

Creating ponds for Fen Raft Spider *Dolomedes plantarius*



Freshwater Habitats Trust

A 50-YEAR PROJECT TO CREATE A NETWORK OF CLEAN WATER PONDS FOR FRESHWATER WILDLIFE

1. Introduction

The Fen Raft Spider *Dolomedes plantarius* is an impressive animal. It is one of the largest spiders in the UK (up to 23mm long), with a dark brown or black cigar-shaped body and pale border stripes. They are keen hunters capable of catching prey both above and below the water. The spiders rest on the edge of ponds using their front legs to detect movement through the water surface (Figure 1). Normal diet includes other invertebrates such as spiders, pond skaters and dragonflies, but they are also capable of taking tadpoles and even fish.

The Fen Raft Spider has a very restricted distribution and is only known from three sites in the UK (Figure 2). Raft spiders reach maturity in their third year so have a relatively slow development time for an invertebrate. This means populations need more time to recover from decline caused by habitat loss, inappropriate management or other factors. Creating appropriate ponds will provide new habitat for spiders to colonise and give them the opportunity to increase their range, building up the populations and making them less vulnerable to extinction.



© Paul Jones

© Helen Smith

Figure 1. Fen raft spiders are known as fishing spiders, but the pools where they live are important for more than just food. They tap out their courtship display on the water surface and immerse their egg sacs under the water to keep them cool in hot weather.

2. Key habitat requirements

- Fen Raft Spiders are found in fens or lowland grazing marshes which are fed by unpolluted, base-rich waters.
- The spiders need stiff-leaved emergent plants on the edges of the pools that they inhabit to support the nursery webs in which they rear their young.
- Ponds for Fen Raft Spiders are open and unshaded. Sites with scrub encroachment or large stands of Common Reed *Phragmites australis* quickly become unsuitable, and require management by grazing or cutting.

Key messages

- Create ponds adjacent to existing populations to allow natural population spread, as Fen Raft Spiders have poor powers of dispersal.
- Fen Raft Spiders can cope with fluctuating water levels but do not tolerate drying out.
- They need emergent stands of stiff vegetation on the pond margin to provide perches for hunting and sites for their nursery webs.
- A complex of small deep pools will provide the maximum edge habitat and will hold water throughout the year.
- Sites may need to be managed by grazing to maintain an open, diverse and structurally complex habitat.
- Seek advice from the Fen Raft Spider project www.dolomedes.org.uk.

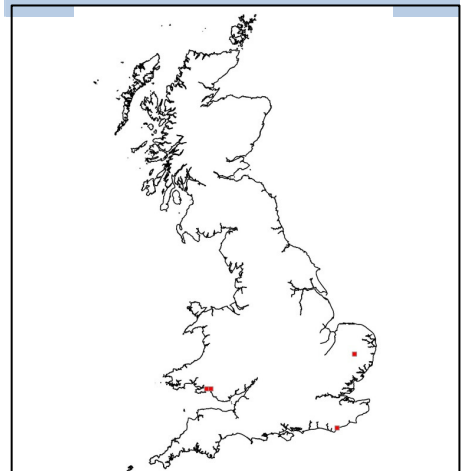


Figure 2. Current distribution of the Fen Raft Spider in the UK.

3. Sites for the Fen Raft Spider

The Fen Raft Spider was first discovered in Britain in 1956 at Redgrave and Lopham Fen on the Suffolk/Norfolk border. It was later found on the Pevensey Levels in Sussex in 1988 and has more recently been found on Crymlyn Bog in South Wales, in 2003. The lack of reliable records before 1956 results from confusion with its commoner relative, the Raft Spider *Dolomedes fimbriatus*, together with under recording of this cryptically camouflaged species in its often inaccessible wetland habitats.

Although we will never know how widely distributed this species used to be, its present distribution suggests that it occurred widely in lowland Britain. The drastic decline in extent and quality of lowland wetlands must have influenced the historic distribution of the Fen Raft Spider and continues to restrict its distribution today.

Redgrave and Lopham Fen

Fen Raft Spiders at Redgrave and Lopham Fen are found in and around areas of small (15-50m²) but relatively deep (>1m) pools, created both as a result of peat turf cutting in the 18th and 19th Centuries and more recently, specifically to provide deep water for the spiders in dry summers.

These pools are surrounded by mixed fen habitat including stands of Great Fen-sedge *Cladium mariscus*. This is important for the Fen Raft Spiders as they build nursery webs in emergent vegetation on the margins of pools where they hunt (Figure 2).

Unfortunately the fen has had a chequered history in the last 50 years, having suffered from abstraction, eutrophication and scrub encroachment. Restoration of the fen has been underway since 1999 but recovery for the Fen Raft Spider has been a slow process.

Within the fen, pond creation adjacent to the core habitat for Fen Raft Spiders, together with translocation of spiders to areas of restored habitat within the fen complex is thought to be the only effective means of helping this population to expand. Suffolk Wildlife Trust has begun creating new ponds under the Higher Level Stewardship Scheme.

Pevensey Levels

The Pevensey Levels are an area of lowland floodplain grazing marsh fed by base-rich water. The spiders are found within the network of ditches that cross the Levels rather than in isolated pools. Many of these ditches have a very rich flora and aquatic fauna.

The Fen Raft Spiders build their nursery webs (Figure 3) in emergent marginal vegetation including Cyperus Sedge *Carex pseudocyperus* and in the stiff-leaved, floating rosettes of Water Soldier *Stratiotes aloides*.

The Pevensey Levels have also been under pressure in the last 50 years from drainage, changes in land use and invasive alien water plants. But a concerted effort by the Environment Agency, Natural England, Sussex Wildlife Trust and local landowners has significantly improved the habitat for the Fen Raft Spider and the future of this relatively large population looks bright.



© Helen Smith

Figure 3. A small turf pond on Redgrave and Lopham Fen.



© Helen Smith

Figure 3. Female Fen Raft Spiders are very attentive mothers. She will carry her egg sac until the spiderlings hatch and will then guard the nursery web which is constructed in stands of emergent vegetation.



Crymlyn Bog

In common with the Redgrave and Lopham Fen site, the spiders at Crymlyn Bog are found in turf ponds. They are also found along near-by sections of the disused Tennant Canal, on the edge of Pant-y-Sais National Nature Reserve, where the vegetation structure for nursery webs is provided mainly by Tussock Sedge *Carex paniculata*.

Scrub encroachment and the spread of common reed *Phragmites australis* was reducing the area of high quality fen habitat at Crymlyn Bog but grazing is now helping to restore structure and diversity to the fen. In dry summers, the population at Pant-y-Sais is restricted by the availability of turf pools on the reserve.

4. Pond designs for the Fen Raft Spider

Pond location

For natural colonisation to occur, ponds need to be created very close either to the existing Fen Raft Spider populations, or to new populations created as part of Natural England's translocation programme.

Ponds should be dug in wet areas with a year-round high water table. Fens, rough wet grasslands, grazing marshes with high-quality ditch systems, are the types of habitat where such ponds could benefit local biodiversity too, in addition to the Fen raft Spider. It is important to avoid damaging sites with existing biodiversity value, but the small ponds required by Fen Raft Spiders can often be created to diversify the habitat rather than replacing existing high quality fen. Pond creation opportunities are often present during the restoration of wetland habitats, e.g. clearing common reed or stump pulling following scrub clearance.

Water source

The Fen Raft Spider needs a year-round supply of clean, base-rich, standing or slow moving water. A year-round high water table is essential to provide relatively stable water levels and the associated fen habitat. Deep and protracted winter flooding may be detrimental but flooding at other times of the year can be beneficial if it enlarges the area available for hunting and breeding, and promotes dispersal. Ponds for Fen Raft Spider should be fed by rain and ground water.

Pond design

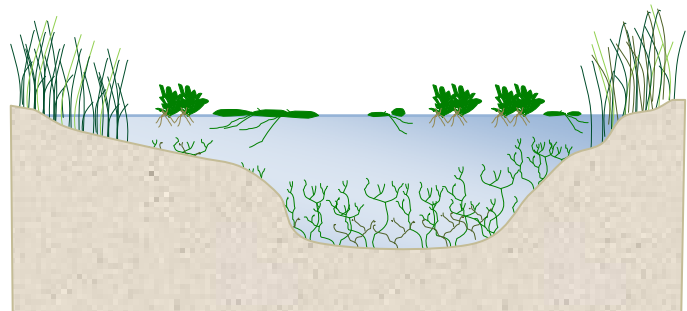
Relatively small (eg 10-50m²) ponds which will give more edge compared to their area are suitable for Fen Raft Spiders, but they should still be large enough to have an open, sunny water surface and provide abundant aquatic prey. Complex pond shapes, including linear features, will have more edge habitat than ponds with a round or simple design. Networks of ponds will colonise better than isolated ponds – Fen Raft Spiders have a relatively low tendency to disperse.

Ponds should include deep areas (about 1.25m) to reduce the likelihood of them drying out but be profiled with very gently shelving sides to allow a wide margin of emergent vegetation to develop (Figure 4). Fen Raft Spider nursery webs are usually built in vegetation directly above the water; falling summer water levels that leave the emergent vegetation stranded can result in breeding failure. Warm sunny sites are preferred for nurseries, so it is beneficial to encourage the development of emergent vegetation along south-facing banks, leaving deeper water close to north-facing banks.

Figure 4. Create small ponds to maximise the amount of edge habitat

Gently shelving sides encourage a wide margin of stiff-leaved emergent plants for nursery webs.

Floating Water Soldier also supports nursery webs.



Clean water allows abundant submerged and floating macrophyte growth to support aquatic invertebrates – food for the Fen Raft Spiders.

Deep pools prevent the pond from drying out.

High groundwater levels year round supports fen vegetation.

The structure of the pond side vegetation is very important as the spiders hunt, breed and also hibernate here. Stiff-leaved plants, complex vegetation structure and open, sunny conditions are important. At Redgrave and Lopham Fen, the Fen Raft Spider is particularly associated with ponds where the Great Fen-sedge grows, but avoids ponds with vigorous growth of Common Reed, so ponds for this species should not be created in reed-dominated areas. Fen Raft Spider densities are particularly high amongst the floating rosettes of Water Soldier – but note that this species should not be introduced to new sites.

Management

Most well designed ponds need little additional management provided they are located within low intensity catchments. However, for species such as the Fen Raft Spider, with very restricted populations, it is important to consider their specific needs and manage ponds to maintain optimum conditions to aid species recovery.

Manage tall, dense, marginal vegetation. Species such as Great Fen-sedge, should be cut or grazed on rotation to reduce shading and ensure vigorous growth. This sedge should be cut in early August, during the Fen Raft Spider breeding season, and it is important that dense clumps of it are left uncut around the pond margins. Cutting the sedge in July poses greater risks to breeding spiders and to nesting birds; at other times of year it risks frost damage and poor regrowth.

Grazing with cattle or ponies offers an alternative to mowing. Cattle grazing is the traditional management on the Pevensey Levels where it creates habitat variety, with poached, water-filled hollows surrounded by tussocky vegetation along the ditch banks. Sheep grazing is much less effective in creating suitable conditions.

On fen sites, careful control of stocking rates is required and will vary according to stock, vegetation type and the wetness of the site. The growth of Common Reed should be discouraged by removing it from ponds. This is most effectively done by removing the roots by mechanical excavation of sediment every 5 years or so. Vigorous reed encroachment around the ponds can be discouraged by early-autumn mowing.

Control water levels. Some ability to control water levels is advantageous, although not essential, unless the site dries out in summer. If water levels can be regulated, protracted and deep winter flooding should be avoided and relatively high levels maintained in summer. Such a regime is unlikely to suit all the wildlife in the pond so any such management will need to consider other species present.

Maintain clean water. Eutrophication is a problem where it occurs. Mitigation against eutrophication (e.g. payments to surrounding land owners) should be carried out where this is possible and affordable (Natural England should be consulted for advice on mitigation measures).

Monitor the population. This is essential where Fen Raft Spider populations occur to assess how they are responding to changing management and water levels. Where new populations are established by translocation, detailed monitoring of their success is particularly important (Box 1).

Box 1. Conservation work for Fen Raft Spider

The Fen Raft Spider is one of the many species that have become Endangered as a result of losses and pollution of lowland ponds, lakes and watercourses.

This BAP priority species is one of only two British spiders to be fully protected by law. A license is required from Natural England to do any work which may disturb them.

The Fen Raft Spider project www.dolomedes.org.uk is coordinating conservation work, including research, monitoring, conservation management, a translocation project and habitat creation work.

For further information about the Million Ponds Project and to consult other factsheets in the Pond Creation Toolkit, please visit www.freshwaterhabitats.org.uk or email enquiries to info@freshwaterhabitats.org.uk



This factsheet was prepared by Buglife with the advice and expertise of Dr. Helen Smith, www.dolomedes.org.uk.