

Spiders of Rodley Nature Reserve, Leeds

Introduction

In this, the first year of spider recording at Rodley Nature Reserve (NR), a report is provided describing the site, the methods used and the species recorded. A brief introduction as to why the survey is being undertaken is also included. For a general introduction to spiders as a group, it is recommended that a copy of Preston-Mafham's book entitled '*Spiders of the World*' is obtained or ordered from a local library. Full details of this and other references cited are included in the Bibliography at the end of this report (after Table 2).

Why Survey?

Spiders like many invertebrate taxa are historically poorly studied, when compared with for example, birds, mammals and plants. Consequently, there is a notable gap in our knowledge of their distribution and ecological requirements. This lack of knowledge can potentially hamper site managers in understanding the nature conservation value of any species recorded on their sites and those involved in the biodiversity action plan process. In recent times, this knowledge gap is being addressed through national recording schemes co-ordinated through the national biological recording centre, based at Wallingford (Oxfordshire). The spider recording scheme commenced in 1987 and culminated with the *Provisional Atlas of British spiders* (Harvey, Nellist and Telfer, 2002).

The study at Rodley NR was prompted following a cursory search on the National Biodiversity Network's website (<http://data.nbn.org.uk/>) on the spider fauna recorded within the two ¹hectads (10 km x 10 km grid squares) that generally cover Leeds (SE 23 and SE 33) and discovering that less than 100 species had been recorded. Comparing this with the most recent published national list of 645 species (Merrett and Murphy, 2000) and experience recording elsewhere in the UK would suggest that this area is poorly recorded. Following an initial visit to the Reserve in early April 2008, it was agreed that a study would be undertaken, concentrating on the three main habitats present on the site.

Site Description

Rodley NR lies within the River Aire's floodplain on land that was once part of Yorkshire Water's Sewage Treatment Works (SE 235 363). It lies entirely within ²vice-county 64 (mid-west Yorkshire). From the summer of 1999, a series of wetland areas were created, hedgerows planted and grassland management changed to benefit wildlife, in particular birds, but also biodiversity in general to enhance the site's nature conservation value. Therefore, the majority of the habitats as managed today are recent in origin, being less than ten years old.

The main habitats present on site can be divided in to three broad categories: grassland, wetland and secondary woodland/ scrub (including hedgerows). The grasslands, owing to their origin, are classified as improved grassland (following the Phase 1 habitat survey methodology (Joint Nature Conservation Committee, 2003) used for most botanical surveys although attempts are being made to diversify them by undertaking annual hay cuts and artificially introducing new species with seed. The wetlands were created in 1999 with a primary function to attract wildfowl with water levels artificially managed and are currently a mosaic of swamp, marshy grassland and marginal and inundation vegetation (dominated by common reed (*Phragmites communis*) following the Phase 1 classification. Woodland on the north bank of the River Aire largely consists of mature willows (in particular crack willow (*Salix fragilis*)) and ash (*Fraxinus excelsior*). Central within the Reserve is a rectangular plot of planted willow (*Salix* sp.) that is being partially managed as a coppice plot. Bramble (*Rubus*

¹ For the purposes of biological recording nationally, the UK is divided up in to hectads (10 x 10 km) using the Ordnance Survey grid system. There are 100 hectads within each 100 km grid square (prefixed with two letters). Rodley NR falls within the hectad SE 23.

² Vice-counties are standard recording units (originally devised for botanical recording) that remain fixed, regardless of subsequent amendments to local authority boundaries. They enable comparison of records over an extended period of time since the mid-1850s when they were first defined.

fruticosus agg.) scrub is also prevalent in this habitat. The site's hedgerows are largely recent in origin, dominated by hawthorn (*Crataegus monogyna*) and blackthorn (*Prunus spinosa*).

The structure of these habitats (in particular, its variation and complexity) will have a greater influence on the species of spider present than any particular species. Unlike, for example, butterflies, spiders are not associated with a particular foodplant but constrained by the habitat's structure, i.e. the three dimensional space created by how the vegetation is interwoven. In general, the more complex a habitat's structure is, the more opportunities for spiders to exploit there will be.

Consequently, it was decided to study three principal habitats within the Reserve to establish a baseline from which further investigations can proceed. The habitats selected were the improved grassland, hedgerows and marginal wetland habitats. Each of these habitats potentially offers spiders different ecological niches within which they can exploit, owing to variations in habitat management, vegetation structure and humidity (as a result of the habitats proximity to open water).

Methodology

There are a variety of different methods that can be employed to capture spiders. Pitfall trapping is particularly effective at capturing those species that are predominantly ground-dwellers whilst sweep-netting and beating foliage are more applicable for capturing species inhabiting vegetation higher up such as within the sward and low branches.

Pitfall trapping involves placing plastic vending machine drinking cups flush with, or slightly below ground level, within which a preserving fluid is poured in. These can be left for a period of up to a fortnight before the contents are retrieved and the pitfall traps re-set. To prevent inadvertent captures such as small mammals or amphibians, a lid (in this instance a ceramic tile) was placed over the pitfall trap with a small gap underneath to allow invertebrates to pass through; this proved effective.

Sweeping and beating vegetation involves more physical activity on the surveyor's behalf! A sweep-net is rigorously passed through the grass sward (or similar vegetation), collecting any invertebrate that may be present. Sweeping for between 30 – 60 seconds can collect a significant amount of material that can then be sorted, releasing any individuals that are not required. Likewise, beating vegetation can collect specimens inhabiting the lower branches of shrubs and trees. Holding an upturned umbrella beneath the foliage which is struck firmly with a stick is likely to dislodge individuals and forcing them to fall on to the umbrella. This is then followed by a rapid game of cat-and-mouse (or in this instance, ³pooter-and-spider) as the spider tries to avoid capture.

All three methods were employed on the Reserve in 2008.

The study was undertaken between late April and late June 2008, which coincides with one of the main peak activity periods for spiders. Spiders were identified using Roberts (1993). Species can only be identified with certainty if they are sexually mature and their secondary sex organs are fully developed. Most species are sexually mature during the spring and summer with a few species developing later in the year; a small percentage in the winter months.

Constraints to the Study

It was hoped to include the willow coppice plot as part of the study. However, it is the Reserve's policy to prevent access in to this area during the breeding bird season and so no collecting was undertaken here. Weather conditions during the spring and summer of 2008 were generally considered to be dreadful, for invertebrates at least. A generic pattern of lower than average temperatures and sunshine, in combination with what seemed like one

³ A pooter is a small manual device that enables the arachnologist/ entomologist to suck up the insect/ spider into a small pot without damaging the specimen. Care has to be taken to ensure the correct tube is out in ones mouth to avoid ingesting the specimen as opposed to capturing it!

wet weekend after another, meant that the season as a whole for many invertebrate groups (in particular butterflies and moths) was sub-optimal. These weather conditions were generally not conducive to collecting as wet weather as well as vegetation renders sweeping and beating vegetation ineffective. Given that I could only undertake site visits to the Reserve during the weekends only, this restricted the number of visits that I could make when surveying was likely to be productive. Furthermore, personal commitments conspired to prevent any visits between July and November, so no further collecting was achieved in 2008.

Collecting Locations

Pitfall traps were located in three locations across the Reserve (see Table 1). Arrays of four pitfall traps were located in each habitat and were collected and re-filled on a fortnightly basis from the 23rd April – 21st June 2008. The contents of each pitfall trap were collated together and taken home to be sorted and identified.

Table 1: Location of Pitfall Traps at Rodley Nature Reserve

Location	Grid Reference	Habitat Description
Grassland	SE 2357 3631	Neutral grassland overlying a former waste tip. Grassland structure varied within the compartment. Area around pitfall traps sown with a wildflower meadow mix, dominated by red clover (<i>Trifolium vulgare</i>) and fine-leaved grasses (e.g. red fescue (<i>Festuca rubra</i> agg.)). Other areas, dominated by common couch (<i>Elytrigia repens</i>), especially towards hedgerow.
Hedgerow	SE 2357 3634	Pitfall traps located at the base of a hawthorn (<i>Crataegus monogyna</i>) dominated hedgerow. Ground flora mostly common nettle (<i>Urtica dioica</i>) and common couch with occasional cleavers (<i>Galium aparine</i>).
Wetland Edge	SE 2367 3618	Pitfalls traps located on the edge of a marshy 'lagoon' amongst bare ground and common reed (<i>Phragmites communis</i>) leaf-litter. Water levels fluctuated through the course of the study, eventually swamping the pitfall traps.

Collecting was also undertaken at various other locations across the Reserve, in particular within and on the boundary with the Mike Fisk Meadow.

Results

A total of 46 species of spider were recorded by all methods and are listed in taxonomic order in Table 2 following the national checklist published by Merrett and Murphy (2000).

Of the species recorded at Rodley, a total of 36 species are new to the hectad (SE 23) and Leeds (NL in the status column in Table 2) and 5 species are only new to the hectad SE 23.

Pitfall traps were located in the separate habitats to establish if there is a distinct spider fauna present. Unfortunately, the results obtained to date are too premature to state whether this is the case or not. The apparent reduced species-richness in the wetland habitat is possibly a result of the pitfall traps becoming water-logged on a couple of occasions, necessitating their removal before the end of June and the lack of other collecting methods employed here.

Discussion

The total number of species recorded is considered, given the poor season and limited survey period, a reasonable total. It should be noted that late summer/ autumn active species

including many of the typical orb-web species (Family: Araneidae) will have been immature between April – June and so are largely absent from the list.

The national status of spiders (in the UK) was originally published by Merrett (1990) but for many species, this is probably out of date. A national status review (for spiders) is currently underway and will follow the revised IUCN guidelines and criteria. However, this is only at the consultation stage, after a draft list was published in July 2008 (Dawson, Harvey and Russell-Smith, 2008). None of the species recorded in 2008 are currently considered to be of nature conservation concern although the high percentage of new records for the tetrad (c. 78 %) suggests that the Reserve is likely to hold many more species that are new for the area.

A number of species recorded are particular specialists within the habitat that they were recorded in and are worth mentioning. The money-spiders *Gnathonarium dentatum* and *Hypomma bituberculatum* are common species inhabiting wet habitats, frequently colonising disturbed wetland sites. The latter species can also tolerate temporary submergence (Harvey, Nellist and Telfer, 2002). This is precisely the type of habitat within which the wetland pitfall traps were placed. Two other wetland specialists were recorded. The wolf-spider genus *Pirata* is invariably recorded in wetland habitats and can be frequently observed basking in the sun, where terrestrial vegetation meets the water's edge or even observed running across the meniscus (water surface). *Pirata piraticus* is the most widespread of the six species in Britain although not previously recorded in the tetrad before 2008. The record of *Pachygnatha clercki* is similarly unsurprising. Less frequent than *P. degeeri* (which was recorded in the grassland), it is nevertheless a widespread species in the UK and typically recorded close to or within wetland habitats.

Of the other species recorded, those belonging to the Theridiidae, Philodromidae and Thomisidae are typically recorded on low vegetation and were beaten from hawthorn branches on some of Rodley's hedgerows with the exception of *Xysticus cristatus*, which was captured in pitfall traps in the grassland and wetland habitats and *Tibellus oblongus*, which was swept in grassland (Mike Fisk Meadow). All are common and widespread.

The wolf-spiders *Pardosa amentata* and *Pardosa pullata* are abundant in the grasslands at Rodley and are probably the most widespread of the thirteen *Pardosa* species recorded in Britain, occupying a wide variety of habitats. In mid to late summer, females can be observed carrying their silken egg-sac behind them on their abdomen and subsequently, the tiny spiderlings on their back.

Finally, it is worth mentioning *Dictyna arundinacea*. This is a small species of spider that is typically recorded in its small retreat on dead flower stems such as common ragwort (*Senecio jacobaea*) or docks (*Rumex* spp.). Often, the male can be observed in close proximity to the female.

Conclusions

The first year studying the spider fauna of Rodley NR has provided new records for the national spider recording scheme and yielded 36 new species for the hectad SE 23. This is despite the limited survey effort deployed in 2008. It is therefore hoped that further survey work will be undertaken, author's commitments elsewhere permitting, in 2009. If so, it is anticipated that further species will be recorded that will be new to the Reserve, hectad and Leeds.

A copy of this report has been submitted to West Yorkshire Ecology (Biological Record Centre), the national Spider Recording Scheme organiser (Peter Harvey) and Leeds City Council. All individual records have been submitted to the national recording scheme.

Richard Wilson
Leeds, December 2008

Table 2: Species of Spider Recorded at Rodley NR, Leeds (April – July 2008)

Family	Species	Status	Hedgerow	Grassland	Wetland	Other
Theridiidae ('comb-footed spiders')	<i>Theridion sisyphium</i> (Clerck, 1757)	SE23	x			
	<i>Neottiura bimaculata</i> (Linnaeus, 1767)	NL	x	x		
	<i>Paidiscura pallens</i> (Blackwall, 1834)	NL	x	x		
Linyphiidae ('money-spiders')	<i>Walckenaeria unicornis</i> O. P.-Cambridge, 1861	NL	x		x	
	<i>Entelecara acuminata</i> (Wider, 1834)	NL	x			
	<i>Gnathonarium dentatum</i> (Wider, 1834)	NL			x	
	<i>Dismodicus bifrons</i> (Blackwall, 1841)	NL	x	x		
	<i>Hypomma bituberculatum</i> (Wider, 1834)	NL			x	
	<i>Baryphyma pratense</i> (Blackwall, 1861)	NL			x	
	<i>Baryphyma trifrons</i> (O. P.-Cambridge, 1863)	NL		x	x	
	<i>Oedothorax fuscus</i> (Blackwall, 1834)	NL		x	x	
	<i>Oedothorax gibbosus</i> (Blackwall, 1841)	NL	x			
	<i>Oedothorax retusus</i> (Westring, 1851)	NL		x	x	
	<i>Tiso vagans</i> (Blackwall, 1834)	NL		x		
	<i>Gongylidiellum vivum</i> (O. P.-Cambridge, 1875)	NL		x		
	<i>Erigonella hiemalis</i> (Blackwall, 1841)	NL	x	x		
	<i>Savignia frontata</i> Blackwall, 1833				x	
	<i>Diplocephalus latifrons</i> (O. P.-Cambridge, 1863)	NL	x			
<i>Erigone atra</i> Blackwall, 1833	SE23			x		
<i>Erigone dentipalpis</i> (Wider, 1834)	SE23			x		
<i>Meioneta saxatilis</i> (Blackwall, 1844)	NL	x				

Family	Species	Status	Hedgerow	Grassland	Wetland	Other
	<i>Centromerita bicolour</i> (Blackwall, 1833)			x		
	<i>Bathyphantes gracilis</i> (Blackwall, 1841)		x	x	x	
	<i>Kaestneria pullata</i> (O. P.-Cambridge, 1863)	NL	x			
	<i>Diplostyla concolor</i> (Wider, 1834)		x			
	<i>Lepthyphantes tenuis</i> (Blackwall, 1852)		x	x		
	<i>Lepthyphantes ericaeus</i> (Blackwall, 1853)		x			
	<i>Neriere clathrata</i> (Sundevall, 1830)		x			
	<i>Microlinyphia pusilla</i> (Sundevall, 1830)			x		
Tetragnathidae ('big-jawed spiders')	<i>Tetragnatha montana</i> Simon, 1874		x			
	<i>Pachygnatha clercki</i> Sundevall, 1823		x		x	
	<i>Pachygnatha degeeri</i> Sundevall, 1830	NL		x		
Araneidae ('orb web spiders')	<i>Larinoides sclopetarius</i> (Clerck, 1757)	SE23				x
	<i>Araniella cucurbitina</i> (Clerck, 1757)	NL	x			
	<i>Zygiella x-notata</i> (Clerck, 1757)	NL				x
Lycosidae ('wolf spiders')	<i>Pardosa amentata</i> (Clerck, 1757)	NL	x	x	x	
	<i>Pardosa pullata</i> (Clerck, 1757)	NL	x	x	x	
	<i>Pirata piraticus</i> (Clerck, 1757)	NL			x	
Dictynidae	<i>Dictyna arundinacea</i> (Linnaeus, 1758)	NL	x	x		x
Clubionidae ('sac spiders')	<i>Clubiona lutescens</i> Westring, 1851	NL	x			
	<i>Clubiona reclusa</i> O. P.-Cambridge, 1863	NL		x		
	<i>Clubiona stagnatilis</i> Kulczyński, 1897	NL	x	x	x	
Philodromidae ('crab-spiders')	<i>Philodromus aureolus</i> (Clerck, 1757)	NL	x			

Family	Species	Status	Hedgerow	Grassland	Wetland	Other
	<i>Philodromus cespitum</i> (Walckenaer, 1802)	NL	x			
Thomisidae ('crab spiders')	<i>Xysticus cristatus</i> (Clerck, 1757)	NL		x	x	
	<i>Tibellus oblongus</i> (Walckenaer, 1802)	SE23		x		
Number of Species			24	23	14	3
Key: NL = New to Leeds (see text for definition) SE23 = New to hectad SE 23						

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