

An introduction to *Russula*

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Fig. 1. *Russula sanguinaria* (Bloody Brittlegill). This is a common sight under *Pinus*, but one of dozens of red species of *Russula*, requiring work to confirm. Photo © Max Mudie.

Russula species are, I think, the Marmite of the field mycology world. Although they have been despised or avoided by so many mycophiles because of the relative difficulty of achieving species identification, I have always loved them. I am not sure whether this is because of, or in spite of, their awkwardness – but, either way, these ubiquitous and often rainbow-coloured jewels brighten up any woodland walk. If you haven't already spent some time at least attempting to identify them, then I am here to convince you to try.

Determining a species ID with a *Russula* can be a frustrating and painstaking process which can sometimes remain inconclusive even with microscopy. They can, however, appear deceptively simple earlier on in one's journey! I think most of us feel we can easily identify them at least to genus, but having seen mistakes made (most commonly with *Rhodocybe gemina*), I thought it was worth including a brief description of the genus as a whole.

Russula species are very variable in stature, but (as a morphological sweeping statement), they are generally quite squat, with shortish stipes compared to their cap width, simple unornamented stipes, gills ranging from white to ochre/orange, and smooth caps. I often think that

if you asked a child to draw a mushroom, you would likely get something resembling a *Russula*. There are approximately 150 species in Britain.

In English they are commonly known as 'Brittlegills', due to the tendency of most (though not all) species to have fragile/friable lamellae. Due to the exceptions to this rule, I think that a better genus indicator, for beginners and improvers, is how the stipe breaks. The majority of trama (flesh) cells of *Russula* species are generally quite globose, sitting on top of one another like a stack of oranges in a greengrocers. This is quite different to the trama cells of the majority of other genera, whose long, thin cells are more like a bunch of asparagus. The result of this structural difference is that where many mushroom stems will pull apart like string cheese, or at least tear raggedly with some long fibres remaining, *Russula* stems, by contrast, will break cleanly, with the sturdiest, densest among them snapping like a stick of chalk.

When flicking through a basic field guide, it is often easy to find something that looks 'just like' the mushroom in your hand, but the truth is rather more complex. As an introduction to the genus, in the front of his key – 'The Genus *Russula* in Great Britain' (2017) – Geoffrey Kibby shares a quote from Anna Maria Hussey (1855):

“If we know of any one, who in the pride of intellect spurned all mental tasks as mere play, we would tame him by insisting on his mastering, classifying and explaining the synonymes of the genus *Russula*.”

This quote was pointed out to me over a decade ago, when I was given an earlier edition of Kibby's book by the very encouraging Ken Burgess. He found me at the end of a residential foray and informed me that if I insisted on trying to identify every *Russula* I found, then I would need it. It was excellent advice, so consider this me passing it along: 'The Genus *Russula* in Great Britain' (Kibby, 2017) really is an essential resource, should you be as enthusiastic/daft as I was.

While the key does sometimes split species on microscopic differences, I think it is well worth following the process even as somebody who does not (yet!) use microscopy for identification. There

are some which will be possible to key out using only morphology, and others which will lead you to a point where the remaining options are easier to separate using morphological differences.

As with any field identification, looking at the whole mushroom is rarely going to be helpful, and the 'checklist' approach suggested for any morphological identification is never more essential than here. It can feel rather daunting, especially after a few failed attempts, to tackle *Russula* species on macromorphology alone, but it is at least sometimes possible. With this in mind, I share a useful (but likely not exhaustive) checklist for the genus *Russula*, below; it contains some information that wouldn't be as important in other genera.

Once you are fairly sure you are working with a *Russula* species (for which see above), these are the specific features you will need to consider...

Russula checklist

Habitat	<i>Russula</i> species are mycorrhizal, which means they grow in relationships with certain plants, usually trees. Making a note of the tree species that are growing within about 5–10 m can be extremely helpful or even essential for reaching an ID.
Size/Stature	For the purposes of the key, size is the width of the cap of the mushroom, but it is also useful to note the overall stature. Is your mushroom very stout and squat, with a stipe much shorter than its cap diameter, or gracile and leggy – slim and much taller than it is wide, for example?
Colour	<i>Russula</i> are often extremely variable, even within the same species, but a broad observation on whether your specimen is reddish, greenish, purplish etc., or a mixture, is still important to note. It is also useful to check whether the stipe is white or flushed with colour.
Bruising / colour change	Some species of <i>Russula</i> will bruise different colours when damaged and/or with age. Trying to observe specimens of differing maturity, and also deliberately damaging them, can provide valuable information.
Smell	Some species of <i>Russula</i> smell of very little, but others have extremely distinctive scents which can narrow things down very quickly. From pelargonium (garden geraniums), to old shellfish: these mushrooms really are a sensory experience!
Taste	It comes as a surprise to many that one of the important identifying features of <i>Russula</i> species (and some other fungi) is taste. We are not talking about eating them in a meal, but a test referred to as 'nibble and spit' – this involves taking a small bite, chewing it for 20 seconds or so at the front of our mouth, and then spitting it out. Providing you remember the last step, this is a safe test, and will tell you whether your Brittlegill is mild, bitter, acrid or hot – or something completely different. For example, just last year we were delighted to find a species which tasted distinctly of menthol.
Peeling of the cuticle	This test is, again, specific to <i>Russula</i> . One of the important features to observe is the degree to which the cuticle peels. This means peeling the "top skin" from the edge of the cap (margin) toward the middle. The amount of "peelability" is expressed as a fraction of that distance, so a half-peeling <i>Russula</i> measuring 10 cm across, would only peel 2.5 cm (or halfway toward the centre of the cap).
Spore colour	While spore colour can be really helpful if you don't know which genus you have found, it is rarely necessary for identifying a mushroom, once you have an experienced eye: the morphological features are usually enough. Spore colour is important with <i>Russula</i> , though, and for this you will want to make a proper spore print (Fig. 2).
Chemical reactions	For many of us, field reagents were the first step on the slippery slope into microscopy, and they are particularly helpful in this genus. If you don't already, I would recommend carrying the following items on your forays: FeSO ⁴ (ferrous sulphate/iron salts), available as either a solution or in crystal form, I prefer the latter; guaiac (a solution of guaiacum resin in alcohol); and KOH (potassium hydroxide). These are available online in small dropper bottles, which are practical for use in the field. There are others which are useful for determining particular species (e.g. ammonia, which is mentioned below). If you are looking for specific species then you may want to research which chemicals you might need in advance. These are mostly used by placing a drop (or rubbing a crystal) onto the stipe, but do check your literature first: some chemicals need to be applied differently to identify species.

Making a spore print

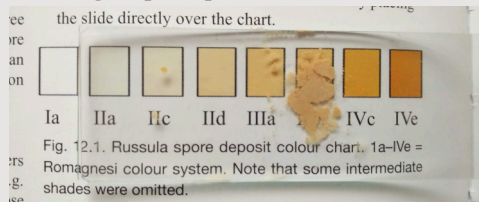


Fig. 2. A small heap of spores on a glass slide being compared to a standard colour chart. Photo © Clare Blencowe.

To make a spore print, you will need to remove the cap (or a piece thereof) from the mushroom, place it gills down on paper or glass. I always print onto a microscope slide; but the glass or Perspex from a picture frame would do. This enables you to move the print over dark or light backgrounds to better visualize it. Cover this with a cup or bowl and leave for a few hours to overnight. When it is done, you will need to scrape the spores into a little pile (a knife back or a credit card work well) and then compare to a colour chart. There is one in Kibby (2017).

Once you have checked all of the above, you may be able to name the species you have found. Some species will also have unique features which will separate them from other, similar species. This could be anything from forking or anastomosing gills, a very distinct smell or taste, a cuticle which falls short of reaching the margin, or even a veil. These checks can be completed on a case-by-case basis, once you have narrowed down the potentials.

Having essentially said it is all but impossible to identify *Russula* in the field, I would like to share a few species with distinctive combinations of features. I like to think that this makes them a little more friendly. These are excellent species to keep a look out for and to use for honing your skills. You will certainly find you can add a few more to the list yourself, as you become more familiar with the genus.



Fig. 3. *Russula vesca* (The Flirt). Showing the pellicle stopping short of the margin, resembling bared teeth. Also the gills forking near the stipe. Photo © Virn Stothers.

Russula vesca (The Flirt)

A rather distinctive mid-sized *Russula*. This species can have a mixture of dusky/dirty pinks and greens – and is often described as being ‘the colour of old ham’. It has gills that are much more flexible than most *Russula* species and often forking right next to the stipe, is very white/pale in both stipe and gills. Its extra special feature which aids field ID is that its cap cuticle doesn’t quite reach all the way to the very edge of the cap. This means that the edges of the gills are exposed, which is the source of two of its English common names; ‘The Flirt’ (lifting its skirt to show you a little flash of gill), and the ‘Bare Toothed Brittle-gill’. This combination of features is usually enough to identify it without further study.

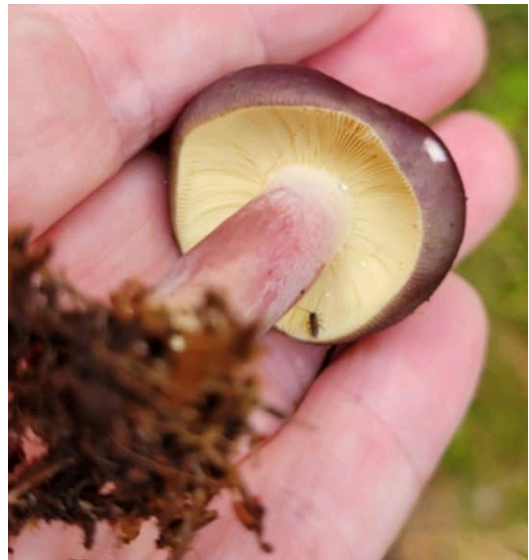


Fig. 4. *Russula sardonia* (Primrose Brittle-gill). The gills are a beautiful soft primrose yellow. Photo © Virn Stothers.

Russula sardonia (Primrose Brittle-gill)

This strikingly attractive species is a beautiful wine red on the cap (although green and yellow forms are also known, and not uncommon), flushed with a slightly paler version of the same on the stipe. When turned over, the gills are the softest primrose yellow! The colour combination, alongside habitat (mycorrhizal only with species of *Pinus*), and a very hot/spicy ‘nibble and spit’ test, are enough to identify the most common colour form. If you think you have found them, and you like a little chemistry experiment, then try dripping ammonia onto the gills for certainty (or to impress your mycophile friends) and wait for them to turn bright pink.

Russula nigricans (Blackening Brittle-gill)

The most common of the multiple blackening *Russula* in my local area, this is also the least complicated. While it is extremely variable in stature and colour, depending on maturity, it has a relatively short checklist of features. This *Russula* begins dirty white/mottled brown and neat as a button, before becoming huge, undulating and bruising rosy reddish then black on damage, turning completely black as it



Fig. 5. *Russula nigricans* (Blackening Brittlegill). Showing the blackening that gives it its common name, and the thick, widely spaced gills which distinguish it from similar species. Photo © Will Brantingham.

matures. It is extremely stocky in stature, with a shorter stipe than its cap width, and has extremely widely spaced, thick gills. These gills are even more brittle than most other brittlegills – they crumble dramatically into pieces akin to big, flaked almonds upon rubbing, and may ping off a fair distance in the process. This last feature gives certainty to your ID of the species in the field.

Russula nigricans is not a fussy friend, as it associates with a range of trees, but it does have a rather pickier couple of occasional hitchhikers: if you are really lucky, you may just find it (or one of the other blackening species) with an

Asterophora species hitching a ride. *Asterophora lycoperdoides* (Powdery Piggyback) and *A. parasitica* (Silky Piggyback) are parasitic fungi which grow only on the mature fruiting bodies of blackening *Russula* species (and some species of *Lactarius*). They are worth looking for, as they are an absolute treat to behold (Fig. 6).

I hope this meander through the genus *Russula* has encouraged you to be less intimidated by them. Even if you still feel intimidated, please know that you are in good company in your plight!

Thankfully, they are pretty, even if we can't put a name to them.



Fig. 6. *Asterophora parasitica* (Silky Piggyback) growing on the blackened gills of an old *Russula* sp.. Photo © Virn Stothers.

References

- Hussey, A.M. & Reed, F. (1855) Illustrations of British mycology, containing figures and descriptions of the funguses of interest and novelty indigenous to Britain. London: Reeve, Benham and Reeve. <https://doi.org/10.5962/bhl.title.3606>.
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