



BugWise Web2Spider

A tool for monitoring the diversity of web-building spiders



The Web2Spider Guide was created by Helen Smith, John Gollan, Matthew Bulbert.

All illustrations were prepared by Helen Smith. Illustrations labelled with “adapted from Main, 1976” were modified from:

“Main, Barbara York (1976). *Spiders*, Collins (The Australian Naturalist Library), Sydney.”

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Images on the title page were provided by Matthew Bulbert, John Gollan and David Hain

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Scope of the document:

The *BugWise Web2Spider* method has been prepared by Australian Museum staff who work on spider behaviour, taxonomy and ecology. The method's underlying assumption is that the number and different types of spider webs are closely linked to the number and diversity of web-building spiders. *Web2Spider* method has been designed so that: (1) users do not need an expert knowledge of spider identification; (2) specialised equipment is not required; and (3) it is more cost effective than traditional collecting techniques. The method can be easily modified and applied to meet any number of project objectives and/or educational aims. The current version of the *Web2Spider* method has largely been developed and tested in riparian habitats in the Upper Hunter Valley, New South Wales. The guide will also be useful in other areas and habitats, particularly in south-eastern Australia.

Also supplied with the *Web2Spider* guide is a glossary of terms and an example datasheet for recording data. The separate *Web2Spider Supplement* contains notes about the common spider species that make the web types identified in the guide. A DVD demonstrating the *Web2Spider* method is also available by emailing us at the address below. The DVD chapters provide suggestions for how to carry out web surveys, information on the various web-types, worked examples and some tips to prepare you for overcoming potential problems.

If you wish to comment on *Web2Spider* please visit our site at www.bugwise.net.au and either email us or post a comment on the forum.

On the website, you will also find detailed information about spiders and their role in the environment via links on the BugWise resources page.

Happy Hunting!
The BugWise Team



BugWise

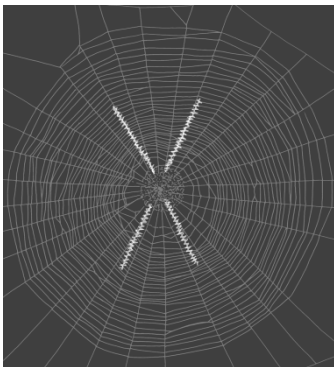
Web2Spider

A tool for monitoring the diversity of web-building spiders

WEB KEY – START HERE

Choice A. Orb web: the main web is wheel-like, or part of a wheel...

.....Go to **page 2**



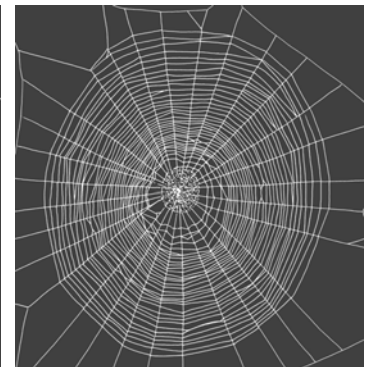
(p. 3)



(p. 5)



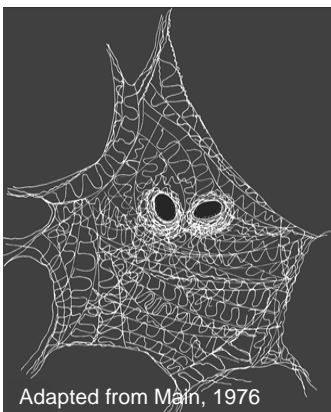
(p. 6)



(p. 7)

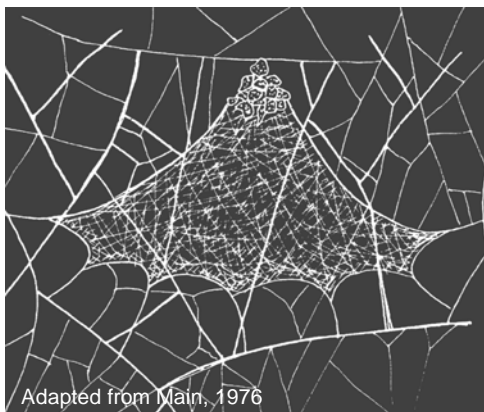
or

Choice B. Other webs: are not wheel-like..Go to **page 8**



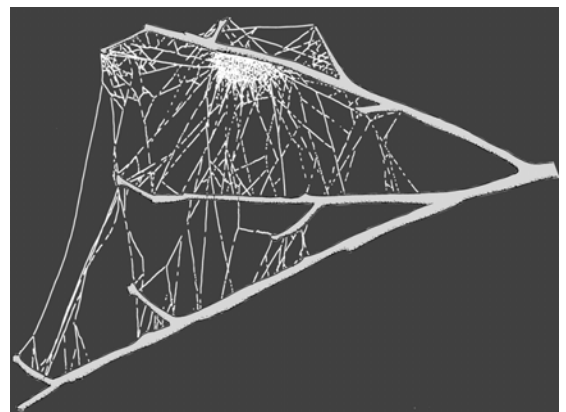
Adapted from Main, 1976

(p. 9)



Adapted from Main, 1976

(p. 10)



(p. 12)

A. Orb webs

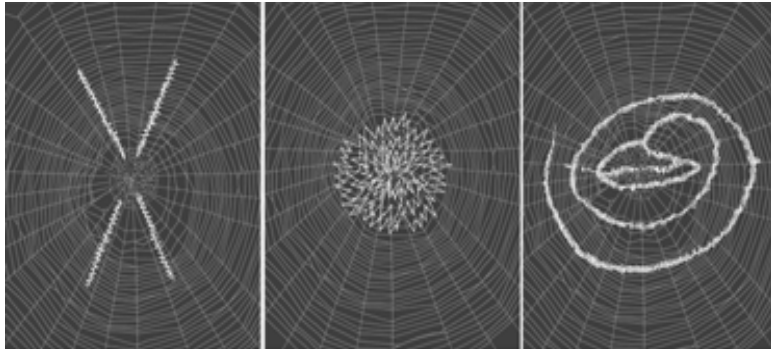
2

A1. DECORATED ORBS

- **Silk patterns** or **debris** woven **onto** web catching surface or **flecks** on support lines



Go to page 3

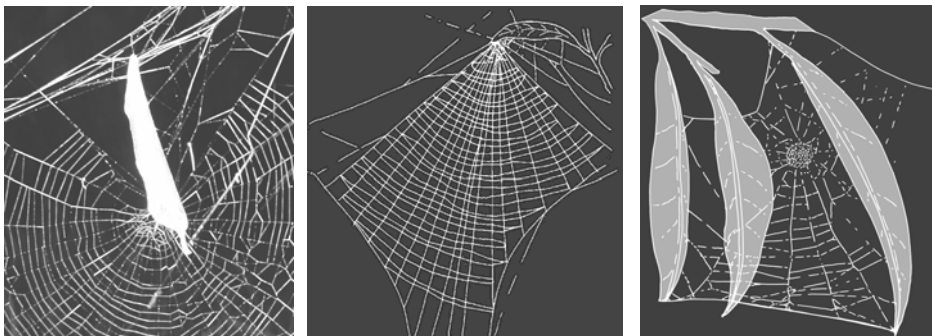


A2. MISSING SECTOR & OFFSET ORBS

- **Incomplete** circle, or **hub** markedly **off centre**
- Missing sector narrow or most of the web
- Any objects are not attached to the catching surface



Go to page 5

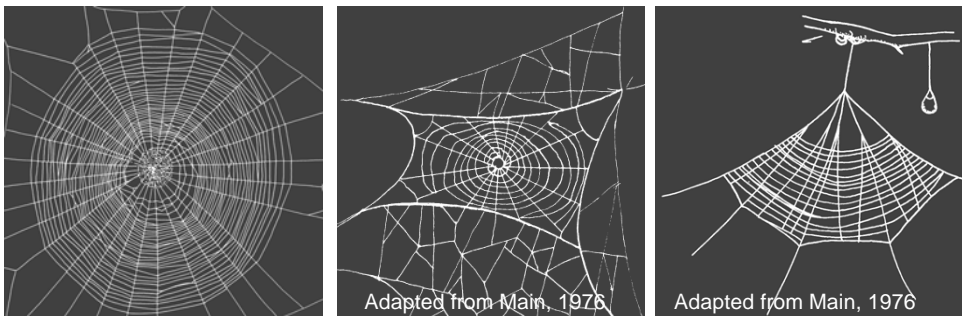


A3. PLAIN ORBS

- **Complete circle or oval**, **hub** often **centrally placed**
- No patterns or loose objects woven into web



Go to page 7

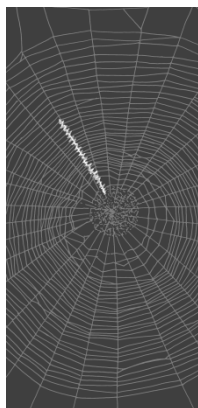
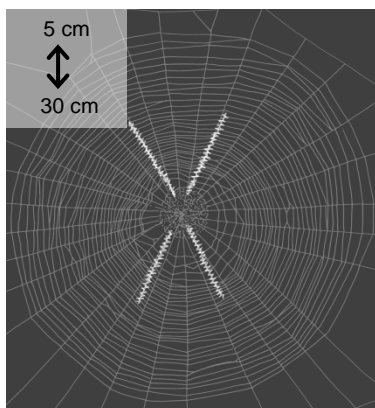


A1. DECORATED ORBS

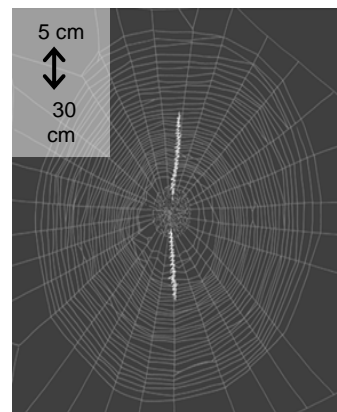
Decoration forms one or more straight lines

Decoration of **silk only**

W1 Vertical web with an “X” or part of an “X”.

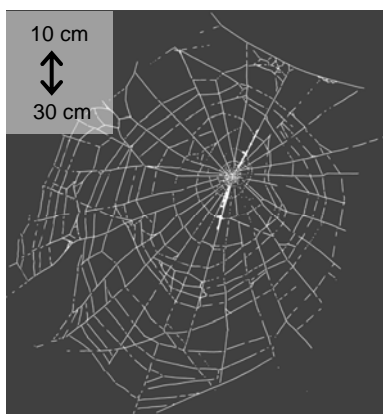


W2 Vertical web with **line up and down**



Webs usually tidy and taut (unless damaged)

W3 Sloping or horizontal web, hub may be offset



Barrier web often present

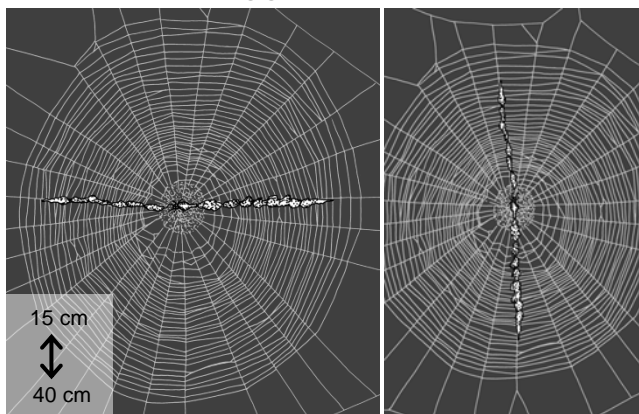
Extra decorations such as silk spots or flecks can be found anywhere on the web including the barrier web

Web silk may seem floppy and soft

Sometimes rather untidy web built onto remains of an earlier web

Decoration of **silk and remains of prey**

W4 Line of debris and egg sacs



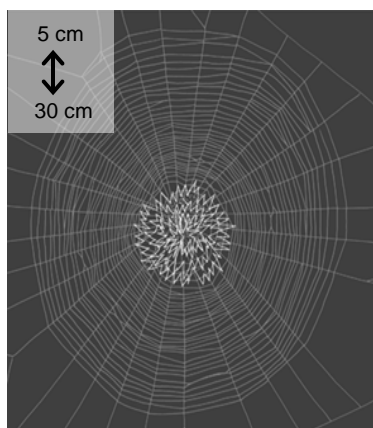
Silked bundles of prey debris are joined together and woven to the web surface

More decorated orbs on next page

A1. DECORATED ORBS (continued)

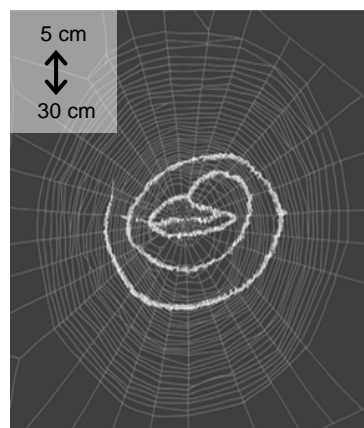
Decorations in various shapes
(all webs more or less vertical)

W5 Compact “doily”

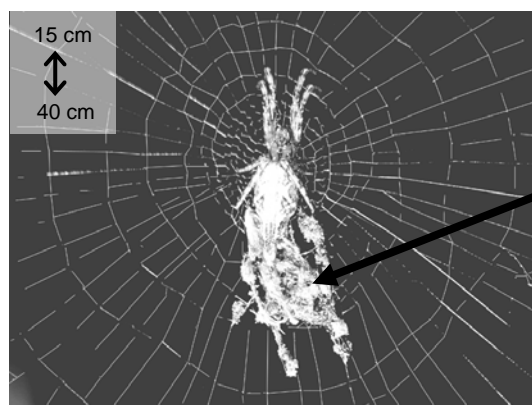


Decorations of silk only in W5. Often debris at centre of W6

W6 Meandering “S” or scroll

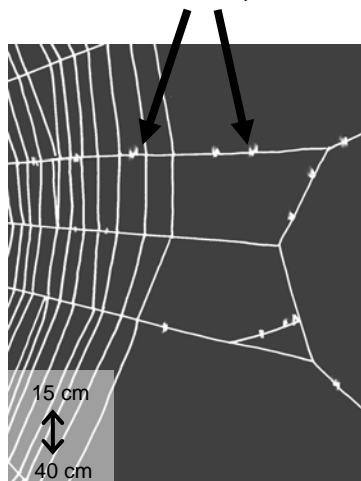


W7 Messy patch of silk and debris



Debris

W8 Silk flecks, often on supporting lines

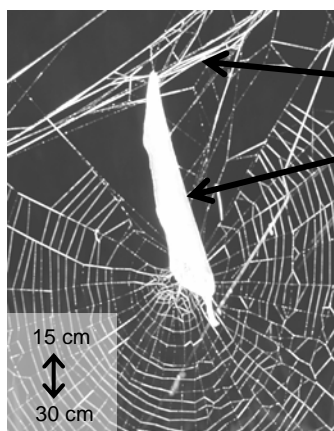


May also have silk patches on web surface

Strong webs in open situations

Curled-leaf in missing part of web circle

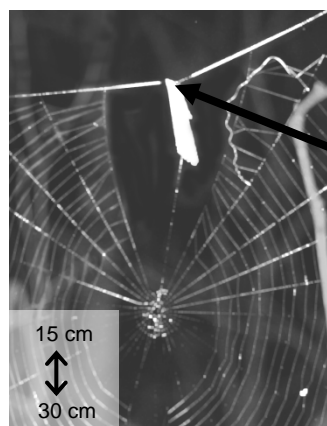
W9 Leaf at web centre



Leaf
suspended in
a tangle of
lines

Web hub
emerges from
open end of
leaf

W10 Leaf away from web centre

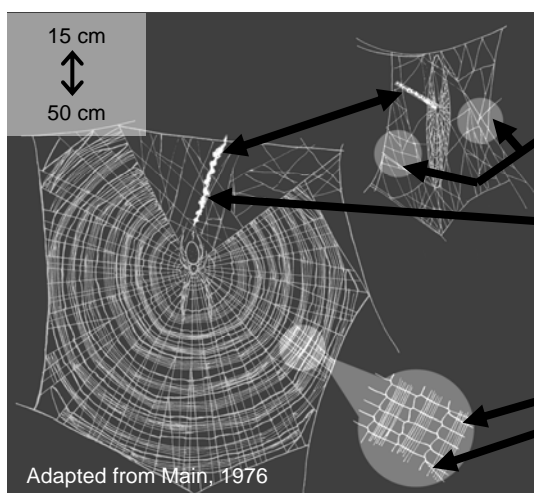


No tangle
above web

Leaf
attached to
top support
line

Web hub
separate
from leaf

W11 Many radial lines, 20 to 40 in 90°



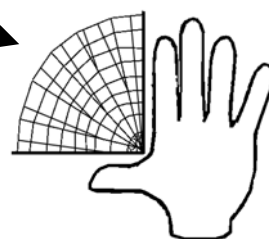
Barrier webs
often present

Web silk often
golden-yellow

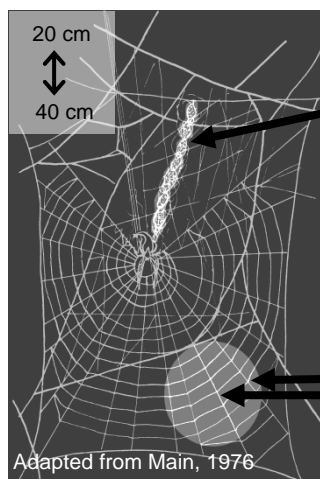
Debris may be
present (on a
separate line)

Radial lines branch,
making them numerous
towards edge of web, 20-
40 in 90° section

Estimate 90°
using hand.
NB each branch
line is counted



W12
Sloping
web



Barrier webs
often present

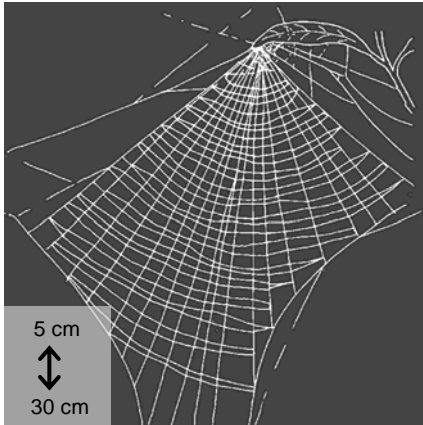
Fluffy egg sacs
may be present
in a line through
missing sector
into web centre

Radial lines less
numerous (and do not
branch), less than 20 in
90° section

More missing sector and offset orbs on next page

“Pie slice” and other webs

W13 Web approximately **vertical**

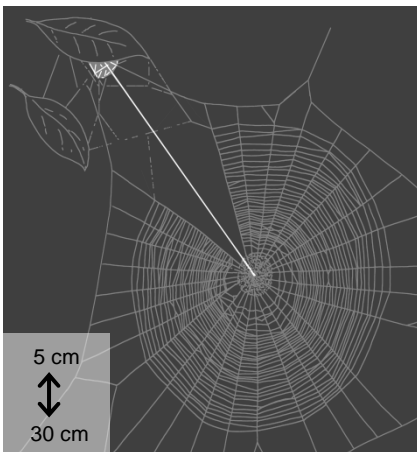


Web almost a complete circle or reduced to only a “pie slice”

Web hub opens directly from retreat

Retreat under a leaf or in a curled leaf or occasionally other debris or silk

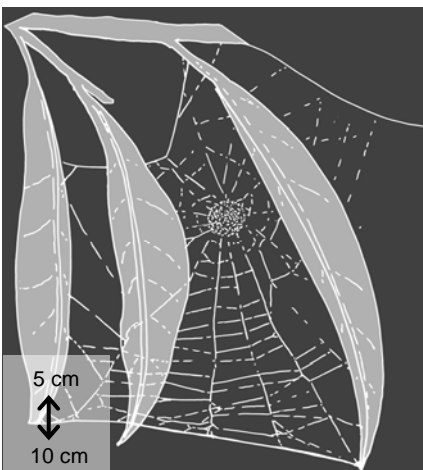
W14 Fine **signal line** to tangled retreat in a plant



Signal line can be hard to spot – this kind of web is often given away by the tangle around the retreat

NB sometimes some catching spirals pass through the “missing sector” close to the edge of the web

W15 **Offset orb**, web more or less **horizontal** (shown from below)



Hub markedly offset from centre (often hidden under a leaf or attached to a twig)

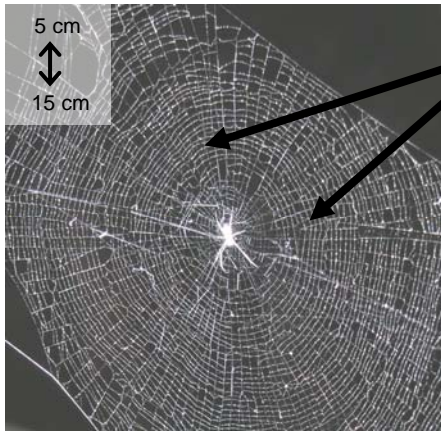
A tangle of lines is often present near the hub

Sometimes so untidy that only a hint of radial structure remains

NB one of the decorated orb webs, W3, may also have an offset hub

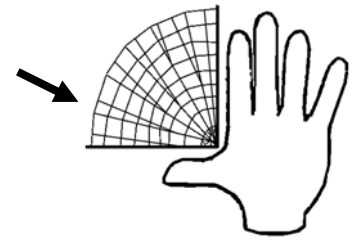
A3. PLAIN ORBS

W16 Many radial lines



Radial lines branch, making them numerous towards edge of web, 20-40 in 90° section

Barrier web and debris may be present (on a separate line)

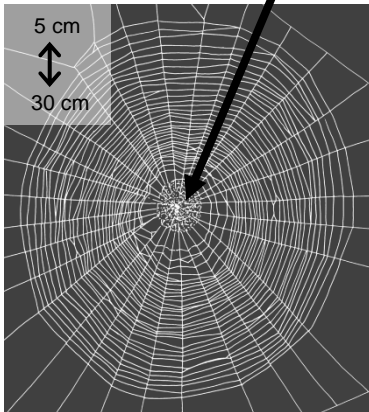


Estimate 90° using hand

Web may be distinctly oval

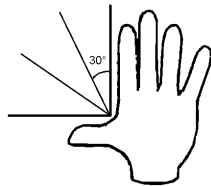
Vertical or slightly sloping webs

W17 Web hub filled in



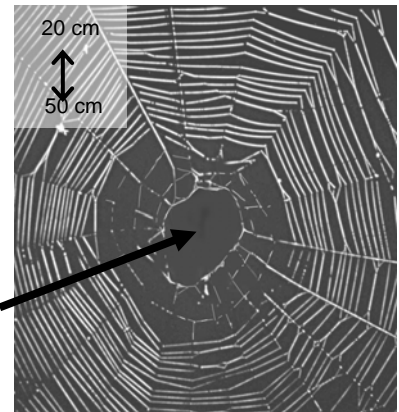
Radial lines less numerous (and do not branch), less than 20 in 90° section

Web slope usually less than about 30°



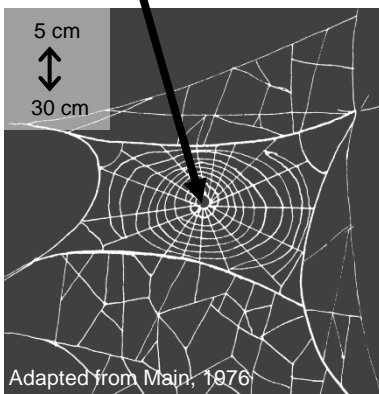
Sometimes with a few tensioning threads across the hole

W18 Distinct hole at web hub



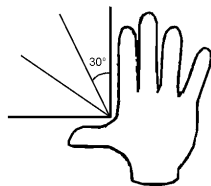
Horizontal or strongly sloping web

W19 Hole at hub



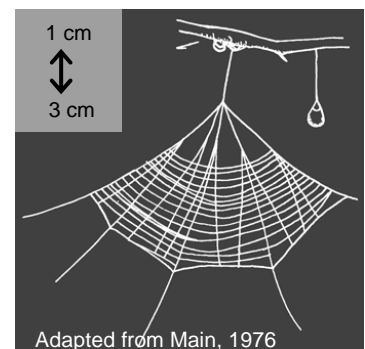
Fine barrier web often present

Slope usually greater than 30°



Damp places such as rotten tree stumps

W20 Very small web, pulled upwards into a cone



NB For a large web like a tent or cone, go to W25

B. Other webs

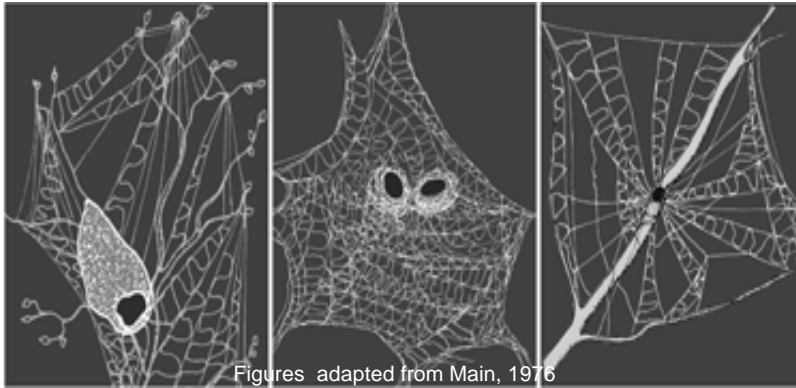
8

B1. LACE WEBS

- New parts of web have ladder-like or zigzag weave
- Old parts of web have a coarse and uneven weave
- Between leaves, on twigs or on tree surfaces



Go to page 9



B2. SHEET & KNOCKDOWN WEBS

- Fine sheet – looks like a hammock or hanging mosquito-net
- Often with a knockdown web above or below



Go to page 10

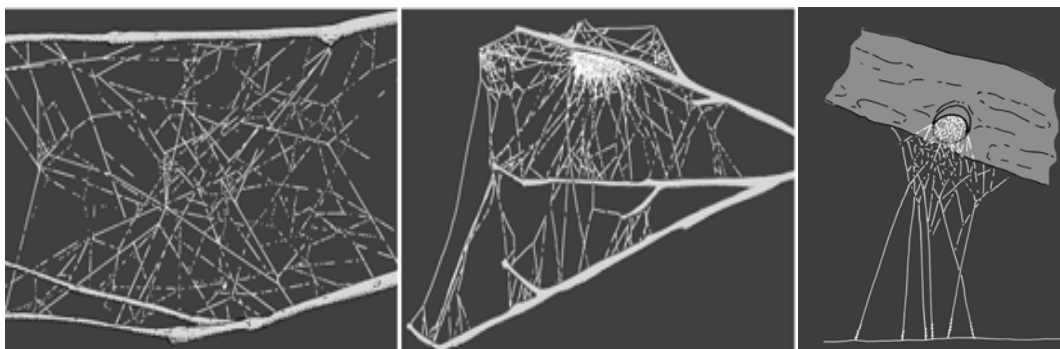


B3. TANGLE WEBS

- Few to many fine threads
- No sheet
- No defined pattern – messy looking



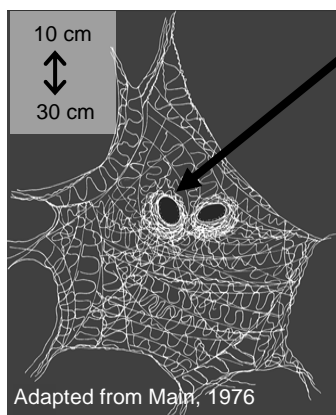
Go to page 12



B1. LACE WEBS

Webs on rough **tree trunks** or **bark**

W21 Funnel-like entrance holes



Old webs join into overlapping fans

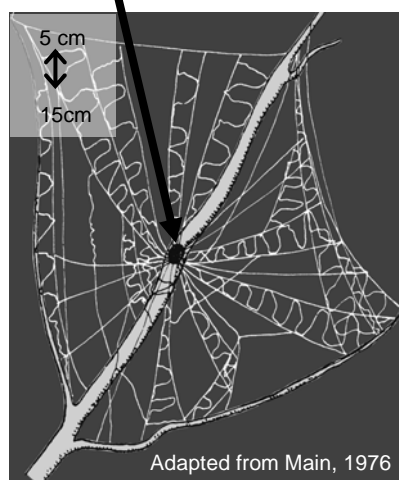
Lace structure degenerates to a characteristic irregular pattern

Old matted silk is coarse



Webs among **twigs**, **leaves**, **flower heads**

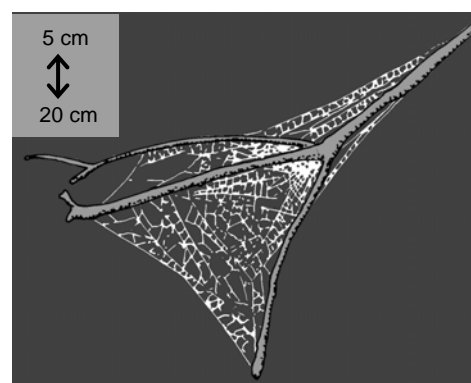
W22 Web radiates from hole in dead twig



Strap-like lacy spokes

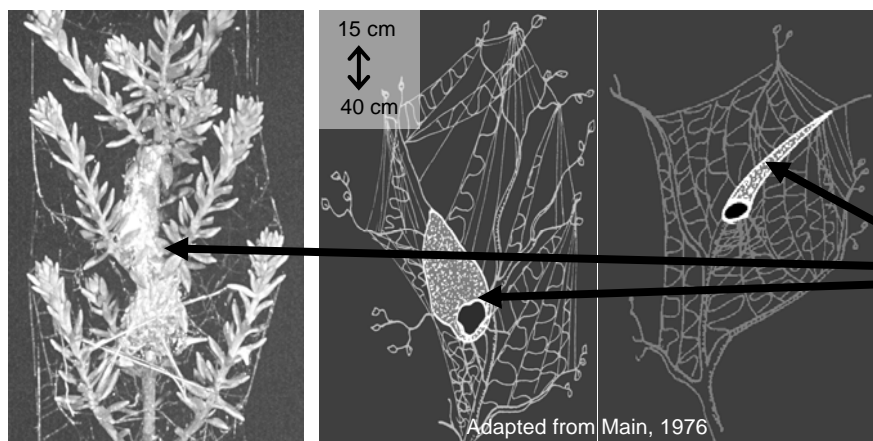
Spokes not joined into a fan

W23 Web sections fan out. Silk retreat may be visible



If web radiates from a twig hole it forms a lacy fan rather than spokes

W24 Web around large or small **nest**



Nest made from silked together leaves or debris

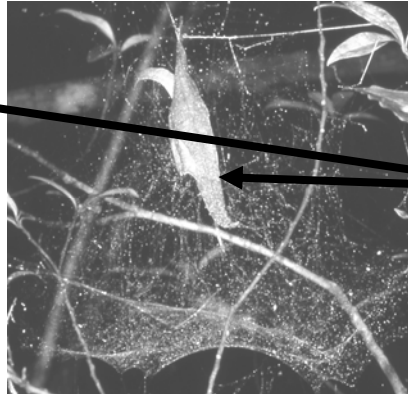
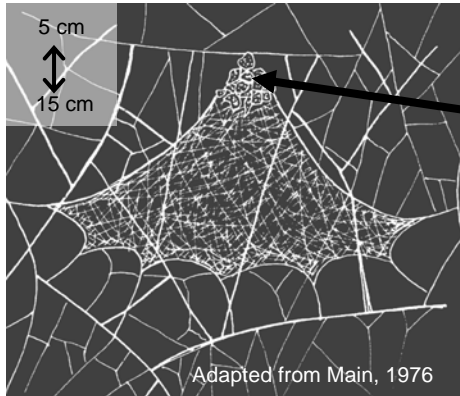
Knockdown web above and/or below sheet surface (pp. 10-11)

No knockdown web, just lateral support lines (p.11)

With knockdown web

Sheet pulled up in one or more **peaks** and/or leaf or detritus **retreat** suspended in lines **above sheet**

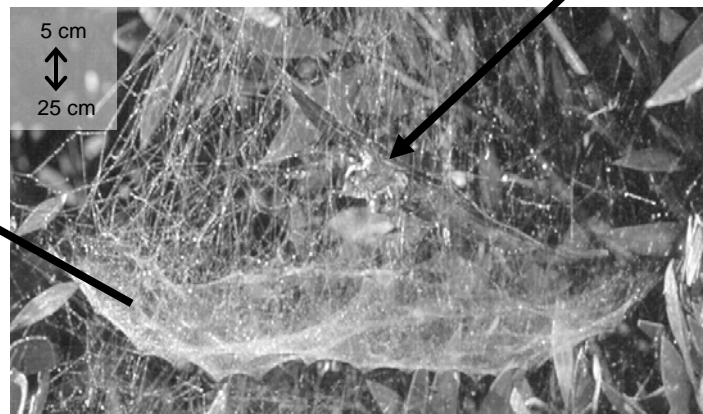
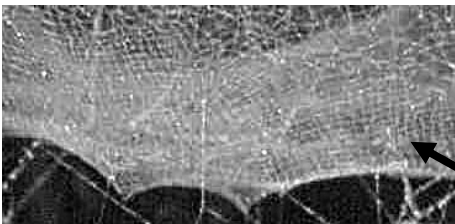
W25 Irregularly woven sheet, very light and filmy



Both web types are commonly made in vegetation between leaves and twigs

Web often includes a retreat of detritus, a dead leaf etc

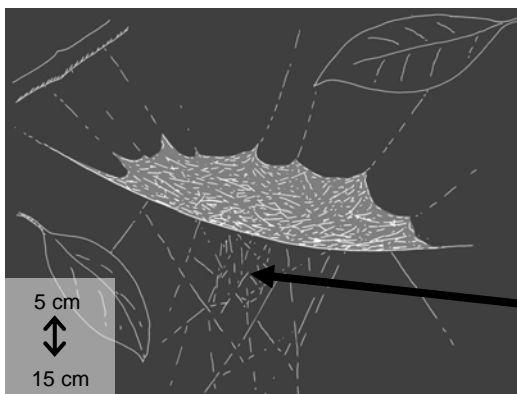
W26 Regular radial weave (**may** be finely meshed, look closely!)



Some webs may be much less dense

Several spiders may make webs close together with many connecting lines

W27 No distinct **peaks in sheet** and **no retreat**; small **sheets** or **hammocks** in low vegetation



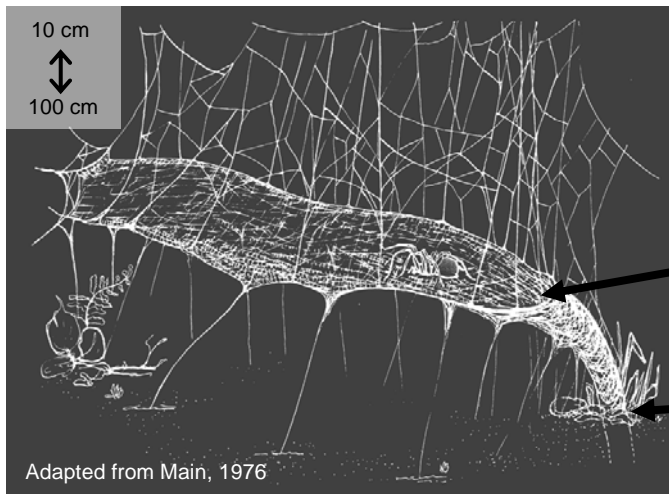
May be small peaks where knockdown lines attach

Knockdown web above or below sheet



More sheet and knockdown webs on next page

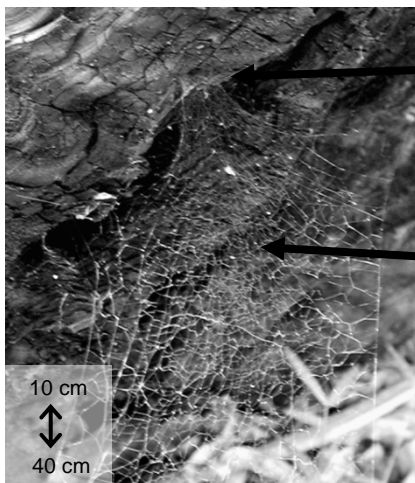
(sheets with knockdown web continued)

W28 Platform web: knockdown web above sheet; with burrow

Sheet slopes into retreat burrow

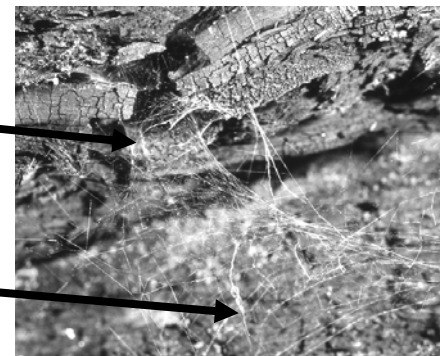
Retreat burrow opens on to top of sheet

Retreat usually a burrow in the ground, but may be into wood crevice, grass tussock etc

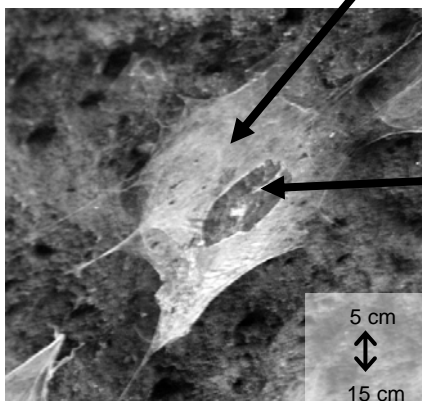
Sheets with no knockdown web**W29 Filmy sloping sheet. Retreat opens beneath sheet (spider runs upside-down on underside)**

Retreat burrow often in rotting wood or under bark, sometimes in an earthen bank

Filmy sheet slopes down from retreat



Web often roughly triangular or trapezoid

W29a Densely woven sheet with broad funnel to substrate

On rock faces under sheltered overhangs, underside of logs etc

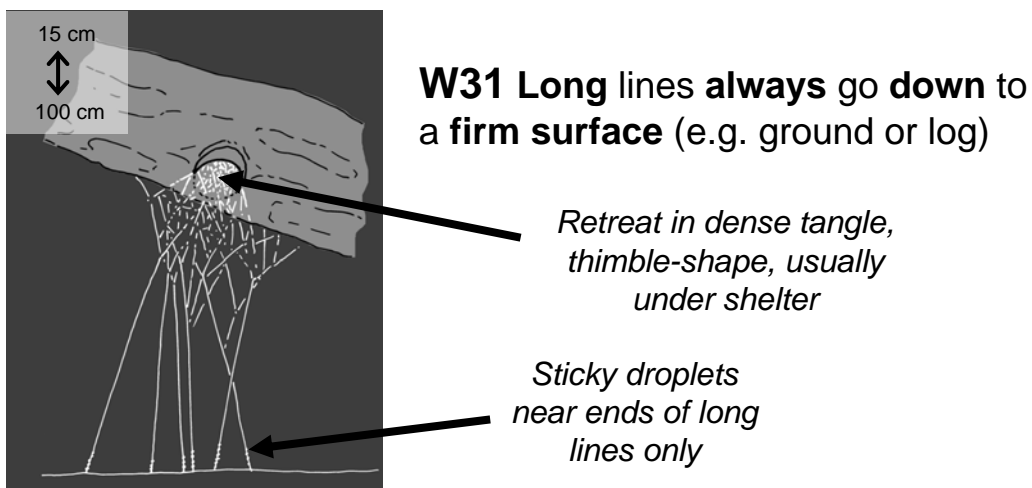
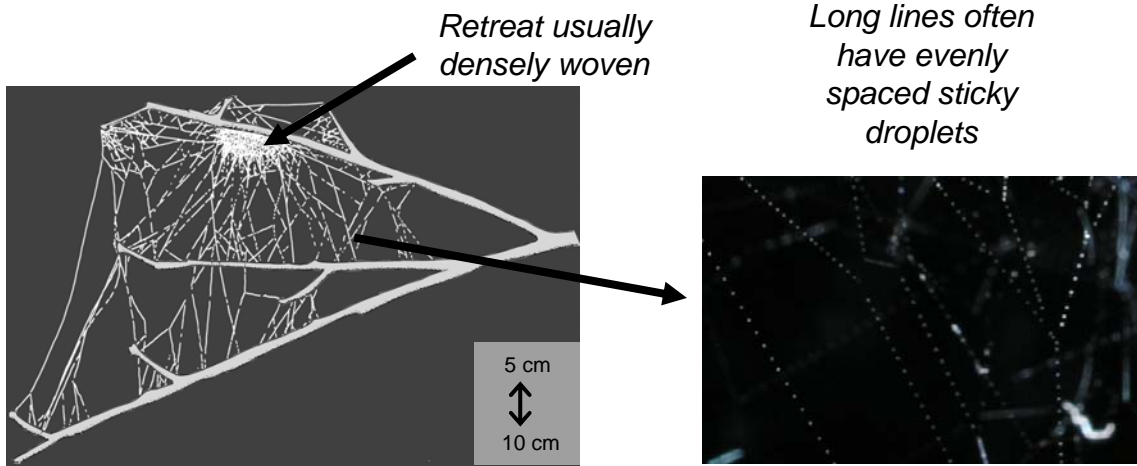
Funnel often closed by sheet

Beware, old abandoned webs may persist for many months.

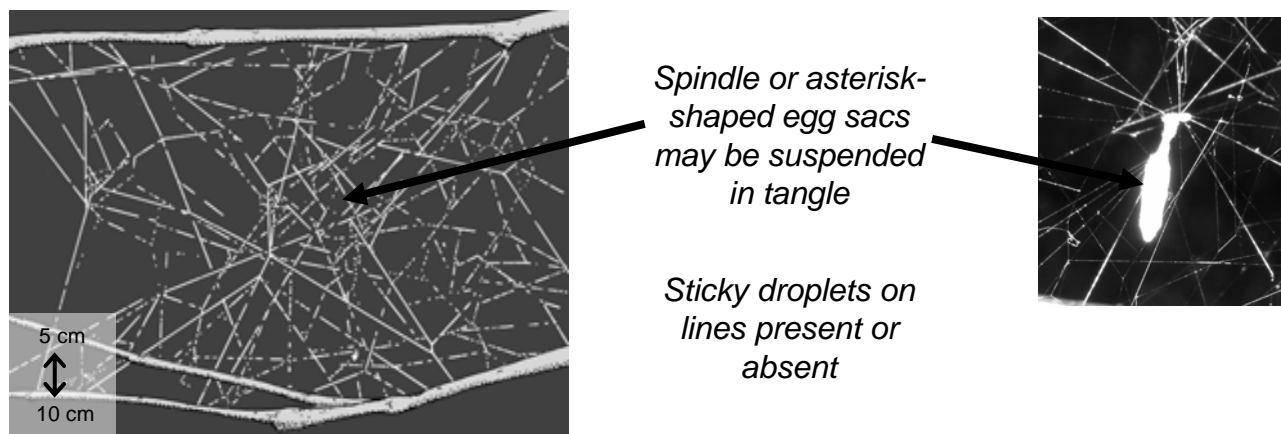


With a silk **retreat**, retreat may be tight silk or an untidy mess

W30 Web between leaves, twigs or branches



W32 Without a silk retreat



GLOSSARY

A **barrier web**, also known as a labyrinth, 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 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 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

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.

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 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.

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: 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.

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.

(Glossary continued....)

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.

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: 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.

A **sheet** is a closely woven mesh of non-sticky silk lines. Sheet webs can be simply guyed out 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.

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 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 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'.

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.

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|--------------------------------|--|
| Collectors Name(s) | Full names eg. John Smith not 'J. Smith' |
| Date | Format = dd/mm/yy eg. 03/03/05 |
| SiteID | Unique code for the area under investigation. Include abbreviation for locality, site number, and unique code number eg. McN01_01 = McNamara park, site 1, transect 1. |
| Locality | The locality of the site under study. This should include a locality name, and/or directions to locality in words and preferably a GPS reading. E.g. McNamara park, Broke, 500m west of Broke general store, E31°27'21: S118°28'29 |
| Transect number | to properly sample any given site it is necessary to undertake more than one transect. The datasheet has room for 10 transects within any given site. |
| Time start | Time at start of active searching |
| Time finish | Time at finish of active searching |
| Tallies | Area used to score webtypes. |
| Webtypes | Place the webtype number in this column when observed E.g W9 |
| Environmental variables | |
| Wind code | Beaufort scale code for designating wind strength (see below) |
| Weather code | Standard code for depicting weather conditions (see below) |
| Slope direction | Determine the direction the transect faces. Put 0 if the transect is flat. |
| Cloud percentage | Estimate of the percentage of sky occupied by cloud to the nearest 10% |

| | |
|----------------------|--|
| Wind codes | 0 smoke rises vertically 1 slight smoke drift. 2 wind felt on face and leaves rustle. 3 leaves and twigs in slight motion. 4 dust raised and small branches move. 5 small trees in leaf begin to sway. 6 large branches move and trees sway. |
| Weather codes | Sunny S – shadows cast. Overcast O – no shadow cast. |