

COMPARISON OF THREE OFTEN MIS-IDENTIFIED SPECIES OF PILL-WOODLOUSE *ARMADILLIDIUM* (ISOPODA: ONISCIDEA)Steve Gregory¹ and Paul Richards²¹ Northmoor Trust, Hill Farm, Little Wittenham, Abingdon, Oxfordshire, OX14 4QZ, UK.

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The genus *Armadillidium* Brandt, the pill-woodlice, comprises six species in Britain. The eurytopic *Armadillidium vulgare* (Latreille, 1804) is the only widespread member of the genus and may be locally abundant in south-eastern England. The remaining species have more localised distributions and are more restricted in their habitat preferences (Gregory, in prep). There has been some confusion in recent years regarding the correct identification of the two very attractively marked pill-woodlice *A. pictum* Brandt, 1833 and *A. pulchellum* (Zencker, 1798). As both are of some significance it is important to have reliable determination. When faced with juvenile *A. pictum* in particular, it can be easily dismissed as an adult *A. pulchellum*. *A. vulgare* is also found occasionally in brightly coloured forms, with ornate mottling, which have been mistaken for its two scarcer relatives. This latter species may occur with either of the former two and is also considered in this paper.

The rare *A. pictum* is listed in the British Red Data Book (Bratton, 1991). The thin scatter of records extends from the English Lake District south to the Welsh/English border counties of Monmouthshire and Gloucestershire. It typically occurs in hilly areas with rocky terrain where accumulations of scree, rocks or boulders are present. Many known sites are ancient deciduous woodland, but it also inhabits rough and/or shady grassland, including grikes in limestone pavement. It readily climbs vegetation and may be beaten from shrubs or found inhabiting dead wood niches several metres above ground level (Chater, 1988; Richards & Thomas, 1998).

A. pulchellum is more widely distributed and occurs across southern Scotland, northern England, Wales and south-western England. It is mainly associated with the coastal and upland grasslands and can be locally common on the short turf grasslands of the Carboniferous limestones of northern England, such as Derbyshire (Richards, 1995), beyond the northern inland range of *A. vulgare*. However, a few isolated populations are known from heathland in south-eastern England (Hopkin, 1986; Alexander, 2000; Telfer, 2007). In Wales *A. pulchellum* has been collected from Oak *Quercus* sp. woodland (Chater, 1989) and has been beaten from Ivy *Hedera helix* on a tree trunk (J.F. Harper, personal communication). These are habitats akin to those favoured by the rare *A. pictum*.

It is apparent that *A. pictum* and *A. pulchellum* are characteristically associated with rural semi-natural habitats. Although tolerant of acidic substrates, both seem to favour calcareous soils. There would appear to be considerable overlap in their respective distributions and habitat preferences. Indeed, the two may occur at the same site, but they normally occupy different niches. Generally *A. pulchellum* is tolerant of, and possibly favours, higher levels of insolation than *A. pictum* (and possibly also *A. vulgare*). For example on limestone pavement *A. pictum* is typically found within sheltered grikes that dissect the exposed clints favoured by *A. pulchellum*. In light of the Welsh observations cited above, it is clear that associated habitat is not a reliable distinction between the two species and it is essential that care is taken with the identification of these two species.

The marked north-western distribution of *A. pictum* and *A. pulchellum* means that there is a limited overlap of their respective ranges with that of their south-eastern congener *A. vulgare*. Often where their distributions do overlap they do not usually occur at the same locality. Unlike the former two species, *A. vulgare* cannot tolerate high altitude or non-calcareous localities. However, north of a line from the Severn Estuary to the Humber the latter is able to thrive within an increasingly narrow coastal fringe where the effects of latitude are ameliorated by maritime and/or synanthropic influences. Thus, in coastal localities in northern England it is possible to find *A. vulgare* co-existing with *A. pulchellum*. It is also possible that *A. pulchellum* may be under-recorded from relict heathland in south-eastern England, an area where the eurytopic *A. vulgare* is characteristically ubiquitous. *A. vulgare* and *A. pictum* may also occur together, such as seen on the limestones of the Welsh borders (Gregory, 2008). Again, the message is that care is needed with the identification of these superficially similar *Armadillidium* species.

While the FSC synopsis by Oliver and Meechan (1993) is an excellent guide to British and Irish species, there is unfortunately a mix up between the descriptions of the two scarce species, *A. pictum* and *A. pulchellum*. The following is a brief summary of the errors in the key and species descriptions for these two woodlice.

ADDENDUM TO OLIVER AND MEECHAN (1993)

Page 86, Identification key, Couplet 6

First option should read; *Rear angle of first pereonite **chamfered** (Fig. 36B) Armadillidium pulchellum*

Second option should read; *Rear angle of first pereonite **pointed** (Fig. 35B) Armadillidium pictum*

Page 92, *A. pictum*, species description

Size incorrect. Should read; *Small to 9 mm, can roll into a tight ball.*

First pereonite should read; *Rear angle of epimera **acute*** (Fig. 35B)*

* it is perhaps better to use 'smoothly pointed' or 'not chamfered'

Description of male sexual characters correct.

Page 93, *A. pictum*, Fig 35 caption

Size incorrect. Should read; *Dorsal view of whole animal, length 9mm.*

Page 94, *A. pulchellum*, species description

Size incorrect. Should read; *Small to 5mm, can roll into a tight ball but leaves a gap.*

First pereonite should read; *Rear angle of epimera **chamfered** (Fig.36B).*

Description of male sexual characters correct.

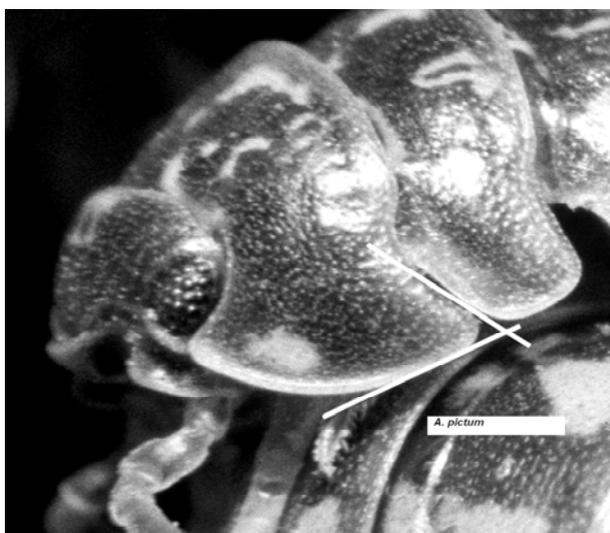
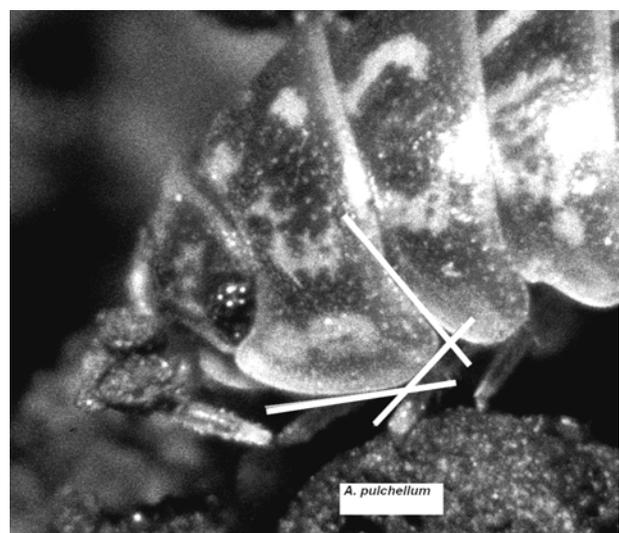
Page 95, *A. pulchellum*, Fig 36 caption

Size incorrect. Should read; *Dorsal view of whole animal, length 5mm.*

The descriptions and figures in Steve Hopkin's AIDGAP key are correct (Hopkin, 1991), as are those in Vandel (1962) and Gruner (1966). Table 1 summaries the distinctions between the three species of pill-woodlouse considered here.

Table 1: Summary of features distinguishing *Armadillidium pulchellum*, *A. pictum* and *A. vulgare*

	<i>Armadillidium pulchellum</i> (Zencker, 1798)	<i>Armadillidium pictum</i> Brandt, 1833	<i>Armadillidium vulgare</i> (Latreille, 1804)
Maximum length	Small species to 5 mm.	Medium species to 9 mm.	Large species to 18 mm.
Rolls up	Into a tight ball, with a slight gap.	Into a perfect sphere.	Into a perfect sphere.
Posterior edge of first pereonite	Chamfered (i.e ‘cut off’ to form a blunt angle of two ‘corners’). See Figure 1.	Smoothly pointed , not chamfered. See Figure 2.	Smoothly pointed , not chamfered. Similar to <i>A. pictum</i> .
When preserved in alcohol	Solid dark patch remains at edge of 7 th pereonite.	Solid dark patch remains at edge of 7 th pereonite.	Edge of 7 th pereonite has the same pigmentation as central portion.
Male endopod 1	Robust and slightly curved throughout length.	Broadly hooked through approx. 90°.	Bent through 90° at extreme tip only.
Male 7th leg (Pereopod)	Anterior face of the ischium with a fringe of ‘hairs’.	Sternal faces with a dense array of jagged ended spines on carpus and merus. Ischium with no fringe of hairs.	Sternal face of ischium concave. Ischium with no fringe of hairs. No dense patch of spines on carpus and merus.
Ridge of scutellum	Extends all the way around the ‘face’.	Is raised in the centre only , not extending around the ‘face’.	Is raised in the centre only. Similar to <i>A. pictum</i> .
Tip of telson	Wide in comparison to height. Tip roundly truncate , not at all pointed.	Narrower in comparison to height; virtually an equilateral triangle. Tip almost pointed.	Intermediate between <i>A. pulchellum</i> and <i>A. pictum</i> but broadly truncate.
Colour	Dark brown, mottled with yellow, chestnut and orange patches. Often with red-brown at rear edges of pereonites (as <i>A. pictum</i>).	Dark brown or black, with yellow or greenish mottling. Red-brown at rear edges of pereonites. Often slightly darker than <i>A. pulchellum</i> .	Typically slate-grey, but variable. Mottled varieties rarely as ornately patterned as <i>A. pulchellum</i> or <i>A. pictum</i> .

**Figure 1:** Posterior edge of first pereonite of *Armadillidium pictum* (smoothly pointed)**Figure 2:** Posterior edge of first pereonite of *Armadillidium pulchellum* (chamfered)

REFERENCES

- Alexander, K.N.A. (2000) A relict population of *Armadillidium pulchellum* (Zencker) (Isopoda: Armadillidiidae) in the heathlands of south-east England. *British Journal of Entomology and Natural History*, **13**: 133.
- Bratton, J.H. (1991) *British Red Data Books: 3. Invertebrates other than Insects*. Joint Nature Conservation Committee.
- Chater, A. (1988) *Armadillidium pictum* in Radnorshire. *British Isopoda Study Group Newsletter*, **24**: 2. Unpublished.
- Chater, A.O. (1989) Woodlice in Ceredigion. *Dyfed Invertebrate Group Newsletter*, **16**: 23.
- Gregory, S.J. (in preparation). *Woodlice in Britain & Ireland, 2nd Edition*.
- Gregory, S.J. (2008) *Armadillidium pictum* Brandt in Downton Gorge NNR, Herefordshire. *Bulletin of the British Myriapod and Isopod Group*, **23**: 13-14.
- Gruner, H.-E. (1966) Krebstiere oder Crustacea. V. Isopoda. 2. Lieferung. *Die Tierwelt Deutschlands*, **53**: 151-380. Jena.
- Hopkin, S.P. (1986) *Armadillidium pulchellum*, editors note. *British Isopod Study Group Newsletter*, **21**: 5. Unpublished.
- Hopkin, S.P. (1991) A Key to the Woodlice of Britain and Ireland. *Field Studies* **7**: 599-650.
- Oliver, P.G. & Meehan, C.J. (1993) *Woodlice*. Synopses of the British Fauna (New Series) **49**. Field Studies Council.
- Richards, J.P. (1995) Millipedes, Centipedes and Woodlice of the Sheffield Area, *Sorby Record Special Series*, No. **10**. Sorby Natural History Society/Sheffield City Museum.
- Richards, P. & Thomas, R. (1998) Woodlice and Centipedes new to the Region. *Sorby Record*, **34**: 78, Sorby Natural History Society/Sheffield.
- Telfer, M.G. (2007) *Armadillidium pulchellum* (Zenker) new to East Anglia. *British Myriapod and Isopod Group Newsletter*, **14**: 3. Unpublished.
- Vandel, A. (1962) Isopodes Terrestres. Deuxieme partie. *Faune de France*, **66**. Paris.