

STYLONISCUS MAURITIENSIS (BARNARD, 1936) – AN OVERLOOKED WOODLOUSE OF TROPICAL GLASSHOUSES NEW FOR ENGLAND AND WALES (ISOPODA, ONISCIDEA: STYLONISCIDAE)Steve J. Gregory¹ & Keith Lugg²¹ 4 Mount Pleasant Cottages, Church Street, East Hendred, Oxfordshire, OX12 8LA, UK.E-mail: stevegregory@btopenworld.com² 42 Mere Oak Park, Three Mile Cross, Berks, RG7 1NR, UK.E-mail: keithlugg@aol.com**ABSTRACT**

The tropical woodlouse *Styloniscus mauritiensis*, first recorded in Britain from inside glasshouses at Royal Botanic Garden Edinburgh, Scotland, in 1986, was rediscovered there in 2015. Subsequently, additional sites new for England and Wales have been discovered, suggesting it may have been overlooked in heated glasshouses. Information about microsites inhabited and associated species is provided. A description with illustrations is provided to allow identification.

INTRODUCTION

The styloniscid woodlouse *Styloniscus mauritiensis* (Barnard, 1936) has been recorded ‘in the wild’ from the tropical islands of Mauritius in the Indian Ocean and from Hawaii in the Pacific (Schmalfuss, 2004). In August 1986 Charles Rawcliffe collected several specimens of *S. mauritiensis* (identified by F. Ferrara) from among peat in plant pots inside a heated ‘tropical’ glasshouse at Royal Botanic Garden (RBG) Edinburgh, Scotland (NT2475, VC 83); the only recorded occurrence of this species in Europe (Schmalfuss, 2004). Additional specimens were collected the following November and are held in the collection of the late Steve Hopkin (now in possession of SJG).

Although written up in the British Isopod Study Group Newsletter No. 22 (Rawcliffe, 1987), species confined to heated glasshouses were not included in the standard British identification works; i.e. Hopkin’s (1991) AIDGAP Key and Oliver & Meechan’s Synopsis (1993). Consequently, this addition to the British fauna was overlooked for twenty years until Rawcliffe’s discovery was highlighted by Collis & Harding (2007). There have been no additional UK records for *S. mauritiensis* since Rawcliffe’s original discovery in 1986 (Gregory, 2009) and the species has never been described or figured in British literature.

RE-DISCOVERY OF *STYLONISCUS MAURITIENSIS*

During the 2015 annual BMIG spring field meeting based at Linlithgow a visit was organised on 10th April to RBG Edinburgh. The authors took the opportunity to collect from the complex of heated glasshouses, including those closed to the public, and were successful in re-finding *S. mauritiensis*. Two specimens were found inside one of the non-public glasshouses and a thriving population inside the Montane Tropics House (Gregory, 2015; Table 1). These were identified using Taiti & Ferrara (1983), subsequently confirmed by Stefano Taiti (pers. comm.).

Subsequently, in spring 2017 the authors visited a number of heated glasshouses as part of a general survey of the fauna inhabiting such sites (Gregory, 2017). Specimens of *S. mauritiensis* have been identified from three additional locations: the Amazonia House at Living Rainforest, Berkshire; the Tropical Forest House at Birmingham Botanic Gardens and the Tropical House at the National Botanic

Garden of Wales. See Table 1 for details of records. These represent the first records of *S. mauritiensis* in England and Wales.

In light of the discovery of *S. mauritiensis* at several sites in the UK, a description with figures based on British specimens is provided below to allow identification of this species.

TABLE 1: Material examined of *Styloniscus mauritiensis* (Barnard)

CR – Charles Rawcliffe (in collection of late Steve Hopkin); KL – Keith Lugg; SJG – Steve Gregory.

Locality	Glasshouse	Grid Ref	Vice County	Number of specimens	Date of collection	Leg.
RBG Edinburgh	House 20 (tropical)	NT247755	83	1♂, 4♀♀	11.xi.1986	CR
RBG Edinburgh	House 18 (tropical)	NT247755	83	1♂, 1♀	10.iv.2015	KL
RBG Edinburgh	Montane Tropics	NT247755	83	5♂♂, 4♀♀, 8juv	10.iv.2015	SJG, KL
Living Rainforest	Amazonica	SU543761	22	2♂♂, 3♀♀	12.i.2017	SJG
Birmingham BG	Tropical Forest	SP048854	38	1♂, 8♀♀, 3juv	24.i.2017	SJG, KL
NBG Wales	Butterfly House	SN522181	44	3♂♂, 2♀♀	27.ii.2017	KL

HABITAT AND MICROSITES

All specimens of *S. mauritiensis* have been collected from inside artificially heated ‘tropical’ glasshouses, where the mean monthly temperature does not fall below 18°C. Despite extensive searches, additional specimens have not been found inside adjacent ‘subtropical’ or ‘Mediterranean’ glasshouses (where mean temperatures for some months are cooler).

Specimens are typically found, and most numerous, among damp peaty soil or debris. Where surface conditions are drier it becomes much more difficult to locate this species. This is probably also true of other associated oniscids. Details of individual locations are given below.

Royal Botanic Garden Edinburgh

Charles Rawcliffe’s original (1986) specimens were found among peat in pots holding cuttings of the Indonesian club-moss *Lycopodium pinifolium* (Collis & Harding, 2007).

In April 2015, two specimens were collected from House 18, which is not open to the public, from among peaty debris between plant pots and capillary matting on glasshouse staging. The millipedes *Oxidus gracilis* (C.L.Koch, 1847), *Poratia digitata* Porat, 1889 and *Choneiulus palmatus* (Němec, 1895) were also collected. In addition, a population was found inside the Montane Tropics House, where specimens were collected from between and within blocks of peat and from among damp peaty debris nearby. The millipedes *Choneiulus palmatus* and *Cylindroiulus salicivorus* Verhoeff, 1908 were also collected.

Living Rainforest, Berkshire

In January 2017, specimens of *S. mauritiensis* were hand sorted from damp peaty debris within a rotting palm stump in the Amazonica House. Here it was associated with the tropical woodlice *Trichorhina tomentosa* (Budde-Lund, 1893) and *Reductoniscus costata* Kesselyak, 1930.



FIGURE 1: *Styloniscus mauritiensis* (Barnard), habitus

A) Royal Botanic Garden Edinburgh, 10.iv.2015; B) Living Rainforest, Berkshire, 12.i.2017;
C) Birmingham Botanic Garden, 24.i.2017 (images © Keith Lugg).

Birmingham Botanic Garden

In January 2017, several specimens were hand-sorted from upper layers of peaty soil in the Tropical Forest House, which had been kept moist by a dripping pipe. No additional specimens were found nearby where the soil surface was noticeably drier. The woodlouse *Nagurus cristatus* (Dollfus, 1889), a pan-tropical tramp species (Schmalfuss, 2004), was collected nearby.

National Botanic Garden of Wales

In February 2017, specimens of *S. mauritiensis* were found by turning large pieces of dead wood. Individual specimens would emerge from peat filled cracks within the wood and could be collected by pooter as they run across areas of bare wood before disappearing into another crack. Also collected from the same habitat were the millipedes *Poratia digitata* Porat, 1889 and *Cylindroiulus parisiorum* (Brölemann & Verhoeff, 1896).

IDENTIFICATION

A complete re-description of *Styloniscus mauritiensis*, based on specimens collected from Mauritius, is provided by Taiti & Ferrara (1983). The description below is based on live specimens and freshly preserved material preserved in 75% IDA collected in Britain (Table 1) between 2015 and 2017. Some of Charles Rawcliffe's original 1986 material was also examined. Specimens are held in the personal collections of the authors.

Taxonomy

ORDER Isopoda Latreille, 1817

SUBORDER Oniscidea Latreille, 1802

SECTION Synocheta Legrand, 1946

FAMILY Styloniscidae Vandel, 1952

GENUS *Styloniscus* Dana, 1853

***Styloniscus mauritiensis* (Barnard, 1936)**

syn. *Trichoniscus mauritiensis* Barnard, 1936

syn. *Indoniscus mauritiensis* (Barnard, 1936)

Appearance

Male specimens are 2.00-2.5mm in length, while gravid females are 2.75-3.25mm. In life specimens varied from tan-coloured to a reddish-brown (Figs. 1A-C), but typically marbled with indistinct pale patches. Antennae and uropods are unpigmented and in live specimens contrast against the pigmented body. Body pigments gradually fade following preservation in alcohol and specimens collected by Charles Rawcliffe in 1986 (in the personal collection of the late Steve Hopkin, now in possession of SJG) are a uniform off-white colour.

Lateral lobes of cephalon weakly developed, frontal region slightly projecting, with distinct forward projecting tubercles (Fig. 2A). Antennae rather stout, flagellum slender, comprising about four indistinct segments and terminating in a long fine brush. Eye composed of three black ommatidia arranged in a triangle, close-set and fused in adults, but separated in immatures (as in *Trichoniscus pusillus* agg.). The black pigment of the ocelli has faded slightly in preserved specimens collected in 1986, but remains distinct. The cephalon and pereionites are covered with coarse tubercles arranged transversely in rows, each bearing a short spine. The pleon bears a single row of weak tubercles. Apical margin of telson rounded and bearing four short stout spines (Fig. 2B).

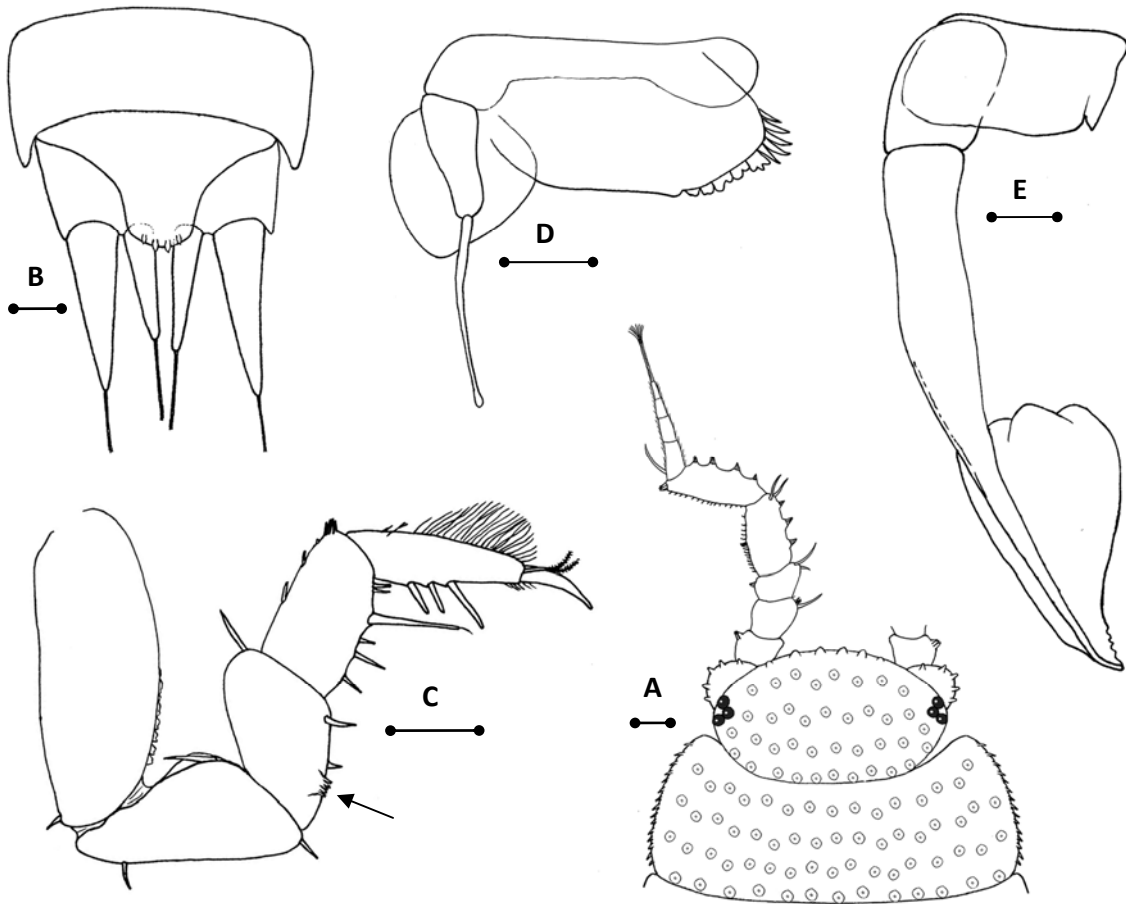


FIGURE 2: *Styloniscus mauritiensis* (Banard) male. RBG Edinburgh, SJG leg., 10.iv.2015.

A) Head, antenna and first pereionite, dorsal view; B) Last pleonite, telson and uropods, dorsal view; C) Pereiopod 7, internal view; D) First pleopod; E) Second pleopod, with fifth exopod attached to tip. Scale bars 0.1 mm

Male sexual characters

First pleopod (Fig. 2D) is considerably wider than long. The outer edge bears a number of rounded tooth-like structures, which abruptly change into tapering elongated structures. Basal section of endopod stout, the second slender and elongated, terminating in a rounded spoon-like tip. The exopod of non-descript rounded triangular shape.

Second pleopod (Fig. 2E) with endopod curved along its entire length and gradually tapered to a fine outwardly curved point. In all male specimens dissected the tip of the endopod 2 is slotted tightly into a groove on the fifth exopod, and difficult to tease apart (as shown in Fig. 2E).

Male 7th pereopod (Fig. 2C) is distinctive in bearing a small lobe, topped with a group of scales, on the inner face of the merus (arrowed). This scale tipped lobe can be difficult to see until the pereopod is in the correct orientation.

Similar species

Styloniscus mauritiensis is similar in size and general appearance to the two other Styloniscid species known from heated glasshouses in Britain (Gregory, 2009); *Cordioniscus stebbingi* (Patience, 1907) and

Styloniscus spinosus (Patience, 1907). The authors have yet to encounter (male) specimens of either *C. stebbingi* or *S. spinosus*, but the three species should be readily separable on the basis of male first and second pleopods. However, figures in old texts, such as Edney (1954), can be misleading. Unfortunately, Patience's (1907a) original description and figures of *C. stebbingi* bear more than a passing resemblance to *S. mauritiensis* (as redescribed by Taiti & Ferrara, 1983).

According to Patience's (1907b) original description of *S. spinosus*, the tip of the telson is rounded and bears three small teeth (four in *S. mauritiensis*, Fig. 4B, and in *C. stebbingi* (Patience, 1907a). Also in *S. spinosus*, the antennae, legs and uropods are similarly pigmented to the body. These appendages are poorly pigmented, contrasting against the pigmented body, in *S. mauritiensis* (Figs. 1A-C) and *C. stebbingi* (Patience, 1907a).

It is also likely that additional species of Styloniscid woodlice may occur inside heated glasshouses. Reliable identification can only be based on examination of a male specimen.

AN OVERLOOKED SPECIES?

In addition to RBG Edinburgh, *S. mauritiensis* has now been found at three additional localities with tropical glasshouses (of five surveyed) in spring 2017 (Table 1), including first records for England and Wales. This suggests that previously *S. mauritiensis* may have been overlooked and/or misidentified in Britain. As far as we are aware, this species has not been recorded elsewhere in Europe either (Schmalfuss, 2004).

In the past, *Cordioniscus stebbingi* was the most widely recorded styloniscid in Britain, including several records since 1980 (Gregory, 2009). This includes RBG Edinburgh, where it was not found during our 2015 surveys. During the surveys reported herein, male specimens of *C. stebbingi* have yet to be encountered, although several females of a slightly smaller and more darkly pigmented styloniscid species (relative to typical *S. mauritiensis*) have been collected.

Although in recent decades there has been a resurgence of interest of the woodlouse fauna (Oniscidea) of heated glasshouses, such as those of botanic gardens (e.g. Gregory, 2014), this remains an under-recorded environment and there remains much to discover, even from casual sampling.

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REFERENCES

- Collis, G.M. & Harding, P.T. (2007) Charles Rawcliffe's discovery of the alien woodlouse *Styloniscus mauritiensis* (Barnard 1936). *Bulletin of the British Myriapod & Isopod Group*, **22**: 20-21. http://www.bmig.org.uk/sites/www.bmig.org.uk/files/bulletin/BullBMIG22_p20-21_Collis&Harding_S-mauritiensis.pdf
- Edney, E.B. (1954). *British woodlice*. Synopses of the British fauna, No. 9. London, Linnean Society.
- Gregory, S. (2017) Hot Woodlice and Centipedes. *British Myriapod & Isopod Group Newsletter* No. 34: 7. <http://www.bmig.org.uk/sites/www.bmig.org.uk/files/news/BMIGnews34.pdf>

- Gregory, S. (2015) Some highlights from Royal Botanic Garden, Edinburgh. *British Myriapod & Isopod Group Newsletter* No. 31: 2.
<http://www.bmig.org.uk/sites/www.bmig.org.uk/files/news/BMIGnews31.pdf>
- Gregory, S. (2014) Woodlice (Isopoda: Oniscidea) from the Eden Project, Cornwall, with descriptions of species new to Britain and poorly known British species. *Bulletin of the British Myriapod & Isopod Group*, **27**: 3-26.
[http://www.bmig.org.uk/sites/www.bmig.org.uk/files/bulletin/BullBMIG27\(2014\)p03-26_Gregory-Eden.pdf](http://www.bmig.org.uk/sites/www.bmig.org.uk/files/bulletin/BullBMIG27(2014)p03-26_Gregory-Eden.pdf)
- Gregory, S. (2009) *Woodlice and Waterlice (Isopoda: Oniscidea & Asellota) in Britain and Ireland*. Shrewsbury: Field Studies Council Publications.
- Hopkin, S.P. (1991). *A key to the woodlice of Britain and Ireland*. AIDGAP, Field Studies Council Publication. Preston Montford. (reprinted from *Field Studies*, **7**: 599-650.)
- Oliver, P.G. & Meechan, C.J. (1993). *Woodlice*. Synopses of the British Fauna (New Series). Field Studies Council. Preston Montford.
- Patience, A. (1907a) On a new British terrestrial isopod. *Journal of the Linnean Society London, Zoology*, **30**: 42-44 and plate 7. <https://doi.org/10.1111/j.1096-3642.1907.tb02122.x>
- Patience A. (1907b) On a new British terrestrial isopod. *Annals of Scottish Natural History*, **1907**: 85-88 and plate 3. <https://archive.org/details/annalsscottishn08unkngoog>
- Rawcliffe, C. (1987) Collecting in hothouses. *British Isopod Study Group Newsletter* No. 22: 6.
http://www.bmig.org.uk/sites/www.bmig.org.uk/files/news_bisg/BISGnews22-1987.pdf
- Schmalfuss, H. (2004): World catalog of terrestrial isopods (Isopoda: Oniscidea). *Stuttgarter Beitrage zur Naturkunde. Serie A*, **654**: 341 pp. http://www.oniscidea-catalog.naturkundemuseum-bw.de/Cat_terr_isop.pdf
- Taiti S, & Ferrara F. (1983) Su alcuni Isopodi terrestri della Réunion, di Mauritius e delle Seychelles. *Revue Suisse de Zoologie*, **90**: 199-231.