

## ***Brachyiulus lusitanus* Verhoeff, 1898 new for the UK from the Eden Project (Diplopoda: Julida: Julidae)**

Steve J. Gregory

4 Mount Pleasant, Church Street, East Hendred, Oxfordshire OX12 8LA, UK.

E-mail: stevejgregory@btopenworld.com

### **Abstract**

The millipede *Brachyiulus lusitanus* Verhoeff, 1898 was first reported new for the UK from the Eden Project, Cornwall in 2009 based on a single male specimen. Subsequently, additional material has been collected. A brief description with figures is provided to enable identification and details of habitats and microsites inhabited is given. This widespread European species is probably a recent colonist to Eden Project, aided by human activity, and additional British sites may await discovery.

**Key words:** Julida, Julidae, *Brachyiulus lusitanus*, new for UK, identification.

### **Introduction**

Eight species of *Brachyiulus* are known in Europe (Kime & Enghoff, 2017), but until 2009 just a single species, *Brachyiulus pusillus* (Leach, 1815), was recorded in Britain and Ireland and known to be widespread and relatively common (Lee, 2006). Being of characteristic appearance it was often identified in the field by experienced recorders, without microscopic examination. However, in 2009 a second species of identical appearance, *Brachyiulus lusitanus* Verhoeff, 1898, was recorded by Helen Read from the outdoor educational/ornamental gardens of the Eden Project, Cornwall (17.iv.2009, SX0455, VC1) during BMIG's annual field meeting to the county (Barber, Gregory & Lee, 2010).

This initial record was based on a single male specimen, confirmed by Henrik Enghoff. Subsequently, both *B. lusitanus* and *B. pusillus* have been recorded from the Eden Project on several occasions by the author and others. In 2010 much additional material of *B. lusitanus* (and *B. pusillus*) was collected from the outdoor biome and more recently in 2018 and 2020 from the Mediterranean Biome (Table 1).

A brief description with figures of *B. lusitanus* based on specimens collected from Eden Project is provided below to allow separation of the two *Brachyiulus* species now known to occur in Britain.

**Table 1: Observations of *Brachyiulus* species at Eden Project**

Species	No. males	Date	Biome	Recorder
<i>Brachyiulus lusitanus</i>	1	17.iv.2009	Outdoor Biome (gardens)	Read, H.J.
	9	18.iv.2010	Outdoor Biome (gardens)	Gregory, S.J.
	1	ii.2018	Mediterranean Biome	Lugg, K.
	1	21.iii.2020	Mediterranean Biome	Gregory, S.J.
	1	21.iii.2020	Mediterranean Biome	Harding-Morris, J.
	2	31.x.2020	Mediterranean Biome	Telfer, M.G.
<i>Brachyiulus pusillus</i>	1	17.iv.2010	Foundation Office flowerbed	Gregory, S.J.
	1	18.iv.2010	Outdoor Biome (gardens)	Gregory, S.J.
	2	18.iv.2010	Mediterranean Biome	Gregory, S.J.



**Figure 1: *Brachyiulus lusitanus* male, live specimen from Mediterranean Biome.**  
Specimen collected by James Harding-Morris, March 2020 (image © James Harding-Morris)

## Identification

*Brachyiulus lusitanus* (Fig. 1) is identical in general appearance to *B. pusillus* with two dorso-lateral yellow/cream stripes running along the entire length of the body and the preanal ring bearing a very short caudal projection (which is easily overlooked). Thus, using Blower (1985) it will readily key to *B. pusillus*. Only mature males of the two species can be identified and are readily separated by the shape of their respective gonopods.

The gonopod of *B. lusitanus* has a very distinctive shape (Fig. 3). The phylacum of the solenomerite is well developed, lamellar, and bears numerous wrinkled ridges. Thus, in lateral view the gonopod widens distally to give a broad rounded appearance. This contrasts with *B. pusillus*, which lacks a well-developed phylacum, where the gonopod tapers gently from its base towards a gradually narrowed distal tip (Blower, 1985, pg. 185, fig. 58C).

The gonopods of *Brachyiulus* species are not fully retracted into the body and remain protruding slightly (Fig. 2A-C). Because of the differences in the relative proportions of the gonopods described above it is therefore possible to identify the two species without dissection. The broad striate phylacum of *B. lusitanus* is clearly visible in lateral view (Fig. 2B), in contrast to the relatively slender and tapered gonopod of *B. pusillus* (Fig. 2C).

## Location, habitat and associated species

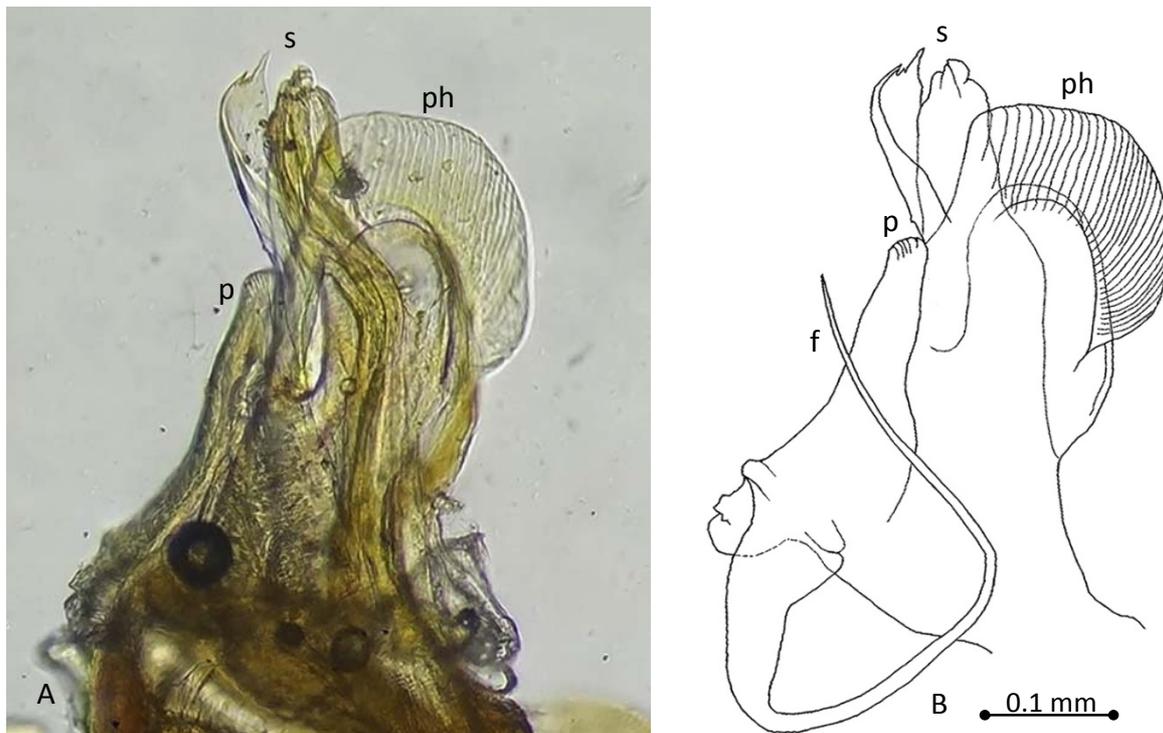
In the UK, *Brachyiulus lusitanus* has only been recorded from the Eden Project in Cornwall, where it has been recorded in the Outdoor Biome (outside gardens) and within the Mediterranean Biome (Table 1). First recorded by Helen Read in 2009 from the outdoor vegetable garden (Barbour (sic), 2009; Barber *et al.*, 2010), it was readily re-found there in 2010 and proved to be more widely distributed with additional specimens collected from beside nearby ditches and under stones and dead wood around the

main entrance. Associated millipedes were *Brachydesmus superus* Latzel, *Cylindroiulus britannicus* (Verhoeff), *Cylindroiulus latestriatus* (Curtis), *Ophiulus pilosus* (Newport) and *Polydesmus inconstans* Latzel. It is of note that of ten males collected, only one proved to be *B. pusillus*, while the other nine were *B. lusitanus* (in addition to a number of unidentified females). A male *B. pusillus* was also collected from an ornamental flower bed outside the Eden Project Foundation Offices.



**Figure 2: *Brachyiulus* males, preserved specimens from Eden Project.**

- A) *B. lusitanus*, anterior body rings showing protruding gonopods (arrowed). Specimen collected from Mediterranean Biome, SJG leg., March 2020; B) Same specimen, close up of un-dissected gonopods showing phylacum. C) *B. pusillus*, close up of un-dissected gonopods (note lack of phylacum). Specimen from Outdoor Biome (gardens), SJG leg., April 2010.



**Figure 3: *Brachyiulus lusitanus* male gonopod, internal view.**

Specimen from Outdoor Biome (gardens), SJG leg., April 2010. A) Specimen cleared in euparal.

B) Sketch of same specimen. p - promerite, s - solenomerite, ph - phylacum, f - flagellum.

In 2010 *B. lusitanus* was not collected from the Mediterranean Biome despite extensive searching, although two males of *B. pusillus* were recorded. However, in 2018 and 2020 male specimens of *B. lusitanus* were recorded from inside the Mediterranean Biome (Table 1). One male, collected in March 2020 (by the author) was found under a piece of dead wood associated with *Cylindroiulus britannicus* (Verhoeff) and *C. truncorum* (Silvestri). In 2018 and 2020 *B. pusillus* was not found in the Mediterranean Biome. It is possible that *B. lusitanus* has expanded its range within Eden Project since 2010 and colonised the Mediterranean biome. It is unfortunate that the Outdoor biome (gardens) was not surveyed in 2018 nor 2020 to confirm its continued existence there.

In light of the discovery of *B. lusitanus* at Eden Project the author has examined his personal voucher collection of *B. pusillus*, which comprises nine tubes from Oxfordshire, and BMIG's basic and research collections (Harper, 2007) of ten tubes from south Wales. All samples that contain mature male specimens have proved to be *B. pusillus*. In addition, Helen Read (pers. comm.) confirms male *B. pusillus* from specimens collected in Anglesey (north Wales), Lancashire (north-west England), Dumfries & Galloway (south-west Scotland), Buckinghamshire and Kent (south-east England).

### Distribution and habitats elsewhere

*Brachyiulus lusitanus* is native to, and widely distributed across, central and southern Europe, from Italy, north to Germany and Czech Republic, and east to Greece, Bulgaria and Romania, with an isolated record from southern Spain (Kime & Enghoff, 2017). It also occurs in North Africa and has been introduced to Australia and North America.

It has been recorded from a wide variety of habitats, including woodland (under bark and moss), meadows, arable fields, vineyards and parks.

## Discussion

*Brachyiulus lusitanus* is clearly well established at the Eden Project, but so far has not been recorded from other sites in the UK. It is most likely a non-native accidental import introduced via the horticultural trade. Thus, it is considered by Lee (2015) to be ‘Not Applicable (NA)’ for assessment of conservation status under the IUCN Guidelines in his update of the national threat status of British millipedes.

Further work is needed to ascertain whether *B. lusitanus* is more widely distributed across the UK, both by examination of existing voucher specimens and by collection of additional material. It is possible that *B. lusitanus* may be found at other heated ‘Mediterranean’ glasshouses in Britain and Ireland, or even outdoors in synanthropic sites, such as in ornamental gardens. Thus, when *Brachyiulus* are encountered in future, male specimens should be retained for microscopic examination.

## Acknowledgements

I thank Tim Petitt and Marc Mappley of the Eden Project for allowing un-restricted access in the biomes, without which these surveys would not have been possible. I am very grateful to James Harding-Morris for organising the survey in March 2020 and for allowing the use of his image of a live male *Brachyiulus lusitanus* collected during that survey. Keith Lugg and Mark Telfer kindly allowed their records of this species to be included in this paper.

## References

- Barber, T., Gregory, S. & Lee, P. (2010) Reports on the 2009 BMIG spring meeting in Cornwall. *Bulletin of the British Myriapod & Isopod Group*, **24**: 65-74.
- Barbour (sic), T. (2009) Centipede, millipedes and woodlice in the Eden Project. *Bulletin of the Peninsular Invertebrate Forum*, **19**: 1-4.
- Blower, J.G. (1985) *Millipedes*. Linnean Society Synopses of the British Fauna (New Series) No. 35. Leiden: Brill / Backhuys.
- Harper, J. (2007) The BMIG specimen collection. *Bulletin of the British Myriapod & Isopod Group*, **22**: 9-11. Also see <https://www.bmig.org.uk/page/introduction-collections>.
- Kime, R.D. & Enghoff, H. (2017) Atlas of European millipedes 2: Order Julida (Class Diplopoda). *European Journal of Taxonomy*, **346**: 1-299.
- Lee, P. (2006) *Atlas of the millipedes (Diplopoda) of Britain and Ireland*. Sofia & Moscow, Pensoft.
- Lee, P. (2015) *A review of the millipedes (Diplopoda), centipedes (Chilopoda) and woodlice (Isopoda) of Great Britain*. Species Status No. 23. Natural England Commissioned Reports, Number 186.