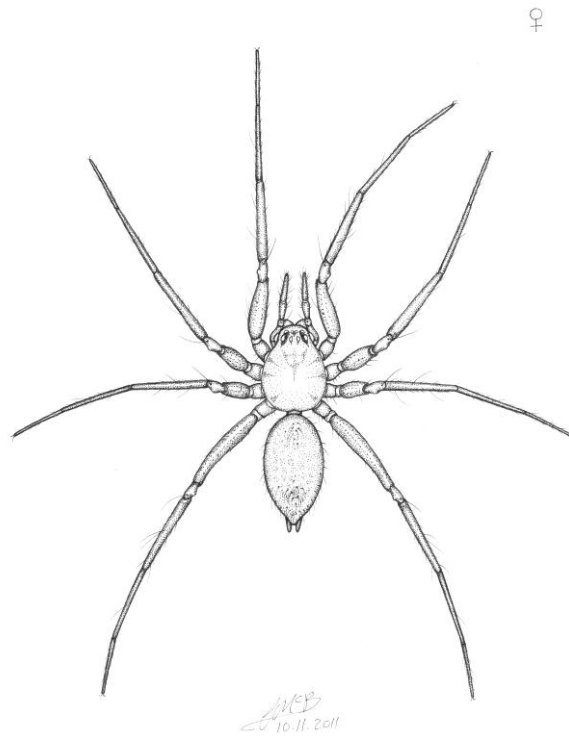




**The distribution, ecology and conservation of the
Horrid ground-weaver *Nothophantes horridus*.**

**Duncan Allen
2011**



**DISCOVER
WITH
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Buglife – The Invertebrate Conservation Trust

Introduction

The Horrid ground-weaver (*Nothophantes horridus* Merrett & Stevens, 1995) is a species of small Linyphiid spider (total body length of just 2.5mm.). The name comes from the Greek *Notho* meaning spurious and *Hyphantes* meaning weaver and *horridus* from the Latin for bristly referring to the characteristic bristly body and palps. Not much is known about the natural history and ecology of this spider it is thought to be nocturnal and troglodytic coming out to feed at night amongst the quarry slopes. It is for precisely this reason that this study was undertaken in order to elucidate the ecology of this spider.

The Horrid ground weaver is a world endemic to the UK and currently listed as a priority species on the UK Biodiversity Action Plan. It is the only representative of its genus and was first recorded and described in the UK in 1989. It was re-found in 1995, and has been described from six females collected between 1989 and 1994 (Merrett & Stevens 1999). In March 1997 two males and a female were found at Radford Quarry (Plymstock) bringing the total number of specimens found to date up to 9 individuals. This species is only known from two sites worldwide and both are in the Plymouth area: one at Radford Quarry, and the other (the type locality) which has recently been developed at Plymouth Trade Park, Macadam Road (previously known as Shapter's Field Quarry).

UK Status

The Horrid ground weaver is a UK Biodiversity Action Plan (UKBAP) priority species, and due to the type locality having been extensively developed it is listed as Critically Endangered. The species is also listed as a Natural Environment and Rural Communities Act 2006 - Species of Principal Importance in England.

The listing of this species on the UKBAP recognises its conservation as a national concern but there are currently no guidelines available for how to deliver this (in common with the majority of invertebrate species added to the UKBAP priority species list in the most recent review – 2004) - this is due to the lack of habitat and ecological data on the species. In order to develop an informed conservation strategy and give advice to aid conservation efforts, more information about the ecology and habitat associations of the Horrid ground weaver must be gathered.

Project Aims

- To confirm the current status and distribution of *N. horridus* in South Devon.
- To develop more effective sampling methods for future surveying and monitoring of the species.
- To advance our understanding of the ecology of the species.
- To develop an informed conservation strategy for the species.

Sites

The study focussed on the Radford Quarry site in Plymouth (SX5053), due to the development of the type locality Plymouth Trade Park, Macadam Road site access was not obtained. Another site at the Plymstock Royal Mail depot (SX503538) was identified for its potential due to close proximity to the existing site, and the existence of seemingly analogous habitat (quarried limestone cliff and slope).

Radford Quarry (fig 1 &2) is located in the south east of Plymouth next to Radford Lake. The site covers 5.22ha and is owned and managed by Plymouth City Council with restricted

public access. Inside the quarry there are a mixed variety of habitats including calcareous grassland, open habitat mosaics, low scrub, wet flushes and cliff/slope. A rich diversity of limestone plants and wildlife have been recorded some of which known to be nationally rare and scarce species.

Radford Quarry has been designated a County Wildlife Site due to its limestone habitats. Plant species recorded include the nationally scarce dwarf mouse-ear (*Cerastium pumilum*). Other plant species of interest include pyramidal orchid (*Anacamptis pyramidalis*), lesser centaury (*Centaurium pulchellum*), round-leaved crane's-bill (*Geranium rotundifolium*), pale flax (*Linum bienne*) and ivy broomrape (*Orobanche hederæ*). Invertebrate records include the nationally scarce centipede *Henia vesuviana* and butterflies such as the locally scarce brown argus (*Aricia agestis*).

Figure 1: Ariel view of Radford



Figure 2: Interior of Radford Quarry



The Royal Mail Depot (fig 3 & 4) at Plymstock was chosen due to its proximity and geological similarity to the existing sites. The sample site at the depot was a limestone bluff that lies just in front of the depot car park.

Figure 3: Ariel view of Depot note bluff above car



Figure 4: Limestone outcrop at Royal Mail depot



General Method

There is a need to establish the distribution of this species in order to assess its status as a UK endemic and to better plan for its conservation. Due to the size and cryptic nature of this spider developing effective surveying techniques is an essential part of the project so that future studies can be more effectively. Once an effective survey method had been established this will allow arachnologists to survey new sites to establish presence or absence of *N. horridus*.

Surveys were undertaken at a known historical site (Radford Quarry) and a potential new site (Plymstock Royal Mail depot) to focus on the survey technique development.

The following trapping techniques were used:

Platform Pitfall Trapping

From discussions with local experts and a review of existing literature on *N. horridus*, we found very little existing knowledge of the ecology of the species. However, it is thought that the species is a nocturnal hunter leaving fissures and cracks in the cliff face and hunting on the scree slopes surrounding the quarry most likely feeding on collembola and other small arthropoidal prey. It was decided that platform pitfall traps sunk into the scree slopes would be an effective way of capitalising on this behaviour. Platform pitfall traps are currently used by the University of Plymouth for tree canopy invertebrate sampling, the trap has a square plywood (17.8 x 17.8 cm) platform attached to the rim of the pitfall trap (which has a diameter of 10.5 cm) in order to increase the surface of the catchment area this has the added bonus in scree as acting as an anchoring point and allows scree and stones to be placed around the trap allowing for better interface with the environment.

Cavity straw refuge traps

Cavity straw traps are a simple and effective trapping technique used in the collection of terrestrial arthropods especially small arachnids (Cuthbertson and Murchie 2005). Drinking straws were placed into crevices and fissures in the cliff face, if *N. horridus* is using these as a refuge or as a means of navigating from underground to the surface it was hoped that these would prove effective in trapping the spider as it sheltered during the day.

Straw refuge traps

This design of straw trap follows the more conventional straw trap used in environmental monitoring (Cuthbertson and Murchie 2005) where the sterilized barley straw is substituted for paper art straws. The traps are made from tin cylinders lined with corrugated cardboard and filled with paper art straws this acts as artificial refugia and were placed into the scree slopes as well as in suitably sized crevices and small cave entrances.

Rock turning and pootering

After looking over some of the old field data from the original surveys for *N. horridus* it was found that one of adults from the Radford quarry site was caught under a stone on the quarry floor. In order to explore the possibility of *N. horridus* being found on the quarry floor an extensive sweep using standard pooters of the quarry was undertaken. A pooter is a standard piece of entomological sampling kit it comprises of two tubes and a chamber one tube is placed in the mouth and the other over the insect that you wish to sample a short sharp suck is used to pull the insect up the tube and into the collecting chamber. A group of volunteers from the University of Plymouth were taken to the site and arranged in a line across the site and proceeded to rock turn and pooter up all small spiders these spiders were put into 70% IMS and taken back to the laboratories at Plymouth University for identification.

Suction sampler

In order to maximise out time in the field sampling, two suction samplers were employed to allow us to sample harder to reach and denser vegetation and scree that could not be efficiently sampled by pootering. Suction samplers are known to be a very efficient method of sampling the smaller organisms associated with short vegetation (Bell & Wheatear, 2001). A suction sampler is a portable vacuum cleaner which is used to suck invertebrates off vegetation and the surface of the ground. The suction samplers employed in this study were modified conventional garden leaf blowers, by inserting a fine net in the intake of the machine, small invertebrates are sucked up and collected in the net, the nozzle is most effective when the nozzle is held as close too or against a surface and swept back and forth covering a known area (Wright & Stewart, 1992). This method was mainly deployed on dense grass tussocks and other vegetation as well as some of the larger scree slopes. once the area had been sampled the collection net was emptied into a large white tray and all spiders were pootered up and collected stored in 70% IMS and brought back to Plymouth University.

Noteworthy Species

While the sampling did not produce any specimens of *N. horridus* it did however confirm the presence of another rare European spider of the family Theridiidae currently listed as RDB 3-Rare (Bratton 1991) *Episinus maculipes*. This is not only just a new record for the species it is also a new site, this can be seen as an unexpected yet positive outcome with these records helping to add to data for this species.

Further study and recommendations

It is proposed that this study be resumed again in the spring of 2012 in the months of March and April, as this is when the adults of *N. horridus* have traditionally been found. Resuming the search will still follow the same sampling methods described above with a greater emphasis on volunteers assisted field sweeps with suction samplers and pooters, as this generated the most linyphiids as well as other spider species from the quarry, this method is also historically how *N. horridus* was found at both sites in the past. Pitfalls and straw traps will still be used over the two months with a look at the relocation of some of the traps in different habitats to maximise the chances of sampling *N. horridus* if it is found among the rocks on the quarry floor.

Presence of *Nothopantes horridus*

We have been unable to confirm or deny the presence of *N. horridus* at either Radford Quarry or the Royal Mail Depot, while extensive sampling yielded no positive results we cannot discount the possibility that this species is still living at the quarry site, there has been no management change or alterations to the quarry in recent years that would lead to the loss of this species.

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