

**Monitoring Invertebrate features on SSSI –
Porrhomma rosenhaueri in Lesser Garth
Cave, Cardiff**

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CCW Contract Science No. 907



The cave spider *Porrhomma rosenhaueri* in Lesser Garth Cave

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Rhywogaeth o gorynod sy'n byw mewn ogofâu yw'r *Porrhomma rosenhaueri* (L. Koch), ac maent yn unigryw ymhlith ffawna Prydain. Mae'n debyg taw hon yw'r unig rywogaeth o gorryn paleotroglobitig yn y wlad. Er ei bod hi'n sicr nad oes digon o waith cofnodi wedi cael ei wneud ar ffawna ogofâu Prydain, mae digon o waith wedi cael ei wneud i awgrymu bod y *Porrhomma rosenhaueri* wir yn brin (Fowles 1994). Dosbarthiad cyfyng iawn sydd i'r corynod hyn ym Mhrydain, gan taw dim ond dau safle yn ne Cymru y gwyddom amdanynt, sef Ogof y Ci ger Merthyr Tudful ac Ogof Fach y Garth ger Caerdydd (Jefferson 1989).

Dau weithiwr, Chapman a Jefferson fu'n gyfrifol am ganfod poblogaeth Ogof Fach y Garth ym 1979, a hynny wrth chwilio am yr isopod *Proasellus cavaticus* a ganfyddir hefyd mewn ogofâu (Chapman 1980). Ar y pryd, nododd Chapman y gallai'r boblogaeth o *Porrhomma rosenhaueri* fod yn weddol fawr, ond rhybuddiodd fod y safle o dan berygl oherwydd gwaith chwarela gerllaw. Ni chynhaliwyd arolwg swyddogol bellach tan Fehefin 1997, pan ddarganfu Carter a Mann (1997) 6 o anifeiliaid byw a thystiolaeth o lawer iawn mwy.

Nod yr arolwg hwn oedd sefydlu protocol Monitro Safonau Cyffredin (CSM), gan ganiatáu ar gyfer ymweliadau pellach i gasglu data ystyrllon ar faint a hyfywedd y boblogaeth o gorynnod, ynghyd â chyflwr eu cynefin. Cymerwyd trawslun o brif dramwyfa'r ogof gan ddefnyddio gwybodaeth a phrofiad o arolwg 1997. Cafodd y rhannau hygyrch o'r brif dramwyfa eu harolygu'n ofalus, gan gofnodi'r corynnod byw a'r gweoedd oedd mewn cyflwr da er nad oedd corynnod arnynt. Adeg yr ymweliad cyntaf ym Medi 2009, canfuwyd 17 o gorynnod byw, a chasglwyd un at ddibenion dilysu. Cyflawnwyd arolwg pellach yn Rhagfyr 2009 ond dim ond 6 coryn byw a ganfuwyd y tro hwnnw. Trafodir rhesymau posibl dros hynny ymhellach yn yr adroddiad.

Er gwaethaf y ffaith fod Ogof Fach y Garth ar gyrion chwarel brysur, yr argraff gyffredinol yw bod y boblogaeth o gorynnod *Porrhomma rosenhaueri* yn dal i fod yn gadarn yn Ogof Fach y Garth. Mae gan yr ogof ei hun amrywiaeth dda o rywogaethau ogof ac felly mae'n safle pwysig ar gyfer bywydeg ogofâu Prydain.

EXECUTIVE SUMMARY

The cave dwelling spider *Porrhomma rosenhaueri* (L. Koch) is unique to the British fauna as it is considered to be the only species of paleotroglobitic spider present, and whilst the cavernicolous fauna of the UK has undoubtedly been under-recorded, sufficient work has occurred to suggest that *Porrhomma rosenhaueri* is genuinely rare (Fowles 1994). The spider has a very limited distribution in the UK and is only known from two sites in South Wales, Ogof y Ci near Merthyr Tydfil and Lesser Garth Cave near Cardiff (Jefferson 1989).

In 1979 two workers, Chapman and Jefferson, found the Lesser Garth Cave population whilst investigating the cave for the cave dwelling isopod *Proasellus cavaticus* (Chapman 1980). At the time Chapman reported that the *Porrhomma rosenhaueri* population may well be quite sizeable but warned that the site was under the threat of quarrying. It was not until June 1997 that the next recorded survey took place when Carter and Mann (1997) found 6 live animals and evidence for many more.

The aim of this survey was to set up a Common Standards Monitoring (CSM) protocol, allowing future visits to compile meaningful data as to the size and viability of the spider population along with the condition of the habitat. A transect of the main passage was carried out using information and experience from the 1997 survey. The accessible parts of the main passage were carefully surveyed, recording both live spiders and webs in good condition but with no obvious spider. The first visit was made in September 2009 and found 17 live spiders, removing one to confirm identification. A follow up visit in December 2009 repeated the survey but found only 6 live spiders. Possible reasons for this are discussed further in the report.

The overall impression is that, despite living next to an active quarry, the spider *Porrhomma rosenhaueri* is still well-established in the Lesser Garth Cave. The cave itself has a rich diversity of cave associated species and is thus an important site for speleobiology in the UK.

1 INTRODUCTION

The cave dwelling spider *Porrhomma rosenhaueri* (L. Koch, 1872) is unique to the British fauna as it is considered to be the only species of paleotroglobitic spider present, and whilst the cavernicolous fauna of the UK has undoubtedly been under-recorded, sufficient work has occurred to suggest that *P. rosenhaueri* is genuinely rare (Fowles 1994). The spider has a very limited distribution in the UK and is known only from two sites, both of which are in South Wales; Ogof y Ci near Merthyr Tydfil, and Lesser Garth Cave near Cardiff (Jefferson 1989).

In 1979 two workers, Chapman and Jefferson, found the Lesser Garth Cave population whilst investigating the cave for the cave dwelling isopod *Proasellus cavaticus* (Chapman 1980). At the time Chapman reported that the *P. rosenhaueri* population may well be quite sizeable but warned that the site was under the threat of quarrying. In 1996 the active quarry next to the cave put in an application to extend the quarry and to drive a tunnel from a main road into the floor of the existing quarry, passing under the Lesser Garth Cave complex. The consultancy responsible for the impact assessments commissioned a biological survey of the cave complex with the view of trying to establish whether *P. rosenhaueri* was still present in the cave. In June 1997 Carter and Mann (1997) carried out this survey, which found 6 live animals and evidence for many more. The quarry company, Cemex UK Materials Ltd, was subsequently successful in its planning application and at the commencement of the recent planning works the quarry company placed a grilled gate on the entrance to the cave as a health and safety precaution. The construction of the tunnel and new stone crushing plant was completed during 2009.

Lesser Garth Cave (NGR ST125821) itself is located on the outskirts of Cardiff close to the top of the SE corner of the Lesser Garth hill. The site is within a designated SSSI and is important due to its biological (Jefferson 1989) and archaeological significance (appendix 1). The cave is formed in the Black Rock limestone which is mainly dolomitized. The cave appears to have formed along a bedding plane with vadose downcutting (Davis 1983), followed by collapse once the passage had been abandoned by the stream. The cave forms part of a complex of small caves which includes Ogof Ffynnon Taf (which can now only be accessed via a tight squeeze via Lesser Garth cave) and Ogof Pen y Craig. In total the complex consists of around 400m of accessible passage.

Little is known of the biology of *P. rosenhaueri*, with little detailed survey work with which to base conservation decisions. Consequently there is little or no information on the lifecycle of the species, and currently the spider is listed as RBD2: vulnerable in Bratton (1991) and Endangered (EN) using IUCN classifications in a recent draft review by Dawson et al (2008). A number of the spiders in this genus can be found living with cracks in the soil surface or even found within mines, cellars and caves e.g. *Porrhomma egria* which also exhibits reduced eyes. Typically several of the species in the group produce single egg sacs which are attached to the rock, and which are then guarded by the female (Harvey et al, 2002). Typically males must have to wander in search of females, and lone males of *P. rosenhaueri* have been observed wandering over the cave floor or calcited walls. This survey has been commissioned to begin to provide some further baseline data to enable the development of a Common Standards Monitoring (CSM) protocol.

2 METHODOLOGY

2.1 Survey site access

The cave system is on land owned by Cemex UK Materials Ltd who own and operate the quarry next to the cave, and from whom permission to visit the cave was obtained prior to the visit. This required producing a risk assessment (appendix 1), method statement (appendix 2) and suitable indemnity cover.

Access to the cave involves a short but very steep walk up a slope which can be very slippery and thus requires care. The cave itself, although not complex, still requires the use of the correct caving equipment. Figure 1 shows a survey of the cave. The entrance chamber area is formed from a boulder platform (figure 2) with occasional pits in the floor. After a short distance a climb down into the main passage is encountered (figure 3) with a parallel rift passage system joining on the left also with drops down. The climb into the main chamber is around 8m deep and needs to be rigged with suitable rope protection equipment by a trained person. A resin embedded steel 'P' hanger is located close to the top of the climb which is backed up using natural belays. Once in the large main cave passage (figures 4 and 5) this can then be followed for around 100m over a number of short climbs and drops, ending in a boulder choke. Two pools occur in the floor of the cave at around half way and close to the end of the cave (figure 6). These contain the stygobitic isopod *Proasellus aquaticus* and numerous Collembola so should be avoided. The only significant side passage in this part of the cave is a narrow oxbow passage.

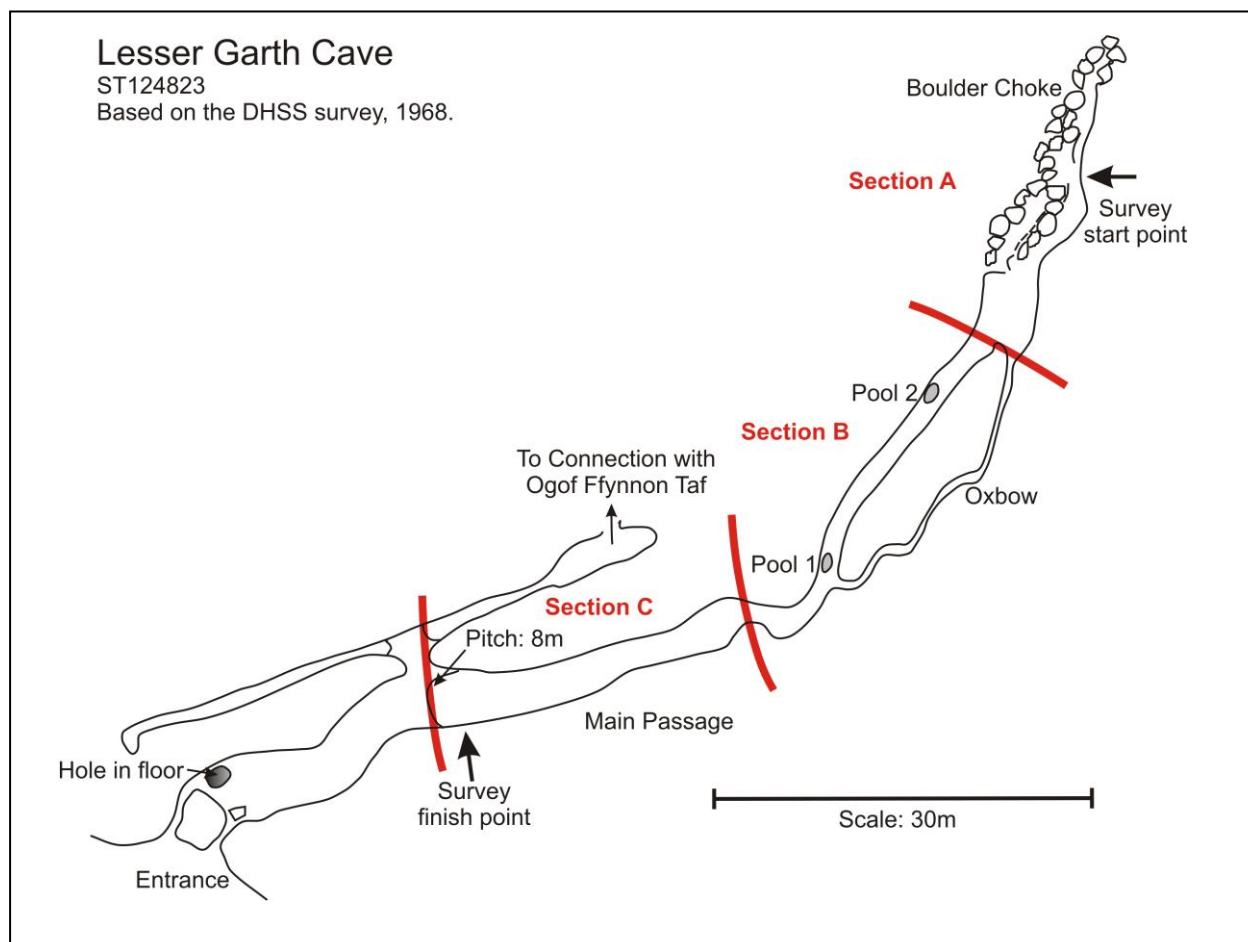


Figure 1. Survey of Lesser Garth Cave showing the position of the start and finish transect points.

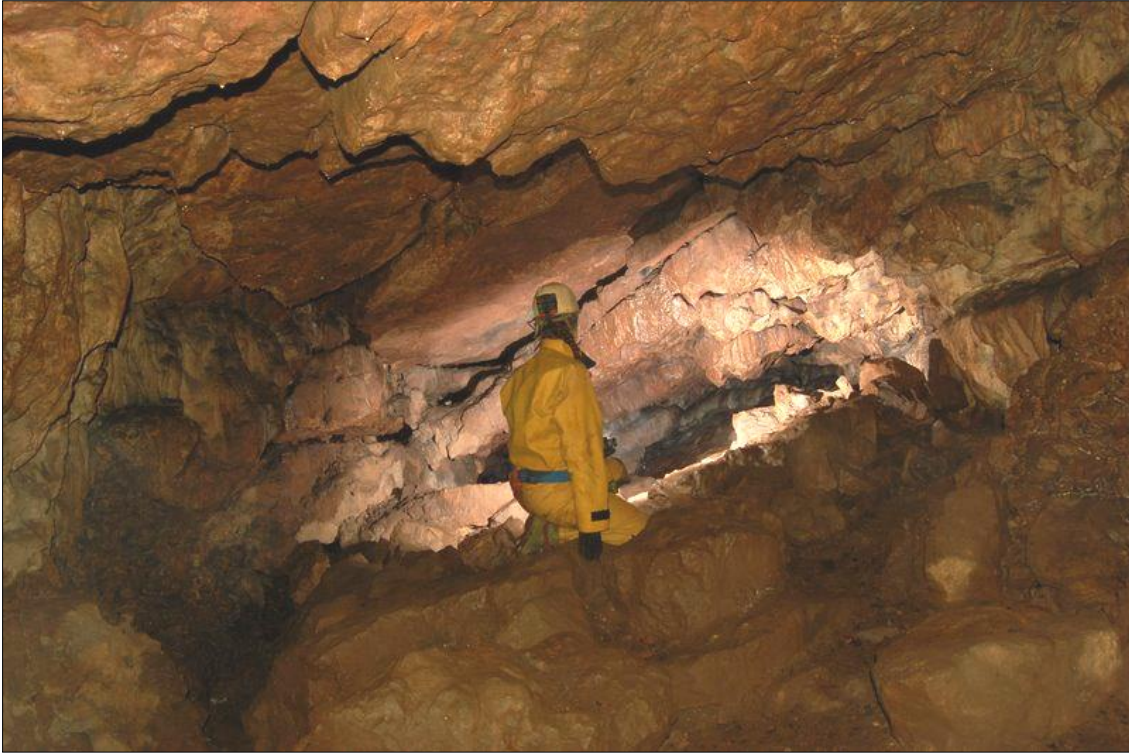
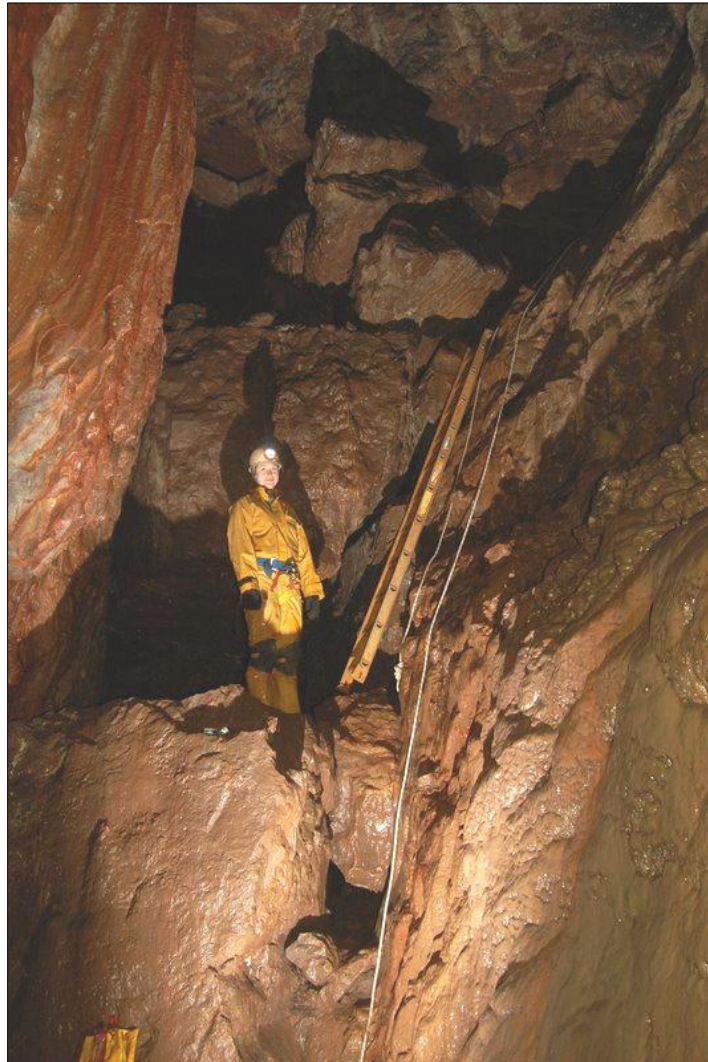


Figure 2. In the entrance chamber area on the boulder platform looking into the cave, while figure 3 below shows the climb down into the main passage from the bottom. The aluminum ladder is an 'aid' put in by previous visitors to the cave.



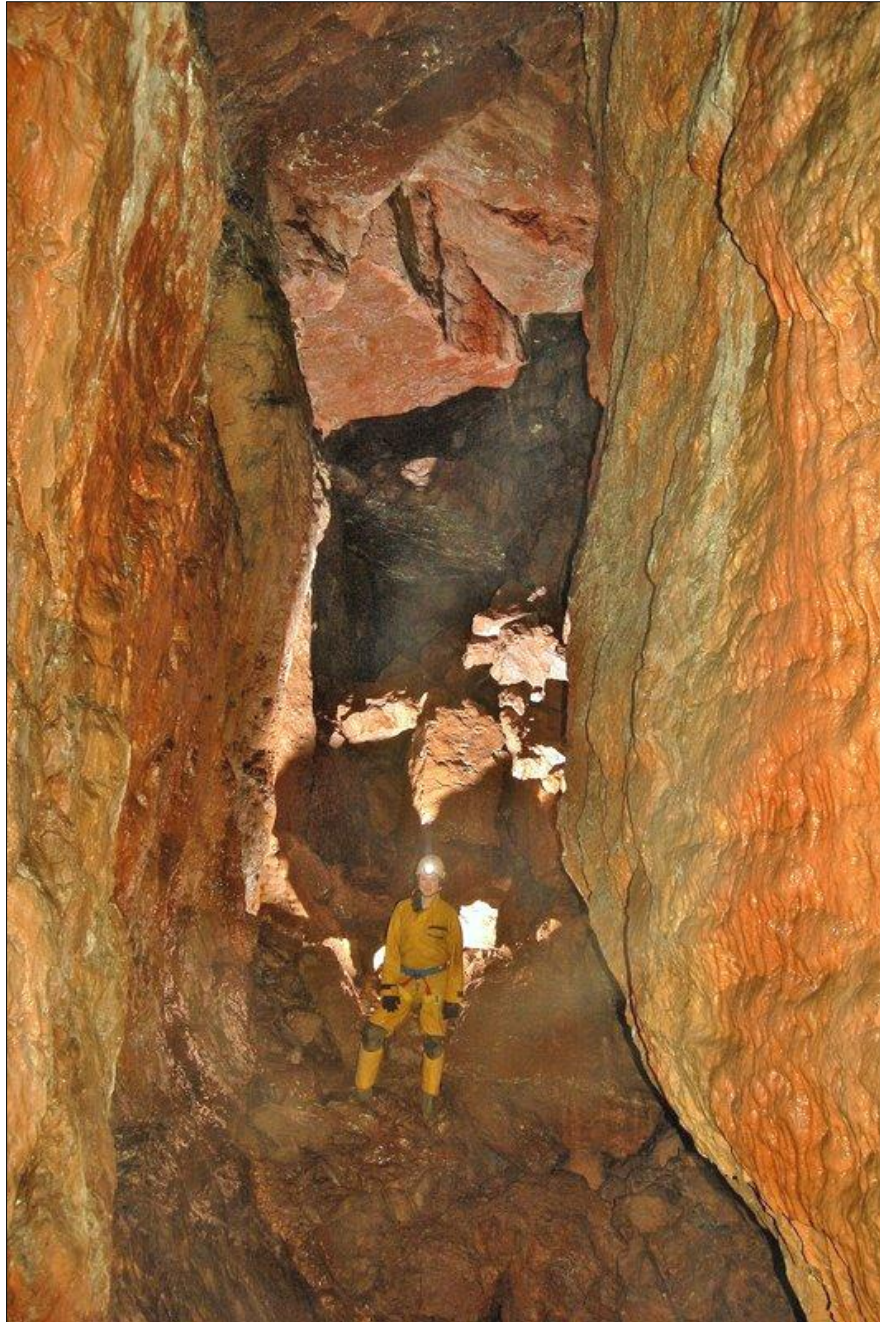


Figure 4. In the main passage looking into the cave.

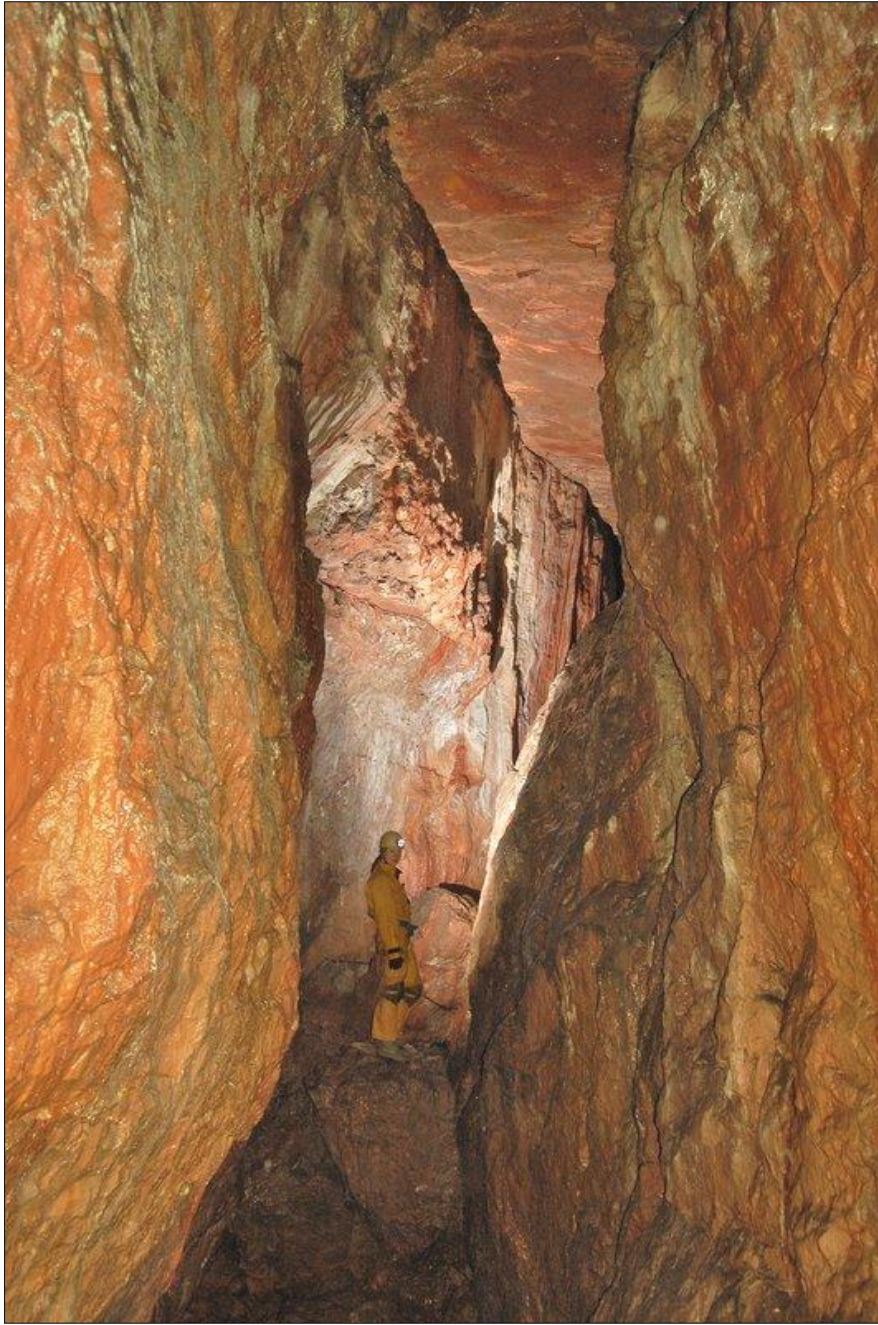


Figure 5. In the main passage, but now looking back in the direction of the entrance.



Figure 6. Searching for spiders in the latter half of the cave in the region of the second pool where the styglobitic isopod *Proasellus cavaticus* can be found.

2.2 Survey methodology

In order to develop a repeatable survey of the cave for *P. rosenhaueri* a set transect of the main cave was developed. The overall locations of the start and finish points are marked on figure 1. The start point was at the end of the cave close to the terminal boulder choke on top of a short but obvious climb up. The survey then proceed back towards the entrance of the cave finishing at the large boulder directly below the climb down into the main passage as shown in figure 3. During the survey a careful search was carried out along the accessible areas of the cave passage, both at floor level and as high on the walls as could be safely assessed. As the spiders are only around 2mm long and very pale coloured they are difficult to spot. The trick is to have a hand held light in addition to the head torch, and to use a raking light to pick up the very fine webs of the spider in suitable fissures, limestone pockets and gaps in rocks (figure 7). Once a web is spotted then the angled light can be used to look for the presence of a spider on the web. Both spiders and the presence of webs in good condition were recorded on the survey notes. A note was also made of any other species found in the cave as an additional indicator of the condition of the overall environment in the cave.

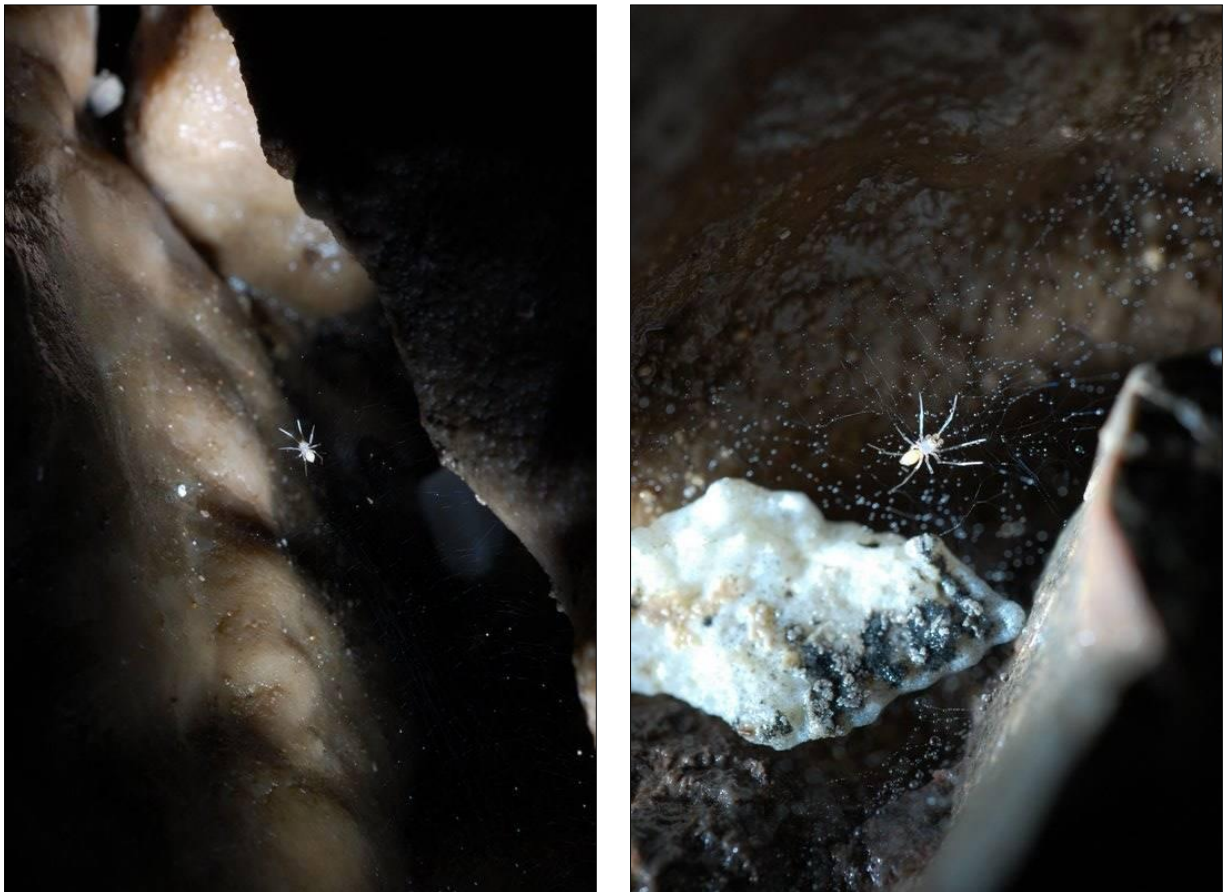


Figure 7. In the left hand image is a female, whilst on the right is a male, both on webs amongst rocks at floor level. Both images are lit with a hand held high powered LED light held at an angle.

It is possible to confuse *P. rosenhaueri* with other species of *Porrhomma* especially in the field. Both *P. egeria* and *P. convexum* can occur in caves. Both of these species are darker in

colouration and larger than *P. rosenhaueri*, although *P. egeria* can exhibit paler colouration and reduced eyes. Neither of these species has been recorded from Lesser Garth Cave and all vouchers examined from the cave have been *P. rosenhaueri*. Thus it is considered safe to assume a small, very pale spider found in the cave is *P. rosenhaueri*. If spider numbers are numerous it is recommended a voucher specimen is collected into 70-80% ethanol based solution for identification by a suitable specialist. Detailed notes on the identification of *Porrhomma* species can be found on the British Arachnological Society website - http://wiki.britishspiders.org.uk/images/3/33/Identification_of_Porrhomma_species.pdf. It is potentially more difficult to assume any webs found belong to *P. rosenhaueri*. Thus an assumption has to again be made that a fine web found in suitable habitat belongs to *P. rosenhaueri*. Finding a live spider on a web will give the field worker a feel for the look of the spider and the structure of its web complex (see cover image and figure 7).

3 RESULTS

3.1 First Survey

Figure 8 shows the approximate distribution of live spiders and webs found between the two transect points in the cave on the first survey. In total 17 live spiders were found during this survey, with 24 additional webs in good condition but with no obvious spider in residence. The spiders were found within wall fissures and gaps amongst rocks at floor level.

The overall habitat of the cave appeared to be good. The cave had the expected entrance fauna of the large cave spider *Meta menardi* and other associated spiders such as *Metellina merianae*, as well as moths such as *Triphosa dubitata*. Deeper within the cave could be found the stygobitic isopod *Proasellus cavaticus* within the two permanent pools in the cave. Throughout the cave bat droppings showed the site was being actively used, presumably by the Lesser Horseshoe bat *Rhinolophus hipposideros*.

3.2 Second Survey

Figure 9 shows the results of the second survey. On this visit only 6 live spiders were found, although a further 29 webs were also located. The overall pattern of spiders and webs mirrored the previous visit in September.

In addition the expected entrance fauna was present, including a number of eggs sacs of the spider *M. menardi*, as was the presence of *P. cavaticus* in the pools despite recent cigarette butt debris in the first pool. In addition, between the first and second pools a single adult of the harvestman *Sabacon viscayanum* was found, while in the main passage between the climb down and the first pool three Lesser Horseshoe bats, *R. hipposideros*, were spotted roosting high up.

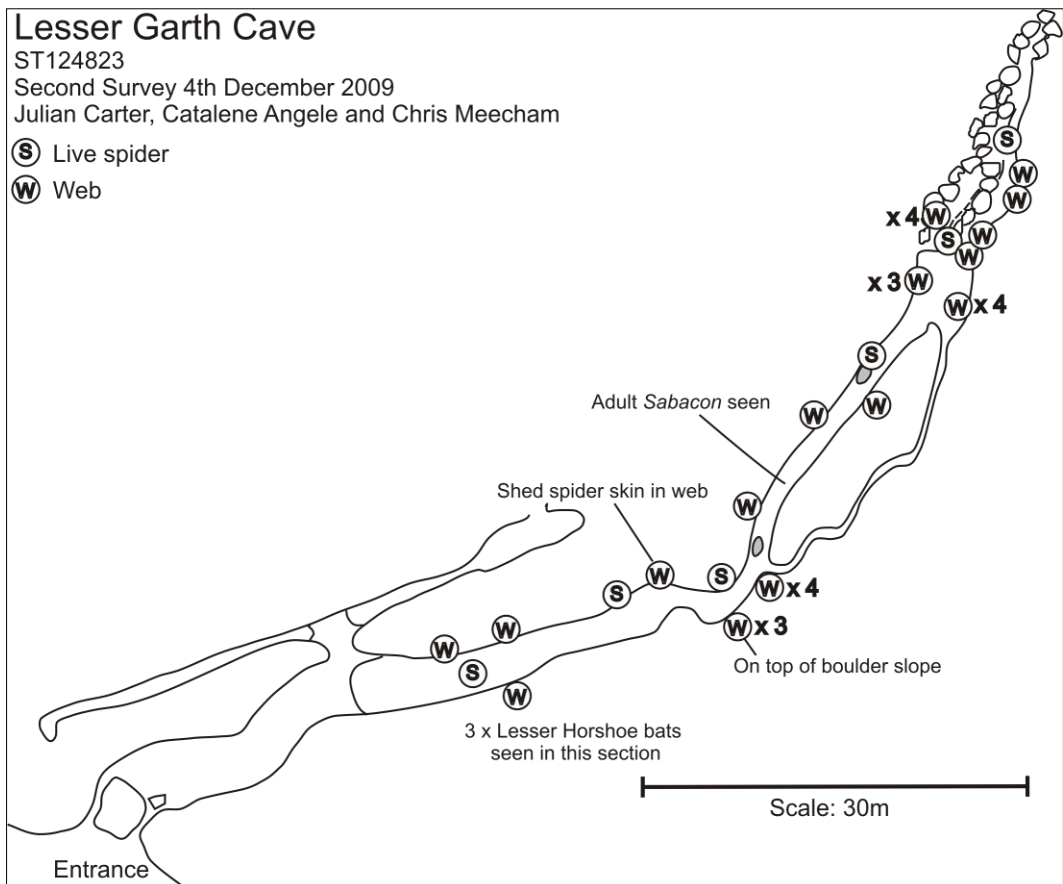
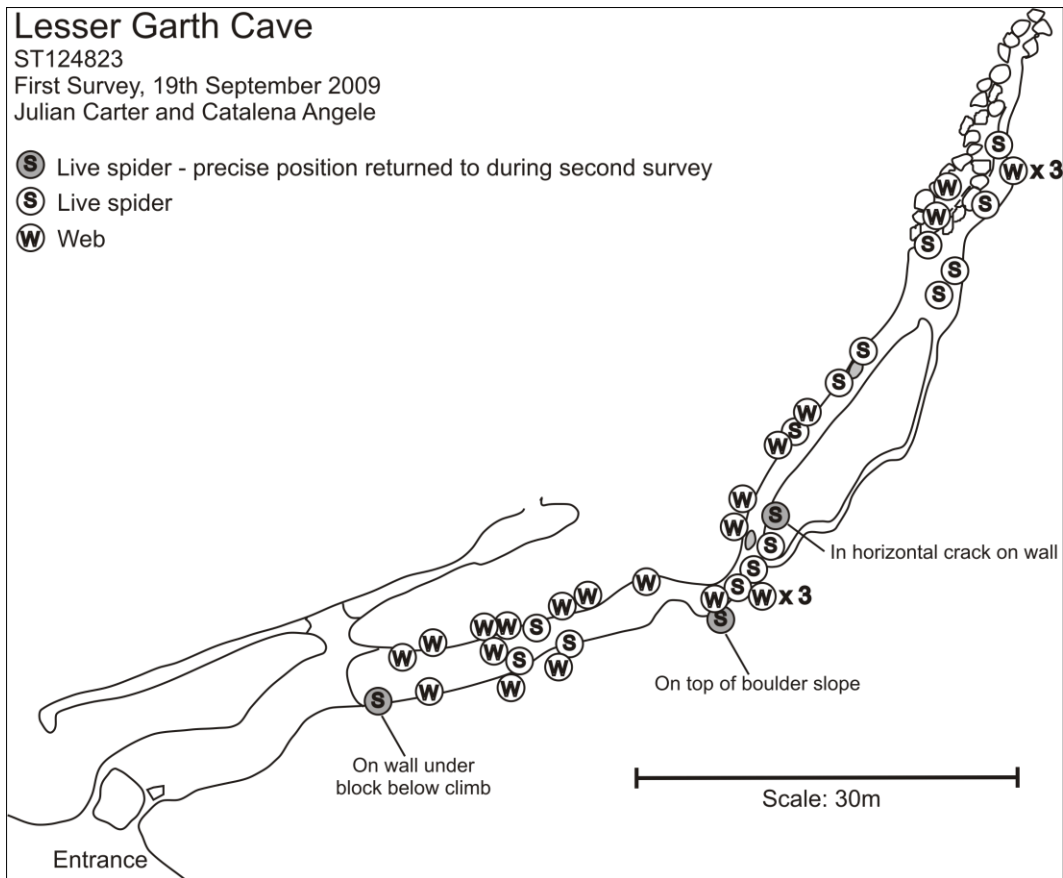


Figure 8 (top) and figure 9 (bottom). Results of the two surveys on the 19th September and 4th December 2009 respectively.

4 DISCUSSION

4.1 Historical data

The Lesser Garth population of *P. rosenhaueri* was found in 1980 by Chapman and Jefferson (Chapman 1980) who were primarily visiting the cave to search for a reported population of the stygobitic isopod *P. cavaticus*. During this visit they found 4 live spiders and deduced that there must be a good population in the cave as they did not carry out a very exhaustive search.

The next known recorded visit was part of a biological survey of the cave (Carter and Mann, 1997), with special reference to *P. rosenhaueri*. During this visit 6 live spiders were recorded which were all found in the section of the cave from the base of the climb to the first pool. No spiders were recorded in the further end of the cave in this survey.

Numerous visits by interested cavers and biologists have recorded the presence of the spider in the cave since its original discovery but these have been ad hoc observations that have generally remained unrecorded.

4.2 Current data

The two surveys reported here have found live spiders, along with evidence of the spiders throughout the whole section of the cave surveyed. Within this a number of areas appear to have higher abundances of *P. rosenhaueri*; an area of the main passage around 15m from the base of the climb; the area leading to the first pool; the area around the second pool; and the section towards the end of the cave around the junction with the oxbow passage.

The difference in the counts between the two visits is currently more difficult to explain as there is still currently little data on the biology of *P. rosenhaueri*. It could well be that there is a seasonal die-off of mature adult spiders, although such seasonal responses are usually less pronounced with troglobitic cave dwelling animals. Caves tend to offer an environment that is more consistent with stable environmental parameters and a reduced risk from predation. The trade off is a more nutrient poor environment due to reduced food availability. True cave dwellers therefore develop strategies to deal with increased starvation and sporadic food supply by reducing metabolic rates, reducing sensory structures that are not required such as eyes, prolonged life expectancy and larger but fewer eggs. *P. rosenhaueri* certainly exhibits characters expected in a cave adapted animal such as pale colouration and much reduced eyes, but other aspects of its life history are unknown. Further possible evidence that the difference in spider counts may be a periodic die off was found in three precise positions in the cave which had spiders in the September survey, but no evidence of either webs or spiders in the December visit (marked on figure 8).

Another possibility for the difference in spider counts could be disturbance. In recent years access to the cave has been more restrictive, although the entrance gate does get vandalised and the cave can also be accessed by a squeeze under an entrance block that bypasses the gate. Between the two visits reported here the gate had been vandalised again allowing uncontrolled access (see figure 10). Disturbance between the two visits was evident in the cave through discarded rubbish and the presence of part of an old aluminium ladder hanging down the entrance climb (seen in figure 3). Whether this apparent increase in visitor pressure on the cave had directly affected the spider counts is difficult to assess. However considering the cave has been open to access prior to the gate being placed a few years back, and that there is evidence of much past vandalism in the cave through broken formations and discarded rubbish in cracks etc it is unlikely. The cave has been open to a great deal of past disturbance and the spider populations have persisted, although such disturbance has undoubtedly been detrimental to overall condition of the cave and its habitat.

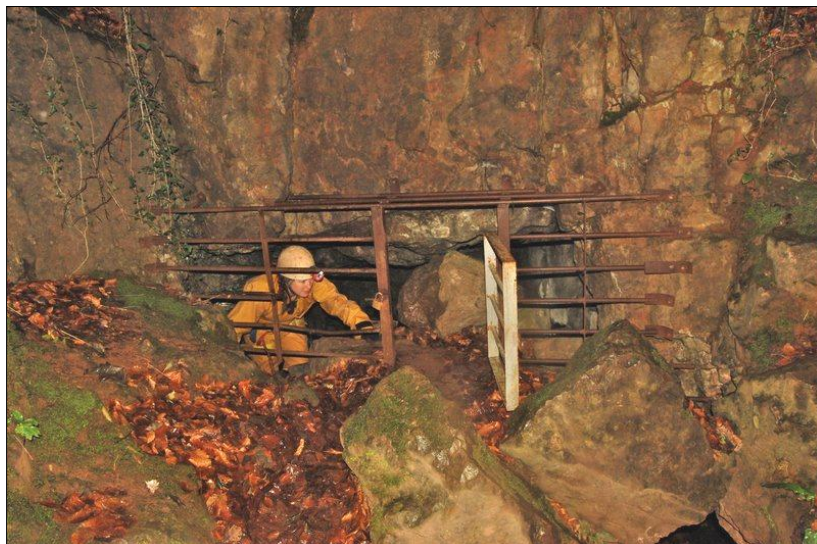


Figure 10. Entrance to cave showing the vandalised entrance grill to the left of the gate.

4.3 Summary of spider counts.

The known data is summarised in Table 1, with casual records confirming the continued presence of the spider between the recorded visits. Variability in the population dynamics can only be more fully assessed through further survey work to build on the existing information.

Table 1: summary of the spider counts from the recorded visits to the cave.		
Survey	Live spiders	Webs
Chapman, July 1980 (initial discovery)	4	-
Carter and Mann, June 1997	6	-
16/09/2009 Visit	17	25
04/12/2009 Visit	6	28

4.4 Important habitat attributes

Part of the CSM process is also to try and define whether the habitat is in favourable condition, but with few detailed surveys of the cave it is difficult to draw conclusions as to status of the *P. rosenhaueri* population and its associated habitat. The site has been open to continual human disturbance for some considerable time, as suggested by the archaeology of the site (Redknapp et al. in press). More recent years have seen the additional threats of quarrying and of increased human visitation for leisure. Despite this the cave still has a rich cave biodiversity for a UK cave system. As the September survey found good numbers of the live spider, it can be assumed that the habitat is in a favourable condition and this is supported by the presence of other important cave dwelling species through the cave as discussed in the results. Also, while some litter is evident in the cave, the presence of the gate has reduced the overall disturbance on the cave over the last 3 years despite regular vandalism. Therefore, important habitat attributes within the cave environment that can be recorded are the overall biology of the site, focusing on the absence or presence of some key species, and the overall condition of the cave with reference to pollution and litter debris.

However, the condition of the cave habitat should also be considered along with the condition of the surrounding SSSI within which it is based. A characteristic of the two caves *P. rosenhaueri* is found within in the UK is that they are both close to the surface, and appear to have higher nutrient loads than deeper cave systems which are more obviously devoid of food sources. A system such as Lesser Garth Cave which has low over burden is thus more directly linked to the surface ecology and nutrient flows through the soil and fractured rocks zones than deeper, more isolated cave passages. The presumed main prey for *P. rosenhaueri* is Collembola which have been observed on the walls and pools of the cave system, and which are common inhabitants within the sub surface ecology. As a result it would seem likely that *P. rosenhaueri*, whilst showing adaptation to the cave environment, is still reliant on a more regular food supply than very specialist cave adapted animals such as *P. cavaticus* which is highly tolerant to starvation. This may explain the seasonal change in adult numbers if the spider is not exhibiting the prolonged life style expected with many other cave adapted animals. It also demonstrates that the quality of the surface habitat can potentially have a considerable effect on the cave habitat.

4.5 Conservation objective

Conservation Objective (for when the feature is in favourable condition)	To maintain the spider <i>Porrhomma rosenhaueri</i> in Lesser Garth Cave SSSI in favourable condition where
Lower limit	Six spiders and fifteen fresh unoccupied webs recorded in total along the transects, with at least one spider in each of the three transect sections (see Fig. 1) Or: Twenty spiders recorded along the whole transect, with at least two spiders in each transect section
Definition of fresh unoccupied webs	Spider webs that are intact and are not full of debris

The key objective is to maintain the population of the troglobitic spider *P. rosenhaueri* within the Lesser Garth Cave in Favourable Condition. Currently the information available on this species is very limited making measurable objectives hard to define. Using the information derived by this and previous work it is suggested that the *P. rosenhaueri* population is in favourable condition where:

- 6 or more live individuals are found along the defined transect, including additional evidence of a more extensive population through the presence of intact webs.

It is not possible at present to establish attributes to assess the quality of the habitat for *P. rosenhaueri*. The presence of other cave fauna in the cave would suggest a favourable habitat is present and this would include populations of the cave spider *Meta menardi* amongst the entrance fauna; the presence of the cave isopod *P. cavaticus* within the two permanent pools; and evidence of bat usage in the cave through the presence of fresh bat droppings. Concerns should be raised if there is evidence of increased disturbance within the body of the cave, either through commercial operations, vandalism, litter or other forms of pollution.

4.6 Management recommendations

Due to the current lack of knowledge on the lifecycle and the extent of the *P. rosenhaueri* population it is difficult to make any firm management recommendations other than to preserve the cave habitat as a whole. The best way to protect the cave would be to continue to control access through a bat friendly gate system on the entrance. However this is fraught with problems. The cave, prior to the recent quarry works, has effectively been open access, albeit without proper landowner permissions. When a gate has been installed this has been subject to repeated vandalism in order to obtain access, and any controlled access system will require a suitable management process.

Whether the cave remains gated or not, the management of the site would require a regular check of the site to review its condition. It is unclear who is using the cave for access. Bone-fide caving groups tend to respect access conditions and tend to be well aware of cave conservation issues. However many of the persons entering this cave seems to be poorly aware of these issues judging by the graffiti and litter that occurs in the cave. These problems could be improved through increasing awareness of the cave's importance e.g. through the use of an interpretation notice at the entrance, web-based information sources, or development of a local trail that highlights the importance of the SSSI as a whole. Such actions would require suitable funding and close cooperation with the landowners, management authorities and local community but could be of benefit to all involved.

4.7 Future Monitoring

Understanding more fully the life history of *P. rosenhaueri* will be very important to inform conservation management decisions. It is currently not known when eggs are laid, how long the spiders live or the extent of their food source, which is presumably Collembola. Also, as these cave populations are apparently very isolated it would be a useful research project to explore the conservation genetics of the species and how it relates to other European populations. Such studies would be difficult, time consuming and outside the capacity of a CSM project. However the setting up of this CSM does provides the framework that begins to put together recorded information on this particular spider population and its associated habitat.

It would also be useful to establish if the spider is present in the other associated cave systems to provide an idea of the extent of the underground population, although establishing the true extent of the population will be virtually impossible since the spiders will almost certainly be living in voids and cavities completely inaccessible to a field worker.

4.8 Monitoring Protocol

Once long term monitoring has started, the parameters used to decided whether the spider population and its habitat is in favourable condition can begin to be refined. Thus it is very likely that the thresholds suggested above and the protocol set out below will require some modification.

- Carry out the survey at a set time of year, such as during September which has so far recorded the peak count. Additional surveys are of course desirable if the resource is available.
- It is important that field workers are familiar with both the cave environment and how to find the spiders prior to beginning the survey transect. Thus it is recommended that the survey begins at the transect point at the rear of the cave as the surveyors will then be familiar with the terrain they are to cover, and that time is spent becoming familiar with how to spot the spiders and their webs before starting the actual transect.

- The survey is carried out in pairs slowly moving through the cave between the two set transect points. Only areas of the cave and floor safely accessible are searched. This should take around 3+ hours.
- All live spiders are recorded. If a web is found without an obvious spider and considered to be in good condition, i.e. is not fragmented and full of debris, this is also recorded.
- During the visit record the presence of the more obvious cave associated fauna such as the cave spider *M. menardi* amongst the entrance fauna; the presence of the cave isopod *P. cavaticus* within the two permanent pools; and evidence of bat usage in the cave through the presence of fresh bat droppings.
- Record the general condition of the cave along with evidence of any damaging disturbance within the cave such as vandalism, litter and other forms of pollution. Photography can be useful for this. The points where the main cave passage photographs used in this report were taken have been marked on figure 11.

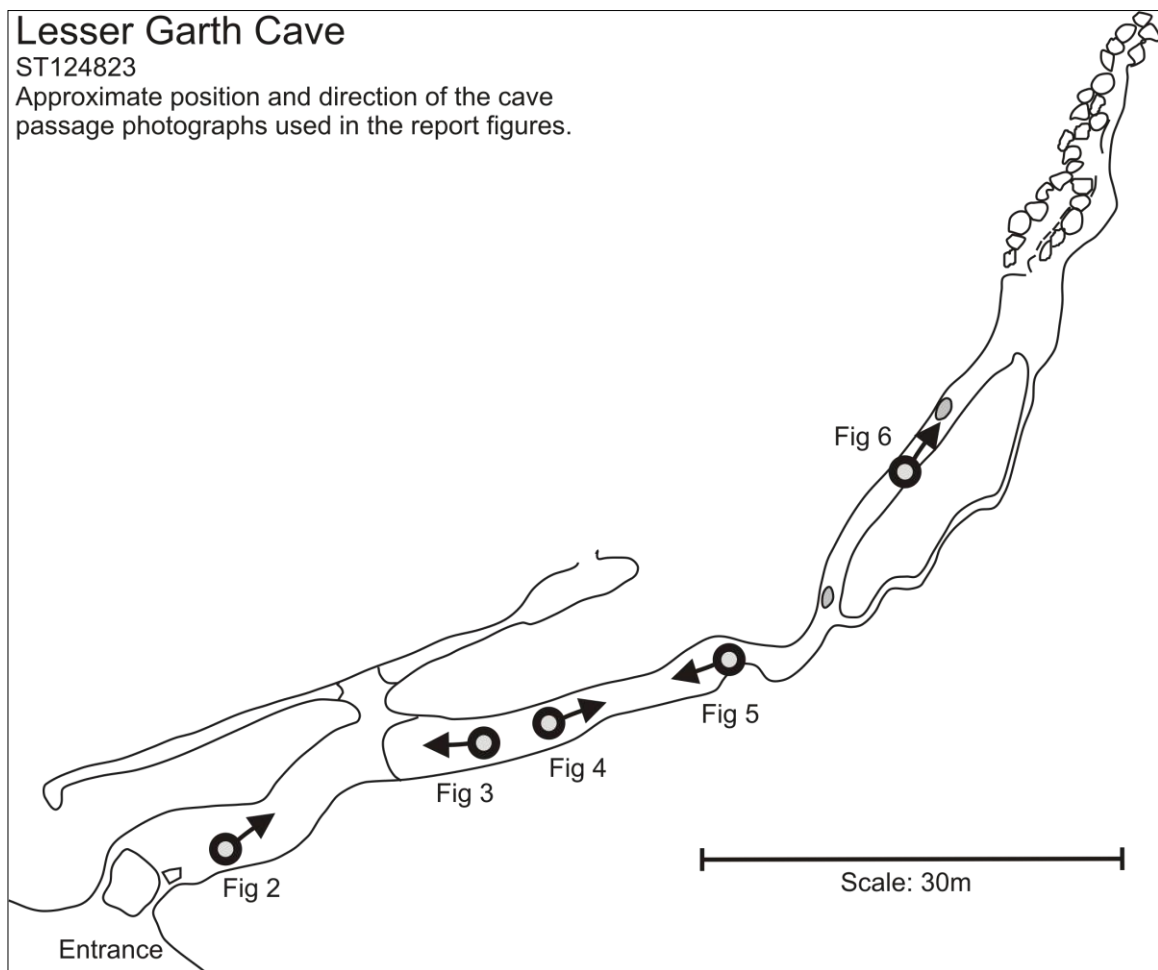


Figure 11. Approximate positions and directions of the cave passages photographs used in this report

5 CONCLUSIONS

Limited information is currently available for the *P. rosenhaueri* population in the Lesser Garth Cave, thus it is difficult to state the necessary attributes that enable an accurate assessment of whether the spider and its habitat is in favourable condition. However, the fact that the September survey found good numbers of the spider does suggest that the population is in a viable condition. The presence of other notable cave fauna also suggests that the habitat, despite

disturbance, is also in a favourable condition. Future monitoring will add to this knowledge and enable management decisions on the spider and the cave to be refined and developed. Disturbance of the cave is potentially a serious issue, however, which can affect the distribution of the spider and its prey and will need to be addressed by the interested parties involved.


6 ACKNOWLEDGEMENTS

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Appendix 2: Copy of the risk assessment used.



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Risk Assessment Record (Off-Site Working)

Hazard	Risk			Control measures to minimise risk
	High	Medium	Low	
Climate		✓		Wearing of appropriate clothing for the cave environment.
Habitat		✓		Appropriate use of ropes and ladders to access main part of cave.
Work Equipment		✓		Trained in use of all the safety equipment to be used.
Human			✓	
Animals			✓	
Agents			✓	
ACTION REQUIRED (in priority order)		Completion date:		
1/				/ /20..
2/				/ /20..
3/				/ /20..
IS RESIDUAL RISK ACCEPTABLE?		YES		
Assessment review date: / /20..				
(Not required)				
Assessed by: <i>J. K. [Signature]</i>		Date: 30/11/2009		
Do you have adequate training in order to undertake this work? Tick ✓ if appropriate Cross X if deficient				
<input type="checkbox"/> Mountain skills	<input checked="" type="checkbox"/> First aid skills	<input checked="" type="checkbox"/> Caving	<input checked="" type="checkbox"/> Appropriate medical certification	
<input type="checkbox"/> Navigation skills	<input type="checkbox"/> Boat handling	<input type="checkbox"/> Diving Certificate	<input type="checkbox"/> Handling mechanical equipment	
Safety equipment (Specify required equipment, e.g. mobile phone, first aid kit)				
Mobile phone, First Aid kit, full caving equipment, CE marked safety equipment (ropes, helmets, etc.), emergency equipment - emergency blanket; spare clothing; spare lights.				

Appendix 3: Method Statement for the survey of the Lesser Garth Cave for the troglobitic spider *Porrhomma rosenhaueri*.

This survey will be carried out by Julian Carter (senior fieldworker), Chris Meecham and Catalena Angele of the Department of Biodiversity, National Museum Wales, Cathays Park, Cardiff. CF15 8LF.

1. Procedure

Project brief: The project is to set up a Common Standards Monitoring (CSM) protocol to survey the population of the rare cave spider *Porrhomma rosenhaueri*. This work has been commissioned by the Countryside Council for Wales (CCW).

Location: Lesser Garth Cave, Cardiff. ST125 821

Sequence of Works:

- Gain permissions to enter the cave and the access key at the site office at Taffs Well Quarry.
- Prior to entrance to the cave contact will be made with a staff member at the National Museum Wales and a callout time established.
- Care will be taken accessing the site as this is up a steep wooded slope for a distance of around 300m from the access path.
- The climb to access the main part of the cave will be rigged with a safety handline and a safety belay rope using the preinstalled resin anchors in the cave. These will be visually inspected before use.
- Appropriate care will be taken whilst working in the cave which has numerous boulders and short climbs.
- Work in the cave will consist of searching for the spiders in a defined area and using digital photography to document the spiders habitat and the cave as a whole.
- On exit from the cave contact will immediately be made with the callout contact.
- The descent down the slope from the cave will be taken with the appropriate care.
- Return key to site office and sign off from the site.

Start of Project: During September 2009. Final report to be delivered to CCW by January 2010. 1 full day and 1 half day visit will be made to the cave.

2. Control measures.

- Two fieldworkers will be in the cave working as a buddy pair. Both workers are physically fit and experienced in the cave environment. The senior fieldworker is highly experienced and is an Underground Controller with the West Brecon Cave Rescue Team and holds Advanced First Aid for Cave Rescue certification (renewal date November 2011).
- Appropriate PPE will be worn consisting of CE marked climbing helmet; LED lighting (both main and backup); oversuit; undersuit; safety wellies; and belay belt.
- Additional safety equipment will be carried comprising of a first aid kit, survival blanket, food and water.
- All necessary safety equipment used will be visually inspected prior to use and CE marked e.g. ropes and carabineers.
- 80% ethanol will be used to preserve any collected animal specimens. COSHH forms for this have been filled in and are filed in all laboratory area at the Department of Biodiversity, National Museum Wales. Only small quantities, <100 ml, will be carried into the field.

4. Emergency Arrangements

A callout procedure will be put into operation where a time of expected exit from the cave will be provided to a colleague acting as emergency cover. If contact is not made by the underground team at the agreed time then Cave Rescue will be called via 999. Do not request any other rescue service as the CR team will have the expertise to enter the cave and then request any additional cover that is required. Police will automatically be informed as part of the process. Once the CR team has been alerted the Taffs Well Quarry manager will then also be informed.

Date:

Signed: