ lookalike specimens into zones of the sorting tray or transfer into new trays. Use soft forceps to handle invertebrates. For dry specimens, pin or mount them on cardboard (and then use pins), or glue to ‘points’ (small teardrop-shaped cardboard retainers for small specimens such as ants). Pinned specimens include (but are not limited to) moths, butterflies, beetles, bugs and cicada.

Gestalt

Begin identifications using the ‘gestalt’ (a German word for form or shape, historically used in psychology). Most invertebrates fall easily into body-form categories, and humans tend to think in categories so we find it easy to place invertebrates into groups—for example, insects, spiders or long-bodied forms with many legs. The method relies on overall appearances and your ability to mentally categorise forms (see Figure 1).



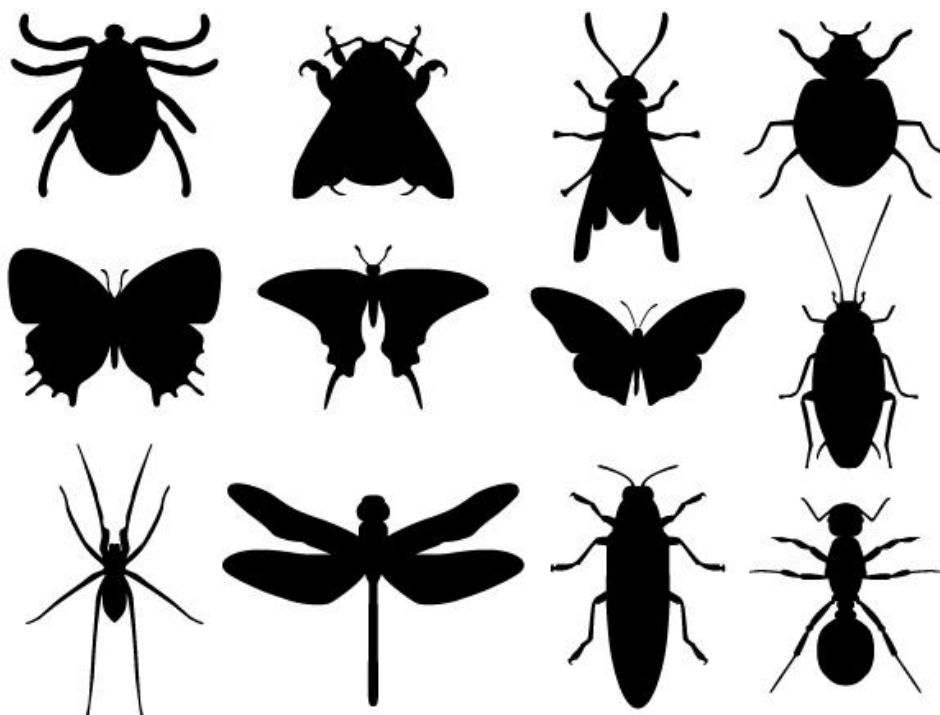


Figure 1. An example of the differences between invertebrate types based on their whole-body form (the gestalt). These forms are the first step in classifying specimens.



Picture books

Table 1. Useful books illustrating a selection of New Zealand invertebrates

Invertebrate group		Title	Author	Publisher/Year	Notes
Insects	General insect identification	<i>Which New Zealand Insect?</i>	Andrew Crowe	Penguin 2002	Excellent series. Clear. Thumbnail photos with habitat, threat status and taxonomic information. 126 pages.
		<i>The Reed Handbook of Common New Zealand Insects</i>	Annette Walker	Reed 2000	Large, clear paintings of insects, covering two pages per species (text and image). 167 pages.
		<i>Insects of New Zealand</i>	Brian Parkinson and Don Horne	New Holland Publisher (NZ) Ltd 2007	A nicely produced portrait format book. Difficult to hold open while simultaneously examining specimens.
	Wētā	<i>The Weta Book: A Guide to the Identification of Wetas</i>	Mike Meads	Manaaki Whenua Press 1997	A slender paperback with useful keys and diagrams for the main wētā groups in New Zealand.
	Grasshoppers	<i>The Grasshoppers (Acrididae) of New Zealand: Their Taxonomy and Distribution</i>	R. S. Bigelow	Canterbury University Press 1967	The first book written about New Zealand grasshoppers. A little out of date but remains a solid starting point for identifications.
	Dragonflies & damselflies	<i>The Dragonflies of New Zealand</i>	Richard Rowe	1988	Covers all known species and life histories of New Zealand dragonflies and damselflies.
	Stick insects	<i>Stick Insects</i>	J. T. Salmon and Thomas Buckley	The stick insects of New Zealand 1991	An older reference, but useful. Thomas Buckley has revised the taxonomy of New Zealand Phasmatidae.
	Moths and butterflies	<i>Moths & Butterflies of New Zealand. A photographic guide.</i>	Robert Hoare	New Holland 2014	Excellent handbook of useful images.
		<i>Butterflies of the South Pacific</i>	Brian Patrick and Hamish Patrick	Otago University Press 2012	Covers a huge geographic area (the Pacific Islands).
		<i>Moths & Butterflies of New Zealand</i>	Brian Parkinson	Reed 2000	Another useful handbook.



Insects	Moths and butterflies	<i>New Zealand Butterflies</i>	George Gibbs	William Collins 1980	Out of print. Excellent life history details. Covers common and rare species. Provides a good reference point to compare current distributions.
		<i>New Zealand Tussock Grassland Moths</i>	E. G. White	Manaaki Whenua Press 2002	A dense treatise on Mackenzie Basin moths. Valuable for comparative ecological work.
		<i>Fauna of New Zealand 14: Lepidoptera—Annotated Catalogue, and Keys to Family-Group Names</i>	John S. Dugdale	DSIR 1988	Type specimen catalogue and some descriptions. 262 pages.
Spiders	<i>Which New Zealand Spider?</i>	Andrew Crowe	Penguin 2007	Type specimen catalogue and some descriptions.	
	<i>A Photographic Guide to Spiders of New Zealand</i>	Cor Vink and Bryce McQuillan	New Holland (NZ) 2015	Excellent macro photography. Informative, many pictures.	
	<i>Spiders of New Zealand and Their Worldwide Kin</i>	Ray Forster and Lyn Forster	Otago University Press 1999	A thorough introduction to New Zealand spiders. Good intro to spider anatomy and non-spider groups. Many pictures. 270 pages.	
	<i>Spiders of New Zealand: Annotated Family Key & Species List</i>	Pierre Paquin, Cor J. Vink, and Nadine Duperre	Manaaki Whenua Press 2010	One of the best manuals available for spiders. This indispensable book is large format, spiral bound and has excellent illustrations. A primary source for locating spider families.	
Harvestmen (daddy long legs)	<i>The New Zealand Harvestmen (Sub-Order Lanitores)</i>	R. R. Forster	Canterbury Museum Bulletin No. 2 Pegasus Press 1952	The first definitive treatise on New Zealand's harvestmen. Describes all the species Ray Forster worked on. Superb diagrams. Unfortunately this book is well out of print but copies occasionally turn up on Amazon.com for about US\$50.00.	
Snails	<i>Land snails</i>	Jenny Jones	Heinemann Education 2001	A book for children/young people.	
	<i>Fauna of New Zealand 38: Naturalised terrestrial Stylommatophora (Mollusca: Gastropoda)</i>	Gary Barker	Heinemann Education 2010	A thorough catalogue of the naturalised slugs and snails in New Zealand.	



Web resources

Ants

Key to the ants of New Zealand (Landcare Research):

<http://www.landcareresearch.co.nz/resources/identification/animals/key-to-ants-of-nz>

Soil invertebrates

Soil bugs (Massey University):

<http://soilbugs.massey.ac.nz/>

Various invertebrates

Distributions for some beetles and cockroaches (Peter Johns):

<http://www.nzbiodiversity.com/families/index.html>

New Zealand wētā

Weta Geta (Massey University):

<http://wetageta.massey.ac.nz/Text%20files/ID%20Tool.html>

Moths and butterflies

New Zealand butterfly information (Robert Arter-Williamson):

<http://nzbutterfly.info/>

What is this bug? Moths & butterflies (Landcare Research):

<http://www.landcareresearch.co.nz/resources/identification/animals/bug-id/what-is-this-bug/bugs-with-legs/6-legs/moths-and-butterflies>

General

What is this bug? (Landcare Research):

<http://www.landcareresearch.co.nz/resources/identification/animals/bug-id/what-is-this-bug>

André Larochelle & Marie-Claude Larivière's web pages:

<http://www.larochellelariviere.com/>

Land snails

Distribution and status of native carnivorous land snails in the genera *Wainuia* and *Rhytida* (DOC):

<http://www.doc.govt.nz/Documents/science-and-technical/Sfc101.pdf>



New Zealand land snails (DOC):

<http://www.doc.govt.nz/documents/about-doc/concessions-and-permits/conservation-revealed/nz-land-snails-lowres.pdf>

Powelliphanta snail (DOC):

<http://www.doc.govt.nz/nature/native-animals/invertebrates/powelliphanta-snails/>

Mollusca (Massey University):

<http://soilbugs.massey.ac.nz/mollusca.php>

New Zealand terrestrial molluscs (Landcare Research):

<http://www.landcareresearch.co.nz/science/plants-animals-fungi/animals/invertebrates/molluscs>

New Zealand land molluscs (Te Ara):

<http://www.teara.govt.nz/en/snails-and-slugs/page-1>

Keys and specialised information (diagnostic characters)

The *Fauna of New Zealand* series is the most comprehensive and useful publication for invertebrate descriptions and couplet keys. Although not complete, the series is detailed and used by researchers. Published by Manaaki Whenua Press, these books allow identification to family, genus and species. Some are also available online at:

<http://www.mwpress.co.nz/fnz>

Grasshoppers

Grasshopper distribution (Simon Morris):

<http://homepages.cyberxpress.co.nz/visualmap/index.htm>

Hemiptera (true bugs)

Invertebrates (Landcare Research):

<http://www.landcareresearch.co.nz/research/biosystematics/invertebrates/hemiptera/>

What is this bug? Hemiptera (Landcare Research):

<http://www.landcareresearch.co.nz/resources/identification/animals/bug-id/taxonomic-list-of-bugs/hemiptera>

Soft scale insects

Soft scale factsheets (Landcare Research):

<http://www.landcareresearch.co.nz/science/portfolios/defining-land-biota/invertebrates/systematics/scale-insects/species-information-sheets>



Beetles: Coleoptera

Checklist of New Zealand ground-beetles (Coleoptera: Carabidae). Also an image gallery. (Landcare Research):

<http://www.landcareresearch.co.nz/science/plants-animals-fungi/animals/invertebrates/systematics/carabidae/checklist>

The Virtual Identification to New Zealand Ground-Beetle Genera has been updated to include all genera described to May 2009, and habitus drawings of one representative of each genus in the Lucid Phoenix interactive key to genera (Landcare Research) (Note: You'll need JAVA installed on your PC to run the key):

<http://www.landcareresearch.co.nz/science/plants-animals-fungi/animals/invertebrates/systematics/carabidae/genera/virtual-identification>

This peer-reviewed publication can be cited as:

Larochelle, A.; Larivière, M.-C. 2007 (and updates): New Zealand ground-beetles (Coleoptera: Carabidae): A virtual identification guide to genera.

<http://www.landcareresearch.co.nz/science/plants-animals-fungi/animals/invertebrates/systematics/carabidae/genera/virtual-identification>

Other pages on New Zealand Carabidae (Landcare Research):

<http://carabidae.landcareresearch.co.nz/>

Lepidoptera

Visual guide to the larger moths (Landcare Research):

<http://www.landcareresearch.co.nz/research/biosystematics/invertebrates/largemoths/>

Hymenoptera

Family key (Landcare Research):

<http://www.landcareresearch.co.nz/resources/identification/animals/hymenoptera2>

The key is specific for New Zealand families, so it won't be useful elsewhere.

On the left-hand side of the homepage, there are menus with brief info and figures to help clarify terms.

Stick insects (Phasmatodea)

Stick Insects (Phasmatodea) (Landcare Research):

www.landcareresearch.co.nz/research/biosystematics/invertebrates/phasmatodea/

Bibliography of New Zealand Terrestrial Invertebrates—Online:

<http://www.bugz.org.nz/WebForms/SearchForm.aspx?doSearch=false>



Some general information sources

The New Zealand Entomological Society:

<http://ento.org.nz/>

Some good photographs of New Zealand invertebrates

<http://www.nhc.net.nz/index/insects-new-zealand/insects-spiders.htm>

Danilo Hegg's website has some excellent photographs of alpine invertebrates:

<http://www.southernalpsphotography.com/Wildlife>

Onychophora (peripatus)

Peripatus (Onchyphora) (Landcare Research):

<http://www.landcareresearch.co.nz/science/plants-animals-fungi/animals/invertebrates/systematics/onchyphora>

New Zealand peripatus/ngaokeoke (DOC):

<http://www.doc.govt.nz/nature/native-animals/invertebrates/peripatus-ngaokeoke/>

General information

Fact sheets for some insect species (Landcare Research):

<http://nzacfactsheets.landcareresearch.co.nz/Index.html>

Invasive species

Invasive invertebrate threats (Landcare Research):

www.landcareresearch.co.nz/research/biocons/invertebrates/



Taxonomic specialists

Table 2. Contact information for invertebrate taxonomic specialists in New Zealand

Invertebrate group	Name	Contact (as of March 2017)
Beetles	John Marris	Curator, Lincoln University Entomology Research Collection Lincoln University (03) 423 0748
	Richard Leschen	Landcare Research—Manaaki Whenua Private Bag 92170 Auckland Mail Centre Auckland 1142 (09) 574 4111 leschenr@landcareresearch.co.nz
	Peter Johns	Canterbury Museum Rolleston Avenue Christchurch 8013 (03) 366 5000
Cockroaches	Peter Johns	Canterbury Museum Rolleston Avenue Christchurch 8013 (03) 366 5000
	Warren Chinn	Department of Conservation Private Bag 4715 Christchurch Mail Centre Christchurch 8140 (027) 408 3313 wchinn@doc.govt.nz
Flies	Peter Johns (crane flies)	Canterbury Museum Rolleston Avenue Christchurch 8013 (03) 366 5000
	Franz-Rudolf Schnitzler (Tachindae)	New Zealand Arthropod Collection Landcare Research—Manaaki Whenua Private Bag 92170 Auckland Mail Centre Auckland 1142 SchnitzlerR@landcareresearch.co.nz
Mayflies	Terry and Tim Hitchings	Canterbury Museum Rolleston Avenue Christchurch 8013 (03) 366 5000



Stick Insects	Thomas Buckley	Landcare Research—Manaaki Whenua Private Bag 92170 Auckland Mail Centre Auckland 1142 (09) 574 4116 http://www.landcareresearch.co.nz/about/people/staff-details?id=YnVja2xleXQ=
Wasps and Ants	Darren Ward	Landcare Research—Manaaki Whenua Private Bag 92170 Auckland Mail Centre Auckland 1142 (09) 574 4223 wardda@landcareresearch.co.nz
	John Early	Auckland War Memorial Museum Private Bag 92018 Victoria Street West Auckland 1142 (09) 309 0443
Moths and Butterflies	Robert Hoare	Landcare Research—Manaaki Whenua Systematics Team Private Bag 92170 Auckland Mail Centre Auckland 1142 Phone: (09) 574 4112 http://www.landcareresearch.co.nz/about/people/science-teams/systematics
	Eric Edwards	Department of Conservation PO Box 10420 Wellington 6143 (027) 201 3781 or (021) 024 888 44 eedwards@doc.govt.nz
	Brian Patrick	Wildlands Ecological Consultants PO Box 33499 Barrington, Christchurch 8244 (03) 332 3868 Mob (021) 394 098 Toll free: 0508 945 369 Christchurch@wildlands.co.nz
Wētā (& Grasshoppers)	Corinne Watts	Landcare Research—Manaaki Whenua Private Bag 3127 Hamilton 3240 (07) 859 3706 http://www.landcareresearch.co.nz/about/people/staff-details?id=d2F0dHNj
	Mary Morgan-Richards	Associate Professor in Ecology Institute of Agriculture and Environment, Massey University (06) 356 9099 ext. 84835 M.Morgan-Richards@massey.ac.nz



	Steve Trewick	Professor in Evolutionary Ecology Institute of Agriculture and Environment, Massey University (06) 356 9099 ext. 84842 S.Trewick@massey.ac.nz
	Peter Johns	Canterbury Museum Rolleston Avenue Christchurch 8013 (03) 366 5000
	George Gibbs	Victoria University (retired) George.Gibbs@vuw.ac.nz
	Warren Chinn	Department of Conservation Private Bag 4715 Christchurch Mail Centre Christchurch 8140 (027) 408 3313 wchinn@doc.govt.nz
Dragonflies/Damselflies	Milen Marinov	Ministry for Primary Industries 14 Sir William Pickering Dr Burnside, Christchurch 8053 0800 008 333 Milen.Marinov@mpi.govt.nz
Hemiptera (Bugs, Cicada, etc.)	Marie Claude Lariviere	Landcare Research—Manaaki Whenua Private Bag 92170 Auckland Mail Centre Auckland 1142 (09) 574 4113
	Thomas Buckley	Landcare Research—Manaaki Whenua Private Bag 92170 Auckland Mail Centre Auckland 1142 (09) 574 4116 http://www.landcareresearch.co.nz/about/people/staff-details?id=YnVja2xleXQ=
Millipedes/Centipedes	Peter Johns	Canterbury Museum Rolleston Avenue Christchurch 8013 (03) 366 5000
	Warren Chinn	Department of Conservation Private Bag 4715 Christchurch Mail Centre Christchurch 8140 (027) 408 3313 wchinn@doc.govt.nz



Spiders/Harvestmen	Cor Vink	Canterbury Museum Rolleston Avenue Christchurch 8013 (03) 366 5000 cvink@canterburymuseum.com
	Phil Sirvid	Te Papa National Museum 55 Cable Street PO Box 467 Wellington 6011 (04) 381 7000
Terrestrial Crustacea	Peter Johns	Canterbury Museum Rolleston Avenue Christchurch 8013 (03) 366 5000
Gastropoda	Kath Walker (giant land snails)	DOC Nelson Office Monro State Building 186 Bridge St Nelson 7010 (03) 546 3140 kwalker@doc.govt.nz
	Karin Mahlfeld	DOC National Office 18-32 Manners St Wellington 6011 (027) 421 8880 kmahlfeld@doc.govt.nz
	Gary Barker	Landcare Hamilton Private Bag 3127 Hamilton 3240
Platyhelminthes (Flat Worms)	Peter Johns	Canterbury Museum Rolleston Avenue Christchurch 8013 (03) 366 5000

