

Web2Spider

Introduction

Web2Spider is a scientific tool kit to monitor spider diversity in the local environment by observing web types.

This toolkit consists of:

- three dichotomous keys
- three identification tables explaining the characteristics of 19 orb webs and 13 non-orb webs and the spiders that commonly make them
- tally sheet
- glossary

Web2Spider is suitable for children 6 years and over.

Aims

Web2Spider aims to:

- increase understanding of and interest in spider diversity in your surroundings.
- provide a resource to collect data and monitor spider diversity and behaviour.

Spider diversity

Invertebrates make up over 95% of animal species, and many ecologists consider invertebrate diversity to be an important indicator of ecosystem health. Spiders are invertebrate predators and are a vital part of invertebrate diversity. Australia has a unique spider fauna, with about 12% of the world's described species and almost two-thirds of known spider families being found here. There are many species still waiting to be named, and estimates for the diversity of Australian spiders range from around 7,000 to 20,000 species in total.

Often, it is difficult and time consuming to identify spiders themselves, but the web-building species give us another way. Ecologists studying ecosystems sometimes use the wide variety of web designs made by different spiders as a method for comparing spider diversity between sites.

This Web2Spider for children is adapted from a tool developed for Citizen Scientists to monitor the effects of habitat changes such as revegetation projects. The original version is available [here](#).

Acknowledgements

Web2Spider (W2S) is based on the research and data made available by the BugWise Outreach team: John Gollan, Matthew Bulbert, and Helen Smith.

The BugWise Outreach project was sponsored by Coal and Allied Community Trust. W2S wishes to acknowledge Prof Barbara York Main for permission to adapt and use her web illustrations in the identification tables (W11, W12, W19, W21, W22, W24, W28).

W2S for children was originally adapted by Sue Lewis, Education Officer, Science Communication.

Further information can be found at australian.museum/bugwise

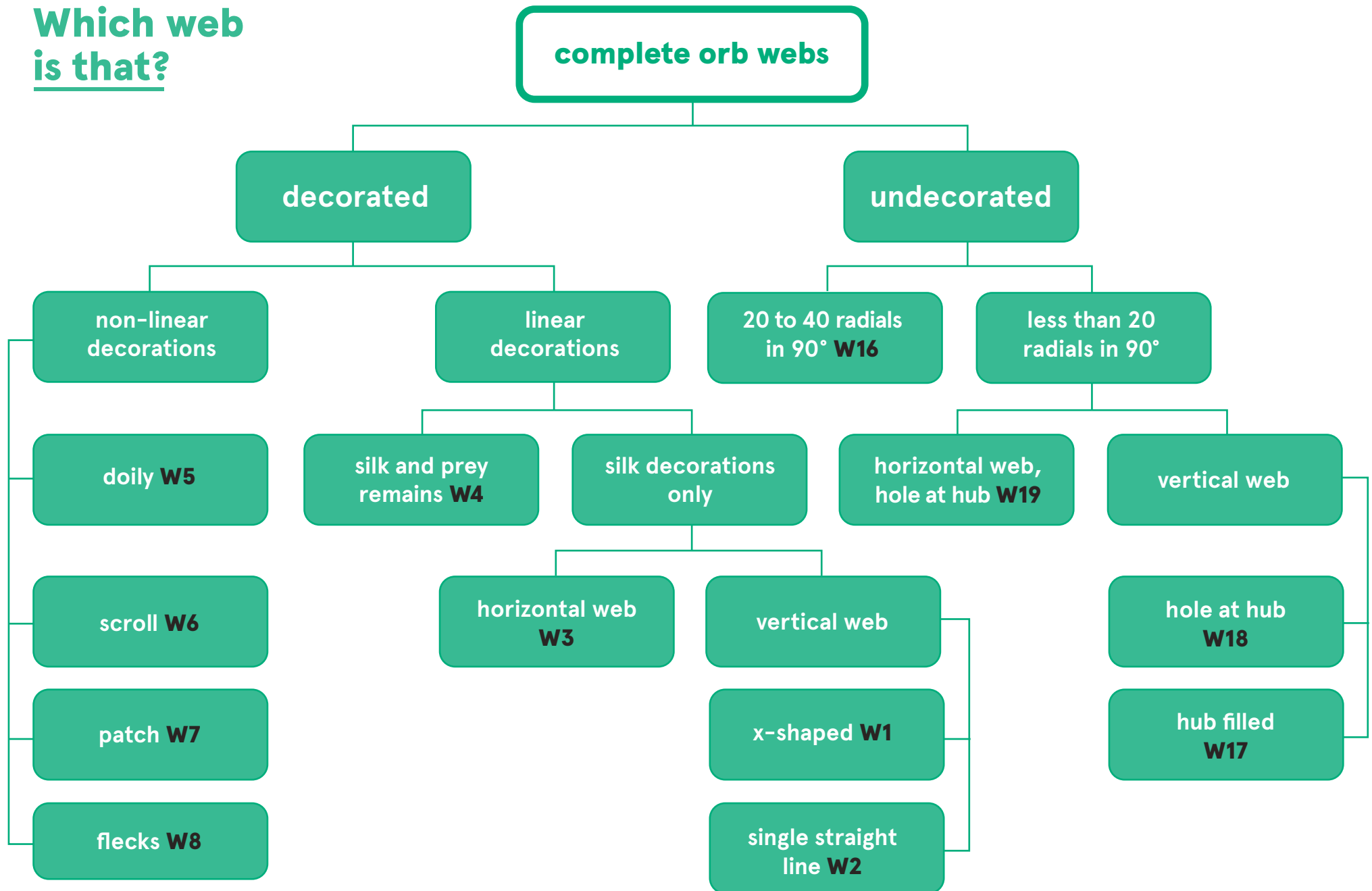


How to use the Web2Spider toolkit

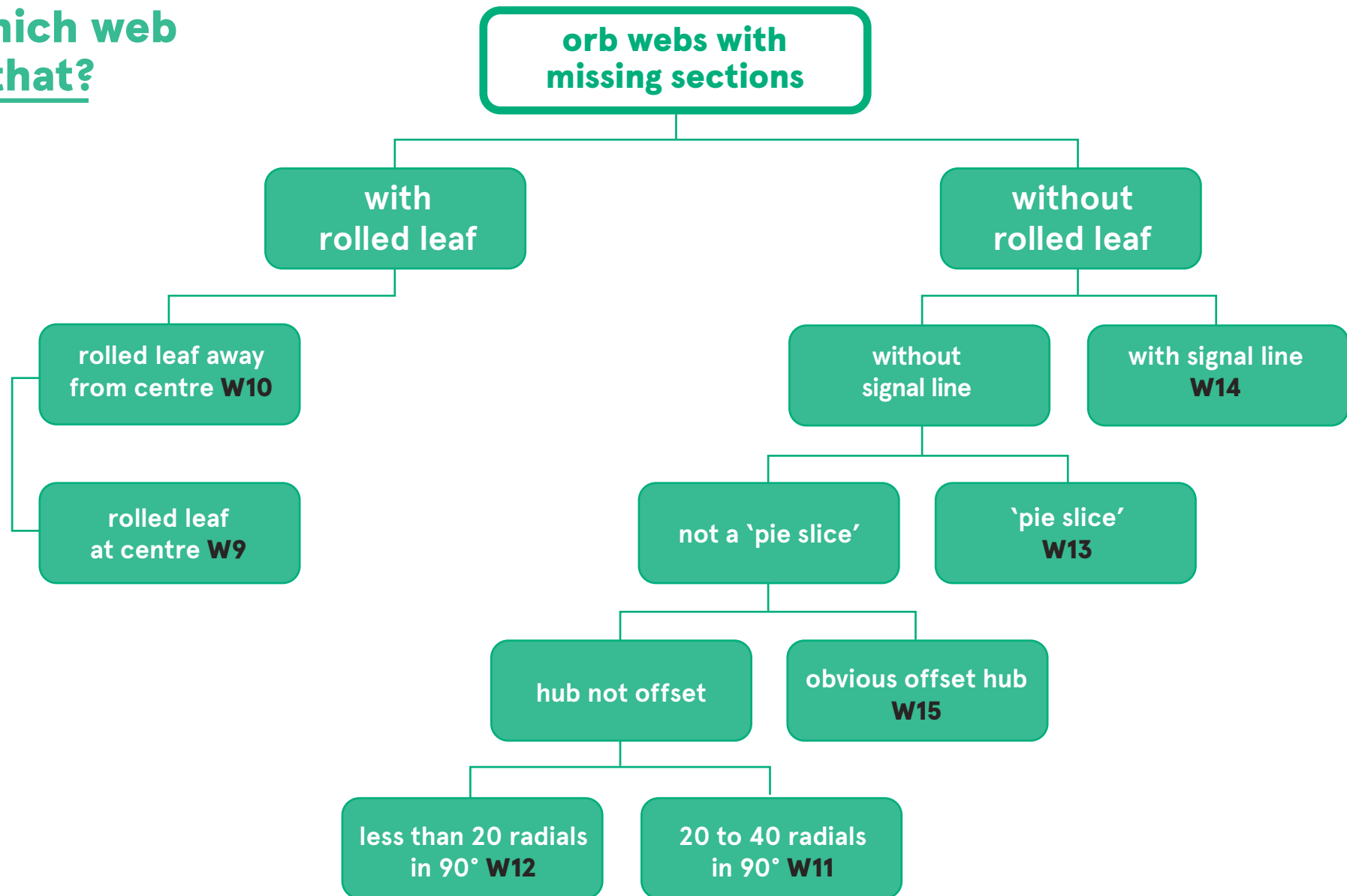
1. Locate web
2. Spray web with a fine water mist from approx. 30 cm using a spray bottle
3. Identify whether the web is a
 - a. Complete orb web, or
 - b. Orb web with missing sections, or
 - c. Other web (not an orb web)
4. Choose the appropriate dichotomous key to identify web type e.g. W8
5. Choose appropriate identification table to identify spider
6. Record web type using the tally sheet



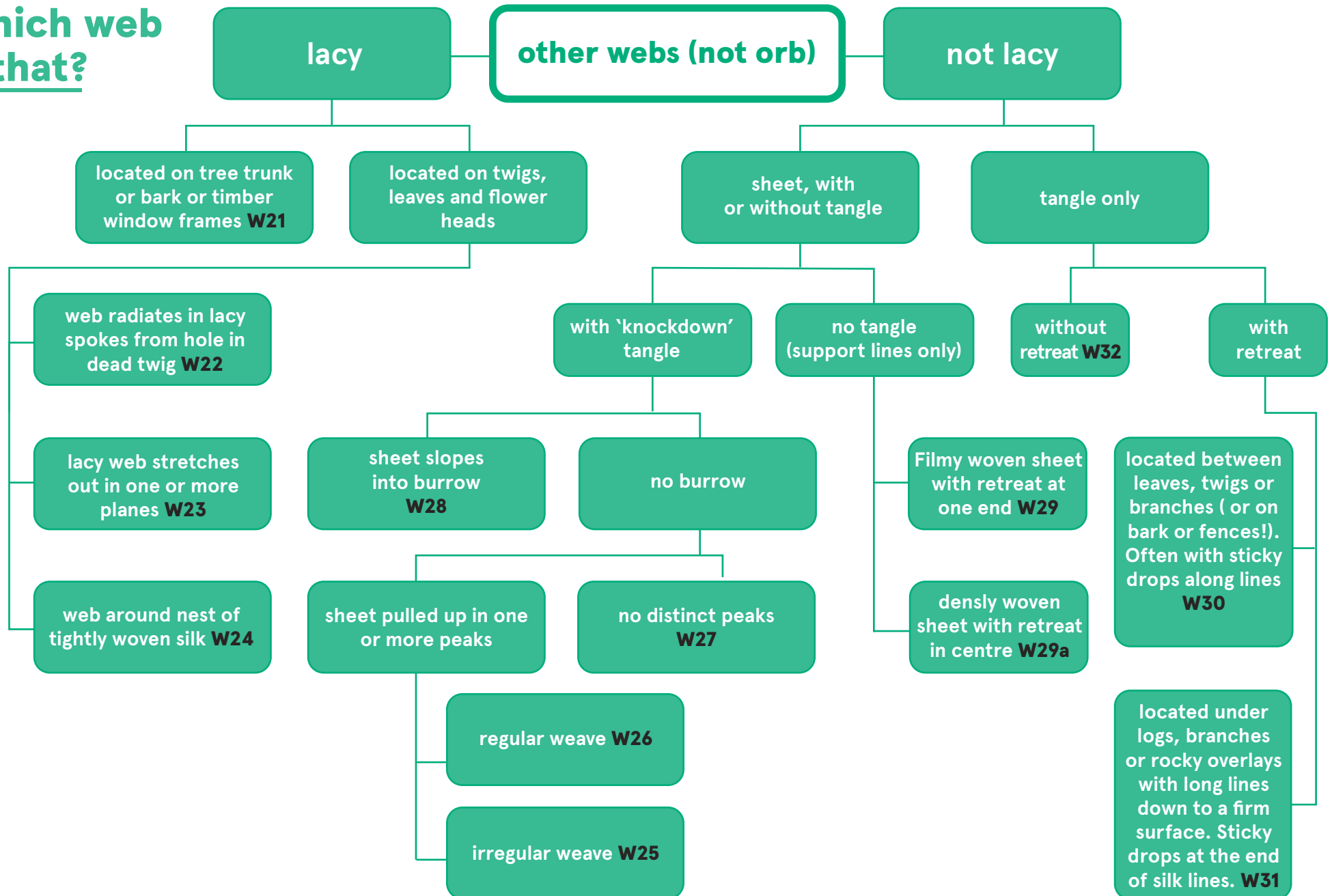
Which web is that?



Which web is that?



Which web is that?

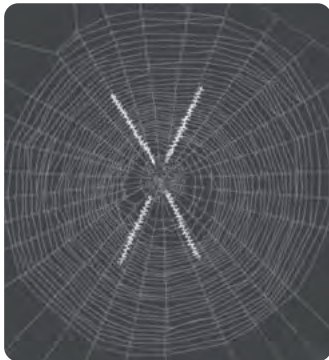


Complete orb webs

web type & size (diameter)

W1

5–30 cm



descriptors

- **Vertical** web with an **X**, or **part of an X**.
- The spider is at the hub, **head down**.
- Spiders rest with **front and rear legs paired up** forming an “X”.
- When web is in **shade**, the full **X** is less likely to be present.

examples of spiders from Sydney region

St Andrew’s cross spider

Argiope keyserlingi



W2

5–30 cm



- **Vertical** web with **line up and down**.
- The spider is at the web hub by day, **head down**.
- The decoration may only be very fine.

Grass orb weavers

Plebs spp.; *Argiope protensa*



web type & size (diameter)

W3

10–30 cm



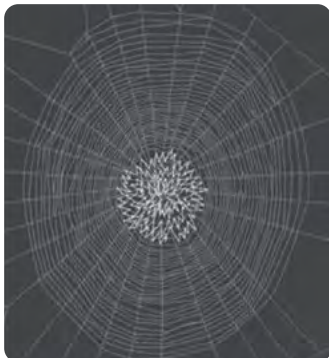
W4

15–40 cm



W5

5–30 cm



descriptors

- Extra decorations such as silk spots or flecks can be found anywhere on web.
- Silk may seem **floppy, soft** and often **messy**.
- Webs are made from combed rather than sticky silk, and sometimes have partially destroyed web still attached.
- Spiders are usually active in the web by day, **head down** at hub.
- May have an **offset hub**.
- There is a **barrier web present**.

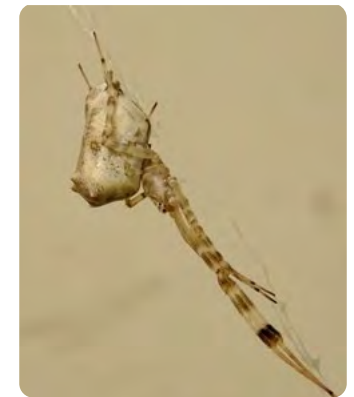
- Decoration is a line of debris and egg sacs **joined with silk**.
- Decoration is woven to the web surface.
- Spider is camouflaged at web **hub**.

- Decoration of silk only, in compact **doily**.
- Young St Andrew's cross switch from making a doily to an X at a leg span of about 1cm.

examples of spiders from Sydney region

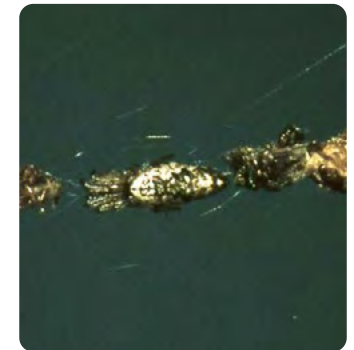
Hackle-band orb weavers

Philoponella spp.



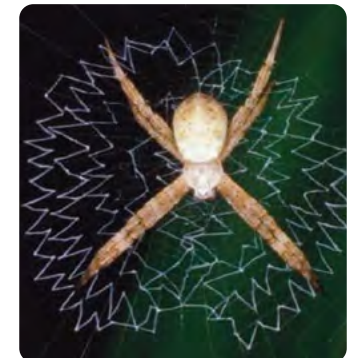
Decorating orb weavers

Cyclosa spp.



Young St Andrew's cross spider

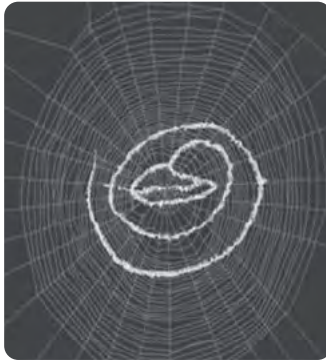
Argiope keyserlingi



web type & size (diameter)

W6

5–30 cm



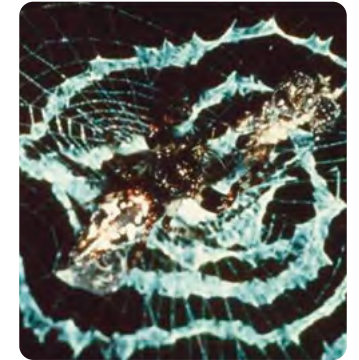
descriptors

- Decoration of silk only, in meandering "S" or **scroll**.
- Spider is **camouflaged** at the **hub**.
- Some species attach egg sacs to twigs nearby.

examples of spiders from Sydney region

Decorating orb weavers

Cyclosa spp.



W7

15–40 cm

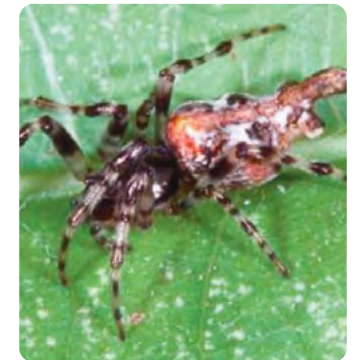


- **Messy patch of silk and debris.**
- Decorated patch maybe the start of a much larger area or line of debris.

(may be a variant of W4 or W6; more research needed)

Decorating orb weavers

Cyclosa spp.



W8

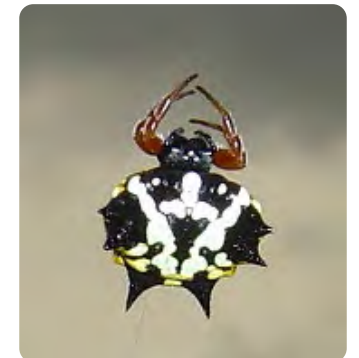
15–40 cm



- Silk **flecks**, often on support lines; may also have silk patches on web.
- **Strong webs** in open situations.
- Spider is black, white and yellow, although proportion of colours varies.
- Spiders often form colonies and occupy webs by day.

6-spined or Christmas spider

Austracantha minax



Missing sector & offset orb webs

web type & size (diameter)

W9

15–30 cm



W10

15–30 cm



descriptors

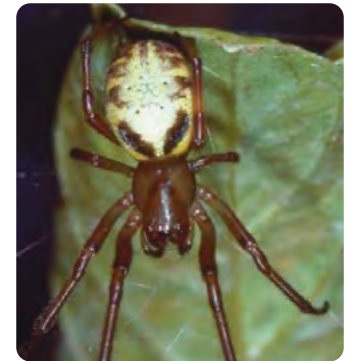
- Leaf opens at web **centre**.
- Leaf suspended in a tangle of lines – **barrier web**.
- Web **hub** emerges from open end of leaf.
- Spider hides in leaf during day, often **head down** with legs protruding from entrance of **retreat** (leaf).

- Leaf **away** from centre and attached to web's top support line
- Web **hub** is quite separate from leaf.
- **No tangle above web**.
- Spider hides in leaf (**retreat**) during day, **head upwards** and darkly pigmented posterior of **abdomen** used as **plug**.

examples of spiders from Sydney region

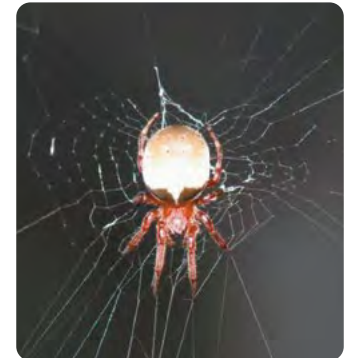
Leaf-curling spider

Phonognatha graeffei



Leaf-curling spider

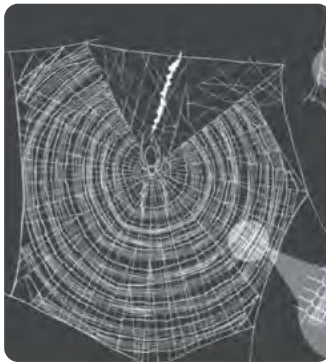
"*Araneus*" *dimidiatus*



web type & size (diameter)

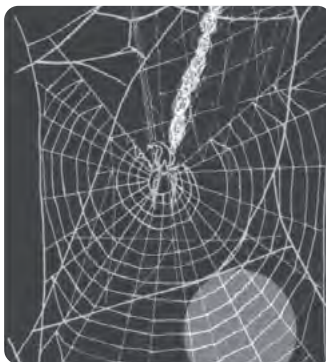
W11

15–50 cm



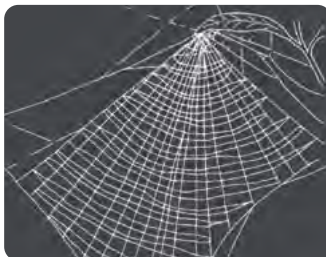
W12

20–40 cm



W13

5–30 cm



descriptors

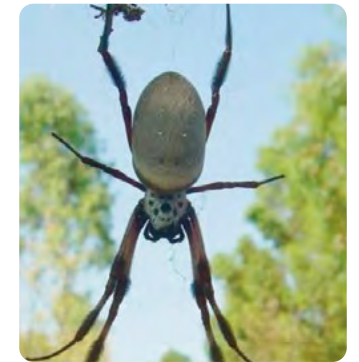
- Many radial lines, **20 to 40** in 90°.
- Debris may be present on separate line.
- Web silk **often golden yellow**.
- Spider is at hub by day, **head down**.
- Small males may be present in the same web.
- Tangle of lines create a **barrier web**.
- Tiny kleptoparasites may also be present.

- Web is **sloping**.
- Radial lines **less numerous**, less than **20–40** in a 90° section.
- Fluffy egg sacs may be present in a line through missing sector into web centre.
- Large young females are sometimes brightly coloured with yellow and red, but at maturity, become fawn coloured which matches the debris and egg sacs which they later add to the web.
- By day, spider camouflaged in centre, head down slope.
- Barrier web often present.

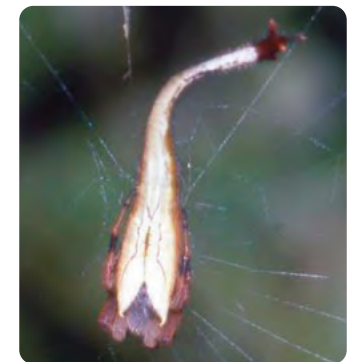
- Web may be a “pie slice” and **vertical**.
- **Retreat** is a living leaf, a small curled leaf, other debris or just a cone of silk.
- The web is slowly changed into the adult shape (W9).

examples of spiders from Sydney region

Golden orb spiders
Trichonephila spp.



Scorpion-tailed spider
Arachnura higginsi



Young leaf-curling spider
Phonognatha graeffei



web type & size (diameter)

W14

5–30 cm



descriptors

- A fine **signal line** to tangled retreat in plant.
- Signal line is often hard to spot – this kind of web is often given away by the tangle around the retreat.
- Sometimes catching spirals pass through the “missing sector” close to the edge of the web.
- Spider is alerted to prey by **vibrations** along the signal line which leads to the retreat.

examples of spiders from Sydney region

Signal-line spider

*“Araneus”
albotriangularis*



W15

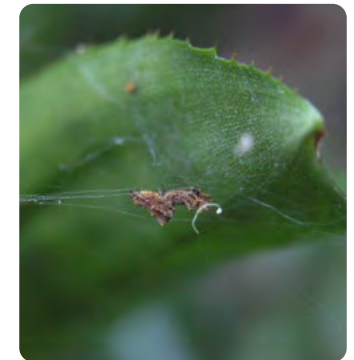
5–10 cm



- **Offset orb**, web more or less **horizontal**.
- **Hub obviously** offset, often hidden under a leaf or attached to a twig.
- A **tangle of lines** is often present near the hub.
- Webs are made from **combed silk** rather than sticky silk.
- Spiders are usually near the web **hub by day** but may look like a piece of debris.
- Resting pose is characteristic with **front legs folded under**.

Hackle-band orb weavers

Philoponella spp.



W16

5–15 cm



- **Many radial lines**, 20–40 in a 90° section.
- Web may be distinctly oval.
- The catching surface of the orb can be difficult to find in a tangle of **barrier** lines.
- The web form is slowly changed to the adult shape. (W11)
- Spiders may be very common in spring and summer.

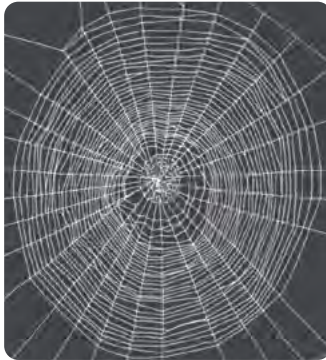
Young (juvenile)
golden orb spiders

Trichonephila spp.



web type & size (diameter)

W17 5–30 cm



descriptors

- Web **hub filled in**; radial lines **less than 20** in 90° section.
- Web **slightly sloping** or **vertical**.
- **Juveniles** of **many orb weavers** make this web.
- Signal-line weavers occasionally make an **entire web** when the retreat is away from the surface of the web, so that the signal line does not interfere with the catching spirals.
- Many decorated orb weaving spiders make a plain orb, especially in shady locations.

examples of spiders from Sydney region

Plebs spp. (see W2);
Argiope spp. (see W1, W5); *Cyclosa* spp. (see W4, W6, W7); signal-line spider (see W14); “*Eriophora*” spp. (see W18)

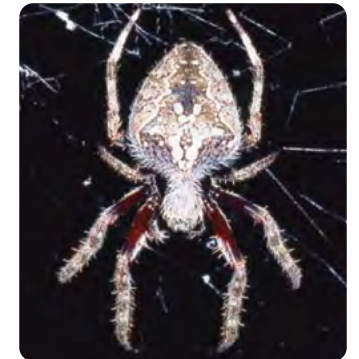


W18 20–90 cm



- **Vertical** or **slightly sloping** web, usually less than 30°. Less than 20 radials in 90°.
- **Hole at hub**. Adult “*Eriophora*” spp. (garden orb spiders) make **huge wheel-like webs**.
- Spiders usually hide away from web by day and remake the web in the evening.
- *Backobourkia heroine* make smaller webs lower down in understorey or shrubby vegetation.

Garden orb spiders
Eriophora spp.
Backobourkia
heroine



web type & size (diameter)

W19
5-30 cm



descriptors

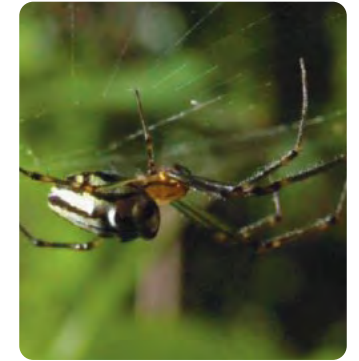
- **Horizontal** or **strongly sloping** web, slope usually more than 30°.
- Tetragnatha have elongated jaws, body and legs. If in the web by day they have **head up-slope**, otherwise they often hide with their **legs extended along** a twig or **like a piece of bark** in the web.
- The abdomen of Leucauge is silver, with black and yellow; these spiders are always in their web during the day, **head down-slope**.
- **Barrier web** may be present.

examples of spiders from Sydney region

Long-jawed spiders

Tetragnatha spp;
Silver orb spider

Leucauge
dromedaria



Other webs: lace, sheet & tangle

web type & size (diameter)

W21

10–30 cm



descriptors

- Lacy web found on **tree trunks or bark**.
- “**Funnel-like**” **entrance** leads to a retreat.
- Old silk is matted and coarse, and lace degenerates to an irregular pattern.

examples of spiders from Sydney region

Black house or
Window spiders
Badumna insignis,
B. longinqua



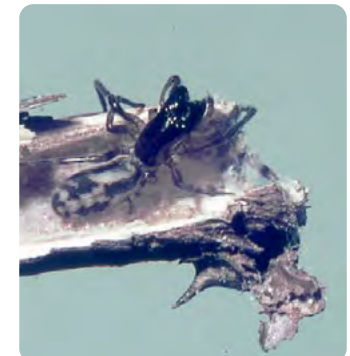
W22

5–15 cm



- **Web radiates from hole** in dead twig.
- Found among twigs, leaves and flower heads.
- Lacy radial spokes.

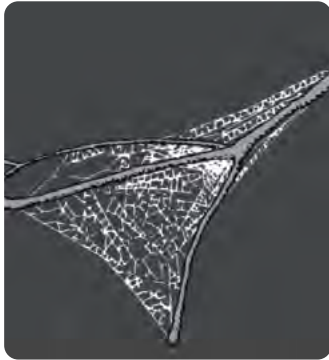
Twig spiders
Paramatachia spp.



web type & size (diameter)

W23

5–20 cm



descriptors

- Found among twigs, leaves and flower heads.
- **Lacy surfaces stretch out** in one or more planes.
- Silk retreat may be visible.

examples of spiders from Sydney region

Black house spider and relatives

Badumna spp.



W24

15–40 cm



- Found among twigs, leaves and flower heads.
- Surrounds a large or small **nest made from leaves or debris** woven tightly with silk.

Communal foliage webbing spider

Phryganoporus candidus



W25

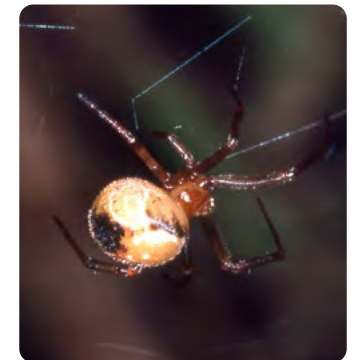
5–15 cm



- **Sheet** pulled up in **one or more peaks**.
- **Leaf or detritus retreat** suspended in lines above sheet.
- **Irregularly woven sheet**, very light and filmy.

Comb-footed platform spider

Parasteatoda mundula and relatives



web type & size (diameter)

W26

5–25 cm



descriptors

- **Sheet** pulled up in one or more **peaks**
- **Leaf/detritus retreat** suspended in lines above sheet.
- **Regular radial weave** (finely meshed, look closely!)
- Several spiders may make webs close together with many connecting lines.

examples of spiders from Sydney region

Tent web spider

Cyrtophora parnasia



W27

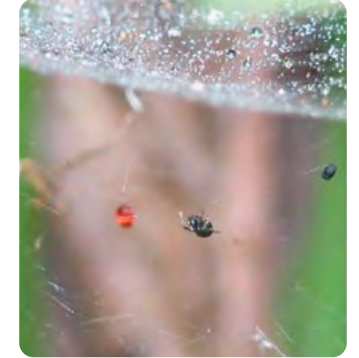
5–15 cm



- **No distinct peaks** in sheet (may be small peaks where knockdown lines attach).
- No retreat
- Small sheets or hammocks in low vegetation.
- Knockdown tangle above or below sheet.

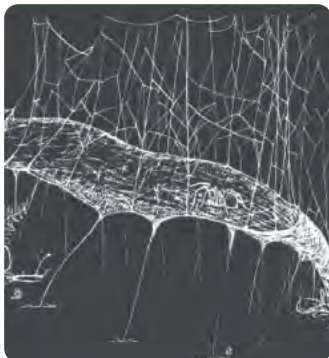
Money spiders

Family Linyphiidae



W28

10–100 cm



- **Platform** web with **fine knockdown** tangle above sheet.
- Sheet slopes down into a **retreat burrow**.
- Retreat is usually a burrow in the ground, but maybe into a wood crevice or grass tussock.

Platform spider

Corasoides australis



web type & size (diameter)

W29

10–40 cm



descriptors

- **Filmy sloping sheet** slopes down from retreat.
- Retreat **opens below** sheet and spider runs upside down on sheet.
- **Retreat** often in rotting wood or under bark, sometimes in an earthen embankment.
- Web roughly triangular or trapezoid.

examples of spiders from Sydney region

Platform spiders
Family Stiphidiidae;
Cupboard spider
Steatoda spp.



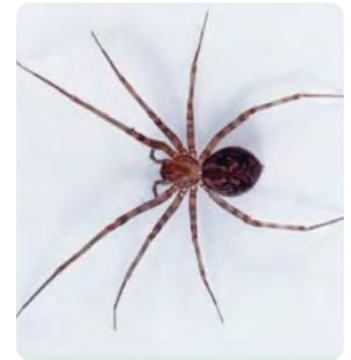
W29a

5–15 cm



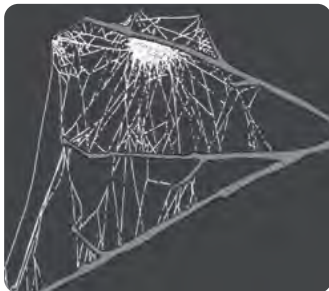
- Densely woven sheet with **broad funnel** to substrate.
- Found on rock faces or underside of logs.
- **Retreat in centre** of sheet.
- Funnel often closed by sheet.

Crinoline or
Sombrero spider
Stiphidion facetum



W30

5–10 cm



- Tangle webs **with silk retreat**; retreat may be tight silk or untidy mess, usually densely woven.
- Web between **leaves, twigs or branches**.
- Long lines of theridiid web often have evenly spaced sticky droplets
- Spider is usually in or near retreat, upside down.

Comb-footed spiders
Theridion theridioides
and relatives;
"Achaearanea" spp.



web type & size (diameter)

W31
15-100 cm

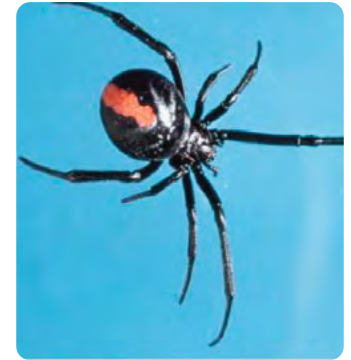


descriptors

- **Tangle webs** with **long lines** which always go down to **firm surface** (e.g. ground/log).
- **Retreat** in dense tangle, thimble shaped, usually under shelter.
- Sticky droplets **near end** of long lines only. The long lines are the catching points – crawling animals get stuck to the sticky droplets and the elasticity of the long lines takes prey upwards when they break.
- The retreat may be of thickly tangled silk and often contains egg sacs, as well as spider, which hangs upside down.

examples of spiders from Sydney region

Redback spider
Latrodectus hasseltii;
Comb-footed spiders
Cryptachaea spp.;
Cupboard spiders
Steatoda spp.



W32
5-10 cm



- **Tangle web without a silk retreat.**
- Spindle or asterisk-shaped egg sac may be suspended in the tangle.
- Sticky droplets on lines present or absent.
- Theridiids will usually be present in a catching web.

Cobweb or Neon spiders
Theridion spp.



Glossary

A barrier web

Also known as a labyrinth, a barrier web is a haphazard series of silk lines in front of and/or behind an orb web. These are thought to help deter and detect predators. The lines may also help to disorient flying prey, making them more likely to fly into the orb, which is the catching part of the web.

Catching surface

The area of an orb web that is covered by spirals or switchbacks of sticky, stretchy silk. In missing sector webs, the missing sector is defined by not having this catching surface, although a tangle of lines may fill the gap.

Debris

Debris refers to the remains of the spider's meals and sometimes small scraps of leaves and bark that are incorporated into webs and retreats. Some spiders join these bits in a line and hang it from the web, whereas others attach it to the surface of the web using conspicuous white silk. Retreats may also be made from, or incorporate, debris.

Decorations

Decorations are silk patterns, or sometimes the silk-wrapped remains of the spider's meals (debris), which are woven onto the surface of the orb web. If examined closely the silk patterns often zigzag.

Fan

Indicating the shape of a hand fan. Extending out from a central point

Hammock

What we have termed here a hammock web is a sheet web that is suspended like a trampoline or circus safety net. The main supports and stabilising lines are around the edge and below the sheet and the centre is lower than the edges. There is often a tangle below the sheet where the spider waits for prey.

Horizontal

See orientation.

Hub

The hub is the central area of an orb web. This is typically an irregularly woven area where the radial support lines meet and are joined together. Some spiders eat away part of this area when they have finished making the sticky spiral.

Knockdown web

A knockdown web is a tangle of lines above or below a sheet web which disorients or intercepts flying insects so they land or fall onto the sheet. Like barrier webs, knockdown webs probably also serve a protective function by preventing predators such as wasps from easily flying in.

Lace webs

Lace webs do not contain sticky silk, instead they capture prey by snagging. Each line is composed of many tiny fibres which are combed to produce an entangling fuzzy thread, rather like a fluffed out strand of wool or cotton. The web is constructed in a characteristic pattern of ladder-like sections with zigzag steps. New regions show this clearly, but as the web ages, this structure decomposes, and sometimes new layers are laid over the old. Eventually the structure of old areas of the web appears as a jumble of different-sized squares, rectangles and circles.

Nest

A nest can be considered as a glorified retreat. Here we are specifically referring to the densely woven home of a particular kind of spider. These are often solitary, in which case the nest may be small, but sometimes they live communally, and the large nest may contain up to one hundred or more spiders.

Orientation

Orientation: vertical, horizontal or sloping. These are all terms used to describe how an orb web is positioned. Using a bicycle wheel as a model, 'vertical' would refer to the normal orientation with the bicycle held upright ready for use. 'Horizontal' would apply if the bicycle were lying on its side, or 'sloping' if it were angled from being leant against a low wall or post.

Glossary

Platform webs

Platform webs are a kind of sheet web. The sheet is gently to steeply sloping up and out from the spider's retreat, which is in a silk-lined burrow. The sheet is pulled taut into a smooth surface, which the spider runs on. This is the platform. Above the platform is a maze of knockdown lines.

Radials

Radials are the silk lines that radiate from the centre of an orb web to the outer frame or support lines like the spokes of a wheel. They are the framework on which the catching spiral is laid.

Retreat

A retreat is a hideaway where the owner of the web may be lurking. This is typically a dead, curled leaf; a hole in a dead twig; or pieces of debris joined to form a tube, which is bound with silk. Sometimes the retreat is just a denser area of silk lines woven into a tunnel, which is usually against a twig or leaf. Often there is a protective tangle of lines around the retreat area, which can make it look like a separate web.

Sector

Sector: if you think of the radial lines that go from the centre of an orb web to the frame as being like the spokes of a wheel, then the area between each spoke is a sector (like a pie slice). 'Missing sectors' might be filled in with a tangle, but there are rarely any catching spirals through them. The catching spirals either form a U-turn to either side or end abruptly.

Sheet

A sheet is a closely woven mesh of non-sticky silk lines. Sheet webs can be simply connected to the adjacent substrate, e.g. vegetation etc., or associated with a tangle of vertical or haphazardly orientated lines. The sheet part can be seen as a distinct flat or curving surface among the supporting lines. Dew, or a fine spray of water droplets, shows a sheet up clearly.

Signal line

A signal line allows the spider to hide away from an orb web in relative safety, whilst allowing it to monitor the web in case prey flies in. The signal line is usually attached in the hub area at one end and can be followed to the spider's retreat at the other. One leg of the spider can often be seen resting on the line.

Silk

Silk is composed of thin, strong protein fibres. Silks are produced by a number of invertebrates, including caterpillars such as the 'silkworm' and spiders. Whereas the caterpillars and other insects mostly use silk to make a nest or a cocoon, spiders have adapted silk for all kinds of purposes. These include the covering for egg sacs, for making secure retreats and, of course making webs. Spider silk is spun from the spinnerets, on the tip of the spider's abdomen. Several different kinds are made, including combed fluffy silk (cribellate silk) which is used in lace webs, strong non-sticky threads like those that support orb webs and the sticky silk that is coated with viscous droplets and makes up the catching spiral on many orb webs.

Sloping

See orientation.

Spirals

Spirals form the catching surface of a typical orb web. Sometimes there is literally one continuous spiral from the outer edge of the web into the hub. In other webs there may be breaks, or the catching thread may reverse direction once or many times. In most orb webs the spirals are made of sticky silk that is coated in glue-like droplets. A few kinds of orb webs have catching silk of a different nature (cribellate silk). This cannot be as highly tensioned as sticky silk, and so these webs often appear untidy and 'floppy'.

Tangle

A tangle is a more-or-less unstructured and haphazard collection of silk lines without other features like an orb or a sheet. As a guide, we have defined a simple tangle web as anything over five lines in roughly a 10 x 10 x 10 cm area. When tangles are a part of a different web type they usually have a special name; for example, a system of haphazard lines placed on either side of an orb or below it is usually called a 'labyrinth' or 'barrier web' and a similar tangle above a sheet web is often called a 'knockdown web'.

Vertical

See orientation.

Tally sheet

Names:

Location:

Habitat description:

e.g. grasses, bushes, trees, tree canopy, large trees, dead trees

web type	1st survey	2nd survey	3rd survey	4th survey
	Date: _____ Time: _____	Date: _____ Time: _____	Date: _____ Time: _____	Date: _____ Time: _____
	Weather conditions: _____	Weather conditions: _____	Weather conditions: _____	Weather conditions: _____
W1				
W2				
W3				
W4				
W5				
W6				
W7				
W8				
W9				
W10				
W11				
W12				
W13				
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W22				
W23				
W24				
W25				
W26				
W27				
W28				
W29				
W29a				
W30				
W31				
W32				