

ON THE TERRESTRIAL LANDHOPPER *ARCITALITRUS DORRIENI* (HUNT, 1925) (AMPHIPODA: TALITRIDAE): IDENTIFICATION AND CURRENT DISTRIBUTION

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ABSTRACT

Truly terrestrial Landhoppers (Talitridae) are characteristic inhabitants of subtropical forests, but one introduced species, *Arcitalitrus dorrieni*, is capable of surviving outdoors in the mild Atlantic regions of Ireland and southern and western Britain. The discovery of a few outlying populations of landhoppers in north-east Britain highlighted the need for an update-to-date identification work to check if these were indeed the same species, or another naturalised species of terrestrial Talitrid. Specimens of *A. dorrieni* are examined from across its known British and Irish range. A brief description and figures of key features are presented and comparison is made to other semi-terrestrial Talitrids, particularly *Cryptorchestia cavimana*. A brief review of the ongoing spread and current distribution of *A. dorrieni* in Britain and Ireland is presented. It is possible that successive generations of *A. dorrieni* have become better adapted to the temperate British climate. An identification key to separate *A. dorrieni* from other known British and Irish Talitrids is given.

INTRODUCTION

The Talitridae is an amphipod family that is widely distributed across warm temperate and subtropical regions where they inhabit a wide variety of habitats from coastal to inland terrestrial habitats. However, the truly terrestrial Landhoppers are characteristic inhabitants of subtropical forests where they form an important component of the leaf-litter decomposition fauna. Several species have been accidentally transported by man and have established themselves in glasshouses throughout the world.

Four species of Landhopper (also known as Woodhopper or Lawn Shrimp) have been reported as introductions into Britain and Ireland. Three species, *Brevitalitrus hortulanus* Calman, 1912, *Talitroides alluaudi* (Chevreux, 1896) and *T. topitotum* (Burt, 1934) have only been recorded from inside heated tropical glasshouses, such as Kew Gardens and Glasgow Botanic Gardens (Cochard, Vilisics & Séchet, 2010). The fourth species, *Arcitalitrus dorrieni* (Hunt, 1925), is Britain's and Ireland's only truly terrestrial amphipod that is capable of surviving outdoors. Consequently, it has been adopted as an honorary 'woodlouse' by the BMIG woodlouse recording scheme (Gregory, 2000; Barber & Gregory, 2012).

Arcitalitrus dorrieni was originally described from Trescoe Abbey Gardens, Isles of Scilly, in 1924 (Hunt, 1925). A decade later it was also discovered in Co. Galway, western Ireland (Rawlinson, 1937). From the Isles of Scilly it rapidly colonised south-western England. Subsequently, it has spread further afield, especially into the mild and moist Atlantic regions of western Britain, but remained most frequent in south-west England and south Wales (Harding & Sutton, 1988; Cowling, *et al*, 2004). In Ireland it has been widely, but patchily, recorded in coastal regions where it may be under-recorded. Although *A. dorrieni* has been known from Royal Botanic Gardens Kew, London, since 1980 (Welch, 1981), there had been no subsequent records further north than this in eastern Britain. It is now known that *A. dorrieni* is native to the forests of New South Wales, eastern Australia (Peart & Lowry, 2006), where several other species of *Arcitalitrus* have been described.

This article was prompted by the reported occurrence of *A. dorrieni* in Sunderland, north-east England (Gregory, 2012), an area which experiences relatively cold and dry winters. Was this the same warmth and moisture loving species known from southern and western Britain, or was it different species of talitrid ‘landhopper’? It also appears that on occasions *A. dorrieni* has been confused with the semi-terrestrial species *Cryptorchestia cavimana* (Heller, 1865) (e.g. as reported by Gregory, 2013). There appears to be no readily available British work for the identification of *A. dorrieni*, or for the three ‘alien’ tropical glasshouse species, *Brevitalitrus hortulanus*, *Talitroides topitotum* and *T. alluaudi*. Lincoln (1979) primarily deals with British marine amphipods. It does describe and figure *A. dorrieni*, but excludes the three ‘alien’ species. Peart & Lowry (2006) provide an identification key to the nine known species of *Arcitalitrus* (all native to Australia), but, although briefly described, *A. dorrieni* is not figured.

Thus, British specimens of *A. dorrieni* are described and figured herein and a simple key to British terrestrial amphipods presented with the intention of encouraging interest in this neglected group of species.

IDENTIFICATION OF *ARCITALITRUS DORRIENI*

Material examined

Specimens thought to be *A. dorrieni* were examined from various sites, both within the known range (southern and western Britain and Northern Ireland) and also from recently discovered outlying sites along the eastern coast of Britain (East Anglia, north-east England and south-east Scotland). Material examined is listed in Table 1.

Taxonomy

ORDER Amphipoda

 SUBORDER Senticaudata

 INFRAORDER Talitrida

 PARVORDER Talitridira

 SUPERFAMILY Talitroidea

 FAMILY Talitridae

Arcitalitrus dorrieni (Hunt, 1925)

 Synonyms: *Talitrus dorrieni* Hunt, 1925

Talitroides dorrieni (Hunt, 1925)

Talitrus sylvaticus Haswell, 1879 (in part)

Hurley (1975) established subgenus *Talitrus* (*Arcitalitrus*) to accommodate *Talitrus sylvaticus* Haswell, 1879 and treated *T. dorrieni* as a junior synonymy of that species. Consequently, some older British works (e.g. Ingle, 1958) have used the name *sylvaticus* (for *dorrieni*). Subsequently, Bousfield (1984) resurrected *T. dorrieni* as a valid species and Friend (1987) elevated sub-genus *Arcitalitrus* to generic status to accommodate *dorrieni* and *bassianus* Friend. Although this synonymy was acknowledged by Moore & Spicer (1986), there appears to have been some confusion that two species, *A. dorrieni* and *A. sylvaticus*, have been recorded from Britain and Ireland, rather than just the former.

Description

Descriptions of *Arcitalitrus dorrieni* are given by Hunt (1925) and Lincoln (1979). The description below is based on material identified as *A. dorrieni* in Table 1. Key characters are shown in **bold**.

TABLE 1: Localities of amphipod material examined in the course of this study

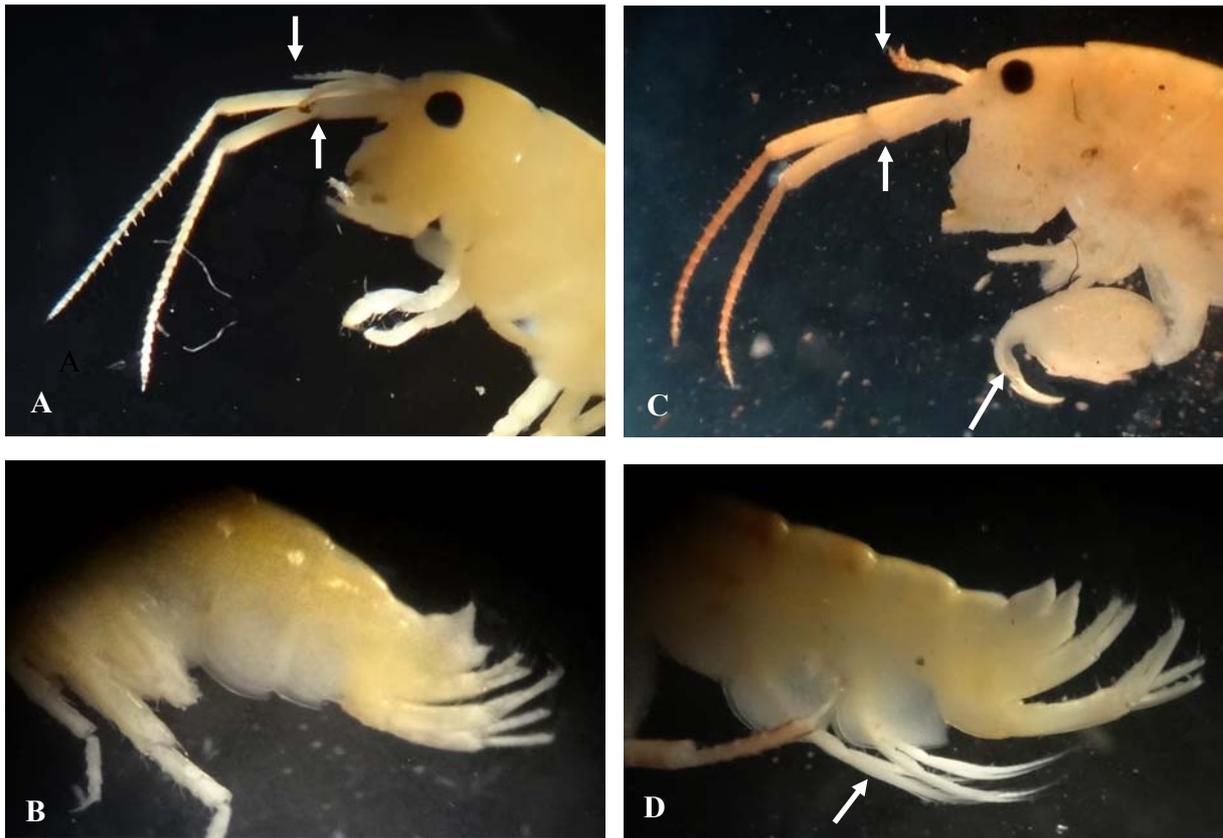
*determined by Roy Anderson using the information presented in this paper

Locality	Vice County	VC no.	Grid Ref	Date of collection	Species determination
Eden Project	East Cornwall	2	SX 04-54-	18.ix.2010	<i>Arcitalitrus dorrieni</i>
Ivybridge	South Devon	3	SX 63-53-	12.xii.2012	<i>Arcitalitrus dorrieni</i>
Okehampton	North Devon	4	SX 59-95-	19.x.2015	<i>Arcitalitrus dorrieni</i>
Cardiff	Glamorgan	41	ST 17-83-	03.ii.2015	<i>Arcitalitrus dorrieni</i>
Ventnor, Bot. Gdn.	Isle of Wight	10	SZ 55-77-	07.xii.2015	<i>Arcitalitrus dorrieni</i>
Waterlooville	South Hampshire	11	SU 68-08-	31.x.2013	<i>Arcitalitrus dorrieni</i>
RHS Wisley Gdn.	Surrey	17	TQ 06-58-	1.iv.2016	<i>Arcitalitrus dorrieni</i>
Sheffield Park	East Sussex	14	TQ 41-23-	2.iv.2016	<i>Arcitalitrus dorrieni</i>
St. Leonards	East Sussex	14	TQ 80-10-	22.xi.2012	<i>Arcitalitrus dorrieni</i>
Preston	South Lancashire	59	SD 55-27-	02.vi.2010	<i>Arcitalitrus dorrieni</i>
Brodict Castle	Isle of Arran	100	NS 01-37-	13.ix.2010	<i>Arcitalitrus dorrieni</i>
Norwich	East Norfolk	27	TG 2--0--	09.xi.2012	<i>Cryptorchestia cavimana</i>
Newark-on-Trent	Nottinghamshire	56	SK 76-53-	12.i.2016	<i>Cryptorchestia cavimana</i>
Aberlady Bay	East Lothian	82	NT 46-80-	11.iv.2015	<i>Orchestia gammarellus</i>
Sunderland	County Durham	66	NZ 39-55-	01.ix.2012	<i>Arcitalitrus dorrieni</i>
Sunderland	County Durham	66	NZ 39-54-	16.i.2015	<i>Arcitalitrus dorrieni</i>
Edinburgh	Midlothian	83	NT 26-75-	10.iv.2015	<i>Arcitalitrus dorrieni</i>
Ballywalter Beach	Co. Down	H38	J 63-69-	20.ii.2016	<i>Arcitalitrus dorrieni</i> *
Belfast	Co. Antrim	H39	J 35-69-	18.ii.2016	<i>Arcitalitrus dorrieni</i> *
Belfast	Co. Antrim	H39	J 30-74-	18.ii.2016	<i>Arcitalitrus dorrieni</i> *

Body laterally compressed, up to 15 mm in length, cuticle lacking calcification. Eye circular about $\frac{1}{3}$ head length (Figs. 1A & 2A). **Antenna 1 terminates beside the basal third of peduncle segment 3 of antenna 2** (Figs. 1A & 2B). Antenna 2 about 50% of body length (Fig. 2A), with flagellum about twice the length of the peduncle, **comprising about 25 articles in mature specimens** (Figs. 1A & 2B), but considerably fewer in immature specimens.

Gnathopod 1 and gnathopod 2 are not sexually dimorphic (as Figs. 2E & 2F). Gnathopod 2 with merus and carpus expanded posteriorly as a rounded flange, propodus of “mitten-like” type (Fig. 2F). Coxal gill 2 lobate, ‘W’ shaped, not incised (Fig. 2H). Coxal gill 6 lobate, anterior and posterior margins smooth, **apically deeply incised** (Fig. 2I). Gills 3-5 less well developed.

Epimeron 2 longer than epimeron 3 (Fig. 2C). Epimeron 3 with posterior margin weakly crenulate and posteroventral corner subquadrate (Fig. 2D). Uropod 1 and uropod 2 are not sexually dimorphic. Telson entire, longer than broad, with slight notch at tip, **with more than ten robust marginal and apical setae** (Fig. 2G).



FIGURES 1A-B: *Arcitalitrus dorrieni* male, from Ivybridge, Devon.

A) Antennae 1 & 2 (Note relative position of arrows in Figs. 1A and 1C), lateral view; B) Epimera 1-3 (note pleopods concealed) and urosome, lateral view.

FIGURES 1C-D: *Cryptorchestia cavimana* male, from Norwich, Suffolk.

C) Antennae 1 & 2 and gnathopod 2 (arrowed), lateral view; D) Epimera 1-3, showing conspicuous pleopods (arrowed) and urosome, lateral view.

Pleopod 1 well developed, biramous (Fig. 2J). Both rami well developed, distinctly segmented and longer than peduncle. Both typically with about 7 to 9 articles, the inner ramus slightly longer than the outer. The rami and outer edge of peduncle are fringed with stout plumose setae. Pleopod 2 also well developed, biramous, slightly longer and stouter than pleopod 1 (Fig. 2K). Both rami well developed, distinctly segmented and subequal in length to peduncle. Both typically with about 7 to 9 articles, the inner slightly longer than the outer. The rami and outer edge of peduncle are fringed with stout plumose setae. **Pleopod 3 is considerably reduced to little more than a tubercle (< 0.1 mm in length), entirely lacking rami** (Fig. 2L).

Identification of British and Irish terrestrial and semi-terrestrial Amphipods

The terrestrial landhoppers and coastal sandhoppers (family Talitridae) are readily distinguished from the aquatic shrimps (families Crangonyctidae and Gammaridae) by antenna 1 (the dorsal pair) being considerably reduced in size; less than $\frac{1}{4}$ the length of, and much narrower than, antenna pair 2 (the ventral pair) (Figs. 1A, 1C, 2B & 3A). They have round eyes (Figs. 1A & 1C) and an entire telson, bearing at most an apical notch (Fig. 2G). In contrast, the aquatic shrimps typically have antenna 1 and 2 subequal in size, or the shorter antenna (often pair 2) at least $\frac{1}{2}$ the length of the longer. Eyes are oval or kidney shaped and telson is divided longitudinally into two parts, at least by a deep central cleft.

Although similar in appearance to other Talitrids, such as *Cryptorchestia cavimana*, *Orchestia* spp. and *Talitrus saltator*, *Arcitalitrus dorrieni* is darkly pigmented (almost black) in life. However, body pigments rapidly fade to pale orange upon preservation in alcohol. Confusion in the field is most likely to occur with the introduced *C. cavimana*, which may be darkly pigmented in life (dark brown) and is also capable of inhabiting semi-terrestrial sites far inland; albeit typically close to water (Lincoln, 1979). Both species have epimeron 3 and telson of similar shape (as in Figs. 2D & 2G), but differ in a number of other characters. The most useful characters for separating *A. dorrieni* from *C. cavimana* (and other related species) are detailed below.

A simple key to distinguish *Arcitalitrus dorrieni* from other British and Irish Talitrids is given in Appendix I.

Relative lengths of antennal pairs 1 and 2

In *A. dorrieni* antenna 1 is relatively long and terminates alongside the basal third of peduncle segment 3 of antenna 2 (Figs. 1A & 2B - arrowed). This character is shared with the introduced tropical glasshouse species, *B. hortulanus*, *Talitroides alluaudi* and *T. topitotum*.

In the case of *C. cavimana*, *Orchestia* spp. and *Talitrus saltator* antenna pair 1 is shorter and does not reach beyond the end of peduncle segment 2 of antenna pair 2 (Figs. 1C & 3A - arrowed).

Number of flagella segments of antenna 2

In mature specimens of *A. dorrieni* (up to 15mm in length) antenna 2 has the flagellum comprising about 25 articles (Figs. 1A & 2B). However, the number of flagella articles increases with each moult, so considerably fewer articles will be seen in immature specimens. Immatures examined of 7.5 mm in length have about 15 articles.

Mature *C. cavimana* (up to 20mm) have the flagellum of antenna 2 with about 15 articles (Figs. 1C & 3A). Other British and Irish species of *Orchestia* have between 10-17 articles, while *T. saltator* has about 35 articles that are wider than long (Lincoln, 1979; Chevreux & Fage, 1925).

Shape of male gnathopod 2

In *A. dorrieni* gnathopod 2 (Fig. 2F) is not sexually dimorphic, being identical in male and female specimens. This character is shared with the introduced tropical glasshouse species and the native sandhopper *T. saltator*.

In *Cryptorchestia*, *Orchestia* and related genera, males have gnathopod 2 with the propodus greatly enlarged, giving a 'boxing-glove' appearance, contrasting that of the female (Figs. 3C vs 3B).

Shape of coxal gill 6

In *A. dorrieni* coxal gill 6 (located at the base of pereopod 6) is lobate, with anterior and posterior margins smooth and apically with a deep cleft (Fig. 2I).

In *C. cavimana* coxal gill 6 is a rounded triangle (Fig. 3D), and in other species it is of a different, but equally characteristic, shape (but never with a deep apical cleft).

Development of pleopods 1-3

Although pleopods 1 & 2 are well developed in *A. dorrieni*, each bearing two distinctly segmented rami (Figs. 2J & 2K), they are relatively short (c. 1mm in length), directed anteriorly and consequently more or less obscured in lateral view by their corresponding epimera 1 and 2 (Fig. 1B). Pleopod 3 is

considerably reduced to little more than a tubercle (< 0.1 mm in length), entirely lacking rami (Fig. 2J) and very difficult to see.

In contrast, *C. cavimana* has all three pleopods (1-3) well developed (up to 3mm in length), with pleopod 3 bearing two distinct rami that are subequal in length to the peduncle (Fig. 3E). The pleopods are directed posteriorly, extending ventrally well beyond the epimera 1-3, and consequently conspicuous in lateral view (Fig. 1D). The pleopods are also similarly well developed, and visible in lateral view, in closely related genera of *Orchestia* and in *T. saltator*.

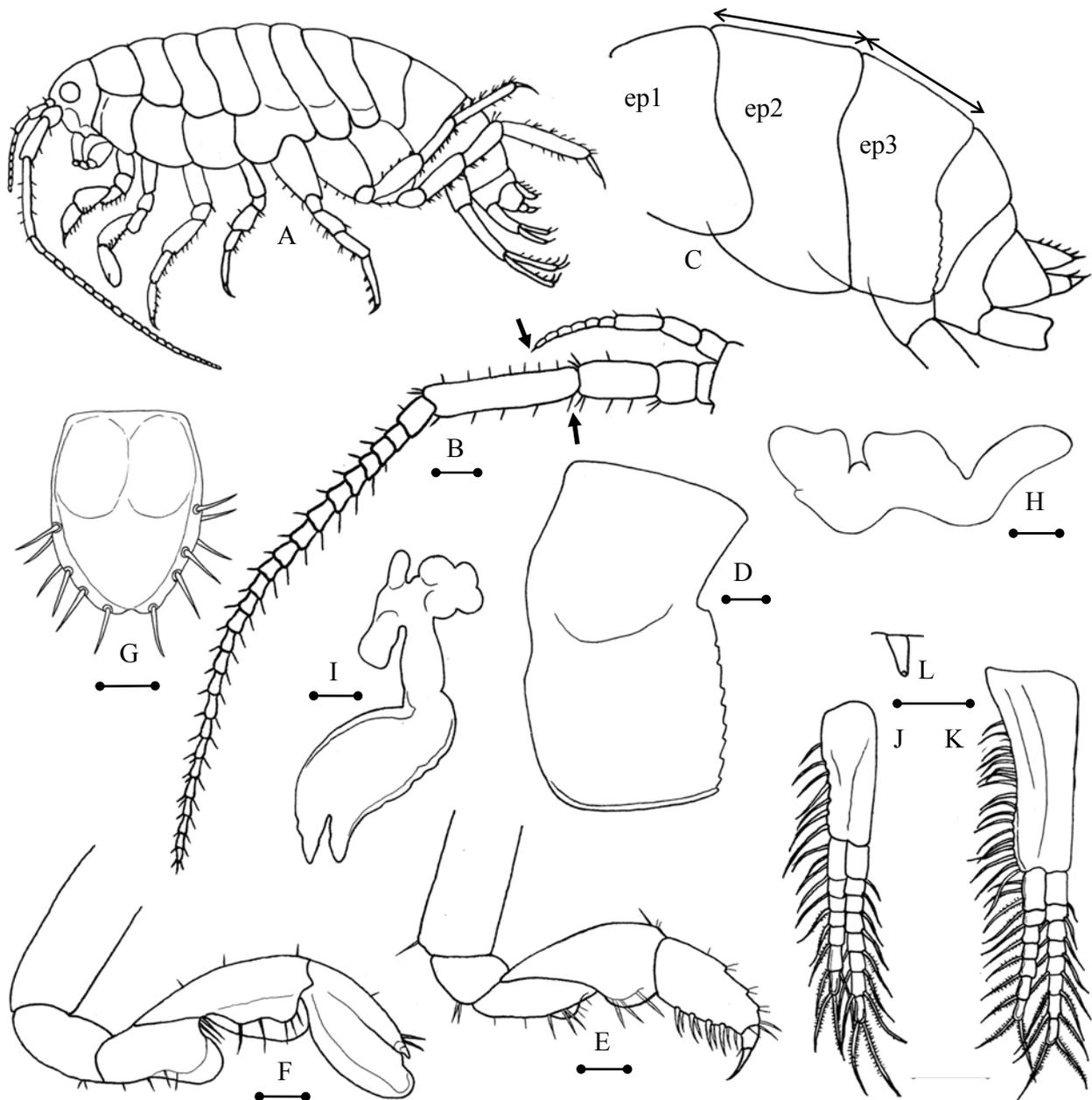


FIGURE 2: *Arcitalitrus dorrieni* (Hunt) female. Specimen from Ivybridge, Devon

A) Entire animal, lateral view; B) Antennae 1 and 2, lateral view (compare position of arrows with Fig. 3A); C) Epimeron 1-3 and urosome, lateral view; D) Epimeron 3, lateral view; E) Gnathopod 1, anterior view; F) Gnathopod 2, anterior view; G) Telson, dorsal view; H) Coxal gill 2, lateral view; I) Coxal gill 6, lateral view; J) Pleopod 1, anterior view; K) Pleopod 2, anterior view; L) Pleopod 3, anterior view. Scale bars = 0.2 mm

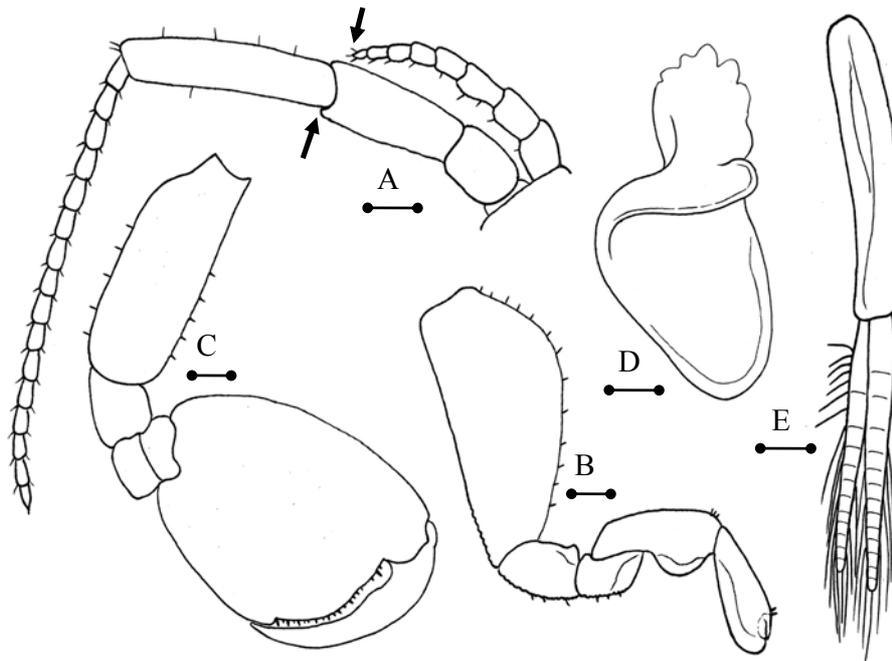


FIGURE 3: *Cryptorchestia cavimana* (Heller), from Norwich, Norfolk

A) Female, antennae 1 and 2, lateral view (compare position of arrows with Fig. 2B);
 B) Female, gnathopod 2, anterior view; C) Male, gnathopod 2, anterior view; D) Female coxal gill 6,
 lateral view; E) Female pleopod 3. Scale bars = 0.2 mm

Other *Arcitalitrus* species

Peart & Lowry (2006) provide descriptions and identification keys to the nine known species of *Arcitalitrus* (all native to Australia). It is possible that other species may turn up in Britain or Ireland. They diagnose *Arcitalitrus dorrieni* by gill 6 being apically incised (Fig. 2I); pleopod 3 rami absent (Fig. 2L); uropod 3 peduncle with 2 robust setae; telson entire, with more than 10 robust setae (Fig. 2G). Two other species of *Arcitalitrus* also have gill 6 with a deep apical cleft as seen in *A. dorrieni* (and which also share the homoplastic character of epimeron 2 being longer than epimeron 3). *A. moonpar* Peart & Lowry has epimeron 3 with posteroventral corner evenly rounded, while *A. bundeena* Peart & Lowry has epimeron 3 with posteroventral corner bearing a prominent tooth formed by a notch on the posterior edge. In *A. dorrieni* epimeron 3 has the posteroventral corner subquadrate (Fig. 2D).

THE CONTINUING SPREAD OF *ARCITALITRUS DORRIENI* IN BRITAIN AND IRELAND

A map of the current known distribution of *Arcitalitrus dorrieni* is given in Fig. 4. To give an indication of its spread across Britain and Ireland of over past decades, the earliest recorded occurrence of *A. dorrieni* within a given 10km square is plotted using four date classes (up to 1988, 1989 to 2004, 2005 to 2010 and 2011 to present). This is the opposite of conventional distribution maps where the most recent record in a 10km square takes precedence.

Distribution up to 1988

Harding & Sutton (1988) summarised the British and Irish distribution (90 localities) of *A. dorrieni* known to that date (based on Richardson, 1980; Welch, 1981; Moore & Spicer, 1986). The species was shown to be widespread in the south and west of Cornwall (including the Isles of Scilly), with a scattering of sites along the southern coasts of Devon and Dorset. They considered that further

populations remained to be discovered within this range. Isolated records were known from Kew Gardens, Surrey and the Scottish islands of Colonsay, on the west coast. The only known Irish sites remained in the environs of the original 1936 record in Co. Galway.

New sites recorded between 1989 and 2004

Cowling, *et al* (2004) reported some 60 new 10-km square records for *A. dorrieni* since the publication of Harding and Sutton (1988). This was mainly a consolidation of range in south-west England, but also wide scatter of records from south Wales and additional sites in the Scottish western Isles. Although its distribution has remained predominantly coastal, it also appears to be established in the London area. In Ireland it was widely, but patchily recorded, where it is possibly under-recorded. Of particular note is that Cowling, *et al* (2004) also reported a vast number of negative records outside this range, where surveys were undertaken, but *A. dorrieni* was not found.

Sites discovered since 2005

Since 2000 additional records for *A. dorrieni* have been collated by the author through the BMIG Woodlouse Recording Scheme (Gregory, 2000). An updated distribution map was presented by Barber & Gregory (2012). It was apparent that *A. dorrieni* was now well established and locally common in south-west England and south Wales. Elsewhere within its previously known range it appears to be increasing, especially in south-eastern England. In western Scotland it was recorded from the Isle of Arran and from Glasgow on the mainland in 2010 (Gregory, 2016; Hancock, 2012). In Northern Ireland *A. dorrieni* has been widely recorded from ornamental gardens, such as those owned by The National Trust (Roy Anderson, pers. comm.), but there is only a scatter of records elsewhere in Ireland (possibly due to under-recording).

Until 2012 all known records were from the southern or western areas of Britain. In eastern England there were no records of *A. dorrieni* north of the London area. Then in 2012, *A. dorrieni* was first reported from Sunderland, north east England, where it appears to be well established, and in 2015 it was also reported from Hull, Yorkshire, and Edinburgh, south-eastern Scotland (Gregory, 2012; 2015). It is possible that *A. dorrieni* has been over-looked in eastern England. It is apparent that the vast majority of known records remain coastal, where extreme temperatures are ameliorated.

DISCUSSION

Arcitalitrus dorrieni is a subtropical species and Richardson (1980) suggested that harsh weather may slow its spread by reducing population size. Harding & Sutton (1988) demonstrated that the then known distribution in Britain and Ireland exhibited a close correlation with mean January 5°C isotherm. The southern and western coasts of Britain experience relatively mild winters and this is where *A. dorrieni* predominantly occurs. Bathed in the relatively warm waters of the North Atlantic drift it is perhaps not unexpected that *A. dorrieni* should colonise western parts of Scotland. It is no coincidence that this is also an area where 'tender' exotic plants were imported to be grown outdoors.

Considering that many of the records from Britain and Ireland are associated with long established ornamental gardens, such as those now managed by the National Trust, it seems likely that the species was initially dispersed widely and inadvertently among exotic plants. In recent decades it is possible that the horticultural trade has become the main vector of dispersal, via garden centres and potted plants. Once established in an area *A. dorrieni* may be carried inadvertently within garden refuse and tipped soil allowing rapid colonisation adjacent areas such as gardens, waste ground, woodland, and a variety of other damp, typically shady, habitats.

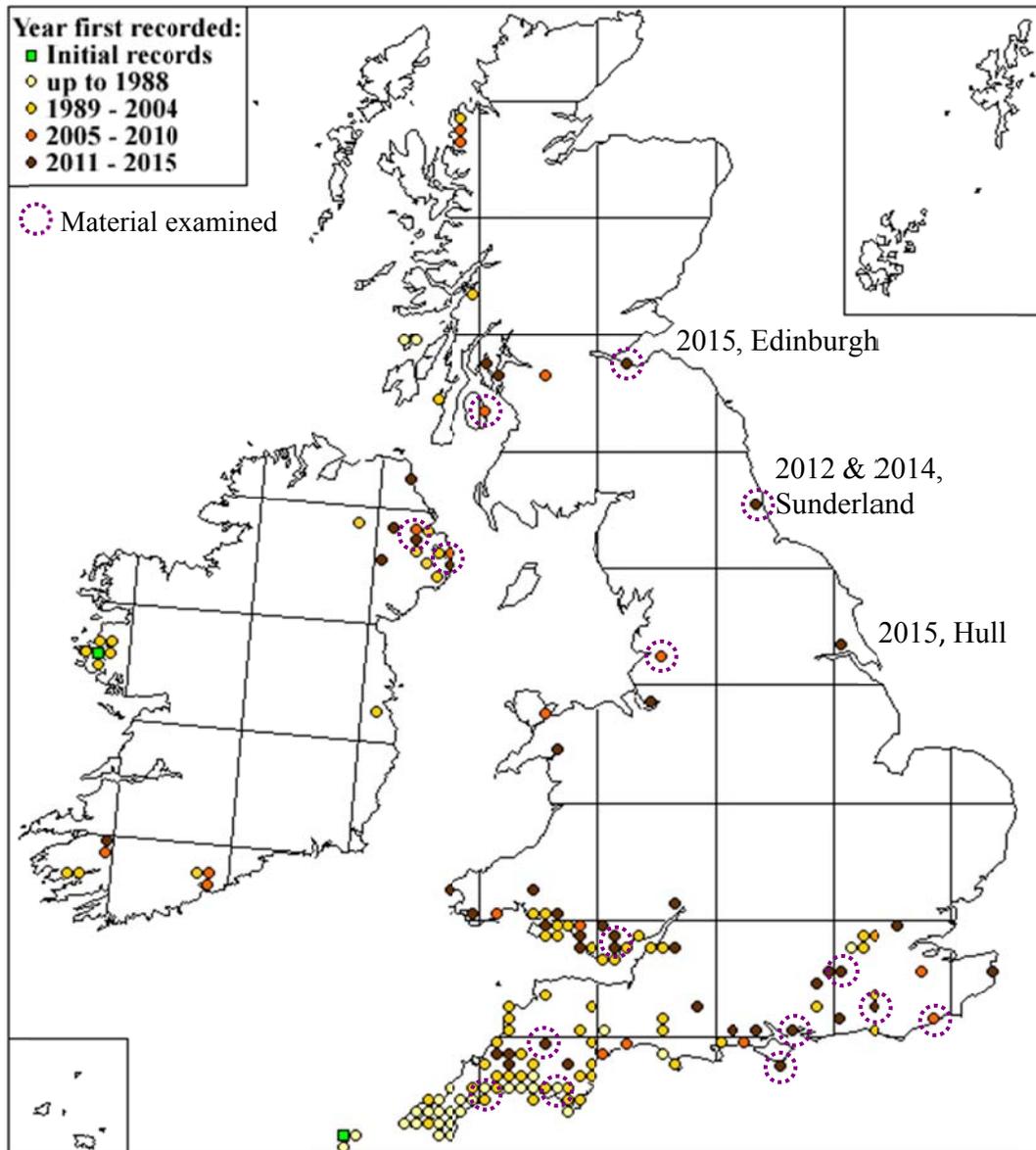


FIGURE 4: Map indicating succession of 10km records for *Arcitalitrus dorrieni* (Hunt) in Britain and Ireland (i.e. the earliest record in each 10km square is shown).

Based on Harding & Sutton (1988), Cowling, et al (2004) and Barber & Gregory (2012), with additional records submitted to the BMIG Non-marine Isopod Recording Scheme. The first recorded occurrences are Isles of Scilly, 1924, and Co. Galway, 1936.

Its apparent expansion into new areas of Britain and Ireland may be facilitated by climate change. Edinburgh and Sunderland, which are located on the north-east coast of Britain, would seem to be inhospitable places for a subtropical Landhopper. However, both sites occur within built up areas and are close to the coast. Thus, it is likely that adverse weather conditions will be ameliorated by maritime and urban heat-island effects. This is clearly not the complete picture since in Sunderland specimens have been observed to be active during hard frosts or beneath deep snow and rapidly retreat into burrows excavated into the soil when disturbed (Andrew Fox, pers. comm.). It is possible that successive generations of *A. dorrieni* may have become better adapted to the British climate (as suggested by Brey, 2002).

It is plausible that *A. dorrieni* may have been introduced into to Britain and Ireland more than once. However, taking the isolated Scottish record on Colonsay as an example, where *A. dorrieni* was first discovered in 1979, it is known that exotic plants were imported from a variety of countries from the 19th Century onwards, but during the 1930s plants were also imported from the Isles of Scilly (Moore & Spicer, 1986). Thus, this seems a highly probable route of initial introduction, supporting the idea that *A. dorrieni* has only been introduced once into Britain and Ireland. Further support for this idea comes from the observation that globally *A. dorrieni* has only been introduced into Britain and Ireland (where exchanges of plant material between estates took place), whereas its close relative, *Arcitalitrus sylvaticus*, has been introduced into California, USA (Lazo-Wasem, 1983) and neither species have been recorded from continental Europe (Cochard, Vilisics & Séchet, 2010).

Whatever its origins, it is clear that the Landhopper, Woodhopper or Lawn Shrimp, *Arcitalitrus dorrieni*, is here to stay.

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APPENDIX I

Key to the identification of *Arcitalitrus dorrieni* in Britain and Ireland

- 1) Amphipods with antenna 1 (dorsal) considerably reduced, no more than 1/3 (typically less) the length of, and much narrower than, antenna 2 (ventral) (Figs. 2B & 3A). Eyes circular (Fig. 2A). Telson entire, with no more than a shallow central distal notch (Figs. 2G) **Talitridae 2**
- Amphipods with antenna 1 and 2 similar in size, or the shorter antenna at least 1/2 as long as the longer one. Eyes oval or kidney shaped. Telson divided longitudinally into two parts, at least by a deep central cleft. (Gammaridae & Crangonyctidae) **Aquatic Water-shrimps**
- 2) Antenna 1 relatively long, terminating alongside the basal third of the third peduncle segment of antenna 2 (Fig. 2B). Pleopod 3 greatly reduced, less than 1/2 length of pleopods 1 & 2, either entirely lacking rami (e.g. Fig. 2L) or with inner ramus reduced to a few vestigial segments. Gnathopod 2 never sexually dimorphic. Always found in terrestrial, albeit moist, habitats **Terrestrial Landhoppers 3**
- Antenna 1 relatively short, not reaching beyond the end of the second peduncle segment of antenna 2 (Fig. 3A). Pleopod 3 well developed, at least 2/3 the length of pleopods 2, bearing distinct paired rami. Gnathopod 2 sexually dimorphic (Figs. 3B & 3C), except in *Talitrus saltator*. Typically associated with coastal intertidal or supralittoral habitats, but *C. cavimana* may be found beside watercourses considerably inland **Supralittoral Sandhoppers and Semi-terrestrial Land hoppers**
- 3) Gill 6 with distinct 'pincer-like' apical cleft (Fig. 2I). Pleopods 1 and 2 with inner and outer rami of similar length, as long as or longer than peduncle (Figs. 2J & 2K). Pleopod 3 reduced to vestigial stump, entirely lacking rami (Fig. 2L). Telson with more than 10 robust dorsal setae (Fig. 2G). Widely naturalised outdoors, or inside heated glasshouses ***Arcitalitrus dorrieni***
- Gill 6 of different shape, lacking apical cleft. Pleopods 1 & 2 either have inner rami reduced, much shorter than outer rami or with both rami much shorter than peduncle. Pleopod 3 reduced, with or without short rami. Telson with 8 or less setae. Associated with heated tropical glasshouses ***Brevitalitrus hortulanus*; *Talitroides alluaudi* or *T. topitotum***