A Field Guide to Spiders of Australia

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A FIELD GUIDE TO

SPIDERS

OF AUSTRALIA

ROBERT WHYTE AND GREG ANDERSON

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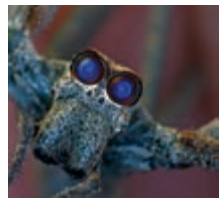

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Foreword

Read no further – unless you are willing to fall in love with spiders. Submitting to the pages that follow could change your life. You will want to convert all your friends to a love of spiders so that they can still be your friends. This will be easily done because you will have this book to show or give to them. It consigns to the prejudice bin the silly idea that a passion for invertebrates is uncool. This book pulses with the gratitude felt by two naturalist-scientists who have drawn inspiration from those little scuttling things many people recoil from.

As children most of us were taught to dislike and fear spiders. I remember the time after school I climbed high up a mango tree to a ball of straw: a finch nest in the leafy crown. I slid two fingers inside and felt the soft down of the chicks nestled within. When I withdrew my fingers a giant huntsman spider burst out and I realised I had been enjoying myself by fondling a hairy spider. I recoiled from the idea, but today I am wise enough to know that spiders should be enjoyed in every possible way. This book invites us all to do that.

I have known one of the authors for more than 35 years. Robert Whyte showed negligible interest in nature in his twenties. This book shows how deeply and successfully he has embraced his life's purpose. He had the Queensland Museum's curator of spiders, Robert Raven, whom I have known for even longer, as an excellent mentor.

This book shows us there is more to spiders than we might think. There are Peacock Spiders that outdo butterflies for beauty. (That might seem an exaggeration, but the photos show it is easily true.) Almost as striking is the Christmas Jewel Spider, and then there are the mating Long-jawed Spiders shown on page 320. There are

Tim Low is the author of *Where Song Began*, which explored the biogeography of Australian birds and explained how northern hemisphere thinking had skewed our understanding. *Where Song Began* became the first Australian nature book ever to win General Non-fiction Book of the Year.

Austracantha minax Christmas Jewel Spider ♀ Fish River Station NT PHOTO: ROBERT WHYTE. ♀ 8 mm ♂ 4 mm

all the spiders that practise mimicry, by imitating bird droppings, ants, flies, beetles or parts of flowers. Some of them even mimic different ant species at different stages of growth. The Green Tree Ant of the tropics has three different spider mimics, so if imitation really is a form of flattery, that ant must be full of conceit. There are other spiders that look ordinary but do extraordinary things. Fishing Spiders skate over the water and catch fish, and some spiders live entirely by thieving from other spiders. Australia's Seashore Spiders have travelled to New Zealand, presumably by travelling in crevices on floating logs. And then there are the flat Huntsman Spiders that live in colonies of up to 300. You have arrived as a spider devotee when you can peel back bark and look with joy rather than unease upon a teeming mass of these.

Birdwatchers carry binoculars as a matter of course and we should all be carrying magnifying glasses so we can properly enjoy life at the small end of the spectrum. Butterflies win more praise than Peacock and Jewel Spiders only because they are larger. This book is something we should be carrying as well. The introductory chapters are loads of fun and the photos are enchanting.

Tim Low

Maratus volans Flying Peacock Spider ♂ Sydney NSW PHOTO: JÜRGEN OTTO. ♀ 6 mm ♂ 5 mm

Myrmarachne smaragdina Green Tree Ant Mimic ♀ Darwin NT PHOTO: GREG ANDERSON. ♀ 7 mm ♂ 6 mm

Left *Amyciaea albomaculata* Green Tree Ant Mimic JUV from the Crab Spider family Thomisidae, Darwin NT. Right *Propostira* sp. Green Tree Ant Mimic ♂ from the family Theridiidae, Daintree QLD PHOTOS: GREG ANDERSON. "The Green Tree Ant of the tropics has three different spider mimics, so if imitation really is a form of flattery, that ant must be full of conceit." ♀ 7 mm ♂ 6 mm

Preface

In 2007 if there had already been a modern field guide to spiders with colour photographs of nearly every common, beautiful, intriguing and important Australian spider, this project would not have been started. There were top-quality spider field guides from Singapore, Hong Kong, Japan and Korea and New Zealand, but no comprehensive and accurate modern field guide for Australia.

So we began to write what we wished was in the book stores. It was a daunting task.

From the outset the aim was to produce a popular, practical field guide with high-quality photos of live spiders in natural settings. With a general audience in mind, the book was consciously written in everyday language. Technical terms have been avoided or, in cases where this was not possible, they have been accompanied by explanations. For example, if the term **tarsus** is mentioned it is followed by its explanation (final or outermost leg segment).

Perhaps the most important scientific terms with no practical alternatives are **Araneomorphae**, meaning spiders with fangs inward pointing and two lungs; and **Mygalomorphae**, meaning spiders with parallel directed fangs and four lungs. The word **cephalothorax** (the fused head and chest segment characteristic of spiders) and **carapace** (the upper part of this) might also occasionally appear without explanation. These and other crucial terms are in the glossary.

All Australian families are included, arranged alphabetically in three large groups, starting with the most commonly encountered **araneomorphs,** followed by **mygalomorphs**, then finally a section of **little-known spiders**. Early in the book is a section on shortcuts to identify obvious groups (see page 22).

The content is limited to spiders. This was to maximise space so as to be able to include as many species as possible. There are over 1,300 images in this book, many of them representing new discoveries not yet scientifically described.

The taxonomy of spiders is a movable feast, or perhaps a smörgåsbord of delights, with so much on offer it may be hard to know where to begin or how to make sense of it all. Thanks to recent major changes to the classification of spiders at the family level, notably by Ramirez in 2014, Dimitrov and colleagues in 2016 and Wheeler in 2017 we can direct readers to a chart showing a family tree of spiders on page 450.

Different people will undoubtedly read the book in different ways. Some might start with the index looking for a particular rarity, thinking, I wonder if they have got *Spiderosus suchandsuchus*? Imagine their delight when they find *Spiderosus suchandsuchus* in the index with a **bold** page number, meaning not only is it mentioned, it also has an image. Others might flick through the photos or go to a favourite group, for example the stunningly beautiful Peacock Spiders.

Whichever way you choose to explore its contents, this book will have made substantial progress towards achieving its aims if it has expanded your knowledge, reduced your fears and encouraged you to look more closely at spiders.

Runcinia acuminata Pointy Runcinia ♀ with Robber Fly prey, Bunya QLD
PHOTO: NICK MONAGHAN WWW.LIFEUNSEEN.COM. ♀ 10 mm ♂ 6 mm

Acknowledgements

A deep debt of gratitude is owed to Robert Raven, mentor and guide, and also Robert's colleagues on Level Six at Queensland Museum Brisbane, including Mike Rix, Barbara Baehr, Owen Seeman and Wendy Hebron. The late Ray Mascord and Val Davies were both exceptionally generous with active support over many years.

Thanks also to arachnological friends further afield including Helen Smith, Graham Milledge, Mike Gray, Gustavo Hormiga, Jonathon Coddington, the late Graham Wishart, Barry Richardson, Marek Zabka, Stano Pekar, Jerzy Prószyński, Pawel Szymkowiak, Mark Harvey, Volker Framenau, Phil Sirvid, Cor Vink, David Hill, Danilo Harms, David Hirst, GB Edwards and Wayne Maddison.

Many spider enthusiasts have helped. All are appreciated. A few who went above and beyond are singled out here.

Iain R. Macaulay has been a tireless traveller in the field, providing countless photographs and specimens from remote locations. We are grateful to be given permission to reproduce images from the superb collection of Peacock Spider expert Jürgen Otto. Mark Newton is a highly skilled citizen scientist of the arid lands; he provided many great images and ideas.

Thanks to Keith and Lindsay Fisher (Julatten), Barbara Maslen and Allen Sheather (Daintree) and Sue and Phil Gregory (Kuranda) for generously allowing spiders to be collected on their properties. David Knowles kept us in the loop with spiders from WA, as did Jean and Fred Hort, and Beth and Ron Kinsey. Graham Brown was a knowledgeable local guide in the NT and provided extensive logistics support. Katarina Christenson sent many photos from the ACT. Adam Parsons' treasure trove of fabulous images was regularly consulted and raided. Mike McCoy and Steve Pearson contributed images from tropical north Queensland. Nick Fisher explores northern NSW and south-east Queensland rainforests and posts his spider images. Sergio Grez while visiting from Chile compiled a spider website. Densey Clyne was an inspiration to meet at her home, and Joseph Koh and David Court were generous guides outside Australia.

The websites of Ed Nieuwenhuys, Ron Atkinson, Nick Monaghan and Peter Chew were (and still are) pioneers in the field. They paved the way. We wouldn't have been able to cover nearly as much ground without the help of our friends in Flickr groups, particularly Spiders of Australia. Over time many Facebook sites devoted to spiders appeared where we could 'meet' like-minded enthusiasts.

Many made valuable comments on the manuscript, including Joan Wilkinson, Mike Rix, Helen Smith, Jürgen Otto, Malcolm Tattersall, Robert Raven, Nick Fisher, Russell Harisson, Barbara Baehr, Volker Herzig, Dick Harding, Carolyn Mason, Tim Ransome and Volker Framenau. Tim Low generously provided the Foreword, lending some of his well-deserved fame. Thanks to Anne Jones for editorial assistance, Damien Ledwich for InDesign techniques and Judy Grimshaw for sharing her knowledge of Lynx Spiders.

Anna Harisson was our best and most adept student, proving the benefit of sharp eyes and nimble fingers. Marina Novak encouraged Anna's arachnology.

As this book has been a project over many years countless people have given us support and encouragement – we thank you all and we apologise for not having the space to list you all here. We thank our families and friends and especially those helping protect and restore natural bushland, ensuring there will be healthy habitat and fascinating natural studies far into the future.

Special thanks to Bush Blitz jointly funded by the Australian Government and BHP Billiton. Shown here is the scientific and support team (Robert Whyte far right back row) in Kiwirrkurra, a remote community in the Gibson Desert WA PHOTO: ROBERT WHYTE.

Poecilopachys australasia Two-spined Orb-weaver ♀ Sunshine Coast QLD PHOTO: ROBERT WHYTE. Special thanks to John Marnane for collecting this spider near Mapleton QLD. ♀ 8 mm ♂ 3 mm

Desognaphosa yabbra Crossover Spider ♀ Wynnum QLD PHOTO: ROBERT WHYTE. One of many such firsts we were given by Robert Raven who collected bucket-list spiders for inclusion. ♀ 5 mm ♂ 4 mm

Maratus personatus Masked Peacock Spider ♂ Cape Riche WA PHOTO: JÜRGEN OTTO. This species has been celebrated widely as the cutest spider in the world. ♀ 4 mm ♂ 3 mm

Introduction

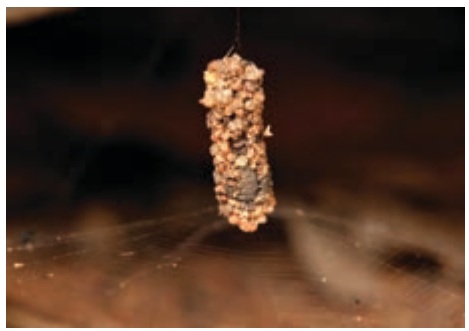
This is a book about an often misunderstood, sometimes feared group of animals, illustrated with beautiful images and informed by good science. Its simple aim is to inspire interest in the natural world and its invertebrate wonders.

As a child, you might have been lucky enough to play in local creeks, scooping up shrimps and water beetles in a jar with rainbow fish, tadpoles, skaters and dragonfly nymphs. The aim of this book is to inspire a similar wonder, delight and interest in tiny jewel-like spiders glinting from their hiding places under leaves, or large spiders of ancient lineages, spending their lives underground. To be able to identify and understand these creatures will surely make the time you spend in natural places more vibrant and meaningful.

Popular nature guides are well-trodden ground, if not for spiders, then for many other groups of animals. Most of all, birds and butterflies are the clear winners in the field-guide genre. But why stop there? Birds and butterflies might be just the beginning. There is so much more out there.

If you are already a backyard naturalist, you may have ventured into the world of



Who doesn't like a good mystery? These spiders have a pebble-encrusted retreat suspended above a horizontal orb web pulled up at the centre. You don't see that every day. Strangely, they seem to resemble spiders from Brazil, notably the Twelve-spotted Spilasma. Laurence Sanders discovered this unusual critter about 15 km west of Emerald in a strip of land between the highway and the railway line. Researchers at the George Washington University in Washington D.C. are on the case. DNA analysis so far has suggested this is a quite independent case of pebble-encrusted retreats and this spider is related to *Arachnura*, not at all related to *Spilasma*. Such mysteries are an almost everyday occurrence in arachnology and it is discoveries like this that make spidering so much fun. PHOTOS: LAURENCE SANDERS ♀ 4 mm

insects, bugs, beetles and moths. There are guides to help you identify Blue-banded Bees, Harlequin Bugs, Jewel Beetles, Damselflies, Katydids, Lacewings and Mantids.

And then you come to spiders. A few are dangerous, most are bright and beautiful, while some are cheeky and disarming.

They belong to the world of the small, the world of invertebrates, a world which has irrevocably changed with the advent of modern digital cameras, magnifying lenses and super-macro settings. New vistas have opened up, the colours stunning, the structures complex and fascinating, the variety endless.

You now have the guide book in your hands and you are ready to absorb spider knowledge.

But the very first thing one learns about Australian spiders is that our knowledge is embarrassingly incomplete. Amazingly there are still many more unknown spiders than known ones.

The current explorers of this field know all too well how much there is still to learn. If you join them you are very likely, within a few days, to discover an undescribed species yourself, a species new to science. That's exciting and pretty rare in biological studies. There are not many groups of animals visible to the naked eye which have so many new species to discover in your own backyard or in nearby bush. The adventure of discovering and naming new species is just the beginning. How do these species function? How do they fit into food webs? What are their ecological roles, their life cycles, behaviours, strengths and weaknesses?

In answering these questions, not only can you satisfy your own curiosity, you can also contribute to the world's knowledge of nature. Let's face it, there couldn't be a better time to discover new nature – before it disappears.

Before going any further, here's a question. What's your level of spider knowledge? How much do you know? Very little, quite a bit, or lots?

If you answered lots, you are one of very few Australians.

Apart from the Sydney Funnelweb, St Andrew's Cross, the Redback, the Huntsman, Daddy Long-legs and Garden Orb-weaver, most Australian spiders are virtually unknown to the general public, even to many naturalists.

This is rather odd, in a world that explores distant galaxies and the depths of the oceans, because spiders are everywhere and often close by. They occupy virtually every possible habitat niche and every continent. There is even a small jumping spider known to live at an altitude of 6,700 metres on Mount Everest, making it one of the highest-altitude creatures on Earth.

Spiders are also early colonisers. When the remains of the 1883 volcanic explosion of Krakatau were explored in 1884, the only living thing on the island was a tiny spider, found in a crevice.

Has anyone tried to calculate how many spiders there might be, in total?

Yes, actually. In 1939 British arachnologist W. S. Bristowe calculated that in one Sussex field there were at certain seasons more than 2,000,000 spiders to the acre. This translates to an amazing 500 per square metre, which admittedly stretches credulity. In 1999 Martin Nyffeler of the

Opposite *Sphecotheres vieilloti* Australasian Figbird ♂ Brisbane QLD PHOTO: ANNE JONES. Will spiders ever become as popular as birds? Probably not. But surely they deserve more love and affection than they presently get.

University of Bern reworked the calculations (using data available since Bristowe's original 1939 estimates) finding a much more reasonable average of 200 per square metre.

Whether there are 500 or 200 spiders per square metre in optimal conditions, the simple fact is there are lots of spiders out there, and more than the ones you normally see. There are spiders in the forest canopy, under leaves, under bark, in leaf litter and underground. There are also spiders so small they are simply overlooked, and others so well camouflaged you miss them even in plain sight.

In Australia, we know of thousands of spider species which exist but are undescribed. Others are yet to be discovered. Elsewhere this is not the case. Occasionally previously undescribed British species are found but they are a rarity rather than an everyday occurrence. In Japan and Germany previously undescribed species are so rare, if you discovered one you would probably be carried through the streets on the shoulders of Ministers of the Environment.

The total number of Australian spider species is probably around 15,000 to 20,000. So far only 4,000 of them have been described, a small percentage.

Euryattus ventralis Creeping Jumping Spider ♀ Cape York QLD PHOTO: ROBERT WHYTE. This is not a new species but it is the first recorded Australian specimen of this species normally found in PNG (and its neighbours). Thanks to its describer Jerzy Prószyński for identification. ♀ 8 mm ♂ 7 mm

Why are so many spiders unknown?

Australia is a vast, old continent and it has been on its own, separated from other land masses, for a long, long time. Around 80 million years ago Australia and its most recent companion, Antarctica, began slowly separating. Africa and South America were far distant, even though they were still attached to Antarctica.

Around 46 million years ago Australia began moving rapidly north towards the Equator, finally completing its separation from Antarctica, becoming a true island continent. Drying began in the north, eventually reaching the Nullarbor, while the far north drifted into the tropics where it came under the influence of a monsoon climate.

The result of all this has been plenty of time for separate evolution. This is why more than 90 per cent of Australia's invertebrate species are known nowhere else.

Western science has been operating in Australia for not much over 200 years, nowhere near enough time to explore every nook and cranny; and much of Australia is harsh, making exploration difficult.

Is the challenge too big? Not really. It is certainly a big challenge, but citizen science is helping. Will all Australia's spiders be known one day? Unlikely. Their diversity is mind-boggling. The closer you look, the

Austracantha minax Australian Christmas Jewel Spider ♀ Glenmorgan QLD PHOTO: ROBERT WHYTE. A common and much-loved spider throughout Australia, sometimes found in large groups (with overlapping webs) in a range of habitats. ♀ 8 mm ♂ 4 mm

more you find. One simply has to accept this world of the small, the engine room of ecosystems everywhere, is something that may never completely mapped, defined or written down. But this shouldn't stop us trying.

For many groups of Australian invertebrates, progress is being made. Lavishly illustrated field guides cover more species of moths, beetles, dragonflies, butterflies, stick insects, even cockroaches, than ever before.

This guide to the spiders of Australia is designed to be a welcome addition to the libraries of naturalists, scientists, students, farmers, gardeners and the general public.

Everyone has a story about spiders and most people have an opinion about them. More and more the opinions are becoming favourable as people learn spiders are fascinating and wonderful to photograph.

The vast majority of spiders are harmless and all of them, in fact, are beneficial.

Australomisidia pilula Lozenge-shaped Crab Spider ♂ Central Highlands TAS PHOTO: ROBERT WHYTE. This spider was previously in the genus *Diaea*. A modern taxonomic revision by Pawel Szymkowiak has found there are no genuine *Diaea* spp. in Australia. They have all been moved to new genera (see page 352). ♀ 6 mm ♂ 4 mm

Argiope keyserlingi St Andrew's Cross Spider ♀ Brisbane QLD PHOTO: ROBERT WHYTE. This is one of the more recognisable and easily identified Australian spiders. ♀ 20 mm ♂ 5 mm

From arachnophobia to arachnophilia

Fear of spiders is learned. It is not innate. It is one of those fears switched on or not in early childhood. It is learned from people around the child who make the 'disgust-and-horror' face when they see a spider. In other cultures where eating spiders is routine, this fear is not expressed and therefore it is not switched on.

While fear of spiders is an acquired fear, it is still very real. Some arachnophobes have lived severely limited lives because of their phobia. The good news is – arachnophobia can be unlearned. With careful desensitisation and a positive outlook, fear can be overcome, even reversed.

Spiders: Learning to Love Them by Lynne Kelly tells the story of how Lynne overcame her night terrors by studying spiders in her garden.

It took Lynne six months of close observations of the spiders around her house before the fear went completely. After the fear came the fascination. Lynne still studies spiders and has got to know many of the world's leading arachnologists.

Undescribed *Jotus* sp. ♂ Barron Gorge QLD PHOTO: ROBERT WHYTE. When beginning to cure your arachnophobia and desensitising yourself to reduce fear of spiders, it's probably best not to start with a big, hairy Huntsman. Why not try this adorable jumping spider, only 3 mm long, completely harmless to humans and extraordinarily cute. You can get to know it and maybe even give it a name. ♀ 4.5 mm ♂ 3 mm

How to use this book

After an initial skim through, it's likely most people will take this book off the shelf when they have a spider they want to identify.

After a while, you may know which part of the book to go to, whether it be to identify a mostly ground-dwelling mygalomorph spider or a daytime hunter on foliage. The pages of your favourite groups might become dog-eared, tea-stained or coffee-splattered. If so the book is proving its worth.

The information with each photograph will tell you where in Australia the spider specimen was found and in what type of habitat, one or two significant facts and the approximate maximum size of females and males.

In many cases spiders encountered in the main sections of this book will be fairly easy to find, commonly noticed, reasonably large and often attractive. There is a separate section for spiders in little-known families which might be hard to find, remote, rare or extremely small.

Argiope ocyaloides Bark-hugging St Andrew's Cross Spider ♀ Collinsville QLD PHOTO: ED NIEUWENHUYS. This is a spider in the family Araneidae, subfamily Argiopinae, known for its interesting web patterns. ♀ 14 mm ♂ 4 mm

Oxyopes sp. Lynx Spider JUV Henbury Station NT PHOTO: ROBERT WHYTE. This species cannot be identified with certainty because it is juvenile. Only adults have all the features necessary for confident identification.

Information on biology

Biology, as a broad term, refers to lifestyle, behaviour, reproductive and mating habits, prey capture, and so on. It usually involves observations in the field. To say very little is known about the biology of a species would apply to so many spiders in this book it would become tediously repetitive. The reason so little is known is because many were described in the 19th century from preserved specimens sent back to Switzerland, Holland, Germany, France, Britain or Italy. The author in many cases did not see a living specimen, let alone one in the wild. The knowledge gaps are only now beginning to be filled, as scientists and citizen scientists make more observations in the field.

What if I find a spider outside its range?

Ranges for Australian spiders are extremely difficult to specify, as so little is known. Surprises pop up all the time. A few spiders are presently known from small ranges, but even this may change over time when more information is gathered.

Coverage

Images from all states and territories have been included. The east and particularly the north-east of Australia are well represented as this is a region of extremely high species diversity.

Special trips to other states and participation in the Federal Government's Australian Biological Resources Study program Bush Blitz have added many remote locations including the deserts of Western Australia, mist forests of Tasmania, rocky gorges of the Kimberley, snowy peaks, swift rivers, the arid centre, the far northern coastlines and the tip of Cape York.

A generous arachnological community has provided photographs from even more locations. As a result this book is the most comprehensive popular account of Australian spiders ever published.

But as comprehensive as this book might be, there are always more spiders. There are spiders known but elusive and others no one has seen for decades, possibly extinct. Range extensions, new species, new genera and even new families are being added to the Australian lists all the time. The website *arachne.org.au*, a companion to this book, will be updated whenever possible.

Can I tell how big by the photo?

The scale of each photograph differs. In other words the photos are not to scale relative to each other. A small spider can look big in a photo and a big spider can look small. But each photo caption has the body length for the spider; for example, the spider on the facing page is accompanied by the symbols and measurements ♀ 3 mm ♂ 2 mm, meaning the female has a body length of 3 mm and the male a body length of 2 mm. If the body length of either sex is not included it is because it is not known. Juveniles are signified JUV.

Measurements, for example ♀ 24 mm ♂ 12 mm, refer to the average upper limit of body length, from the front of the cephalothorax (front segment) to the rear of the abdomen (rear segment).

Maratus purcellae Purcell's Peacock Spider ♂ Brisbane QLD PHOTO: IAIN R. MACAULAY. Don't let the size of the image on the page fool you. This spider is extremely small (total body length of only 1.8 mm) even though a full-grown male. ♀ 3 mm ♂ 2 mm

Neosparassus sp. Badge Huntsman Spider ♀ Fish River Station NT PHOTO: ROBERT WHYTE. Bigger than it looks. This spider and the one on the previous page could hardly be more different. This Huntsman Spider, by no means the largest Australian spider, is around 20 times the size of the one to the left. It hunts by night; the other hunts by day. ♀ 35 mm

Allowing for mutants and monsters, larger specimens may possibly be found in the wild or in collections but not often.

Smaller specimens could definitely be found, as body length is highly variable across populations. A small specimen of a particular species may be only half the size of a large one. Although the general size of a spider can be helpful in identification, particularly at the family level, it is not a reliable character for distinguishing species.

Abbreviations

The abbreviation sp. (for example, *Argiope* sp.) is used to indicate an unnamed species. The abbreviation spp. is used as the plural of sp. to indicate many separate species.

You don't tell us what they eat

In most cases there is no specific information on what each spider eats. While some spiders are food specialists, for example concentrating on a diet of ants in the case of family Zodariidae, or moths in the case of the female Bolas spiders, the great majority of spiders all eat more or less the same things: invertebrates (including other spiders).

Where food is specialised, or bizarre, like the occasional bird which might get caught in the web of a Golden Orb-weaver and eaten, it is noted. Ironically, *Nephila edulis,* the Golden Orb-weaver which has been known to consume birds, is itself considered a tasty snack in parts of Indonesia, *edulis* meaning edible.

Very large spiders like the Fat-legged or Australian Tarantula *Selenocosmia crassipes* are known to eat small frogs and lizards. Recently a Queensland Huntsman Spider was seen dragging away a full-grown mouse.

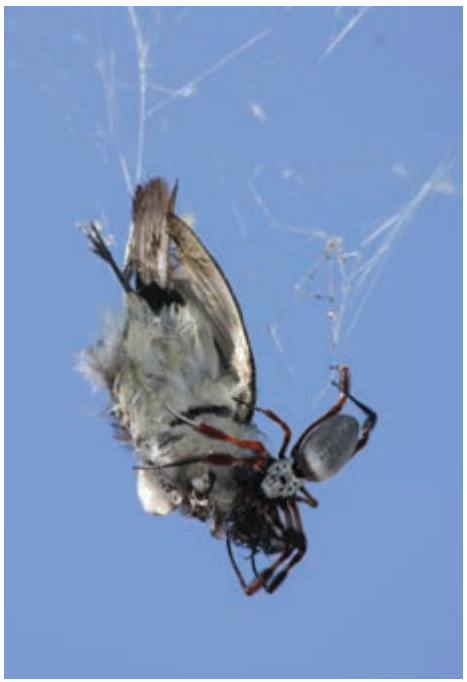
How are spiders sorted on the page?

In each spider family, the spiders are listed alphabetically, reading down the left column of each page, then the right column. When a female and a male are shown together the caption usually spans both columns. Some may be slightly out of strict order, where the layout has forced an exception.

Capitalisations

In this book common names of spiders are capitalised as is commonly done for other animals, for example Red Kangaroo, Emu, Whale Shark and Leather-back Turtle. However, capitals for common names are used only when referring to a particular named species. Red Kangaroo is not just any red-coloured kangaroo, only *Macropus rufus*. As a spider example, Sparklemuffin refers not just to any spider resembling a sparkly muffin; it refers only to the Peacock Spider *Maratus jactatus*.

When referring to a number of orb-weavers, lower case is used, because the discussion concerns many spiders in many families which construct orb webs, not a particular family. However, group names, for example Jumping Spiders, are capitalised. In this sense Jumping Spiders are not all spiders that jump (many do) but



Nephila edulis Golden Orb-weaver ♀ feeding on a finch caught in its web, Brisbane QLD PHOTO: MYRELLA BAKKER. As this photo shows, the strong golden silk of this species can snare dragonflies and even small birds. ♀ 35 mm ♂ 5 mm

Oxyopes sp. Glenmorgan QLD PHOTO: ROBERT WHYTE. A known unknown or, to be more accurate, a known but undescribed spider. This is a fairly common Lynx Spider in the Brigalow Belt of the western Darling Downs, but it has not yet been scientifically named. ♀ 5 mm ♂ 4 mm

Opisthoncus sp. Anna's Opisthoncus ♀ Burbank QLD PHOTO: GREG ANDERSON. This *Opisthoncus* sp. has not been officially described. It is nicknamed *Opisthoncus* Two-spot-big-jaw-southern (because the male has big chelicerae and there is another similar one in the north) and sometimes Anna's Opisthoncus, because Anna Harisson captured quite a few of them. ♀ 5 mm ♂ 6 mm

only a particular family called Salticidae.

Shorthand names for families like araneids for the spiders of the family Araneidae, or oonopids for the spiders in the family Oonopidae, are not capitalised.

Aren't there many spiders in a species?

A species is referred to in the singular, even though it is applied to many specimens making up a species.

Therefore **the** Northern Jumping Spider *Mopsus mormon* **is** a spider in northern Australia, not **are** spiders in northern Australia.

The same goes for all other classification levels. Oxyopidae **is** a family (singular) whose spiders **are** (plural) known as Lynx Spiders.

Do I have to learn taxonomy?

Taxonomy is the science of classifying things. When you are sorting the laundry, you are doing taxonomy. Everyone who can sort laundry is already a taxonomist, but to really learn spider taxonomy you will need a powerful microscope and a friendly specialist to help you get started. Even trained taxonomists often have problems with where species begin and end.

Tracking down the original reference specimen for a species name (called the holotype) can also be a challenge.

Is there a list of common names?

Unlike scientific names, common names are not bound by any rules. Birds and butterflies, being so popular and well documented, have reliable common names, but not spiders. Authors sometimes specify official common names when describing spiders, but this has begun to happen only recently.

Common names usually arise in a community, then become widely accepted, rather like new words entering the language on the street. People often use different common names for spiders in different parts of the world, even in different parts of Australia. This book uses well-known common names, but where they do not exist new ones have been created based on the principle that a useful common name should be simple and memorable and an obvious fit for the spider.

Often the common names given here are informed by the scientific Latin or Greek used in the original description. These

Araneus senicaudatus Tailed Orb-weaver ♀ Cheyne's Beach WA PHOTO: GREG ANDERSON. This spider is a close relative of *Eriophora pustulosa* Knobbed Orb-weaver. It is common in WA. The species name is made up of *seni* meaning old and *caudatus* meaning tail. ♀ 7 mm ♂ 6 mm

Backobourkia collina Desert Orb-weaver ♀ Henbury Station NT PHOTO: ROBERT WHYTE. *Backobourkia* is derived from the Australian colloquial expression 'back o' Bourke'. Bourke is a remote NSW town and the term loosely means 'in the middle of nowhere' and generally refers to the Australian outback. ♀ 11 mm ♂ 3 mm

were often originally chosen because they were descriptive; for example, *albomaculata* means white marks as *albo* means white and *maculata* means marks.

Following this logic, in many cases the common name is simply a translation of the scientific name. Not all scientific names, though, are descriptive. Some denote places, names of people (patronyms) or in some cases they may be just a random arrangement of letters.

When species are named after people, the common name treats the person's name as the owner of the species, for example Koch's Wolf Spider *Anomalosa kochi* and Keyserling's Garden Jumping Spider *Opisthoncus keyserlingi*.

It seems reasonable to assume that for common names to be successful they should be relatively easy to remember, descriptive if possible, and defensible. In other words, they should seem reasonable. They may not survive, but that's life. There is nothing to stop you choosing your own common name, especially if you find any particular suggestion doesn't appeal to you.

Some commonly used, historical or legacy names can be misleading. If these traditional common names present a problem, alternatives have been sought. For example, the traditional common names used for spiders in the family Theridiidae include **Comb-footed Spiders** (because they can be identified by the presence of a comb of stiff hairs on the last segment of leg 4), **Tangle-web Spider**s (because their webs may be rather tangled) **Cobweb Spiders** (which actually means Spider-web Spiders, because *coppe* or *cob* from Middle English simply means spider), or even **Space-web Spiders** (because their webs are three dimensional).

Unfortunately the tarsal comb can't be seen with the naked eye and may be absent; Theridiidae isn't the only family with tangled webs; all spider webs could be called cobwebs; and many other families also have three-dimensional or space webs.

In this case they may be referred to as theridiids, the anglicised shorthand form of the family name Theridiidae.

Take heart though; names aren't usually this troublesome.

Whip Spider ♂ Brisbane QLD PHOTO: GREG ANDERSON. The common name seems perfectly reasonable for this whip-like species of Theridiidae, known scientifically as *Ariamnes colubrinus*. ♀ 22 mm ♂ 13 mm

Euryopis sp. ♀ Melbourne VIC PHOTO: GREG ANDERSON. Even a scientific name is not forever. This spider genus is known for now as *Euryopis* but may one day become *Emertonella*. ♀ 6 mm ♂ 4 mm

Thomisus spectabilis Spectacular Crab Spider ♀ Fish River Station NT PHOTO: ROBERT WHYTE. This spider is so-named because it is spectacular, which is relative, of course. It might not be spectacular compared with the Sydney Opera House, but it is spectacular compared with other Crab Spiders. ♀ 11 mm ♂ 2.5 mm

Determining species – everything helps, including genitals

Some of you must be wondering by now how can you be sure photographs in this book have been identified correctly?

This is when you find out about the importance of spider genitals. The careful study of spider genitalia with a microscope is the first line of inquiry for anyone serious about scientific spider identification. This is because the genitalia of each specimen of a species has the same knobs, flanges, bumps, curves, spurs, chambers, ducts and tubes.

It can be a little embarrassing to talk about. People already look at you oddly when you mention spiders. Try mentioning spider genitals. In the male, the parts referred to are the palpal organs on the extremities of the pedipalps, the two appendages near the mouth. These develop into finely structured organs to transfer sperm to the female's genitalia. Her receiving organ (epigyne) is on the underside of the abdomen near the lungs. Both male and female have evolved to match each other, like a lock and key.

Although genitals are important, they are just one of many features to be checked.

The external appearance of living specimens is extremely useful. Other diagnostic features, such as scales, hairs, spines, eye sizes, eye placements, leg lengths, behaviour and location are also helpful.

When it comes to the crunch, if all the features of a spider (known as diagnostic characters) match the the official scientific description and its detailed images, scientists can be reasonably sure they have the correct name for their specimen.

Wherever possible, in fact in most cases, the specimens photographed by the authors for this book have been examined under a microscope to check their genitalia and other characteristics, only being identified to family, genus or species if the criteria above were satisfied; and generally these specimens have been kept for future reference. This will enable future workers to cross reference preserved specimens with photographs of the same animal alive, to either verify or revise the identifications used here.

Ananeon sp. ♂ Darwin NT PHOTOS: ROBERT WHYTE. In order to identify a species, arachnologists look closely at the sex organs. The image on the right is the male sex organ of the *Ananeon* sp. on the left. Because spiders have a lock-and-key system, the male part fitting the female part of the same species, it is useful in identification. This species is *Ananeon*, identifiable by its distinctive palp. It is very similar to the only described *Ananeon*, *Ananeon howardensis*. It is not *Ananeon howardensis* because of small differences, not only to the palp but also to other diagnostic characters. ♀ 7 mm ♂ 5 mm

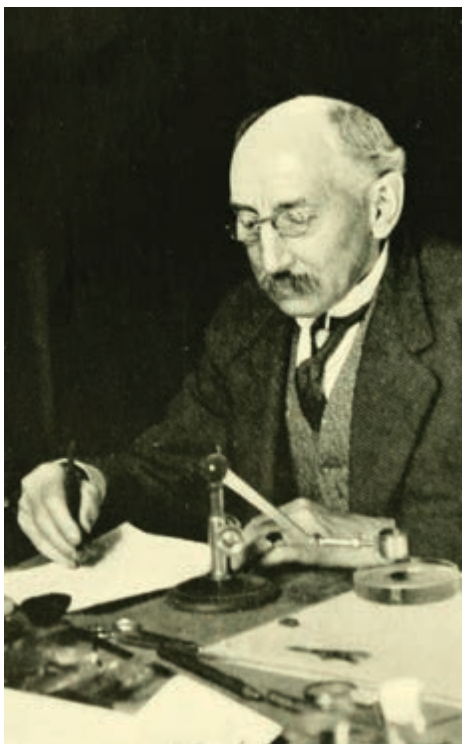
Australia's rich arachnological history

The great exploratory work on Australian spiders, in the context of the western system of classification, was compiled by two Germans. Together they produced *Die Arachniden Australiens, nach der Natur beschrieben und abgebildet (1871-1890)*. This major work of many volumes was begun by L. Koch and continued by Graf E. von Keyserling. It is a work of pioneering arachnology, unsurpassed even to this day. The drawings in particular are excellent. Since Koch and Keyserling, there have been many accounts and guides but never again have so many new species been described.

The collectors of the time also deserve special mention, notably Eduard Daemel (1821–1900) entomologist, trader, explorer and collector; and Amalie Dietrich (1821–91) who spent 10 years in Australia collecting specimens for the Museum Godeffroy in Hamburg.

William Joseph Rainbow (1856–1919) was probably the most prolific of Australia's early home-grown contributors. He described around 200 new species of spiders. His *Census of Australian Araneidae* (1911) listed all 1,102 species known to that date.

Amalie Dietrich (1821–91). Portrait of Amalie Dietrich on her 60th birthday, drawn by Christian Wilhelm Allers, 1881.



William Joseph Rainbow (1856–1919). Records of the Australian Museum.

Keith McKeown wrote an early book, *Spider Wonders of Australia* in 1936, followed by *Australian Spiders: Their Lives and Habits* in 1952 and *Australian Spiders* in 1963.

Barbara York Main, based in Western Australia, wrote a Jacaranda Pocket Guide in 1964. She went on to write many more books and hundreds of scientific papers, making an immense contribution to the scientific and popular understanding of spiders.

John Child was the first to use significant numbers of colour photos in his series of nature books. His *Spiders of Australia* came out in 1965.

One of Australia's most-accomplished arachnologists, V. V. Hickman, contributed *Some Common Spiders of Tasmania* in 1967. Ion Staunton was author of a factfinder book *All about Australian Spiders* in 1968.

The prolific Densey Clyne has been a life-long champion of Australian wildlife, especially invertebrates. She published *Australian Spiders* in 1969 with excellent colour photos and descriptions.

Probably the most useful field guides to spiders were Ramon Mascord's collection of books, *Australian Spiders in Colour* in 1970, *Australian Spiders* in 1978 and *Spiders of Australia* in 1980, all of them out of print but still in use today. Mascord's achievement was remarkable – the photos are small by today's standards and quite a few of the names have since changed, but Mascord's books were easily the most impressive and useful field guides for several decades.

There have been many books in more recent times – pocket books, coffee-table books, hyped books about the world's most deadly, and books for kids.

Bert Brunet produced comprehensive and entertaining guides, *The Silken Web: A Natural History of Australian Spiders* in 1994 and *Spiderwatch: A Guide to Australian Spiders* in 1996. Terence Lindsey wrote *Spiders of Australia* in 1998.

Spiders of New Zealand and Their Worldwide Kin, published in 1999, was a New Zealand book by Ray and Lyn Forster, both celebrated arachnologists. They dealt with a large number of Australian species in an extremely accurate and thorough account, with high-quality photographs and drawings. Their book shared their expertise and enthusiasm for arachnology and showcased many exciting scientific breakthroughs in the field.

Jenny Shield's *Spiders of Bendigo* came out in 2001. It is a small but excellent book featuring many of Australia's common species in colour.

The first and so far only interactive key to spiders came out in 2002, compiled by present day arachnologists Robert Raven, Barbara Baehr and Mark Harvey. This built on the achievements of Valerie Davies, who published a key to families in a Queensland Museum booklet in 1986.

Spiders and Scorpions Commonly Found in Victoria by Walker, Yen and Milledge appeared in 2003. Framenau, Baehr and Zborowski's *A Guide to the Spiders of Australia* appeared in 2014.

The future should bring many more spider studies enhancing our understanding of these animals. For more readings see page 437.

Opposite, top left, underside and head of a female spider showing the external anatomy by James Henry Emerton. Top right, an annotated illustration from *Die Arachniden Australiens* by Koch and Keyserling. It depicts a male Black-spotted Peacock Spider *Maratus nigromaculatus*. Bottom row internal female spider anatomy by John Henry Comstock 1902, conversion by Ryan Wilson CC BY 3.0 via Wikimedia Commons.

Parts of a spider – the need-to-know terms

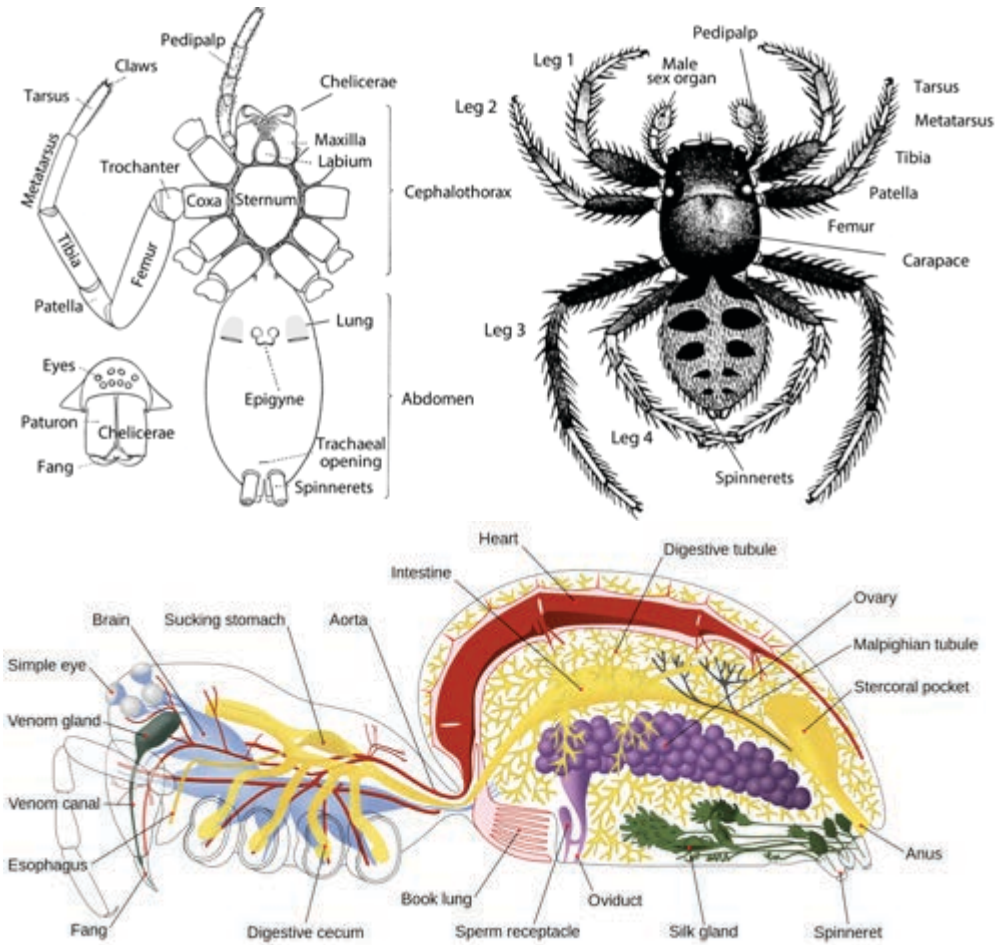
Most parts of a spider are simple and obvious. For example, legs 1, 2, 3 and 4 refer to the pairs of legs, 1 being the front pair, 4 being the rearmost pair, sometimes written I, II, III and IV.

Spiders have two body segments: the cephalothorax, which means head and chest together; and the abdomen, the large segment at the rear. They are connected by a tube called the pedicel.

The front section has most of the muscles, brainpower, eyes and legs. The rear section has the lungs, genitalia, gut, and spinnerets, with some muscles supporting these.

Males have external secondary sex organs, on the ends of each of their pedipalps (also called palps). The female has a receiver for the male's organ on the underside of her abdomen near the lungs called the epigyne.

Eyes (usually eight) are important and often distinctive. For a deeper study of spider anatomy, a good book is Foelix's *Biology of Spiders*.



Shortcuts to identification

Few spider names are known by the general public, but most people could probably identify the Redback Spider. Plenty of advertising images for beer and boots help. It is a very striking looking spider. Nothing else looks like it.

The famous Sydney Funnelweb is also well known but is rarely identified accurately. Any number of large, dark-coloured, fearsome-looking spiders can be found wandering about the suburbs, falling into the dog's water dish or a swimming pool.

Sydney Funnelweb Spiders are only found within a 120 km radius of Sydney, but lookalikes elsewhere can be just as dangerous. It would be wise to be cautious with all of them, even though they may not all be Sydney Funnelwebs.

Birdwatchers may be able to identify hundreds of birds by their appearance or their song but not know the bird families they belong to. People with a knowledge of spiders, on the other hand, usually use the characteristics of spider families for identification. For example, the Lynx Spider family can be identified by a characteristic hexagonal eye pattern.

The following pages contain some easy-to-see features to help you identify spiders at least to the family level. Knowing the family a spider belongs to is the first step to becoming a spider expert.

Selenocosmia crassipes Australian Tarantula ♀ Cape York QLD PHOTO: ROBERT WHYTE. If a spider is extremely large, furry-looking, with tiny, close-set eyes, chances are it's an Australian Tarantula from the family Theraphosidae. How big? For a spider, enormous. The Australian Tarantula can grow to a body length of 90 mm, not including legs, just eyes to spinnerets. ♀ 90 mm ♂ 70 mm

Thomisus spectabilis Spectacular Crab Spider ♀ Townsville QLD PHOTO: MALCOLM TATTERSALL. Many spiders are found in flowers, but only one large, white spider in flowers is renowned for taking prey bigger than itself. It is the female Spectacular Crab Spider. The victim here is the Ulysses Butterfly *Papilio ulysses*, a Swallowtail Butterfly with a wingspan of up to 105 mm. ♀ 11 mm ♂ 2.5 mm

Behaviour

Some spider groups have distinctive behaviour. This is only useful for identification if you can actually see it happening. Sometimes you can't. Spitting Spiders (Scytodidae) splatter their prey with a sticky mass of toxic silk exuded from pores in their chelicerae but they complete their spit in 1/700th of a second and on a very small scale.

Netcasters are much more obliging. At night they can remain motionless for hours with their nets extended, held in the claws of their outstretched legs.

Some spiders are social, or semi-social, living together in colonies. Normally they would eat each other but chemicals in the retreat probably prevent them from going cannibal.

Scytodes tardigrada Slow-moving Spitting Spider ♂ Cairns QLD PHOTO: IAIN R. MACAULAY. Spitting is impossible to see happening, but you can identify this family by its domed carapace shape, six eyes and extremely slender legs. ♀ 9 mm ♂ 7 mm

Menneus aussie Aussie Netcaster JUV Mount Colah NSW PHOTO: GREG ANDERSON. Netcasters are relatively easy to recognise at night as few families wait for their prey holding a silken net. ♀ 11 mm ♂ 10 mm

Phryganoporus candidus Social Outback Spider ♂ Muttaburra QLD PHOTO: ED NIEUWENHUYS. Large colonies of this spider, which is in the family Desidae, may cover trees with webs attached to silk retreats with many entrances. Each colony may contain hundreds of individuals.♀ 8 mm ♂ 6.5 mm

Xysticus albomaculatus Semi-social Crab Spider males left, female, and a retreat just beginning to be built right, Brisbane QLD PHOTOS: ROBERT WHYTE. These spiders create a structure of green leaves bound with silk. It becomes a home for spiders of all ages living communally. ♀ 5.5 mm ♂ 4 mm

Some spiders have spectacular courtship behaviour, including the displays of male Peacock Spiders shown below. The female Peacock Spider selects a male of her own species by the shape, colour and movements of his courtship display when his colourful flap or fringe, usually tucked away against the sides of the abdomen, is stretched out in full magnificence like a peacock's tail.

As well as colourful flaps, fans and fringes, Peacock Spider species have elaborate leg-waving routines. These are also unique to each species. The females watch the courtship display, eventually becoming mesmerised and placid, allowing the male to approach and mate.

Their displays seem to also mesmerise humans. The use of digital macro-photography, both stills and video, has made them media superstars.

Many other Jumping Spiders have courtship displays. This makes sense as they have good eyesight and are active by day when they can easily be seen by prospective mates. The male Paddle-waving Jumping Spider *Jotus remus*, for example, lures the female by waving a paddle-like fan on the end of his third leg. Male *Cosmophasis* not only wave their legs and pedipalps, they also tap them in complicated rhythms.

The Crab Spider family Thomisidae is also active by day. Some species have spectacular plumes of hairs on the legs. They may be used in courtship but also may be used to scare off predators. They look quite aggressive at full stretch.

Some display behaviours seem to double as mimicry. *Neon*, *Frewena*, and *Bianor* spp. seem to be imitating ant behaviour even though the spiders themselves are not particularly ant-like in appearance.

While all spiders have significant behavioural traits as a result of adaptation over the histories of their lineages, many traits are subtle and not useful as identification shortcuts.

Maratus fimbriatus Fringed Peacock Spider ♂ Nyngan NSW PHOTO: JÜRGEN OTTO. This Peacock Spider is named for its enormous fringe of colourful hairs. Similar fringes are also present in *Maratus speciosus* (right), *Maratus chrysomelas* and *Maratus nigromaculatus*. ♀ 4.5 mm ♂ 3.5 mm

Maratus speciosus Orange-fringed Peacock Spider ♂ Perth WA PHOTO: JÜRGEN OTTO. This spider is found on Sea Spinach plants *Tetragonia decumbens* in coastal sand dunes. ♀ 5 mm ♂ 4 mm

Eyes

Most spiders have eight eyes. But how big are they and how are they arranged? This is a useful key to many families.

Spider families with fewer than eight eyes are relatively easy to identify if you can find them, but many are obscure or very small. You would be extremely lucky to see a tiny tetrablemmid spider, for example, let alone its eyes.

Dysderidae is a family of large spiders with six eyes but only one species occurs in Australia, the introduced *Dysdera crocata*.

Scytodidae, the Spitting Spiders, have six eyes, but these spiders are more easily recognised by body shape and markings.

Spiders in Segestriidae have six eyes but otherwise look like many other families, except their first three pairs of legs are all directed forward.

Some families have varying numbers of eyes. In the case of troglodytic cave spiders, many have no eyes at all.

Cytaea sp. ♀ Cairns QLD PHOTO: ROBERT WHYTE. Jumping Spiders in the family Salticidae are probably the easiest of all spiders to identify even for beginners. No other family has hugely enlarged middle eyes in the front row. These are called anterior median eyes, sometimes shortened to AMEs. Anterior means front and median means middle. The outer eyes in the front row are also enlarged but not as much as the two central ones.

Deinopis subrufa Ogre-faced Net-casting Spider ♂ Brisbane QLD PHOTO: ROBERT WHYTE. This is the only spider which could even be remotely confused with a jumping spider. But the difference is easy to see. The enlarged eyes of this species are the middle eyes of the back row. Two small black eyes below the huge ones are the middle eyes of the front row. The outside eyes in the front row are in the hairy knobs on the side of the face. The outside eyes of the back row are out of sight on the side of the carapace. ♀ 18 mm ♂ 18 mm

Left, eyes of a cycloctenid and right, eyes of a ctenid PHOTOS: ROBERT WHYTE. These two families have eye arrangements not greatly dissimilar to each other but different from most other families except perhaps Toxopidae and Miturgidae (in part). Eye patterns are useful in distinguishing most families, even when they are not as obvious and distinctive as those of Jumping Spiders, Net-casters, Wolf Spiders and Lynx Spiders. There are eye charts of most Australian araneomorph families on the website arachne.org.au. Some mygalomorphs also have distinctive eye patterns. For example, actinopodids have eyes in a wide group across the front of the carapace while most other mygalomorphs have more compact groupings. ♀ 18 mm ♂ 18 mm

Wolf Spider ♀ Charleville QLD PHOTO: GREG ANDERSON. Spiders in Lycosidae have a distinctive eye pattern. It's not just the greatly enlarged eyes in the back row (so far apart they appear to be in two rows, creating a pattern from front of 4, 2, 2). The clincher is the front row which is mostly straight or slightly downcurved towards the fangs. (Technically this is called procurved.) While other families might have more or less enlarged eyes in the back row, no other family has the front row even slightly downcurved. ♀ 15 mm ♂ 15 mm

Oxyopes papuanus Northern Lynx Spider ♂ Daintree River Crossing QLD PHOTO: ROBERT WHYTE. The classic eye pattern of the Oxyopidae, the Lynx Spider family, is supposed to be hexagonal, but this only refers to the six biggest eyes. Another two smaller eyes are always quite visible below the hexagon. But no other family has an eye pattern like this so you can be sure it's an oxyopid. ♀ 8.5 mm ♂ 7.5 mm

Spinnerets

All spiders produce silks, sometimes up to seven different types for different uses. The main silk-producing organs are called spinnerets, which generally can be seen at the rear of the spider. In some spiders there is another silk-producing organ called the cribellum.

There may be only two spinnerets, or rarely as many as eight, but none in Australia has eight. Most spiders have six. Even though some spinnerets are conical and some cylindrical, most look pretty much the same to the naked eye, with a few notable exceptions. Two-tailed Spiders (Hersiliidae) have elongated spinnerets, sometimes enormously so. They are so long they look like two tails projecting from the rear of the abdomen, hence the common name. Spiders in the family Hahniidae (Comb-tailed Spiders) nearly all have spinnerets arranged in a line instead of a cluster.

Spinneret sizes and shapes are particularly useful in distinguishing mygalomorph families. Curtain Web Spiders in the family Dipluridae, for example, sometimes have spinnerets as long as the abdomen itself, while Mouse Spiders in the family Actinopodidae have short spinnerets.

In the family Prodidomidae, one of the most unusual cases of bizarrely arranged spinnerets, two extremely long spinnerets may start near the front end of the abdomen, and can project almost as far behind.

Tamopsis brisbanensis Brisbane's Two-tailed Spider JUV ♂ Boondall QLD PHOTO: GREG ANDERSON. *Tamopsis* spp. occur in most parts of Australia, mostly having small distributions, but some, like *Tamopsis fickerti* and *Tamopsis brisbanensis* are rather widespread. ♀ 5 mm ♂ 5 mm

Undescribed hahniid possibly *Alistra* sp. ♀ Black Mountain Road, Kuranda QLD PHOTO: GREG ANDERSON. This small spider in the family Hahniidae has spinnerets arranged in a row. This is often rather difficult to see. In this case the outside ones are much longer than the others. ♀ 4 mm ♂ 3 mm

Molycria sp. Undescribed prodidomid ♀ Glenmorgan QLD PHOTO: ROBERT WHYTE. Species in this family are swift-running ground spiders, their bodies shiny because of scales or hairs. The middle eyes in the rear row are flat and silvery. Nearly all prodidomids are recognised by extremely long spinnerets which start well forward (sometimes in the front third of the abdomen) and project beyond the tail. ♀ 4 mm ♂ unknown

Cethegus sp. Undescribed Cethegus JUV Fish River Station NT PHOTO: ROBERT WHYTE. This ground-dwelling spider in the family Dipluridae was collected in the NT, near the Douglas and Daly Rivers. Extremely long spinnerets are a shortcut for identifying spiders in Dipluridae. ♀ 20 mm ♂ unknown

Location

In houses, where many people encounter spiders, a small number of families are regularly seen on walls and ceilings. Because these are quite different from each other you can narrow down identification fairly quickly; in fact most people probably know them already.

Perhaps the best known of all is the lightning-fast Huntsman, very large and often disconcerting because of its sudden, unpredictable movements. The Huntsman family is Sparassidae. Many genera, including *Heteropoda* and *Holconia,* are often found on walls, especially at night. These are beneficial spiders, hunting insects roaming houses after dark.

Most people don't realise there are many genera and species of Daddy Long-legs Spiders in Australian houses, not just the cosmopolitan Daddy Long-legs Spider *Pholcus phalangioides* which is found everywhere in the world. There are in fact nine of these introduced pholcid spp. but they are only rarely looked at closely enough for identification.

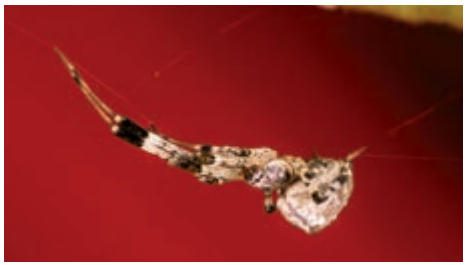
Daddy Long-legs Spiders are also interesting for the claims (a) they have the most toxic venom of any spider and (b) their fangs cannot penetrate human skin. Both of these claims are simply false. One thing is true: Daddy Long-legs Spiders do have very long legs. This makes them easy to recognise.

Another common ceiling spider in Queensland is a venomless spider in the family Uloboridae, *Zosis geniculatus* (also introduced).

Spitting Spiders *Dictis* (in the tropics) and *Scytodes* (widespread) are also seen in and around houses. A very common but often overlooked spider in houses is the pale, almost transparent, fast-running Wall Spider *Oecobius navus,* body length only 2 to 4 mm. If you keep your eyes open you are sure to see one, but blink and you might miss it.

Smeringopus natalensis Natal's Daddy Long-legs Spider ♀ Hope Valley SA PHOTO: MARK NEWTON. This species is extremely common in Australia, often misidentified as *Pholcus phalangioides.* ♀ 4 mm ♂ 3.5 mm

Holconia immanis A large male Grey Huntsman ♂ Brisbane QLD PHOTO: ROBERT WHYTE. Family Sparassidae is perhaps the best-known spider group in houses. This species, one of many called Huntsman, is one of the largest sparassids in Australia and can have a body length of 45 mm. Its outstretched legs can be up to 16 cm across. ♀ 45 mm ♂ 40 mm



Zosis geniculatus Ninja-star Ceiling Spider ♀ Brisbane QLD PHOTOS: ROBERT WHYTE. The spider in the photo above right made the impressive egg sac to the left. ♀ 3 mm ♂ 2 mm

Dictis striatipes Tropical Spitting Spider ♂ Darwin NT PHOTO: GREG ANDERSON. ♀ 6 mm ♂ 5 mm

Oecobius navus Wall Spider ♂ Brisbane QLD PHOTO: ROBERT WHYTE. ♀ 3 mm ♂ 2 mm

Latrodectus hasseltii Redback Spider ♀ Newcastle NSW PHOTO: GREG ANDERSON. This spider's venom can cause severe pain. Seek medical help if bitten. ♀ 10 mm ♂ 3 mm

The famous Redback Spider in the family Theridiidae is apparently fond of toilet seats (according to the Slim Newton song) but actually is more likely to be under low eaves or skirting around houses, in sheds, in rubbish piles, or under logs. Other theridiids often seen in houses include *Nesticodes rufipes* (in warmer areas), *Cryptachaea gigantipes* and *Parasteatoda tepidariorum*.

White-tailed and Black House Spiders are usually found on the outside of houses, as well as in and on garages and sheds.

The odd thing about these two spiders is that the White-tailed (which has an undeserved reputation for causing wounds that don't heal) actually hunts and eats Black House Spiders, whose bites may cause a painful sore.

Some spiders are found in unusual places. Fishing Spiders (family Pisauridae) are sometimes found underwater. Intertidal Spiders (family Desidae) and Seashore Spiders (family Anyphaenidae) can be found on rocky shorelines below the high-tide mark.

Badumna insignis Black House Spider ♂ Katanning WA PHOTO: GREG ANDERSON. ♀ 18 mm ♂ 12 mm

Lampona cylindrata White-tail Spider ♀ Belair Adelaide SA PHOTO: GREG ANDERSON. ♀ 9 mm ♂ 8 mm

Nesticodes rufipes Red House Spider ♀ Strathpine QLD PHOTO: GREG ANDERSON. ♀ 2 mm ♂ 2 mm

Cryptachaea gigantipes Long-legged Common House Spider ♀ Hill Top NSW PHOTO: ADAM PARSONS. ♀ 6 mm ♂ 5 mm

Webs

Not all spiders make web snares to trap prey but many do, resulting in seemingly endless web types with different shapes, sizes, methods of construction and types of silk. Some are permanent while others are consumed by the spider each morning. While some are helpful in identification, webs can be misleading. Similar web types can occur in quite different families, and different types of webs can occur within a single family.

The most obvious type of web snare is the orb or wheel web, which is made from main lines attached to support radii from the centre to the outer edge and structural spirals accompanied by or replaced with spirals of sticky silk for prey capture.

The spiders making these are generally called orb-weavers and will mostly be in Araneidae or Tetragnathidae. There are others in little-known spider families.

Orb webs can be very large and closely or sparsely woven, medium-sized, or small, but they all do the same job: trap flying prey by day or night.

Other types of webs, like the three-dimensional space web (occupying a space or volume) do the same thing. Theridiidae (because its spiders are so abundant and diverse) is the most obvious family of space-web builders, but this is by no means a family-wide trait. Many spiders in the subfamily Hadrotarsinae don't make much of a capture web at all.

Some spiders construct webs both to capture prey and for protection. The web of the Black House Spider, for example, is a complex barrier of robust silk with a few entrances for rapid attack and retreat. The spider waits near an entrance sensing for movement of prey which it can rush out and grab. The Hollow Twig Spider *Paramatachia tubicola* in the family Desidae has a distinctive radiating web surrounding the entrance to its retreat in a twig.

Nephila plumipes Golden Orb-weaver web, Brisbane QLD PHOTO: ROBERT WHYTE. The Golden Orb-weavers are the only spiders to make webs with golden silk, seen here on the perimeter of this web. If it is a web like this with golden silk, you can be sure it's a Golden Orb Weaver.

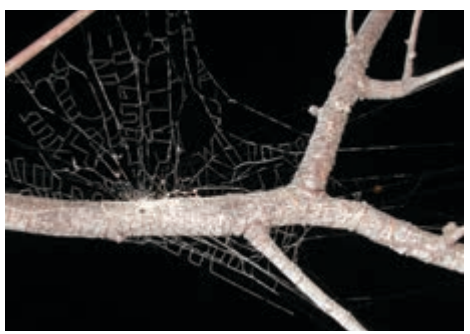
Cyrtophora hirta Tent Web Spider web, Townsville QLD PHOTO: MALCOLM TATTERSALL. If you find one of these narrowing funnels you know you have a Tent Web Spider and it is probably in the retreat (the narrowing funnel).

A space web in Kangaroo Vine *Smilax australis* PHOTO: ROBERT WHYTE. The spider and its web are protected by the sharp thorns on the vine stems.

Cyclosa sp. Decorated Web Spider web, Brisbane QLD PHOTO: ROBERT WHYTE. *Cyclosa* spp. in Araneidae are known for decorative patterns in their webs.

The distinctive webs of *Badumna insignis,* the Black House Spider, Brisbane QLD PHOTO: ROBERT WHYTE.

Dipluridae is the only mygalomorph family with a substantial web, Brisbane QLD PHOTO: ROBERT RAVEN.



Paramatachia tubicola Hollow Twig Spider. Left, the distinctive radiating web surrounds the hole in the twig where this spider lives PHOTO: ROBERT RAVEN. Right Hollow Twig Spider ♀ in its silk-lined retreat, Bellawongarah NSW PHOTO: GREG ANDERSON. ♀ 8 mm ♂ 7 mm

Burrows

Burrows provide protection for spiders from predators, heat and desiccation (drying out). They are places to hide while keeping an eye (or more likely a vibration-sensitive tarsus) out for passing prey.

Nearly all mygalomorphs have burrows of some sort, usually in the ground, some quite deep with side branches and chambers. Some build retreats in decaying parts of trees. One exception is Dipluridae, the Curtain Web Spiders, most of whom do not burrow as such, instead opportunistically taking advantage of a burrow-like cavity under rocks or tree roots, where they construct filmy curtains of silk to catch prey.

Because mygalomorph spiders (except for Mouse Spiders) have little protection against drying out, they are rarely seen outside the burrow in the daytime, especially when it's hot and dry. Even the males, which go wandering at night in search of females, will do so mostly on damp nights in summer. Araneomorphs are better protected against desiccation and are able to roam more freely.

Many mygalomorph families have lidded burrows. However, there are also many whose burrows have no lids. Idiopids, sometimes called Spiny Trapdoor Spiders, have species such as *Arbanitis longipes* and *Arbanitis robertcollinsi* with open or unlidded burrows in the form of papery tubes emerging above the soil.

Spiders in Barychelidae (Brush-footed Trapdoor Spiders) including *Idiommata* spp. have short burrows. Some like *Sason* spp. have a short, barrel-shaped retreat of silk on trees with a soft door at each end. In the family Theraphosidae, the Whistling Tarantulas, *Selenotholus foelschei* has large unlidded entrances, while others have lids. In some, lids come and go with the seasons.

Most Wolf Spiders (like the one shown on the facing page) have burrows, some with lids, some without. Wolf Spider burrows are usually not as deep as the deepest burrows of mygalomorphs. Other araneomorph ground spiders, including *Storena* spp. (in the ant-eating spider family Zodariidae), have decorated burrow entrances.

Euoplos sp. in the family Idiopidae, whose lid is closed above left, then open right, Mount Glorious QLD PHOTOS: GREG ANDERSON.

The Wolf Spider above was found in this 12 cm-deep lidded burrow (left) Charleville QLD PHOTOS: GREG ANDERSON.

This burrow of a *Storena* sp. in the family Zodariidae (not a mygalomorph) is made in desert sand with an entrance protected by gathered leaves and debris. Morgan SA PHOTO: MARK NEWTON.

Selenotholus foelschei Foelsche's Whistling Spider burrow Fish River Station NT PHOTO: ROBERT WHYTE. This is a large spider with a correspondingly large and deep burrow.

Unlidded burrow of *Misgolas villosus* in the family Idiopidae, Hornsby NSW PHOTO: HELEN SMITH. Many Idiopids, also known as Spiny Trapdoor Spiders, have classic trapdoors on their burrows.

Egg sacs

Egg sacs can be surprisingly useful in identification, often visible even when the spider itself is hidden.

They may well prove to be as distinctive as bird nests as a clue to genera and species.

To know if this is true, many more observations and records are needed. There is a great opportunity for citizen scientists to document egg sacs, webs, burrows and other characteristics of spider biology.

Some egg sacs may not be easy to recognise, disguised as seed heads or other plant parts, or hidden away under leaves of other structures. Documentation will be a boon to scientists and naturalists everywhere.

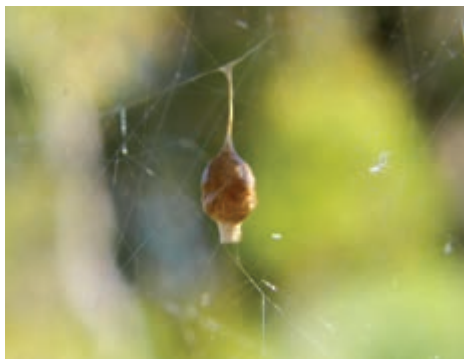
Below left, egg sac of *Australomimetus* sp. in the family Mimetidae, Morgan SA PHOTO: MARK NEWTON. Below right *Arachnura higginsi* Higgins's Orb-weaver ♀ Brisbane QLD PHOTO: ROBERT WHYTE. This spider disguises both egg sacs, food debris and itself in a long line on its web. ♀ 16 mm ♂ 3 mm

Opisthoncus sp. Garden Jumping Spider ♀ Hobart TAS PHOTO: GREG ANDERSON. This retreat in a curled bracken tip contained the spider and a cluster of pale-yellow eggs. ♂ 14 mm ♀ 14 mm

Araneus albotriangulus White-winged Orb-weaver ♀ with egg sac, Cooroy QLD PHOTO: GREG ANDERSON. This species builds a small, loose egg sac. ♀ 5 mm ♂ 3 mm

Araneus dimidiatus group ♀ Kuranda PHOTO: GREG ANDERSON. This egg sac is spherical with woolly, strong strands and is bigger than she is. ♀ 8 mm ♂ 6 mm

Unidentified araneid ♀ Portland Roads QLD PHOTO: GREG ANDERSON. This type of egg sac is quite common across many different spiders in Araneidae. ♀ 4 mm ♂ 2 mm



Left *Argyrodes* sp. with egg sac ♀ Julatten QLD PHOTO: GREG ANDERSON. ♀ 5 mm ♂ 4 mm. Right, 3 mm egg sac of Dew Drop Spider *Argyrodes antipodianus* Perth WA PHOTO: WENDY EIBY.

Appearances can be deceptive. These two similar species have distinctively different egg sacs. Left, a Brown Widow *Latrodectus geometricus* ♀ Darwin NT PHOTO: GREG ANDERSON. ♀ 9 mm ♂ 3 mm. Right, a lightly coloured Redback Spider *Latrodectus hasseltii* ♀ Kiwirrkurra WA PHOTO: ROBERT WHYTE. ♀ 10 mm ♂ 3 mm

Two very different spider families with similar poses on their egg sacs. Left *Dictis striatipes* ♀ in the family Scytodidae, Douglas River NT PHOTO: ROBERT WHYTE. Right *Dendrolycosa icadia* ♀ in the family Pisauridae (Fishing Spiders), Big Mitchell Creek QLD PHOTO: GREG ANDERSON. These spider families are not closely related.

Lehtinelagia evanida Common Lehtinelagia ♀ Whiteside QLD PHOTO: GREG ANDERSON. ♀ 5 mm ♂ 4 mm

Synalus angustus Square-tailed Bark Spider ♀ ACT PHOTO: KATARINA CHRISTENSON. ♀ 11 mm ♂ 7 mm

Runcinia acuminata Pointy Runcinia ♀ Deception Bay QLD PHOTO: GREG ANDERSON. ♀ 10 mm ♂ 6 mm

Lampona cylindrata White-tail Spider ♀ Gosford NSW PHOTO: ED NIEUWENHUYS. ♀ 9 mm ♂ 8 mm

Theridiids with egg sacs, left ♀ Wongabel QLD, right ♀ Queenstown TAS PHOTOS: GREG ANDERSON.

Daddy Long-legs Spider spp. with egg sacs. Left ♀ *Belisana* sp. right ♀ *Crossopriza* sp. Darwin NT PHOTOS: GREG ANDERSON. ♀ 3 mm ♂ 2 mm

Micromerys sp. ♀ Julatten QLD PHOTO: GREG ANDERSON. This Daddy Long-legs Spider in the family Pholcidae carries a string of eggs suspended from its chelicerae. It seems all *Micromerys* spp. do this. They are also identifiable by their slender abdomens and by having only six eyes. ♀ 8 mm ♂ 6 mm

Leaf-curlers

Several families use either living or dead leaves which they curl into a protective retreat. Some Theridiidae including *Parasteatoda decorata* and *Nihonhimea mundula* use dead leaves, even those previously made by other leaf curlers.

Orb-weavers *Phonognatha graeffei* and A*raneus dimidiatus* use curled dead leaves. Many *Phonognatha* spp. find a naturally curled dead leaf, then bind it even more tightly with silk, suspending it at the top of their orb webs. Some *Phonognatha* spp. use a live or dead leaf when juvenile. The spiders of the *Araneus dimidiatus* group, in the broader sense, sometimes use a living leaf.

Sac spiders including *Clubiona* (family Clubionidae) and *Cheiracanthium* (family Eutichuridae) are commonly found in live-leaf retreats, especially in gardens. Some salticids use leaf retreats also. Many Crab Spiders in the family Thomisidae, including *Tharpyna*, *Porropis*, and some *Cymbacha,* bend leaves of grass more than double and therefore are easy to find if you are looking for them.

Other signature traits of behaviour helpful for identification (notably mimicry) are included in breakout sections interleaved in the spider description pages ahead (alphabetical by family, starting with Araneomorphae).

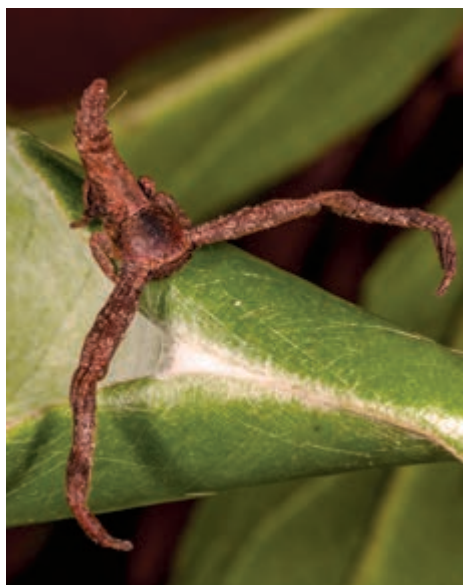
Phonognatha graeffei Graeff's Leaf-curler ♀ Sydney NSW PHOTO: ELLIE DOWNING. A leaf curler in the Orb-weaver family Araneidae. The leaf retreat is at the web's hub. This spider has gathered pollen bundles dropped by trapped bees and was apparently eating them. Over the following hours one of the balls was seen to shrink in size and pollen was seen on the spider's chelicerae. Pollen is now thought to be an important part of the diet of many spider species. ♀ 12 mm ♂ 7 mm

Sac Spider ♀ Brisbane QLD PHOTO: ROBERT WHYTE. Inside this live leaf, the edges of which are pulled together and fastened with silk, is the retreat (or sac) of the Garden Sac Spider *Cheiracanthium* sp. in the family Eutichuridae. *Cheiracanthium* spp. are medium-sized spiders and very common, often dominating gardens.

Boomerangia dimidiata Half-sized Crab Spider ♀ Tabletop Swamp Litchfield NT PHOTO: GREG ANDERSON. This rather small Crab Spider makes its sac in a bent grass stem. ♀ 4 mm ♂ 2.5 mm

Xysticus albomaculatus Social Tharpyna colony, Brisbane QLD PHOTO: ROBERT WHYTE. This Crab Spider species makes a large many-chambered retreat for up to a 100 spiders by binding Acacia leaves together. ♀ 5 mm ♂ 3.5 mm

Theridiid sp. ♀ Hobart TAS PHOTO: GREG ANDERSON. One of many spiders in Theridiidae which curls a dead leaf to make a retreat. ♀ 6 mm ♂ 3 mm



Sidymella sp. ♀ Mount Colah NSW PHOTO: GREG ANDERSON. Many Crab Spiders in Thomisidae use leaves, seeming to prefer live green leaves, even the brown-coloured species. ♀ 5 mm ♂ 4 mm