

***ORITONISCUS FLAVUS* (BUDDE-LUND, 1906) – A WOODLOUSE NEW TO SCOTLAND (ISOPODA: ONISCIDEA: TRICHONISCIDAE).**Duncan Sivell¹ & Steve J. Gregory²

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INTRODUCTION

One of us (DS) collected a number of female specimens of a large (up to 7 mm), darkly pigmented trichoniscid woodlouse with a prominent single ommatidium from Melville Castle, near Edinburgh (NT306667, VC 83) in September 2010 as part of a Wildlife Information Centre survey. These specimens were found under moss in mixed woodland. On the basis of external morphology the specimens readily keyed (using Hopkin, 1991) to *Oritoniscus flavus* (Budde-Lund, 1906).

This species is known to occur widely in Ireland (Doogue & Harding, 1982). In 1994 a population, presumed introduced, was discovered in south Wales (Morgan, 1994), but otherwise it is unknown from the British mainland (Gregory, 2009). The Irish distribution of *O. flavus* is centred on an area known to support thermophilous species (Doogue & Harding, 1982) suggesting it favours the moist climate and mild winters found in southern Ireland. In contrast Edinburgh lies on the ‘cold and dry’ north-east coast of Britain. Thus, it was queried by SJG whether the specimens were referable to another morphologically similar continental species such as *Hyloniscus riparius* (Koch, 1838), an expansive species that is widespread in the Netherlands (Berg, *et al*, 2008).

CONFIRMATION OF IDENTIFICATION

A return visit to the area by DS in February 2011 resulted in the discovery of numerous specimens at two additional sites along the River North Esk (Sivell, 2011). Firstly, at Dalkeith Country Park (NT333677) specimens were widely found among well-developed leaf litter on the woodland floor along a several hundred metre length of the river. Secondly, by the riverside cycle path between Whitecraig and Musselburgh (NT345708) numerous specimens were observed under moss on the banks of the river (Table 1). The samples collected included a male specimen from each site. These were confirmed by SJG to be *Oritoniscus flavus s. str.* (Budde-Lund, 1906). These records extend the global range of this species about 200 km further north of previous records from County Meath in Ireland (Doogue & Harding, 1982) (Fig. 1).

In April 2015 SJG visited Dalkeith Country Park (during the BMIG 2015 field meeting to Linlithgow). On this occasion the leaf-litter on the woodland floor was very dry (despite the presence of a typical wet woodland flora, including carpets of Opposite-leaved Golden Saxifrage *Chrysosplenium oppositifolium* and Ramsons *Allium ursinum*) and *O. flavus* proved elusive. Five specimens (including two males) were found with difficulty at the base of the river bank where deep accumulations of leaf-litter and flood debris had maintained suitably damp conditions beneath. In the field these were reminiscent of a dark immature *Philoscia muscorum* (Figs. 2 & 3). Here other moisture loving species, including Marsh Slug *Deroceras laeve* Müller and the millipede *Craspedosoma rawlinsii* Leach, were also recorded. A few additional specimens of *O. flavus* were found by Keith Lugg in a water-logged heap of rotting grass-cuttings beside an access track nearby.

TABLE 1: The first records of *Oritoniscus flavus* s. str. in Midlothian, Scotland in chronological order. DS = Duncan Sivell, SJG = Steve Gregory, KL = Keith Lugg

Locality	Grid reference	Vice County	Number of specimens	Date	Collector
Melville Castle	NT306667	VC 83	Many specimens observed: few ♀♀ collected	19.x.2010	DS
Dalkeith Country Park	NT333677	VC 83	Many specimens observed: 3 ♂♂ & 5 ♀♀ collected	04.ii.2011	DS
Whitecraig cycle path	NT345708	VC 83	Many specimens observed: 2 ♂♂ & 5 ♀♀ collected	04.ii.2011	DS
Dalkeith Country Park	NT333677	VC 83	2 ♂♂ & 5 ♀♀ found with difficulty	11.iv.2015	SJG, KL

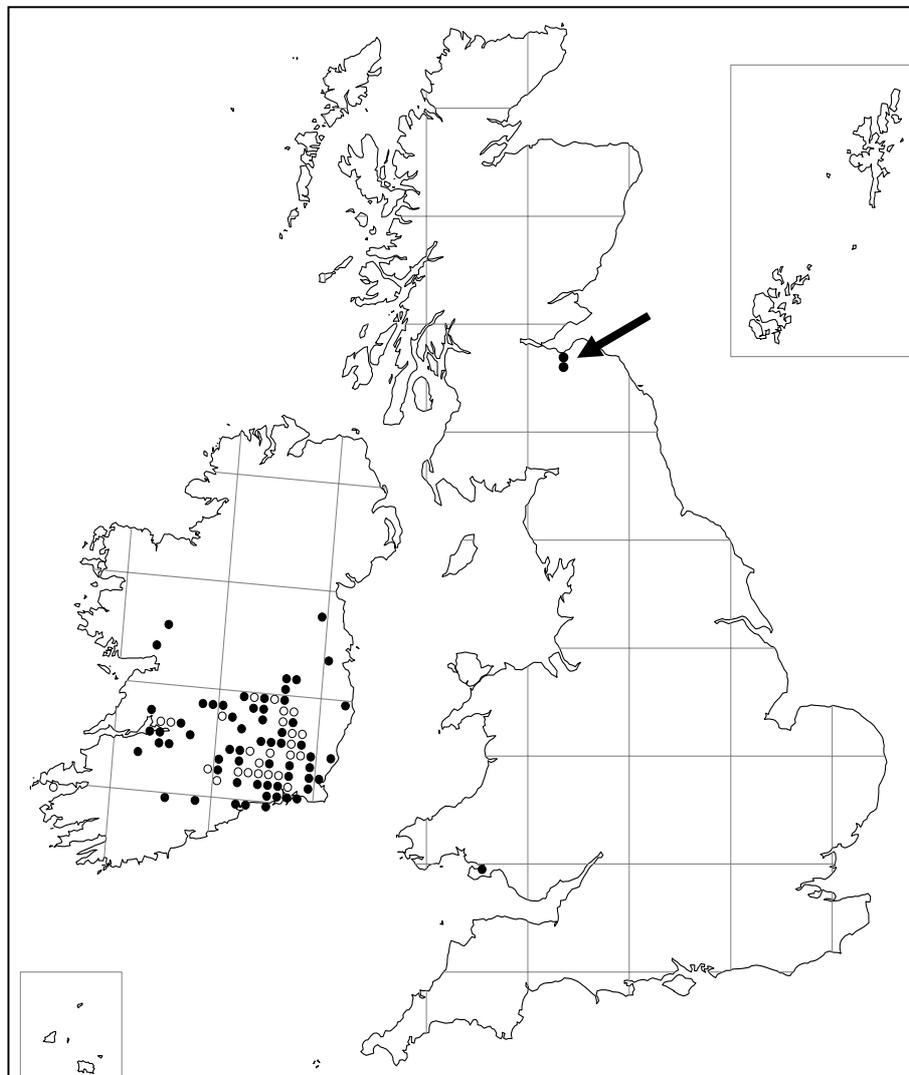


FIGURE 1: Distribution map showing 10km records for *Oritoniscus flavus* in Britain and Ireland (after Gregory, 2009). Scottish records, reported herein, are arrowed.



FIGURES 1 and 2: Specimen of *Oritoniscus flavus* from Dalkeith Country Park, 11.iv.2015
(images © Keith Lugg)

IDENTIFICATION OF *ORITONISCUS FLAVUS*

The four male specimens examined were between 4.5 and 5.5 mm in length. Females were between 5.5 and 7 mm. Although darkly pigmented purple-red in life, specimens gradually faded to straw yellow upon preservation in alcohol. The specimens are stored in 75% ethanol and currently retained in the personal collections of the authors.

The *Oritoniscus flavus* described in standard British identifications works (i.e. Hopkin, 1991 and Oliver & Meehan, 1993) has been shown by Dalens, *et al* (1996) to be a complex of three closely related species: *O. violaceus* Dalens, Rousset & Fournier, 1996; *O. intermedius* Vandael, 1957; and *O. flavus* (Budde-Lund, 1906). The same publication cited specimens from the Irish and Welsh populations as being referable to *O. flavus s. str.*

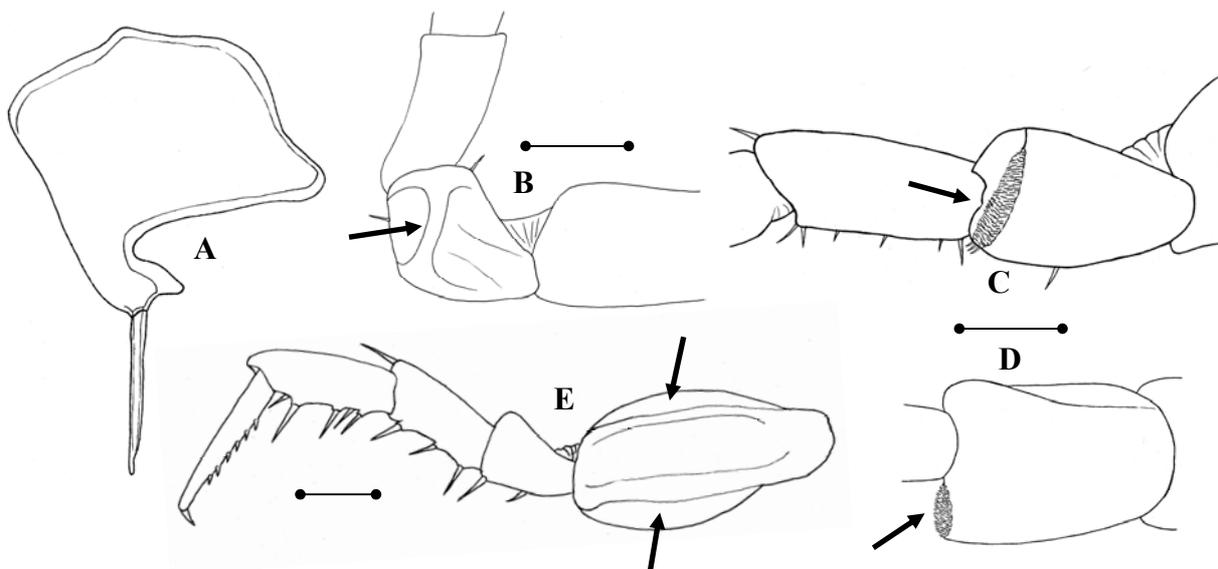


FIGURE 2: *Oritoniscus flavus* (Budde-Lund) male. Dalkeith Country Park, 4.ii.2011
A) Exopodite of first male pleopod; B) Second pereopod, ischium and merus, posterior view;
C) Third pereopod, ischium and merus, anterior view; D) Third pereopod, ischium, dorsal view;
E) Fifth pereopod, posterior view. Scale bars = 0.2 mm

It is not possible to reliably separate these three species on the basis male first pleopod (Fig. 2A), as figured in Hopkin (1991) and Oliver & Meechan (1993), because they do not differ significantly in shape between the three species. However, male specimens of *O. flavus* are readily distinguished from those of *O. intermedius* or *O. violaceus* by examination of the second, third and fifth pereopods. Females cannot be reliably identified.

In *Oritoniscus flavus s. str.* the basis of the fifth pereopod appears very swollen relative to the other articles due to the presence of well developed flanges directed both dorsally and ventrally from the anterior surface (Fig. 2E, arrowed). This character is absent in *O. intermedius* and *O. violaceus* (Dalens, *et al*, 1996) and provides a simple means of identification. In addition, the ischium of the second pereopod bears a shallow hollow at each end on the posterior surface, to leave a conspicuous rounded ridge rising between (Fig. 2B, arrowed). Another easily seen character is found on the ischium of the third pereopod which at the distal end bears a prominent flat-topped bulge on its anterior face, covered with pointed scales (Fig. 2C, arrowed). This is most easily seen by viewing the ischium from dorsal or ventral view (Fig. 2D).

DISCUSSION

Oritoniscus flavus was found to be numerous at each of its three River North Esk localities, so it appears to be well established locally. The habitats and micro-sites that it was recorded in are very similar to those noted in Ireland where it is typically associated with river and stream valleys, occurring under leaf litter, stones and dead wood (Doogue & Harding, 1982). The three known River North Esk populations are widely separated which suggests that a recent introduction is unlikely, and it may have been present, unnoticed, for many decades.

The Edinburgh area has been relatively well worked for woodlice (Gregory, 2009), so it may be that *O. flavus* is restricted to the River North Esk. From 2011 to 2013 further searches for this species were made by DS in the winter months, further downstream in Musselburgh (NT338723) and upstream from Polton (NT288647) to Roslin Glen (NT271627), but *O. flavus* was not seen at these other sites. It therefore appears to be restricted to a length of the River North Esk between 7 and 15 km long, based on findings so far. None-the-less, it will be interesting to see whether this woodlouse can be found along other river systems in the Edinburgh area. In France it is thought that the species may be dispersed along with flood debris during flood events (Franck Noël, pers. comm.).

Dalens *et al* (1996) considered *O. flavus* to be an expansive species that is spreading northwards and westwards from its native Pyrenean stronghold. Noël & Séchet (2007) report its recent discovery in the departments of Maine et Loire, Deux-Sèvres and Vendée in north-west France. In Ireland its strong association with semi-natural habitats has been taken as evidence of its native status (Doogue & Harding, 1982), but Cawley (2001) considers it may be an ancient introduction. In south Wales, Morgan & Pryce (1995) consider *O. flavus* to be a relatively recent colonist, possibly introduced via the once thriving coal exporting trade of the Llanelli region. Its discovery in south Wales, wherever its origin, supports the view that it has good dispersal ability and is able to successfully colonise new localities.

Given the isolated nature of the Scottish populations, some 500 km north of the other known British site in south Wales, it also seems highly probable that *O. flavus* has been unintentionally introduced into the valley of the River North Esk. However, there is a wide difference in latitude, and climate, between south Wales and eastern Scotland and the ability of *O. flavus* to adapt to new localities seems extraordinary.

The obvious question is how did the south-western *O. flavus* get to eastern Scotland? One possible route of introduction to Melville Castle is via the importation of exotic trees and plants into the gardens during the Victorian period. A second possible route of introduction is via the nearby Melville Nurseries, a commercial plant nursery, which according to old aerial photographs once comprised a large complex of glass houses until at least the 1940s (available online at <http://maps.nls.uk>).

A second puzzle is how a species with a distinct south-western distribution in Britain and Ireland, that apparently favours the high humidity and warm winters of the Atlantic climate, can survive in eastern Scotland? The east coast of Scotland is considerably colder, and has much lower rainfall, than Ireland or south Wales. Although Mellville Castle lies on a south facing slope, it is unlikely that the valley of the River North Esk will receive much direct heat from the sun. At the known Pyrenean sites for *O. flavus* (cited in Dalens *et al.*, 1996) the winters are likely to be cold, with the ground covered with snow at times. In many ways this is perhaps not dissimilar to winters in eastern Scotland. As to humidity, it is probable that *O. flavus* becomes more restricted to wet micro-sites in the less humid east coast of Scotland. Certainly in April 2015 the species proved very elusive at Dalkeith Country Park (Table 1) when the woodland floor had dried out. Specimens could only be found where damp conditions prevailed, such as beneath deep accumulations of leaf-litter and flood debris. It is of note that a few specimens were also collected from a saturated heap of rotting grass-cuttings, indicating that the species is able to exploit other suitably damp micro-sites.

On the basis of these Scottish observations, there is no obvious reason why *Oritoniscus flavus* should not occur at other sites in Britain.

ACKNOWLEDGEMENTS

We thank Glynn Collis for his helpful comments regarding the likely mechanisms of introduction and establishment of *O. flavus* along the River North Esk.

Keith Lugg kindly permitted the use of his images of *O. flavus* collected from Dalkeith during the BMIG 2015 field meeting to Linlithgow.

The distribution map was plotted using the DMapW mapping programme developed by Alan J. Morton.

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