

***Porcellionides sexfasciatus* (Budde-Lund, 1885) new for the UK from Eden Project, Cornwall (Isopoda: Oniscidea: Porcellionidae)**

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Abstract

The woodlouse *Porcellionides sexfasciatus* (Budde-lund) is reported new for the UK from the Eden Project, Cornwall. A brief description with figures is provided to enable identification and information is given about habitats and microsites inhabited. This western European species is probably a recent colonist to the Eden Project, aided by human activity, and additional British sites may await discovery.

Key words: Isopoda, Oniscidea, *Porcellionides sexfasciatus*, new for UK, identification.

Introduction

The Eden Project, Cornwall (SX0455, VC1) includes an extensive glasshouse complex (the Rainforest and Mediterranean Biomes) covering 2.2 ha which is stocked with thousands of plant species from around the globe. The woodlice (Isopoda: Oniscidea) inhabiting these biomes were widely sampled by various researchers between 2003 and 2010 and records for 14 species of woodlice (Isopoda: Oniscidea), five species new for Britain, are collated by Gregory (2014). This included *Chaetophiloscia sicula* Verhoeff (Philosciidae), *Lucasius pallidus* (Budde-Lund) (Porcellionidae) and an unidentified (non-British) species of *Armadillidium* Brandt (Armadillidiidae) collected in the Mediterranean Biome.

In February 2018 during a visit to the Eden Project Mediterranean Biome KL observed two unfamiliar woodlice which were photographed (Fig. 1A-B). Subsequently, the images were seen by Franck Noël who suspected that they may be *Porcellionides sexfasciatus* (Budde-lund, 1885) (pers. comm. to SJG).

Currently, two species of *Porcellionides* Miers are known from Britain and Ireland (Gregory, 2009). The Plum Woodlouse, *P. pruinosus* (Brandt), with its characteristic pruinose ‘bloom’ covering the pereonites, inhabits synanthropic sites such as compost and manure heaps and is most frequent in southern and eastern England. In contrast *P. cingendus* (Kinahan), a typically well patterned species, has a marked south-western distribution, being widespread across southern Ireland, but mainly restricted to southern and western coastal areas in Britain.

Confirmation of *Porcellionides sexfasciatus* in the UK

A formal visit to collect specimens from the Eden Project biomes was arranged by JH-M on 21.iii.2020 (accompanied by SJG and KL). Two specimens collected from the Mediterranean Biome (Fig. 2A-B) were found upon microscopic examination to be female *P. sexfasciatus*. This determination was confirmed by Franck Noël (pers. comm. to SJG) from images taken by SJG of a specimen collected by JH-M (specimen shown in Fig. 2A, 2C-F). Subsequently, on 31.x.2020, a male specimen was collected inside the Mediterranean Biome by Mark Telfer (pers. comm. to SJG). A brief description with figures is provided below to allow separation of the three species of *Porcellionides* now known to occur in Britain and Ireland.

These are the first recorded occurrences of *Porcellionides sexfasciatus* (Budde-Lund, 1885) in the UK.



Figure 1: Two live specimens of *Porcellionides sexfasciatus* observed at Eden Project in 2018.
A) Male (with re-generated right antenna) B) Female (recently moulted) (images © Keith Lugg).

Identification

A number of sub-species have been described, mainly from the Iberian Peninsula (Vandel, 1962). The sub-species present in France, and reported here, is *Porcellionides sexfasciatus sexfasciatus* (Budde-lund, 1885). Widely used synonyms include *Metoponorthus sexfasciatus* Budde-Lund, 1885, *Porcellio molleri* Verhoeff, 1901 and *Porcellio variabilis* Lucas, 1849. It should be noted that another widely used name *Porcellionides sexfasciatus* (C.L. Koch, 1847) is a synonym of *Orthometopon phaleronense* (Verhoeff, 1901), a species native to Greece (Schmalfuss, 2003) and not the species reported herein.

Porcellionides sexfasciatus is a well pigmented woodlouse, in life with a characteristic pruinose bloom, with a strongly discontinuous (stepped) pereion-pleon body outline and the antennal flagellum composed of two articles. It is capable of rapid movement. The body bears a distinct pattern of dorsal longitudinal stripes and, characteristically, the basis of each pereopod bears a darkly pigmented band. The shape of the male first exopodite is diagnostic.

Using Hopkin (1991) live animals are likely to key out as *P. pruinus* due to the pruinose 'bloom'. However, in preserved material this distinctive 'bloom' is lost, and specimens are likely to key to *P. cingendus* (in both Hopkin, 1991 and Oliver & Meehan, 1993) due to the distinctly raised traverse ridge present on the 2nd to 7th pereionites. Details of how to differentiate the three species are outlined below (but also see also Noël & Séchet, 2007; Noël, Séchet & Lefebvre, 2014). Potential confusion between the identification of *P. sexfasciatus* and *Orthometopon planum* (Budde-Lund, 1885) (Agnaridae), a species that is spreading northwards across France, but not yet recorded from the UK, is highlighted by Noël, Séchet & Lefebvre (2014).

Description

The brief description below is based primarily on the two female specimens (Fig. 2A-B) freshly preserved in 75% ethanol that were collected from the Eden Project in March 2020. The specimens photographed in 2018 (Fig. 1A-B) and the male collected in October 2020 were not available.

Porcellionides sexfasciatus exhibits sexual dimorphism, with the male being much more heavily pigmented than the female (see Fig. 1A vs 1B). Thus, the pigmentation patterns described below will be much less obvious in the male (Vandel, 1962). This, and other details of the male (see *Male sexual characters* below), are taken from published sources. The first female specimen (shown in Fig. 2A, 2C-F; J.H-M leg., SJG det.) is 8.0 mm in length (front of cephalon to tip of telson) by 3.25 mm wide. The second (Fig. 2B; SJG leg./det.) is 6.75 mm by 2.75 mm. Noël & Séchet (2007) give length up to 11-12 mm for French specimens.

The characteristic pruinose bloom seen in live specimens, akin to that of *P. pruinus*, is lost upon preservation in alcohol leaving a background of purplish-brown pigment visible across the cephalon, pereion and pleon (Fig. 2A-D). The cephalon is mottled with pale spots. Six dark bands (hence 'sexfasciatus') run longitudinally along the length of the pereion and are most obvious posteriorly: a pair of either side of the mid line and a pair on each lateral margin running parallel to the epimera (which separated by a noticeably pale band). The dark bands continue onto the pleon, but it is the intervening three white bands that are most apparent here. The basis of the pereopods each bears a darkly pigmented band (Fig. 2E), which is characteristic of this species (Vandel, 1962), and the underside of the pleon, noticeably the exopods, is also darkly pigmented.

The cephalon with lateral lobes hardly visible from above and the median lobe is lacking (Fig. 2C). Eyes are composed of numerous (c. 18) ommatidia (Fig 2C) and antennal flagellum is composed of two sub-equal articles (Fig. 2F). Posterior margins of the anterior pereionites are rounded, lacking backward projections (Fig. 2C), but backward projections become progressively more pronounced posteriorly (Fig. 2D). The dorsal surface with fine granulations. Pereionites 2 to 7 each with a distinct raised

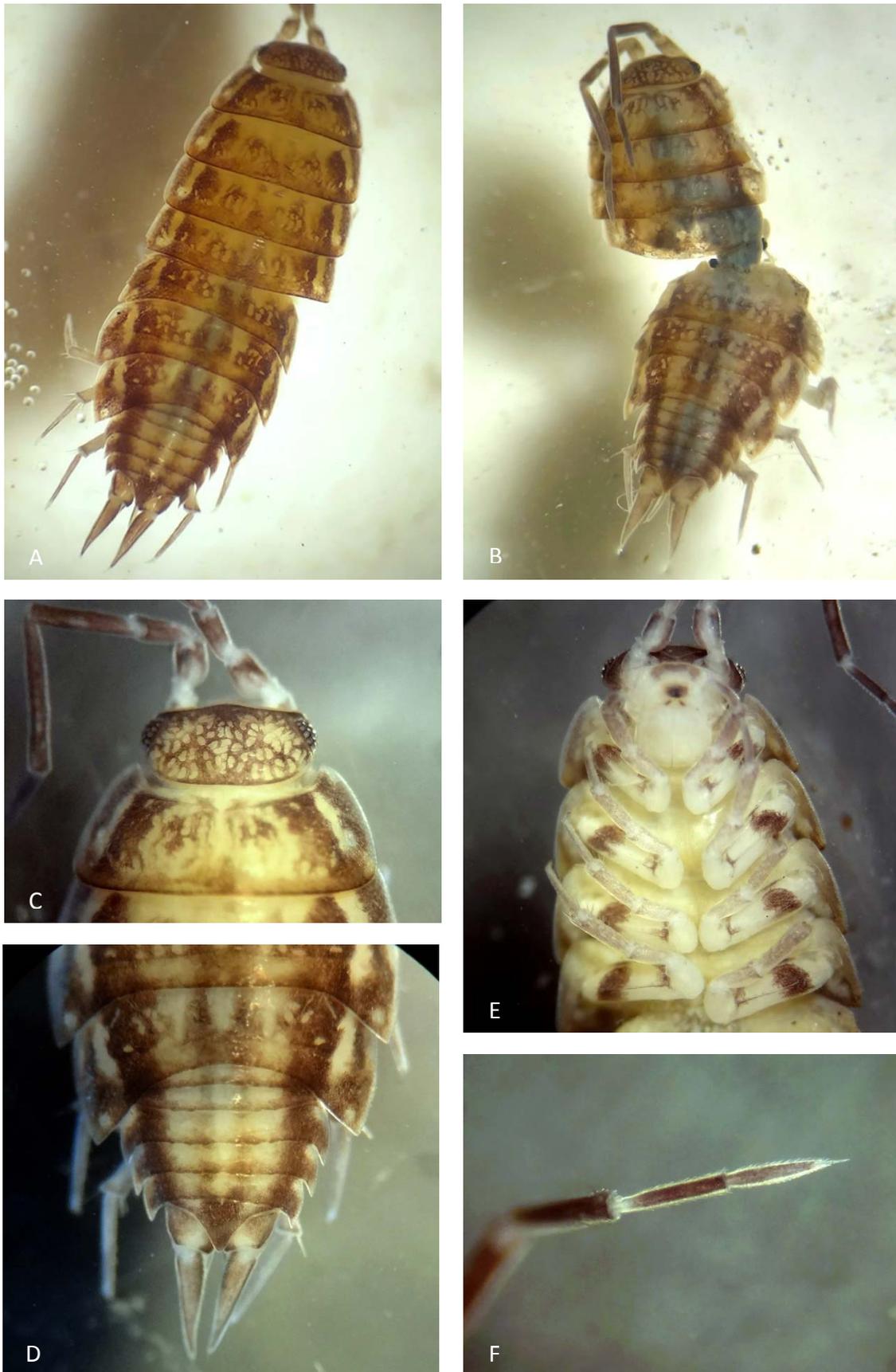


Figure 2: *Porcellionides sexfasciatus* female, specimens collected from Eden Project in 2020. A) & B) Two different preserved specimens; C) Cephalon and pereionite 1; D) Pereionite 7, pleon, telson and uropods; E) Ventral view, showing characteristic darkly pigmented bands on basis of pereopods; F) Antennal flagellum (images C-F are of specimen shown in 2A).

transverse impression (ridge) that lies within the posterior third. In *P. cingendus* this ridge lies towards the anterior margin of the pereionites and in *P. pruinus* they are not raised into a ridge (Oliver & Meehan, 1993; Noël & Séchet, 2007; Noël, Séchet & Lefebvre, 2014). The lateral noduli are very distinct, lying in a conspicuously unpigmented patch towards the postero-lateral corner of each pereionite (Fig. 2A, C- D). These are also apparent in *P. cingendus*, but inconspicuous in *P. pruinus* (Noël & Séchet, 2007; Noël, Séchet & Lefebvre, 2014).

The pleon is much narrower than the pereion, producing a strongly stepped body outline (Fig. 2D). Each pleonite bears an acute backward projection at the lateral-posterior corner. Two pairs of pseudotracheae are present. The telson is triangular, lateral margins concave and tip just reaching basipod of the uropods. Exopod of the uropods is long and slender (more so in the male; Vandel, 1962).

Male sexual characters

This account is taken from published literature (Vandel, 1962; Oliver & Meehan, 1993; Noël & Séchet, 2007). Exopod 1 of male *P. sexfasciatus sexfasciatus* (Fig. 3A) is of characteristic shape (Vandel, 1962, p.611, fig. 301D; redrawn here) being elongated into a gradually tapering point and lacking a cleft on the outer margin of the pseudotracheae. In contrast, exopod 1 of *P. cingendus* (Fig. 3C) is much broader relative to its length, being rather cordate in shape, with a conspicuous cleft on the outer margin of the pseudotracheae (arrowed). Exopod 1 of *P. pruinus* (Fig. 3B) is of a very different shape, being much broader than long. In *P. sexfasciatus sexfasciatus*, the carpus of male pereopod 1 is devoid of spines (Vandel, 1962), whereas both *P. cingendus* and *P. pruinus* have a brush of spines on the ventral face of the carpus (Vandel, 1962; Oliver & Meehan, 1993). The male pereopod 7 lacks secondary sexual modifications in all three species (i.e. is identical to that of the female).

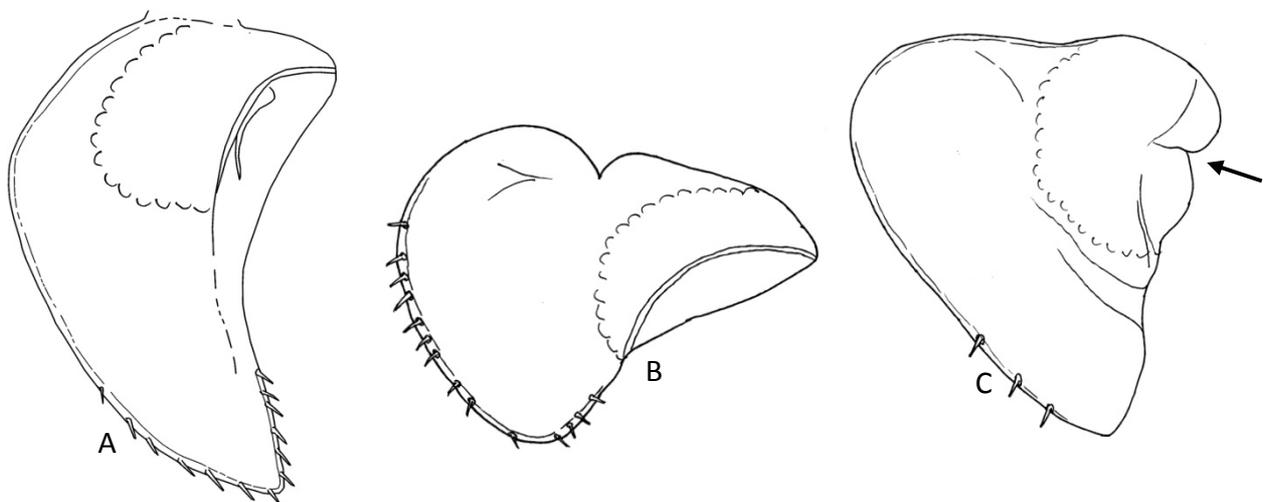


Figure 3: Comparison of exopod 1 of male specimens (anterior to top, posterior to bottom).

A) *Porcellionides sexfasciatus sexfasciatus* (redrawn from Vandel, 1962); B) *P. pruinus*;
C) *P. cingendus*, cleft in pseudotracheae arrowed (B & C redrawn from Oliver & Meehan, 1993).

Distribution and habitats

Porcellionides sexfasciatus is widely distributed across the western Mediterranean region, including Spain, France, Italy, Malta, Morocco, Algeria, Tunisia and numerous Atlantic islands (see map in Vandel, 1962; p.608, fig. 299) and has been introduced to many other parts of the world (Schmalfuss, 2003).



Figure 4: Locations where *Porcellionides sexfasciatus* were collected in March 2020.

- A) Mediterranean ‘garden’, under uppermost stone behind table;
- B) Western Australia ‘garden’, under stone at top of wall.

In France it is widespread along the coastline of both the Mediterranean and the Atlantic where it reaches as far north as Finistère (Île de Sein), north-west Brittany (Séchet & Noël, 2015; Muséum National d'Histoire Naturelle, 2003-2020). Although this is predominantly a littoral species, it is not confined to the coast and is able to colonise synanthropic habitats inland (Séchet, 2004; Séchet & Noël, 2015), with a preference for relatively dry stony or sandy soils (Noël & Séchet, 2017). Synanthropic sites where it is assumed to be introduced include gardens and a cellar in Paris (Vandel, 1962), where it has not been recorded recently, and it has also been found inside heated glasshouses, e.g. in the Park Phoenix (Lemaire & Gerriet, 2014).

In Britain *P.sexfasciatus* has been recorded only from within the Mediterranean Biome of the Eden Project in Cornwall. The two specimens photographed in Fig. 1 were observed in the 'Mediterranean garden' by KL in February 2018. An additional female was collected there in March 2020 by JH-M. On the same date a second female was collected from the 'Western Australia garden' by SJG, but a third specimen seen nearby rapidly escaped capture. These specimens were found under loose stones in dry situations (Fig. 4A-B), with no other species of woodlouse present. Other woodlice recorded nearby (but in moister microsites) were numerous *Armadillidium nasatum* Budde-Lund, a few *Porcellio scaber* Latreille and a single *Lucasius pallidus* (Budde-Lund) (a species previously recorded here in 2010; Gregory 2014).

It is quite possible that *P. sexfasciatus* may be found at other heated warm temperate 'Mediterranean' glasshouses in Britain and Ireland. Given its occurrence on the Atlantic coast of Brittany it may be just a matter of time before it is discovered outdoors, either in coastal habitats or synanthropic sites, such as gardens. Likely places to look would be the Channel Islands, or even the south coast of England, and its off-shore islands.

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