

**INTERIM REPORT OF A SURVEY
FOR THE PILL MILLIPEDE
TRACHYSPHAERA LOBATA (RIBAUT, 1954)
AND THE CENTIPEDE
NOTHOGEOPHILUS TURKI LEWIS, JONES & KEAY, 1988
ON THE ISLE OF WIGHT**

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Executive Summary

1. Field work undertaken in February 2011 confirmed the continued existence of a population of the pill millipede, *Trachysphaera lobata*, at East Cliff, Bembridge on the Isle of Wight. The presence of the centipede, *Nothogeophilus turki*, at Freshwater Bay was not confirmed. Several other sites on the island were surveyed but neither species was collected.
2. *Trachysphaera lobata* was found to be present within a significantly greater area of the habitat at East Cliff than in previous surveys in 2005 and 1984.
3. The combination of wave erosion and cliff slumping was identified as the major threat to the survival of *Trachysphaera lobata* at East Cliff. Tree felling appeared to have ceased, for the present at least. Other human disturbance on the site was not considered a major issue.
4. Recommendations are made for further survey for *Trachysphaera lobata* and to address the threats to the habitat at East Cliff.
5. Recommendations are made for further survey for *Nothogeophilus turki* in Cornwall and on St Marys, Isles of Scilly as well as on the Isle of Wight. Further surveys should be undertaken in May.

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1. Introduction

***Trachysphaera lobata* (Ribaut, 1954)**

Trachysphaera lobata is a small, white pill millipede approximately 4mm in length and less than 2mm in breadth. It is presumed to be calcicolous based on the evidence of French records from over a dozen locations in the western half of the country. Most of these records involve specimens collected from caves but the millipede has also been found in woodland litter and in a quarry (Kime, 2001). Outside of France the only records of *T. lobata* are those from Bembridge on the Isle of Wight (Jones & Keay, 1986) and from two locations in south Wales (Harper, 2010). Its occurrence here would seem to fit with its Atlantic distribution in Europe and there is no reason to suppose it is not native to Britain.

The first British specimens of *T. lobata* were collected from East Cliff, Bembridge (SZ648888) in June 1984 by Dick Jones and Andy Keay. Whilst sieving sandy soil in a narrow, coastal belt of mainly sycamore woodland they found the millipede at a density of up to 5600 per m³ of soil (Jones & Keay, 1986). These high densities were only achieved when selectively sampling pockets of sandy soil within the much more extensive clay underlying the site. They also reported finding a site for *T. lobata* at the Duver (SZ637892) in September 1984. This record has since been recognised as an error but the millipede was found subsequently in an area of scrub close to Bembridge Harbour, a few hundred metres west of the East Cliff site. However, the scrub was later cleared and the site developed resulting in the loss of the millipede population. Andy Keay subsequently visited the East Cliff site on several occasions, sometimes accompanied by other workers, and noted the continued erosion of the woodland belt by wave action. In August 2004 he spent three days sampling approximately 1m³ of soil from the site and found only two specimens of *T. lobata*. A further four days field work, later in the year, produced nothing (Keay, 2004). Field work undertaken in February 2005 (Lee *et al.*, 2005) confirmed the continued existence of the millipede at East Cliff but estimates of population density of 2377 to 3313 individuals per m³ of soil suggested a significant decline had occurred since the population was first discovered.

The original description of *T. lobata* relies heavily on male characters to separate it from *T. pyrenaica* (Ribaut, 1907) but no male specimens were found at Bembridge in 1984. The identification had to be based on somatic characters as given in Demange (1981). Specimens were also examined by J-P. Mauriès (Curator of Arthropods, National Museum of Natural History, Paris). That the population was not parthenogenetic was established when male specimens were collected from Bembridge in 2005 (Lee *et al.*, 2005) but examination of the male characters of these specimens and, later, of male specimens from Wales (Harper, 2010), showed slight differences from Ribaut's illustrations of type specimens leaving open the possibility that the British populations were a new species.

***Nothogeophilus turki* Lewis, Jones & Keay, 1988**

Nothogeophilus turki is a short, yellowish-white centipede up to 13mm in length. The species was first described on the basis of a relatively large number of specimens collected in the Isles of Scilly and the Isle of Wight. Reportedly it has been collected from Cornwall but no data exists to support this and it has never been recorded elsewhere despite the fact that the original collectors considered it 'very probably an

introduction' (Lewis *et al.*, 1988). Therefore, the precautionary principle would suggest that Britain has an international responsibility for the conservation of *N.turki*.

N.turki appears to be more or less restricted to coastal areas in England (Barber, 1992). It has occurred under stones, in soil and in leaf litter up to 500m inland. The latter site was deciduous woodland on the banks of a stream in the upper part of the Porth Hellick & Higher Moors SSSI, St Marys, Isles of Scilly. One record from Newport Docks, Isle of Wight was from an area of demolished buildings, although no more than 5m from the tidal river (A.N. Keay, pers. comm. quoted in Stoev *et al.* 2010). This last site has since been developed as a car park. The last time the animal was reported would seem to be the unconfirmed sighting from Cornwall in the mid-1990s (A.D. Barber, pers. comm.). Any further conservation work or autecological study is dependent on targeted survey confirming the presence of the centipede at its historic sites or discovering new populations.

2. Aims

The survey work reported here had three main aims:

- To determine the current distribution of the millipede *Trachysphaera lobata* on the Isle of Wight;
- To confirm the presence and determine the current distribution of the centipede *Nothogeophilus turki* on the Isle of Wight;
- To collect specimens of *Trachysphaera 'lobata'* from Bembridge for a project to establish the identity of the British populations using DNA analysis and Scanning Electron Micrography (SEM) to compare British specimens with continental material.

Although not central to the field work on this occasion, the level of threat to *T. lobata* through loss of habitat at Bembridge would be assessed to continue the monitoring begun on earlier visits. The Biodiversity Species Action Plan for *T. lobata* also refers to identifying sites that could host a translocated population if the habitat loss at Bembridge became too great but this was not attempted on the reported visit.

3. Methods

The authors undertook field work on the Isle of Wight between 22nd and 24th February 2011. The first site visited was East Cliff (Ordnance Survey (OS) grid reference SZ6488) where non-standardised hand searching was employed to collect the required number of specimens (25) of *T. lobata* for SEM and DNA analysis. As the authors were familiar with the sandy, humus rich soils that were most likely to support the millipede this method was considered the most time-efficient. The extent of the occupied area of habitat was assessed by searching for the millipede whilst moving east and then west along the coast. Eight figure OS grid references were noted for the most easterly and most westerly points at which *T. lobata* was found.

Priory Woods (OS grid reference SZ6390) were visited later on 22nd February 2011 to search for *T. lobata*.

Field work on 23rd and 24th February 2011 was targeted at *N.turki*. Again, the method employed was non-standardised hand searching (see Appendix A, Figure 1). Initially, efforts were concentrated on an attempt to rediscover the centipede in its previously recorded location at Freshwater Bay (SZ3485). Other sites visited were Colwell Bay (SZ3287), Compton under cliffs (SZ3784), Brook Chine (SZ3883), Knowles Farm (SZ4975) and Bonchurch Landslip (SZ5878).

In addition to the target species, all other species of myriapods and isopods encountered were recorded. Details of these records were passed to the relevant national recording scheme.

4. Results from East Cliff

4.1 Site description

The habitat at East Cliff consists of a narrow belt of semi-natural deciduous woodland dominated by sycamore (*Acer pseudoplatanus*) with some ash (*Fraxinus excelsior*) and turkey oak (*Quercus cerris*). The ground flora is dominated by mats of ivy (*Hedera helix*), nettle (*Urtica dioica*) and various grass species with some bramble (*Rubus fruticosus* agg.), dog's mercury (*Mercurialis perennis*) and fern species. The woodland stretches for approximately 800m along the foot of an unconsolidated cliff approximately 7m high (see Appendix A, Figure 2) that faces roughly north north east. The woodland belt has a maximum depth of approximately 50m before ending in a wave eroded cliff between one and two metres high at the top of the beach (see Appendix A, Figure 3). Towards either end of the woodland there are increasing amounts of human disturbance with gardens and buildings reaching down to the shore. A public footpath through the site has been closed for safety reasons as erosion has generated a significant hazard from falling trees. The path is blocked in places where such trees have not been cleared.

The whole site is underlain by Bembridge limestone which outcrops approximately 30m offshore as low rock ledges. This is overlain by Bembridge Marls which form the platform on which the woodland grows. The cliff behind the woodland is a raised beach formed during the Ipswichian period. Sands and gravels eroded from the cliff cover the marls to varying depths and have created pockets of lighter soils within the heavy clay. *T. lobata* appears to be most abundant within these 'sand pockets'.

4.2 Findings

Table 1 shows the locations of the eastern and western extremes of the occupied habitat at East Cliff. In the current survey no specimens of *Trachysphaera lobata* were found east of grid reference SZ65078861 or west of SZ64758871. These

Table 1: Grid references showing extremes of area found to be occupied by *Trachysphaera lobata* at East Cliff in 2005 and in 2011

	Most westerly specimen	Most easterly specimen
2005 survey	SZ64768871	SZ64958866
2011 survey	SZ64758871	SZ65078861

locations extend the length of habitat known to be occupied by 120m to the east and by 10m to the west. This is a significant increase of over 50% on the length of occupied habitat (200m was the length reported by Lee *et al.* in 2005) but does not necessarily suggest a significantly larger population than previously believed to exist. The distribution of the millipede within the site is known to be uneven. This patchiness of distribution appears to be related to the nature of the substrate as *T. lobata* is only found in pockets of humus rich, sandy soil with or without coarser pebbles. It is absent from the clay soil that underlies most of the woodland and from slumps at the base of the unconsolidated cliff where the soil is often sandy but lacks any organic material. The substrate within the additional occupied area has not been assessed for its suitability and no attempt has been made to assess the population size.

A second factor that has to be considered is that, although the length of habitat is greater, erosion has been removing habitat at the shoreline. It is unknown whether the rate of erosion is greater than the production of new habitat through cliff slumps or, more importantly, whether the loss of 'mature' substrate incorporating organic material at the shoreline is greater than the rate at which the raw material generated by cliff slumps becomes 'mature' substrate suitable for the millipede.

Lists of the other centipedes, millipedes and woodlice found at East Cliff are given in Appendix B. All of these species are widespread in southern England. Lee *et al.* (2005) noted that the woodlouse *Haplophthalmus danicus* was often found in association with *T. lobata* and suggested that as numbers of the millipede declined towards the edge of its range the centipedes *Henia vesuviana* and *Cryptops anomalans* appeared more abundant. There were no signs of any such relationships found in the current study; indeed the two centipedes were not recorded at East Cliff.

5. Results from Freshwater Bay

5.1 Site description

Searches for *N. turki* were initially concentrated on Freshwater Bay on 23rd February 2011. The eastern and western ends of the Bay are formed by vertical 25m cliffs of steeply dipping Upper Chalk overlain by gravels and alluvium. Quarternary deposits of sands, gravels and chalk fragments form a less steep south facing, vegetated cliff slightly east of the centre of the Bay (SZ346856). This soft cliff is fronted by a concrete promenade and shingle beach. A narrow strip (2-3m) of privately owned, possibly mown, short turf tops the cliff. Rising to 5-6m by a flight of wooden steps, the length of cliff is no more than 30m but is the site where the centipede was first collected at Freshwater Bay and appeared still to form the most likely habitat for the centipede (see Appendix A, Figure 4).

5.2 Findings

In the current survey no specimens of *N. turki* were collected at Freshwater Bay. Lists of the centipedes, millipedes and woodlice found at Freshwater Bay are given in Appendix B. All of these species are widespread in southern England.

6. Results from other sites

6.1 Priory Hotel and Woods

Priory Woods, crossing the boundary of the parish of Nettlestone and Seaview and the parish of St Helens (SZ6390), was visited on 22nd February 2011. This is an area of semi-natural deciduous woodland on a cliff top facing the sea to the east. The whole woodland is underlain by heavy clay with very few, very small pockets of other soils. The woodland has a deep litter layer which helps to create some areas of more friable soil but generally the soil is not humus rich. *T. lobata* was not found here. As the millipede is apparently absent from the litter layer at East Cliff it is unlikely *T. lobata* is present, even in the more friable pockets of soil, at Priory Woods. Lists of the centipedes, millipedes and woodlice that were found at Priory Woods are given in Appendix B. All of these species are widespread in southern England.

6.2 Colwell Bay

Colwell Chine (SZ3287) was visited on 23rd February 2011. The habitat searched was a shallow, west facing, wooded slope underlain by clay and chalk. The beach is popular with tourists in summer but this caused no problems in the very damp conditions experienced during the current survey. Lists of the centipedes, millipedes and woodlice that were found at Colwell Bay are given in Appendix B. Although several geophilomorph centipedes were collected none of them proved to be *N. turki*. All of the species recorded are widespread in southern Britain.

6.3 Compton Bay

The under cliff at Compton Bay (SZ370849) was visited on 23rd February 2011. This area owned by the National Trust lies 2km to the east of Freshwater Bay. The underlying geology comprises Cretaceous sands and clays. The habitat searched was a steep, vegetated landslip of Gault clay (see Appendix A, Figure 5) accessed from the steps at Compton Chine. The presence of large embedded rock fragments that can be easily turned generally assists in the search for soil invertebrates (see Appendix A, Figure 6) but few invertebrates of any kind were found. The few species of centipede that were found at Compton Chine are listed in Appendix B. These species are all widespread in southern England

6.4 Brook Chine

Another area of soft, slumping, vegetated cliff at Brook Bay (SZ386834) was accessed via Brook Chine on 23rd February 2011. Again this area is owned by the National Trust and comprises the same Cretaceous geology as at Compton Bay. Lists of the centipedes, millipedes and woodlice that were found at Brook Chine are given in Appendix B. All of these species are widespread in southern England.

6.5 Knowles Farm

The final site visited on 23rd February 2011 was also National Trust owned. Knowles Farm is an area of 170 acres at the southern tip of the island around St Catherine's Point. The land is an area of slumping Gault clay undercliff covered by a mixture of scrub, grass and woodland. The area was surveyed at three locations between SZ490756 and SZ492758 to account for the three major habitats present. Lists of the centipedes, millipedes and woodlice that were found at Knowles Farm are given in Appendix B. All of these species are widespread in southern England.

6.6 Bonchurch Landslips

Bonchurch Landslips (SZ581785) was visited on 24th February 2011. This area of 70 acres comprises ash woodland on Gault clay soft cliffs and landslips between Shanklin and Ventnor. The area is largely owned by Isle of Wight County Council. Lists of the centipedes, millipedes and woodlice that were found at Bonchurch Landslips are given in Appendix B. All of these species are widespread in southern England.

7. Threats

In February 2011 no attempt was made to estimate the density of the population of *T. lobata* at East Cliff. Although the millipede was found along a greater length of habitat than in previous years, a number of factors affecting the site that are likely to be detrimental to the survival of the species were still seen to be present. These factors are discussed in more detail below.

7.1 Coastal erosion

Lee *et al.* (2005) estimated that the site had eroded approximately 5m in 15 years, equivalent to a rate of 0.33m per annum. Assuming the width of the site is 50m, no new habitat is created by cliff slumps and that the rate of erosion remains constant, this suggests that the woodland at East Cliff will have completely disappeared in 150 years. However, *T. lobata* is likely to disappear from the site long before this as much of the woodland belt is considerably narrower than 50m and the millipede population is not evenly distributed throughout the woodland. As the soils towards the base of the unconsolidated cliff lack the humus content that *T. lobata* appears to need, its habitat will have disappeared well before the last few trees fall into the sea.

7.2 Offshore dredging

Lee *et al.* (2005) reported offshore dredging as occurring during their fieldwork and suggested this could increase erosion rates at East Cliff and further east along the coast. There was no evidence of dredging during the 2011 visit but no attempt was made to determine if operations were continuing.

7.3 Habitat degradation

Habitat degradation through tree felling was identified as an issue by Lee *et al.* (2005). Clearly trees will be lost at East Cliff through coastal erosion but even before this occurs there is a significant risk that a tree will be felled on health and safety grounds by the site owner. Although there was evidence of tree felling in 2005, no recent tree felling was evident in early 2011. Loss of trees may affect *T. lobata* in two ways. Firstly the reduction in canopy may lead to drying of the soil. Based on personal observations of captive animals, this millipede seems to be less able to cope with drier conditions than the other species of pill millipede found in the UK. Secondly the loss of living trees will reduce the seasonal input of organic matter into the soil from leaf fall. Again, field observations suggest that high humus content is an essential characteristic of those soils that support *T. lobata* populations.

7.4 Human disturbance

Evidence of human disturbance of the woodland, including dumping of garden waste from properties built on the cliff, was apparent as it was in 2005 (Lee *et al.*, 2005). However, the discoveries of the Welsh populations of the millipede in sites strongly influenced by human activity (Harper, 2010) suggest that disturbance is less of a threat than was feared in 2005.

7.5 Cliff slumping

There is clear evidence that slumping of the unconsolidated cliff behind the woodland at East Cliff occurs on a regular basis. A number of debris slopes are present and

show different stages of colonisation by vegetation. Much of this material may become a suitable substrate to support *T. lobata* once organic matter has been incorporated. However the development of a suitable soil from the freshly eroded cliff material is a long term process and in the short term cliff slumps bury any potentially suitable soils that have already developed at the base of the cliff. As the area of woodland remaining continues to be reduced by coastal erosion any loss of habitat due to cliff slumping becomes an increasingly significant risk to the remaining millipede population.

8. Recommendations

- All attempts to establish ownership of the East Cliff site have been unsuccessful. Ownership does need to be established before any practical conservation measures can be implemented there.
- At the very least the owner should be made aware of the importance of the site and should be encouraged to refrain from any management activities which may further threaten the survival of the species until a management plan for the site can be agreed.
- A site meeting should be arranged with the owner and relevant specialists (e.g. soft cliffs expert, coastal protection engineer, local EN staff, BMIG representative etc) to identify the issues affecting the site and how they can feasibly be dealt with. The aim should be to agree a management plan for the site that at least extends as long as possible the existence of the *Trachysphaera lobata* habitat.
- Further survey work for *Trachysphaera lobata* should be undertaken in other potential habitats. Lee *et al.* (2005) identified Centurion's Copse, part of the RSPB Brading Marshes reserve, as a site worthy of further study. Further survey at coastal sites in south Devon and Dorset may also be worth considering but the discovery of sites in south Wales suggest the coastal location may not be a key factor.
- A repeat survey for *Nothogeophilus turki* should be undertaken at Freshwater Bay in May. Further survey work could be undertaken around the Isle of Wight at the same time.
- The continued existence of *Nothogeophilus turki* in the type locality at St Marys, Isles of Scilly should be confirmed.
- Further survey work is required to follow up the unconfirmed record of *Nothogeophilus turki* in Cornwall.

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Appendix A: Photographic record



Figure 1: Non-standardised hand searching at Freshwater Bay (SZ3485)



Figure 2: Unconsolidated cliff forming inland boundary of *Trachysphaera lobata* site at Bembridge (SZ6488)



Figure 3: Wave eroded cliff forming coastal boundary of *Trachysphaera lobata* site at Bembridge (SZ6488)



Figure 4: Original *Nothogeophilus turki* site at Freshwater Bay (SZ3485)



Figure 5: Vegetated landslide at Compton Bay (SZ370849)



Figure 6: The presence of large embedded rock fragments that can be easily turned assists in the search for soil invertebrates

Appendix B: Species lists

Taxa	Freshwater Bay SZ347857	East Cliff SZ647887	East Cliff SZ648887	East Cliff SZ649886	East Cliff SZ650886
Isopoda					
<i>Armadillidium vulgare</i>	•	•	•		
<i>Haplophthalmus danicus</i>		•			
<i>Oniscus asellus</i>	•	•	•		
<i>Philoscia muscorum</i>	•	•	•		
<i>Platyarthrus hoffmannseggi</i>	•				
<i>Porcellio scaber</i>	•	•	•		
<i>Trichoniscus provisorius</i>	•	•			
<i>Trichoniscus pusillus</i>	•	•	•		
<i>Trichoniscus pygmaeus</i>	•				
Chilopoda					
<i>Cryptops hortensis</i>		•			
<i>Geophilus carpophagus</i>		•			
<i>Geophilus osquidatum</i>		•			
<i>Lithobius melanops</i>		•			
<i>Schendyla nemorensis</i>	•				
<i>Stigmatogaster subterannea</i>	•	•			
Diplopoda					
<i>Brachychaeteuma melanops</i>		•			
<i>Cylindroiulus latestriatus</i>	•				
<i>Glomeris marginata</i>		•			
<i>Ophiulus pilosus</i>		•			
<i>Trachysphaera lobata</i>		•	•	•	•

Taxa	Priory Hotel SZ631902	Priory Woods SZ6390	Colwell Bay SZ3287	Compton under cliffs SZ370849	Brook Chine SZ386834
Isopoda					
<i>Androniscus dentiger</i>		•	•		
<i>Armadillidium vulgare</i>		•	•		
<i>Haplophthalmus danicus</i>		•			
<i>Oniscus asellus</i>		•	•		
<i>Philoscia muscorum</i>		•	•		
<i>Porcellio scaber</i>		•	•		
<i>Trichoniscus provisorius</i>		•			
<i>Trichoniscus pusillus</i>		•	•		
Chilopoda					
<i>Cryptops hortensis</i>		•	•		
<i>Geophilus carpophagus</i>	•				•
<i>Geophilus osquidatum</i>					•
<i>Geophilus truncorum</i>			•		
<i>Lithobius forficatus</i>		•	•	•	
<i>Lithobius melanops</i>		•	•		
<i>Lithobius microps</i>				•	
<i>Lithobius variegatus</i>		•			
<i>Schendyla nemorensis</i>		•	•	•	
<i>Stigmatogaster subterrannea</i>		•			
Diplopoda					
<i>Brachychaeteuma melanops</i>			•		
<i>Chordeuma proximum</i>		•			
<i>Ophiulus pilosus</i>		•			
<i>Polydesmus coriaceus</i>			•		

Taxa	Knowles Farm SZ490756	Knowles Farm SZ491757	Knowles Farm SZ492758	Bonchurch Landslips SZ581785
Isopoda				
<i>Androniscus dentiger</i>	•			•
<i>Armadillidium vulgare</i>			•	•
<i>Haplophthalmus danicus</i>				•
<i>Haplophthalmus mengei</i>				•
<i>Oniscus asellus</i>	•	•	•	•
<i>Philoscia muscorum</i>		•	•	•
<i>Platyarthrus hoffmannseggii</i>			•	
<i>Porcellio scaber</i>	•	•	•	•
<i>Trichoniscus provisorius</i>			•	
<i>Trichoniscus pusillus</i>	•	•	•	•
<i>Trichoniscus pygmaeus</i>			•	•
Chilopoda				
<i>Cryptops hortensis</i>				•
<i>Geophilus carpophagus</i>				•
<i>Geophilus electricus</i>		•		
<i>Geophilus truncorum</i>		•		
<i>Lithobius forficatus</i>	•			
<i>Lithobius melanops</i>	•			
<i>Lithobius microps</i>			•	
<i>Schendyla nemorensis</i>	•			•
<i>Stigmatogaster subteranea</i>		•		•
<i>Strigamia acuminata</i>				•
Diplopoda				
<i>Brachychaeteuma melanops</i>		•		
<i>Brachydesmus superus</i>		•		
<i>Ophiodesmus albonanus</i>	•			