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ASK A WILD DOLPHIN

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RAINFOREST MAMMAL CONNECTIONS

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SPIDERS: EXQUISITELY CAPTIVATING

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MOVEMENT

Follow the action to the heart of the story



COVER PHOTO

Photo © Tony Bartram

BOTTLENOSE DOLPHIN

(*Tursiops truncatus*)

From beggar to partner: this dolphin is now in the identification catalogue for a program based on the Kangaroo Island Dolphin Watch model. See pp 12-17 for more.

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A plucky chick adds a chapter to the work on endangered black-cockatoo species.



ROMANCING THE KNOWN:

*Caught
in the
allure
of the arachnids*



Photo © Dr Greg Anderson

Above: This north Queensland *Thwaitesia* seems to fit into a possible *Thwaitesia argentiopunctata* 'group', but the abdomen is not shaped like that of the south-east Queensland species.

Previous page: This stunningly patterned spider could be *Thwaitesia nigrinodosa*. Observed in south-east Queensland in dry rainforest merging with dry eucalypt forest, the highly reflective silver and gold markings on its 5mm body sparkle in sunlight; it makes a small tangled web in green vegetation.



Photo © Mark Crocker

Becoming a naturalist later in life changes you.

BY ROBERT WHYTE

How hard can it be to identify one or two apparently common spiders?

Becoming a naturalist in later life changes you. With the awe and wonder you felt as a child, you scoop up shrimps and water beetles in a jar. You peer through a microscope at intricate structures you never dreamed possible. You begin to see connections and networks all around. You notice the chirruping call of the eastern sedgefrog (*Litoria fallax*), the evocative odour of the small rainforest tree, smell of the bush (*Mallotus laoxyloides*), the bitter-tasting fruit of the quinine bush (*Petalostigma pubescens*) on your timid tongue, the startling red leaf and blue fruit of the blue quandong (*Elaeocarpus grandis*) and the abrasive rasp on your fingertips of the rough-leaved elm (*Aphananthe phillipinensis*). Rebuilding your sketchy skills in Greek and Latin, you come to know the meaning of the names and their places in the great Linnaean classification system. You feel as though you are at last making sense of life's rich tapestry.

Then you come to arachnids.

Arachnids are everywhere. Pre-dating insects, the group includes harvestmen, mites, ticks and scorpions. The best known are spiders, of course, and with good reason.



SPIDERS ARE THE MOST SUCCESSFUL TERRESTRIAL PREDATORS ON EARTH.

Photo © Robert Whyte

Above: Exquisitely marked but only 4mm long, this *Thwaitesia* species could easily be overlooked in dense foliage.

Below: Could this timid spider in dry rainforest merging to dry sclerophyll near a north Brisbane creek be *Thwaitesia argentiopunctata*?

The spin on spiders

Spiders are the most successful terrestrial predators on Earth. They occupy virtually every possible habitat niche. The British arachnologist W.S. Bristowe established that an English meadow in late summer could support a population of around five million spiders per hectare. The weight of insects consumed by English spiders each year easily exceeds the weight of the entire human population of England. They are everywhere. They occupy a vital place in the food web, and without them we would be literally drowning in insects.

So why are so many unknown?

Take a walk in a nearby bushland, or even in your own backyard. Take a close look at some dense foliage with a hand lens, checking under the leaves, in the flowers, along the stems. If you don't see an undescribed spider in 15 minutes, you're not trying.

A great deal of the arachnid fauna in Australia is what we call 'unknown to science'.

In other words, it has yet to be officially described.

Dr Robert Raven of the Queensland Museum believes only about a third of our spider fauna is known – and if you add in the mites and other lesser known groups, the amount of arachnid fauna known to science could be as little as 10 percent.

With modern digital cameras, magnifying lenses and super-macro settings, we can achieve marvels. A whole new world is opening up. But will we ever be able to convincingly put a name to a specimen?

Where to look

This is when you find out about the importance of spider genitals.

In the male, they are the palpal organs on the extremities of the pedipalps, the two appendages around the mouth. These develop into finely structured organs to transfer sperm to the female's epigyne. Her complicated organ has evolved to match his, or vice versa. The careful study of spider genitalia is our first line of inquiry when we get serious about spider identification.



Photo © Robert Whyte



SPIDER GUIDES

For the amateur, the difficulties of spider identification, even with known species, are great. The great exploratory works on Australian spiders were compiled by two Germans, beginning with L. Koch (1871–1881) and continued by Graf E. von Keyserling (1885–1890). Together they produced *Die Arachniden Australiens, nach der Natur beschrieben und abgebildet*, a work unsurpassed even to this day. Unfortunately the descriptions are not particularly useful for modern arachnology. They are reasonably detailed, in their now-archaic 19th century German, but do not concentrate on our current diagnostic details. The drawings, or figures, are excellent, but of course there are no colour photos.

In our opinion, the best field guide – the combination of Ramon Mascord's *Australian Spiders in Colour* (1970) and his *Spiders of Australia* (1980) – is remarkable, considering nothing as comprehensive has been done since. Yet the photos are small by today's standards and quite a few of the names have changed.

This sub-adult female could, when mature, develop the distinctive markings that would identify her as Thwaitesia nigronodosa.



Photo © Robert Whyte

Photo © Robert Whyte



Photo © Mark Crocker

Above: If you don't see an undescribed spider in 15 minutes, you're not trying. **Left:** The small (4–7mm) but distinctive Australian jewel spider (*Austracantha minax*), possibly the most photographed invertebrate in Australia, occurs throughout most of Australia in shrubby woodlands.

People already look at you oddly when you mention spiders. Try mentioning spiders' genitals.

Nonetheless you forge on. Until you get stumped. My own peak of exasperation turned out to be a remarkably pretty spider, common in Brisbane creekside dry rainforest. I had found this beautiful animal, both by day and by night, in good quality remnant rainforest along Enoggera Creek. But could I name it? Certainly it was a *Thwaitesia* species, but which one? There are very few photographs of this genus on the Web, in field guides or in spider picture books. Only two are known from Australia: *Thwaitesia nigronodosa* (named *Argyrodes nigronodosa* by arachnologist William Joseph Rainbow in 1912) and *T. argentiopunctata* (named *A. argentiopunctata* by Rainbow in 1916).

Luckily, taxonomy is a science solidly based in fact and all species must refer to an actual animal, a single specimen referred to as the holotype. In the late 1800s, in the days of the great German arachnologists Koch and Keyserling, preserved spiders were taken back to Hamburg and other European cities where these scientists were based. More recent holotypes collected by Australian scientists have mostly been kept in Australia. In the case of *Thwaitesia*, the material is at the Queensland Museum.

Hunting amongst holotypes

With my sparkling *Thwaitesia* specimens (I now had two) in glass vials in my pocket, I waved hello to Dr Owen Seeman, Collection Manager, as Assistant Collection Manager Wendy Hebron led me down the jam-packed halls to the compactus housing the holotypes.

There they all were, ordered by genus in alcohol-filled jars containing numerous specimens in vials. It is a peculiar feeling holding a holotype. These were the actual animals that Rainbow described, stored here for exactly this purpose, so that people could validate their identification.

In a perfect world, that is. Although alcohol at 70 percent is an excellent preservative, some colours, especially reds, greens and yellows, disappear rapidly. And over the years

the specimens, for one reason or another, may degrade.

Under Dr Raven's microscope, I discerned enough from the holotypes to make me feel confident in my tentative separation of the two species I had collected. Viewing some of the many hundreds of more recently collected *Thwaitesia* seemed to confirm my ideas.

In the absence of definitive documentary evidence, my hunch is that *Thwaitesia argentiopunctata* has two small hemispherical peaks (tubercles) on the rear high point of the upper abdomen, brown leg joints, a dark line or mark running all the way down the centre of the upper cephalothorax and black and gold colours on the upper abdomen with a silver blobby stripe, often fringed by red.

On the other hand, my feeling is that *Thwaitesia nigronodosa*'s abdomen has a single high peak, black leg joints (possibly giving the name *nigronodosa* which means black nodes, or joins), a dark line or mark running half the way down the centre of the upper cephalothorax and a black, silver and gold upper abdomen

From personal to publishable

Of course my personal conclusions, comforting as they might be, are not enough for science. Proper documentation and a truly convincing argument require detailed descriptions, measurements and new photographs of the holotypes, as well as photographs and drawings of fresh specimens. This needs to be published in a peer-reviewed, scientific journal. Entry to this world is not restricted, anyone can submit articles. But I am not there yet, and the learning curve is steep. So for the moment, all I have is a 'hunch'. While I develop the skills and knowledge necessary to write a paper revising these spiders, I have to accept the very real possibility that I may never know for sure exactly which *Thwaitesia* is which. The startling variation of a north Queensland specimen, photographed by my colleague and collaborator Dr Greg Anderson, makes the difficulty of identification painfully obvious. There may be as many as 10 *Thwaitesia* species in Australia when our largely unexplored rainforests and arid regions are fully investigated.

So there it stands. Invertebrates in general, and arachnids in particular, are object lessons in humility and acceptance. We are humbled by the staggering diversity and we simply have to accept that this world of the small – the engine room of ecosystems everywhere – is something we may never completely map, define or write down, even in our efforts to quench our burning desire to know.

But this shouldn't stop us trying.

ROBERT WHYTE is a Queensland-based writer, photographer and naturalist. He is director of Save Our Waterways Now, a community environmental organisation in Brisbane's Enoggera catchment (www.saveourwaterwaysnow.com.au). He and Dr Greg Anderson are working together on a field guide for Australian spiders (www.arachne.org.au).