



**Bedfordshire  
Cambridgeshire  
Northamptonshire**

# Identifying British Slugs: Part 1: Introduction

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**v. 3.1**

**April 2018**

This is an updated version of a guide I first produced in 1988. I added photographs in 2012. It's since been through about six training workshops, each of which highlighted couplets in the key which needed clarifying. It aims to provide a free, quick and simple key to identify almost all British slugs to species level. It uses external features, most easily seen on live slugs.

The British fauna, and our knowledge of it, has grown a lot in the last three decades. In 1982, the first AIDGAP slug key was published by the Field Studies Council (Cameron, Eversham & Jackson, 1983). It covered 32 species. In 2014, a superb, beautifully illustrated, completely new, 136-page AIDGAP key appeared (Rowson, Turner, Anderson and Symondson, 2014), containing 44 species: twelve additions, or a 38% increase! I cannot think of another group of animals or plants which has grown so much in my lifetime.

Previously, with this key you could have identified all but four pairs or trios of very closely related species, whose identity was best confirmed by dissection. Now, some of those tricky species can be identified with more confidence, but several of the recent additions to the British list are rather poorly understood and there are now seven tricky pairs or trios to consider. I have tried to include enough detail so that these can be tentatively recognised in the field, but if you think you have found any of these, you should consult a copy of the new AIDGAP key, or pass the specimens to a specialist (yes please!).

The illustrations are original, except for the figures of the *Arion hortensis* group (adapted from Davies (1977, 1979)).

Unlike the new AIDGAP key, this one does not include the 'semi-slugs', molluscs with a coiled shell which is conspicuous even though they cannot crawl completely within it. They are included in the companion key to land snails instead.

## Ecology of British slugs

Most British slugs are generalist herbivore-detritivores, feeding on living and dead plant matter. In most habitats, including most gardens, these fulfil a similar ecological function to earthworms, breaking down large pieces of plant material, enabling fungi and bacteria to access it and return it to the soil as humus and free nutrients. In some broadleaved woodlands in autumn, slugs may make up over half the animal biomass and be the most important recyclers of detritus. Many slugs actively seek out and scavenge on more protein-rich food, such as dead animal matter (in gardens, including slugs and snails which have been trodden on), and carnivore faeces, especially in the breeding season, first to build up their reproductive organs then to produce eggs. Five species, *Testacella* and *Selenochlamys*, are mainly predatory, adapted to feed on earthworms but also eating other slugs. A few species feed largely on fungi, algae and lichens: *Limacus* species, *Malacolimax tenellus*, *Limax cinereoniger*, and *Geomalacus maculosus*. One species, *Boettgerilla pallens*, is largely subterranean, feeding on earthworm faeces and carrion.

Less than a quarter of species are regarded as pests. These fall into two types: underground feeders which make holes in root crops (*Milax* and *Tandonia* species start the holes, *Arion distinctus*, *A. hortensis* and *Deroceras* species often follow), and surface feeders on seeds, seedlings and tender parts of plants (*Arion rufus*, *A. vulgaris*, *A. distinctus*, *A. hortensis*, *Deroceras reticulatum* and *D. invadens* being the worst culprits).

Their feeding ecology means that gardens are good places for slugs. I have seen half the British species in the garden of the Trust's office in Cambourne, and a further five species are more likely to be found in gardens than elsewhere. That said, a few species are good habitat indicators, at least in part of their range:

Ancient woodland: *Arion owenii*, *Limax cinereoniger*, *Malacolimax tenellus*, *Tandonia rustica*

Coniferous woodland: *Arion cf iratii*, *Malacolimax tenellus*

Wetlands: *Deroceras laeve*, *D. agreste* (in East Anglia)

Upland grasslands: *Deroceras agreste*

Lichen-rich boulders and trees, on moorland, bog and grassland: *Geomalacus maculosus*

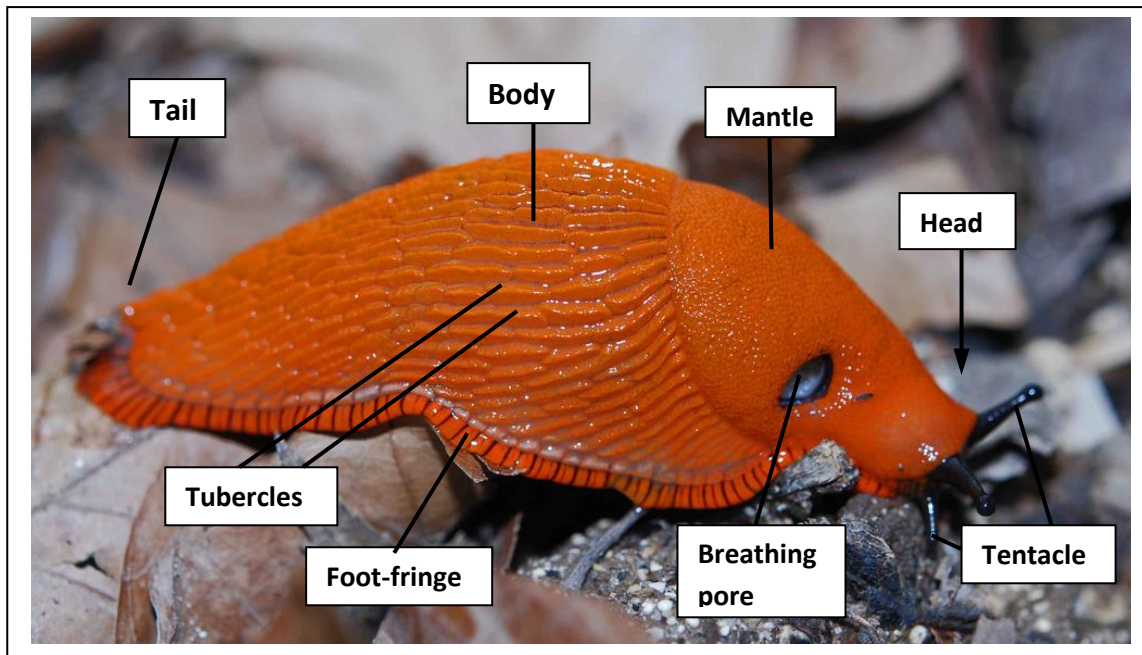
Some species may vary in their habitat choice in different climate zones: in central England I associate *Arion circumscriptus silvaticus* with wet woodlands, but elsewhere it is associated with acidic upland grassland and moorland.

Along with several land snail species, some slugs are indicators of disturbance and human impacts on habitats. Most of these are recent introductions to Britain. The presence of species such as *Arion rufus*, *A. vulgaris*, *Deroceras invadens*, *Tandonia* species, and the snails *Oxychilus draparnaudi* and maybe even *Cornu aspersum*, are a sign that a wood is heavily disturbed: you will probably find plants escaped from gardens there, too. Until recently I would have added *Limacus* and *Ambigolimax* species as disturbance indicators, but in the last five years, their continuing rapid range expansion has led to their colonising some well established centuries-old secondary woodland, and they may also be in ancient woodlands soon.

## Useful identification features

For most of the 19<sup>th</sup> and 20<sup>th</sup> century, slugs were rather unpopular among naturalists who studied molluscs, partly because they do not have an attractive and recognisable shell, and so do not make good specimens: a collection of preserved slugs is rather like a lot of small, faded pickled gherkins. Slugs also had a reputation for being difficult to identify, because they did not have a well-formed and conspicuous external shell, unlike the more popular snails, and many species are very variable in colour. As a novice in the 1970s and 80s, I was often shocked to find people who would glibly identify the garlic snails, the tiny whorl-snails, and even the small freshwater bivalves, being nervous of naming many slug species. One reason for the perceived difficulty is that most slug guides include illustrations of the reproductive organs of dissected slugs, which can be unaccountably off-putting to the average shell collector. Another reason is that immature slugs often look very different from the adults. This does not necessarily make them impossible to identify, but you may need to use different features (so, in this guide, the juveniles of large *Arion* species are keyed out separately from the adults). It's only since a few slug enthusiasts have reared most species from egg to adult, taking clear notes or photographs, that we have worked out how even very small individuals of some species can be identified reliably. There are still a few species for which dissection can be useful or even necessary to confirm identification, but very often, having confirmed that a species is present, you can work out which the majority are using external features.

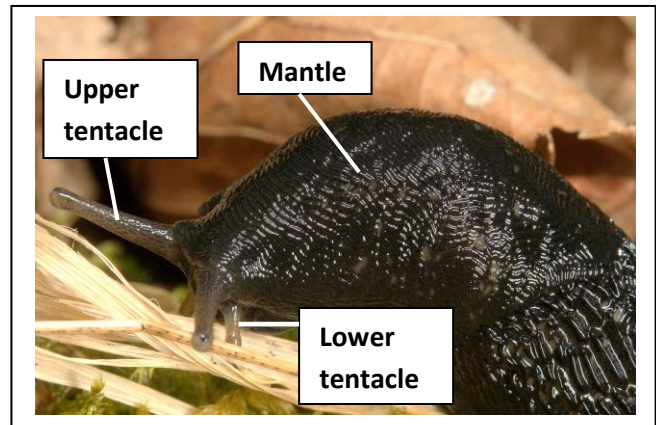
The following photographs shows the main external features used in these keys.



The above Lusitanian Slug, *Arion vulgaris*, is a large round-back slug, which does not have a keel down the middle of its back. The mantle, the oval flap of skin at the front behind the head, is rough and pitted, but does not have either a V- or horseshoe-shaped groove (found in *Milax* and *Tandonia*) nor a finger-print-like set of concentric ridges found in *Limax*, *Deroceras* and their relatives (see next pictures). The body is covered in a meshwork of grooves, with raised areas called tubercles between them. Depending on the species, these can be prominent and ridged, as in this photo, or smooth, flat and hard to distinguish. Their coarseness or smoothness can be a useful identification feature. The foot-fringe, the ribbon which skirts the body where it reaches the ground, can be narrow or broad, and in the larger *Arion* species it is often brightly coloured and strongly striped, as above. Like most large *Arion* species, the above slug has a mucus gland at the tail tip, above the foot-fringe, which often has a small blob of slime attached. The breathing pore, on the right side of the slug and at the lower edge of the mantle, is conspicuous when open, but hard to see when closed. Its position helps confirm what family and genus a slug belongs to: so, **if photographing a slug for identification, be sure to include its right side!**



Budapest Slug, *Tandonia budapestensis*, showing the faint horseshoe- or V-shaped groove on the mantle, the point of the V aiming forward toward the head. It also has small white commensal mites on and around it.



Ash-black Slug, *Limax cinereoniger*, showing concentric ridges, like a finger-print, on the mantle. The upper tentacles end in a small eye; the lower have taste cells and are used for testing food.

## Glossary and explanation of terms

*(The following definitions apply to this key; some other guides may interpret terms differently.)*

**Aggregate (abbreviated to 'agg.')**: a group of similar or closely related species which have often not been separated. Sometimes referred to as a species complex. May be named from one of the species in the group, with a suffix, e.g. *Arion ater* agg. or *Arion ater s.l.*

*s. l.* (*sensu lato*) meaning 'in the broad sense' is used for aggregates. To indicate that one particular species is intended, the alternate suffix is used, e.g. *Arion ater s.s.* (*sensu stricto*) meaning 'in the narrow sense'.

**Bands**: stripes of darker pigment running lengthwise along either side of the slug, down the body and tail, or the mantle, or both. On the mantle, the band on the right side may arch over the breathing pore, dip under it, or surround it. In *Arion hortensis* aggregate, use a hand lens to see if the upper edge of the dark mantle band has a small nick in it, above the breathing pore.

**Body**: used here for that portion of a slug behind the mantle, before it tapers into the tail. In *Testacella*, the whole animal behind the head and in front of the shell.

**Breathing pore (= respiratory pore, pneumostome)**: an opening on the right side of the animal, at or near the lower edge of the mantle. Its position helps distinguish the genera - in slugs with the mantle just behind the head, the breathing pore is in the front half of the mantle in *Arion*, but in the rear half in other slugs. In two genera, the pore is near the rear end: *Testacella* have the mantle hidden under the shell, and the breathing pore at the edge of the shell; in *Selenochlamys*, the mantle is tiny disc near the rear end, with the breathing pore at its edge.

**cf.** Latin, *confer* meaning 'compare with...'. Used when the identity of a species is not certain, but it is thought very likely to be species X. At present, *Arion cf. fagophilus*, *A. cf. iratii*, *Limax cf. decampi* and *Tandonia cf. cristata* are in this position.

**Foot-fringe:** See photograph above. This is a ribbon which encircles the whole slug around the outer edge of the sole. It is often separated from the sides of the body by a groove. It may be contrastingly brightly coloured and stripey in the large *Arion* species, or the same colour as the rest of the body, e.g. in *Limax* and *Deroceras*.

**Genus:** in the scientific naming of plant and animal species, the first part of the two-part (binomial) name, always beginning with a capital, e.g. *Arion* in the name *Arion ater*. Closely related species are placed in the same genus.

**Keel:** a single ridge along the midline of the back, running from the tail tip forwards. In *Tandonia* it runs all the way from tail tip to the rear of the mantle, and may be brightly coloured. In *Deroceras*, it is noticeable only near the tail, where it looks as if the animal had been pinched like a piece of plasticine.

**Mantle:** In snails, this is the region of the body, just inside the mouth of the shell, which secretes the new shell as the animal grows. In most slugs, with an internal shell, it is a flap of skin and tissue just behind the head, and under which the slug can withdraw its head when disturbed or resting. It may have a pattern of concentric ridges (like a fingerprint - see *Limax* photograph above), or be rough or pitted or smooth. In *Testacella*, the mantle is within the tiny shell, at the tail tip, and in *Selenochlamys*, it is small and at the tail tip.

**Mucus:** The slime of a slug fulfils many important functions: it lubricates the animal's movement over the ground; it reduces moisture loss and desiccation; and it may protect against predators; *Limax maximus* mates in mid-air on a rope of mucus; and trails of slime may leave a chemical signal which communicates with other slugs. It also helps in identification: different species have differently coloured and textured slime, and in some species the body mucus is a different colour from the sole mucus.

**sensu lato or s. l. :** in the broad sense, meaning an aggregate of closely related species.

**sensu stricto or s.s. :** in the narrow sense, meaning one individual species out of an aggregate of closely related species.

**Shell:** In the four species of *Testacella*, a small ear-shaped external shell is attached near the tip of the tail. In *Limax*, *Deroceras* and their relatives, it is an oval plate under the mantle, sometimes visible from above in pale individuals; in *Arion*, it is a rather ill-defined cluster of granules, and in slugs living on acid, lime-deficient soils, it may be small and difficult to find.

**Sole:** the underside of the slug, on which it slides. It may be uniformly coloured, or have a dark or light central stripe, or have colour diffused in from the edges. The slime on the sole is usually colourless, even if the body has coloured slime; in the *Arion hortensis* group, it is conspicuously orange.

**Subgenus:** Some of the more species rich genera of slugs have been divided into subgenera. This is the name, starting with a capital letter, given in brackets after the genus name in the checklist. Most of these are not used very often, but in *Arion* they are quite useful, as young slugs might not be identifiable to species, but we can tell they have a false keel so must be *Arion (Carinarion)*, or are the youngster of one of the big species, *Arion (Arion)*, or have orange sole mucus so must be *Arion (Kobeltia)*.

**Subspecies:** one common definition of a **species** is that it is distinct groups of organisms which breed with each other, but are not ordinarily capable of breeding successfully with another species in nature. **Subspecies** is used mainly for geographic races which show consistent differences in appearance or behaviour, but which can still interbreed when they meet. There are all sorts of problems with any single definition (what of plants or animals



which self-fertilise or reproduce without mating? What if two 'species' sometimes hybridise?). In British slugs, species are almost all clearly defined without confusion. There are three exceptions:

*Arion rufus* will mate with *A. ater*, and many populations of 'big black *Arion*' are no longer pure *ater* if you look at their internal anatomy. For this reason, they were formerly treated as subspecies (*Arion ater ater* and *Arion ater rufus*). But in many places they remain distinct and hybrids occur rarely or never.

*A. vulgaris* is thought to breed occasionally with both *A. ater* and *A. rufus*, but little is known of the features which would identify the hybrids.

The two monochrome false-keeled slugs, *Arion circumscriptus* and *A. silvaticus*: DNA studies have shown that these are extremely closely related, so may be best treated as *A. circumscriptus circumscriptus* and *A. circumscriptus silvaticus*. As they are almost always identifiable from coloration, they have anatomical differences, they usually occupy different habitats, and they remain distinct when they are living together, I think they are still worth recording as distinct, and I would not be surprised if future work puts them in separate species again.

**Tentacles:** Slugs have two pairs of tentacles, a longer upper pair with eyes at the tip. The eyes are small in *Testacella*, and absent in *Selenochlamys*, an adaptation to life under ground. The lower, shorter tentacles are well supplied with taste organs and are used mainly to taste potential food.

**Tubercles:** The body of most slugs is covered with a network of fine grooves. The individual raised areas of skin between the grooves are the tubercles. They can be smooth and flat and hard to see e.g. *Deroceas*, roughly circular and raised into conical bumps in *Arion intermedius* - hence its name 'Hedgehog Slug' - or elongate and raised into crinkly ridges in the larger *Arion* species. In the latter, a measure of coarseness of the tubercles is to count the number on the back which reach the rear edge of the mantle, and lie between the two dark lateral bands.

## Notes on the annotated checklist

This includes all the species which have been found in Britain or Ireland. A couple of species occur as rare introductions confined to heated greenhouses, so are not included in the keys. Family names are in CAPITALS. The valid scientific name of a species is given in **bold italic**, any recently used synonyms in *italics* (I have tried to include any names which have been used in Britain since about 1960), and the preferred English name in normal **bold**. Subgeneric names are given in brackets after the genus. I have changed to using the English names in the new AIDGAP guide (Rowson *et al.*, 2014), which will be the definitive guide for decades to come. Almost all their English names are clear and apposite. Rowson *et al.* list quite a range of different English names for many species, so records from older literature should be translatable.

The name of the original author who described a species is given immediately after the scientific name: this is sometimes important with slugs, as the name has been used to refer to different slugs by later authors. The date of description is given as it provides an insight into the history of the study of slugs - new species are still being recognised in north-west Europe.

'*sensu X non Y*' means 'in the sense used by person X, which is not the same as used by person Y'.

'*Auctt.*' means 'by (other) authors', meaning the name has been used by some people to mean a different species from what the original author intended.

A few slugs have been recognised as distinct species for several years before they were formally described, so have been given temporary names - some of these names appear in published guides such as Kerney & Cameron's *Field Guide*, so they are included too. Two are used in the Aidgap guide: *Arion* sp. Davies and *Testacella* sp. 'tenuipenis'.

## Annotated checklist

### Family ARIONIDAE

***Geomalacus maculosus*** Allman, 1843

**Kerry Slug**

Spotted Slug, Spotted Kerry Slug

Found only in the extreme south-west of Ireland in counties Kerry and Cork, where it occurs in old woodland and on coastal grassland, heath and rocks, this species is very distinctive, dark green with opaque pale cream or white spots. The only species with which it is sometimes confused is the Irish Yellow Slug, *Limax maculatus*, which can be dark green, and has large pale blotches on body and mantle. The key should separate them clearly.

***Arion (Arion) ater*** (Linnaeus, 1758)

**Large Black Slug**

*Arion ater ater*

Great Black Slug

Formerly ubiquitous, this species may be declining as the very closely related *Arion rufus* and *A. vulgaris* are spreading. As noted in the Glossary (under 'subspecies'), there is some evidence that it may interbreed with *A. rufus* and produce fertile offspring. Both species are very variable in colour. 'Pure' *A. ater* is still common in upland habitats, on lowland heaths and in fens and wet meadows, and in these habitats it is often uniformly black above, with a very dark grey sole. This and the next two species lay large, translucent spherical eggs, up to 5mm diameter, which are only loosely held together.

***Arion (Arion) rufus*** (Linnaeus, 1758)

**Large Red Slug**

*Arion ater rufus*

Great Red Slug

The status and distribution of this species (sometimes still regarded as a subspecies of *A. ater*) is still unclear. It used to be considered a 19<sup>th</sup> or 20<sup>th</sup> century arrival from further south in Europe, but the similar red southern European slug is now considered likely to be a distinct species *Arion empiricorum*. If so, our species is confined to Britain, Ireland and Scandinavia, and it has been here a long time: Linnaeus refers to specimens from Yorkshire, described in 1685! In Britain it is mainly a southern and lowland species, which seems to have expanded in recent decades, and now is a very common slug in gardens and in built-up areas. It often occurs in woodlands and other semi-natural habitats, though is scarce or absent in the uplands.

***Arion (Arion) vulgaris*** Moquin-Tandon, 1855

**Vulgar Slug**

*Arion lusitanicus* auctt. non Mabille 1868

Spanish Slug, Iberian Slug, Lusitanian Slug

False Lusitanian Slug, Plague Slug

Probably a 19<sup>th</sup> or early 20<sup>th</sup> century colonist from southern Europe, this species is patchily distributed but is common in gardens and built-up areas in parts of the south-east of England, and appears to be spreading. Recent media stories have referred to it as the 'Spanish Slug' (which is an earlier name for *Ambigolimax valentianus*, below). It can be difficult to distinguish from forms of *Arion rufus* when adult, though juveniles are often distinctive.

***Arion (Arion) sp. 'Davies'*****Stella Davies's Slug**

This large roundback slug does not yet have a scientific name, but is clearly a distinct species, found so far at a handful of sites scattered across England, including at least one place in Cambridgeshire. Its brownish forms are sometimes indistinguishable from *A. rufus* or *A. vulgaris*, but its commonest colour form, a slightly bluish grey, is fairly distinctive.

***Arion (Arion) flagellus* Collinge, 1893****Green-soled Slug**

*Arion lusitanicus sensu* Quick, 1952,

Durham Slug, Spanish Stealth Slug

Kerney & Cameron 1979, *non* Mabilie 1968

*Arion 'Durham' auctt.*

The status of this species in Britain and Ireland is disputed. Until recently, its distribution suggested it was a long-established species in Britain and Ireland, occurring in ancient woodlands, upland moorland and other semi-natural habitats, as well as occasionally being found in gardens and urban areas. Since the mid 1990s, it has been expanding rapidly, and has become a pest in gardens in some areas. Some authors take this as a sign that it is a fairly recent arrival from southern Europe. Though described from south-west Ireland in 1893, it was forgotten by British workers till rediscovered in Durham in the 1950s. It was confused with *A. vulgaris*, and referred to, together with that species, as *A. lusitanicus*, for many years. They are now regarded as three distinct species, and true *lusitanicus* appears not to occur in Britain. Juvenile *A. flagellus* are easily recognised; adults are often less strikingly patterned and may be confused with the preceding three species, but they always have an opaque creamy or greenish sole, which is distinctive. Unlike the other large *Arion* species, *A. flagellus* lays fairly small (2-3mm) oval, opaque creamy eggs bound together with strands of creamy mucus, much more like those of *A. subfuscus* (subgenus *Mesarion*) than the larger species.

***Arion (Mesarion) subfuscus* (Draparnaud, 1805)****Dusky Slug**

Very common and widespread in most habitats, natural and man-made, very variable in colour, but easily recognised by the bright orange body mucus and the colourless sole mucus. Recently separated from *A. fuscus*, which has so far been found in Ireland and a few sites in Britain, including East Anglia. Currently, the two can be distinguished only by dissection. Another close relative, probably *A. iratii*, has also been found, but is more distinctive because of the dark spots on its back.

***Arion (Mesarion) fuscus* (O. F. Müller, 1774)****Northern Dusky Slug**

Recently recognised at a few sites in England including Thetford Forest, and probably in Ireland, it is widespread in Europe and North America. Currently not certainly distinguishable from *A. subfuscus* on external features, but there are a few features which suggest which individuals are worth checking.

***Arion (Mesarion) cf. iratii* Garrido, Castillejo & Iglesias, 1995** **Pyrenean Dusky Slug**

Recently recognised as separate from *A. subfuscus*, and currently known from quite a number of woodland sites in south Wales. Distinctive in having dark spots on its mantle and back. The slight doubt over the name is that there are several similar species in the Pyrenees, and it is uncertain which has arrived in Britain.

***Arion (Carinarion) fasciatus* (Nilsson, 1823)****Rusty False-keeled Slug**

*Arion circumscriptus auctt. non* Johnston

Bourguignat's Slug, Orange-banded Slug



Slightly larger when mature, with a distinct yellow side-band, and a uniquely long and flattened resting position, this species is common in Scotland and northern England, but rather local in the Midlands and south.

***Arion (Carinarion) circumscriptus circumscriptus*** Johnston 1828      **Spotted False-keeled Slug**

*Arion fasciatus* auctt. non Nilsson

Dotted Slug, Forest Slug

Until the 1960s, confused with *A. fasciatus* and *A. silvaticus*, the three have been referred to as *A. fasciatus* agg. or *A. circumscriptus* agg. They are usually easily recognised on external features. Common throughout Britain and Ireland, the darkest and dullest of the three similar species.

***Arion (Carinarion) circumscriptus silvaticus*** Lohmander, 1937      **Silver False-keeled Slug**

*Arion fasciatus* auctt. non Nilsson

Silver Slug, Heath Slug

*Arion circumscriptus* auctt. non Johnston

The least common of the three closely related species, and the least often found in gardens and cultivated areas. Reduced to subspecies in the Aidgap key. See 'Subspecies' in the glossary. Fairly frequent in wet woodland and fenland, and occasional in other habitats, throughout Britain and Ireland.

***Arion (Kobeltia) hortensis*** Férussac, 1819      **Blue-black Soil Slug**

*Arion hortensis* form R (Davies, 1977 etc)

Southern Garden Slug

Until the 1970s, this and the next two species were confused under the name *A. hortensis*. As an aggregate, they are very distinctive, being small, grey, striped *Arion* with bright orange sole mucus. *A. hortensis* s.s. is fairly frequent in southern England, uncommon in the north and in Ireland, and probably absent from Scotland. A fourth closely-related species, *A. occultus*, was described from Ireland in 2004, and another, probably *A. fagophilus*, has recently been found in south Wales. *A. hortensis* is often recognisable from external features, but it is safest to confirm the identity by dissection initially.

***Arion (Kobeltia) distinctus*** Mabille, 1868      **Brown Soil Slug**

*Arion hortensis* form A (Davies, 1977 etc)

Common Garden Slug

Until the 1970s, confused with *A. hortensis*. Very common in almost all habitats throughout Britain and Ireland, including gardens. Usually distinguishable on external features, but worth confirming by dissection initially.

***Arion (Kobeltia) owenii*** Davies 1979      **Tawny Soil Slug**

*Arion hortensis* form B (Davies, 1977 etc)

Irish Garden Slug, Inishowen Slug

Rare outside Ireland, this is a very striking and distinctive small slug, warm brown with black side-stripes and white flanks, and distinctly chiselled or crystalline-looking tubercles. Common in Northern Ireland and in parts of south-west England, rare and scattered elsewhere. Sometimes found in gardens, sometimes in woodland.

***Arion (Kobeltia) occultus*** Anderson, 2004      **Disappearing Soil Slug**

Anderson's Slug, Cryptic Garden Slug

Recently described from Northern Ireland, where it seems to be uncommon, and yet to be found in Britain. On external features, somewhat intermediate between *A. distinctus* and *A. owenii*.

***Arion (Kobeltia) cf. fagophilus*** de Winter 1986      **Silurian Soil Slug**

This poorly known species has recently been found in wet woodlands and along riversides in south Wales.

***Arion (Kobeltia) intermedius*** Normand, 1852**Hedgehog Slug**

Widespread and very common, though not especially so in gardens, this is a distinctive, small slug with a 'prickly' appearance as its tubercles are conical, especially toward the tail. May be overlooked for young of larger species.

**Family BOETTGERILLIDAE*****Boettgerilla pallens*** Simroth, 1912**Worm Slug**

A strikingly thin, pale and worm-like animal, unlike any other slug. A recent colonist, with the first record in 1972, it spread very rapidly, reaching Ireland within a decade, and by the mid 1980s was half-way up Snowdon, and on the shores of northern Scottish sea lochs. Although it does well in gardens, it also thrives in semi-natural habitats. Probably spends most of its life under ground, suspected of browsing on soil micro-organisms or even invertebrates - one of the few species which will not survive in captivity with oatmeal, carrot or mushrooms.

**Family MILACIDAE*****Milax gagates*** (Draparnaud, 1801)**Smooth Jet Slug**

Local and rather scarce, most often found in gardens, but also frequent in semi-natural habitats in the west of Britain. Mainly subterranean, feeding on roots and tubers, especially potatoes.

***Milax nigricans*** (Philippi, 1923)**Rough Jet Slug**

A one-off casual introduction, formerly found at Bexhill, Sussex. Could possibly reach Britain again, with imported plants. One of several dark *Milax* species known from Mediterranean islands, so any records would need careful examination.

***Tandonia sowerbyi*** (Férussac, 1823)**Sowerby's Keeled Slug**

*Milax sowerbyi* (Férussac, 1823)

Widespread and fairly common in gardens and in horticultural and arable crops, but seldom very abundant. Spends most of its time under ground - potentially a serious pest of root crops.

***Tandonia budapestensis*** (Hazay, 1881)**Budapest Keeled Slug**

*Milax budapestensis* Hazay, 1881

*Milax gracilis* (Leydig, 1876)

The smallest, slimmest and most widespread and by far the most abundant Milacid in Britain. A 20<sup>th</sup>-century colonist, first record 1936, readily transported with plants. A serious pest of root crops, probably the main species making holes in potatoes, carrots etc. Although it spends a lot of time under ground, it is often so abundant that it is easily recorded on the surface too.

***Tandonia cf. cristata*** (Kaleniczenko, 1851)**Crimean Keeled Slug*****Tandonia rustica*** (Millet, 1843)**Spotted Keeled Slug**

A distinctive large pinkish slug covered in blackish speckles. First found in Britain in an ancient woodland in Kent in 1986, and seen once or twice since at the same site. Known from one other southern English wood. First definitely found in ancient woodlands in southern Ireland in 1996, where it is locally abundant, and there is a possible record from the same small area in 1911. Usually found under deep oak or beech leaf

litter, often on chalk or limestone, possibly native but overlooked. Uncommon, and mainly in ancient forests, in mainland Europe.

## Family LIMACIDAE

***Limax maximus*** Linnaeus, 1758

### Leopard Slug

Tiger Slug, Great Grey Slug

Probably the commonest Limacid in Britain (though the Yellow Slugs may be increasing), found in many habitats, from gardens to ancient woodland. Large, striking, and very variable in pattern, hence the English names. Usually grey with darker brown or even purplish stripes and/or spots. Will eat lettuce and other green plants in captivity, but much prefers fungi, lichens and dead plant material. Famous for its mating behaviour - hanging in mid-air on a rope of mucus from the branch of a tree.

***Limax cinereoniger*** Wolf, 1803

### Ash-black Slug

Very local, and absent from many areas (apparently, including our three counties). Confined almost entirely to old, well-established woodland, or occasionally, upland moorland on woodland fringes. Large or very large when fully grown, and very distinctively black and white, but youngsters are pinkish-sandy-brown. Usually shuns live green plants even in captivity - mainly a lichen and fungus browser. Recent research has shown that there is more than one species standing under this name in Europe, and it is possible that the widespread *cinereoniger* may turn out to be more than one species in Britain too. Additionally, one of the European species, probably *L. decampi*, has been introduced here (see below).

***Limax cf. decampi*** Menegazzi, 1854

### Fylingthorpe Slug

Recently discovered in one site in north Yorkshire, probably an accidental introduction from Italy.

***Malacolimax tenellus*** (O F Müller, 1774)

### Lemon Slug

*Limax tenellus* O F Müller, 1774

A small (*Deroceras*-sized) Limacid, confined to ancient woodland (seems very slow to colonise secondary woodland nearby), and usually found in the autumn, feeding on large toadstools. As it lives for 2 years or more as an adult, it must be present all year round, but hard to find. Nationally rare, and one of the best ancient woodland indicators.

***Limacus flavus*** (Linnaeus, 1758)

### Yellow Cellar Slug

*Limax flavus* Linnaeus, 1758

Yellow Slug, House Slug

A distinctive species, yellow, quite finely speckled darker yellow-brown-green, with beautiful blue tentacles. Fairly common and widespread throughout Britain and Ireland in the recent past, strongly associated with human habitation, found in gardens, on walls, in drains and cellars, and the species most often found indoors. Appears to have declined rapidly since the 1980s, at the time *L. maculatus* has expanded. Feeds mainly on lichens, algae, fungi and dead plant material.

***Limacus maculatus*** (Kaleniczenko, 1851)

### Green Cellar Slug

*Limax maculatus* Kaleniczenko, 1851

Green Slug, Irish Yellow Slug

*Limax grossui sensu* Kerney & Cameron 1978, ?? *non* Lupu, 1976

*Limax pseudoflavus* Evans, 1978

*Limax hibernicus nomen nudum*

Another distinctive species, greenish with darker green-brown mottling, and bluish tentacles. Only recognised as a separate species from *L. flavus* in the 1970s, in Ireland, where it occurs in woodlands as well as domestic habitats (which *L. flavus* never does), it was described more than once in a few years, then synonymised with a species described from the Crimea in 1851! There has been some continuing debate over the number of species like this in Europe and indeed, in Britain and Ireland, but most authors agree there is just one darker more mottled species close to *L. flavus*, and that it should probably be called *maculatus*. This is the most commonly mis-identified slug online, on sites like iSpot and Flickr: variously referred to *Limacus flavus* or *Limax maximus*. It appears to be increasing rapidly, and is now an abundant garden slug in some areas. Feeds mainly on lichens on walls, and dead plant material in gardens - often found huddled in compost bins.

***Lehmannia marginata*** (O F Müller, 1774)

**Tree Slug**

*Limax marginatus* O F Müller, 1774

A distinctive rather translucent, watery fawn or pale grey species. Widespread and fairly common in areas of high rainfall and moderate or low levels of pollution, found in woodlands of all kinds, where it climbs trees and feeds on fungi and lichens. Occasionally found on old stone walls. Scarce in the dry East of England, and in polluted urban areas.

***Ambigolimax valentianus*** (Férussac, 1821)

**Iberian Threeband Slug**

*Lehmannia valentiana* (Férussac, 1821)

Greenhouse Slug, Spanish Slug

*Limax valentianus* Férussac, 1821

*Limax poirieri* Mabille, 1883

This medium-sized pink slug with dark stripes is a long-established slug in heated greenhouses, in the 1980s this species was first found living outdoors, and is now a frequent garden slug over much of lowland England. Since 2005 it has also been found occasionally in woodlands.

***Ambigolimax nyctelius*** (Bourguignat 1861)

**Balkan Threeband Slug**

Only recently distinguished from *A. valentianus*, having likewise been confined to heated greenhouses, then found in gardens, and now also turning up in woodlands occasionally. Probably very under-recorded.

## Family AGRIOLIMACIDAE

***Deroceras laeve*** (O F Müller, 1774)

**Marsh Slug**

*Agriolimax laevis* (O F Müller, 1774)

A small, dark slug, common and widespread throughout Britain in damp places - marshes, fens, damp woodland, ponds and ditches. It will forage underwater briefly. Unique among British molluscs, as far as is known, in being able to produce eggs by mating, by self-fertilizing, and even by self-cloning (and sometimes, all three methods in one batch of eggs).

***Deroceras invadens*** Reise et al., 2011

**Tramp Slug**

*Deroceras caruanae* auctt. non (Pollonera, 1891)

Caruana's Slug, Chestnut Slug

*Agriolimax caruanae* auctt. non Pollonera, 1891

*Deroceras panormitanum* auctt. non (Lessona & Pollonera, 1882)

First found in Britain in 1931, now common throughout, often among the most abundant slug in gardens, but also found in many semi-natural habitats. A very active, rapid and aggressive species. This slug is now thought to be a globally invasive animal of Mediterranean origin, which is now widespread throughout

Europe, north America, Australia and New Zealand. The previous names used for it are now thought to be separate species in Malta, Sicily and other Mediterranean islands, which have not become invasive pests.

***Deroceras panormitanum*** (Lessona & Pollonera, 1882)                      **Sicilian Slug**

First found in Cardiff in 2012, and still known only from a small area of garden in the city. It may spread or be introduced elsewhere, but is hard to tell from *D. invadens*.

***Deroceras agreste*** (Linnaeus, 1758)

*Agriolimax agrestis* (Linnaeus, 1758)

**Arctic Field Slug**

Milky Marsh Slug, Northern Field Slug

This is mainly a northern and upland slug, found in grasslands and occasionally moorland from Yorkshire northwards throughout Scotland, known from a single site in Ireland, and from one or two East Anglian fens. The name was previously used for *D. reticulatum*. Identification should be confirmed initially by dissection.

***Deroceras reticulatum*** (O F Müller, 1774)

*Agriolimax reticulatus* (O F Müller, 1774)

*Agriolimax agrestis auctt. non* (Linnaeus, 1758)

**Netted Field Slug**

Grey Field Slug, Field Slug

The commonest slug, in almost all habitats from gardens and farmland to marshes, woodlands, moorlands and sand dunes. Extremely variable in colour from black, through pinkish oatmeal with grey speckles (the commonest form) to white.

**Family TRIGONOCHLAMYDIDAE**

***Selenochlamys ysbryda*** Rowson & Symondson, 2008

**Ghost Slug**

A whitish, eyeless, mainly subterranean and strictly nocturnal predatory slug, first found in Britain in Brecon in 2004, and now known from many sites in south Wales and one or two in England. It proved to be new to science, and the first of its genus and family to be found in western Europe. The only other species in the genus is found in the Caucasus. Presumably introduced with plant material, and will perhaps spread as other slugs have done in recent years. *Ysbryd* is Welsh for 'ghost' and this appears to be the first species name derived from Welsh.

**Family TESTACELLIDAE**

***Testacella haliotidea*** Draparnaud, 1801

**Ear Shelled Slug**

Common Shelled Slug

All three *Testacella* species are quite large, slow-moving, unenergetic slugs, looking very unlike our other species, having a small shell at the tip of their tail. They are largely subterranean predators of earthworms, other slugs and other soft-bodied invertebrates, which occur mainly in gardens and horticultural land (preferably well manured and thus rich in earthworms). Spending much of their time underground even after dark, they are seldom encountered, so are likely to be under-recorded. This species is pale cream coloured, with a well formed ear-shaped (or abalone-shaped) small shell, and is widely scattered but apparently rare.

***Testacella maugei*** Férussac, 1819

**Atlantic Shelled Slug**

Maugé's Shelled Slug

See *T. haliotidea* for general information. This species is confined to south-west England, where it is fairly frequent in gardens, and is recorded more often than the other three species. It has a larger shell than the other three, and is usually mid brown in colour.



***Testacella scutulum*** Sowerby, 1820

**Orange Shelled Slug**

Golden Shelled Slug

See *T. haliotidea* for general information. This often brightly-coloured slug, usually creamy yellow with an orange foot fringe, and is widely scattered across Britain and seen more often than *T. haliotidea*.

***Testacella* sp. 'tenuipenis'**

**Shelled Slug**

Until recently, confused with *T. scutulum*, and still without a name. Apparently more frequent than *T. scutulum*, but almost impossible to identify without dissection.

# Identifying British Slugs: Part 2: IDENTIFICATION KEYS

## KEY TO GENERA

- Lengths are from tentacle tip to tail tip on an extended, crawling slug, and are the normal maximum; young slugs will be smaller.
- Test mucus colour by dabbing gently with a piece of white paper.
- Where this key reaches a species name, look in the checklist (above) for more information. Where this key stops at a genus or group of genera, go on to the species keys below.

### 1 (Three choices)

**1a** External shell present. No mantle visible. Breathing pore at edge of shell. Tiny eyes just visible at tip of upper tentacles. A pair of grooves running forward from near the shell along the sides of the body. Slug cream-coloured, yellowish or brown. 12cm.

***Testacella* (Shelled Slugs, 4 species): Species Key 1**

**1b** No external shell present. Mantle tiny and situated at tail tip, easily overlooked. Breathing pore at edge of mantle. No eyes at tips of tentacles. Four grooves running from tail tip almost to head, with vein-like grooves joining up between them. No eyes on upper tentacles. Slug white, pink or very pale grey, often translucent with pink or purplish organs visible through body. Long and slender when extended. Upper tentacles tapering and diverging in a V shape at the front of the head (no 'forehead' between their bases). Up to 7.5cm. Currently known from several sites in south Wales and a few in England. Illustration below. ***Selenochlamys ysbryda* (Ghost Slug)**



**1c** No external shell present. Mantle a flap of skin over the front part of the body, covering head when slug is contracted. Breathing pore at lower edge of mantle on right side. No grooves running the length of the body. Eyes clearly visible as a black spot at the tip of each upper tentacle. **2**

- 2 Keel absent or obscure. Mantle without ridges or grooves. Breathing pore in front half of mantle. Tail tip fairly blunt, often with a mucus gland, so often carrying a blob of thick mucus on the tail tip.

***Arion* (17 species) and *Geomalacus maculosus* : Species Key 2**

Keel present along midline of back, at least near tail tip. Mantle either with concentric ridges like a fingerprint, or with a faint V-shaped groove (the point of the V pointing toward the head).

Breathing pore in rear half of mantle. Tail tip often pointed, never with a mucus gland and large blob of mucus. 3

**3 (Three choices)**

- 3a Keel rarely reaching mantle. Mantle with concentric grooves and ridges like a fingerprint (not always easy to see if slug is irritated and producing lots of mucus; use hand lens on small slugs). No V-shaped groove on mantle. 4

- 3b Keel extending from tail tip to mantle, often paler than body. Mantle finely pitted and roughened, but without 'fingerprint' grooves. A faint V-shaped groove on mantle. Never pale silver-grey, nor very slender and worm-like. ***Millax* (2 species) and *Tandonia* (4 species): Species Key 3**

- 3c Keel extending from tail tip to mantle, often darker than body. Mantle very pointed at rearm with 'fingerprint' grooves (often difficult to see). Slug pale silver-grey or white, very slender and worm-like when extended. 3-4cm. Illus. below. ***Boettgerilla pallens* (Worm Slug)**



- 4 Tail truncated, keel short, looking as if tail tip has been pinched. Mucus colourless or milky-white, never yellowish. Mantle usually shorter - covers head but does not overlap in form of a skirt when contracted. Concentric ridges on mantle centred to right of midline, near breathing pore. Small (1.5-4cm, rarely to 6cm). ***Deroceras* (5 species): Species Key 4**

Tail more gradually tapered. Keel often extending a third or half the way to mantle. Mucus always transparent (not milky), but sometimes yellowish or greenish. Mantle often overlaps head to form a 'skirt' in front when animal is contracted; in some species, slug raises the skirt when stroked on mantle. Ridges centred more or less on midline. ***Limax* and relatives (9 species): Species Key 5**

## SPECIES KEY 1: *Testacella* - Shelled Slugs

- 1 Shell large (c. 14mm long when slug is adult), oblong, strongly convex. Dorsal grooves about 5mm apart where they emerge from front of shell. Animal broad and deep at rear, brownish (occasionally grey-green-brown or blackish) with brighter (often pink or orange) foot-fringe and sole. Extended length 6-10mm. South-western. ***Testacella maugei* (Atlantic Shelled Slug)**

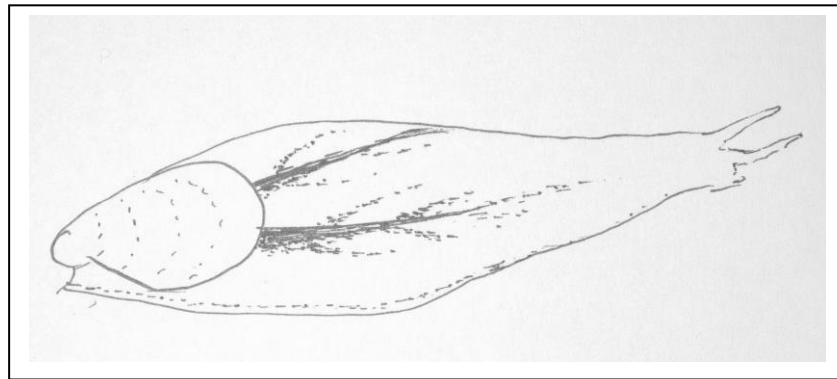
Shell smaller (7mm or less), almost triangular, concave or flat or weakly convex. Dorsal grooves emerging more or less together from shell edge. Animal more slender, usually pale cream, yellow, fawn or white. Extended length 8-12cm. **2**

- 2 Shell c. 7mm long, whitish, slightly convex. Dorsal grooves start close together but distinctly separate at shell edge. Usually dull creamy-white or pale yellow, with whitish sole and foot-fringe. 8-12cm. ***Testacella haliotideae* (Eared Shelled Slug)**

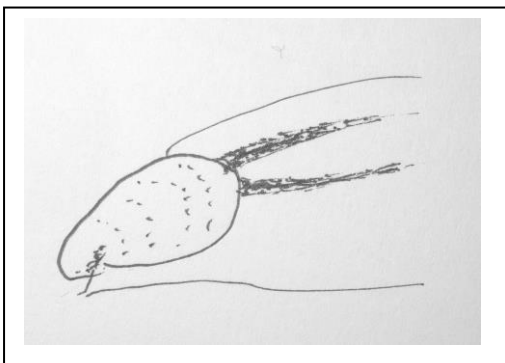
Shell c. 6mm, sometimes orange-yellow, more flattened, often slightly concave. Dorsal grooves usually join just before they disappear under the shell. Usually yellow, finely speckled with black or brown, and with an orange foot-fringe and sole. 8-12cm.

***Testacella scutulum* (Orange Shelled Slug) and *Testacella 'tenuipenis'***

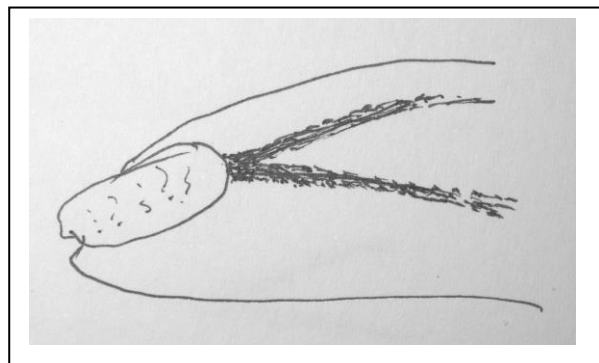
These two species are not certainly identified without dissection, but *T. scutulum* tends to be deeper yellow or orange and heavily speckled with fine brown marks, whereas *T. 'tenuipenis'* is paler yellow, less heavily speckled. In *T. scutulum*, the dorsal grooves meet in a V, as in the illustration, whereas in *T. 'tenuipenis'* they meet more like a U. Consult the Aidgap key and ideally, dissect to confirm.



***Testacella maugei***



***Testacella haliotideae***



***Testacella scutulum***

## SPECIES KEY 2: *Arion* and *Geomalacus* - Round-back Slugs

- **Size (crawling length) is used literally. Measure the slug and go where the key takes you - adults and juveniles of larger species key separately. *Arion* species very often have a dark band along each side of the body and along the mantle toward the head.**

- 1 Body and mantle dark grey-green blotched with white or yellow. Contracts by curling up into a ball with its underside folded against itself. Confined to Cork and Kerry in south-west Ireland. 9cm.

### *Geomalacus maculosus* (Kerry Slug)

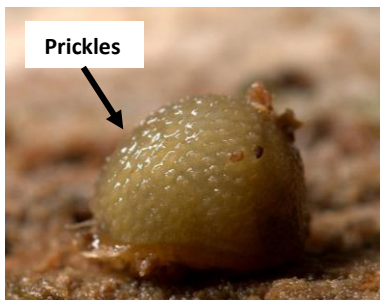


Never with pale spots or blotches. Cannot curl up when contracted.

2

- 2 Small (to 2cm). Tubercles toward tail with round bases, and appearing conical when slug is contracted (appearance 'prickly'). Usually yellow-grey with dark head, with or without a pair of faint darker longitudinal bands. Mucus yellowish, often concentrated at front and rear ends of sole. A row of dark grey or black spots in groove at upper edge of foot-fringe near head.

### *Arion intermedius* (Hedgehog Slug)



Often larger. Not appearing prickly, tubercles with more elongate bases. No spots in groove above foot-fringe at head end, but foot-fringe often with transverse lines.

3

- 3 5cm or longer. Tubercles coarse, often ridged, **or** body mucus bright orange **and** sole mucus clear. Foot-fringe usually with well marked dark transverse bands.

4



Less than 5cm long when extended. Often with finer tubercles and poorly marked foot fringe.

8



- 4 5-7cm. Body mucus bright orange and sticky, sole mucus colourless. Usually well banded. If so, 12-15 or more tubercles between the two dark bands, at rear of mantle. Tubercles rather fine, smooth and flattened. Often red-brown or orange, occasionally grey or black. Unable to contract fully, so a rather elongate shape when resting. Foot-fringe rather narrow and often with fairly faint transverse lines. Never 'rocks' when irritated. **4A**

Often larger. Seldom well banded. If banded, with fewer than 12 tubercles between the dark bands. Tubercles very coarse and ridged (picture above). Colour very variable. Mucus colourless or slightly yellow or green. Contracts fully into a hemisphere. Foot-fringe strongly marked. May 'rock' (sway and twist slowly from side to side) when irritated. **5**

- 4A** Mantle and top of back with small blackish dots. Currently known only from south Wales – check identification with Aidgap key. ***Arion cf. iratii* (Pyrenean Dusky Slug)**

Mantle without any black spots. Common and widespread.

***Arion subfuscus* (Dusky Slug)**

A closely related species, ***Arion fuscus*, the Northern Dusky Slug**, would key out here, too. It is very similar to *A. subfuscus*, but usually has a patch of dark or greyish pigment on the side of the body below the mantle edge and extending backwards below the dark band, near the foot-fringe.



***Arion cf. iratii* (left)**



***Arion subfuscus* (right)**

- 5 5-10cm (rarely 12cm). Bands often present. If banded, with 6-9 tubercles between the dark bands (completely untouched by dark pigment of band) along rear edge of mantle, i.e. dorsal tubercles wide spaced. Mucus often greenish or yellowish. Sole always pale cream or very pale greenish, even when body is dark. Body colour variable: commonly khaki with 2-tone pale and dark bands and a dull mustard foot-fringe (pictured), but orange, brown and black forms common in some populations. Breathing pore relatively small. Never rocks.

***Arion flagellus* (Durham Slug)**



May be larger. Seldom strongly banded. Dorsal tubercles very coarse and ridged, but close-set. Mucus usually colourless except in very brightly coloured slugs. Sole often darker, suffused brown, black or reddish especially near edges. May rock when irritated. **6**

- 6** 5-15cm. Often rocks (squirms, twists and sways) when irritated. Rarely banded, and if so, usually with dark bands on a paler background. Sole never darker than body. Breathing pore seldom with a blackish rim. **7**

5-10cm. Never rocks. Often banded, and can appear to be dark with two pale bands (see juvenile, couplet 14). Dark body pigment is overlain, often finely speckled, with orange or yellow. This may be abundant, giving an orange slug (difficult or impossible to separate from *A. rufus*), or sparse, giving a dark olive or brown slug with a light peppering of yellow. Dark forms may have sole darker grey-black than body, in which case they must be this species; pale forms may have orange or red sole. Breathing pore often with a thin blackish line around the rim. ***Arion vulgaris* (Vulgar Slug)**

(Given the difficulty of distinguishing *A. ater*, *rufus*, 'Davies' and *vulgaris*, slugs which fit the above description should be compared with the Aidgap key and preferably checked by dissection)

- 7** **Four DIFFICULT choices: in this group, some colour forms can be quite reliably recognised from external features, but others are not distinguishable without dissection. Most populations include a range of forms, so it may be possible to record the species without identifying all or even most specimens. Check with the Aidgap key, and confirm with dissection if possible.**
- 7a** Usually rocks. Uniformly black body when mature, sole dark grey or blackish. Foot-fringe dull, blackish or dark red. Probably ***Arion ater* s.s. (Large Black Slug)**
- 7b** Sometimes rocks. Bright orange above, with orange sole or cream sole with orange round edges. Foot-fringe brighter orange-red than the rest of the slug. Probably ***Arion rufus* (Large Red Slug)**
- 7c** Never rocks. Fairly pale bluish-grey with a darker grey band down each side. Foot-fringe often fairly bright orange. Probably ***Arion* sp. 'Davies' (Stella Davies' Slug)**
- 7d** Body shades of brown or cream, or two-tone dark above with pale flanks, or entirely pale. Not fitting one of the above.  
Colour forms of ***Arion ater* or *rufus* (or, if not rocking, *vulgaris* or *A. 'Davies'*)** which are separable only by dissection  
Note: these colour distinctions are not absolutely reliable, but especially in areas where you know what species are present because a sample has been checked by dissection, they give a strong indication. It is likely that *A. ater*, *A. rufus* and possibly *A. vulgaris* can interbreed and produce offspring, so intermediates can occur.
- 8** **Three choices**
- 8a** 2-4cm. Sole orange or yellow with orange mucus, body mucus yellow. Brown, grey or black with black longitudinal bands. Usually dark, but with more or less pale lower flanks. Often finely sprinkled with yellowish dots, giving a paler appearance. Foot-fringe unmarked and inconspicuous, yellowish. No suggestion of a keel down the back. Semicircular or  $\frac{3}{4}$  circular in cross-section (end profile of crawling slug) - side bulging out slightly - so foot-fringe is not visible from directly above. ***Arion hortensis* agg. (Soil Slugs, 5 species)** **9**
- 8b** 2-5cm. Sole white, sole mucus colourless or nearly so. Grey or pale fawn with well marked dark bands. Mantle and back nearly always pale- or mid-grey. Occasionally a narrow yellowish stripe below each dark band, otherwise monochrome. Foot-fringe unmarked and inconspicuous, whitish. A row of larger, usually paler, tubercles along midline of back creating the impression of a keel;

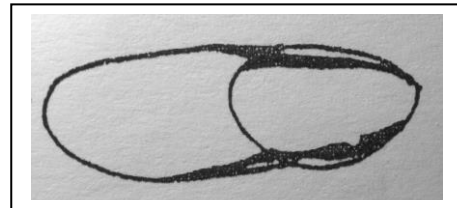
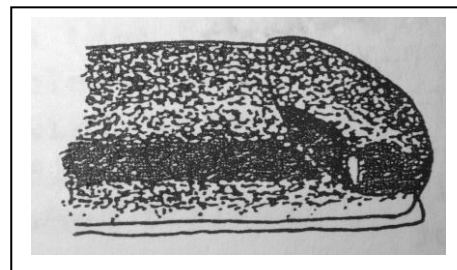
especially conspicuous in young slugs. Bell-shaped in cross-section, lower sides flared out, so foot-fringe is visible from above. ***Arion fasciatus* agg. (3 species/subspecies) 10**

- 8c** 2-5cm. Sole white or creamy, mucus colourless or greenish/yellowish. Very variable in colour but commonly yellowish, with or without a dark or black back or stripes. Foot-fringe usually well marked with dark transverse stripes. No hint of a keel. Semicircular or  $\frac{3}{4}$  circular in cross-section (end profile of crawling slug) - side bulging out slightly - so foot-fringe is not visible from directly above. **Young of larger *Arion* species 12**

**9 Three choices**

- 9a** Typically blue-black, well sprinkled with fine yellow dots, so appearing yellow-grey or brown. Lateral black bands rather low, variable but often dark almost down to foot-fringe, with only the lowest one row of tubercles white. Mantle bands converge both at front and back of mantle, and may meet at front. Upper edge of right band usually dips or breaks over breathing pore. Translucent parts of tentacles greyish, no hint of redness. Matures in Spring and Summer, mates in autumn. Very common everywhere.

***Arion distinctus* (Brown Soil Slug)**

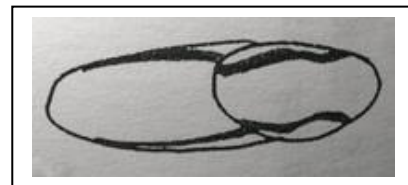
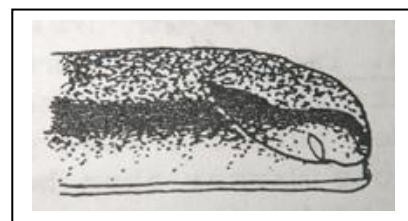


- 9b** Usually blue-black with well-marked bands, and appearing black-and-white because of the broad pale flanks. Bands higher along sides, mantle bands rarely converge strongly, right band arching above breathing pore, which may be in a whitish region. Tentacles translucent reddish. Matures in autumn and winter, mates in Spring. Patchily distributed, but frequent in gardens in southern England.

***Arion hortensis* s.s. (Blue-black Soil Slug)**



*Arion hortensis* showing broad pale flanks and high mantle band



- 9c** Typically brown, with distinct blackish bands with pale coffee colour along upper edge, and with broad pale greyish flanks. Mantle bands usually rather high over breathing pore, coming close together at front. Tentacles pink-brown or violet in translucent parts. Tubercles distinctive, very coarse: each tubercle is sharply ridged and angular when animal is contracted, creating a regularly chiselled or crystalline appearance quite unlike *A. distinctus* and *A. hortensis* (but resembling *A.*



*intermedius* when very young). Usually a little larger than the other two, and flatter in cross-section. Matures from September onwards. Common in Ireland, scattered in Scotland and England.

***Arion owenii* (Tawny Soil Slug)**

Two recently-recognised species, ***Arion occultus* (Disappearing Soil Slug)** and ***Arion cf. fagophilus* (Silurian Soil Slug)**, have coarse tubercles rather similar to *A. owenii*, but not quite so neatly 'crystalline'. They tend to be dark with a heavy speckling of yellow (so can look very like pale forms of *A. distinctus*). Currently *A. occultus* is known only from northern Ireland and *A. cf. fagophilus* only from south Wales, but they could easily turn up elsewhere. Check the Aidgap guide for more details, and consider dissecting to confirm.

- 10** Commonly light creamy-grey overall, with dark grey lateral bands. Always showing clear yellow or orange immediately below the grey band. When undisturbed, appears rather long and slightly flattened. 2-5cm (a little larger than the following two). Common in northern England and Scotland, scarce in the south and in Ireland.

***Arion fasciatus* (Rusty False-keeled Slug)**

2-3cm (rarely 4cm). Entirely monochrome, grey, white and blackish, no clear yellow under dark bands (though old *A. circumscriptus* sometimes yellows with age). Not very flattened or elongate.

**11**

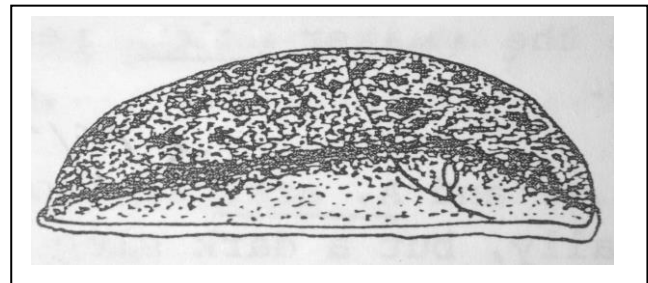
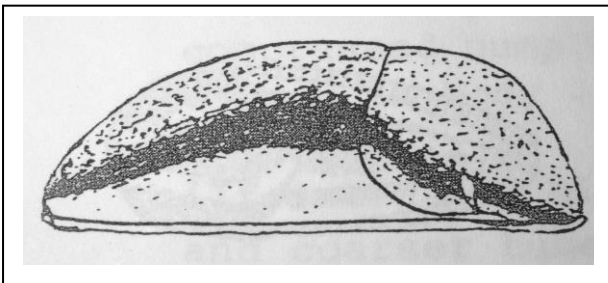
- 11** Lateral bands broad, high and well defined, blackish. Flanks very pale, white-silver-grey. Mantle and back uniformly grey, no dots. Fairly frequent, especially in woodlands, rarely in gardens.

***Arion circumscriptus silvaticus* (Silver False-keeled Slug)**

Lateral bands less prominent, narrower, generally lower and often grey rather than black. Flanks grey, rarely strikingly pale. Mantle speckled with dark grey dots. Common in gardens and in wild habitats.

***Arion circumscriptus circumscriptus* (Spotted False-keeled Slug)**

**Note: the above two subspecies are very difficult to separate when young except in extreme forms. Albino *A. silvaticus/circumscriptus* cannot be separated at present.**



***Arion circumscriptus silvaticus* (Silver False-keeled slug), left**

***Arion circumscriptus circumscriptus* (Spotted False-keeled Slug), right**

- 12 Three choices**

Body mucus orange and sticky. Tubercles smooth and close-set, 12-15 or more between the dark bands. Usually shades of brown with well marked dark bands. Foot-fringe often poorly marked and not very conspicuous. Unable to contract into a tight hemisphere; never rocks.

***Arion subfuscus* (Dusky Slug), *Arion cf. iratii* (Pyrenean Dusky Slug), *A. fuscus* (Northern Dusky Slug)**

**4**

Body mucus usually slightly green-yellow. Colour usually bright, shades of orange, green and brown with well marked dark bands. 5-9 tubercles between dark bands, tubercles prominent and ridged and widely spaced. Foot-fringe often mustard yellow with well marked dark stripes. Can contract into a tight hemisphere; never rocks.

***Arion flagellus* (Green-soled Slug)**

Body mucus clear or slightly orange or yellow. Colour variable: often pale yellow with dark head when young, developing darker or red pigment from top of back downwards. Sometimes with dark

bands. Tubercles coarse and ridged, less wide-spaced than in *A. flagellus*, 10-13 between dark bands (when bands are present). Can contract into a tight hemisphere; may rock. **13**



*Arion subfuscus* ¾ adult



*Arion flagellus* ½ adult



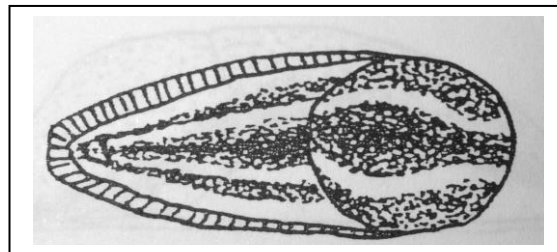
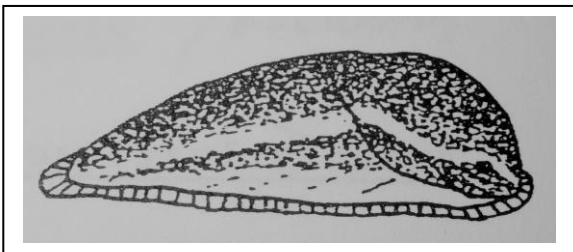
*Arion rufus* ¼ adult

- 13** Commonly dark brownish on back and upper flanks, paler on lower flanks, with two pale orange-yellow bands on sides and mantle. Mantle bands close and parallel at front, wider apart in middle and almost meet at rear. Dark pigment spreads with age, then overlying orange pigment develops. Foot-fringe broad, usually pale orange with mid-grey lines. Never rocks. Mainly in gardens and cultivated areas.  
***Arion vulgaris* (Vulgar Slug) or *A. sp.* 'Davies' Stella Davies' Slug**

Uniformly pale (usually yellow) on hatching, gradually developing dark pigment either as two bands, or as a broad band along the back, which spread gradually downward. Foot-fringe usually broad and well-marked with blackish lines. May rock when irritated.

***Arion ater* (Large Black Slug) or *Arion rufus* (Large Red Slug)**

**Note: the young of these four very large *Arion* species are very difficult to distinguish. Some forms of *A. vulgaris* look just like *A. rufus* or *A. sp.* 'Davies' both as juveniles and adult, but the pale-banded form of young *A. vulgaris* (below) is fairly distinctive. See also couplets 6 and 7.**





### SPECIES KEY 3: *Milax* and *Tandonia* - Keeled Slugs

- 1 Pale, usually pinkish or yellowish, finely speckled with black, especially in grooves between tubercles. Mantle with a pair of thin blackish bands, most prominent near hind end of mantle. Keel whitish or yellowish. Mucus white or colourless. Up to 10cm. Very rare, so far in old woodland in Kent and in southern Ireland.

#### *Tandonia rustica* (Spotted Keeled Slug)

Dark, olive-brown or grey sometimes paler on lower flanks. No dark bands on mantle. Blackish flecks not contrasting strongly with background colour. Keel either not contrasting with body, or dull yellowish. Mucus often yellowish, especially on mantle. Usually smaller. Often abundant in gardens and farmland. **2**



*Tandonia rustica* (Spotted Keeled-slug)

- 2 Keel mustard yellow, body colour brown or olive, speckled darker; grooves between tubercles darkly pigmented. **3**

Keel either darker grey than body or not contrasting, never yellowish. Body dark grey shading to paler on flanks. Fairly smooth, with fine, flattened tubercles and rather watery colourless mucus. **4**

- 3 Small, 2-4cm (occasionally 6cm), slender when fully extended. Sole with a dark central stripe. Mucus colourless, or yellowish on mantle when irritated. Contracts into a C shape when resting. Yellow keel rather flat. Breathing pore rim black or dark grey (may be difficult to see). Very common in gardens, cultivated land and wild habitats.

#### *Tandonia budapestensis* (Budapest Keeled Slug)

Often larger (up to 8cm) and more heavily built. Sole uniformly white or cream. Mucus thick and yellowish, sticky, appearing rather 'dry'. Yellow keel juts up as a raised ridge, which becomes crinkled when slug contracts. Rests as a squat lump, not in a C. Fairly frequent in gardens and farmland though rarely abundant. Seldom in wild habitats.

#### *Tandonia sowerbyi* (Sowerby's Keeled Slug)

A third species, *Tandonia cf. cristata* (Crimean Keeled Slug) has recently been found in south Wales. It is the size and colour of *T. budapestensis* but does not have the dark stripe down the middle of the sole, and less often curls into a C shape. Check the Aidgap key for more details.

- 4 Sole pale. Body usually mid grey above, pale grey or whitish on flanks. Tubercles very smooth. Up to 6cm. Occasional in gardens and cultivated land, frequent in coastal habitats in the west.

#### *Milax gagates* (Smooth Jet Slug)

Sole dark, brownish. Body usually black sometimes shading to mid grey on flanks. Tubercles coarser. Up to 6cm. A Mediterranean species, once found at Bexhill, Sussex in the 1940s, not seen in Britain since. Other dark *Milax* species occur in southern Europe and might be imported.

***Milax nigricans* (Rough Jet Slug)**



*Tandonia budapestensis*



*Milax gagates*



*Milax cf. nigricans*

## SPECIES KEY 4: *Deroceras* - Field Slugs

- 1** Mucus colourless, becoming thick and opaque milky-white when irritated. Under a lens, pale parts of skin speckled with clusters of opaque whitish chalky granules. Overall colour often pinkish or oatmeal, usually flecked and blotched with darker grey, but can be anything from black to white. 2-4cm, occasionally 6cm. **2**  
Mucus always colourless, never milky. No opaque granules in skin. Colour some shade of brown, often rather translucent. Very active and rather slim. **3**
- 2** Often pinkish or oatmeal, marked with grey flecks or blotches, sometimes black, brown, grey or white. Pale forms very nearly always with some darker markings, at least in the grooves between tubercles. Tubercles large and distinct. Whole slug often appears rather stout. Very common everywhere.  
***Deroceras reticulatum* (Netted Field Slug)**
- Almost always pale buff or fawn - 'sunburnt oatmeal' - with paler sides. Completely lacking or with very few darker flecks. Tubercles rather finer and smoother, and whole slug appearing rather slim. Frequent in upland pasture, occasional in moorland, very rare in Norfolk fens.  
***Deroceras agreste* (Arctic Field Slug)**
- 3** 1-2.5cm. Ground colour brown to blackish. Paler individuals finely flecked or streaked blackish. Colour fairly uniform over whole slug. Sole dark. Rim of breathing pore often a little paler but not a large, conspicuous cream patch. Mantle nearly half of body length, and with fewer, more widely spaced ridges. Less translucent; dark colour alone may distinguish. Common in marshes and wet woodland, rarely in gardens.  
***Deroceras laeve* (Marsh Slug)**
- 2-3cm. Mid brown body with chestnut mantle. Sole pale. Usually quite translucent. Breathing pore usually a conspicuous large, oval creamy blotch at right side of mantle. Mantle about  $\frac{1}{3}$  length of slug, rather finely grooved. Common in gardens and cultivated land, fairly frequent in woodland, seldom in wetlands.  
***Deroceras invadens* (Tramp Slug)**
- Another species, almost indistinguishable from *D. invadens*, has recently been found in Cardiff. ***D. panormitanum* (Sicilian Slug)** may be more uniform brown rather than having a paler mantle. See the Aidgap key for more information.



*Deroceras reticulatum*



*Deroceras agreste*



*Deroceras laeve*



*Deroceras invadens*



**SPECIES KEY 5: *Limax*, *Limacus*, *Lehmannia*, *Ambigolimax* and *Malacolimax***

- 1 Small (rarely more than 4cm), lemon-yellow, pale orange, or greenish yellow with darker head. Almost unbanded, never speckled or blotchy. Mucus orange or yellow. Confined to ancient woodland, most often found feeding on fungi in autumn.

***Malacolimax tenellus* (Lemon Slug)**

Often larger. Either fawn coloured with or darker markings, often stripes or blotches; or yellow/green and mottled or blotched. **2**

- 2 Green or yellowish, speckled or blotched darker on body and mantle. Tentacles bluish. Mucus yellow or greenish. Up to 12cm. **(*Limacus*, 2 species) 3**

Background colour fawn, grey, pink, brown or black often with well marked longitudinal stripes, and with stripes or blotches on mantle. Tentacles fawn or dark, never bluish. Mucus colourless. Can be even larger, up to 20cm. **4**

- 3 Mainly yellow, finely mottled with darker yellow or grey-brown on body, and fine pale speckles on mantle. Paler markings on body often join up into a pale stripe along keel. A wide zone on flanks above foot-fringe lacks darker pigment. Tentacles translucent blue. Near habitation, on walls outside and also indoors. ***Limacus flavus* (Yellow Cellar Slug)**

Mainly pale green, green-grey or orange-green, with large blotches of dark olive-green on body. Mantle dark olive with large irregular pale green or yellow blotches. Rarely with a pale stripe along keel. Dark pigment usually comes low down on flanks. Tentacles translucent blue or grey. Mainly in gardens and on walls in Britain; also found in woodland in Ireland.

***Limacus maculatus* (Green Cellar Slug)**



*Limacus flavus*



*Limacus maculatus*

- 4 Pale grey, fawn or pink, rather translucent and smooth, with rather watery mucus. Mantle almost always with two dark bands, and body often banded. Tentacles not especially long, uniformly pale. Slug rarely more than 6cm. **(*Lehmannia* and *Ambigolimax*, 3 species) 5**

Fawn, pale brown or black. Often mottled and marbled on mantle, and with several blotchy stripes along body, but very rarely with 2 dark mantle bands (if so, sandy coloured, less than 2cm long, and with coarse tubercles). Tentacles often very long and slender, with prominent rounded tubercles which are often darker fawn or black in mature slugs. Often larger, 15-20cm when adult.

**(*Limax*, 2 species) 7**



*Ambigolimax valentianus*



*Limax maximus*

- 5 Pale fawn, very translucent when wet. Mucus extremely watery. Usually with faint darker bands on mantle and along body, and a more opaque whitish line along keel. Up to 8cm. Usually in woodland, climbing trees, or on old stone walls. Common except in eastern England.

***Lehmannia marginata* (Tree Slug)**

Pink, brown or a warm shade of fawn, with two dark lines high up along body, and along mantle, often a third, midline stripe on mantle. Mucus more sticky. No paler line on keel. Up to 7cm, but often 4-5cm. Common in gardens and greenhouses, rapidly colonising more natural habitats.

**(*Ambigolimax* (2 species))**

6



***Lehmannia marginata* Tree Slug**



***Ambigolimax valentianus* Iberian Threeband Slug**

- 6 Usually pinkish with two rather faint, narrow or broken bands down the mantle and body, and a third midline band on the mantle. Generally found on the ground, and not very active.

***Ambigolimax valentianus* Iberian Threeband Slug**

Often browner and darker, with two strong dark bands down mantle and body, and a fairly strong midline band. Often with other dark marbling too. Often climbs trees and walls, and can be speedy and active.

***Ambigolimax nyctelius* Balkan Threeband Slug**

The two species are not certainly separable without dissecting, but the features given can provide some indication. When you know for sure which species are present in a particular site, and the variation between them, the features are more reliable.



***Ambigolimax nyctelius* Balkan Threeband Slug**

- 7 Usually pale grey or brown, overlaid with dark brown-black longitudinal stripes (which may be irregular or broken) on body, and spots and blotches on mantle. Occasionally lacks all dark markings. Sole uniformly pale. Tentacles pale, usually reddish brown. Keel same colour as body, short, obvious only near tail and extending about halfway to mantle. 10-15cm (rarely 20cm), fairly robustly built. Common in most habitats including gardens.

***Limax maximus* (Leopard Slug)**



When mature, usually uniform black above, with whitish keel. Sole white on midline with sharply defined grey or black at sides in adult. Tentacles pale grey or fawn with raised blackish dots. Keel extending further forward, often reaching mantle. Tubercles more coarse, and active slug more slender than *L. maximus*. 15-20 cm (occasionally 30cm). Uncommon, mainly in ancient woodland, occasionally on moorland. ***Limax cinereoniger* (Ash-black Slug)**

Note: hatchlings of both species are pale fawn. *L. maximus* quickly develops dark marbling and stripes, *L. cinereoniger* gradually develops a pair of longitudinal bands, from which the dark pigment gradually spreads. Both species are less translucent and with coarser tubercles and stickier mucus than *Lehmanna* species. The black dots on the tentacles of *L. cinereoniger* appear at about 8 weeks old.

A third very large *Limax* species, probably ***Limax decampi*, Fylingthorpe Slug**, has been found at one site in north Yorkshire. There, it is largely white with line of blackish spots, but in Europe it is more variable. If you find anything which is the size of *L. cinereoniger* but looks odd, check with the Aidgap guide.



*Limax maximus*, half adult size



*Limax cinereoniger*, adult



*L. cinereoniger*, 8 weeks old

## Acknowledgements

Over the years I have been helped by many people in getting to know slugs better. Predecessors of this key were produced jointly with Noel Jackson, with whom I spent many days on fieldwork while I was in Durham as an undergraduate; Noel also arranged the testing and re-writing of earlier keys. The late Stella M Davies was generous with her time and ideas, and her work on *Arion hortensis* complex and the larger *Arion* is the foundation for our modern understanding. Thierry Backeljau has provided details from his extensive studies. Helpful suggestions were also made by the late Lewis Lloyd-Evans and Dr Michael Kerney. Dr Roy Anderson's publications and website have been an inspiration.

The 2014 Aidgap key by Rowson, Turner, Anderson and Symondson, is liberally referred to in this key, because it is one of the best-written and best-illustrated guides to any British animal group, and it is inexpensive and readable. This key is not intended to rival the Aidgap guide, merely to provide a temporary help until you buy the book!