

KEY TO BLACKENING SPECIES OF *RUSSULA* OF SECTION COMPACTAE

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The blackening *Russula* species of the section Compactae – of which *R. nigricans* is the best known – are quite easy to recognise as a group; their squat, robust and brittle fruitbodies start out white but rapidly discolour brown to black in all parts. The species, however, are less easily determined and a surprising amount of confusion exists in the literature and on forays as to how they are delimited. The standard British reference work by Rayner which we have used for many years is sadly now out of step with more recent treatments of this section; nomenclatural changes have occurred and new species described which necessitate changes.

The following key is a distillation from the recent books by Galli (1996) and Sarnari (1995), which are founded in large part on the monograph by Romagnesi (1985). Two recently described species are included even though not yet recorded from Britain on the assumption that they may be

found here. These species are marked with an asterisk. The terms SBA and SV stand for sulfobenzaldehyde and sulfovanillin, two essential chemicals if you wish to study any *Russula*. Add to these Melzer's iodine solution, some ferrous sulphate and a good microscope and you have all you need to examine spores, cap cuticle and cystidia.

R. densifolia in the sense of Rayner is now called *R. acrifolia*. Rayner describes this as fairly common although this does not tally with my personal experience; perhaps it is only locally frequent. What is now considered to be the true *R. densifolia* in the sense of Romagnesi has characteristic broad, inflated cap cells and is little-known in this country. What is often recorded on forays under this name is a third species *R. anthracina* with slender cap cells many of which are filled with large blackish-brown oily droplets when mounted in SBA or SV and with gills usually



Russula nigricans with broad, widely spaced gills with characteristic blackened edges and flesh which turns bright red before eventually blackening. Mature fruitbodies of this species are completely black and appear as if burned. Photograph © Geoffrey Kibby.



Russula anthracina in the sense of Romagnesi, Sarnari, Galli and others, with slight pink flush to the gills and flesh directly blackening. This is *R. albonigra* in the sense of Rayner. Photograph © Nick Legon.

having a characteristic pinkish-flesh hue.

More careful study is needed of any of the 'crowded-gilled' blackening *Russula* species to be sure of what you have. Make careful notes of the taste of flesh versus lamellae, colour changes over several minutes and drawings of cap cuticle and spores. You may be surprised at what you have!

Measurements of gill spacing are taken from Galli and measured at the edge of a mature cap.

Abbreviations used in the key:

RR = Rayner, R.W. (1985). *Keys to the British Species of Russula*, third edition. British Mycological Society.

RP = Phillips, R. (1981). *Mushrooms and other fungi of Great Britain & Europe*. Pan Books

CD = Courtecuisse, R. & Duhem, B. (1995). *Mushrooms & Toadstools of Britain & Europe*. HarperCollins.

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- 1. Flesh turning red before becoming grey to black 2
 - Flesh turning directly grey to black 6

 - 2. Taste mild in the flesh and mild to occasionally slightly acrid in the lamellae 3
 - Taste somewhat acrid in flesh and very acrid in the lamellae 5

 - 3. Lamellae thick and very widely spaced (4-6 per cm); fruit bodies sturdy and fleshy; flesh strongly reddening before blackening; common everywhere under conifers and broad-leaved trees RR3, RP92, CD1345 ***R. nigricans***
 - Lamellae closer spaced to very crowded (9-14 per cm); fruit bodies large to small; flesh turns pink to red before blackening; under conifers or broad-leaved trees on acid soils 4

 - 4. Fruit bodies often very large (12+ cm); cap cuticle with long, septate, cylindrical cells (fig. 1); flesh pale pink then grey; odour faint, sour, of wine barrels; under pines on sandy soils, uncommon RR5, RP91, CD1348 ***R. adusta***
 - Fruit bodies small to medium; cap cuticle with cells often very broad, swollen-ovate (fig. 2); flesh red then grey-black; odour indistinct; conifers or broad-leaved trees, seemingly uncommon (non sensu Rayner, Roger Phillips), CD1349 ***R. densifolia***

 - 5. Flesh only very slightly reddening; cap cuticle without pileocystidia, but with cells showing abundant large blackish droplets internally (fig. 3); lamellae often with a pinkish-flesh tint; flesh slightly acrid but noticeably acrid in the lamellae; common in broad-leaved woods RR6, RP91 (both as *R. albonigra*), CD1347 ***R. anthracina***
 - Flesh strongly reddening; cap cuticle with pileocystidia, often numerous and frequently diverticulate at tips (fig. 4), not reacting in SV, but contents granular, greyish in SBA; lamellae pale cream; flesh slightly acrid, extremely acrid in lamellae; infrequent (?) in broadleaved woods RR4, RP93 (both as *R. densifolia*), ***R. acrifolia***

 - 6. Lamellae medium spaced (4-8 per cm), distinct refreshing menthol taste in gills; flesh rapidly blackening; pileocystidia rather large, never forked at tip, with oil drops not blackening in SBA or SV; on calcareous soils (non sensu Rayner, Roger Phillips), CD1346 ***R. albonigra***
 - Lamellae more crowded (10-14 per cm); taste mild and menthol-like to rather acrid; flesh blackening to blackish-brown; pileocystidia absent or if present hard to distinguish, but cells with large black oil droplets may be visible when mounted in SVA or SB 7

 - 7. Taste mild and slightly menthol-like in lamellae; pileocystidia absent; Mediterranean under holm oak and turkey oak (*Quercus ilex*, *Q. cerris*) ***R. atramentosa****
 - Taste noticeably acrid in flesh or lamellae; pileocystidia present or absent 8

 - 8. Pileocystidia present but often hard to distinguish, narrow, many with diverticulate ends, with small blackish oil drops in SBA; lamellae always white, found with oaks. Recently described by Sarnari, might occur in Britain ***R. fuliginosa****
 - Pileocystidia absent, many cells showing abundant large blackish droplets internally (fig. 3); lamellae often with a pinkish-flesh tint (sometimes distinguished as var. *carneifolia*); common in broad-leaf woods RR6, RP91 (both as *R. albonigra*), CD1347 ***R. anthracina***

References

Galli, R. (1996). *Le Russule*. Edinatura.
 Rayner, R.W. (1985). *Keys to the British Species of Russula*, third edition. British Mycological Society.

Romagnesi, H. (1985). *Les Russules d'Europe et d'Afrique du Nord*. Reprint. J. Cramer.
 Sarnari, M. (1998). *Monografia illustrata del Genere Russula in Europa Vol. 1*. A.M.B. Fondazione Centro Studi Micologici.

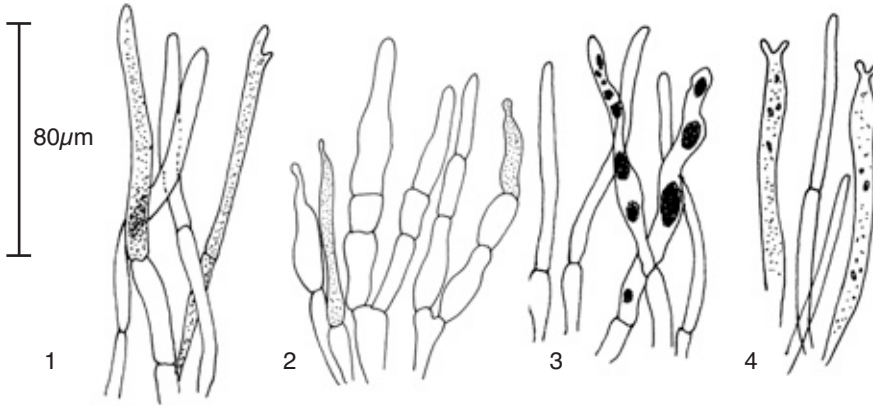
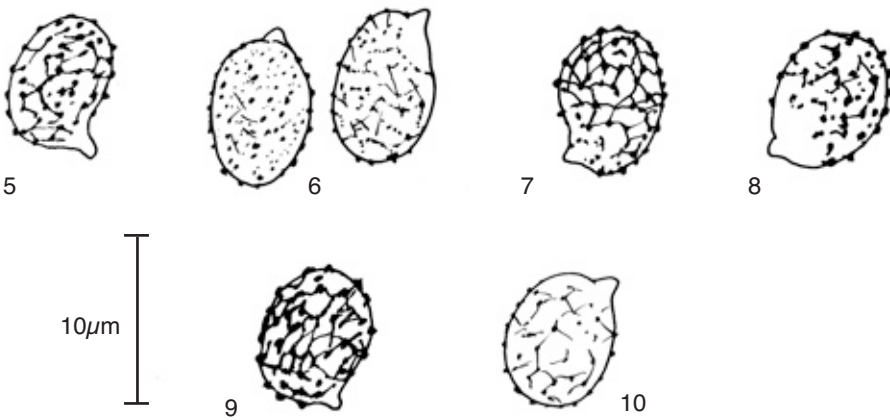


Fig. 1 Cap cuticle of *R. adusta* showing long cells, plus simple, grey-staining pileocystidia. **Fig. 2** Cap cuticle of *R. densifolia* with chains of broad, swollen cells with apical cell often attenuate, and some grey-staining pileocystidia. **Fig. 3** Cap cuticle of *R. anthracina* with blackish oil droplets. **Fig. 4** Cap cuticle of *R. acrifolia* with numerous grey-staining pileocystidia, frequently diverticulate at the apex.



Figs 5-10 typical spores of blackening *Russula* species.

Fig. 5 *R. nigricans*. **Fig. 6** *R. albonigra* with very low spore ornamentation. **Fig. 7** *R. anthracina* with coarse network and prominent warts. **Fig. 8** *R. densifolia*. **Fig. 9** *R. acrifolia* with very coarse network and prominent warts. **Fig. 10** *R. adusta* with very fine ornamentation and low warts. All spores stained with Melzer's iodine solution.