

# Surveying the Missing-sector Orbweb Spider *Zygiella x-notata* in the Falkland Islands

## Introduction

The introduced Missing-sector Orbweb Spider (*Zygiella x-notata*) is a recent arrival in the Falkland Islands, probably having been introduced at a hitchhiker on an imported vehicle or shipping container around 2015. Native to continental Europe and the UK, this spider has been introduced to many countries through trade, including North and South America, and St Helena.

The Missing-sector Orbweb Spider spins a 'classical' orb web and feeds on captured insects. There are concerns that it is competing with the native Green Spider *Molinaranea magellanica*, which also weaves an orb web to feed on captured insects. The aim of this survey is to find out how far the introduced species has spread in the Falklands, and also how abundant it is becoming.

Adult Missing-sector Orbweb spiders are not attracted to traps or lights. However, they are easy to monitor through their distinctive, very conspicuous, webs, and a new web is made most mornings. In addition, the Missing-sector Orbweb Spider is closely associated with human habitation and its webs can be found on window frames both inside and outside the house, under window sills and guttering and often on car wing mirrors, as well as on garden shrubs and gate posts. They are also very common around boats and docks. This makes it very suitable for both citizen science surveys as well as more formal scientific surveys, as surveys can be done around the home and don't require approaching or handling spiders.

The proposed approach is to conduct both citizen science and scientific surveys using visual censusing. This is an effective technique when applied to animals with conspicuous artefacts, such as most web spiders. Results may be biased by different surveyors' abilities to spot webs, and may also underestimate true population densities by overlooking a certain percentage of satiated spiders which have not rebuilt their webs on the day of the survey. However, this doesn't affect presence records, and repeated surveys by the same surveyors provides an index of relative abundance.

The aim of the citizen science survey is to:

- Determine the spread of the through records of its presence or absence primarily around homes and gardens.

The aims of the scientific survey are to:

- Determine the spread of the Missing-sector Orbweb Spider;
- Confirm the presence or absence of this species in a location;
- Assess the relative abundance of the species in different locations and over time;
- Assess the presence and relative abundance of other spiders in different locations and over time.

The Green spider can also be surveyed at the same time.

## Further information and sources

Laurence Bee, Geoff Oxford and Helen Smith (2017) Britain's Spiders. A field guide. Princeton University Press.

British Arachnological Society Factsheet 6. Missing-sector Orbweaver  
[http://britishspiders.org.uk/wiki2015/images/9/99/Missing\\_sector\\_online.pdf](http://britishspiders.org.uk/wiki2015/images/9/99/Missing_sector_online.pdf)

Alastair Lavery (2017) Annotated checklist of the spiders, harvestmen, and pseudoscorpions of the Falkland Islands and South Georgia. *Arachnology* **17**: 210–228.

Alastair Lavery (2018) Report on Arachnida identified for the Falkland Island Government. Department of Agriculture 2015 to 2018. Unpublished report, June 2018.

Herbert W. Levi. (2001) The Orbweavers of the Genera *Molinaranea* and *Nicolepeira*, a New Species of *Parawixia*, and Comments on Orb Weavers of Temperate South America (Araneae: Araneidae). *Bull. Mus. Comp. Zool.*, 155(9): 445-475, June, 2001.

Martin Nyffeler and Dries Bonte (2020) Where have all the spiders gone? Observations of a dramatic population density decline in the once very abundant Garden Spider, *Araneus diadematus* (Araneae: Araneidae), in the Swiss Midlands. *Insects* 2020, 11, 248; doi:10.3390/insects11040248

## How to identify the missing-sector spider *Zygiella x-notata*

The introduced Missing-sector Orbweb Spider *Zygiella x-notata* has a very distinctive web which is usually, but not always, missing a sector, hence its common name. The arrow is pointing to the missing sector, which is typically in an upper corner of the web.

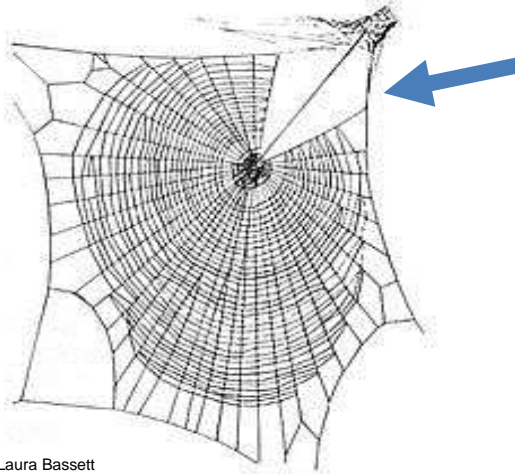


Photo credit Laura Bassett

The spider is pale brown, females 6 – 7 mm and males 3.5 – 5 mm, with a darker head area and a large globular abdomen which is characteristically silver-grey with a grey-brown leaf-shaped mark extending backwards. Legs are long and slender and typically with dark bands; see the image below. The spider will be in the centre of the web or hidden in a retreat close by, at the end of the signal thread extending through the missing sector of the web.



Photo credit Natural History Museum

Further information on *Zygiella x-notata* can be found in the factsheet [http://britishspiders.org.uk/wiki2015/images/9/99/Missing\\_sector\\_online.pdf](http://britishspiders.org.uk/wiki2015/images/9/99/Missing_sector_online.pdf)

## How to identify the Green spider *Molinaranaea magellanica*

The native Green spider spins a complete orbweb which often (but not always) has a web decoration or a conspicuous silk structure (the stabilimentum) in the centre.

The spider itself is dark orange with a characteristic pattern which is usually green, and an olive green abdomen. This spider is quite large, females 8 – 17.5 mm and males around 6.2 – 9.8 mm. Females may have a spotted abdomen. Immatures and adults can be distinguished from other species by the five distinct black, longitudinal stripes on the underside of the abdomen, separated by four white lines, arrowed in the image below.

Legs are noticeably striped. The spider tends to sit with the legs in pairs, two legs forward and two legs back.



Green spider. Ventral view  
Image © rodrigobt CC-BY-NC



Green spider. Dorsal view  
Image © Diego Reyes Arellano

See the Annex for information on the orbweb spiders in the Falklands.

## Citizen science survey on the Missing-sector Orbweb Spider *Zygiella x-notata*

### How to do the survey

When:

- Between mid-morning and mid-afternoon (after the web has been built and before it is likely to have been damaged or lost).
- On a day when it's not raining and ideally not too windy, as both may destroy webs.
- During the late summer, when spiders will be most active: between 1<sup>st</sup> January and 31<sup>st</sup> March.

Where:

- Around the outside of houses and gardens.
- Around the outside of vehicles, checking the wing mirrors, windscreen wiper area, and around and external spare tyre fixings.
- In boat yards and the inside and outside of boats.

How:

- Search for and record all the missing sector webs you can see. Webs are conspicuous – make sure you can see the missing sector (see the picture in “How to identify a Missing-sector Orbweb Spider” if you're not sure) - and this will probably take between 10 and 30 minutes, depending on how big the area is you are surveying.
- Also record any Green spider webs you can see.
- Record the results on the recording sheet and send it to **xxxx**.

Optionally:

- Record any other spiders encountered at the site. A simple count is fine if you're not sure what species they are, and you can also take photos to identify the species.
- Record the results on the same recording sheet.

## Surveying the missing-sector spider *Zygiella x-notata*

### Citizen science recording sheet

Name of recorder	(who is doing the survey)	
Date of survey	(when are you doing the survey)	
Address of the site surveyed	(give the address or a name for the site surveyed)	
Describe the site	(what sort of place is the site: house and garden, garage, farm buildings, boat yard, boat etc)	
<b>Number of missing-sector webs seen</b>	<b>Spider seen?</b>	<b>Details</b>
(the number seen in total for this survey)	(how many webs had spiders visible?)	(any details, for example if you searched the house and all the webs were in the window frames, or in the garden were only close to the house, etc. )
<b>Number of Green spider webs seen</b>	<b>Spider seen?</b>	<b>Details</b>
(the number seen in total for this survey)	(how many webs had spiders visible?)	(any details, as above)
<b>Other spiders seen away from webs</b>		
(the number seen in total for this survey. You can note down different types separately, or just put them together here)	(any details)	
<b>Any notes or comments</b>	(Anything comments or other information can be put here)	

## Scientific survey on the missing-sector spider *Zygiella x-notata*

### How to do the survey

When:

- Between mid-morning and mid-afternoon (after the web has been built and before it is likely to have been damaged or lost).
- On a day when it's not raining and ideally not too windy, as both may destroy webs.
- During the summer, when spiders will be most active: between 1<sup>st</sup> January and 31<sup>st</sup> March.

Where:

- Around the outside of houses and gardens.
- Along hedges of parks, graveyards and farms.
- Around the outside of vehicles, checking the wing mirrors, windscreen wiper area, and around and external spare tyre fixings.
- In boat yards and the inside and outside of boats.

How:

In terms of monitoring spread, the important point is that the same building(s) or transect should be revisited over time.

#### Transects

- For gardens, parks, graveyards, hedgerows and field edges – walk a linear path, the length of which depends on the nature of the landscape being surveyed, and record the estimated length. Transects don't need to be straight lines but the line shouldn't cross itself or loop round to come within 2m of itself.
- Slowly walk along the edge of a path and intensively search by eye the vegetation within 1 m to one side of the path and from ground level to a height of 2 m;
- Record each *Zygiella x-notata* web encountered within the transect;
- Record any Green spider webs encountered within the transect;
- Record any other spiders encountered along the transect, if possible identifying the species; take photos or specimens to confirm identification. If specimens are collected they should be held in separate containers, to avoid predation;
- Record the results on the recording sheet and send it to **xxxx**.

#### Searches

The exterior of houses and buildings, gardens, boatyards and boats.

- Make a thorough visual search of the entire site;
- Record each *Zygiella x-notata* web encountered at the site;
- Record any Green spider webs encountered at the site;
- Record any other spiders encountered at the site, if possible identifying the species; take photos or specimens to confirm identification. If specimens are collected they should be held in separate containers, to avoid predation;
- Record the results in the recording sheet and send it to **xxxx**

**Surveying the missing-sector spider *Zygiella x-notata***  
**Scientific survey recording sheet**

Name of recorder	(who is doing the survey)		
Date of survey	(when are you doing the survey)	Time of survey	
Address of site surveyed	(give an address or name for the site surveyed)		
Type of survey	(transect or visual search, noting how long the area surveyed is)		
Describe the site	(what sort of place is the site: house, graveyard, farm buildings, boat yard etc.)		
Number of missing-sector webs seen	Spider seen?	Details	
(the number seen in total for this survey)	(how many webs had spiders visible?)	(any details of locations of the webs)	
Number of Green spider webs seen	Spider seen?	Details	
(the number seen in total for this survey)	how many webs had spiders visible?)	(any details of locations of the webs)	
<b>Other spiders seen away from webs</b> (use one line for each species, identifying them if possible)			
(the number seen in total for this survey)	(any details)		
Any notes or comments	(Anything comments or other information can be put here)		



## **Annex. Orbweb Spiders**

Alastair Lavery

### **Falkland Island Species**

Most spiders do not make the classic radial and spiral orbwebs we most often think of as spiders' webs. Only two native Falklands spider make this kind of web.

The familiar Green Spider (*Molinaranea magellanica*) is found throughout the islands and spins its complete orb-webs in Gorse, Tall Fern and other tall vegetation or in spaces such as peat banks, which can support its complex webs.

The other species is the rare and unfamiliar Island Long-jawed Spider (*Tetragnatha insulata*). It's found mainly on West Falkland and the extreme west of East Falkland. Its webs are spun in Tall Fern and Gorse. It has not been found in the Stanley area since 1986.

The two orbwebs are superficially similar, but close examination will show an important difference. As a member of the Orbweb spider family (Araneidae), the Green Spider's web has a criss-cross of threads at the centre of the web (hub). In the Island Long-jawed Spider, a member of the family Tetragnathidae, the web hub has a hole, with no silk.

The two spiders are very different in appearance, the Green Spider being compact and round, though not always very green, while the Long-jawed Spider is mainly brown and strikingly long and thin.

### **Recently introduced species**

Two species of orbweb spider have been found recently, at present mainly in the Stanley area. One species, the Garden Spider (*Araneus diadematus*), has only been found once and so may not be encountered. It has a distinctive appearance and a web very similar to that of the Green Spider. It is very common in the UK and throughout Europe.

The Missing-sector Orbweb Spider (*Zygiella x-notata*) produces a distinctively different web from the Green Spider, with one sector of the spiral completely missing in the upper part of the web (but this is not always the case). Running through the centre of this empty section is a single thread leading from the hub to the spider's retreat at the edge of the web.



Green spider. Dorsal view  
Image © Diego Reyes Arellano



Garden spider. Dorsal view.  
Image © David Nicholls



Long-jawed spider  
Image © Alastair Lavery