An Introduction to Woodlice

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OPAL EXPLORE NATURE

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Introduction

- This publication is designed as part of a series of stand-alone introductions to the study of ground invertebrates. It can be used as a taught presentation or as a self-study guide.

- Further ebooks are available on Millipedes and general Myriapods.

- These publications can be used for self study by simply proceeding through the presentation at your own pace. The full text is included within each slide.

- They are also designed as a text and image resource for group training. Numerous images are included, to offer as comprehensive a selection of species and identification features as possible.

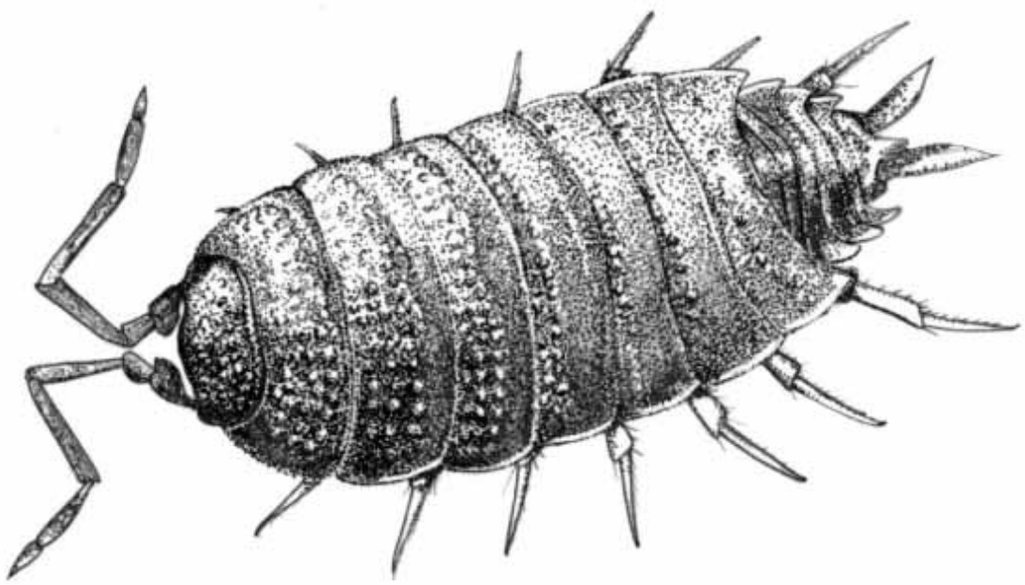
Outline

This presentation provides:

- A basic introduction to the terrestrial **Isopoda:Oniscidea** or "**Woodlice**".
- An introduction to the morphology and main identification features of the most common British species.
- Details of general isopod classification, ecology, collection and recording.
- How to find out more.

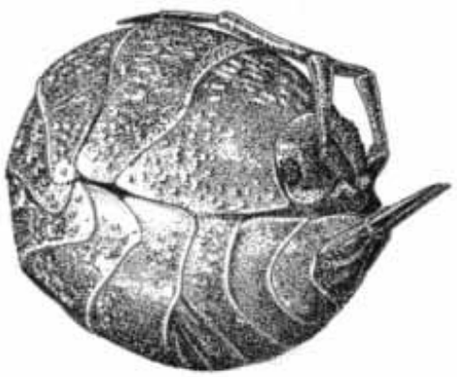
What are Woodlice? (1)

- Woodlice are arthropods. They have calcified exoskeletons, jointed legs and a segmented body.
- They belong to the Class CRUSTACEA, which includes the crabs, shrimps and lobsters.
- In common with other crustaceans, woodlice have seven pairs of legs and jointed antennae.



What are Woodlice? (2)

- **Phylum Arthropoda**
  - **Subphylum Crustacea**
  - **Class: Malacostraca**
    - Subclass: Eumalacostraca
    - Superorder: Peracarida
      - Order: Amphipoda
      - Order: Isopoda
        - **Sub-order: Oniscidea: *Terrestrial Woodlice***
        - Sub-order: Asellota: ***Aquatic Waterlice***



What are Woodlice? (3)

- Woodlice belong to the Order ISOPODA.
- Isopods all have seven pairs of limbs that are largely similar and modified for walking, in contrast to the various modifications seen in other crustaceans.
- “Isopod” literally means “Equal feet”.
- There are only two orders of Crustacea with species able to live entirely on land.

What are Woodlice? (4)

- The terrestrial Isopoda (Woodlice), belong to the suborder ONISCIDEA.

- Amphipods are also close relatives of the woodlice, but are usually aquatic. The name AMPHIPODA means “different-footed”, because the appendages are developed for different functions. Unlike the woodlice, amphipods are flattened from side to side and quite unstable out of water.

- There is only one terrestrial amphipod known from Britain (the Woodhopper, *Architalitrus dorrieni* – not pictured).

- There are also aquatic isopoda (Waterlice) in the suborder ASELLOTA, including the Water Hoglouse, *Asellus aquaticus*. These water-bound species are not included in this review.

What are Woodlice? (5)

- Crustacea are normally thought of as aquatic, but the isopods have successfully made the transition to land.
- Different modifications have enabled the isopods to survive out of the water, such as the flat, stable body and walking, rather than swimming, limbs.
- They have a very characteristic stance, which gives them great stability on land.

What are Woodlice? (6)

- Despite their move to land, marine isopods still exist.

- These include: the Tongue-eating Isopod, *Cymothoa exigua*, which causes degeneration of the tongue of its host fish, the Rose Snapper. It then attaches to the remaining tongue stub and floor of the fish's mouth by hook-like feet. In this position the isopod superficially resembles its host's missing tongue. This is the first known case in animals of functional replacement of a host structure by a parasite.

  http://en.wikipedia.org/wiki/Cymothoa_exigua

- There are also giant, deep sea isopods:

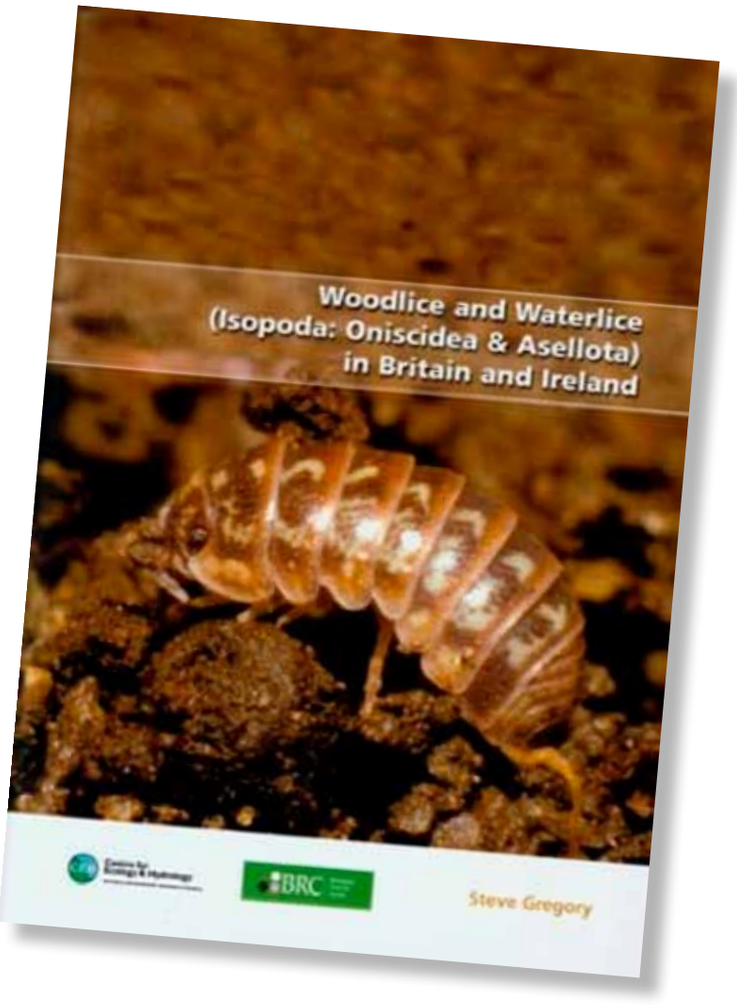
  http://www.youtube.com/watch?v=RJ1C1N4OG9s&feature=related

Why look at Woodlice? (1)

- There are not too many to learn (around 40 species found in Britain).
- They occur at all times of year.
- They offer a good introduction to invertebrate natural history.
- They are fairly easy to collect and identify.

Why look at Woodlice? (2)

- There is a good range of literature available for study and identification.
- Despite the good distribution information which is available, there is still scope for making new discoveries.



Why look at Woodlice? (3)

- They are preyed on by a wide range of other species, providing a valuable contribution to the food chain.

- Woodlice are an ecologically significant decomposer of plant (and some animal) material.

Pause for thought...

Give four good reasons why you might take an interest in woodlice.

Well-known Woodlice (1)

Most people will be familiar with these ubiquitous animals in and around their homes. Consequently there are many colloquial names in Britain:

Cud-worms
Bibble-bugs
Cheese-pigs
Coffin-cutters
Monkey-peas
Pea-bug
Penny-pigs
Sink-lice
Tiggy-hogs
Grammerzows
Roly poly
Woodbug
Armadillo bug
Ball bug
Hardy back
Potato bug
Chuggy pig
Butcher boy
Curly-baker
Carpenter
Cheesybug
Cheeselog
Daddy gamfer
Granny Grey
Doodle bug
Sow-bugs
Pill-bugs; and
Slaters.

Well-known Woodlice (2)

- Woodlice are very prominent in the public consciousness. They occur in a number of cultural references, for example in the poem *Greenaway* by Sir John Betjeman:

*"**To crackling layers of broken slate, where black and flat sea-woodlice crawl**"*

Well-known Woodlice (3)

They also occur in fine art:

- Woodlice are the subject of two paintings by Paul Klee: Assel & Assel im Gehege
  http://vs-material.wegerer.at/kunst/images_be/veronika/klee2.jpg

- There are real woodlice in the contemporary art of Chris Dunseath:
  "Woodlice appear in unexpected places, almost like particles in Quantum Physics that seem to appear and disappear for no apparent reason" ("Orbiting woodlice", 2010)
  http://ww.axisweb.org/artwork.aspx?workid=73171

- *Woodlouse evolution* by Annabel Ward, depictions of repeated woodlice
  http://www.annabelward.com/page16.htm

Well-known Woodlice (4)

- They surprisingly occur quite frequently throughout history … in recipes! Holt, 1885, included a recipe for ‘woodlouse sauce’.

- There is also a reference from Larousse Gastronomique to a sauce made from woodlice, “sauce de cloportes“, recommended served with fried sole.

Well-known Woodlice (5)

- There is a representation of a woodlouse (“land crab”) in the stained glass of St. Mary’s church, Shrewsbury

Reproduced by kind permission of The Churches Conservation Trust, (St Mary’s Shrewsbury).

- They were also famously the inspiration for a sermon by the chancellor of Truro Cathedral. Wherein he uses woodlice, their taxonomic position and ability to provide nutrient gases through their digestion, as an analogy for the Trinity! (Thornton, 1989).

Well-known Woodlice (6)

Woodlice make an appearance in a range of literature:

- The Ruth Rendel Inspector Wexford novel, “No More Dying Please”
- Gustave Flaubert’s “Madame Bovary”
- “Lord of the Flies” by William Golding
- Novels of Jean Paul Satre such as “Huis clos”:
  “*Il y faisait toujours une chaleur de claporte. Il y fait une chaleur de claporte*”:
  “***It was always woodlouse hot….It IS woodlouse hot…***

Well-known Woodlice (7)

Woodlice were even censored from Beatrix Potter's, "The Tale of Mrs Tittlemouse"!

In 1909, her publishers felt that the word 'wood-lice' was too offensive. So it was changed to "Three *creepy-crawly* people hiding in the plate rack".

Ms Potter declared that, "I will erase the offensive word, 'Woodlice'!"

http://www.childrensnursery.org.uk/childrens-books-bpotter/mrs-tittlemouse%20-%200011.htm

Well-known Woodlice (8)

In music there are references to woodlice in the song cycle, "The Window" (or the songs of the wrens), by Alfred Tennyson and Arthur Sullivan.

http://en.wikipedia.org/wiki/The_Window_(song_cycle)

Matt Swindells in his song "Woodlouse" (2007) somewhat inaccurately observed,

"… What do you eat, where do you sleep? (we want to know, we want to know)
Just like a small armadillo, with six legs instead of four.
You have not moved for an hour, you look so incredibly bored.
Maybe you're dead…"

http://www.myspace.com/mattswindells/music

Well-known Woodlice (9)

Medicinal uses:

- Woodlice have a number of medicinal uses, particularly for indigestion.

- In the past, inhabitants of the Aegean island of Seriphos used to make a powder from a large local species *Armadillidium officinalis* to cure stomach-aches. This was presumably due to the high calcium carbonate concentration in its exoskeleton which would neutralise stomach acids.

Well-known Woodlice (10)

Medicinal uses:

- The widely known use of woodlice as a diuretic is captured in Dutch and French words for woodlouse: *pissebed* and *pissenlit*.

Pause for thought…

What characters do woodlice share with other crustaceans?

Give three colloquial names for woodlice.

Woodlouse natural history (1)

- Woodlice are very intolerant of water loss and are usually not far from moist habitat.

Woodlouse natural history (2)

- Woodlice have acquired a variety of adaptations to enable what was previously an aquatic animal to colonise terrestrial habitats.

- They remain, nonetheless, rather limited in their ability to conserve water. Neither millipedes, centipedes or woodlice have a waxy waterproof cuticle like the insects (with the exception of certain desert species, Hopkin & Read 1992).

Woodlouse natural history (3)

- They heavily rely on behavioural responses to avoid situations in which water loss will occur.
- In woodlice this generally means remaining in areas of high humidity or refuges during the day, when levels of moisture are usually lower.
- Activity may correspondingly be confined to the more humid hours of darkness.
- This is particularly true of the smaller species with a larger surface area/body ratio which are more susceptible to water loss.



Woodlouse natural history (4)

- One behavioural feature of woodlice is that with an increase in humidity they show a decrease in activity and speed, but tend to change direction more.

- These responses mean that a woodlouse will remain in a damp area rather than move away from it.

- Combined with this are responses to avoid light and to make as much contact with their surroundings as possible, (Sutton 1972). This behaviour means that woodlice will soon find crevices to hide in, or bunch together to avoid drying out.

Woodlouse natural history (5)

- Woodlice are primarily invertebrates of the ground layer.
- They are most easily found under logs and rocks, or among grass and leaf-litter.
- There are also species which are largely confined to the sea shore.

Woodlouse natural history (6)

- Woodlice are often considered as a pest because of them wandering into houses at night. But this is largely a random action to avoid very wet weather.

- Despite the name, they are certainly not interested in the sound, dry timber of a house.

Woodlouse natural history (7)

- In the garden, woodlice rarely attack living plants, preferring to eat vegetation which has begun to decompose. In glasshouses, woodlice may occasionally nibble seedlings but they rarely do any significant economic damage.

- In the litter layer of deciduous woods, and on compost heaps, woodlice perform a vital role. They chew dead plants into small fragments and deposit these as faecal pellets which decompose rapidly. (Hopkin 1991).

Woodlouse natural history (8)

- Deposition of faecal pellets containing fungal spores in deep, moist leaf litter by woodlice may be important in stimulating decomposition in woodlands (Hassall *et al.*, 1987). Thus, the feeding activities of woodlice speed up the decomposition process and help to return essential nutrients to the soil.

- Woodlice will graze fungal hyphae from leaves (Gunnarson, 1987).

- Woodlice are also well-known for eating their own droppings (COPROPHAGY). This enables them to recycle vital elements such as copper back into their system. Even where food is plentiful, a woodlouse may die if it is prevented from eating its own faeces.

Woodlouse natural history (9)

- Woodlice are themselves eaten by a variety of animals including beetles, toads, shrews, birds and spiders, including one genus, *Dysdera* which preys exclusively on woodlice.

Woodlouse natural history (10)

- Up to 40% of all woodlice that are eaten are consumed by centipedes (Hopkin 1991).

Pause for thought...

Name three environmental factors influencing the lives of woodlice.

What structural or behavioural responses have woodlice developed to accommodate these?

Life history (1)

- Male and female woodlice look very similar, but adult males have modified PLEOPODS at the hind end which are diagnostic of species.

- A male will climb onto a female and stimulate her by drumming on her back with his front legs. He then reaches round to transfer sperm by inserting the longer of the second pleopods (second ENDOPOD) into her genital opening.

Life history (2)

- Due to their aquatic ancestry, eggs and young woodlice are not well adapted to life on land and are very susceptible to desiccation.

- After mating, the female moults in order to produce a water-filled ‘brood pouch’ (or MARSUPIUM) beneath her body into which the eggs are laid. This partially simulates the aquatic condition.

Life history (3)

- After hatching, the young woodlice remain in the pouch until they are sufficiently mature to fend for themselves.

- These individuals (known as ‘mancas’) moult twice more until they possess the full complement of seven pairs of legs.

- At subsequent moults as the woodlouse grows, there is little change in the overall appearance. This means that many species are identifiable even as quite immature specimens.

- These juveniles moult at regular intervals to become sexually mature adults within a year.

Life history (4)

- These moults continue with less frequency in the adult depending on environmental conditions and may be noted in the ‘two-tone’ appearance of individuals undergoing this process. This occurs because the rear half is shed two or three days before the front half, producing an animal of different size and colour at each end.

- The average lifespan is around two to four years. (Oliver and Meecham, 1993).

Collecting (1)

- To find woodlice, look in places as suggested by habitat, food supply and the need for moisture.
- Most species are more active at night, but harder to catch.
- They are quite tolerant of cold and some species are more easily found on frosty days.
- Find by simple hand searching; turning logs, stones, leaf litter, dung or tidal flotsam etc.

Collecting (2)

- Pick up specimens gently by hand or use a wetted paint brush or soft storks-bill forceps.

Collecting (3)

- Smaller species can be found by sifting soil or litter samples through progressively finer sieves.

Collecting (4)

- Pitfall trapping involves placing cups into the ground for the woodlice to fall into.
- Other species will also fall in and prey on the woodlice, so a preservative such as a propylene glycol based antifreeze can be put in the bottom.
- Mesh covers can be used to exclude mammals such as Shrews.

Collecting (5)

- Berlese or Tulgren funnels can be used to extract all invertebrates from a sample, by placing a heat and light source (light bulb) above which encourages the animals to move deeper down and eventually fall into a collecting vessel below.

- Woodlice for preservation are collected into tubes of 70% Industrial Denatured Alcohol (IDA) or ethyl alcohol. Preferably with a little glycerine added to keep them supple.

- Some colour features are lost in alcohol, so eye colour etc. should be noted before preservation.

Collecting (6)

- A label within the tube should be written with permanent, water-resistant ink onto good quality paper (Goatskin is ideal).

- Record:
  - Where found (including grid ref)
  - When (date)
  - Who was the collector
  - Identification or "determination" label on a separate piece of paper, with the date and name of determiner.

Collecting (7)

- Voucher specimens are ‘real’ objects that provide evidence of a piece of data.
- They are essential for checking identifications at a later date, as well as for reference for comparing anatomical features.
- They also offer opportunities to return to the specimen for future uses such as DNA sampling.
- Generally males are the most useful for identification purposes. They are generally smaller than females.

Woodlice in captivity

- Woodlice are very easy to keep alive to study. A plastic pot with a moist tissue at the bottom and elements of the natural habitat are usually sufficient for a thriving colony. Include leaf litter, damp moss and decaying fruit or vegetables. Cuttlefish bone can provide added calcium.

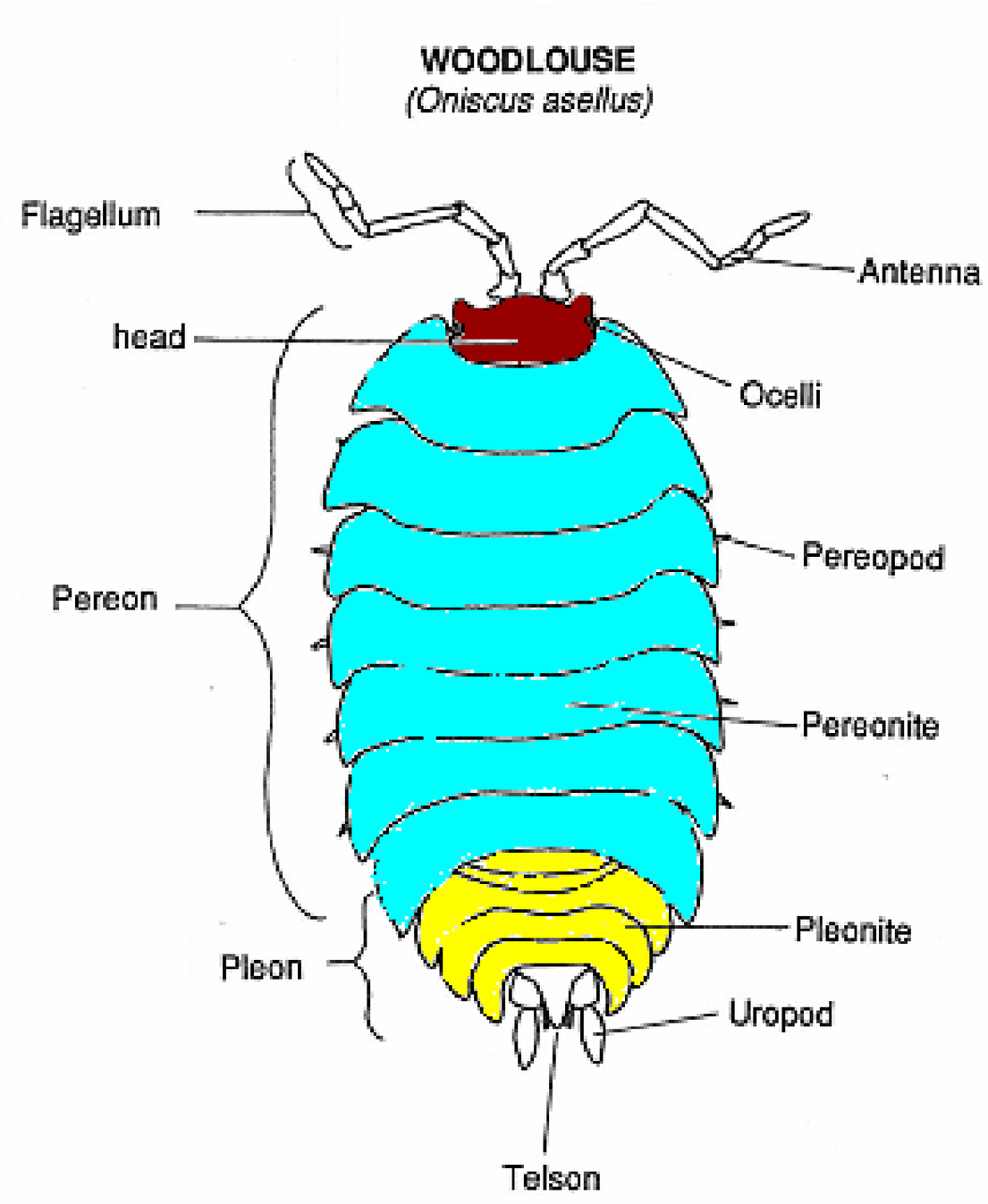
- Some woodlice will scavenge on animal remains and have been used as a simple means of cleaning flesh from skeletons.

Pause for thought...

Suggest four techniques for finding or collecting woodlice.

Woodlouse anatomy (1)

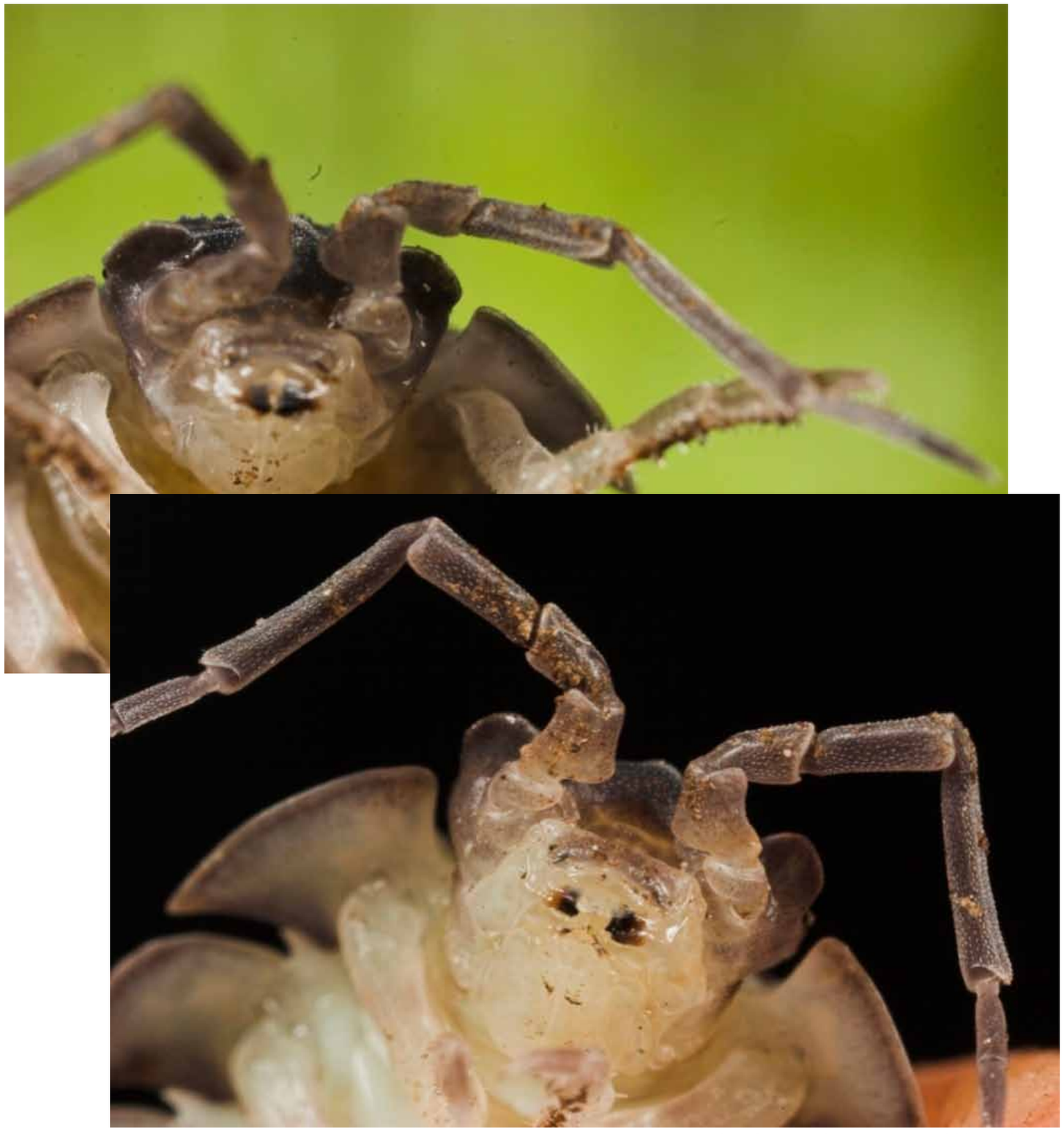
- The general morphology of a woodlouse is shown in the illustration.
- Woodlice are generally flattened animals, with the body differentiated into three main zones, the head, the pereon (seven segments) and the pleon (five segments).



Woodlouse anatomy (2)

- The head supports the antennae, with their ‘elbowed’ joints.

- There are also mouthparts which are able to bite and chew rather than filter feed like their aquatic cousins.



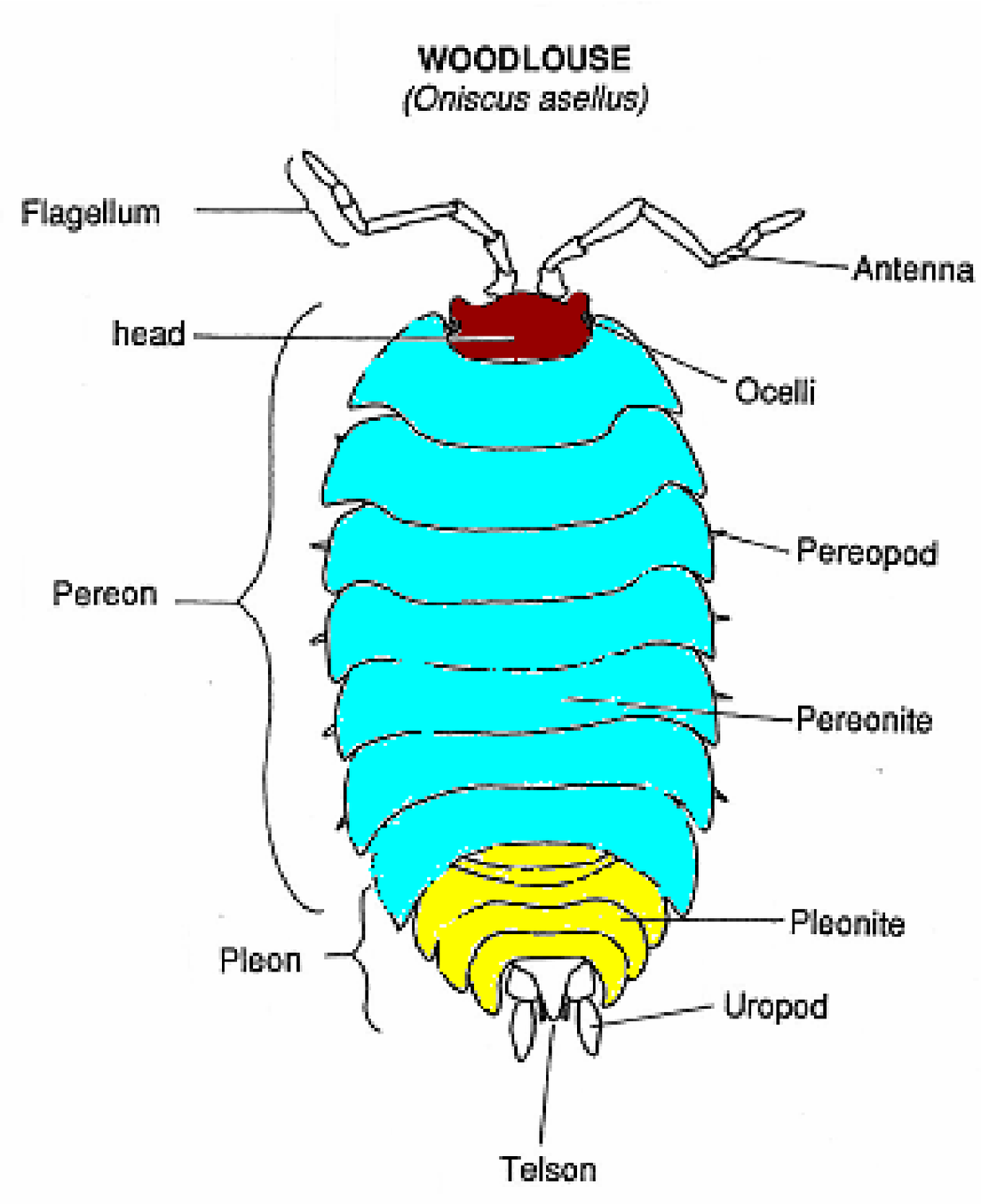
Woodlouse anatomy (3)

- All juvenile and adult Woodlice have seven pairs of walking legs. Unlike any other group of terrestrial arthropods.

- These are on the front part of the body, the pereon and are therefore known as PEREOPODS.

Woodlouse anatomy (4)

- The limbs on the hind part of the body, or Pleon, are called PLEOPODS and are modified to function as gills or reproductive organs.

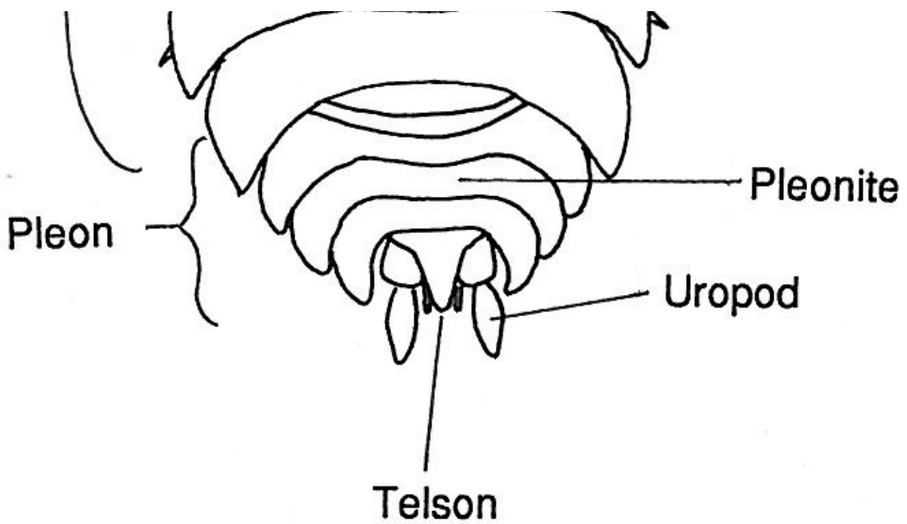


Woodlouse anatomy (5)

- The PLEOPODS also function in control of water loss and the uptake of oxygen.
- In the most terrestrial species (eg. *Porcellio*, *Armadillidium*, *Cylisticus* etc.) the gills have developed as PLEOPODAL LUNGS which can be seen as white patches on the underside of the pleon in live specimens.
- They tend to be called 'lungs' rather than gills because they exchange gases from the air directly into the 'blood' system as in humans.

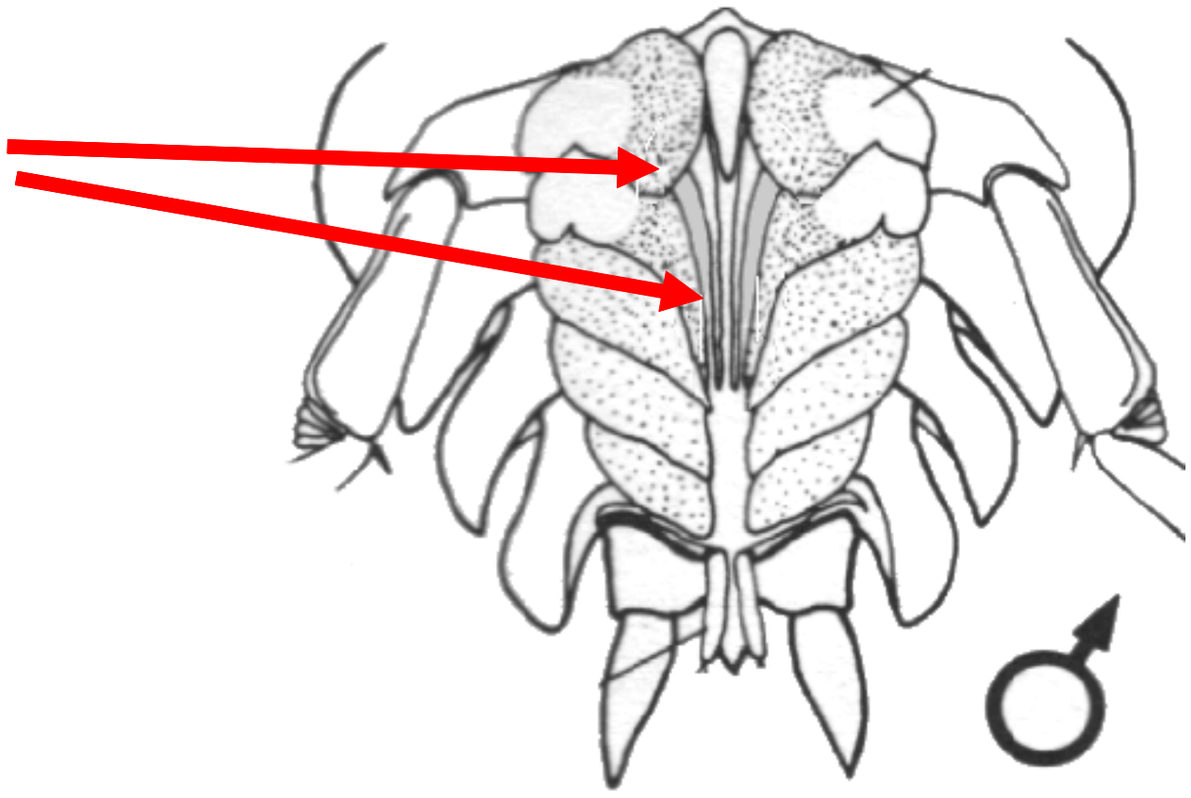
Woodlouse anatomy (6)

- At the rear end of the animal there are paired UROPOD structures, often sticking out. These can have a repellent, sensory or water management function.



Woodlouse anatomy (7)

- The reproductive organs are also at the rear. Woodlice have developed structures for the internal fertilization of eggs.



Identification (1)

- The following pages show examples of some of the characteristics which can be used to identify Woodlice.
- The combination of these characters are summarised in the tabular key, which covers a selection of British species.
- For more comprehensive keys to all British species, please refer to the Further Reading section.

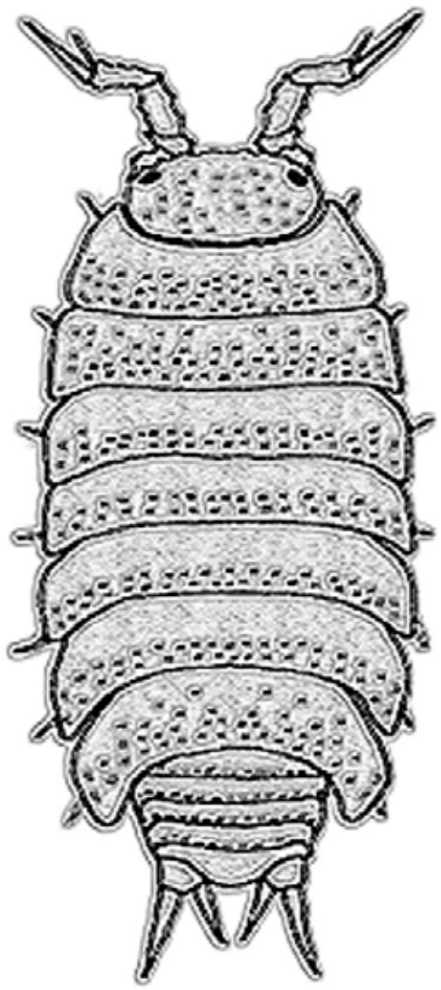
Identification (2)

- Many species can be identified when immature, but keys usually refer to characters most clearly seen in adults.

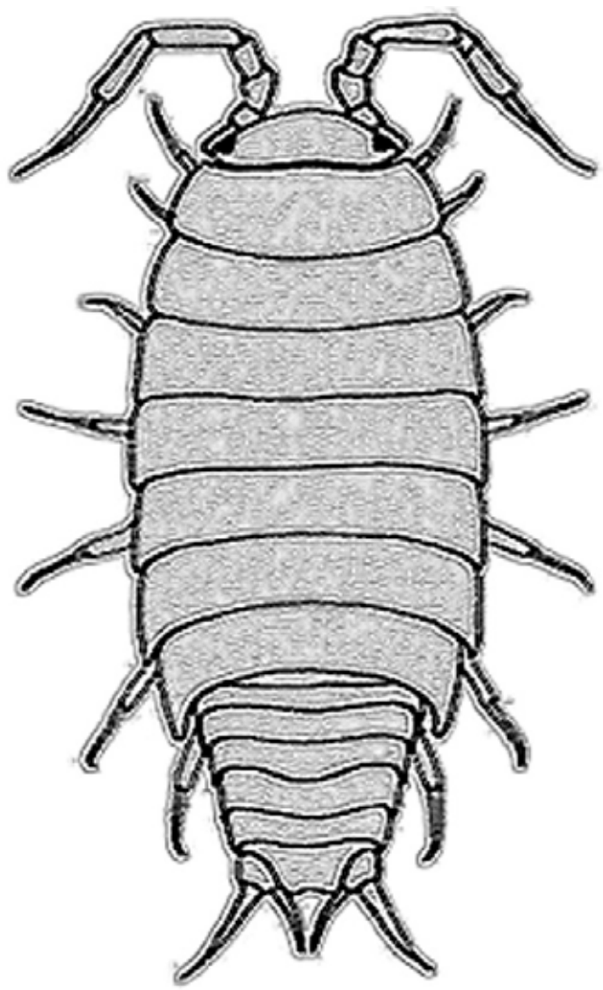
Identification (3)

- Simple morphological characters such as **colour** and **sculpturing** are helpful.

Longitudinal ridges
Haplophthalmus



Rows of tubercles
e.g. *Androniscus*



Smooth
e.g. *Trichoniscus*

Re-drawn from Hopkin 1991

Identification (4)

- Simple morphological characters such as **colour** and **sculpturing** are helpful.

Longitudinal ridges
Haplophthalmus

Rows of tubercles
e.g. *Androniscus*

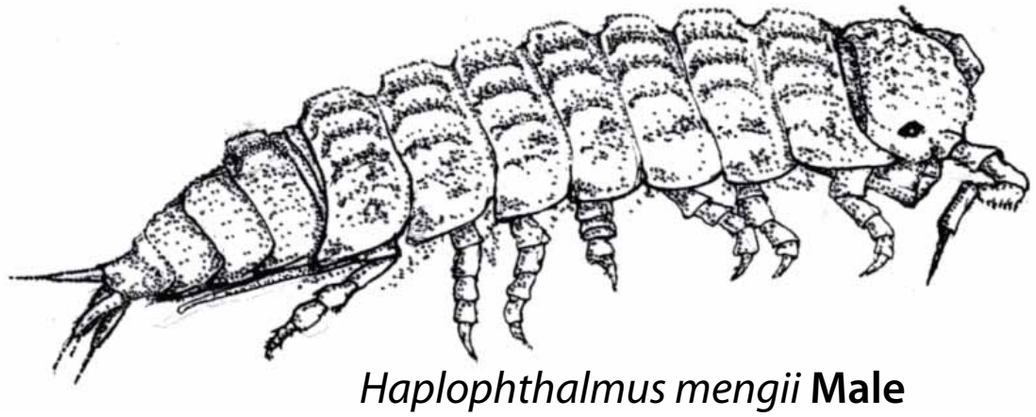
Smooth
e.g. *Trichoniscus*

Identification (5)

- The longitudinal ridges of *Haplophthalmus* species are distinctive. The absence of projections on the third segment of the pleon distinguish *H. danicus*.

- *H. mengii* and *H. montivagus* can only be separated by differences in the male pleopods.

Haplophthalmus danicus **Male**



Haplophthalmus mengii **Male**

Identification (6)

- Colour can be a helpful feature, but some species can be quite variable.

Armadillidium vulgare
Common pill woodlouse

Identification (7)

- There are quite attractively coloured woodlice, such as *Armadillidium pulchellum* and *Armadillidium pictum*.

A. pulchellum

A. pictum

Identification (8)

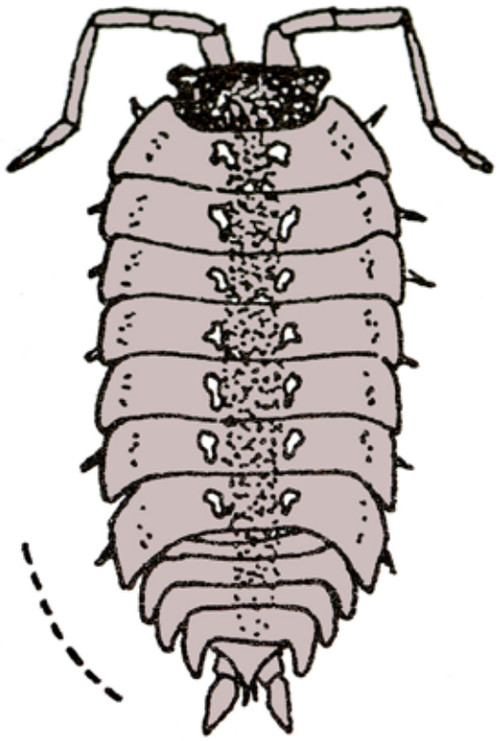
- These two species can be distinguished by their size (*A. pictum* is larger) and the shape at the corner of the first pereonite.

Armadillidium pulchellum
First pereonite with flattened, 'cut-off' corner.

Armadillidium pictum
First pereonite with pointed corner.

Identification (9)

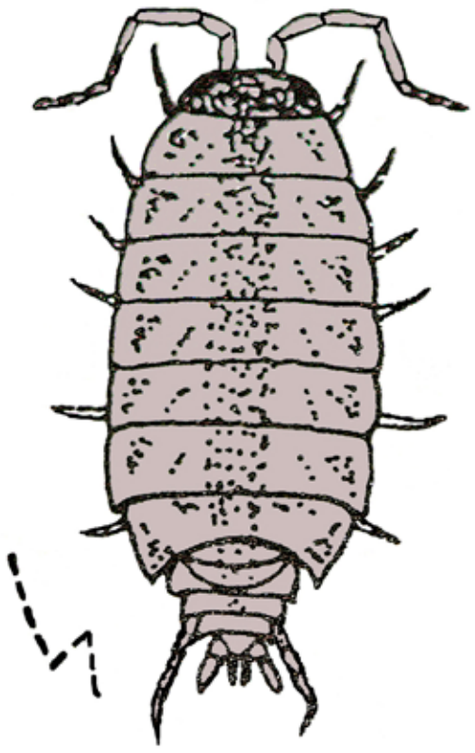
- Colour can fade in preserved specimens. A more reliable character can be seen in the outline of the body. This may be generally continuous from head to telson or there may be a 'junction' where the hind body (PLEON) narrows relative to the fore body (PEREON).



Continuous outline

Fore body (PEREON)

Hind body (PLEON)



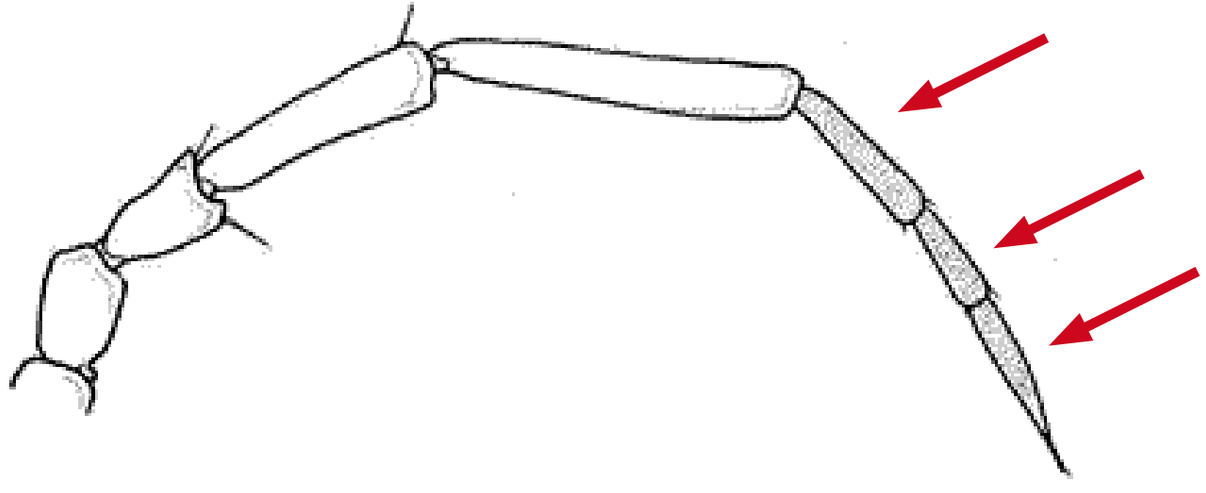
Stepped outline

Porcellio spinicornis (continuous)

Philoscia muscorum (stepped)

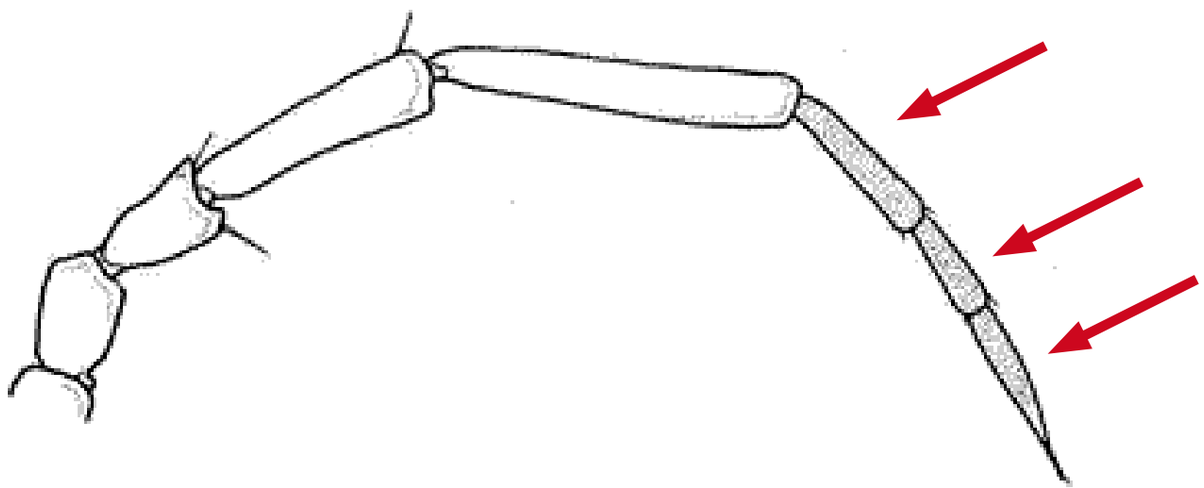
Identification (10)

- A character which is used to separate the main families of woodlice is the number of segments at the end of each antenna.
- This FLAGELLUM may consist of two or three distinct sections, ten bead like segments or several barely discernable ones which taper to a bristly tuft.



Flagellum with three distinct segments

Identification (11)

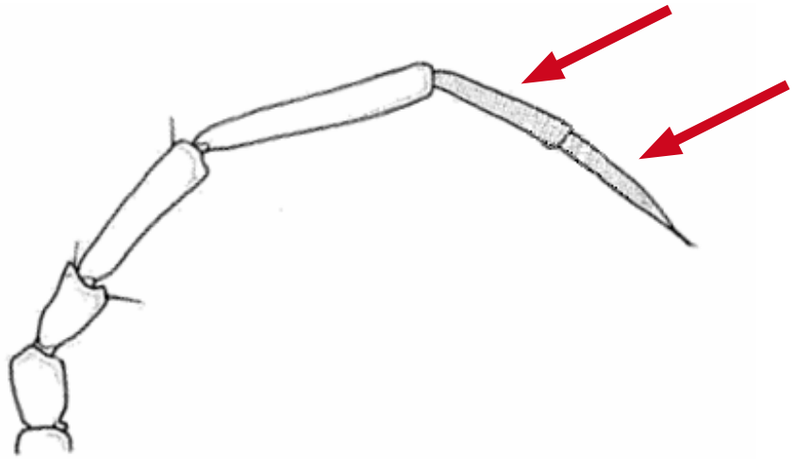


Flagellum with three distinct segments

Philoscia muscorum
Common Striped Woodlouse

Oniscus asellus
Common Shiny Woodlouse

Identification (12)



Flagellum with two distinct segments

Porcellio

Armadillidium

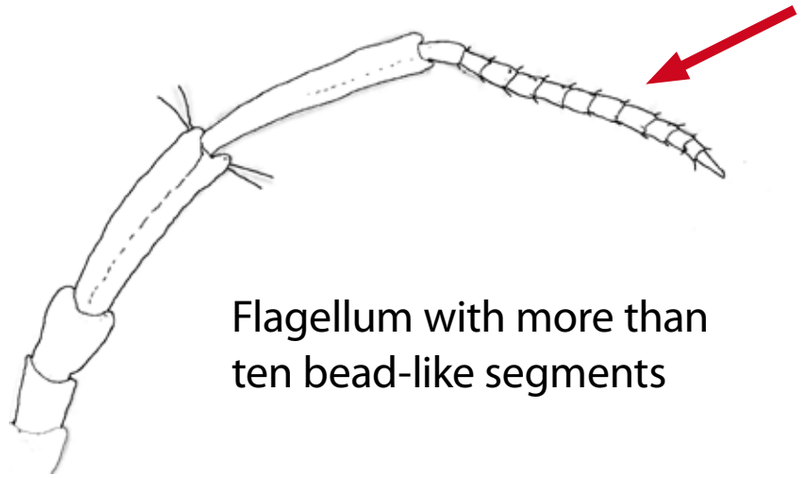
Porcellionides

Trachelipus

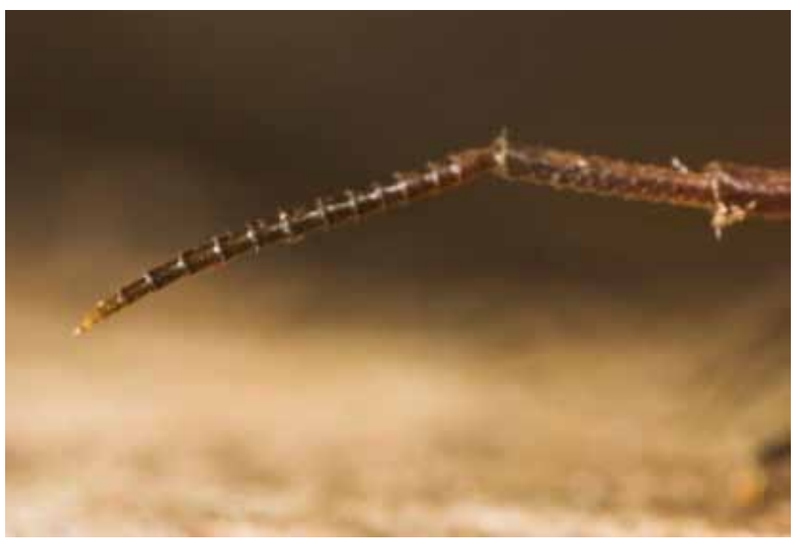
Cylisticus

Identification (13)

- The flagellum consists of ten bead like segments in *Ligia* and *Ligidium*. In these two genera, there are also distinctive, forked uropods.

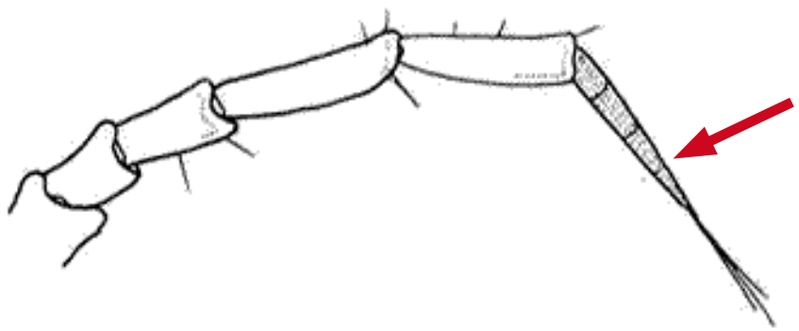


Flagellum with more than ten bead-like segments



Identification (14)

- Several very small woodlice have antennal flagella which taper to a bristly tuft.



Flagellum with several indistinct segments forming a tapered cone

Oritoniscus

Metatrichoniscoides

Haplophthalmus

Androniscus

Trichoniscoides

Identification (15)

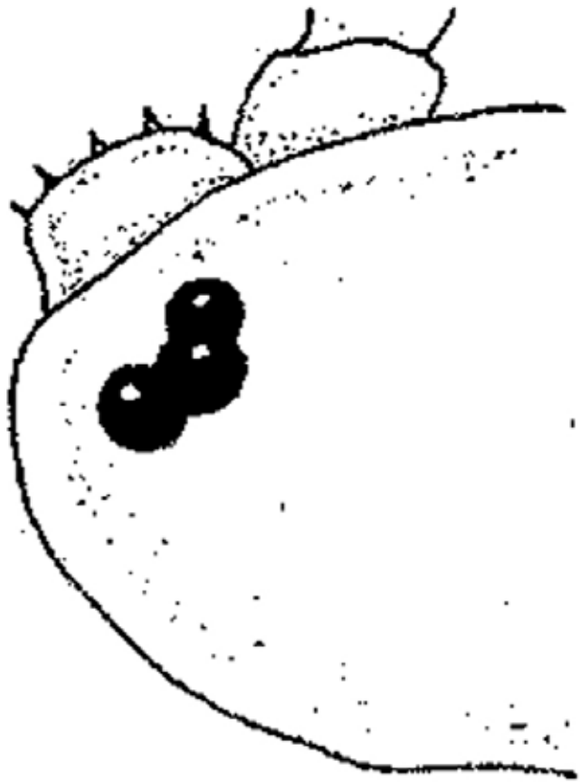
- The number and colour of ocelli in each eye is diagnostic. The colour may be lost if preserved in alcohol so this should be noted where relevant while the animal is alive.

Identification (16)

- In Trichoniscus species the three ocelli fuse together in adults but are separate in juveniles. This provides a distinction between adult *T. pygmaeus* and juvenile *T. pusillus* of the same size.

Identification (17)

Trichoniscidae



Three ocelli
Trichoniscus

One ocellus
Most species

No ocelli – blind
Metatrichoniscoides

Re-drawn from Hopkin 1991

Identification (18)

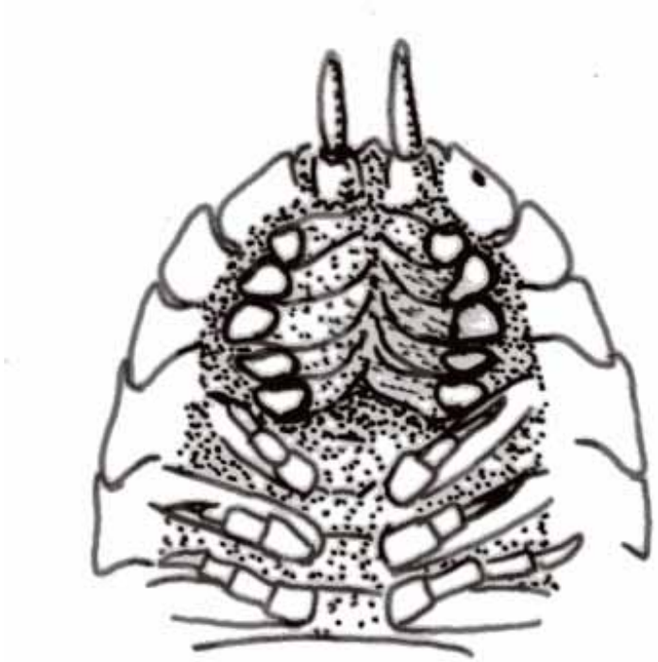
- The number of PLEOPODAL LUNGS can help identification. They are seen as white patches on the underside of the pleon in live specimens.

Eluma caelatum

Armadillidium pictum

Identification (19)

Where present, there are usually two pairs of pleopodal lungs, but in *Cylisticus convexus* and *Trachelipus rathkii*, there are five pairs.



Identification (20)

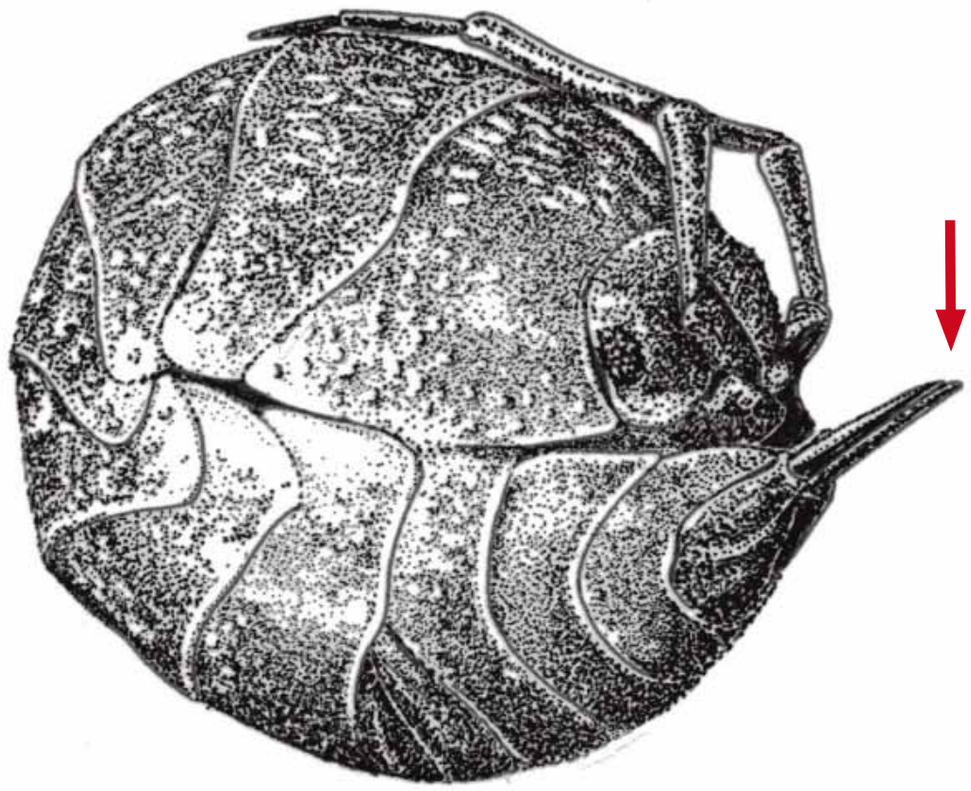
The shape of the uropods and tail or 'telson' can be quite distinctive between species.

Identification (21)

- The Uropods may be short and flattened in the pill woodlice, Armadillidiidae, or projecting, spear-like at the back.

- In the Ligiidae and small Trichoniscidae they are forked.

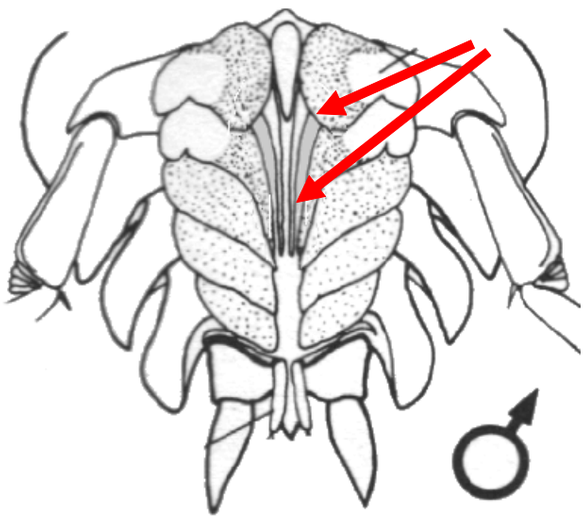
Uropods flattened
Armadillidium vulgare

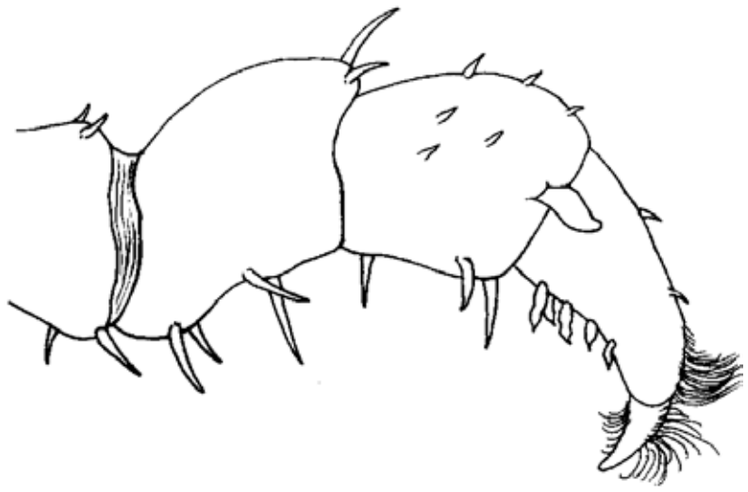


Uropods projecting
Cylisticus convexus

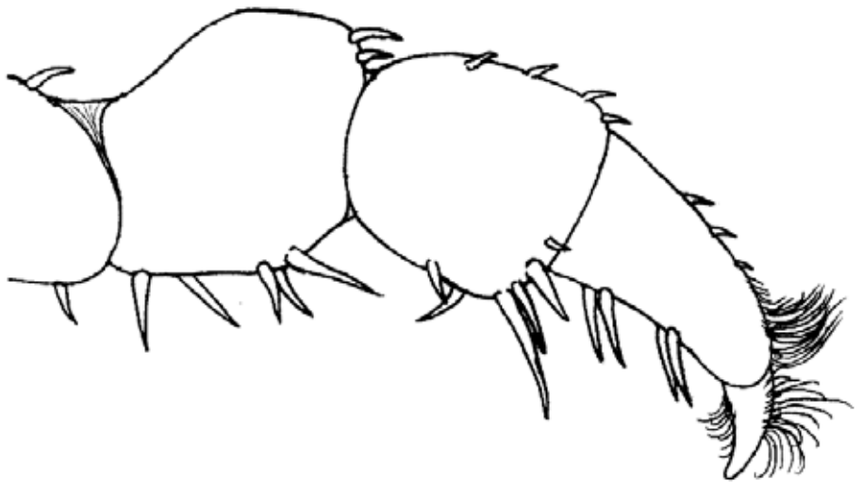
Identification (22)

- As previously described, male genitalia structures are very diagnostic of species but are beyond the scope of this review.
- The modified limbs of the pleon are called PLEOPODS. Some function as gills but others form elongated structures for sperm transfer.
- In males, the first and/or seventh leg (Pereopod) may also have specific diagnostic spines and bulges.





Seventh leg of *Haplophthalmus mengei*

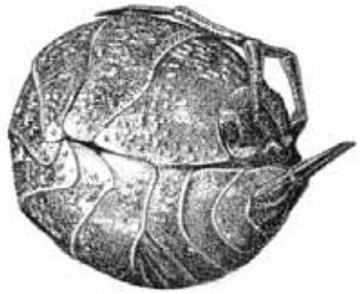


Seventh leg of *H. montivagus*

Identification (23)

- Of the species that roll up into a ball such as *Armadillidium* (= Armadillo) there are diagnostic elements to the extent that they form a sphere.

Armadillidium pictum and *A. vulgare* form a perfect, closed sphere with nothing protruding



Armadillidium nasatum and *Cylisticus convexus* leave their antennae sticking out

(This *A. vulgare* has it's antennae out!)

A. pulchellum leaves a slight gap

Identification (24)

- In addition to rolling up, other defensive behaviours can give clues to woodlouse identity. Some authors may refer to them variously as “runners”, “clampers” or “creepers”.

- “Runners” have noticeably longer legs and move at speed. For example, *Porcellionides pruinosus*, the dung heap woodlouse.

Identification (25)

- Many of the most common species are “clampers”. They initially stay put when disturbed. They tend to have wide, flattened bodies that are difficult to pick up.

Porcellio dilatatus

Oniscus asellus

Identification (26)

- A few species may be considered to just “creep” slowly off, but this may be as much a response to temperature, light levels or humidity, than a diagnostic characteristic of species.

Trichoniscoides albidus

Trichoniscus pygmaeus

Pause for thought...

Name six anatomical features which are useful in the identification of woodlice.

Identification (27)

- The following chart summarises the main characteristics of some of the commonest or most distinctive British species.
- Colour coding helps to group together species with more similarities.
- Note that it covers only 27 of the 40 or more British species and should not be used to definitively identify all specimens.

Antennal flagellum	Pleopodal lungs (pairs)	Body outline	Body sculpture	Defensive behaviour	Eyes (ocelli per side)	Uropods	Additional comments	Maximum length (mm)	Species
One conical tapering section with 'brush' at end. (Very small species)	0	Continuous	Weak longitudinal ridges. Without projections on third segment of pleon	Creeper	1 black	Forked	Cream-white	4	*Haplophthalmus danicus*
One conical tapering section with 'brush' at end. (Very small species)	0	Continuous	Well developed longitudinal ridges. Projections on third segment of pleon	Creeper	1 black	Forked	Cream-white. Two species separated by close examination of male genitalia	4	*Haplophthalmus mengii/montivagus*
One conical tapering section with 'brush' at end. (Very small species)	0	Stepped	Rows of small bumps across body	Runner	1 black	Forked	Pale pink, orange or red, with central double yellow stripe	6	*Androniscus dentiger*
One conical tapering section with 'brush' at end. (Very small species)	0	Stepped	Smooth	Runner	1 dark brown	Forked	Maroon coloured. Very shiny	9	*Oritoniscus flavus*
One conical tapering section with 'brush' at end. (Very small species)	0	Stepped	Rows of small bumps across body	Creeper	1 dark brown	Forked	Red-brown with white uropods	4	*Trichoniscoides albidus*
One conical tapering section with 'brush' at end. (Very small species)	0	Stepped	Smooth	Runner	3 black. Tightly grouped	Forked	Head pigmented red-brown as body. Separated by close examination of male genitalia	5	*Trichoniscus pusillus/provisorius*
One conical tapering section with 'brush' at end. (Very small species)	0	Stepped	Smooth	Creeper	3 black. Tightly grouped	Forked	Cream-white to pale pink. Head always paler	2.5	*Trichoniscus pygmaeus*
10 or more distinct sections	0	Continuous	Smooth	Very fast runner	Large 'compound' eyes	Long and forked. Of equal length	On rocky shores	30	*Ligia oceanica*
10 or more distinct sections	0	Stepped	Smooth	Very fast runner, but quickly stops, then runs again	Large 'compound' eyes	Long and forked. Of different lengths	Shiny. Dark, mottled black, grey and brown/yellow	9	*Ligidium hypnorum*

Antennal flagellum	Pleopodal lungs (pairs)	Body outline	Body sculpture	Defensive behaviour	Eyes (ocelli per side)	Uropods	Additional comments	Maximum length (mm)	Species
3 sections	0	Continuous	Smooth	Clamper	Around 25 black	Exopodite spear-shaped	Shiny. Pale grey edges and yellow patches	16	*Oniscus asellus*
3 sections	0	Stepped	Smooth	Runner	Numerous black	Exopodite spear-shaped	Shiny. Colour variable. Dark head and central stripe	11	*Philoscia muscorum*
2 sections	0	Continuous	Granular	Active in ant nests	None	Exopodite spear-shaped	White. Antennae are very broad and may appear to have only one flagellum segment	4	*Platyarthrus hoffmannseggi*
2 sections	5	Continuous	Smooth	Runner. Curls into a loose ball with antennae and uropods sticking out	Numerous grey	Long and straight. May be orange	Grey-brown	15	*Cylisticus convexus*
2 sections	5	Continuous	Broad, smooth bumps	Clamper	Numerous black	Exopodite spear-shaped	Mottled dark/light grey or orange in longitudinal bands	15	*Trachelipus rathkii*
2 sections	2	Continuous	Numerous, broad, smooth bumps	Clamper	Numerous black	Exopodite spear-shaped	Outline very oval. Telson parallel-sided and rounded at tip	15	*Porcellio dilatatus*
2 sections	2	Continuous	Roughly textured with sharp bumps across all segments	Clamper	Numerous black	Exopodite spear-shaped	Usually slate grey, but may be randomly mottled orange, cream or black	17	*Porcellio scaber*
2 sections	2	Continuous	Numerous, broad, smooth bumps	Clamper	Numerous black	Exopodite spear-shaped	Dark head and central stripe bordered by yellow patches	12	*Porcellio spinicornis*

Antennal flagellum	Pleopodal lungs (pairs)	Body outline	Body sculpture	Defensive behaviour	Eyes (ocelli per side)	Uropods	Additional comments	Maximum length (mm)	Species
2 sections	2	Stepped	A ridge runs across each pereon segment	Runner	Numerous black	Exopodite spear-shaped	Mottled yellow and brown.	7	*Porcellionides cingendus*
2 sections	2	Stepped	Smooth, with rows of small bumps	Runner	Numerous black	Exopodite spear-shaped	Purple-grey with white bloom. May be orange. White legs. In dung heaps	12	*Porcellionides pruinosus*
2 sections	2	Continuous	Smooth	Clamper. Can curl into an imperfect ball.	Numerous black	Wide. Not projecting	Dark grey. Edges of body splay out slightly	20	*Armadillidium depressum*
2 sections	2	Continuous	Smooth	Curls into a tight ball leaving antennae sticking out	Numerous black	Wide. Not projecting	Grey-brown longitudinal bands. Distinctive nose-like projection at front of head	20	*Armadillidium nasatum*
2 sections	2	Continuous	Smooth	Curls into a tight ball	Numerous black	Wide. Not projecting	Attractive black/ orange and green/ yellow. First pereonite with pointed corner	9	*Armadillidium pictum*
2 sections	2	Continuous	Smooth	Curls into a loose ball	Numerous black	Wide. Not projecting	Attractive brown/ orange and yellow. First pereonite with flattened, 'cut-off' corner	5	*Armadillidium pulchellum*
2 sections	2	Continuous	Smooth	Curls into a tight ball	Numerous black	Wide. Not projecting	Grey with yellow mottling. Also yellow, and orange varieties	18	*Armadillidium vulgare*
2 sections	2	Continuous	Smooth. Covered with fine hairs	Curls into a loose ball	1 black	Wide. Not projecting	Purple-brown	10	*Eluma caelatum*

Species gallery

- The following gallery presents images of some of the more common or distinctive species, to illustrate the identification chart.

- The first are often called “the famous five”; five of the most common species in Britain.

Species gallery (1)

Common shiny woodlouse
Oniscus asellus

Three flagellum segments • Large • Smooth and shiny • Body outline continuous, with pale edges, often with yellow flecks • Pointed telson • Gardens and woodland

South-western subspecies, *O. asellus occidentalis*

An unusual white form

Species gallery (2)

Common striped woodlouse
Philoscia muscorum

Three segments to antennal flagellum • Medium sized • Shiny • Greenish, speckled brown, occasionally red or yellow • Often with a dark central line with a black head • Body with discontinuous outline

Species gallery (3)

Common rough woodlouse
Porcellio scaber

Two flagellum segments • Large • Dull, rough surface • Usually grey, but sometimes more orange • Often with orange base to the antennae • Pointed telson • Tolerant of dry environments so often seen in houses • Common in gardens and occurs everywhere

Species gallery (4)

Common pygmy woodlouse
Trichoniscus provisorius/pusillus

Two distinct species, requiring close examination of males for identification • Small • Brown (occasionally purple) • Tapered antennae • Three eyes tightly fused together in adult • Body outline discontinuous

Male *T. provisorius* alongside a third, small species, *T. pygmaeus*

T. provisorius/pusillus female

Species gallery (5)

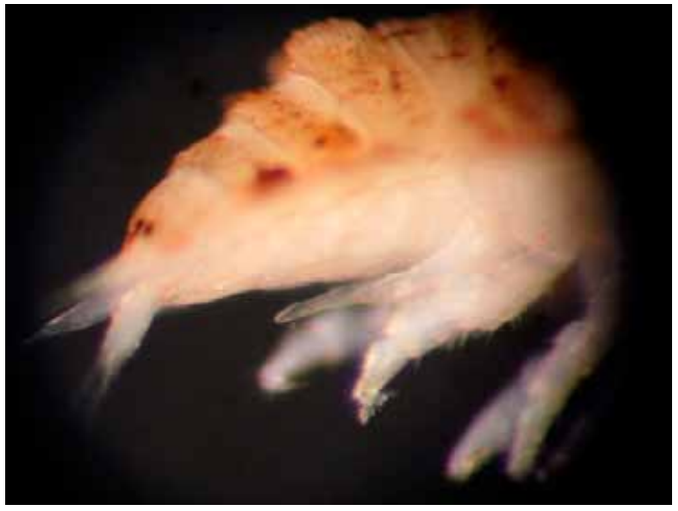
Common pill woodlouse
Armadillidium vulgare

Large • Smooth and shiny • Dark grey to orange or pale brown • Two flagellum segments • Rolls into a perfect sphere with antennae inside (unlike the one shown here!!) • Wide, blunt uropods • Less common in northern Britain

Species gallery (6)

Haplophthalmus mengii

Small • Cream-white • Well developed longitudinal ridges across the body • Two raised projections on third segment of pleon •Tapering antennal flagellum • Eyes of a single black ocellus • Requires examination of male genitalia to separate from *H. montivagus*



Species gallery (7)

The Rosy woodlouse
Androniscus dentiger

Small • Pale pink to bright orange, with a widening double yellow stripe down the back • Rows of tiny spines across the body • Tapering antennal flagellum • Eyes of a single black ocellus

Species gallery (8)

Oritoniscus flavus

Tapering antennal flagellum • Stepped body outine • Eyes of a single brown ocellus • Maroon-brown with paler sides • Very shiny • Very rare in Britain but widespread in Ireland in damp locations

Species gallery (9)

Trichoniscoides albidus

Tapering antennal flagellum • Small • Dull red, with contrasting white telson and uropods • Eye of a single dark brown ocellus • Often in damp situations, such as streamsides and ditches

Species gallery (10)

Trichoniscoides sarsi

Tapering antennal flagellum • Very small • White with pale pink at rear end • Eye of a single red ocellus, with area around eye also suffused with red • Requires male specimens to separate from some very similar species • A soil-dwelling species which can be very difficult to find

Species gallery (11)

Common sea slater
Ligia oceanica

Restricted to tidal zones • Antennal flagellum of ten or more segments • Continuous body outline • Mottled black, grey and yellow/brown • Large eyes of more than 100 ocelli • Long forked uropods of equal length

Species gallery (12)

Ligidium hypnorum

Antennal flagellum of ten or more segments • Stepped body outline • Dark, mottled black, grey and yellow/brown • Large eyes of more than 100 ocelli • Long forked uropods

Species gallery (13)

The Ant woodlouse
Platyarthrus hoffmannseggi

Closely associated with ant nests • Antennal flagellum of two sections, one of which is hardly visible • Continuous body outline • Body a granular, transparent white, with yellow body contents visible • No eyes

Species gallery (14)

Cylisticus convexus

Five pleopodal lungs • Two segments to antennal flagellum • May reluctantly curl into a loose ball with uropods and antennae sticking out • Uropods may be orange

Species gallery (15)

Trachelipus rathkii

Five pleopodal lungs • Two segments to antennal flagellum • Mottled dark/light grey or orange in longitudinal bands

Species gallery (16)

Porcellio dilatatus

Large and oval shaped, with a continuous outline • Two segments to antennal flagellum • Telson almost parallel sided and rounded at tip • Farmyards and dung heaps

Species gallery (17)

Porcellio spinicornis

Large • Similar to *Oniscus asellus*, but with a rough surface • Black head, with an often darker stripe down the centre of the body, bordered by yellow flecks • Body with a continuous outline • Two segments to antennal flagellum

Species gallery (18)

Porcellionides cingendus

Two segments to antennal flagellum • Mottled yellow and brown or red • Stepped body outline • Raised ridge runs across each pereon segment

Species gallery (19)

Porcellionides pruinosus

Two segments to antennal flagellum • Purple-grey with a white bloom that rubs off • White legs • Stepped body outline • Farm yards and dung heaps

Species gallery (20)

Armadillidium depressum

Shiny dark grey • Edges of body splay out slightly • Rolls into an open, slightly elliptical sphere due to the splayed pereon segments • Two antennal flagellum segments • Wide, blunt uropods

Species gallery (21)

Armadillidium nasatum

Grey-brown longitudinal bands • Distinctive nose-like projection at front of head • Two flagellum segments • Rolls into a ball with antennae sticking out • Wide, blunt uropods

Species gallery (22)

Armadillidium pictum

Quite large (up to 9mm) • Attractively coloured yellow, orange and green on black • The first pereonite has a pointed rear corner • Rolls into a tight ball • Two antennal flagellum segments • Wide, blunt uropods

Species gallery (23)

Eluma caelatum

Smooth, purple-brown body with fine hairs • Can curl into a tight ball, but usually leaves a gap • Eye of a single large black ocellus • Uropods, wide, not projecting • Antennal flagellum of two segments

Pill millipedes

- Some pill millipedes look like pill woodlice, because they both roll into tight balls
- Millipedes have more than seven pairs of legs; two pairs per segment
- They have a single large last segment, not the five small segments plus uropods of the woodlice

Species gallery

Glomeris marginata
Pill millipede NOT A WOODLOUSE

Large • Shiny, with pale edges to body segments • Clubbed antennae, without flagella • More than seven pairs of legs; two pairs per segment • A single large last segment • No uropods

Pause for thought...

Match the woodlouse to its habitat:

Ant nests

Ligia oceanica

Sea shore

Porcellionides pruinosus

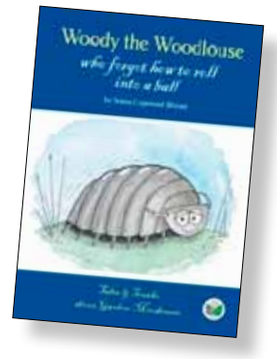
Dung heaps

Platyarthrus hoffmannseggi

Further reading

- Copeland Bloom, S. (2011) ***Woody the Woodlouse, who forgot how to roll into a ball.*** Amateur Entomologist's Society, London

  (Children's introduction)



- Gregory, S.J. (2009). ***Woodlice and Waterlice (Isopoda: Oniscidea & Asellota) in Britain and Ireland.*** Centre for Ecology & Hydrology, Wallingford/Field Studies Council, Preston Montford

  (Detailed ecology and distibution information)

- Hopkin, S.P. (1991) ***A key to woodlice of Britain and Ireland.*** AIDGAP, Field Studies Council Publication No. 204. Preston Montford. (reprinted from Field Studies **7**: 599–650)

  (Excellent introductory key)

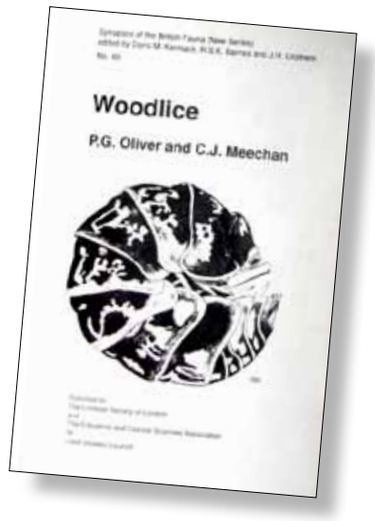
Further reading

- Hopkin, S.P. (2003) ***The Woodlouse name trail.*** Field Studies Council chart

  (Basic beginner's guide)

- Oliver, P.G. and Meechan, C.J. (1993) ***Woodlice. Synopses of the British Fauna*** (New series). Field Studies Council. Preston Montford

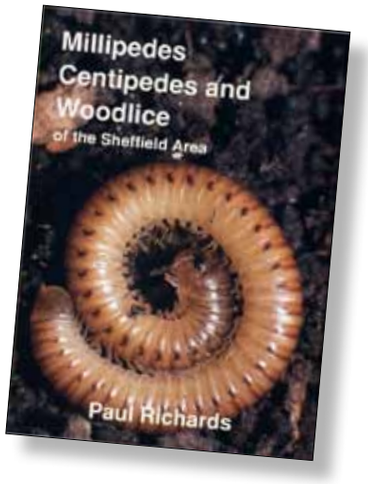
  (Comprehensive study with detailed keys)



Further reading

- Richards, J.P. (1995). ***Millipedes, Centipedes and Woodlice of the Sheffield Area.*** Sorby Record Special Series No.10 Sheffield City Museum/Sorby Natural History Society

  (Example of a local key with maps)



- Sutton, S.L. (1972). ***Woodlice.*** Ginn, London. (Reprinted 1980, Pergamon Press, Oxford).

  (Ecology, behaviour, simple key and classroom investigations)

References

Chater, A.O. (1988) Woodlice in the Cultural Consciousness of Modern Europe. *Isopoda*, **2**: 21–39.

Encylopedia of Life http://www.eol.org

Gunnarson, T. (1987) Selective Feeding on a Maple Leaf by *Oniscus asellus* (Isopoda). *Pedobiologia*, **30**: 161–165.

Hassall, M., Turner, J.G. and Rands, M.R.W. (1987) Effects of Terrestrial Isopods on the Decomposition of Woodland Leaf Litter. *Oecologia*, Berlin, **72**: 597–604.

Thornton, M. (1989) The Woodlouse Sermon. *Isopoda*, **3**: 1–4.

Recording

- By recording (and collecting voucher specimens) a much more accurate picture of distribution and rarity can be assessed

- Conservation and ecology depend on knowing what is out there and at what frequency.

- Please compile and send all records to:

Biological Records Centre
Centre for Ecology & Hydrology
MacLean Building
Crowmarsh Gifford
Wallingford
Oxfordshire
OX10 8BB

www.ceh.ac.uk

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