

# Spiders of Ku-ring-gai Wildflower Garden

Helen Smith



Helen M. Smith  
Acting Technical Officer and  
Research Associate,  
Australian Museum Research  
Institute, Sydney  
helen.smith@austmus.gov.au

## Spider/animal taxonomy c.f. plant taxonomy

- Plant code is International Code of Nomenclature for algae, fungi, and plants (**ICN**)
- Animal code is International Code of Zoological Nomenclature (**ICZN**)
- There is another Code for Bacteria and other non-Eukaryotes

The Codes cover similar ground. The notable difference in everyday terms is in name endings of taxa above genus – these will be confusing if you are just getting used to plant families, subfamilies etc. but can be useful for working out where you are in a hierarchy.

Taxon level	Plants	Animals	
Family	-aceae	-idae	e.g. family Araneidae
Subfamily	-oideae	-inae	e.g. subfamily Araneinae
Tribe	-eae	-ini	(tribes are not so often used in spider taxonomy)

Rules for the formation of binomials, that is, genus and species Latinised names and their endings are basically the same. Personal names are much more accepted as species names, especially for invertebrates. Author names (and often date) are usually included the first time a taxon (genus or species) is mentioned in a text.

e.g. *Latrodectus hasseltii* Thorell, 1870; *Hadronyche versuta* (Rainbow, 1914)  
The parentheses around Rainbow 1914 indicate that the species was originally described in a different genus, in this case, *Atrax*.

## So what is a spider?

- Phylum Arthropoda: animals with jointed exoskeletons, e.g. beetles, crabs, millipedes, spiders (name literally means 'jointed legs').
- Class Arachnida: eight legs plus other appendages, one or two body parts.

### The arachnid groups found in KWG:

- Scorpions (Scorpionida) are the oldest extant arachnid group, dating back to the start of the Silurian period, c. 435 MYA.
- Acari: ticks and mites.
- Opiliones: harvestmen (confusingly, these are known as daddy long-legs in some parts of the world).
- Pseudoscorpiones.
- Order Araneae: two body parts, eight legs, two pedipalps, silk from spinnerets, e.g. funnel web spider, garden orb spider.



*Cercophonius squama*  
(Australian Museum)



Opilione (L. Levens)



Pseudoscorpion  
(Australian Museum)



*Hadronyche cerbera* ♀ (M.Gray)

## Age

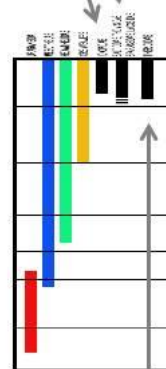
- **Uraraneida**: the first probable 'spiders' (or close relatives, now thought to be a separate Order) in the fossil record. Now extinct. The earliest fossil is from the mid Devonian c. 380 MYA. To compare with plant history, the first vascular plants appeared around the same time.
- **Mesothelae**, definitely spiders and still around today. Fossils of this group first appear from the late Carboniferous, just over 300 MYA.
- **Hexathelidae**, the family containing funnelweb spiders, dates back to c. 240 MYA in the Triassic.
- **Orb weaving** spider families are first known from around the start of the Cretaceous c. 140 MYA. Flowering plants evolved around the same time.
- Some families are more recent still, e.g. jumping spiders, wolf spiders. Brown trapdoor spiders (Idiopidae) are thought to be recent based on phylogeny, but lack fossil record.



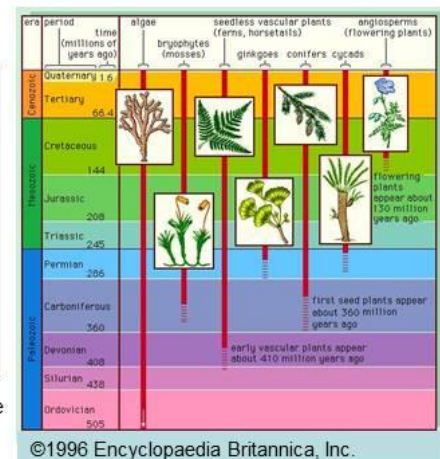
Mesothelae: *Liphistius desultor* ♀ in Malaysia (M.Gray)

Jumping, crab, wolf, huntsman spiders

Trapdoors



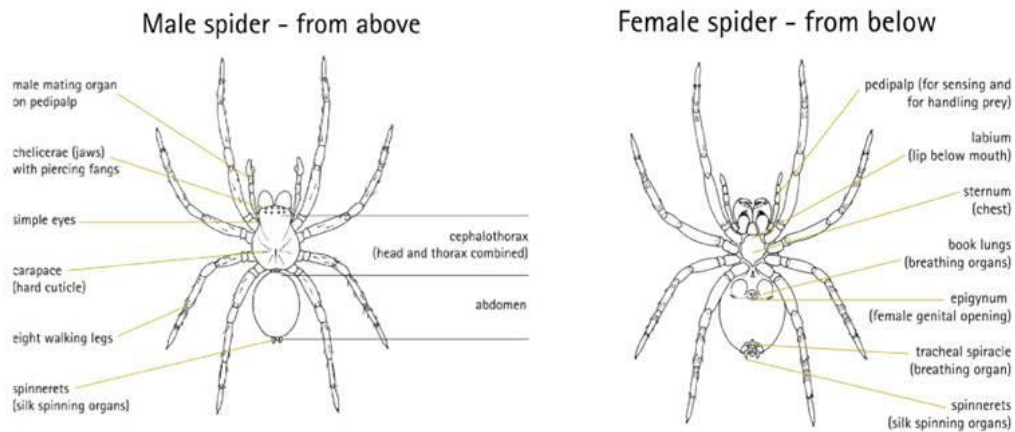
Theridiidae  
(e.g. redback)



©1996 Encyclopaedia Britannica, Inc.



## Spider anatomy and Identification



- Juvenile spiders often not identifiable to species, sometimes not to family.
- Male spiders have swollen pedipalp (mating organ) with structure on underside.
- Female spiders usually have genitalia (epigynum) visible on underside of abdomen.
- Eye pattern often helpful.
- Spider location and activity often useful clue for identification, e.g. in web (note web structure); running on ground; in burrow.

## Spider biology

- Life history: egg – larva – nymph – spiderling (emergence stage) – juvenile – adult; moult to reach next stage and may pass through several juvenile moults.
- Sexually dimorphic to a lesser or greater degree; typically males have different proportions to females – longer legs and smaller lighter bodies aids mobility for locating females.
- Most spiders are generalist predators but may discriminate on size, threat, chemical defences, movement.
- Spiders may have structural requirements for their homes and many have specific microhabitat requirements for one or more parts of the life cycle.
- Silk is made and used by all spiders.

### Uses of silk:

- Prey capture and wrapping: Several silk types in webs used for catching prey.
- Travel: dragline silk is used for dispersal, a safety line and local movement between bushes.
- Homes: burrows are silk lined for stability, for humidity control and for protection from some parasites and predators; silk lid may be used to close the burrow.
- Homes: many spiders use silk to form a retreat – a temporary or permanent shelter for periods of inactivity, e.g. moulting, egg laying, overnight.
- Reproduction: pheromone trails, sperm webs and covering for egg sacs.

## Spider Diversity

- World: 44,540 described species\* (2014); estimates vary for total fauna 2x to 5x, i.e. c. 89,000 – 222,700 spp.
- World: 112 families\* (although this is somewhat subject to discussion).
- Australia 2,800 described species, estimated 20,000 species\*\*.
- NSW? KWG?

Compare this with **vascular plants**\*\*\*

- World 281,621 described species, 368,050 spp. estimated.
- Australia 19,324 described species, 21,645 spp. estimated.
- Vascular flora in NSW: 6363 described spp. (1999).

\*<http://research.amnh.org/iz/spiders/catalog/>

\*\*<http://www.australasian-arachnology.org/identification/id-araneae/>

\*\*\*<http://www.anbg.gov.au/aust-veg/australian-flora-statistics.html>

### Spider families known to occur, or likely to occur, in KWG

#### **Mygalomorphs**

Actinopodidae  
Cyrtaucheniidae  
Dipluridae  
Hexathelidae\*  
Idiopidae\*  
Nemesiidae

#### **Araneomorphs**

Agelenidae  
Amaurobiidae  
Anapidae  
Araneidae\*  
Clubionidae\*  
Corinnidae\*  
Ctenidae  
Cycloctenidae  
Deinopidae\*  
Desidae\*  
Dictynidae  
Filistatidae

Gnaphosidae  
Gradungulidae  
Hahniidae\*  
Hersiliidae\*  
Lamponidae  
Linyphiidae\*  
Lycosidae\*  
Micropholcommatidae  
Mimetidae  
Miturgidae\*  
Mysmenidae  
Nephilidae\*  
Nicodamidae  
Oecobiidae  
Oonopidae\*  
Orsolobidae  
Oxyopidae\*  
Philodromidae\*  
(Pholcidae)  
Pisauridae  
Prodidomidae

Salticidae\*  
Segestriidae  
Selenopidae\*  
Sparassidae\*  
Stiphidiidae\*  
Tetragnathidae\*  
Theridiidae\*  
Theridiosomatidae  
Thomisidae\*  
Trochanteriidae  
Uloboridae\*  
Zodariidae  
Zoridae\*

\*definitely occur  
(observed/recorded/  
photographed)

## Mygalomorphs

### Identification:

- Two pairs of book lungs.
- Large, powerful chelicerae with stabbing fangs (fangs paraxial).
- Paired sigillae (muscle attachment points) on sternum.
- Pedipalps long and leg-like.

### Habitat and biology:

- Australian mygalomorphs are burrow-dwellers – in ground, rocks or trees. Line burrow with silk, some make a trapdoor.
- Most mygalomorph species have limited dispersal abilities c.f. many araneomorphs.
- Spiderlings may live in the mother's burrow for some time until they disperse to establish their own burrows.
- Juveniles take several years to mature.

### Mature males:

- cease moulting and live a year or so;
- wander at the appropriate mating season in search of females.

### Mature females:

- are usually sedentary – hunt from entrance to burrow;
- can continue to moult and can live for many years (maybe 30);
- need to mate after every moult as entire cuticle is shed, including genital tracts;
- construct a silken egg case within the burrow.



Mygalomorph ♂ ventral view (above); trapdoors on burrows (below) (M.Gray)

### Actinopodidae: mouse spiders.

Terminal section of spinnerets short conical; labium much longer than wide; eye group wide. *Missulena bradleyi* is local species. Only known Australian mygalomorphs to disperse by ballooning. Venom potentially dangerous, treat as for FWS.

**Idiopidae:** brown trapdoor spiders. Terminal section of spinnerets short conical; labium about as wide as long, or wider, without cuspules; eyes grouped. Golden hairs on carapace. Males usually have modified leg 1. Burrows with or without trapdoor, often in more open situations than Sydney FWS. Several species, all similar appearance in genus *Misgolas*; other genera less commonly seen.



*Missulena bradleyi* ♂ left, ♀ right (M.Gray)



*Misgolas* sp. ♂ left, ♀ right (M.Gray)



**Hexathelidae:** funnel web spiders. Terminal section of longest spinnerets long and finger-like; eyes grouped; labium about as wide as long, or wider, with cuspules. Two or three species locally. *Atrax robustus* (Sydney FWS) burrows in ground usually under rocks, logs etc. Male note pointed spur leg 2. *Hadronyche cerberea* (Southern tree FWS) burrows in trees, either in rot holes or in deep bark (e.g. some *Melaleuca*). Note leg 2 modified but no spur. Female FWS below – see carapace in profile to identify genus, *Atrax* low, *Hadronyche* higher. Blue Mountains FWS, *H. versuta* may also occur here, burrows in old rotten tree stumps/logs on ground. Female FWS can live 20 years. All bites potentially dangerous, but male SFWS far more venomous to humans than female. FWS do not jump but can be surprisingly agile.



*Atrax robustus* ♂ above, ♀ top right, *Hadronyche cerberea* ♀ right (M.Gray)



*Hadronyche cerberea*. ♂ above; burrow entrances in tree right (M.Gray)

### Identifying funnel web spiders from trapdoor spiders



Males of *Misgolas* sp. (left), *Atrax robustus* (centre), *Hadronyche cerberea* (right)

- Trapdoor spiders: brown, hairy, **golden hairs on carapace**, males with large 'boxing glove' palps and modified **leg 1** (arrow).
- FWS blackish, legs sparsely haired, **carapace glossy**, males with thin palps and modified **leg 2** (arrow).



Burrow of *Misgolas* sp. (M.Gray)

← Trapdoor spider burrow: often in an open situation; no triplines.

FWS burrow: → usually in sheltered situation; often with radiating triplines.



Burrow of *A. robustus* (M.Gray)



## Araneomorphs

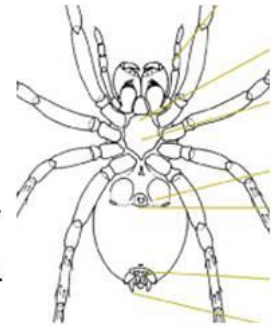
Compared to Mygalomorphs, Araneomorphs are much more varied in morphology, behaviour and in details of life history.

### Identification:

- Usually one pair of book lungs.
- Chelicerae with opposing fangs (fangs diaxial).
- Sternum smooth or with protrusions (no sigillae).
- Pedipalps short in females, sometimes extremely complex in males.

### Habitat and biology:

- Great diversity of foraging strategies and range of habitat utilisation.
- Greater diversity of silk types c.f. mygalomorphs.
- Usually no further complete moults once adult in either sex.
- Life cycles can be short (several generations in one year) or long, taking one to several years to become adult then some may survive several years.
- Males are sometimes dwarf (or females giants) or males can be as big or bigger than females.
- Small spiders can disperse by ballooning – used by spiderlings of many groups and adults of some, e.g. money spiders (Linyphiidae).



### Web makers

Several kinds of silk used for catching surface of webs.

Sticky silk is used by many orb weaving spiders and related groups, such as Theridiidae (inc. redback).



Sticky silk strands with glue droplets (M.Gray)



*Argiope keyserlingi* ♀ (W.Grimm)



*Eriophora transmarina* ♀ (W.Grimm)

**Araneidae:** orb weaving spiders. Orb web with spiral of sticky silk. Many araneids recycle silk proteins by ingesting the old web. *Argiope keyserlingi* (St Andrews cross spider) is distinctively banded and commonly seen by day; *Eriophora transmarina* (garden orb spider) often hides away to one side of the web through the day. Two unrelated species of leaf curling spiders mature at different times: '*Araneus*' *dimidiatus* in early summer, *Phonognatha graeffei* in late summer and autumn; they have different web architecture.



*Phonognatha graeffei* web (D.Hain), ♀ (inset, M.Gray)



*Araneus dimidiatus* ♀ (H.Smith)



(web makers)

**Nephilidae:** golden orb weavers. Web structure (and colour) is diagnostic for the genus. Two common and quite similar species in Sydney, *Nephila plumipes* is most common near the coast and in moister areas. Separate the species by the sternum – with prominent knob in *N. plumipes*, no knob in *N. edulis*. *Nephila* males are much smaller than females and often cohabit in the female's web.

Smaller kelp-toparasitic spiders (*Argyrodes* spp.) are also frequent residents.

**Tetragnathidae.** *Tetragnatha*, (long-jawed spiders) have an elongate body and legs; male (and sometimes female) chelicerae are elongate and modified. May be camouflaged in web, spiders lie outstretched, resembling a piece of bark in the web, or lie along a dead twig. *Tetragnatha demissa* is a common smallish species favouring dead twigs, other species are commonly seen in webs over water or other damp habitats. *Leucauge* sp. (silver orb spider) makes a sloping web in bushes and over low vegetation.

*Nephila* web (below, H. Smith) ♂ ♀ (right, M.Gray)



*Tetragnatha* spp. (left and centre); *Leucauge* sp. (right) (H.Smith)

(web makers)

**Theridiidae:** comb-footed spiders. Tangle webs and gum-footed webs (e.g. *Latrodectus hasselti*, the redback) are characteristic of the family, sometimes with a sheet (*Parasteatoda mundula*) and often with a silk retreat. Many unnamed genera and species in Australia – one of the last major families needing extensive revision. *Cryptachaea gigantipes*, common under rock overhangs and picnic tables, was often confused with an introduced species. Many species are tiny.



*Latrodectus hasselti* ♀ (above) ♂ (right) (M.Gray); remains of meals in redback web (H.Smith)



*Parasteatoda mundula*, web (left, H.Smith), ♀ (above, M.Gray)



Tangle web of *Theridion theridioides* (left), *Cryptachaea gigantipes* ♀ (centre), *Theridion* sp. (right) (H.Smith)



(web makers)

**Linyphiidae:** money spiders (UK). Small spiders that make little hammock webs among foliage. Many species are widely distributed due to the ability of adult spiders to disperse by ballooning. Some male linyphiids have bizarre head modifications.



*Diplocephalus cristatus* ♂ (above); Linyphiid spider (arrow) in hammock web (above right) (H.Smith)

**Stiphidiidae:** no common name.

Stiphidiids do not use sticky silk.

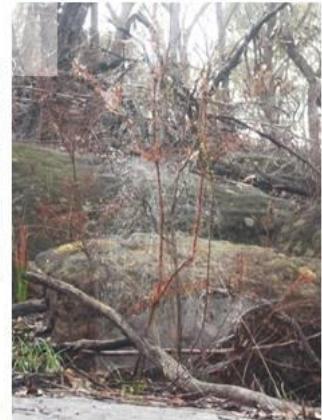
Some stiphidiid species use cribellate silk (see below) but two common species likely to be noticed in KWG do not.

Both make sheet webs:

*Stiphidion facetum* makes distinctive “sombbrero” webs under rock overhangs or in tree hollows; *Corasoides australis* makes platform webs – almost invisible except on a misty morning. The platform is a suspended sheet that leads into a burrow. Above the sheet a tangle of knockdown lines may extend a metre upwards.



*Stiphidion facetum* (left, M.Gray), and web (below, H.Smith); *Corasoides australis* (bottom right, M.Gray), *C. australis* webs (above and right (H.Smith))



(web makers)

Cribellate silk is formed from many fine strands combed to fluff up and catches by entangling; cribellate webs usually have a bluish tinge.



Cribellate silk strand (MG)



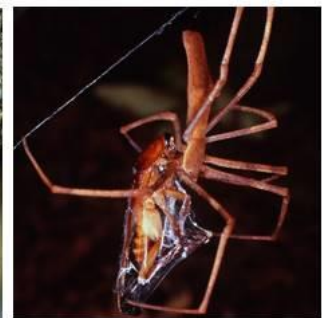
*Menneus* sp. ♂ (above) ♀ right (W.Grimm)



**Deinopidae:** net casting spiders.

Huge forward facing eyes characterise *Deinopis*, the most frequently seen. *Menneus*, the only other genus in the family, lacks such enlarged eyes. The deinopid net-like web is made from stretchy cribellate silk.

Spiders hunt suspended from a frame of lines, holding the web ready above a marked spot. When potential prey crosses the mark, the spider swoops and envelopes the prey.



*Deinopis subrufa* ♀ (left, W.Grimm), close up of eyes (centre, M.Gray), with prey (right, D.Hain)

*Deinopis* web, hung up for later use (H.Smith)





(web makers)

**Desidae:** lace web spiders. Most commonly seen are the black house spider, *Badumna insignis* and its sister species, *B. longinqua*. The former is most commonly seen on tree bark (or around windows) the latter in webs on foliage. Prey can be caught at any time but web maintenance is at night. Lace webs are made from cribellate silk; the pattern degenerates to a messy tangle in the old parts of the web but the zig-zag structure can usually be seen in new or rebuilt areas.

**Uloboridae:** cribellate orb weaving spiders. Uloboridae is the only family to have lost venom glands. Webs often include decorations; webs are not recycled and can become very tatty. *Philoponella* is a common genus; webs may be aggregated.



*Badumna insignis* ♂ (above left, M.Gray); typical lace web structure (above, M.Gray); *Badumna* web on bark (left, H.Smith)



*Philoponella* spp. webs and spiders (H.Smith)

### Hunters on foliage

**Araneidae:** *Arkys*, "orb weaving" species that do not make webs. For some spiders relying on camouflage, variation is the key to survival. The spiders in the top two rows are probably all the same species, *Arkys curtulus*, the bird dropping spider. Some other *Arkys* spp. also resemble bird dung and also vary in colour; *Arkys lancearius*, triangular spider, hides beneath leaves by day but is more active at night.

**Clubionidae:** sac spiders. *Clubiona* and *Cheiracanthium* (sometimes placed in Miturgidae) use silk retreats under bark or leaves; spiders hunt mostly by night. Eyes are spaced evenly across the anterior carapace.



*Arkys curtulus* ♀♀ (top row H.Smith, second row W.Grimm)



Clubionid eye pattern, anterior view

*Clubiona* sp ♀ (M.Gray)



*Arkys lancearius* (left) and *A. alatus* (right) (W.Grimm)



(hunters on foliage)

**Oxyopidae:** lynx spiders. Spiny legs and distinctive eye pattern; can move rapidly by jumping and running. Hunt on leaves and flowers and can be very common.



*Oxyopes* spp. Eyes (left and above), in hunting posture (right) (W.Grimm); *O. elegans* (far right, M.Gray)

**Salticidae:** jumping spiders. Distinctive eye pattern with large, forward facing eyes that can focus and traverse. Often sexually dimorphic, can be difficult to match males and females. Active diurnal hunters, most hide at night in a silk retreat; some hang head down on a silk line from a twig.



*Helpis minitabunda* ♂ (left, J.Otto), ♀ or j (centre, W.Grimm); *Simaethula* sp. ?♂, right (W.Grimm)



Salticid eye pattern, anterior view



*Opisthoncus* sp. ♀ (left, W.Grimm); *Ligonipes* sp. (above, J.Otto)

(hunters on foliage)

**(Salticidae cont.):** Peacock spiders, genus *Maratus*, are one of the best known spider groups in KWG. Local resident, Jürgen Otto, has worked on this group and posted many videos (some taken here) on YouTube. Iridescent males display to much drabber females on low shrubs, and fallen twigs. Most species are only a few millimetres in length and can be difficult to spot despite bright colours. *Maratus plumosus* was described in 2012 from specimens found in KWG.

*Maratus amabilis* ♂ (left), *M. splendens* ♂ (right, J.Otto)



*M. plumosus* (bottom two rows), ♂♂ (above), ♀ (left), subadult ♂ (right) (J.Otto)





(hunters on foliage)  
Hunters on bark and rocks

**Thomisidae:** crab spiders/flower spiders. Legs 1 and 2 longest, distinctive stance.

Thomisids are sit-in-wait predators, sometimes seen feeding on relatively large prey items such as butterflies. Prey is pierced but not crushed or wrapped in silk, so the discarded corpse may look intact. Some species are able to change colour according to environment. Insect eyes sensitive in UV range, spider colour may be attractive to prey despite being obvious to human eyes.



*Diaea evanida* ♀ (left), *Sidymella* spp. ?j (centre) ♂ (right) (W.Grimm)



*Thomisus* sp. (left), *Tmarus cineraceus* (right) (W.Grimm)



*Stephanopsis* spp. (J.Otto)



(hunters on bark and rocks)

**Hersiliidae:** two-tailed spiders or rotating spiders. Two long spinnerets distinguish from other fast moving spiders of similar habitat. *Tamopsis* spp. spiders are well camouflaged; small (c. 5mm diameter) round, white, stalked egg sacs are distinctive. The name 'rotating spider' derives from method of prey capture – wrapping prey by running around it very fast.

**Lamponidae:** white-tailed spiders. *Lampona* spp. sometimes enter houses in search of prey, natural habitat is rough or loose bark on trees, and rocks. Prey on other spiders, especially black house spiders, *Badumna*. *Lampona* bite can cause a localised reaction but no evidence was found for damaging necrotic infections, sometimes attributed to these spiders.



*Tamopsis* sp. (above, H.Smith), ♀ completing egg sac (above right, D.Hain).



*Lampona murina* ♀ (right), ♂ (far right) (M.Gray). *Lampona* hunting (below) and frequent outcome (below right) M.Gray.





(hunters on bark and rocks)

**Sparassidae:** huntsman spiders. Several genera likely in KWG. Eyes spread across anterior carapace; flattened appearance. Mostly nocturnal, may be seen on beams or behind outdoor items by day. Preyed on by orange spider wasp, *Cryptocheilus bicolor* (Pompilidae); comatose spiders are dragged to a nest burrow by female wasp.

Female huntsmen guard their cushion-shaped egg sacs until spiderlings emerge and moult. Loose bark, rock crevices and large leaf bases are typical habitats.



*Isopeda* sp. (above, D.Hain), *Holconia immanis* ♂ (above right, M.Gray). *Neosparassus* sp. ♀ (right, M.Gray). Orange spider wasp with *Isopeda* (below left, W.Grimm), *Heteropoda* sp. ♀ (below centre, W.Grimm), *Pediana regina* (below right) G.Anderson).



*Hunters on the ground*

**Corinnidae:** sun spiders. Fast moving and sun-loving, *Supunna picta* and *S. funerea* most common. Colour pattern distinctive, yellow front legs of the former distinguish between the two species. Some other less noticeable species are ant mimics. *Supunna* dash around in open areas or weave through leaf litter.

**Lycosidae:** wolf spiders. Characteristic eye arrangement. Larger wolf spider species are nocturnal, some smaller species are diurnal. Females most noticeable as they carry their whiteish egg sac attached to the spinnerets. Later, females carry spiderlings on their backs. Many wolf spiders use burrows, some construct extremely well camouflaged trapdoors.



*Supunna picta* ♂ (above), *S. funerea* ♀ (above right) (W.Grimm).



Lycosid eye pattern, anterior view

*Tasmanicosa* sp. (right, M.Gray); *Venatrix* sp. ♀ with spiderlings on board (centre far right) (J.Otto); *Hoggicosa* sp. ♀ with eye shine (below far right, not a Sydney species, D.Clyne)





(hunters on the ground)

**Nicodamidae:** red and black spiders. Colour distinctive. Females and juvenile males may be found in small webs in leaf litter; adult males wander, sometimes in considerable numbers.

**Zodariidae:** ant spiders. Eye arrangement is characteristic. Day or night active; many species feed on ants and some are ant mimics.



Nicodamids, ♂ (above, M.Gray), ♀ (above right, W.Grimm).



Zodariid eye pattern, anterior view



*Storosa* sp. (left, W.Grimm); Zodariidae sp. ♀ with ant prey (above, J.Otto); *Habronestes bradleyi* ♂ (right, W.Grimm),

## Spider Resources

- [www.arachne.org.au](http://www.arachne.org.au): photographs and information; arranged by family.
- World Spider Catalog: <http://research.amnh.org/iz/spiders/catalog/>: the list of accepted species names and references that is followed by most spider researchers.
- Australasian Arachnology Society: <http://www.australasian-arachnology.org/>: Australasian information and news; can subscribe to paper issue for non internet users – contact **Volker W. Framenau**, Phoenix Environmental Sciences, 1/511 Wanneroo Road, Balcatta, Western Australia 6021.
- <http://australianmuseum.net.au/document/Original-Web2spider-guide>
- <http://australianmuseum.net.au/document/Web2spider-supplement/>

Keep a watch for two new spider books, due out in 2014/2015 [one is based on information at Arachne.org.au]

**Many thanks to Dennis Collins, the Australian Museum and photographers:**

Greg Anderson, Densy Clyne, Mike Gray\*, Wendy Grimm, David Hain\*, Laura Levens (under Creative Commons Licence 3.0), Jürgen Otto (from Flickr under Creative Commons Licence 2.0; *M. plumosus* female from Otto & Hill 2013

\* Photographs copyright Australian Museum

Creative Commons licences: <https://creativecommons.org/licenses/>

Helen Smith; corrected for APS website 5.vi.2014