

KEYS TO THE BRITISH GENERA OF
AGARICS AND BOLETI

by

Archie McAdam

It is the mark of a civilized man, and a hallmark of his culture, that he applies no more precision to a problem than its nature permits, or its solution demands.

Attributed to Aristotle but not confirmed as his

February 2009

This booklet is based on a development by Rayner and Brand (1979)
of a tabulation in Ramsbottom (1944).

Contents

Introduction	2
About the Keys and how they Work	2
Practical Issues	4
The Spore Print	4
Melzer Test	6
Microscopy and Acetocarmine	7
To Get Started	7
Smells, colours and gill attachments	8
The cap cuticle	8
Related articles:	
Etymology of Names and Identification of Wood	8
Addresses	8
Abbreviations	9
Acknowledgements	9
PRIMARY KEYS	
KEY A: Genera with macro features which separate them from the fleshy agarics	10
KEY B: Fleshy Genera with Free Gills	11
KEY C1: Gills attached – fleshy species, cap over 3 cm diameter	12
KEY C2: Gills attached - slender species, cap up to 3 cm diameter	12
DIAGNOSTIC KEYS to Genera selected in KEYS A, B and C	14-66
Key to species of <i>Galerina</i> - BFF7 Key by Roy Watling	67
Simplified Key to <i>Coprinus</i> s.l. by Derek Schafer	73
Glossary	76
References	84
Recommended Keys to Species for beginners	87
Index of Genera in various publications	91

Introduction

In trying to identify an unknown agaric to genus, I have found Rayner and Brand's Tables and Keys very helpful indeed. I have been encouraged and helped by others to persevere in updating these keys. The publication of *Checklist of the British and Irish Basidiomycota* (CBIB) has allowed me to include more recent generic concepts. A key may open or close the door to understanding. I realise that one person's key can be another's impenetrable lock and that every key can be improved. It is my hope that these keys will open some of the doors which, when I was a novice to mycology, I found closed (and still do on occasion). They do not, however, cover the so-called 'reduced' or 'cyphelloid' genera of agarics (very small more or less cupulate species lacking gills).

Rayner and Brand developed an idea of Ramsbottom's when they wrote their paper. What I have done is to update their paper with added information about each genus. In preparing this booklet I have depended heavily on David Largent's series of books published by the Mad River Press. From volume VI *Modern Genera*, I have copied many of Largent's words, with his permission, to expand the original text by Rayner and Brand. I have also used material from *Nordic Macromycetes* and *British Fungus Flora* in the description of some genera. Although this makes the booklet considerably longer than Rayner and Brand's original paper, I find the added information very helpful to me. It allows me to find all the information I need to be sure that the agaric I am studying really does belong to the genus I think it does, without my having to look into other books. I hope that this is how this booklet will work for others.

I appreciate that the reader, equipped with no more than a field guide, perhaps with the aid of a hand lens, may have relied on macro features in the past and may feel daunted by the mention of microscope and chemicals. It is possible to use the data in the Keys to identify many genera without a microscope in many cases. This booklet is designed to tempt you from the shallows into the inviting waters of the glorious study of fungi to a greater depth than has been easy before. I have tried to allay any misgivings with the general guidance offered at pages 4-8. Others who have trodden the path before you will be very willing to share their knowledge with you. All you have to do to access this source of help is locate your nearest Fungus Group by contacting The Association of British Fungus Groups or The British Mycological Society (contact details on page 8).

Where can the best Keys to Species be found?

Once a genus has been identified, to identify an individual specimen you need to know where to find the most helpful key. This is best done by referring to Brand, Henrici and Leonard's *Guide to the Literature for the Identification of British Basidiomycetes* (2001). Since I have found this invaluable, I have placed an updated summary of it at the back of this booklet (page 87) with Roy Watling's revised Key to *Galerina* (page 67) and Derek Schafer's *Coprinus* key (page 73).

ABOUT THE KEYS AND HOW THEY WORK

Rayner and Brand designed their paper for students in the hope that the central table in their publication might be memorised. Although it would be hard to memorise the

KEYS A, B and C, derived from that central table, it is my hope that dividing up genera on the basis of overall fruit-body characteristics, as Rayner and Brand did, will result in a set of keys to groups of genera which are small enough to work on comfortably.

How to use the Keys

I. The PRIMARY KEYS, A, B and C

This concise, yet informative, set of keys enables a significant first decision to be made about a specimen, based on certain fundamental macro features. Patient assessment against these keys will be time well spent. Although a careful decision here cannot guarantee unerring progress to the correct genus, it will make the use of the diagnostic (numbered) keys much easier.

KEY A filters out a number of genera with distinctive macroscopic features, such as tough fruit-bodies with pores instead of gills, fruit-bodies which are particularly fragile (crumbly) or particularly tough or are waxy to the touch, etc. You should familiarise yourself with this Primary Key and at first always start with it.

This leaves the bulk of the agarics, to be dealt with in **KEYS B and C**. These **KEYS** depend on gill attachment, spore print colour and presence or absence of a ring or veil. I have put line drawings at the bottom of KEY C to show **gill attachment**. They are described in most field guides and by Penny Cullington (2006) in *Field Mycology*.

If your agaric has free gills it is to be found in **KEY B**.

KEY C is the powerhouse of this booklet.

It includes all **genera with fruit-bodies of normal consistency with attached gills**. It is in two sections: **KEY C1:** Agarics with cap diameter 3 cm and more.

KEY C2: Agarics with smaller cap diameters.

It is to be noted that fruit-body size is partly determined by available nutrition so if a specimen does not key out in, say C1, try it in C2 (for instance, a small *Clitocybe* will not be in Key 34).

In these Primary KEYS only macroscopic features are used. The genera grouped together in the KEYS A-C can be separated by referring to the related Diagnostic (numbered) key in the rest of the booklet.

II The DIAGNOSTIC (numbered) KEYS

In these Keys, microscopic details are added to allow the user to place an unknown fruit-body firmly into a genus. In many cases identification to genus can be achieved using macroscopic features alone but in others microscopic details are needed as well. In some cases only microscopic findings separate genera. If you are working without a microscope or if your microscope cannot distinguish between, say 'spores rough' and 'spores smooth', it is still possible in many cases to decide on the correct genus. This

is done in the way we have to do with any key when we cannot be sure of a feature in the key - by working through one of the options and then another till the answer presents itself.

With practice one can often guess the microscopic feature by the use of a x8-x10 hand lens (see below at page 8). Some entries in the diagnostic Keys contain a lot of information. I have chosen to do this in genera which I have found to be the most difficult to identify.

Final /General Notes on all Keys

The main features of each genus are **emphasised in bold** throughout the **Keys**. The rest of the description of the genus outlines all the characteristics which make that genus unique.

In all the Keys the available options are indicated by letters A1 A2, B1 B2, etc. Where there are more than the usual two alternatives an arrow (↓) indicates this. It is important to **read all the options** before deciding which one to choose. The figure in brackets after *Genus name* is the total number of species of that genus listed in CBIB. Where the genus contains only one species (a monotypic genus), the full name of the fungus appears, e.g. *Resinomycena saccharifera*. Occasionally a particular species is identified in a Key. Then the full name of the fungus is given. If a genus contains species with more than one spore colour, gill attachment or species larger or smaller than 3 cm, that genus will appear in more than one place in the keys.

Genera noted as 'Rare' are very little known in Britain, often from only two or three records (and some of these may be dubious). Material suspected of belonging to any of these genera should be checked by an expert and preserved in a recognised herbarium if found to be correct.

THE SPORE PRINT

Rayner and Brand chose to treat the continuum of possible spore print colours in five groups, a scheme that is also followed here. The colours are defined below. This works well in most cases. All depths of yellow are included with white. Some brown prints are hard to decide, in particular pale brown. *Ripartites*, for instance, has a pale dirty brown which is placed in spore print colour 4 below. If in doubt key your specimen in both colours, 3 and 4. To get an idea of the many shades of brown please see B&K 4:27.

(For abbreviations see page 9)

Spore print colours

BFF colour chart

1. **WHITE** – and very pale cream-colour, pale yellowish, ochre pure white: **B to E**
2. **DULL PINK** (**genera with this colour are all in KEY 24**) – fawny-brown, brick to cinnamon-colour or dull red, clay pink and vinaceous: **30 + 76**
3. **BRIGHT BROWN** - cinnamon, sienna, fulvous, rust: **10,11,12,13**

4. **DULL BROWN** - including pale dirty brown, clay, tobacco brown, brick, snuff-brown and date brown: **15,16,17,24**

5. **BLACK** - including dark purple-brown: **36,37,38 + 21,22,25**

Agarics with spore prints in **shades of green** appear in KEY 14

Making a Spore Print

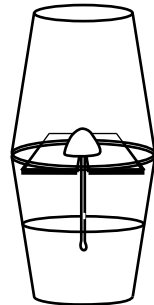
Spore print colour can only be decided with certainty from a spore print. However, where spores have accumulated on a nearby smaller cap or on the stem, ring or partial veil, a reasonable guess can be made. This is also possible from the colour of the gills, providing the fruit-body is sufficiently mature and the spores have had time to ripen.

To get a good print the fruit-body has to be in optimum condition. It has to be well hydrated and all air currents must be eliminated. Rehydration by spraying it with tap water will often also bring back enough of the beauty of the fruit-body to make it suitable for photography, even if it is hygrophanous.

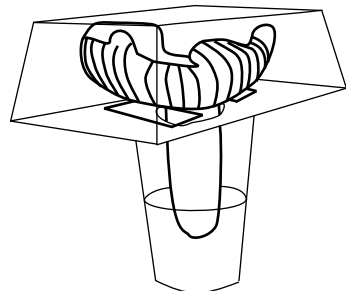
To prepare the fruit-body to make the best print possible, spray the upper surface of the cap with water till it is soaking but not dripping. Then suspend the toadstool over a container of water with the base of the stem in water. To delay the decay of the fruit-body a spore print can be taken in a domestic fridge. Always take the print on to a clear surface - a glass microscope slide if possible.

To eliminate draughts

Small fruit-bodies can be suspended between two slides over plastic tumblers, yoghurt cartons, etc.



Large ones need some ingenuity to achieve perfect conditions. This one was sheltered from draughts in an upside-down Chinese Takeaway container with a hole cut in its lid.



Deciding the spore print colour

When the print is ready to examine, usually after an overnight wait, dry the print with gentle heat, e.g. under a lamp or over a radiator. Then scrape the spores into a heap in

the centre of the slide using a second slide, a cover slip or the blunt end of a safety razor blade. Put a cover slip over the heap of spores to compress it and then decide what the colour is. This can be confirmed by comparison with the BFF Colour Chart if necessary. Sometimes the spore print is not dense enough to be sure of its colour. In these cases, try the keys for the spore print colour on either side of the colour you have chosen.

MELZER TEST, MICROSCOPY AND ACETOCARMINE

The Melzer Test

J+ or J- means Melzer positive or negative. The 'J' stands for *Jod*, the German word for iodine. Dextrinoid is a colour change intermediate between J+ and J-. In the keys to British genera below, only *Chaetocalathus*, *Hebelomina*, *Hygrophoropsis Rozites*, *Tapinella* and some species of *Hydropus* and *Cystolepiota* have dextrinoid spores.

Most genera show no colour change in spores or hyphae with Melzer's (J-). Where there is a change it is usually from white to pale or dark blue-grey, known as an amyloid reaction (J+). In some cases it is from white to brown or from pale brown to a darker brown, known as a dextrinoid reaction. Either positive reaction is a great help in tracing the genus of an unrecognised agaric. In the literature the term J+ can be ambiguous, but in this booklet it is used only for a positive amyloid reaction.

To test if your Melzer's is in good condition examine a slide of any species of *Russula* or *Lactarius*. Every mature spore should exhibit strongly amyloid ornamentation. In smooth-spored genera the reaction is often much weaker, needing a spore print to be sure. Most species of *Lepiota*, including the common *L. cristata*, give a strong dextrinoid spore reaction.

When I asked David Largent how exactly does he do the test, he replied:

"For spores, the most effective way is to test Melzer's on a spore print. Make a spore print on one end of a glass slide (or a piece of glass). Put a drop of Melzer's on the glass but on the opposite end from the spore print (or at least away from the spore print). Tilt the slide glass so the Melzer's flows into the spore print. You will see the colour change, if any, immediately.

"Secondly, Melzer's should be no older than one year. The older the Melzer's solution the slower the colour reaction.

"If you are looking at the spores under the compound microscope, you should place a piece of a gill in a drop of alkali solution (I use 3% potassium hydroxide) on one end of the slide and in a drop of Melzer's on the opposite end of the same slide.

"When you compare the colour differences, it will be obvious what amyloid, dextrinoid, and inamyloid means."

Only by practice will the colour changes become familiar. Once you know them, you need not test against an alkali all the time. If you are unsure of the reaction, always test it. You can use either scope (dissecting or compound). Sometimes it easier to see under the compound microscope.

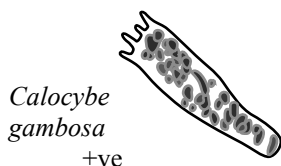
Microscopic technique

The techniques required are described in the publications by J.V.R. Marriott (1994), D. Largent et al (1986), M. Moser (1983), R Watling (1973) and in the introductions to the six volumes of *Fungi of Switzerland*.

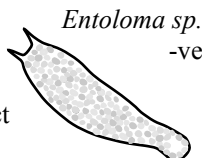
Hints and tips appear in papers in *Field Mycology* published by BMS and in *The Forayer* published by the Association of British Fungus Groups, as well as in the Newsletters of various individual Fungus Groups across the country.

Siderophilous granules

There is a small group of genera which can only be defined properly by the demonstration of siderophilous granules within basidia. When examining a section after staining only the basidia are studied for granules. These granules look like this:



A basidium with granules shows them distinctly although the granules themselves may be smaller than shown here. Where the test is negative there still can be some granulation but it is very indistinct



To show them we need to use the stain acetocarmine which is readily available from Michael Jordan of the Association of British Fungus Groups (which publishes *The Forayer*) and from suppliers of microscope chemicals and reagents. It is a stain which might seem difficult at first because the granules are sometimes smaller than shown above, but I find it has several delights. First the stain seems to last for ever. I have a bottle which a friend inherited from his father years ago. When I compare the results of using it with those of fresh stain, purchased less than a year ago, they are the same. Second, the simplest description of how to use it that I know, is in Lange and Hora (1963), which I quote verbatim below. Their method does away with the complications which some professional mycologists introduce to the technique **and it works**.

Acetocarmine stain (from Lange and Hora)

“Test to be made on dried material. Drying easily done beneath a lamp or in front of a fire at a temperature of about 40°C.

“Place a 3-4 square millimetre of gill into 2-3 drops of acetocarmine on a thin glass slide. Warm gently over low bunsen (AM: I find a spirit lamp works well) to just below boiling point, adding further drops of reagent so that material never dries out. Remove from flame and stir liquid on slide with mounted steel needle (mordant) till some blackening of fluid is noted. (AM: I find it works more reliably when stirred with an old rusty nail). Re-heat as above 2 or 3 more times, stirring between heatings and never allowing material to dry out. Finally mount in fresh acetocarmine and apply cover slip. Tap cover slip smartly with the rubber-shod base of a pencil to splay out material and examine under oil immersion. Dozens of black staining granules are easily seen in a positive reaction. With practice, the reaction can be seen under a dry 1/16th objective.” (AM this is about x600).

TO GET STARTED

All that is needed is enthusiasm for the beauty of fungi in all their many forms, a spore print and a hand lens (at least x8, preferably x10). Some Melzer's reagent and some

alkali also helps. The alkali is used as a wetting agent, a colourless mountant for microscopy, a test for the genus *Gymnopilus* and to rehydrate dried specimens to prepare them for microscopy. (The alkali I use for microscopy is household ammonia solution bought from a pharmacy, diluted 1 part ammonia to 2 parts water). It also helps to join a Fungus Group. Your nearest one can be found by contacting the BMS or the ABFG.

Smells, colours and gill attachments

The smells and the colour changes of the flesh of fungi are sometimes definite in the intact fruit-body. If in doubt, cut the toadstool vertically in half to make a complete section of it. You will then be able to examine the gill attachment properly and the smell and colour changes will be fully developed. When it dries, the smell and colour changes will fade. They can be recovered by cutting a slice off the surface again with a razor blade.

The cap cuticle

In the Keys below the nature of the cap cuticle is used as a differentiating point quite often. Although this is best done microscopically (and some ways of doing it are described in McAdam 2007), a good guess can be made using a fine sewing needle and a x10 lens. A filamentous cuticle can be thought to be a bit like a conical thatched hut roof. The filaments radiate from the centre. If they are picked at with a needle, they can often be raised as linear fragments. This is not so in a cellular cuticle which could be likened to a set of cobble stones. When you try to pick them up with a needle the cuticle tends to fragment. When the cuticle is viscid or gelatinous the process is much less certain and your guess can often be just a guess. The fruit-body's structure itself often behaves a bit like the cap cuticle. Where the cuticle is filamentous the fruit-body is relatively resistant to trauma. Where it is cellular the fruit-body is much more fragile and tends to break up as it does in a *Psathyrella* species. Of course this is just a rule of thumb, but I find it helpful and I have used it in the Keys.

Related articles

Blackwell, E. (1992). The etymology of British Fungus names – *Lactarius* and *Russula*
Blackwell, E. (2004). Some hints for Identifying wood in the field.

Jordan, M., McAdam, A., Williamson, C., Cundall, R., Marriott, J. V. R., Spooner, B.
& Roberts, P. (2004). ABFG Phonetics and Meanings Dictionary.

Addresses

British Mycological Society,
The Administrator,
Fungal Biology, Works Business Centre,
Union Street.
Manchester M12 4JD

Association of British Fungus Groups,
Harveys,
Alston,
nr. Axminster,
Devon EX13 7LG

Suppliers of chemicals and stains

ABFG: Address above, website below

Brunel Microscopes Ltd, Unit 2 St Vincents Road, Bumpers Indust. Est., Chippenham, Wilts, SN14 6NQ

Websites: **BMS:** www.britmycolsoc.org.uk
 ABFG: www.abfg.org
 Brunel: www.brunelmicroscopes.co.uk
 www.usedmicroscopes.co.uk

Abbreviations

ABFG: Association of British Fungus Groups	FM: <i>Field Mycology</i>
AH: Alick Henrici	FN: <i>Funga Nordica</i> Editors Knudsen & Versterholt
AM: Archie McAdam	J+ and J-: Melzer positive and negative
B&K: Breitenbach and Kränzlin <i>Fungi of Switzerland</i>	NCL: New Check List (1960): Anon
BMS: British Mycological Society	NM: <i>Nordic Macromycetes</i> Editors: Hansen & Knudsen
BFF: <i>British Fungus Flora</i> : Watling et al	p.p.: <i>pro parte</i> , in part
CBIB: <i>Checklist of the British and Irish Basidiomycota</i> : Legon and Henrici	MM: Meinhard Moser: <i>Keys to Agarics and Boleti</i>
C&D: Courtecuisse and Duhem: <i>Mushrooms and Toadstools of Britain and Europe</i>	RP: Roger Phillips: <i>Mushrooms</i>
DL: David Largent	RW: Roy Watling
DS: Derek Shafer	s.l.: <i>sensu lato</i> , in a broad sense
EEE: Ern Emmett	s.s.: <i>sensu stricto</i> , in a strict sense
FAN: <i>Flora Agaricina Neerlandica</i> : Bas, Kuyper, Noordeloos and Vellinga	sg: subgenus
	TBMS: Transactions of the British Mycological Society

Acknowledgements

None of the detailed information in this booklet is mine. All I have done is rearrange the information and redesign many keys. Any mistake you find is mine. I have 'stood on the shoulders of giants' to get the information together. Some of my sources are referred to in individual keys. The two Big Friendly Giants who have helped me by phone, e-mail and letter are Alick Henrici and Roy Watling. Jack Marriott inspired the project in the first place by introducing me to Rayner and Brand's publication. Bert Brand has encouraged me to keep going when I felt aimless. I am ever grateful to him for that and for writing the original article with Ronald Rayner. Ted Blackwell made many helpful suggestions which have all been incorporated. Derek Schafer has allowed me to include his *Coprinus* s. l. Key for which I am very grateful indeed. My long-time friend Fred Wilkinson has added greatly to the clarity of the text by his suggestions. Finally my illustrator was Izzy Lambson, my grand daughter to whom I extend my deep thanks as I do to all who have helped me so much.

KEY A: Genera with macro features which separate them from the other (fleshy) agarics

Please note the option 'B' below offers several choices, indicated by the arrow '↓B'

A1 Genera whose spore bearing surface is of tubes making a soft sponge-like mass are the genera covered in BFF1 [And see *Phylloporus* in KEY 7] **KEY 1**

If the fruit-body is very tough and the tubes are firm and not separable from the cap, search for the genus among the Polypores. The one exception in these keys is the soft-fleshed *Fistulina hepatica* (KEY 1). Polypores are to be found in Ryvarden and Gilbertson (1993) and in NM3.

A2 Genera with ridges or gills making up the spore bearing surface

↓B1 Genera with fruit-bodies that are tough and not easily decaying (dry, rubbery and leathery)

C1 Stem central **Spore print colour 1** **KEY 2**
[Spore print colour 3 *Phaeomarasmius* – See KEY 31]

C2 Stem excentric, lateral or nil **Spore print colour 1** **KEY 3**
[Spore print colour 3 *Phaeomarasmius* – See KEY 31]

↓B2 Genera with fleshy fruit-body (which can be rubbery) AND stem excentric, lateral or nil

D1 With gills

E1 **Spore print colour 1** **KEY 4**

E2 **Spore print colour 2, 3 or 4** **KEY 5**

D2 Without gills or gills represented only by veins or ridges: Often very small shell-like species - go to NM2 p 90: Tricholomataceae, 'Gills reduced, vein-like or absent'

↓B3 Genus with gills liquefying to produce inky fluid:

Spore print colour 5 *Coprinus* **KEY 6**

↓B4 Genera with gills separable from cap – 'hymenophore readily peeling away from cap as a unit'

Spore print colour 3 **KEY 7**

↓B5 Genera which grow as parasites on other fungi **KEY 8**

↓B6 Genera with thick and distant or waxy gills

F1 Gills as veins and/or wrinkles

Spore print colour 1 and 4 **KEY 9**

F2 Gills thick, waxy, normal in shape

Spore print colour 1 **KEY 10**

Spore print colour 4 **KEY 28**

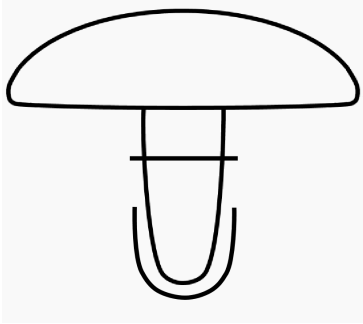
Spore print colour 5 *Gomphidius* **KEY 29**

B7 Genera with fruit-bodies cheesy or brittle

Spore print colour 1 **KEY 11**

KEY B Genera of fleshy agarics with Free Gills (not in KEY A or KEY C)

A. With ring and volva

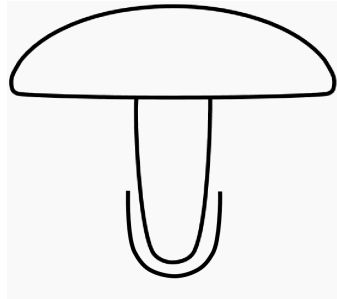


Amanita

Only Amanita has a volva and free gills See KEY 12

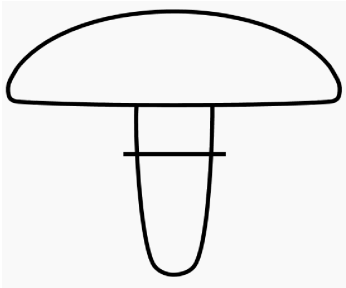
NB Amanita species all have a volva (if dug up with care)

B. With volva and no ring



Amanita

C. With ring and no volva



Spore print colour 1

Chamaemyces, Cystolepiota, Lepiota
Leucoagaricus, Leucocoprinus, Lima-
cella, Macrolepiota, Pseudobaeospora
KEY 12

Spore print colour 3

None

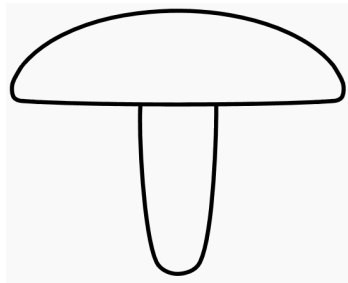
Spore print green or dirty olive brown

Chlorophyllum, Melanophyllum KEY 14

Spore print colour 5

Coprinus, Agaricus KEY 6

D. With neither ring nor volva



Spore print colour 1

Lepiota, Limacella KEY 12

Spore print colour 2

Pluteus, Volvariella Key 24

Spore print colour 3

Bolbitius, Conocybe KEY 13

Spore print colour 4

None

Spore print colour 5

Coprinus, Agaricus KEY 6

KEY C1: Gills attached – fleshy species, cap over 3 cm diameter

Spore colour	1 White	2
A1 With membranous ring on stem No volva present ↓B1 Gills adnexed or adnate ↓B2 Gills sinuate or emarginate B3 Gills decurrent	Cystoderma, Oudemansiella KEY 15 Armillaria Calocybe, Cystoderma, Tricholoma KEY 17 Armillaria, <i>Pleurotus dryinus</i>	Pi
A2 No membranous ring on stem C1 Partial veil fibrillose or weblike (leaving ring of fibrils on stem) C2 Partial veil nil or not weblike (No ring of fibrils on stem) ↓D1 Gills adnexed or adnate ↓D2 Gills sinuate or emarginate D3 Gills decurrent	Cystoderma, Leucocortinarius KEY19 Collybia, Dermoloma, Flammulina, Hebelomina, Laccaria, Leucopaxillus, Lyophyllum, Marasmius, Megacollybia, Melanoleuca, Xerula KEY 23 Dermoloma, Hebelomina, Lepista, Lyophyllum, Melanoleuca, Ossicaulis, Porpoloma, Tricholoma, Tricholomopsis KEY 25 Armillaria, Cantharellula, Clitocybe, Hygrophoropsis, Leucopaxillus, Lyophyllum, Omphalotus, Pleurotus, Pseudoclitocybe, Pseudoomphalina, Tubaria KEY 26	P i n k S p o r e d S p e c i e s

KEY C2: Gills attached - slender species, cap up to 3 cm diameter




Spore colour	1 White	2
E1 Gills not decurrent (free, adnate, adnexed, sinuate or emarginate)	Baeospora, Calocybe, Clitocybula, Collybia, Delicatula, Dermoloma, Flammulina, Hemimycena, Hydropus, Laccaria, Mycena, Mycenella, Resinomycena, Squamanita, Strobilurus, Tephrocybe, KEY 30	K E Y
E2 Gills decurrent (or adnate with a decurrent tooth)	Chrysomphalina, Clitocybula, Fayodia, Gamundia, Ger-ronema, Haasiella, Hemimycena, Hydropus, Laccaria, Lichenomphalia, Mycena, Myxomphalia, Omphaliaster, Omphalina, Pseudoomphalina, Rickenella KEY 34	2 4

Gill attachments

Free

Adnexed

Adnate



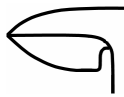
See also Cullington (2006) for use of gill attachment as identification aid.

Agarics with spore prints in SHADES OF GREEN appear in KEY 14

2 nk	3 Bright brown	4 Dull Brown	5 Black
	Galerina, Gymnopilus, Kuehneromyces, Phaeolepiota, Pholiota, Ripartites, Rozites, Tubaria KEY 16 Pholiota KEY 16	Agrocybe KEY 32 Pholiota KEY 16 <i>Hebeloma radicosum</i> Stropharia KEY 33	<i>Panaeolus semiovatus</i> Psathyrella, Stropharia KEY 18
	Cortinarius, Galerina, Gymnopilus, Kuehneromyces, Phaeocollybia, Pholiota, Tubaria, KEY 20 Gymnopilus, Pholiota, Tubaria KEY 20 Gymnopilus, Pholiota, Tubaria KEY 20 Paxillus, Phylloporus, Tubaria KEY 27	Agrocybe, Hebeloma, Inocybe, Kuehneromy- ces, Psilocybe KEY 21 Agrocybe Naucoria, KEY 32 Hebeloma KEY 21 Naucoria KEY 32 Ripartites KEY 28	Hypholoma, Lacrymaria, Psathyrella, Psilocybe KEY 22 Hypholoma (if veil poorly developed) KEY 22 Chroogomphus, Gomphidius, Melanomphalia KEY 29

3 Bright brown	4 Dull Brown	5 Black
Conocybe, Flammulaster, Galerina, Gymnopilus, Phaeocollybia, Phaeo- galera, Phaeomarasmus, Simocybe, Stagnicola, Tubaria KEY 31	Agrocybe, Inocybe, Macro- cystidia, Naucoria, Panaeolina, Simocybe, Stropharia KEY 32	Hypholoma, Panaeolina, Panaeolus, Psathyrella Psilocybe, Stropharia KEY 33
Tubaria KEY 31	Ripartites KEY 28	

Sinuate/emarginate*



With decurrent tooth



Decurrent



* see note in glossary

– emarginate/adnate-emarginate

KEY1

KEY 1

Spore bearing surface composed of tubes

Spore print colours various.

Polypores with a stem can be distinguished from Boletales because the fruit-body is leathery, corky or woody. The majority of Polypores have no stem and have a noticeably actively growing margin. Keys to genera and descriptions are to be found in Ryvarden and Gilbertson (1993) and in NM 3. There are rare occurrences of gilled fungi appearing with pores (tubes), *Laccaria* being particularly prone to this deformity or ‘monstrosity’.

A1 fruit-bodies attached to earthballs

See KEY 8: *Pseudoboletus parasiticus*

A2 Not attached to earthballs

B1 Spores angular to tuberculate or subglobose-globose and then distinctly reticulate verrucose

C1 Spore print purplish-black; cap with large dark grey to black woolly scales; stem with ring; flesh blackening *Strobilomyces strobilaceus*

C2 Spore print pale brown; spores subglobose-globose, warty verrucose; **fruit-body** less putrescent and more persistent in the field than boletes. Only found in Scotland under 2-leaved pines – unrelated to the boletes – the only poroid genus of *Thelephorales*, so not in BFF1: In NM3:309 Rare: *Boletopsis* (2) [RW: *B. perplexa* new to Britain differs from *B. leucomelaena* in the fleeting orange-tawny tomentum at cap margin and stem base, the cystidial shape and spore size.]

B2 All other British boletes and their allies have spores that are smooth or almost smooth under the light microscope.

D1 Tubes separate from each other; fruit-body semicircular, tongue or kidney shaped, at base often contracted to a short stem, upper surface brownish red, sometimes **oozing red fluid on bruising**, lower surface pale yellow at first turning reddish when old and bruised; **flesh** fibrous, soft, marbled exuding red juice; taste sour; **habitat:** a weak parasite on old oak usually near the base

Fistulina hepatica

D2 Tubes inseparable from each other

↓**E1 Spore print pale yellow; stem hollow, outer part firmer than usual with boletes; tubes** free, pores minute, white or yellow *Gyroporus* (2)

↓**E2 Spore print olive-yellow, olive-brown or snuff-brown to ochraceous buff; stem** different from E1

KEY1

- F1 Tubes very short, under 4 mm long**, and difficult to separate from cap, strongly decurrent; pores angular; **cap** viscid but becoming dry and villous; **spores** very small; **habitat**: under alders *Gyrodon lividus*
- F2 Tubes not short, over 6 mm long or if short, not under alders**
- G1 Stem with ring**
- H1 Cap felty-scaly, dry; stem hollow, veil present**; clamps at all septa; **habitat**: under larch *Suillus* sg *Boletinus* (*S. cavipes*)
- H2 Cap viscid; stem solid; tubes and pores yellow to olivaceous brown**; clamps very rare, normally absent; **habitat**: under conifers, usually pine or larch *Suillus* sg *Suillus* (12)
- G2 No ring**
- J1 Stem rough with large scabrosities, ribs, etc**, which usually darken with age; **pores** white, sordid or pale buff at maturity (yellow in one species : *L. crocipodium*) *Leccinum* (17)
- J2 Stem lacking scabrosities, if ornamented then finely granular or punctate and then cap often greasy or tacky to the touch**
- K1 Cap viscid to glutinous**
- ↓**L1 Tubes and pores yellow, bright lemon-chrome to luteous to olivaceous brown to buff**
- M1 Stem granular punctate** especially near apex; stem solid; **habitat**: conifer woods *Suillus* sg *Suillus* (12)
- M2 Stem striate-fibrillose; tubes and pores**: with decurrent tooth to decurrent, variable in length and separable from cap flesh; **cap** bright coloured 20-50mm, convex, expanding, never dry, viscid, minutely wrinkled and streaky; **spore print** ochraceous buff; **spores** sub-fusiform in side view and ellipsoid in face-view, pale straw coloured in ammonia, 10-14/4.4-6.2µm; **cystidia** and esp those approaching tube mouths, large, filled with yellow sap, not aggregated into fascicles; **cap cuticle** with filamentous gelatinous pellicle; **habitat**: on the ground in broad-leaved woods and on heaths
Rare: Aureoboletus gentilis
- ↓**L2 Tubes cinnamon to reddish rust; taste peppery; spore print** reddish brown; **cap** usually <6cm; **stem** lemon chrome at base; **habitat**: with broadleaf trees and conifers *Chalciporus piperatus*
- L3 Tubes red, carmine or rich cinnamon-colour; fruit-body** generally small and squat (<6cm diam); flesh of **stem** bright lemon chrome at base; **spore print** cinnamon colour; **spores** broadly ellipsoid; **habitat**:

KEY 2

grassy places mainly with oak and less commonly with beech

See *FM* 3 (3):83 and 7(3):91: *Rubinoboletus rubinus*

K2 Cap dry or slightly greasy at most when wet; stem smooth, granular-punctate or reticulate-punctate

↓**N1 Tubes variously coloured but when red, then the fruit-body large and bulky; stem** cylindric or swollen; **pores** round; tubes and flesh unchanging or ± blueing when bruised; clamps generally absent

Boletus (36)

↓**N2 Tubes carmine or rich cinnamon colour**, fruit-body generally small, less than 6cm diam; **spore print** cinnamon-colour

See above L3: *Rubinoboletus rubinus*

↓**N3 Fruit-body almost uniformly coloured in some shades of tawny, fulvous or yellow; tubes** subdecurrent to slightly decurrent; **spores** small, ellipsoid rarely >9µm; **habitat**: conifer stumps and sawdust

Was *Pulveroboletus*, now *Buchwaldoboletus* (2)

N4 Stem narrow cylindric; tubes angular and adhering to each other, in some species turning blue on bruising

Boletus sg *Xerocomus*

[AM: In BFF1:13 and CBIB it is included in the *Boletus*]

↓**E3 Spore print dull pink as are also the tubes; stem** with a net; **taste** bitter

Tylopilus felleus

E4 Spore print purplish-brown; tubes and pores vinaceous brown bruising bluish green and staining one's fingers and white paper blue-green on contact

Porphyrellus porphyrosporus

[BFF1: In North America this is considered a subgenus of *Tylopilus*]

KEY 2

Stem central; genera with **leathery or dry and tough fruit-bodies** which revive by wetting after drying out

Spore print colour 1

A1 Small fruit-bodies; cap with long slender, dark brownish hairs margin often appendiculate with fibrils or fibrillose scales; **stem** rather thread-like; **spores** J-; **habitat**: grass stems etc, decaying needles and twigs

Crinipellis scabellia

A2 Not combining these characters

KEY 2

B1 Very small, cap usually less than 2 cm

- C1 Stem smooth, growing on plant debris in wet places; cap cuticle** hymeniform or composed of broom cells or of obviously diverticulate-nodose elements \pm **gelatinous**; black **rhizomorphs** present in some species

For details see KEY 23: *Marasmius* (27)

[DL: Can be confused with a small *Collybia* but that genus has non-insititious, non-horse-hair stem, and has cylindric, repent encrusted hyphae in the cap cuticle.]

- C2 Stem** central, eccentric, lateral, or occasionally absent, **usually with pruinose, pubescent, or tomentose covering**, often short, sometimes brownish from the base, never black and horse-hair-like, **and never with black rhizomorphs**, insititious or subinsititious, i.e. lacking basal hairs (if with a basal mycelium then with a distinct rameales-structure in cap cuticle); **cap** 0.3-3 cm, whitish to ochraceous; **cap cuticle or stem cuticle** or both with a rameales-structure as part of the outermost layer in those species with a basal mycelium; **hyphae** of cap context either not gelatinized, or if gelatinized these hyphae occur in thin zones or pockets; **spores** smooth and globose, ellipsoid, or oblong, **J-**; **habitat**: on dead plant remains *Marasmiellus* (5)

B2 Not so small, cap usually more than 2 cm

D1 Spores J+

- E1 Gills free or adnate, very crowded; cap** 1-5 cm broadly convex or plane; **spores** small (3.5 x 1-3 μ m); **habitat**: on cones or buried cones and woody material

For details see KEY 30: *Baeospora myosura*

- E2 Gills decurrent, not very crowded, cap** 0.2-3 cm, yellowish to brownish to olivaceous brown; stem especially long, tough with fulvous to ochraceous tawny tomentum or strigosity at base; **spores** smooth, ellipsoid, oblong or cylindric; **habitat**: **under conifers but not on cones** *Xeromphalina* (2)

D2 Spores J-

- F1 On cones (usually buried)** of conifers; **cap** 1-2 cm, convex; **gills** subdistant and moderately broad; **cap cuticle** forming a hymeniform layer, so cap is fragile and does not resist damage very well; often atomate at x10 magnification

For details see KEY 30: *Strobilurus* (3)

F2 Not so

- G1 Odour unpleasant, foetid; cap** 0.5-3.5 cm Marasmiuslike, **stem** horse-hair-like, or tapered towards the base, usually fuscous to blackish at least over the base, institious; **cap cuticle** filamentous (cylindric repent not hymeniform or with a rameales structure), hyphae of cutis \pm trama **distinctly gelatinised**; **habitat** on decaying logs, branches, conifer needles or herbaceous stems *Micromphale* (5)

KEY 3

G2 Odour not so unpleasant, though sometimes of garlic; cap cuticle
cellular or filamentous; for other comments see above

For details see KEY 23: *Marasmius* (27)

KEY 3

Stem eccentric, lateral or nil; spore-bearing surface of more or less sharp-edged gills (sometimes anastomosing); **consistency of fruit-body woody, leathery or dry and tough**, some species reviving on wetting after drying out

Spore print colour 1

A1 Gill edge splitting longitudinally, recurving when dry; **cap** 1-4 cm semicircular small, Pleurotus-like; pallid or greyish to greyish brown, densely hairy to tomentose, margin incised and crenate to lobed, dry; **spores** cylindrical, 3-4 x 1-1.5 µm J-; thick-walled **hyphae** in the cap trama; **habitat**: attached to the woody substrate at the margin *Schizophyllum* (2)

[AH: Is probably close to *Fistulina*, and thus an outlier of the agarics.]

A2 Not so

B1 Gill edge coarsely serrate

C1 Spores J+, usually < 8 µm globose and ornamented; gills decurrent; **cap** 0.5-10 (-15) cm; **taste** of raw flesh is acrid-hot or bitter; **habitat**: decaying logs or woody remains of plants *Lentinellus* (6)

C2 Spores smooth and J-, usually > 8µm long ellipsoid, fusoid or cylindric; **cap** 0.5-30 (-40) cm; **gills** smooth to toothed to coarsely toothed; **veil** sometimes present; regular arrangement of **thick-walled hyphae** (wall typically 1 µm or more thick) in the **gill trama** and often hyphal pegs in hymenium; **habitat**: on wood or buried wood *Lentinus tigrinus*

[AM: Now includes *Neolentinus* (3) lumped together under *Lentinus* in NM2 and keying out here.]

B2 Gill edge not coarsely serrate

D1 Spores J+ often very small 4-5x1-2µm sausage-shaped, cylindric or elongate-ellipsoid, smooth; **cap** 5.5-10 cm, occasionally large in *P. Serotinus*, often but not always with a glutinous pellicle (**cap trama** with a gelatinous zone in some species); **gills** typically close to crowded, edges even, either coloured as the cap or yellowish, cinnamon or pinkish-grey; some **hyphae** of gill trama thick-walled; **habit**: single or clustered; **habitat**: on decaying conifer or broadleaf litter and on fence posts *Panellus* (4)

KEY 4

- D2 Spores J-; cap** 1-20 cm, violaceous-tomentose when fresh at least at edge, and **stem** the same, at least at apex, stem mostly well-developed, hairy-strigose; **gill trama** of irregularly arranged **hyphae**, mostly thick-walled; **hyphal pegs** present; subhymenial layer inconspicuous or absent; **habitat:** on decaying wood *Panus conchatus*

KEY 4

Stem eccentric, lateral or nil; consistency of fruit-body fleshy, (those in B1 below are rubbery), fungus not reviving on wetting after drying out

Spore print colour 1

A1 Fruit-bodies usually more than 2 cm diameter (except C2 below)

- B1 Cap cuticle not gelatinous, but a gelatinous layer in flesh below the cuticle, at least in centre of cap** (texture rubbery)

C1 Thick-walled cystidia (metuloids) on gill edge

- D1 Metuloids J-**, except in one species but excretory, thin-walled, dumb-bell shaped cystidia always present; **cap** small to 12 cm **whitish, buff or dull colours**; **a gelatinous layer** in the uppermost layer of the cap; **gill trama** usually gelatinised; **spores** J- smooth or finely punctate; **habitat:** on soil or decaying or living woody plants *Hohenbuehelia* (12)

- D2 Metuloids dextrinoid**, with yellowish crystal-like incrustations on or over their apices; **cap** 0.6-2.2 (-5) cm, **black to blackish-brown or umber-brown, upper layer not gelatinised**; convex-depressed to strongly infundibuliform; **gills** decurrent, blunt, narrow or thick, often forked and reminding one of a *Cantharellus* species, greyish or pallid; **spores** smooth, sub-cylindric often waisted about the centre, thin-walled J-; **habitat:** burned areas, especially sites where fires have been made, such as campfires or bonfires *Faerberia carbonaria*

- C2 No thick-walled cystidia (metuloids)** but marginal cystidia with proliferations and finger-like projections; **cap** 0.2-2.5 cm often greyish or fuscous in colour, often tough and rubbery and often overlooked (small size); **hyphae** of cap trama or gill trama gelatinized with a rameales-structure in the surface of the cap cuticle; spores J- smooth; **habitat:** twigs, trunks and woodland debris

Resupinatus(3)

B2 No gelatinous layer

- ↓**F1 On dead elm, usually standing; cap** 6-30 cm; **spores** 3.5-6µm J- subglobose, (short-ellipsoid or ovoid); **basidia** with various amounts of siderophilous material present but not with abundant siderophilous granules *Hypsizygus* (2)

KEY 4-5

- ↓**F2 On conifers; spores** 4-5x2-3µm subglobose to short-ellipsoid, smooth J-; **cap** 2-8 cm, various shapes, laterally attached by a tubercle, white fleshy, but thin-fleshed and somewhat pliant; **gills** narrow and close to crowded; **habitat:** usually gregarious and in overlapping clusters; **habitat:** well-decayed wood of conifers, especially on moss-covered logs and stumps

Pleurocybella porrigens

- F3 On broad-leaved wood or conifers; cap** 2-15 cm; spore print white, cream-colour, or greyish lilac; **spores** 8-15 µm cylindric or nearly so (ellipsoid) smooth, J-; **hyphae** of gill trama irregular and thin- or thick-walled; siderophilous granules absent; **habitat:** wood of dead or living trees

Pleurotus (5)

A2 Very small fruit-bodies usually less than 2 cm diameter

- G1 Cap with long thick-walled, dextrinoid hairs; cap 4-20 mm; spores** J- or more typically dextrinoid, smooth, broadly elliptical; **cheilocystidia** always present, frequently dextrinoid; **pleurocystidia** absent; **habitat:** twigs and herbaceous stems especially bramble

Rare: *Chaetocalathus craterellus*

G2 Cap without such hairs

- ↓**H1 On wood of hardwoods and on grass stems in heaths;** very small, **cap** <20 mm, *Pleurotus*- or *Crepidotus*-like, white and soft-fleshed; **gills** white finely fringed on edges; **spores** J- small, globose to subglobose, smooth; **cheilocystidia** mostly thread-like and often once-branched

Rare: *Cheimonophyllum candidissimum*

- ↓**H2 On moss, soil or wood; cap** 3-12 mm white

See KEY 5, was *Pleurotellus graminicola* in BFF6: *Crepidotus epibryus* [BFF6: 'The only well-known taxon in *Pleurotellus* differs from all species in *Crepidotus* in its lanceolate, amygdaliform, pale coloured spores.']

- H3 On rotten wood of broad-leaved trees; cap** 1.5-12 cm, white or pale grey; **smell and taste** farinaceous

For details see KEY 25: *Ossicaulis lignatilis*

KEY 5

Stem eccentric, lateral or nil; consistency fleshy, fungus not reviving on wetting after drying out

Spore print colour 2, 3 and 4

A1 Spore print some shade of pink

- B1 Cap cuticle gelatinous, often coarsely veined; cap** 3-7 cm rubbery, bright reddish-pink at first, becoming apricot to flesh-coloured and uniformly wrinkled-

KEY 5

veined; **gills** free to emarginate (adnate-emarginate) interconnected at stem; **taste** bitter; **spores** globose, minutely spiny 5-7 µm; **gill trama** divergent; **spore print** cream-pinkish; **habitat**: caespitose on decaying hardwoods, elm in particular

Rhodotus palmatus

B2 Cap cuticle not gelatinous, spores J-

C1 Spores smooth, not angular in any view

D1 Spores ellipsoid or lacrymoid smooth or slightly ornamented with small verrucae; cap cuticle typically a cutis

some small members of *Clitocybe*

D2 Spores cylindric to sausage shaped 4-5x2-3 µm; cap 2-8 cm fan-shaped and densely tomentose, bright orange-yellowish at first; **smell** strong, nauseous (coal gas, cabbage); **gills** bright orange-yellow; **spore print pinkish cream** but slowly fading to white after storage; **habitat**: broadleaf and conifer wood. It is compared with *Tapinella* in FM 6(2):64.

Phyllotopsis nidulans

C2 Spores angular at least in one view

E1 Spores ellipsoid, angular in all views; cap 0.6-3 (-5) cm; stem can be well developed in some species and then eccentric to lateral and usually very narrow, up to 2 (-6) mm thick at apex; **habitat**: wood or more rarely on decaying fruit- bodies of other fungi such as *Cantharellus cibarius* or polypores

For details see KEY 24: *Entoloma* sg *Claudopus* p.p

[AH: Note that *Crepidotus* in this key includes one species, *Crepidotus epibryus*, with a pink spore print which can be confused with *Entoloma* sg *Claudopus*.]

E2 spores angular in polar view

F1 Spores longitudinally ribbed (view end on) ellipsoid to elongate in profile view, with 5-10 evenly spaced longitudinal ridges (to get a good view of these ridges the spores must be examined under high power, with enough water under the cover slip to allow them room to tumble over); **cap 0.5-3 (-4) cm** mostly white, grey or greyish brown; **smell** farinaceous; **gills** soon pinkish or flesh-coloured from spores; **habitat**: soil, decaying wood, living herbaceous plants, or dung

Clitopilus (7)

F2 Spores obscurely to distinctly undulate and pustulate, angular in polar view; **cap 0.5-5 (-10) cm** white, flesh-brown, yellow-brown, orangey (yes in *Oxford English Dictionary*!), greyish brown, or dark greyish in colour, cap mostly convex or depressed, dry or moist, typically glabrous, very thin or moderately thick-fleshed; **cap cuticle filamentous**, so cap is relatively resistant to damage; not atomate at x10 magnification; **gills** often similar in colour to cap; **spore print** pinkish to flesh-coloured or rarely greyish

KEY 5

pink; **habitat**: on soil, in humus, on mosses, amongst grasses, materials, rarely on wood See KEY 24 part of *Entoloma*: *Rhodocybe* p.p.
[DL: Some species possess cystidia with bright golden-coloured contents when mounted in water, potassium hydroxide or ammonia.]

A2 Spore print not pink

G1 Gills often easily separable from cap; cap sometimes with violet tomentum at attachment; cap 2-4 cm, tomentose to velvety, spatulate ± fasciculate; **gills** typically decurrent, frequently intervenose at attachment, buff or ochraceous-brown and often staining darker brown when bruised; **spore print** sienna ± flushed rust-colour; **spores** smooth, rounded ellipsoid more or less thin-walled, lacking an apical germ pore, yellowish to brownish in potassium hydroxide or dextrinoid, J-; **clamp connections** present; **cystidia** absent; **habitat**: on conifer trunks, forming a vivid yellow discolouration in the wood

See KEY 7 for *T. atrotomentosa*: *Tapinella panuoides*

G2 Gills not separating from flesh of cap

H1 Stem usually very short or absent with age; **spores usually minutely rough (oil immersion needed)**, globose, subglobose, ellipsoid-oblong, or ellipsoid-almond shaped (ellipsoid-amygdaliform); **spore print dull brown, fulvous**, rarely flesh- to salmon-pink; **cap** typically 1-4 cm and > (up to 13 cm), fan-shaped, shell-shaped, semi-circular, or almost round; **gills** mostly white or pale greyish at first, one with distinctly bright scarlet on the edges (*C. cinnabarinus*); when mature gills coloured dull brown to rarely pinkish brown.; **clamp connections** present or absent; **habitat**: on wood, twigs etc, rarely on soil See note above at **E1**: *Crepidotus* (13)

H2 Spores smooth: stem character usually helpful

K1 Gill edge white or toothed

L1 Spore print brown to rusty-brownish; cap 0.5 -1.5 cm with yellowish to chestnut brown or rusty brown colours, Pleurotuslike; **gills** ochre to dark rusty brown with whitish-floccose or toothed edge; **stem** shorter than diameter of cap and curved, with or without slight ring; **cap hyphae** not thick-walled, not brown-encrusted; **spores** smooth, elliptical, and with a distinct or indistinct apical pore, rusty cinnamon-ochraceous in potassium hydroxide; some species showing a bright yellow soluble pigment in tissues when mounted in ammonia; **habitat**: decaying wood of hardwood trees. Has been reported from Ireland.

Rare: *Pleuroflammula ragazziana*

L2 Spore print bright brown; cap 0.5-4 cm, suede-like with a mostly felted-tomentose, velvety, or pruinose surface **with olivaceous hues**; **stem** curved or straight often coloured as the cap and covered with a pruinose, velvety surface; **gills** adnate often with a decurrent tooth; **gill edge** often

KEY 6

fimbriate; **habitat:** woody substrates and decaying leaves

For details see KEY 32: *Simocybe* (6)

K2 Gills edge concolorous, some shade of brown; spore print purplish brown to fuscous sepia; cap typically < 1 cm; **stem** very short in relation to cap diameter and usually curved; **gills** typically coloured pale brownish, lacking yellowish soluble pigments in tissues; **spores** smooth and with apical germ pore; **cystidia:** lanceolate to fusoid \pm elongate neck or *Urtica* hair-shaped; **habitat:** decaying woody substrates, debris, fabric, or on decaying parts of bamboo, palms, or other monocotyledons, or on ferns *Melanotus* (2)
[BFF5: Species are separated according to their substrate, spore details and colour of spore print which is critical in separating those growing on marsh plants. FN and NM: found under *Psilocybe*]

KEY 6

Gills free, with or without a ring, no volva

Spore print colour 5

A1 Typically fleshy species; cap cuticle usually a **cutis of filamentous hyphae**, but in some species there may be scattered, erect end cells arranged more or less in a palisade; **cap** 1-15 (-35) cm glabrous **fibrillose, or scaly**, occasionally staining yellowish or reddish on injuring; **cap and stem** flesh white or with yellow, brown, or reddish-brown colours; **stem** cleanly separable from the cap; **ring** in some cases fragile and easily lost; **gills** close to crowded, soon becoming **pink** and finally **purple-brown, chocolate brown**, or almost black when spores mature; **spores** smooth, globose to ovate to ellipsoid, with or without an obscure germ pore; **habitat** typically on soil or leaf litter, in woods or fields *Agaricus* (42)
[DL: Compare with *Lepiota*, *Leucoagaricus*, and *Macrolepiota*, all of which produce white, cream, or rarely pinkish spore prints, *Chlorophyllum* which has a greenish spore print and *Entoloma* which has attached, pink gills.]

A2 Mostly fragile species, easily broken and in many cases deliquescent; cap 0.1-10 cm often conic or parabolic at first and **often plicate-striate over margin**, white, grey, ochre, or brownish at first, often with universal veil material covering surface as micaceous granules or tomentose to flat membranous patches; **gills** usually with parallel sides, white, becoming reddish (as in *C. comatus*) or typically becoming brown or blackish and then eventually deliquescent into an inky fluid in many cases (*C. plicatilis*, etc obvious exceptions); **habitat:** soil, dung, decaying wood, decaying grasses or hay, compost, on lawns, or at base of trees as a parasite of roots (*C. atramentarius*)
Coprinus (105)

KEY 6

A note on *Coprinus*

This note is derived from Derek Schafer's *Coprinus* course notes (2006), FAN6 and AH: personal communications. DNA studies have shown that *Coprinus* cannot remain a single genus. Redhead et al. (2001) have redefined the species which used to be placed in this genus into four genera. Derek Schafer says this, 'The classification is likely to be used in the future. It is acknowledged but not followed in FAN6. The FAN6 scheme, based on the extensive studies of Kees Uljé, is a more convenient way to approach the current British species - i.e. use FAN6 or my key to go direct to the various Sections of *Coprinellus* and *Coprinopsis*.'

[AM: Please note that in Derek Schafer's key (Schafer (2007) the Subsections of FAN6 are defined as Sections. They have not yet been formally published as Sections of the genera summarised below.]

Derek Schafer's illustrated primary key to *Coprinus* s. l. appears on page 73 below

Summary of the Features of the New Generic Grouping

- 1) The type species *C. comatus* and *C. sterquilinus* will be the only British species retained in *Coprinus*. They are close relatives of *Agaricus* and remote from the rest of the genus (otherwise near *Psathyrella*): *Coprinus* (2)
- 2) The small group of veil-less species allied to *C. plicatilis* form the new genus *Parasola*: **Veil completely absent**; **cap** (0.4-3 cm) opening flattened-convex (not upturned at edge), strongly plicate, thin and membranous; **cap cuticle** a hymenoderm, **lacking setules** (thin-walled, elongated bristle-like cells protruding from the surface of the cap and visible with a hand lens) but may have narrow thick-walled elongated setae (not usually seen with hand lens except in very young specimens, especially primordia; *P. auricoma* is the only British species with this feature); **stem** lacks caulocystidia; **cap and gills** do not deliquesce but gills may become limp and cystidia dissolve *Parasola* (10)
- 3) The rest are assigned to the two large genera *Coprinopsis* and *Coprinellus* (see I and II below) which are distinguished from each other largely by the characteristics of their veils. In FAN 6 they are separated out into several keys listed below.

I) *Coprinopsis* general features

Cap 0.3-8 cm, **white to grey to grey-brown, usually opening fully when mature**, usually radially grooved, edge becoming torn and often upturning in smaller species; **cap cuticle filamentous**, so cap is relatively resistant to damage; (sometimes may be of cells which are short and fat) **never a hymenoderm, never with setae or setules**; **gills** always deliquescent when sporulating; **veil** present and either profuse and easily rubbed off or attached to cap and sparse, then cuticle clearly filamentous *Coprinopsis* (60)

KEY 7

II) *Coprinellus* general features

Cap 0.2-3 cm, EITHER cap and stem with setules (usually easily seen with a hand lens) with or without a veil in Sect *Setulosi*, OR **usually brown or ochre, never pure white**, long closed and not opening fully flat; fruit-bodies medium sized, fleshy and sometimes fasciculate on wood; **veil** of small, scattered granular flakes, always present at first but often washed away in Sect *Micacei* and covering the whole young cap in Sect. *Domestici*, breaking up into small wooly flecks or patches; **cap cuticle a hymenoderm**, so fruit-bodies tend to be fragile; **gills** deliquescent or not

Coprinellus (33)

Summary of *Coprinus* as treated in FAN 6 (Key numbers refer to FAN 6 keys)

Sect. <i>Coprinus</i>		
Subsect. <i>Coprinus</i>	<i>Coprinus</i>	Key 3
Subsect. <i>Atramentarii</i>	<i>Coprinopsis</i>	Key 4
Subsect. <i>Lanatuli</i>	<i>Coprinopsis</i>	Key 5
Subsect. <i>Alachuani</i>	<i>Coprinopsis</i>	Key 6
Sect. <i>Veliformes</i>		
Subsect. <i>Micacei</i>	<i>Coprinellus</i>	Key 7
Subsect. <i>Domestici</i>	<i>Coprinellus</i>	Key 8
Subsect. <i>Nivei</i>	<i>Coprinopsis</i>	Key 9
Subsect. <i>Narcotici</i>	<i>Coprinopsis</i>	Key 10
Sect. <i>Pseudocoprinus</i>		
Subsect. <i>Glabri</i>	<i>Parasola</i>	Key 1 pp
Subsect. <i>Auricomi</i>	<i>Parasola</i>	Key 1 pp
Subsect. <i>Setulosi</i>	<i>Coprinellus</i>	Key 2

KEY 7

Gills separable from cap

Spore print colour 3 and 4

A1 Gills conspicuously thick and waxy becoming subporiform near stem apex and margin of cap, rich lemon-chrome to luteous (bright yellow to yellow-green), decurrent; **cap** 2-8 cm, **bolete-like when viewed from above**, velvety to subtomentose, turning bluish when exposed to ammonia; **spore print** olivaceous brown.

For details see KEY 27: *Phylloporus pelletieri*

KEY 8

A2 Gills at most anastomosing near stem apex, not becoming subporiform

B1 Brown-rotting saprobes on wood (usually coniferous); cap from 8-15 cm, tomentose to velvety becoming \pm smooth at centre often undulate at maturity; **stem** short, lateral, dark velvety; **gills** typically decurrent and yellowish-brown to ochraceous-brown, often staining darker brown when bruised; **hyphae of gill trama** divergent; **spore print dark yellow-brown to cocoa brown or rust-coloured**; **spores** $<6.5\mu\text{m}$, smooth, rounded ellipsoid more or less thin-walled, lacking an apical germ pore, yellowish to brownish in potassium hydroxide, J- or dextrinoid; **clamp connections** present Was *Paxillus*: *Tapinella atrotomentosa* [See: Henrici. (2004), see also *Paxillus* in BFF1 and 6]

B2 On soil and usually mycorrhizal; gill trama divergent; **spore print** dark yellowish-brown to cocoa brown; **spores** all or mostly $>6.5\mu\text{m}$; ochreous then fulvous **cystidia** present on gill face and stem; **clamp connections** present

Paxillus (2)

KEY 8

Genera which grow as parasites on other fungi

Spore print colours various

A1 Fruit-body with pores; parasitic on *Scleroderma citrina*; **spore print** olivaceous snuff-brown; **habitat**: unique in habitat amongst European boletes and therefore easily recognised

Also known as *Boletus* or *Xerocomus*: *Pseudoboletus parasiticus*

A2 Fruit-body with gills

B1 Stem usually very slender, eccentric, lateral or nil but may be well developed; **spore print** shade of pink; **habitat**: on fungi such as *Cantherellus cibarius* or polypores For details see KEY 24: *Entoloma* sg *Claudopus* p.p.

B2 Stem central

C1 Stem base bulbous, a distortion of the tissues of its host as a sclerotium, scaly; colours not bright; **veil not granular**; **cap** 1-3 cm **dry, scaly or fibrillose**, violet colours; **found singly or grouped** often with brightly coloured scales or disrupted rings covering the stem; **chlamydospores** typically present over the surface of the swollen stem base; **habitat**: growing on *Cystoderma amianthinum* or *Galerina* in the case of *S. contortipes*

Rare, see FM 6(1):10-14: *Squamanita* (3)

C2 No swollen sclerotium at stem base

KEY 9

D1 Hyphae of cap or hymenium eventually producing chlamydospores cap 0.5-2.5 cm; **gills** thickened, reduced or absent; **spore print** colour not stated; **basidia** with conspicuous siderophilous granules; **habitat:** parasitic on either freshly produced fruit-bodies, especially species of *Russula* and *Lactarius* or often on well decayed and unrecognisable fruit-bodies

Asterophora (2)

D2 No chlamydospores produced

E1 Small species of *Collybia* [*C. tuberosa*, *C. cirrhata* and *C. cookei*] are found on blackened or well-decayed mushrooms but do not form chlamydospores For details see KEY 23: *Collybia* p.p.

E2 Larger fruit-bodies with saccate volva; cap 3-5(8) cm; gills free; spore print pinkish, flesh-coloured, or brownish-pink; spores smooth, thick-walled J-; gill trama convergent; habitat: on *Clitocybe nebularis*

Volvariella surrecta

[AM: This species is easy to identify because of its habitat. Not reported in UK on any other fungus.]

KEY 9

Spore bearing surface smooth, veined, wrinkled or folded, or if with gills these are narrow, have rounded edges and may anastomose

Spore print colours 1 and 4

A1 Spore print colour 1; hymenium formed of wrinkled ‘gills’; flesh turns olive green in aqueous solution of ferrous sulphate; **spores** verrucose to verruculose or ridged, spore ornamentation brown; easily recognised because of the strongly violaceous, lilaceous colours, ornamented, coloured spores and upright club-shaped fruit-body; it resembles no other British fungus *Gomphus clavatus* [CBIB: ‘rarely collected and possibly extinct’]

A2 Spore print colour 4; hymenium not as A1

B1 Fruit-bodies erect with distinct cap and central to excentric stem

↓**C1 Hymenium almost smooth** or with shallow veins (not gill-like); **cap** usually dark or sordid shades of brown, grey or black

D1 Fruit-bodies deeply funnel-shaped, membranous, with uniformly dark or sordid colours; **spores** J-; **basidia** 2(-3)-spored; **hyphae** on surface of cap and in the context rather short-celled with some secondary septation; **habitat:** often in large flocks in broad-leaved woods *Craterellus cornucopioides*

KEY 9

- D2 Fruit-bodies strongly sinuate-lobate**, rough-scaly, pale greyish brown to brown; **stem** with yellow tinge, grooved and \pm hollow; **basidia** 4-5spored, **hyphae** thick-walled, short-celled without secondary septation; **habitat**: with *Fagus* and *Corylus*, often on rather rich soil

Pseudocraterellus undulatus

- ↓**C2 Hymenium with shallow, vein-like, anastomosing, very narrow gills**, at most only 2-3 times as deep as wide, glowing a pale, soft yellowish colour in complete darkness when freshly collected; **bright orange pigments** in all parts of the fruit-body; **cap** 5-10 cm strongly depressed to funnel-shaped; **stem** wavy and tapering towards the base; **spores** J-; **habit and habitat**: caespitose at the base of oak and chestnut trees

A very rare, southern species in Britain: *Omphalotus illudens*

- E1 With metuloid cystidia** or yellow or yellow-encrusted at apices; **cap** grey 0.6-2.2 (-5) cm (black to blackish-brown or umber); **gills** often forked and reminding one of a *Cantharellus* species, squamulose; **stem** whitish; **habitat**: in burnt places

For details see KEY 4: *Faerberia carbonaria*

E2 Without metuloid cystidia

- F1 Fruit-body white, minute** (up to 12 mm but mostly considerably less)

- G1** Fruit-body sometimes \pm membranous **with hairs on some part and no obvious cystidia** on gill edge; **cap** 0.3-1.0 cm, white and usually irregularly shaped, **margin** typically appendiculate with a thin, filamentous fringe of veil fibrils made of thick-walled hyphae; **veil** rapidly lost; **cap cuticle** thin layer of thin-walled filamentous hyphae; **gills** vein-like and often forked; **gill trama** J+; spores J+; **habitat**: in wet places on soil, rarely on rotten wood, on twigs and on leaves in damp hollows in woodland and under hedges

Delicatula integrella

- G2 Cap smooth with fusoid cheilocystidia; cap cuticle** hymeniform some with broom cells; **spores** J-; 13 species in CBIB less than 10mm

For details see KEY 23: *Marasmius* p.p.

- F2 Fruit-body not minute**, small to medium size 0.5-9; forked gills or ridges often anastomosing and/or dichotomously forked, **coloured as cap**, decurrent; spores J-; **hyphae** of context and surface not becoming secondarily septate, cells not disarticulating; **habitat**: on soil with conifers and broad-leaved trees

Cantharellus (7)

[DL: *Cantharellus* species included here because they resemble mushrooms but are believed to be allied most closely to non-agaricoid genera such as *Hydnum*. Compare with *Cantharellula*: Cap grey; gills forked dichotomously; differs from *Hygrophoropsis* by its typical preference for moss beds, by its reddish spotting on the gills and cap and by its J+ spores].

KEY 10

C3 Hymenium with distinct, decurrent, forking gills, narrow but more than 2-3 times as deep as wide; **cap** 0.5-8 (-10), white, yellowish, orange-yellow, ochre-pink or brown, Clitocybe- or Pleurotus-like, soft to the touch, not viscid; **gills** decurrent, thin (cf. *Cantharellula*); **spores** dextrinoid, smooth, ellipsoid to cylindrical; **habitat**: on ground and on decayed mostly conifer wood See comment at **F 2** on *Cantharellus* above: *Hygrophoropsis* (3)

B2 Fruit-bodies fan-shaped; stem lateral, absent or occasionally strap-shaped

H1 Flesh soft, putrescent, fruit-bodies greyish or brownish; growing on mosses or on the ground; **hyphae** of cap cuticle with distinctly coloured intraparietal or encrusting pigments; **spores** J-; **habitat**: soil and living mosses, probably not parasitic *Arrhenia* (18)

[AM: Compare with other flap-shaped genera in NM2 p 90 – Tricholomataceae by Gro Gulden]

H2 Flesh tough, not putrescent; hymenium wrinkled often reticulately and poroid, or radiately and then with gill-like plates; **spores** J- allantoid, thin-walled, smooth; **habitat**: wood of deciduous trees often still standing

Plicatura crispa

KEY 10

Fungi with waxy gills: whole fungus especially gills, soft, succulent and with waxy appearance (but not consistency), often but not always, brightly coloured; gills narrow wedge-shaped in cross-section, not separable from cap, decurrent or not decurrent; basidia long and narrow

Spore print colour 1

A1 Spores smooth

B1 Cap cuticle of radially arranged hyphae or a trichoderm or if gelatinised an ixocutis or an ixotrichoderm; **spores** J-, more than 6µm, ellipsoid

C1 Trama of gills divergent; cap small to 15 cm, **white, yellow, brown or black**, often slippery to distinctly viscid with **slimy veil**, sometimes forming a ring, but sometimes dry; **stem** viscid or dry, often pruinose or scaly over apex, rarely finely fibrous from partial veil; this genus is only accurately identified by examining divergent gill trama and by determining relative length of the **basidia** (5-7 times the length of the spores); **habitat**: woodland

Hygrophorus (22)

C2 Trama of gills not divergent; never with a fibrillose or slimy veil joining the stem to the edge of the cap even in young specimens

Gill trama regular, of long cells in sg *Hygrocybe*, colours usually bright, **red, reddish, yellow, or** green, rarely with greyish or brownish colours, clean,

KEY 11

shiny, **glabrous** and at times **lubricous to glutinous** or at times minutely **squamulose**; **cap** (0.5-) 1-8 (-12) cm; **habitat**: mainly pastures and heaths

Hygrocybe (58)

[When **gill trama** is **irregular, interwoven** (**cap colours** never bright, mostly white orange or violaceous; **cap cuticle** sometimes truly cellular) this becomes sg *Cuphophyllus* and when it is subregular but of short cells, sg *Pseudohygrocybe*. *Cuphophyllus* is a synonym of *Camarophyllus* which is distinguished from *Hygrocybe* by some (e.g. NM2, MM). Others have this only as a subgenus.]

B2 Cap cuticle a palisade or hymeniform layer of inflated globose or pyriform cells at least when young; **cap** 0.5-3 cm, greyish or brownish; **stem** coloured as the cap; **gills** decurrent usually very distant, greyish or brownish, never bright; **spores** less than 6 μm , smooth with an apical germ pore; **chrysocystidia** in hymenium

Camarophyllopsis (5)

A2 Spores spiny; cap 0.5-20 cm hygrophanous; **stem** often longitudinally striate and fibrous; **gills** **hardly waxy**, adnate to decurrent, pinkish, violaceous, or lilac-coloured; **spores** J-, globose to somewhat ellipsoid (or elongate in a single sand-dune species), spiny; **basidia** less than 5-7 times the length of the spores

Laccaria (9)

[RW: *Laccaria* is no problem when spores are spiny but they are less spiny in *Laccaria maritima* - CBIB: 'still known only from Morayshire (Culbin Sands) where first appeared in 1912.' AM: Another with waxy gills is *Cantharellus* – gills as veins or wrinkles, included in KEY 9]

KEY 11

Gills and flesh (or flesh only) brittle due to groups of rounded cells, in *Lactarius* the flesh producing fluid, often milky, on breaking

Spore print colour 1

Spore ornamentation J+, so spores *en masse* are J+

A1 Producing a milky or watery fluid which can turn red, yellow, lavender or green, on cutting or breaking the flesh, it can stain often with unique colours, like grey, dark brown or black, and odd smells; **cap sometimes concentrically zoned, colours often dull**, never really strong except if orange or yellow; **gills** mostly decurrent, 2 full length gills separated by 1-5 shorter ones; **spores** with distinct ornamentation in the form of warts, points or ridges; **sphaerocysts** if present never extending near the gill edges

Lactarius (73)

KEY 12

- A2 No fluid on breaking; cap colours often bright; gills rarely decurrent;** cap shape remarkably constant; at first convex, then soon becomes broadly but shallowly depressed, and at maturity becomes uplifted; **gills** mostly of a single length and lamellulae are absent or occur sporadically except in one small group (of the *Compactae* with dull coloured caps) which have 1-3 lamellulae - *Russula cyanoxantha* is also an exception; **spores** strongly ornamented with separate warts or short ridges or reticulations; **sphaerocysts** generally present in the gill trama and extending well towards the gill edge *Russula* (138)

KEY 12

Gills free; a membranous ring on stem; universal veil absent or poorly developed and friable flocci on stem base or movable scales on cap

Spore print colour 1

- A1 With Volva; cap up to 20 cm in diameter, with warts or flat patches from universal veil** (tissue present in some species, or these superficial tissues often absent in other species); **stem** typically cleanly separable from cap; **volva** cup-like or collar-like or present as a soft powdery tissue which is easily rubbed off, often fragile and easily destroyed when specimens are collected; **gill trama** divergent; **spores** smooth, thin-walled J+ or J-; **habitat:** soil or leaf litter in woods or fields near trees - most species thought to be mycorrhizal *Amanita* (36)

A2 With no volva

- B1 Cap cuticle hymeniform or cellular** (atomate under hand lens in good light and easily broken up)

- C1 Cap cuticle hymeniform; cap** 2-8 cm, smooth, slightly viscid, often with a fruity or musty smell; **stem** peronate, often exuding rusty-orange drops in moist conditions; **ring like a boot or sock; cheilocystidia and pleurocystidia** present Was *Drosella* is now *Chamaemyces fracidus*
[DL: *Chamaemyces* can be distinguished from all other *Lepiota*-like mushrooms on the basis of its hymeniform cap cuticle and its ochraceous cream-coloured spores.]

- C2 Cap cuticle of spheroid cells** (rounded or elongated); **cap** 0.5-5 to rarely 9 cm, granulose-powdery at first, often white, buff, beige, lilac to dull lavender, or pinkish; **ring mostly not well formed**, of granular material soon lost when cap expands, often leaving a well defined clear ring-like area near the stem apex; **stem** usually <4mm diam; **spores** without germ pore, J- or dextrinoid

Cystolepiota (6)

KEY 12

B2 Cap cuticle mainly filamentous, so cap is relatively resistant to damage; not to-mate at x10 magnification

D1 Cap 2-12 cm **viscid to slimy, smooth**, white, yellow, brown, orange-brown, red-brown to red; **stem** often viscid to slimy below ring in young stages; **spores** small, 3-6 μm in longest dimension, often sub-globose or globose, J-; **gill trama** in young specimens distinctly divergent; **cap cuticle** an ixo-trichoderm; **habitat**: on the ground or on well-decayed wood *Limacella* (6)

[DL: *Limacella* is an *Amanita* with a viscid to slimy universal veil. The volval part of the universal veil is often lost as the fruit-bodies mature. However, the presence of a thin to thick slime layer over the cap and on the stem below the ring are diagnostic characters for the genus.]

D2 Cap dry, rarely smooth, usually at least a few fibrils or scales in centre

E1 Cap margin soon striate-sulcate and often splitting, often with a mealy, floccose or fibrillose covering; **fruit-bodies rather delicate, small** to medium sized; **cap** 1-10 cm, thin, like a *Coprinus* without movable ring; with large **pseudoparaphyses** often abundant in hymenium; **no clamps**

Leucocoprinus (6)

[RW: Those with spores that do not have a germ pore do not have a striate sulcate margin either. AH: 10 greenhouse aliens have also been recorded.]

E2 Cap margin not sulcate (or only inconspicuously) and if flesh reddening then ring movable

F1 Cap bald, downy-mealy

G1 Smaller types with silky cap (2-5 cm); **gills** lilac-brown, old brown or white (and then cap also \pm white); **ring** fugacious; **cap cuticle** of prostrate hyphae *Pseudobaeospora* (5)

[DL: Compare with *Cantharellula*, which differs by its repeatedly dichotomously forked gills and by its presence of clamp connections on the hyphae of the fruiting bodies.]

G2 Medium to large Lepiota-like; cap 5-8(10) cm, glabrous or **innately fibrous, or pruinose-matt** not sulcate or striate at margin; ring membranous, sometimes (when old) movable; **gills** soft and often close to crowded, joined in a collarium; **spore print** can be cream or pinkish; **cap cuticle** a trichoderm or trichodermal palisade; **spores** $<12 \mu\text{m}$ in length with apical germ pore; **no clamps; pseudoparaphyses** scarce or absent

Leucoagaricus (23)

F2 Cap surface scaly or mealy-scaly, but not pruinose-matt

H1 Cap medium-sized to large, 5-20 cm and more, **coarsely scaly to branny-flaky**, but crown smooth, not sharply scaly; **ring** membranous, often complex, on drying moving freely; **spores** usually over 9 μm long, with large obvious germ pore; usually with **clamps** *Macrolepiota* (10)

KEY 13-14

H2 Cap at most 5-6 cm or if larger (to 12 cm) then sharply scaly; cap and stem cleanly separable; **stem** with a well defined clear area at apex with or without membranous to woolly-boot-like ring; **gill trama** not divergent; **spores** lack a germ pore; **habitat:** on soil or on dead or living plant materials *Lepiota* (42)

[DL: For an accurate understanding of which species belong in *Lepiota* and which belong in the other segregate genera, i.e. *Macrolepiota*, *Leucoagaricus*, etc., refer to Moser (1983). Compare *Limacella* and note in it the hyphae of the gill trama are divergent, and it also has a viscid cap and a slimy universal veil.]

KEY 13

Gills free, no ring, no volva no partial veil or not web like, not leaving a ring of fibrils on the stem

Spore print colour 3

A1 Cap atomate, dry with an even margin; cap cuticle cellular; **cheilocystidia** strongly lecythiform; **gills:** ‘occasionally free’

For details see KEY 31: *Conocybe* (67)

A2 Cap viscid to glutinous and thin-fleshed, becoming plicate-striate at least along the margin with age, 0.4-4 cm soft and easily collapsing, not deliquescent; **cap cuticle** hymeniform; **gills** close to crowded; **spores** with an apical germ pore and often truncate; **cheilocystidia** never lecythiform; **habitat:** on wood, fertilized grass, manure, or manured soil *Bolbitius* (5)

KEY 14

With free gills, with ring and no volva

Spore print colours green or dirty olive brown

A1 Cap small, up to 3 cm, like a small *Lepiota*; gills bluish green, green or wine-reddish at first; **cap and stem** powdery from universal veil composed of globose cells (sphaerocysts); **veil:** appendiculate;; **spore print** green to olivaceous or reddish when fresh, becoming fuscous to brownish-purple on drying; **spores** appearing minutely punctate-rugulose when viewed under high power *Melanophyllum* (2)

KEY 15-16

- A2 Cap usually larger**, to 9.0 cm, with low umbo; **gills crowded** white to yellowish at first becoming olivaceous with greenish sheen; **stem** widening downwards to a truncate base and darkening with handling; **ring** conspicuous, ascending often moveable; **smell** like carrots; **spores greenish or greyish-olive**; **habitat**: indoors with imported plants, **toxic**, is tropical to subtropical and found there typically in grassy areas and in fairy rings *Chlorophyllum molybdites*
[FAN: This is a very toxic agaric, causing gastrointestinal problems, especially when eaten raw - worse for children than adults.]

KEY 15

With membranous ring on stem; no volva; gills adnexed or adnate

Spore print colour 1

- A1 Cap viscid**, white, grey or pale brown; **growing on beech** *Oudemansiella mucida*

- A2 Cap dry, both cap and stem covered with a granular to powdery covering**, easily rubbed off; **gills** never free; **veil** granular of \pm globose cells; **cap cuticle** typically an epithelium; **habitat**: soil or wood

For details see KEY 17: *Cystoderma* (8)

KEY 16

With membranous ring on stem, no volva, or a rudimentary one almost too faint and transitory to be worth mentioning, gills adnexed or adnate, sinuate or emarginate (adnate-emarginate)

Spore print colour 3

- A1 With a granular veil** of globose, ellipsoid, or subfusiform cells; **cap** pruinose to granular; **gills** rusty-yellow; **stem** with a flaring or pendant membranous ring, stem below the ring pulverulent to granular as the cap; **cap and stem cuticle** an epithelium *Phaeolepiota aurea*

- A2 No granular veil**

B1 Spores smooth

- ↓ **C1 Medium to large species, cap 5-10 cm \pm squamose or squarrose**; filamentous hyphae forming a cutis in the cap cuticle, so cap is relatively resistant to damage; not atomate at x10 magnification - cuticle neither cellular nor hymeni-

KEY 16

form - with clusters of erect cells in scaly forms; **ring** sometimes fugacious; **spores** with distinct apical germ pore; has either abundant **pleurocystidia** or has **chrysocystidia** For details see KEY 20: *Pholiota* (10)

- ↓C2 **Medium species**, often **caespitose**; **cap** 0.5-6(-10) cm, **glabrous, moist to subviscid**, darker brown colours, darker cinnamon to ochre-brown when moist, (typically not white or bright yellowish), translucent-striate and strongly hygrophanous; **stem** scaly or glabrous below annular zone; hyphae of **cap cuticle** cylindric and repent; **spores** smooth and with a **broad apical germ pore**, more or less thin-walled; usually **no pleurocystidia**; **cheilocystidia never present**; **habitat**: mostly on decaying wood, sawdust, wood chips, or on soil but arising from buried wood *Kuehneromyces* (2)

- C3 **Small to medium species, usually hygrophanous** cap 0.2-6 cm, mostly ochraceous to flesh-coloured, cinnamon or reddish-brown; **cap cuticle of filamentous hyphae forming a simple cuticle of cylindric, repent cells** so cap is relatively resistant to damage; not atomate at x10 magnification; ; **spores** thin walled and collapse in potassium hydroxide

For details see KEY 31: *Tubaria* (9)

B2 Spores usually rough (smooth in a few individual species)

- D1 **Spores small, with dimensions ranging from 3-5 (- 6) x 3-5**, globose or subglobose, pale brownish and echinulate or verruculose in water, and quite distinctive because of these spore characteristics; **cap** 0.3-5.5 cm; **stem** with a fugacious cortinate or felty membranous veil, mostly ornamented with pruina or fine fibrillose scales; **gills** decurrent or adnate, brownish with age

For details see KEY 28: *Ripartites tricholoma*

D2 Spores larger

- E1 **Stem base swollen, with rudimentary submarginate volva**; **cap** 4-12 cm. clay-coloured or ochraceous brown sparingly clad with adpressed, evanescent, whitish filmy scales; **spores** ellipsoid to amygdaliform, warty and wrinkled, rather large, 12-14 x 7-9µm and dextrinoid; **hyphae of tramal tissues** J+ incrustated in part. Smith et al: say, 'a *Cortinarius* with a membranous partial veil.' *Rozites caperatus*

E2 Stem base not swollen no rudimentary volva

- F1 **Cap glabrous hygrophanous** margin often **translucent-striate**, 0.5-3.5 cm. unchanged by alkali; **taste** not bitter

For details see KEY 31: *Galerina* (46)

- F2 **Cap dry**, not translucent-striate 1-15 (20) cm. becoming blackish when alkali solutions are applied (ie potassium hydroxide or ammonia); **taste** often (distinctly) bitter; **spore deposit** bright to rusty-orange; **habitat**: on woody substrates

For details see KEY 20: *Gymnopilus* (12)

KEY 17

With membranous ring on stem, gills sinuate

Spore print colour 1

A1 Veil granular, of \pm globose cells, sheathing the lower part of the stem; cap and stem covered with a granular to powdery covering which is easily rubbed off; **stem** often pallid above ring; **gills** attached, never free; **spores** J+ or not; **cap cuticle** typically an epithelium with globose to cylindric or ellipsoid inflated cells, some species with inflated pedicelled end cells; **habitat:** on soil or woody material

Cystoderma (8)

[DL: Compare with *Cystolepiota* (KEY 12) which has free gills and spores which may be dextrinoid but never amyloid.]

A2 No such granular veil

↓**B1 Cap fleshy and large** 3-15 (20) cm, **scaly especially when young**, margin inrolled at first and usually ornamented with velar material; **gills** whitish or cream, clay pink to pinkish cinnamon, often spotted with age; **gill trama** regular to slightly, although distinctly, divergent; **spores** ellipsoid with prominent apiculus, **J+**, or if **J-** then the partial veil is double (*A. mellea* spores have a peculiar structure with fine longitudinal ridges like a *Clitopilus*); **caespitose to fasciculate** or crowded in small to large troops, rarely solitary; **habitat: on wood** or attached to wood by black rhizomorphs

Armillaria (6)

↓**B2 Cap medium to large**, 2-16 cm; **spores** smooth, typically ellipsoid to subglobose **J-**; hyphae of **cap cuticle** cylindric and forming a cutis; **no cystidia** so no distinguishing micro characters; **habitat:** growing on ground. In popular keys species are separated from one another using macro-characters.

For details see KEY 25: *Tricholoma* (47)

B3 Cap small to medium (0.5-) 2-6 (-10) cm **Tricholoma-like, white or brightly coloured**; **odour** often farinaceous. This genus can only be identified accurately after siderophilous granules are observed in the basidia.

For details see KEY 30: *Calocybe* (8)

KEY 18-19

KEY 18

With membranous ring on stem, gills sinuate

Spore print colour 5

A1 Cap viscid, usually brightly coloured; cap cuticle filamentous, so cap is relatively resistant to damage; not atornate at x10 magnification, lacking a cellular or subcellular hypodermium (see comments under *Hypholoma* in KEY 22 for differences between this and *Hypholoma* and *Pholiota*); **spore print** violaceous-fusous, lilac-fusous, purplish-brown or violaceous-grey

For details see KEY 33: *Stropharia* (17)

A2 Cap pale or dull coloured, usually strongly hygrophanous and then atornate; **flesh of cap** and especially stem typically very fragile; **cap cuticle cellular or hymeniform**; **spore print** dark cocoa, chocolate, blackish, purplish-fusous, or in some species dull reddish-coloured to pinkish-grey

For details see KEY 33: *Psathyrella* (73)

KEY 19

No membranous ring on stem; partial veil fibrillose or web-like, leaving a ring of fibrils on the stem; gills never free

Spore print colour 1

A1 Stem base with abrupt marginate bulb; cap 5-10 cm, with a pale cortina connecting the margin or the cap to the bulb at stem base; **cap** reddish-brown, often covered with pallid veil remnants and with remnants of cortina hanging from the margin; **spores** smooth, hyaline; 'a white-spored *Cortinarius*'

Leucocortinarius bulbiger

A2 No marginate bulb; veil granular, of ± globose cells sheathing the lower part of the stem; both cap and stem covered with a granular to powdery covering which is easily rubbed off; **gills** never free

For details see KEY 17: *Cystoderma* (8)

KEY 20

KEY 20

Gills attached; no membranous ring but partial veil leaves a ring of fibrils on the stem.
(NB some species in KEY 16 can occur with these features, so if the fruit-body does not key out here, then cross-check in that key.)

Spore print colour 3

A1 Spores rough

- B1 Cap 1-16(-20) cm, surface dry, becoming blackish when alkali solutions are applied** (potassium hydroxide or ammonia); **taste** often (distinctly) bitter; **spore print** bright to rusty-orange; **stem** usually without a ring, but *G. junonis* characteristically has a fibrillose or submembranous annular zone on the stem apex; **spores** finely ornamented with bumps and low ridges, no germ pore, no plage; **clamp connections** always numerous; **cheilocystidia** present, usually ventricose with tapering apex and ± capitate tip; **pleurocystidia** of same type sometimes present; **habitat**: woody substrates *Gymnopilus* (12)

B2 Cap cuticle not stained blackish by potassium hydroxide or ammonia;

- C1 Fruit-bodies with a well-developed cortina in young specimens; cap** small to 20 cm; **gills** often distinctly and richly coloured when young, becoming rust brown from spore production, variously attached from sinuate to subdecurrent; **stem not rooting**, typically fleshy, even when narrow, with or without distinct remnants of cortinate partial veil, surface dry or viscid; **spores** brownish or rust brownish in potassium hydroxide or ammonia, or water and warty or appearing finely wrinkled, (not thin-walled and collapsing readily), lacking a plage; **cheilocystidia** lacking in most species; **habitat**: typically terrestrial and forming mycorrhizae with woody plants or shrubs

See note below: *Cortinarius* (226)

[C&D say, 'Extremely difficult. A single specimen cannot be identified. Specimens of all ages and in good condition are needed.']

- C2 No cortina even in young specimens; cap 1-8cm typically brittle; stem** often rooting, spindle shaped; **cap** smooth, ± humid or lubricous to viscid ± conical, acutely or obtusely umbonate margin inrolled or strongly incurved at first, shiny, viscid or subviscid when fresh, pinkish-brown, rusty-brown, liver brown, or olivaceous brown to greenish; **gills** often broad, pallid, lilac, violet, or eventually rusty brown from spores; **spore print** rusty brown; **habitat**: on ground, not caespitose, in coniferous leaf litter

For details see KEY 31: *Phaeocollybia* (3)

A2 Spores smooth

- D1 Spores thin-walled and often collapsing in alkali**, no germ pore; **cap** 0.2-6 cm mostly ochraceous to flesh-coloured, cinnamon, or reddish

KEY 20

brown, mostly hygrophanous, convex to expanded-uplifted; **stem** slender and fragile, with or without a ring; **cap cuticle** a cutis

For details see KEY 31: *Tubaria* (9)

[AM: Compare with *Naucoria*, which differs by its ornamented spores which do not readily collapse in potassium hydroxide mounts. *Naucoria* is usually smaller than 3 cm but does go up to 4cm. See Reid 1984.]

D2 Spores not collapsing in alkali

E1 Cap typically 5-10 cm **smooth or with scales**, sometimes viscid, sometimes hygrophanous, often with fibrillose appendiculate margin, most often with bright yellowish, pale yellowish, rust-yellow, or rust-brown colours; **stem** with a **ring** sometimes fugacious and then leaving a distinct fibrillose ring zone; **spores** with distinct apical germ pore; **cap cuticle filamentous**, so cap is relatively resistant to damage; not atomate at x10 magnification, cuticle with clusters of erect cells in scaly forms; **habitat**: mostly on decaying wood, but some on *Sphagnum* or other mosses or on charcoal or humus *Pholiota* (24)

E2 translucent-striate when moist and strongly hygrophanous .

F1 Cheilocystidia usually present and pleurocystidia may be; spores often with plage
For details see KEY 31: *Galerina* p.p.

F2 No chelio- or pleurocystidia, often caespitose; **cap** 0.5-6(-10) cm. darker cinnamon to ochre-brown when moist; **stem** with persistent or ephemeral membranous or scaly ring, scaly or glabrous below annular zone; **spore print** dark brown or cinnamon-brown; **habitat**: mostly on decaying wood, sawdust, etc
For details see KEY 16 : *Kuehneromyces* (2)

A note about *Cortinarius*

PD Orton (1958) said this about identifying species in the genus *Cortinarius*: “When old most of them turn more or less rusty brown and are then often practically indistinguishable from one another; to quote Fries, ‘after becoming discoloured in age or dry weather even the large well-marked species are scarcely separable’; old material is therefore worthless and should be firmly rejected unless accompanied by younger specimens.”

Currently Karl Soop (2005) is the most helpful source of keys for the amateur. Since many species in *Cortinarius* have very similar microscopic findings, Soop concentrates on macroscopic inspection, backed up by chemical tests to tell them apart. To give a feeling for the subgenera I quote his entry key:

Karl Soop's Schematic Key - Main Classification

1	stem viscid	<i>Myxacium</i>
1*	stem dry	2
2	cap viscid	3
2*	cap dry	4

KEY 21

3	taste bitter, cap white to ochraceous, stem without a marginate bulb	<i>Myxacium</i>
3*	taste mild, or cap or stem different	<i>Phlegmacium</i>
4	cap distinctly hygrophanous	5
4*	cap weakly or not hygrophanous	6
5	stem slender (<8 mm)	<i>Telamonia B</i>
5*	stem thicker	<i>Telamonia A</i>
6	fruit-body entirely dark violet, cap felly, tomentose	<i>Cortinarius</i>
6*	fruit-body different	7
7	gills with a grey, brown, or violaceous tinge	<i>Sericeocybe</i> s.l.
7*	gills with an olive, yellow, orange, or red tinge	8
8	stem slender (<8 mm)	<i>Dermocybe</i>
8*	stem thicker	<i>Cortinarius</i> s.l.

KEY 21

No membranous ring; partial veil present; gills attached

Spore print colour 4

A1 Cap cuticle cellular

For details see KEY 32: *Agrocybe*

A2 Cap cuticle filamentous

B1 Cap usually radiately fibrillose-scaly or fibrillose; spores smooth, warty or spiny, not rough; small to medium, (up to 6cm); **spore deposit** dull earth brown, tobacco-brown or dull yellow-brown; the cut flesh produces odours which are not radish-like but are more often spermatic or fruity; **gills** adnate to adnexed, edges white and often appearing finely fringed; **stem** white-pruinose to finely scaly over apex; **cheilocystidia** present often with thick walls and crystal-incrusted or large and inflated with thin walls
Inocybe (114)

C1 Spore outline smooth, ovoid, ellipsoid, reniform or phaseoliform sg. *Inocybium*

C2 Spore outline wavy-angular, nodulose, stellate or spinose sg. *Inocybe*

B2 Cap smooth,

D1 Spores rough; fruit-bodies *Tricholoma*-like; **cap** viscid, white or pale hazel to cocoa-brown, generally glabrous but some with patches of veil material over margin; **smell of cut flesh often radish-like** when present; **gills** greyish brown

KEY 22

to cocoa-brown over faces from developing spores, edges white-marginate; **stem** white-pruinose to furfuraceous; **spores** warty; **cheilocystidia** present, typically abundant

Hebeloma (33)

[*Naucoria* belongs here also (Cap size up to 4cm) and is detailed in KEY 32.]

D2 Spores smooth with germ pore

E1 Gills dark brown to fuscous with spore maturity and edges remaining whitish from cystidia; **cap** small 0.5-3 cm convex to conic-campanulate, often umbonate or papillate and subviscid to viscid; **spores** smooth, yellow brown to olive or reddish in potassium hydroxide, with an apical pore and truncate at the apex; **cheilocystidia** thin-walled; no **chrysocystidia**

For details see

KEY 33: *Psilocybe* (19)

E2 Gills pale brown to cinnamon; cap 0.5-6(-10) cm translucent-striate, darker cinnamon to ochre-brown when moist and strongly hygrophanous; **cap cuticle** has inflated or subcellular hyphae below it; **ring** persistent or ephemeral, membranous or scaly, scaly or glabrous below annular zone; **spore deposit** dark brown or cinnamon-brown; **habitat**: on decaying wood, sawdust, etc and often caespitose

For details see KEY 16:

Kuehneromyces (2)

KEY 22

No membranous ring; partial veil fibrillose or weblike leaving ring of fibrils on stem (See also KEY 29 – genera with decurrent gills, some with a veil)

Spore print colour 5

A1 Cap 1-6(-10) cm **squamulose**, strongly tomentose-scaly, fragile; **stem** typically with dark fibrillose to scaly covering below annular zone, often very fragile; **veil** present but often fugacious and only recognisable in buds but in some strongly developed, forming ring zones; **gills** becoming spotted or mottled dark brown at maturity, some fruit-bodies exuding colourless droplets of fluid when fresh; **spores** with apical germ pore, rough, (warty-verrucose in *L. lacrymabunda*), become quite dark in potassium hydroxide mounts; **pleurocystidia**, at least some, are fasciculate; **habitat**: on soil, humus, decaying logs and stumps

Lacrymaria (3)

KEY 23

A2 Cap usually glabrous and gills not exuding drops of water even when fresh

B1 Cap cuticle cellular, fragile, cap not plicate but can be sulcate, fibrous fibrous-scaly to bald, campanulate or blunt conical; **gills** not as in *Lacrymaria*; **veil** often fugacious and seen only in young specimens

For details see KEY 33: *Psathyrella* (73)

B2 Cap cuticle filamentous, so cap is relatively resistant to damage; not atomate at x10 magnification; **fruit-bodies not fragile**

C1 Cap 1-6 cm fleshy, Collybia-like, campanulate or blunt conical, usually in greens and browns, sometimes brightly coloured, usually with fragments of appendiculate, cottony veil (cortina) on cap or stem; **cap cuticle filamentous**, so cap is relatively resistant to damage; not atomate at x10 magnification, cuticle seated on a layer of inflated hyphae just below surface layer of cap, separating this genus from *Stropharia* and *Psilocybe*; **gills** pallid or greenish at first; **veil** often hanging to cap margin and on stem appearing like a ring due to dropped spores; **spores** smooth with an apical germ pore; **chrysocystidia** present often as pleurocystidia; **habitat**: on living or decaying wood, and deep mosses especially *Sphagnum* and *Polytrichum* *Hypholoma* (15)
[DL: Compare carefully with *Stropharia*, which typically has a distinct ring and lacks inflated or subcellular hyphae below the cap cuticle. Also compare with *Pholiota* which is generally recognizable by its rusty brown to earth-brown spore print.]

C2 Fruit-bodies Tricholoma-, Mycena-, Collybia-, Omphalina- or Pleurotus-like, often in groups, sometimes caespitose, **cap** 0.5-3 (4) cm, dry, viscid or glutinous; **gills** dark brown to fuscous with spore maturity and edges remaining whitish from cystidia; generally lacks chrysocystidia in the hymenium; **cap cuticle** lacks a layer of dilated hyphae beneath it; **habitat** in soil, litter and in grass and moss and on wood

For details see KEY 33: *Psilocybe* (19)

Key 23

No ring, no partial veil, gills adnexed or adnate

Spore print colour 1

A1 Spores J+ or dextrinoid

B1 Spores J+

C1 Fruit-body Tricholoma-like and often hygrophanous, **cap** 2-15 (-30) cm, broadly convex at first, becoming plane, often with umbo, **cap surface** smooth, dull, radially fibrillose, silky to finely tomentose, coloured umber to browns, including olivaceous to greys to milky coffee to cream; **gills** crowded, white; **stem** narrow, equal, terete, fleshy but breaking cleanly, longitudinally striate; **flesh** rather fibrous **spores** warty (J+ actually their warts only) with plage;

KEY 23

cheilocystidia and often pleurocystidia, **long, projecting, thick walled**, often apically barbed, (encrusted); **clamps** absent; **habitat**: on soil, on humus in parks, gardens, woods, on lawns, or in disturbed areas *Melanoleuca* (21)
[DL: Compare with *Leucopaxillus* which has clamps, lacks encrusted cystidia and usually has a thicker, fleshier stem which binds the leafy substrate at its base.]

C2 Fruit-body Clitocybe-like, usually not hygrophanous, large, cap 5-20 cm, **fleshy**, with dense, rather firm texture, mostly white to pale-coloured; **spores** thin-walled, when smooth faintly coloured and when rough then without a plage; **clamps** abundant **stem** rather stout For details see Key 26: *Leucopaxillus* (4)

B2 Spores dextrinoid; cap 2-4 cm, **viscid, Tricholoma-like**, convex, conical white or reddish-brown or pale tawny on the disc; It is literally a *Hebeloma* with thick walled, non-pigmented spores. For details see Key 25: Rare: *Hebelomina neerlandica*

A2 Spores J-

D1 Spores ornamented gills thick waxy, pinkish, violaceous, lilac-coloured or reddish-brown; cap 0.5-20 cm hygrophanous; **stem** often longitudinally striate and fibrous; **spores** globose to somewhat ellipsoid, spiny

For details see Key 10: *Laccaria* (9)

D2 Spores smooth

E1 Stem dark brown velvety from the base; cap yellow with rusty orange centre, viscid rubbery, not easily confused with other genera; **cap cuticle** composed of inflated cells overlying a layer of gelatinised entangled filamentous hyphae with **dermatocystidia** amongst the gelatinised hyphae; **spores** smooth; **cystidia** elongate flask-shaped (lageniform) thick walled; **habitat**: on various types of hardwoods, fruiting mainly during the winter *Flammulina velutipes*

E2 Stem not dark brown velvety

F1 Gills very broad, distant white, ageing yellowish, adnate to becoming adnexed to subsinuate, even subdecurrent; **fruit-body** large but fragile; **cap** 5-10 (-20) cm margin inrolled, radially fibrillose, blackish to brownish at centre, streaked grey-brown; **stem** with white, creeping rhizomorphs attached to base; **common in late spring**; **cap cuticle** of radially repent hyphae with clavate end cells; **habitat**: hardwood, on rotten logs, buried wood and rich humus, rarely on conifers. *Megacollybia platyphylla*

[AM derived from B&K3:182, *Clitocybula lacerata* (Rare, see Key 30), is smaller, cap 4-5 cm, but could be confused with this.]

F2 Gills not so

G1 Cap cuticle cellular

H1 In the short turf of unimproved grassland

For details see Key 30: *Dermoloma*

KEY 23

H2 In other habitats

- J1 The whole cap cuticle (pellicle) easily separable from the context of the cap**, cap 1-10 cm, radially wrinkled, viscid to glutinous, cinnamon to umber or ochraceous black, **cap cuticle** hymeniform above a gelatinised layer; **stem** slender in proportions, smooth or pruinose arising from a long rooting base which is often missed (**always from wood**); **spores** smooth globose or subglobose, usually over 6 µm broad; **cheilocystidia** large and conspicuous; **habitat**: saprophytic or possibly weakly parasitic, connected to roots or to buried wood, usually beech, by rhizomorphs
Xerula (4)

- J2 Whole cap cuticle not separable from the context of the cap**; cap 0.2-5 cm, white, brownish, greyish, or reddish, usually thin-fleshed; **cap cuticle** either hymeniform or of obviously diverticulate-nodulose elements (broom cells - rameales-structure), fruit-body Collybia-, Mycena- or Omphalina-like, usually tough-fleshed and marcescent, smooth or sulcate or wrinkled, glabrous and appearing velvety in some species; **stem** thin and typically tough, horse-hair-like, or like the bristle of a brush or broom, often black, brown or darkly fuscous over base; **gills** attached in various manners, in some species attached to a collar (e.g., *M. rotula* and *M. capillaris*), crowded to distant; **spores** smooth; **black rhizomorphs** present in some species; **habitat**: mostly on dead wood or leaves, on earth, among grasses
Marasmius (27)

G2 Cap cuticle not cellular: two difficult genera described here

- K1 Basidia with siderophilous granules** (other genera with this feature are *Tephrocybe*, Key 30, *Calocybe*, Key 30 and *Asterophora*, Key 7); **cap** 3-15 cm, glabrous, dull to satiny to suede-like, finely tomentose or merely with a hoary sheen, fleshy, mostly Tricholoma- or Clitocybelike with white or various dull grey to brownish or blackish colours; **stem** glabrous or appressed-fibrillose-striate or occasionally velvety; **flesh** becoming blue or blackish on wounding, **or** fruit-bodies growing in a tuft; **spores** mostly globose or ellipsoid, occasionally may be spiny or low warty, **rapidly lose ornamentation** in Melzer's or alkali; **habitat**: soil, sawdust and on decaying wood, often caespitose or gregarious *Lyophyllum* (9)

- K2 Basidia without siderophilous granules**; cap 0.2-5 (-10) cm, **margin incurved to inrolled, at first becoming decurved**, many species **marcescent** when moistened with water, rarely fleshy, rarely decaying readily; **cap cuticle** filamentous, of cylindric, repent hyphae, rarely a trichodermium made up of irregular coralloid terminal elements ('dryophila-structure'), rarely with pilocystidia, hyphae frequently encrusted; **stem usually narrow** and tough or pliant, rarely thick and fleshy, **never horse-hair-like, never insititious**, occasionally developed from a sclerotium, **never with black thread-like rhizomorphs** at base which run in or

KEY 24

over substrate; **smell** never farinaceous; **spores** in a few species rough;
habitat: on soil, humus, leaf and needle litter, and twigs, rotting mushrooms
Collybia (35)

[DL: This genus can be difficult to identify without considerable experience in identifying mushrooms. AM: It also appears in Key 30, but not in Key 34 as the gills in this genus are never truly decurrent]

KEY 24

Fleshy as well as delicate species, gill attachment various

Spore print colour 2

A1 Genera with smooth spores

B1 With saccate volva; no ring, **cap** 1-20 cm, mostly fibrillose, in some species glabrous, dry or viscid, convex to broadly conic-convex, white, yellowish, pinkish buff, and grayish- to blackish-brown. **gills** free, close and soft to the touch; **gill trama** convergent; **habitat**: soil wood, dung and other mushrooms

Volvariella (9)

B2 no volva or ring,

C1 With a distinct odour of cucumbers or fish; **cap** 1-6 cm, *Collybia*- or *Mycena*-like; **stem** tough, rigid; **gills** almost free; **gloeocystidia in hymenium** very large, abundant on stem surface; **habitat**: soil, plant debris and wood

Macrocystidia cucumis

C2 Other smells but not fish or cucumber; **cap** 0.5-7 cm; **gills free to remote**, often broad, close to crowded, and soft to the touch; **stem** easily separable from cap; **spores** smooth, J-; **gill trama** convergent; **cystidia** present as cheilocystidia, typically leptocystidia or metuloids and in some cases, pleurocystidia; **habitat**: plant debris usually on wood

Pluteus (25)

A2 Genera with angular spores

↓**D1 Spores rough, verruculose or warty** *Rhodocybe* (9)

↓**D2 Spores ribbed, best seen when viewed end-on**, otherwise often appearing smooth *Clitopilus* (7)

D3 Spores angular in every view *Entoloma* (165)

A Note on *Entoloma*

Traditionally the angular-spored species were described, following Fries, in five genera, *Entoloma*, *Nolanea*, *Leptonia*, *Eccilia* and *Claudopus*, based on fruit-body shape. *Entoloma* was restricted to the larger species with a fleshy stem and *Tricholoma*-like build. *Claudopus* had the stem absent or short and lateral. The other three had a fibrous stem: *Eccilia* with decurrent gills, *Nolanea* with campanulate caps and *Leptonia* with caps opening broadly at maturity. This approach was still followed in the 1960 checklist

KEY 24

(NCL). Modern workers recognise around a dozen more naturally defined units. Singer in N. America and Noordeloos, the leading European authority, treat these as subgenera of a single broadly conceived genus *Entoloma*. Others, notably Orton and Watling in Britain and Largent in N. America, recognise fairly similar groups but prefer to treat them as independent genera.

Warning: few *Entoloma* species are easy to identify. Unfamiliar species should not be claimed without keying them out from an authoritative source, preferably Noordeloos (2004), or failing that his earlier treatments (1992) or in FAN1.

The following key, taken from a draft prepared by Alick Henrici, relates the subgenera recognised by Noordeloos to the traditional genera recognised in NCL.

Key to the Subgenera of *Entoloma* in Britain

- ↓**A1 Caps** smooth except sometimes at disc, **cap cuticle** a cutis of narrow hyphae 2-10µm wide with few or none of the hyphal ends much wider
 - ↓**B1 Trama** of cap and gills of inflated elements 40-150µm long usually constricted at the septa ('strings of sausages'); **clamps** present throughout; **cystidia** only in *E.inusitatum*; **habit** often substantial but varied, eg. some former *Leptonia* species (*E.politum* group) belong here sg *Entoloma* (c.30)
 - ↓**B2 Trama** of long narrow ± fusoid elements 100-400µm long; **clamps** rare or absent except in the hymenium, in some species totally absent; **cystidia** often absent, when present usually ± cylindric, rarely conspicuous; **habit** usually ± collybioid; **colours** brown to grey (yellow in *E.pleopodium*) sg *Nolanea* (c.40)
 - B3 Trama** intermediate; **clamps** absent; **spores** ± cuboid: (one species, *E.costatum*, v.doubtfully British) sg *Clitopiloides*
- ↓**A2 Caps** finely pruinose; **cap cuticle** a hymenoderm; two rare grassland species in Europe, both British, from a largely tropical group (*E.henrici*, *E.jennyae*) sg *Inocephalus* sect. *Calliderma*
- A3 Caps** rarely smooth, usually fibrillose, squarrose etc at least near disc; **cap cuticle** seldom a cutis and always with fairly plentiful inflated hyphal ends 10-20(-30) µm wide; **trama** ± of *Nolanea* type (see above), never the short inflated elements of sg *Entoloma*
 - ↓**C1 Habit** of sg *Entoloma* (and there in NCL); **cap** fairly smooth; **clamps** rare outside hymenium; large **cheilocystidia** present (*E.excentricum*, rare in dry calc. grassland) sg *Allocybe*
 - ↓**C2 Habit** Inocybe-like; **cap** ± conical, often umbonate, fibrillose/scaly, sometimes with metallic sheen

KEY 25

- D1** Larger grassland species (*Entoloma* in NCL); **clamps** throughout; **pigment** intracellular
- E1** **Cheilocystidia** large, often capitate, plentiful
(*E.porphyrphaeum* etc.) sg *Trichopilus* (6)
- E2** **Cheilocystidia** absent or poorly differentiated
(*E.plebejum* etc.) sg *Inocephalus* p.p. (3)
- D2** Smaller woodland species (*Leptonia* in NCL); **clamps** absent; **pigment** encrusting; **cheilocystidia** large, lageniform, plentiful (= sg *Pouzaromyces* + sg *Inopilus* of Moser) (*E.dysthales* etc.) sg *Pouzarella* (8)
[*E.scabiosum* would key here but is in sg *Trichopilus* for Noordeeloos.]
- C3** **Habit** otherwise; small to medium species, rarely with large cystidia
- ↓**F1** **Habit** Mycena-like (*Leptonia* of NCL)
- G1** Fruit-body pigmented sg *Leptonia* (50+)
- G2** Fruit-body white sg *Alboleptonia* (4)
- ↓**F2** **Habit** Omphalina- or Clitocybe-like (*Eccilia* of NCL)
- H1** Pale or dark, **pigment** intracellular; two largely tropical subgenera distinguished mainly on whether the spores have a basal ridge or a basal facet
sg *Omphaliopsis* + sg *Paraleptonia* (5)
- H2** Dark, **pigment** entirely encrusting sg *Claudopus* p.p. (10)
- F3** **Habit** Crepidotus-like (*Claudopus* of NCL) sg *Claudopus* p.p. (3)

KEY 25

Gills sinuate

Spore print colour 1

- A1** **Cap cuticle cellular**; cap 1-6 cm, Collybia or Tricholoma-like; **spores** J+ in some species. For details see KEY 30: *Dermoloma* (5)
- A2** **Cap cuticle filamentous**, so cap is relatively resistant to damage; not atomate at x10 magnification
- B1** **Spores J+ or dextrinoid**
- C1** **Spores J+**
- D1** (**actually their warts only**); cap 2-15(-30) cm Tricholoma-like, hygrophanous, broadly convex becoming plane, smooth and ± like leather, often umbonate; **gills** crowded white; **stem** narrow and equal, fleshy but breaking

KEY 25

cleanly, longitudinally striate; **habitat**: on soil, on humus in parks, gardens, woods, on lawns, or in disturbed areas

For details see KEY 23: *Melanoleuca* (21)

D2 Cap 3-10 cm, fleshy, and Tricholoma-like, fibrillose-granulose, squamulose or tomentose, **dull coloured** covered with superficial fibrils **or if pale** then with grey-brown scales and dull colours restricted to cap centre; one species bruises blackish on handling; **stem** fleshy and up to 25 mm broad; **smell** mealy or like pear drops; **spores** smooth; **cheilocystidia** typically present; **clamps** present; **habitat**: on humus or soil, often in parks and grassy areas
Porpoloma (3)

C2 Spores dextrinoid; **cap** 2-4 cm, Tricholoma-like, viscid, white or reddish-brown or pale tawny on the disc; **taste** of cap flesh somewhat to distinctly bitter; **smell** of flesh like iodine or like radish; **gills** white or pale ochraceous, edges white-marginate; **stem** white, thickish, pruinose over apex; **spores** thick-walled, smooth, hyaline or pale yellowish in potassium hydroxide; **cap cuticle** of gelatinized, and entangled-repent hyphae **habitat**: in soil or attached to twigs and branches
Rare: *Hebelomina neerlandica*

[DL: This genus is not well known to most investigators. It is literally a *Hebeloma* with thick walled, non-pigmented spores.]

B2 Spores J-

E1 Cap, gills and flesh yellow or yellow-brown; **cap** 1.5-10 (15) cm often yellowish, reddish or purplish-red typically fibrillose to squamulose and with the fibrils or squamules different in colour from the rest of the surface; **gills** attached variously and often brightly coloured like the cap, yellowish, livid, lavender-greyish, the edges often discoloured, eroded or curled; **cystidia** large, conspicuous, voluminous, on gill edge; **spores** smooth, ellipsoid to subglobose; **clamps** present; **habitat**: wood which is above or below the ground

Tricholomopsis (2)

E2 Cap, gills and flesh of other colours

F1 Spore print very pale dirty or creamy pink, most commonly pinkish buff; **cap** 2-20 (-25) cm Tricholoma- or Clitocybe-like, convex to plane or becoming infundibuliform; variously coloured but often white, dull pinkish, tan, orangey, violaceous, to vinaceous-brown; **gills** white to violaceous; **spores** punctate to finely warty or in certain species almost smooth, round in polar view (unlike *Rhodocybe* which may be mistaken for it but has spores angular in polar view); **cystidia** absent; **habitat** on the ground in woods, on compost, in gardens, in lawns, or in parks
Lepista (11)

F2 Spore print white

G1 On rotten wood of broad-leaved trees; **cap** 1.5-12 cm, white or pale grey; **flesh** thin but tough, matt when young becoming silky shiny in places with

KEY 26

age; **stem** usually slightly excentric, tough may be almost absent; **smell and taste** strong rancid mealy; **spores** small 4-6x3-3.5µm, smooth and thin-walled
Ossicaulis lignatilis

G2 Not only on wood

H1 Usually on soil in woods, lawns, **but can grow on** sawdust piles, decaying wood, disturbed sites, or at edges of snow banks (*L. montanum*), **Tricholoma-like, cap** 3-15 cm, sometimes with flesh becoming blue or blackish on wounding, **or** spores triangular, cross shaped or rhomboid, **or** fruit-bodies growing in a tuft; **basidia with siderophilous granulation**
For details see KEY 23: *Lyophyllum* (9)

H2 Always on soil; Tricholoma-like, cap 2-16 cm, **usually solitary, trooping or in rings; cap** surface smooth, radially fibrillose, minutely to coarsely squamulose or squarrose, viscid or dry; hyphae of **cap cuticle** cylindric and forming a cutis; **spores** smooth thin-walled typically ellipsoid to subglobose; **basidia without siderophilous granulation; cystidia** absent so no distinguishing micro characters; in popular keys, species are separated from one another using macroscopic features

Tricholoma (47)

[DL: Members of genera which might resemble *Tricholoma*, such as *Dermoloma*, *Lyophyllum*, *Hebelomina*, and perhaps *Lepista* can sometimes be difficult to differentiate from it using only macroscopic features.]

KEY 26

Gills decurrent, fleshy species

Spore print colour 1

↓A1 Spores dextrinoid; gills narrow and often dichotomously forked, orange or cream
For details see KEY 9: *Hygrophoropsis* (3)

↓A2 Spores J+

B1 Small to medium

C1 Gills forked

D1 Gills often narrow and dichotomously forked cap 1-5 (-7) cm **infundibuliform or umbilicate**, dark brown or grey; has reddish spotting on cap and gills; **clamps present; habitat:** typically prefers moss beds

Cantharellula umbonata

KEY 26

D2 Gills forked but not dichotomously, greyish; **cap** 2-7 cm, brownish or greyish-brown and strongly hygrophanous; **spores** smooth; **clamps** absent; **habitat**: on decaying wood, beds of leaves or needles, on soil, or among moss *Pseudoclitocybe* (3)

C2 Gills not forked; **cap** 2-5 cm, Omphalina-like, mostly ochraceous, clay-coloured, medium yellow brown or dark cinnamon brown, typically hygrophanous, glabrous; **stem** concolorous with the cap, terete or compressed; **gills** deeply decurrent, white or brownish; **spores** smooth; **cap cuticle** of hyphae with pigment in the hyphal walls or encrusting; **clamps** present; **habitat**: on soil, humus, or charcoal For details see KEY 34: *Pseudoomphalina* (2)

B2 Large or very large (2) 5-20 (40) cm, **Clitocybe-like**; **cap** plane or depressed, white to pale brownish, fleshy; with dense, rather firm texture, not hygrophanous; **stem** rather stout; **gills** crowded, often forked and anastomosing towards the stem; **spores** thin-walled, when smooth faintly coloured and when rough then without a plage but with **strongly J+ ornamentation**, mostly composed of warts; **cystidia** usually absent or poorly differentiated; **clamps** present; **habitat**: with conifers or broadleaf trees *Leucopaxillus* (4)

A3 Spores J-

E1 Growing in dense tufts

F1 Cap 5-10 to 12 cm **strongly depressed to funnel-shaped, bright orange**, with orangey-yellow pigments or with olivaceous overtones; **gills** orangey, narrow, close; **habitat**: decaying wood of hardwoods, typically oaks

See KEY 9, a rare, southern species in Britain: *Omphalotus illudens*

F2 Cap duller and different (can grow singly or trooping also)

G1 Cap 3-15 cm fibrillosely scaly at centre, fleshy, Tricholoma-like but with a ring or ring zone; **gills** have yellowish salmon tint; **spores** broadly ellipsoid; **basidia** without siderophilous granulation

For details see KEY 17: *Armillaria* (6)

G2 Cap 3-15 cm **smooth, dull to satiny to suede-like**; **basidia** with siderophilous granulation

For details see KEY 23: *Lyophyllum* (9)

E2 Growing singly or trooping,

H1 Spore print pale yellow, pale ochre or darker; **cap** 0.2-6.0 cm mostly ochraceous to flesh-coloured, cinnamon, or reddish-brown

For details see KEY 31: *Tubaria* (9)

H2 Spore print white (or pale pink or pale lilac)

J1 Stem central, mostly fleshy or fleshy fibrous, although cartilaginous in several species; **cap** 0.5-30 cm convex, plane, depressed, or infundibuliform, glabrous, fibrillose, or canescent; **gills** broadly adnate to distinct-

KEY 27

ly decurrent, thin, not waxy; **spore print** white, cream coloured, pinkish-buff or pinkish-flesh-coloured; **spores** smooth or slightly ornamented with small verrucae; **cap cuticle** typically a cutis; **habitat**: soil, humus, or decaying wood *Clitocybe* (38)

[DL: Many genera may be confused with *Clitocybe*. *Cantharellula* differs by its dichotomously forked gills and its J+ spores, *Hygrophoropsis* by its dichotomously forked gills and dextrinoid spores and *Laccaria* by its waxy-looking gills and its typically echinate to echinulate spores (but see *L. maritima*). *Lepista* produces pale pinkish-buff spore prints. *Omphalotus* differs by its lignicolous habit and orangey gills. *Tricholomopsis* has a lignicolous habit and large to voluminous cheilocystidia.]

- J2 Stem often excentric to lateral or absent; cap** 2-15 cm, more or less one-sided, **colours** not vivid, whitish, grey and greyish, pale tan; **spore print white**, cream, or greyish-lilac; **spores** elongate often cylindric; **habitat**: on living or dead trees
For details see KEY 4: *Pleurotus* (5)

KEY 27

Gills decurrent, species both large and small

Spore print colour 3

- A1 Gills conspicuously thick and waxy becoming subporiform** near stem apex and margin of cap, rich lemon-chrome to luteous (bright yellow to yellow-green); **cap 2-8 cm bolete-like when viewed from above**, velvety to subtomentose, turning bluish when exposed to ammonia; **dark brick-colour or bay with a distinct** olivaceous flush, retained even on drying, **cap cuticle** of oblong, short glabrous pale brown hyphae 10-20 µm broad; **spores** fusiform to ellipsoid-elongate; **hyphae of gill trama divergent**; **spore print** olivaceous brown (olivaceous ochre in BFF1); no clamp connections; **habitat**: on the ground in broad-leaved woods

Phylloporus pelletieri

[CBIB: often taken at first sight to be *Boletus chrysenteron*.]

A2 Gills never forming pores

- B1 Gills separable from cap; gill trama** divergent; **spore print** dark yellowish-brown to cocoa brown; **spores** all or mostly >6.5µm long; ochreous then fulvous **habitat**: on soil and usually mycorrhizal

For details of this genus see *Tapinella*, KEY 7: *Paxillus* (2)

- B2 Gills inseparable from cap; gill edge concolorous; cap** 0.2-6 cm, mostly ochraceous to flesh-coloured, cinnamon, or reddish-brown, mostly hygrophanous, convex to expanded-up-lifted, thin-fleshed and delicate, in some species with whitish veil patches over margin

For details see KEY 31: *Tubaria* (9)

KEY 28

Gills decurrent or adnate

Spore print colour 4

Cap 0.3-5.5 cm, **Omphalina-like**, convex, subumbonate or slightly depressed, dry or subviscid, not hygrophanous, **whitish to clay coloured**; **gills not forming pores**; **stem** with a fugacious cortinate or felty membranous veil, mostly ornamented with pruina or fine fibrillose scales; **gills** brownish with age; **spore print** pale dirty brown, dull brown (sordid ochraceous brown); **spores small, 3-5(-6) x 3.5 µm**, globose or subglobose, pale brownish and echinulate or verruculose in water, and quite distinctive because of these spore characteristics; marginal **cystidia** inconspicuous; **habitat**: on bare soil or in humus in forest *Ripartites tricholoma*

KEY 29

Gills decurrent, fleshy species

Spore print colour 5

A1 Larger fruit-bodies 1-15 cm

B1 Veil cobwebby, filamentous; **cap** typically with thick flesh, buff to ochre or ochraceous to orange; **stem** 2-50 mm broad at apex, mostly tapered towards base, with a thin evanescent fibrillose veil in young stages, basal mycelium and flesh at base of stem strongly J+; **gills** thick, ochre-pink, clay-coloured to ochraceous at first, becoming smoke-grey or darker; **spore print** smoke-grey to black; **spores** long and narrow; **pleurocystidia** conspicuous and projecting well beyond basidia; **hyphae of context** violet-coloured in Melzer's reagent; **habitat**: on ground under conifers *Chroogomphus rutilus*

B2 Veil gelatinous or glutinous; **cap** viscid to greasy, cap flesh white and J- or buff to yellow and J+; **stem** bright yellow at base blackening with handling flesh at base of stem not J+; **gill trama** divergent; **spores** bullet shaped; **spore print** smoke-grey to dark olivaceous black; **habitat**: on ground under conifers

Gomphidius (3)

A2 Smaller fruit-bodies, cap olive-soot-grey 1-5 cm, Omphalina-like, soon deeply umbilicate fleshy, pale sepia, hygrophanous somewhat scaly at crown; **gills** thick grey when old turning black; **spore print** olive-sepia to grey; **spores** almost spindle shaped 10-12x6-7.5µm; **habitat**: grassland *Melanomphalia nigrescens*

KEY 30

KEY 30

Fruit-bodies less than 3 cm; not marcescent except some species of *Collybia*; stem slender, may be quite tough and fibrous or cartilaginous at least on the surface; **gills** free, or attached, **not decurrent**, except in a few individual species in the genera described below

Spore print colour 1

To tackle this group of genera, test a spore print if possible with Melzer's reagent. If you cannot get a spore print, then test a gill in the reagent to find out if the tissues are J+ or J-. If the features of your fruit-body do not fit a genus in C1, go to C2. (N. B. several genera in this key include species with spores which are J+ and others with spores J-, so they appear twice below).

A1 Stem scaly and swollen, distorting the tissue of its host, violet colours; all types rare; **cap** 1-3 cm; **stem** often with brightly coloured scales or disrupted rings covering it; **smell** strong; **habitat:** growing singly or grouped, parasitic on *Cystoderma amianthinum*, etc For details see KEY 8, rare: *Squamanita* (3)

A2 Not so

B1 Resin-filled hyphae in all parts; cap and stem pubescent composed of ventricose or flagellate, forked or capitate cells; **cap cuticle** of cylindric-capitate or subglobose cells; spores J-; **habit:** trooping; **habitat:** common in wet sites especially with Purple Moor grass and Soft Rush Rare: *Resinomyцена saccharifera* [EEE: When sectioning the **fruit-body it sticks tenaciously** to the blade.]

B2 Fruit-body does not stick to the blade when cut

C1 Spores J+

D1 Caespitose, growing on wood, typically on or near old rotten conifer stumps (one British record on rotten wood of deciduous trees); **cap** 1-6 (10) cm radially fibrillose, streaked faintly smoky-tinged, at least over the disc, hygrophanous; **gills** adnate to decurrent somewhat crowded at most; **spores** subglobose 5-7 x 5-10 µm smooth with granular contents; **cystidia** none on gill edge but present in cap cuticle; no cellular hypoderm in cap

See B&K 3:170, rare: *Clitocybula lacerata* [DL: Compare with *Omphalina*, *Clitocybe*, and *Collybia* which have J-spores.]

D2 May be clustered but not caespitose

E1 Growing in very wet places and cap very small; cap 0.3-1cm usually irregularly shaped, **white slender, hygrophanous; spores J+** but trama is not; has a **veil** rapidly lost but leaves remnants on cap edge; **gills** poorly

KEY 30

developed; **habitat** soil, rarely on decayed wood, on twigs and on leaves in damp hollows in woodland and under hedges

For details see KEY 9: *Delicatula integrella*

E2 Not only in very wet places

F1 Cap cuticle cellular

G1 On decayed wood of deciduous trees (the wood may be buried); **cap** 1-4 cm, surface often mealy, shades of grey, browns or blackish, sepia, cinnamon or fuscous, rather dull; **stem** fibrous, often rooting, concolourous with cap, generally covered in cystidia giving it a pruinose to finely floccose appearance overall or at least over apex; **gills** adnate or decurrent, rarely adnexed; **spores** smooth J+ or J-; **cap cuticle hymeniform**, of radially arranged hyphae supported by rather voluminous cells, **pigments** when present generally intracellular; **basidia** 4-spored; **cystidia** (cheilo-, pleuro-, pileo- and caulo-) usually present; flesh never dextrinoid when spores are J+; **clamps** present; **habit**: often in groups *Hydropus* (4)
(In DL but not European descriptions: **bleeding clear fluid** which darkens in fresh specimens when they are cut.)

G2 In the short turf of unimproved grassland in soil, grass and moss in woods or more often in fields and at edges of woods; **cap** 0.8-4.2 cm with a matt or velvety surface of grey-brown colours; **fruit-bodies** Collybia- to Tricholoma-like, lacking velar elements; **cap cuticle** a hymeniform or palisade layer of inflated cells; **gills** broad, mostly emarginate (adnate-emarginate), some nearly free (finely adnexed); **spores** smooth, J+ or J-; **cheilocystidia** absent *Dermoloma* (5)
[DL: Compare with *Tricholoma*, *Calocybe*, and *Porpoloma*, which do not have a hymeniform cap cuticle.]

F2 cap cuticle filamentous, so cap is relatively resistant to damage; not atomate at x10 magnification

H1 Growing on cones, sometimes buried or woody material; **cap** 1-5 cm; **gills** narrow and very crowded; **spores** very small sausage-shaped (allantoid) or cylindric-ellipsoid, 2.5-4 x 1.5 -2.5 µm; **cystidia** on gill edge rather numerous, fusoid-ventricose, 15-35 x 4-10 µm

Baeospora myosura

H2 Growing in soil, litter or on wood, fragile and soft often trooping; **cap** 0.1-5 cm conic or with a conic umbo, campanulate or merely convex at first, occasionally slightly depressed, transparently fluted at the margin towards centre, margin decurved or plane; **stem** hollow, often fragile, sometimes leaking fluid coloured white, red, etc when damaged; **gills** variously attached typically adnate or adnexed (a few species decurrent) often white, sometimes edged with a colour; **cap cuticle** typically

KEY 30

of cylindric repent or ascending hyphae many with diverticulate elements, **with a layer of inflated cells** directly below the surface layer; **spores** smooth *Mycena* (75)

[DL: *Mycenella*, differs by its spores which typically have spine- or wart-like processes, or if they are smooth, then the hilar appendage is very large. Also see comments under *Hemimycena*: see P2 below and KEY 34]

C2 Spores J-

J1 Cap cuticle cellular

↓**K1 On cones of pine and spruce, often buried; cap** 1-2 cm, convex, matted-fibrillose, white, greyish, brownish; **stem** often strigose over a rooting base 0.5-2 mm diam, pliant to brittle, base typically turns yellowish; **gills** subdistant and moderately broad; **spores** smooth; **cap cuticle** forming a hymeniform layer; **cystidia** large, often thick-walled and/or crested; found especially in spring *Strobilurus* (3)

↓**K2 On soil, humus and decayed woody debris; cap** 0.2 – 2.5 cm, Mycena-like; cap and stem often greyish brown with a pruinose-velvety covering; **gills** adnate to nearly free; **spores** typically spiny or warty, rarely smooth, if smooth then subglobose with a large hilar appendage; **basidia** lack siderophilous granules; none of its tissues J+; **hyphae of cap cuticle** diverticulate, infrequently hymeniform *Mycenella* (4)

K3 On wood; cap up to 3 cm mostly dull grey, sepia, cinnamon or fuscous; **stem** pruinose to finely floccose overall or at least over apex; **gills** adnate or decurrent, rarely adnexed Also see above at **G1: *Hydropus*** (4)

J2 Cap cuticle filamentous, so cap is relatively resistant to damage; not atomate at x10 magnification

L1 Stem brown-velvety at least towards base, always growing on wood; dermatocystidia amongst gelatinised hyphae of the cap

For details see KEY 23: *Flammulina velutipes*

L2 Stem not so

M1 Gills thickish, distant, pinkish, violaceous or reddish brown, adnate to decurrent; **cap** 0.5-20 cm; **spores** spiny globose to somewhat elliptical

For details see KEY 10: *Laccaria* (9)

M2 Gills not so

↓**N1 Tricholoma-like cap** (0.5)-2-6 (-10) cm **white or bright colours** (yellow, pink, orange, reddish, violet or violaceous-brown); **smell often farinaceous**; one species with a **veil**; **gills** ± emarginate (adnate-emarginate), crowded; **spores** smooth or verruculose; **cap cuticle** a cutis or cellular and pigments neither intracellular nor encrusting; **basidia** con-

KEY 30

tain siderophilous granules; **habitat** on the ground in soil or on leaf litter or on lawns, also on decaying woody remains *Calocybe* (8)

[DL: This genus can only be identified accurately after the siderophilous granules in basidia are observed, otherwise its species would be identified as *Tricholoma*. Compare with *Lyophyllum* see note on *Tephrocye* below]

- ↓N2 **Stem remarkably tough**, marcescent, not instititious, not horse-hair-like; **spores smooth**; **cap 0.2-5(-10) cm margin incurved to inrolled, at first becoming decurved**; **gills decurrent**; **cap cuticle filamentous**, so cap is relatively resistant to damage; not atomate at x10 magnification, not strongly differentiated; **taste and smell** never farinaceous For details see KEY 23: *Collybia* (35)

N3 More fragile species

- O1 **Spores may be rough** (NB examine in water); **cap grey colours**, up to 5 cm, **usually moist and translucently striate**, hygrophanous, and thin fleshed, cut surface greyish or a pale sordid hue when fresh; **gills** turning grey; **stem** apex often pruinose; **smell** often floury, rank; **spores** smooth or echinulate or tuberculate (ornamentation disappearing in potassium hydroxide, ammonia or Melzer); **basidia** with siderophilous granules; hyphae of **cap cuticle** thinly encrusted

Tephrocye (23)

[DL: Compare with *Lyophyllum*, which differs by its cap size 3-15 cm, dull colours, fruit-bodies that often stain when bruised (NM2: sect. *Lyophyllum*), and by the thinly incrusting pigments on the hyphae. (NM2: Small species of *Lyophyllum*, stem 0.1-0.5 cm thick, i.e. sect. *Tephrophana* = *Tephrocye*)]

O2 Spores smooth (NB examine in water)

- P1 **Cap cuticle filamentous**, so cap is relatively resistant to damage; not atomate at x10 magnification, **with a layer of inflated cells** directly below the surface layer; **colours various, a few white species**; **cap 0.1-5 cm** For details see above at H2 : *Mycena* (75)

- P2 **Cap cuticle has no layer of inflated cells** directly below the surface layer; **always delicate white or faintly cream coloured**; **cap 0.5-1.5 rarely up to 3 cm**, *Mycena* or *Omphalina*-like; **spores** cylindric or long ellipsoid; **stem** not instititious; **habitat**: on various types of decaying plant material *Hemimycena* (15)

KEY 31

KEY 31 (see also Key 16)

Gills attached, but not decurrent (except in *Tubaria* gills arcuate and may be decurrent)

Spore print colour 3 (actual colour stated in several of the genera below)

A1 Cap greasy and usually acutely conical; stem tough and deeply rooting in conifer litter. All species rare in Britain.

B1 Spores finely rough, <10µm long, ochraceous to rust in water with no plage or germ pore but often with a snout-like apical extension; **cap** 0.8-7cm typically brittle, smooth, ± humid or lubricous to viscid, margin inrolled or strongly incurved at first, pinkish-brown, rusty-brown, liver brown, or olivaceous brown to greenish; **stem** spindle shaped; **gills** often broad, pallid, lilac, violet, or eventually rusty brown from spores; **spore print** sienna to rusty brown; **habitat**: on ground, not caespitose
Phaeocollybia (3)

B2 Spores smooth **cap** 5-25mm often papillate ± acutely umbonate umber or bay with a paler straw or saffron margin which may be wavy when old, often rusty-tawny around the centre drying orange or saffron from the centre out, striate at centre when fresh, smooth and shiny when moist but not viscid; **gills** rather crowded and broad with olivaceous tinges; **stem** horny coloured, often flexuose with strigose tomentose base; **taste** butter becoming astringent; **spore print** pale milky coffee or pale hazel; **spores** 4.5-6x3-3.5 very pale and apparently smooth but minutely roughened under scanning electron microscope; **cap cuticle** filamentous hyphae over shorter ellipsoid or clavate cells; **basidia** 4-spored; **cheilocystidia** cylindric-flexuose or clavate sometimes with broadened base; **pleurocystidia** absent; **clamps** present; **habitat**: only Caledonian pine forests so far
Stagnicola perplexa

A2 Not this combination

C1 Mycenoid build, in soil in troops or often singly, usually tawny, smooth, with cellular cuticle; cap small 0.5-3 cm, conic, campanulate or convex with a hoary sheen and when faded atomate, most often tawny, rust-brown, ochraceous brown or dark brown; **stem** when young pruinose under the magnifying glass; **spore print** rust-brown to yellowish-brown; **cap cuticle** cellular composed of inflated cells; **spores** smooth or punctate with ± wide germ pore, apex often truncate; **cheilocystidia** present and typically lecythiform; mediostratum of **gill trama** highly reduced and replaced by the subhymenial elements, at least in the narrower gills and the outer 1/3 of the normal gills; **habitat**: on the ground in woods or pastures, on dung, occasionally on decaying wood
Conocybe (67)

C2 Cap scaly/scurfy or, if smooth, then with a filamentous cuticle.

D1 Cap scaly or scurfy

KEY 31

- E1 Cap ± excentric, scaly; on attached twigs and small branches;** fruit-bodies small, tough and easily overlooked; cap only 0.5-1.5 cm, **and tough, reviving after drying out; cap scales** of septate, thick walled hyphae; **stem** lateral to ± central and very short; **cap cuticle** filamentous of hyphae of which at least the end portion is broad and has a distinctly thickened encrusted wall; **spore print** rust brown; **habitat:** on decaying twigs, branches, or logs

Phaeomarasmius (2)

- E2 Cap central, scurfy (sphaerocysts); on woodland litter, beech cupules etc.** **Small pale brown species** cap up to 3 cm (*F. limulata* may exceed 3 cm), **scaly appears silky** to finely granulose or granulose-floccose, **colour rusty-foxy; scales on cap** in part at least of pear-shaped to rounded cells or ± broad elongated cells; **stem** central, with or without a ring, when ring present it is often membranous, stem cuticle cells similar to cap scales sometimes; **spores** mostly <10µm long often with thin walls and collapsing easily

Flammulaster (7)

D2 Cap smooth

- F1 Gills broadly adnate to ± decurrent, spores smooth and notably thin-walled; cap** 0.2-6 cm expanded, usually pale, may be furfuraceous, surface not tomentose mostly ochraceous to flesh-coloured, cinnamon, or reddish-brown **mostly hygrophanous**, thin-fleshed and delicate, in some species with whitish veil patches over margin; **gills wide**, more or less triangular in appearance, brownish and often concolorous, with the cap; **stem** typically slender and fragile, with or without a ring; **ring** when present whitish and membranous or evanescent and leaving a ring-like zone, rarely cortinate; **spore print** pale yellowish to cinnamon brown; **spores** smooth, thin-walled, many, (not all) collapsing in potassium hydroxide, pale brownish, ellipsoid, phaseoliform, or limoniform, with no germ pore; **cap cuticle** a cutis, the **hyphae** cylindric and repent; **cheilocystidia** present and clavate, filiform to cylindric, or capitate; **habitat:** leaves, decaying wood or wood chips, mosses or soil

Tubaria (9)

[DL: This genus, with its thin-walled readily collapsing spores, is quite distinct from other brown spored groups.]

F2 Gills less deeply attached

- G1 On wood, cap ± olive tinted, stem sometimes excentric, spores smooth and slightly bean-shaped; cap** 0.5-4 cm, surface smooth, unchanging with alkali, **suede-like (felty-tomentose, velvety or pruinose-velvety or merely tomentose under a lens generally with olivaceous hues from dermatocystidia); stem** eccentric or central curved or straight often coloured like the cap, generally with a pruinose or velvety surface; **gills olivaceous colours** adnate often with a decurrent tooth, gill edge whitish and often fimbriate

Simocybe (6)

KEY 31

G2 On wood or in moss, cap lacking olive tints, stem central, spores never bean-shaped, usually ornamented

↓**H1 On wood, gills ± yellow, spores spiny; usually larger species, cap surface smooth, greasy or dry, becoming blackish with alkali (potassium hydroxide or ammonia); taste often (distinctly) bitter; spore print bright to rusty-orange** For details see Key 20: *Gymnopilus* (12)

↓**H2 On wood or in moss; gills some shade of brown; cap 0.5 -3.5 cm, thin-skinned, often ± membranous, transparently striate when damp, often hygrophanous types with ochre to yellow to rust-brown colours; gills adnexed, sometimes adnate less frequently decurrent, usually with a white fringed edge; spore print mostly buff, ochre to bright rust brown; stem very slender, fragile, 1-2 mm thick; spores which do not collapse readily in potassium hydroxide, often have a plage, seldom have a germ pore and are often ornamented, dextrinoid in species which do not have tibiiform cystidia; cheilocystidia typically present, often fusoid-ventricose, capitate and often diagnostic; caulocystidia always present, may be from end to end of stem, are tibiiform, lageniform or mixed; pleurocystidia present or absent; habitat: often on mosses, decaying foliage, decaying wood, or sandy or richly organic soil** *Galerina* (46)

[DL: The genus can often be easily identified in the field, but the investigator must make a careful examination of the microscopic details to identify most species. AM *Galerina* as currently defined is heterogeneous. Smooth-spored species with a germ pore are sometimes placed in a separate genus, *Phaeogalera* (see below), but this does not solve the problem.]

H3 Amongst *Sphagnum*, or on peaty soil or boggy areas in woods, characteristic of acid heaths or moorlands; cap 0.5-2.8 cm, *Galerina*-like, dark or dull coloured flattening with age and depressed to ± umbonate with traces of veil at margin, smooth, greasy to slimy and hygrophanous; stem fragile and 1-4 mm in diameter, often coloured as the cap, with a distinct or incomplete or evanescent ring, may be clavate; gills adnate to subdecurrent, subdistant, buff or saffron and coloured like the cap; spores large 10-15 µm, ± thick-walled, smooth, ± germ pore, strongly coloured under microscope, J-; cheilocystidia rather variable but forming a sterile edge to the gill; spore print snuff-brown to cigar brown *Phaeogalera* (2)

KEY 32

KEY 32

Small species, gills attached, not decurrent

Spore print colour 4

A1 Smell strong of fish or cucumber; large lanceolate, pointed cystidia on gills

Macrocystidia cucumis

A2 Without this odour or this type of cystidium;

B1 Cap radiately fibrillose or suede-like

C1 Cap radiately, often innately, fibrillose, cap cuticle filamentous

For details see Key 21: *Inocybe* (114)

C2 Cap surface suede-like (felty-tomentose), **velvety** or pruinose-velvety or merely atomate under a lens, generally with **olivaceous hues**, 0.5–4 cm, **cap cuticle** arranged in a trichoderm or hymeniform; **stem** eccentric or central curved or straight often coloured like the cap generally with a pruinose or velvety surface; **gills** adnate often with a decurrent tooth, **gill edge** whitish and often fimbriate; **spore print** pale brown to olivaceous; **spores** smooth, ellipsoid to ovoid or phaseoliform, pale brownish to ochraceous-melleous in potassium hydroxide, germ pore small and indistinct or lacking (*S. rubi* has one) and do not readily collapse in potassium hydroxide mounts; **habitat**: woody substrates and decaying leaves

Simocybe (6)

B2 Cap not radiately fibrillose or suede-like

D1 Cap may be dry but often viscid-sticky and may have separable cap cuticle

For details see Key 33: *Stropharia* (17)

D2 Cap usually areolate or hygrophanous in dry conditions, usually glabrous but some species are felty, to even tomentose

E1 Gills marbled

For details see Key 33: *Paneolina*

E2 Gills not marbled

F1 In swampy areas on or with alders or willows, sometimes *Sphagnum* or on burned ground; **cap colour typically yellowish-brown or reddish-brown**, in some species paler buff in colour or a darker umber brown; **cap** small up to 2.5 occasionally to 4 cm, glabrous to tomentose, often atomate, **usually dry**, conic-campanulate becoming plane, usually hygrophanous; **stem** thin, up to 2.5 mm wide at apex, typically bright cinnamon or reddish-brown with a pale buff apex, becoming dark brown to almost black over base, **often with pale cortinate fibrils as remnants of a veil**; **spore print colour** from cinnamon-brown to reddish-brown or dull brownish-olivaceous; **gill edges** whitish-fringed; **spores** ornamented, warty, although smooth in *N. albotomentosa*, lacking a germ pore and plage, amygdaliform or limoniform; **cheilocystidia** present, *Urtica* trichome-like, i.e. with a swollen base and a long attenuate apex, or cylindric or lageniform or with

KEY 33

a capitate apex; **habitat**: as stated above

Naucoria (16)

[DL: This genus is difficult to identify unless one refers carefully to the microcharacters.]

F2 Not in swampy areas with alders and willows; cap white, tan, tawny, or dark brown, 0.8-10 (-12) cm glabrous, often becoming areolate in dry conditions, convex and often becoming plane; **stem** typically fleshy, narrow in a number of species (e.g. in *A. pediades* group); **ring** present or absent; **spores** smooth with obvious broad apical germ pore; **cap cuticle** hymeniform, composed of a palisade of inflated cells at least in young specimens, these cells often collapsing in mature specimens or these cells often quite narrow in the *A. pediades* complex; **cheilocystidia** lageniform; **habitat** on soil, or decaying wood, or dung, or humus in woods, or lawns, or especially on wood chips in gardens *Agrocybe* (12)

[DL: *Stropharia* and *Pholiota* have a range of spore-print colours which intergrade with those of *Agrocybe*; however, *Stropharia* and *Pholiota* possess a filamentous cap cuticle.]

KEY 33

Slender fruit-bodies, gills attached

Spore print colour 5

A1 Gills marbled; cap atomate under lens, < 2.5 cm, dark reddish-brown or dark greyish-brown hygrophanous, cracking on drying, fragile; **spores** limoniform or not, warty and truncate with an apical pore, not discolouring when treated with concentrated sulphuric acid; **cap cuticle** hymeniform to \pm cellular; **habitat**: usually abundant in grassy lawns in late spring to late summer

Panaeolina foenisecii and *Panaeolus* (9)

A2 Gills not marbled; spores not limoniform

B1 Cap cuticle cellular; cap 0.5-7 cm, pale or dull coloured usually strongly hygrophanous and then atomate, some species covered with brownish to fuscous scales or fibrils, in some with appendiculate scales or fibrils on margin, often splitting radially; **flesh of cap typically very fragile**; **stem** typically very slender and fragile and snapping easily and cleanly in half, with or without a ring; **gills** of some species edged with colour; **spore print** usually colour 5, in some species dull reddish-coloured to pinkish-grey; **spores** smooth or warty-roughened, with an apical germ pore, dark fuscous or cocoa brown in colourless mounting media and fading noticeably in concentrated sulphuric acid; **habitat**: on decaying wood

KEY 33

or leaf litter, on soil or among mosses, on other agarics (e.g. *P. epimyces* on *Coprinus comatus*), or on dung *Psathyrella* (73)

B2 Cap cuticle filamentous, so cap is relatively resistant to damage; not atomate at x10 magnification (**may be difficult to identify in viscid species**)

C1 Chrysocystidia (i.e. cystidia whose contents are yellow in ammonia) **typically present**, absent in a few

D1 Cap cuticle has a layer of inflated hyphae just beneath it (the hypodermium); **cap** usually with yellow or tawny tints

For details see KEY 22: *Hypholoma* (15)

D2 Cap cuticle lacking such a cellular or subcellular hypodermium; cap 1-12 (-15) cm **often viscid rarely almost dry**, smooth or floccose, convex, pallid or ochre-yellow or brownish-yellow or greenish-blue or wine-reddish to reddish-brown or orange-brown to near bright orange-red; **stem** dry or viscid; **ring** present, thick and fleshy-fibrous or thin and brittle; **gills** adnate or adnexed, edges often whitish and fimbriate; **spores** smooth, with a truncate germ pore, freshly deposited spores appearing lilac or greyish-lilac in water mounts; **cheilocystidia** usually as chrysocystidia; **habitat**: on soil, dung, decaying woody substrates, or sawdust, in forests or meadows

Stropharia (17)

[DL: This genus is widely recognized and distinctive in the field. However, there are some smaller species often placed in *Stropharia*, which seem to show similarities to *Psilocybe* or even *Pholiota*. BFF5: The species of *Stropharia* are separated according to their size and colour and viscosity of the cap and spore size. AM: See the comments under *Hypholoma*, KEY 22, for differences between *Hypholoma*, *Psilocybe* and *Pholiota*.]

C2 Chrysocystidia absent (in FAN 4:28 says they are present), **fruit-bodies** **Tricholoma- Mycena- Collybia- Omphalina or Pleurotus-like**, often in groups, sometimes caespitose; **cap cuticle** gelatinised with incrustations, sub-epidermal layers filamentous; **cap** glabrous 0.5-3 cm convex to conic-campanulate, often umbonate or papillate and subviscid to viscid, colours usually dull or pale browns without yellowish or tawny tints (*Psilocybe* in the sense of the BFF); **gills** adnate or adnexed or with a short decurrent tooth, typically broad becoming dark brownish to fuscous with spore maturity and edges often remaining whitish from cystidia; **spores** smooth, yellow brown to olive or reddish-brown in potassium hydroxide with apical pore and truncate at the apex; **cheilocystidia** thin-walled; **habitat** in soil, litter and in grass and moss and on wood

See comments under *Hypholoma* in KEY 22: *Psilocybe* (19)

KEY 34

KEY 34 (see also footnote on page 66)

Slender species, gills decurrent

Spore print colour 1

A1 Gills thickish, distant, pinkish, violaceous or reddish brown; **cap** 0.5-20 cm, hygrophanous; **spores** J- spiny globose to somewhat ellipsoid; **gills** adnate to decurrent

For details see KEY 10: *Laccaria* (9)

A2 Gills not so

B1 Often on burnt ground but may not be, so consider these before moving on to B2 below; spores J+

C1 Gelatinized cap cuticle (and gelatinous hyphae in the gills), **greasy and separable when moist**; **cap** 2.0-4.8 cm, consistently depressed or umbilicate over disc, snuff brown, date brown to pale sepia, strongly hygrophanous; **gills contrasting white**, rather crowded, adnate to decurrent; **spores shortly elliptic**, thick-walled, often smooth but faintly ornamented with J+ warts; **basidia 4-spored**; **cystidia** forming a continuous sterile edge to the gills; **habitat**: woods, pastures, heaths and lawns

Occasional in England, rare or unreported elsewhere: *Myxomphalia maura* [RW: when a transverse section of the gill is made it splits easily down the middle when pulled apart sideways. DL: *M. maura* could be mistaken for *Tephrocybe atratum* which grows on burnt ground but *T. atratum* has grey gills and a dry cap with spores J- and basidia containing siderophilous granules]

C2 Cap cuticle not gelatinized or separable

D1 Cap small 1.0-2.4 cm, matt, convex becoming slightly depressed, grey brown, hygrophanous; **basidia 2-spored**; **spores** globose, recognised immediately by the wheel-like appearance (due to channels running through the walls); **habitat**: coniferous and beech wood and in moss and grass, rarely reported

See *F. gracilipes* in BFF8 and B&K3: *Fayodia bisphaerigera* [AH the three genera, *Myxomphalia*, *Fayodia* and *Gamundia*, described in BFF8, are sometimes still placed in *Fayodia*, but now usually in these three different genera. They all have ornamented spores, as do some *Tephrocybe* species including ones on burnt ground.]

D2 Cap larger, 2-5 cm: see at F3 below:

Pseudoomphalina (2)

B2 Not on burnt ground

E1 Spores J+

↓**F1 Growing on wood;**

G1 Caespitose; cap 1-6(10) cm radially fibrillose, streaked faintly smoky-tinged, at least over the disc; looks untidy

Rare, for details see KEY 30: *Clitocybula lacerata*

KEY 34

G2 Not caespitose but may be grouped together: cap cuticle of radially arranged cells supported by rather voluminous cells; **cap** up to 3 cm, shades of grey, browns or blackish, rather dull, often in groups; **stem** pruinose to finely floccose overall or at least over apex

For details see KEY 30: *Hydropus* (4)

↓**F2 On various substrates including wood:** caps of *Mycena* spp. with decurrent gills are of various shades of brown or pure white, usually transparently sulcate; **gills** usually white but some have colour or coloured edges; **stem** slender, hollow; **spores** smooth

For details see KEY 30: *Mycena* (75)

[AM: Some *Mycena* spp may occur on wood but only the following few of this genus have truly decurrent gills: *M. clavularis*, *M. corynephora*, *M. polyadelpha*, *M. rorida*, *M. speirea* and possibly *M. aurantiomarginata*, *M. mirata* and *M. stipata*]

F3 Not on wood; cap 2-5 cm, Omphalina-like, resembling a small *Clitocybe*, cinnamon, pale fawn, clay-coloured, or darker cinnamon brown, typically hygrophanous, glabrous; **gills** white, cream or brownish especially towards stem; **stem** concolorous with the cap, terete or compressed may be attenuated upwards; **spores** smooth, usually thick-walled and with an obtuse base; **cap cuticle** of parallel hyphae, heavily encrusted with pigment; **cheilocystidia** absent; **clamps** present; **habitat:** on mossy, grassy soil, humus and with conifers

Rare: *Pseudoomphalina* (2)

E2 SPORES J-

H1 With stem relatively long for the cap diameter

J1 Cap 0.5-5(-8) cm white or various shades of yellow from strongly pigmented to pale, lacking veil; **spore print** pale yellowish *en masse*, **gill trama regular to subregular**; **cap cuticle** of repent, smooth, filamentous hyphae forming a cutis with some trichodermal elements in some species; **pigment** of cap and stem cuticle intracellular; **clamps** present in one and absent in the other UK species

Rare, both species in BFF8: *Gerronema* (2)

J2 Cap (0.3-) 0.6-1.2 cm **with projecting cystidia, orangey to brownish**, convex at first but typically depressed to umbilicate with age, generally on mosses very small, fragile, and Omphalina-like; **spores** smooth, ellipsoid; **cystidia:** rather large, projecting from cap and gill edges and faces

Rickenella (3)

[DL: Compare with *Gerronema*, *Omphalina* and *Mycena* which differ by lacking these distinctive cystidia.]

H2 Cap and stem of normal proportions

K1 Always on wood

L1 Cap up to 3 cm, shades of grey, browns or blackish, rather dull, often in groups; **cap cuticle** of radially arranged cells supported by rather voluminous cells; **stem** pruinose to finely floccose overall or at least over apex

For details see KEY 30: *Hydropus* (4)

- L2 Cap 0.7-3 cm with yellowish brown to greenish colours**, (olive-yellow, green-yellow, pale greenish isabella to greenish tinged ivory), more or less hygrophanous; **gills** bright yellow or greenish, thickish, distant and broad; **gill trama** irregular, consisting of short, strongly inflated, colourless elements; **cap cuticle** a cutis of slightly ascending hyphae with rather short terminal elements like cystidia; **clamps** absent; **habitat**: decayed wood of conifers

UK species illustrated in C&D:182 and B&K3:148: *Chrysomphalina* (2)

K2 Other substrates predominate over wood

- M1 Gills widely spaced**, not forked; **habitat**: in *Sphagnum*, on other mosses, or on sandy soil, or in grasslands or woods, and associated with lichens (one species growing on wood and not associated with mosses); **cap**, 0.5-2 (-5) cm usually \pm umbilicate, transparently sulcate, rarely somewhat pleurotoid, **white, yellow, orange, brown to very dark grey-brown, usually hygrophanous**, usually smooth; **spore print** white, yellowish, cream or pink; **spores** smooth with obtuse, acute or confluent base; **gill trama** subregular to irregular; **cap cuticle** a cutis, made up of cylindrical to inflated hyphae, with intracellular or incrusting pigment; **habit**: solitary or in small groups

Majority UK species are in FAN3: *Omphalina* (9)

[RW Some looking like *Omphalina* are known to be lichenised, but this character is often difficult to identify. The algal part may appear as no more than a green scum - *Botrydium*. Only *Lichenomphalia hudsoniana* has a foliose thallus like a lichen. AM: The only other differences are minimal - a gill trama of narrow, branched hyphae ('its peculiar structure of the hymenophoral trama' FAN3). The 4 UK species appear in CBIB as *Lichenomphalia*; they are also covered between B&K3 (under *Gerr-onema*, rare) and FAN3 (under *Phytoconis*). FAN3 comments: 'Delimitation of *Clitocybe* from *Omphalina* can be difficult. Generally speaking, species of *Clitocybe* are (much) larger, have a more regular hymenophoral trama, and a fibrillose (not cartilaginous) stem.']

M2 Gills normally spaced

- N1 With gelatinous cap cuticle (cap cuticle filamentous, somewhat gelatinised); October to January; cap 0.8-4.0 cm** pale; grey, fawn to milky coffee with conspicuous striae when moist, hygrophanous; **spores** very finely ornamented, ornamentation hard to see even with high power; **basidia** 4 spored; **cystidia** lageniform and fusiform scattered along the fertile gill edge; differs from *Tephrocye* especially in having pleuro-cystidia; **clamps** present; **habitat**: on ground with needles and moss in coniferous woods, but usually dunes

See note at **D1** above: *Gamundia striatula*

[AH: BFF8 recognises two species of *Gamundia*, synonymised in FAN3]

KEY 34

N2 Cap cuticle not gelatinised, genera separated macroscopically mainly by colour

↓**O1 Cap a delicate, very pure white** hardly darkening with age to faint cream colour, **small** 0.35-1.5 cm: only this one species of 15 in *Hemimycena* has decurrent gills which are widely spaced; **habitat**: on *Symphytum* (comfrey) leaves in hedgerows

For details see KEY 30: *Hemimycena candida*

↓**O2 Cap and gills orange; spores smooth; cap** 1-4 cm, **cap and gills orange coloured; stem** thin, brittle, also often orange; smell strong, soap-like with a sweet component or like perfume; **spore print** salmon-pink to yellowish; **spores** thick-walled; **trama** irregular with branched hyphae; **cap cuticle** a cutis with **intracellular carotenoid pigments**; **clamps** absent; **habitat**: on humus-rich soils and on buried wood
Rare: *Haasiella venustissima*

↓**O3 Cap grey to brown; spores with prominent spines; cap** 1-3cm hygrophanous, grey to brown, *Omphalina*-like sometimes *Collybia*-like; basidia 4-spored; **cheilocystidia** absent; **pleurocystidia** absent but old basidia with necropigment and then seemingly like pseudocystidia; **cap cuticle** a cutis with encrusting pigment; **clamps** absent; **habit** solitary or in small groups; **habitat**: in grassland, heathlands and forests on acid, sandy soils
Rare: *Omphaliaster* (2)

O4 Cap of various shades of brown or pure white, usually transparently sulcate; **spores** smooth; see notes on *Mycenae* with decurrent gills at F2 above
For details see KEY 30: *Mycena* (75)

Footnotes to KEY 34

Genera with gelatinised tissues: *Myxomphalia*, *Gamundia*

Genera with cheilocystidia: *Gamundia*, *Hemimycena*, *Hydropus*, *Mycena*, *Rickenella*

Genera which have no cheilocystidia, so are potentially difficult to separate: *Clitocybula*, *Chrysomphalina*, *Gerronema*, *Haasiella*, *Omphaliaster*, *Omphalina*, *Pseudoomphalina*

Spores unique: *Fayodia*

Genera with thick walled spores: *Haasiella*, *Pseudoomphalina*

Genera with ornamented or spiny spores, easily seen with light microscope: *Laccaria*, *Myxomphalia*, *Omphaliaster*

Genera in which spores have very fine ornamentation *Gamundia* and *Myxomphalia*

Galerina Key

A Key to *Galerina*

Roy Watling has revised the Key to *Galerina* in BFF7. His revised key was distributed to participants at the BMS 'LBJ' Workshop at Blencathra in 2001 but has not hitherto been generally available. It is therefore reproduced here with his kind permission.

To identify these species positively, we need a precise note of the substrate. Some grow only on *Sphagnum* while others grow on other mosses as well. Careful note needs to be taken of veil remnants and annular zones (for this, fresh young specimens are needed). Smell and taste needs to be recorded. At microscopy we need to know if pleurocystidia are present as well as the type of cheilocystidia and the spores per basidium. The spores have to be examined for ornamentation, perispore, plage and germ pore. Once all this is recorded, this key comes into its own.

- | | | |
|---|--|-------------------------|
| 1 | Facial cystidia present, although sometimes rare – care should be taken in examination | 2 |
| x | Facial cystidia absent | 17 |
| 2 | Basidia 2-spored | 3 |
| x | Basidia 4-spored or only a small proportion 2-spored | 7 |
| 3 | Marginal cystidia thick-walled and beset with crystals, or broadly utriform with broad rounded head often clothed in mucilaginous coating | 4 |
| x | Marginal cystidia ventricose-fusiform with obtuse head, not distinctly thick-walled or with mucilaginous coating | 5 |
| 4 | Thick-walled cystidia (metuloid) | 47. nana |
| x | Utriform cystidia with mucilage
(if cap greenish brown to sepia see <i>G. steglichii</i> – recorded from the Royal Botanic Garden Edinburgh - <i>a green one found in a plant pot</i> , RW) | 48. heimansii |
| 5 | Cap cystidia present: spores (11-) 12-16(-20)/(6.5-)7-9µm. | 10. atkinsoniana |
| x | Cap cystidia lacking | 6 |
| 6 | Marginal and facial cystidia with flexuose neck; velar remnants on stem: spores 10-13/5-7 µm. | 41. badipes |
| x | Marginal and facial cystidia ventricose-fusiform: stem pruinose throughout: spores 11-15/7-8µm. | 8. vittiformis |
| 7 | Spores smooth; facial cystidia usually rare, lageniform with long neck and obtuse head: veil absent or rudimentary | 49. clavus |
| x | Spores exhibiting some kind of ornamentation: facial cystidia numerous or in some cases rather sporadic but then velar remnants distinct. If stem pruinose see <i>G. vittiformis</i> 4-spored form with spores 9-11/5.5-7.5µm. See §6. | 8 |
| 8 | Cap cystidia present (see also §5) | 10. atkinsoniana |
| x | Cap cystidia absent | 9 |

Galerina Key

9	Stem pruinose throughout: spores 9-11/5.5-7.5µm, distinctly verrucose	8. vittiformis
x	Stem with distinct veil remnants either as silky fibrils or floccose covering, or annulate: spore size; and ornamentation various	10
10	Marginal and facial cystidia utriform or broadly lageniform: spores punctate (7-)7.5-9(-10)/(4-)4.5-5(-5.5) µm.	16. salicicola
x	Marginal and facial cystidia elongate: spores distinctly ornamented with or without loosening perispore, or if slightly ornamented then velar remnants distinct	11
11	Veil distinctly annulate: facial cystidia often difficult to observe	12
x	Veil or floccose or silky fibrils on stem (care must be taken to ensure that a ring has not been lost because of environmental damage or bad handling: always check §12 if in doubt)	16
12	Spores slightly roughened with an apical papilla and small pore	44. pseudomycenopsis
x	Spores distinctly roughened, with or without callus (a modification of the end looking like a germ-pore) or if porate then cystidia rather variable	13
13	Cystidia lageniform or cylindric-lageniform with slightly to distinctly capitate apex or irregularly shaped and occasionally with an apical muff; in ditches and slacks with <i>Salix</i>	46. paludinella
x	Cystidia less variable, fusiform or lageniform: not with <i>Salix</i>	14
14	In fields; spores with loosening perispore (exospore) (see also notes to 42. <i>marginata</i>)	45. praticola
x	On wood	15
15	On frondose debris: cap with gelatinized pellicle	43. autumnalis
x	On conifer debris: cap lacking gelatinized pellicle	42. marginata
16	Spores slightly roughened with distinct pore, slightly darkening in alkali (annulate but often found with collapsed ring)	44. pseudomycenopsis
x	Spores distinctly roughened, lacking pore, darkening in alkali	9. terrestris
17	Basidia 2-spored or 2- and 4-spored, basidia intermixed with the former dominant	18
x	Basidia 4-spored	24
18	With veil	19
x	Without veil	21

Galerina Key

19	Veil forming a ring-zone or narrow membranaceous ring	20
x	Veil present, not forming a distinct ring-zone	37. cinctula
20	Spores elongate (10-) 11-15 (-19) μ m long: in marshy areas	30. jaapii
x	Spores never as long (9-11.5 μ m): on very rotten conifer wood	36. ampullaceocystis
21	Spores 11-14.5(-15)/6-8 μ m.	22
x	Spores (7-)8-11(-12)/4-6(-6.5) μ m, smooth or faintly ornamented, (2-)4-spored. generally the latter	23
22	Spores 13-14.5(-15)/6-7(-7.5) μ m, verruculose	6. subclavata
x	Spores 11-14/6.5-8 μ m, smooth in outline but minutely marbled	21. pseudotundrae
23	Spores (7-)8-9(-11)/4-5(-5.5) μ m, asperulate	4. laevis
x	Spores (8-)9-11(-12)/4.5-6(-6.5) μ m, smooth	23. embolus
24	Spores with distinct perispore	25
x	Spores without distinct perispore	28
25	Veil present: (if annulate see 45. <i>pratricula</i> but facial cystidia present although rare)	26
x	Veil absent	27
26	Stem-base bulbillose; cap ochraceous-orange; taste mealy: spores appearing as if 'eared'	11. calyptrata
x	Stem equal: cap rich tawny orange; taste mild; spores with rugged edge with slightly loosening skin but not with blisters or ears	12. cerina
27	Spores strongly ornamented: cystidia lageniform to subcylindric or sometimes vermiform	15. phillipsii
x	Spores less ornamented: cystidia capitate with narrow neck	14. subcerina
28	Spores smooth under light microscope, with germ-pore; fruit-body on woody substrates (sg. <i>Kuehneromyces</i>)	29
x	Spores rough, with or without pore, or if smooth then not on wood	31
29	Fruit-body often bicoloured, strongly caespitose; attached to wood (stumps, trunks etc.); lower stem \pm persistently cinnamon or date-brown, scaly; spores (5.5-)6.5-7.5(8)/(3.5-) 4.5(-5.5) μ m.	1. mutabilis
x	Fruit-body dull-coloured with crowded gills or if bright then with white veil and large ring; on wood or sawdust; stem never as strongly and persistently scaly in lower parts	30

Galerina Key

30	Cap with white veil and large ring; spores 5-7 (-8)/3.5-4.5µm.	2. leucolepidota
x	Cap dull-coloured with very crowded gills; spores 5.5-7/3.5-4.5µm.	3. myriadophylla
31	Cystidia distinctly capitate even resembling the end of a tibia (tibiiform) to distinctly capitate (if spore lacking plage see <i>Gymnopilus fulgens</i>)	32
x	Cystidia not distinctly capitate, at most irregularly swollen at apex to subcapitate	41
32	Always in <i>Sphagnum</i>	31. tibiicystis
x	On wood, peat, soil etc., if in mosses never in <i>Sphagnum</i>	33
33	Spores very rough	34
x	Spores asperulate to smooth; cap lacking prominent central papilla	35
34	Spores (10-)12-14/7.5-9(-9.5)µm; cap campanulate to convex	34. pseudocerina
x	Spores 6.5-8.5(-9)/3.5-5.5µm; cap strongly conical and retaining acute umbo	32. triscopa
35	Veil distinct	36
x	Veil absent or very sparse	37
36	Veil pruinose at apex with apical zone of veil fibrils, becoming smooth but retaining tomentose stem base; spores rarely greater than 11µm.	40. stylifera
x	Veil as fugacious scattered patches on lower stem; spores 9-13.5/5.5-6.5µm, punctate to almost smooth	38. luteofulva
37	Spores usually less than 10µm long	38
x	Spores usually more than 10µm long	40
38	In grass; spores (7-)8-9(-11)/4-5(-5.5)µm, distinctly asperulate, ovoid to lozenge-shaped; cystidia with long drawn-out narrow neck surmounted by small asymmetric capitulum (1.5-3µm broad), 4-spored form	4. laevis
x	On wood; majority of spores smaller	39
39	Spores (6-)7-8.5(-9)/4-4.5µm; cystidia skittle-shaped, ventricose-capitate with head 1-4µm broad; on conifer logs etc.	35. sideroides
x	Spores 6.5-7.5(-8)/4-4.5(-5)µm; cystidia skittle-shaped with head 2-3µm; on mossy stumps, often willow	39. camerina
40	Spores 9.5-11.5(-12)/5.5-6µm, ellipsoid with pore	7. stordalii
x	Spores (11-)12-14(-16)/(6-)7-8µm, lacking germ-pore	5. clavata
41	Veil as annular zone	42
x	Veil only as fibrils on stem or absent	45

Galerina Key

- 42 Marginal cystidia a mixture of capitate and lageniform cells; spores 9.5-12/(5.5-6-7.5) μ m. **28. pseudomniophila** 43
- x Marginal cystidia of one kind
- 43 Cystidia capitate to lageniform; spores (9-)10-12(-14)/(5-)6(-7.5) μ m with poorly loosening perispore that is often difficult to see **13. hypnorum** 44
- x Cystidia subcapitate-ventricose with cylindric neck
- 44 Spores 12.5-14.5(-15)/7.5-8.5 μ m: cystidia fusiform-ventricose; cap flesh pigmented throughout **27. mniophila**
- x Spores 11-14.5/5.5-8 μ m; cystidia lageniform to ventricose sometimes subcapitate; cap lacking pigment in upper part of cap flesh **29. hypophaea**
- 45 Spores with germ-pore see *Phaeogalera* (BFF7 page 80) (also see 7, *stordalii* §40)
- x Spores lacking germ-pore 46
- 46 Copious veil present 47
- x Veil sparse or absent, or soon lost and then left as tomentose foot to stem-base 49
- (if perispore is lost, giving smooth spore, also see 13 *hypnorum* in couplet 43)
- 47 In *Sphagnum*: stem with irregular, thin ring-zone and white patches downwards; gills becoming red-brown or tawny brown; spores (9.5-)11-13/6.5-7 (-7.5) μ m. **26. paludosa** 48
- x Not in *Sphagnum*: on peat or in moss
- 48 In snowbeds on peat; spores (9.5-) 11-16/(6-)7.5-9(-10) μ m, smooth or faintly marbled **22. harrisonii**
- x In moss, in woods etc.; spores-(9-) 12(-14)/6-8 μ m. Minutely punctate **17. pumila**
- 49 In *Sphagnum*, although might occur in other mosses in wet boggy places 50
- x On soil, in woods or on vegetable debris in bogs or in amongst other mosses, not *Sphagnum* 51
- 50 Spores 9-11/5-6 μ m, faintly punctate to smooth, with slight germ-pore **25. septentrionalis**
- x Spores (9-)10-12.5(-14)/5.5-8(-9.5) μ m, faintly rugose to smooth, lacking germ-pore **24. sphagnum**
- 51 Cap not viscid; in fens with *Salix repens* or willow; cystidia a mixture of flexuose and capitate cells **19. permixta**
- x Cap viscid or not; on moss, with lichens in sandy places or on peaty soil; cystidia more uniform 52

Galerina Key

- | | | |
|----|---|----------------------|
| 52 | Cap viscid; on moss in conifer and/or birch woodland; spores 9-11.5/5-6µm. | 18. viscidula |
| x | Cap not viscid | 53 |
| 53 | On peaty soil; spores 10-13/5-6µm; cystidia a mixture of swollen or torpedo-shaped cells and ventricose-rusiform with elongate neck | 20. tundrae |
| x | In sandy places amongst moss, or on wood | 54 |
| 54 | Spores 7.5-10(-11)/5-6.5µm; cystidia lageniform to fusiform, slender to very slender with very narrow neck and obtuse but not capitate apex | 33. uncialis |
| x | Spores (8-)9-11(-12)/4.5-6(-6.5)µm; cystidia clavate or cylindric to lageniform | 23. embolus |

Simplified key to *Coprinus* s.l.

Please note that in Derek Schafer's key (Schafer (2007) the Subsections of FAN6 are defined as Sections. They have not yet been formally published as Sections of the genera summarised below. See also comments in **A Note on *Coprinus*** at page 24 above.

1. Large, scaly, flesh reddening, with ring

***Coprinus* s.str. (*comatus* & *sterquilinus*)** FAN6: KEY3



(S.Skeates)



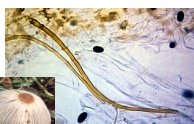
1. Not so

2. CAP with **bristles** (setules) with or without veil



Coprinellus* Section *Setulosi FAN6: KEY2

OR **thick hairs**



Parasola* Section *Auricomi FAN6: KEY1

(one species)



OR **bald, thin, membranous & smooth-stemmed**

Parasola* Section *Glabri FAN6:KEY1

(plicatilis and allies)



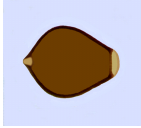
2. CAP not like this (with veil and without setules)

3. Large, fleshy species, veil thin and attached (hard to see), stem with characteristic line, cap colour whitish to grey or brown

Coprinopsis* Section *Atramentarii FAN6: KEY4



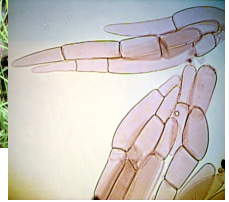
3. Lacking characteristic line on stem; smaller/less fleshy species, veil on cap more obvious OR cap with ochre colours
4. Ochre caps, growing in bunches (fasciculate), veil in the form of glistening mica-like granules (spheres under the microscope) but can be washed off and invisible, stem hairy in young fresh specimens, spores mitriform



Coprinellus micaceus (see
Section ***Micacei*** FAN6:KEY7)

4. Not *C. micaceus*

5. Veil on cap filamentous, formed of chains of elongate cells, generally unbranched, often forming tufts with pointed tips on the cap surface



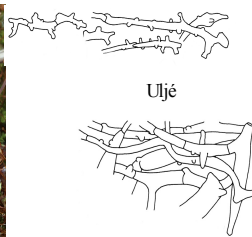
Coprinopsis Section ***Lanatuli*** FAN6:KEY5¹

5. Veil different

6. Veil on cap filamentous but branched or diverticulate, thick- or thin-walled (includes many tiny herbicolous species but also much larger *C. picacea*)

Coprinopsis

Section ***Alachuani*** FAN6: KEY6



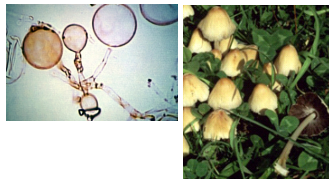
Uljé



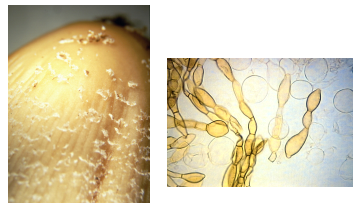
6. Veil on cap mainly of globose or sub-globose cells (length generally less than 2 x width)
7. Cap usually brown or ochre, never pure white; long closed and not opening fully flat; veil present in the form of scattered granulose floccules (often almost completely washed away) or small flocculose scales or patches; fruit bodies medium-sized, fleshy, sometimes fasciculate on wood

8. Cap veil in scattered glistening granules often washed off by rain and difficult to see; consisting mainly of globose thin-walled cells in a matrix of narrow, branched hyphae:

***Coprinellus* Section *Micacei* FAN6: KEY7**



8. Cap veil in more persistent, floccose scales; consisting of chains of cells inflated to a fusiform, ellipsoid or globose shape between the septa

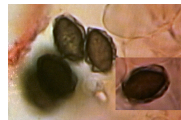
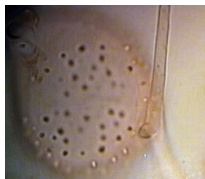


***Coprinellus* Section *Domestici* FAN6: KEY8¹**

7. Cap white to grey, generally opening fully when mature; veil mealy-powdery, entirely covering the cap; fruit bodies generally smaller (but can be large in e.g. *C. nivea*)
9. Cap veil cells with nipple-shaped warts/peg-like protrusions evenly distributed over the globose or sub-globose cells and forming part of the cell wall structure; spores often with “perispore” (myxosporium); fruit bodies some species with strong, unpleasant smell

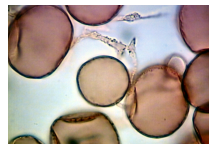
Coprinopsis

Section *Narcotici* FAN6: KEY10

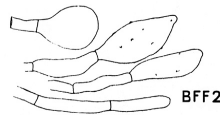
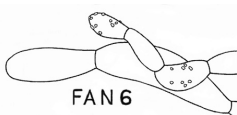


9. Cap veil cells smooth or encrusted with angular lumps not forming part of the cell wall; spores without a myxosporium; fruit bodies without unpleasant smell

***Coprinopsis* Section *Nivei* FAN6: KEY9**



- ¹ ***Coprinellus flocculosus*** has veil that can resemble SECTION ***Lanatuili*** but with more floccose veil, rounded end cells, lacking clamp connections and with large dark spores with very eccentric germ pore, can be easily recognised. It is included in SECTION ***Domestici***



Coprinellus flocculosus

(better photo on back of Field Mycology 3(4) Oct 2002)

Glossary

- abaxial** (dorsal): the surface of a spore facing away from the central axis of the basidium
- adnate-emarginate** (gill attachment): Roy Watling tells us that the word ‘emarginate’ has often been used in a wrong sense in the past. It means ‘with a different margin’ as in the gill edges of *Mycena sanguinolenta*. Therefore the correct term for a gill which has a more tenuous attachment than sinuate, but is still not free is ‘adnate-emarginate’.
- adpressed** (also appressed): closely flattened down (of fibrils or scales)
- agaric**: a term meaning ‘mushroom’ or ‘toadstool’, terms which are interchangeable; it is used to include all members of the Order *Agaricales* which includes all the fungal genera in this booklet
- amygdaliform** (spore): almond shaped, i.e. with a broad base and narrower apex
- amyloid** (spore wall, spore ornamentation, hyphal walls): staining blue-grey to blackish blue upon application of Melzer’s reagent
- allantoid**: sausage-shaped; said of spores which are slightly curved with rounded ends
- anastomosis**: cross connections between largely parallel elements (e.g. gills, hyphae or the ornaments on spores) to form a loose network
- annular zone**: remnant of partial veil; a ring of fibrils left on the surface of the stem when it is too obscure to be called a ring
- apiculus**: hilar appendage
- appendage** (of spores): see hilar appendage.
- appendiculate** (cap margin): having the margin of the expanded cap fringed with hanging fragments of the partial veil
- arcuate**(gill shape): gill shaped like an arc (concave) and running down the stem
- areolate** (pattern on the surface of stem or cap): having a pattern of block-like areas similar to those formed when a mud flat dries; being divided by cracks into small areas,
- arid** (cap or stem surface): feeling as if there is no moisture in the surface (= dry)
- asperate**: rough with projections or points
- asperulate**: delicately asperate
- atomate**: (also farinose) having the appearance of a powdered surface
- basidia** (sing. basidium): the usually \pm club-shaped/clavate cells of the hymenium which support spores on their (usually 2 or 4) extensions (sterigmata)
- Basidiomycetes** (taxonomic category): class of fungi which produce basidia and basidio-spores
- basidiospore**: spore from a basidium
- bilateral**: see divergent
- broom cells**: cells of cap cuticle or gill edges with short or long protuberances which give the appearance of a broom when seen massed together
- brosse* - see *en brosse*.
- bulbillose**: (of a stem), having a small or not clearly marked bulb at the base
- caespitose**: in groups, clusters, or tufts like grass where the individuals are growing quite close together but not joined to each other
- calyptrate** (spore): with outer layer of the spore wall loosening
- campanulate**: in the shape of a bell with outer edge often somewhat curved upwards

canescent (= hoary): cap or stem surface becoming hoary or silvery; densely downy

capitate (of cystidia): having a well-formed head or a rounded knob at the tip

carminophile: see siderophilous

cartilaginous (consistency of stem): resembling cartilage in consistency; firm and tough but pliable; structure forms a sharp, non-fibrous edge and a fibrous centre when broken; consistency of a stem that is typically (not always) 5mm or less in diameter; nearly equivalent to brittle

caulocystidia: cystidia on stem surface

cheilocystidia: cystidia situated on edge of gill or tube

chlamydospores: asexual reproductive cells with thick membrane which are formed by being cut off (budded) from hyphae to survive adverse conditions

chrysocystidia: with contents yellowing in ammonia or potassium hydroxide

clamp connections, clamps: specialized type of hyphal branch associated with a septum and apparently involved with the movement of nuclei; appears as a small arch or handle across the septum

clavate: club-shaped either with the thick end at the apex (cystidium, basidium), or with the thick end at the stem base (e.g. *Clitocybe clavipes*)

clavate-bulbous: type of bulbous stem base having a bulb that gradually tapers upwards and merges with the stem

Clitocybe-like: applied to any fruit-body with decurrent gills, fleshy-fibrous stem, and without a ring or volva

collarium: a tube to which the gills are attached around, but free from, the apex of the stem

Collybia-like: applied to any fruit-body with attached gills, cartilaginous or brittle stem, a convex cap with an incurved to decurved margin and without a ring or volva

context: the interior part of the cap, gills or stem, excluding the cuticle, usually referred to as the flesh

cortina: a cobwebby partial veil, composed of an open network of fibrils, which joins the cap margin and stem together in young fruit-bodies

cortinate: having a cortina

crenate (= scalloped): having the margin composed of rounded teeth

crenulate (margin of cap): minutely crenate having small scallops

cupulate: cup-like in form

cystidia (sing. cystidium): sterile, usually enlarged cells and hair-like formations of varying form and function, situated between the basidia in the hymenium or the cap cuticle and usually projecting out beyond the surface

decurved: cap margin bent down but not inward

dermatocystidia: a general term for caulocystidia and pileocystidia

deliquescent (verb: **deliquesce**): cap and gills do not rot but dissolve away, often very rapidly into \pm liquid drops containing spores when the spores mature (e.g. *Coprinus*)

dextrinoid (also pseudamyloid): staining yellow-brown to red-brown or ruby-red with Melzer's reagent

dichotomous (= dichotomous branching): branching into two \pm equal parts or divisions; often used to describe the repeated branching pattern of gills

disarticulating: becoming detached

divergent (= bilateral): of gill trama in which there is a central strand of hyphae and lateral strands which diverge downwards from the central strand to the spore-bearing layer

diverticulate: (type of branching pattern) said of hyphae or cystidia which have numerous peg-like protuberances or small branches scattered over their surfaces (as met in many *Mycena* species)

diverticulum: a protrusion or outgrowth

echinulate (surface of spores or hyphae): the diminutive of echinate; having small pointed spines

emarginate: gills (or tubes) cut away at the attachment to the stem and decurrent down the stem for short distance, as in sinuate but with a more tenuous attachment

en brosse (of cystidia): with excrescences, diverticulate

encrusted: (pigment) hyphae (or cystidia) with lumpy or crystal-like, granular particles on their surfaces, visible as bands, granules or patches

encrusting pigments: pigment situated on the outer side of the wall of hyphae or cystidia

epithelium: type of cap cuticle or stem cuticle made up of globose to broadly ellipsoid elements in more than one layer deep; **regular epithelium** occurs when the elements are in many-layered chains

excentric (also eccentric): **of stem**: not attached to centre of cap but not actually at the edge; **of germ pore**: skewed towards the abaxial side of the spore

farinaceous: smelling of freshly ground meal, mealy

fasciculate (fruit-bodies and cystidia): growing in a group or bundle

felted (cap and stem surfaces or volva): in the form of felt; i.e. composed of, or covered with, densely compressed, matted hairs or fibrils

fibrillose (surface of cap or stem): covered with delicate hairs which are usually long and evenly disposed, or with silk-like fibres

filamentous (hyphae): thread-like as opposed to cellular

fimbriate: minutely or delicately torn or fringed

flagellate: with whip-like or thread-like appendages

floci: cotton-like groups of tufts

floccose (cap and stem surfaces): covered with tufts of soft hairs, having the appearance of cotton flannel, often soon disappearing

fugacious: fleeting, ephemeral, short-lived, transient

furfuraceous: surface texture of cap or stem scurfy; covered with bran-like particles; coarser in texture than atomate/farinose or granulose

fusiform, fusoid (stem and spores): spindle shaped, tapering at both ends

fusoid-ventricose (cystidium): tapered towards both ends but distinctly enlarged in the middle

gelatinised: applied to hyphal cell walls which soften and partially dissolve in water, swelling up and becoming slimy; sometimes evident macroscopically when the cuticle stretches like rubber as it is peeled

gelatinous: of a gelatine-like, glassy nature (usually referring to cap or stem surface, hyphae or cap trama)

germ pore: thin spot in the apical end of a spore through which the spore may germinate

glabrous: completely devoid of hair or fibrils, smooth

globose (of spores or of dermatocystidia): spherical or nearly so

gloeocystidia: cystidia which are highly refractive and have hyaline or yellowish oily contents.

glutinous: slimy, very viscid; surface of cap or stem, covered with a substance that has the consistency of gluten or of liquid glue which becomes sticky as it dries

granulose (surface of cap or stem): surface covered with small granules, similar in size to those of salt; particles are larger than in farinose but smaller than in furfuraceous

habit (manner of growth): the shape or stature of the fruit-body, also the arrangement of fruit-bodies, e.g. solitary, trooping, gregarious, caespitose

hilar appendage (of spores): short process at basal end of spore, by which it was attached to the basidium by the sterigma, also sometimes referred to as apiculus

humicolous: growing in the soil

hyaline: (spores, hyphae) colourless (under microscope); beware of apparent yellow-green colour which can be due to refracted light

hygrophanous: changing colour markedly or becoming light in colour on loss of water, sometimes clearly recognizable by concentric zones of light and dark or flame-like radial markings due to uneven drying

hymeniform (cap cuticle): constructed like the hymenium (usually of clavate to rounded cells)

hymenium (part of a fruit-body): the spore-bearing layer of a fruit-body often intermixed with sterile elements (cystidia)

hymenoderm: cap cuticle with such a structure as to resemble a hymenium – all elements originating at same level

hymenophore: that part of a fruit-body which bears the hymenium; in mushrooms it is the gills

hyphal peg: fascicle of interwoven, unbranched hyphae arising in the trama and often projecting beyond basidia

hypoderm, hypodermium: a differentiated region just below the cap cuticle or stem cuticle, e.g., in *Hypholoma*, the layer between the cap cuticle and the cap flesh, thus usually meaning the same as subcuticle. It should, however, only be used for cellular structures; hyphal structures being designated subcuticle [FAN1 and Largent do not use this term]

incised (margin of cap): appearing as if it has been cut

incrusted: see encrusted

infundibuliform: funnel-shaped

insititious, inserted (stem): grafted onto substrate; base of stem seems inserted in substrate because basal hairs or tomentum are lacking.

intervenose (gills): provided with veins between the gills

interwoven (hymenophoral trama): hyphae intricately entangled, not running in any particular direction as they project downwards from the cap to form the gill trama

intraparietal (position of pigment): within the hyphal wall itself (as opposed to encrusting or cellular)

irregular (gill trama); where hyphae are irregularly interwoven

ixocutis (cap or stem cuticle): a cuticle in which the hyphal elements are gelatinised and prostrate

ixotrichoderm: a trichoderm made up of gelatinising elements

lacrymoid: (lacryform, dacryoid, dacryform) tear-shaped, with confluent apical appendage

lactiferous (hyphae): non-septate, thin-walled with milky or colourless juice or latex

lageniform (cystidia): swollen at the base, narrowed at the top; like a flask

lamellulae: short gills which do not reach the stem but interspace the longer gills at the cap margin

lecythiform (cystidia): bottle-shaped with a short neck and a distinctly swollen apical head

limoniform (shape of spore): lemon-shaped; said of spores with the ends tapered so they appear beak-like

leptocystidium: the commonest form of cystidium, thin-walled, capitate or not

lignicolous: growing on wood

mamillate (shape of cap): like the shape of a breast; possessing a protuberance (i.e., umbo) in the centre which makes the cap appear shaped like a breast; see papillate

marcescent (feature of fruit-body): able to revive when moistened; applied to a fruit-body which can resume spore production when moistened after being dried; often the fruit-body swells out and resumes its original shape

marginate (feature of gill or shape of stem base): having a well-marked edge or margin; used when the edge of the gill is marked by being coloured differently from the face; also used to describe a bulbous stem base when the bulb is well marked by its distinct rim

melleous: honey-coloured

Melzer's reagent: a chemical solution made of iodine, potassium iodide, chloral hydrate, and water; fungal structures are said to be amyloid (J+) if they turn blue in Melzer's reagent,

membranal (pigment): pigment which lies within the hyphal wall (not encrusting or intracellular)

membranous: cap flesh very thin, and pliant, like membrane; when held up to light gills are visible through cap surface

metuloid (cystidia): \pm thick-walled cystidia which originate fairly deep in the hymenophoral tissue (often with crystalline secretion at apex)

mycorrhiza, (pl. **mycorrhizae**): an association between the mycelium of a fungus and the rootlets of a vascular plant which is beneficial to the fungus as well as the plant

myxosporium: the set of often mucilaginous layers on the outside of the basidiospore wall enveloping the inner set of firm and resistant layers, a sheath outside the true spore wall

necropigments: appear as dark inclusions in the hyphae after the fruit-body has been dried

nodulose: having broad-based, blunt excrescences

Omphalina-like: Clitocybe-like but more delicate, with a strongly depressed cap centre

ornament: sculpture on spores in form of wart, spine, rib, net, etc.

ornamentation (surface of spore, cap, or stem): any projections or protuberances on the outer surface of a spore, cap, or stem, such as warts and spines

palisade: a type of cap cuticle in which all the terminal elements reach the same level and form a palisade of inflated, somewhat elongate cells

papillate: type of umbo, cap having a papilla; differs from mamillate in having a smaller protuberance

parabolic (shape of cap): a shape in which the height is greater than the width but the apex is still rounded, like that of a parabola; **broadly parabolic**: parabolic in shape with the apex broadly rounded; **narrowly parabolic**: parabolic in shape with the apex narrowly rounded

pectinate: when lines are more obvious (than striate, q.v.), short and parallel on the margin of the cap, like the teeth of a comb, the surface is called pectinate

pedicel: a slender stalk

pellicle (surface of cap): the outermost layer of a fruit-body often used only for a surface that is viscid and peels off with ease

pendant (orientation): hanging down; said of a ring which hangs down the stem

peronate (covering of stem): sheathed, having a boot or covering like a sock; used to describe the lower portion of a stem which is sheathed or covered with a universal or partial veil

phaseoliform (spore): in the shape of a french or scarlet runner-bean (i. e. concave in face view)

pileocystidia: cystidia in cap cuticle

plage: \pm distinctly delineated zone on spore wall, above the apiculus, on the adaxial side (that is the side facing the central axis of the basidium) which on warty spores is smooth or distinctly more weakly ornamented

pleurocystidia: cystidia in the hymenium of the gill face

plicate (cap surface): with very regular, radial folds or pleats like those of a fan as in *Coprinus plicatilis*

porate: having a germ pore

poroid: with a hymenium composed of tubes

primary mycelium: the uni-nucleate mycelium from a germinating spore

pruinose (cap, gill and stem surfaces): covered with a powdery (often white or whitish) 'bloom' or pruina as on plums or grapes,

pseudoparaphyses: basidium-like but sterile cells interspersed with basidia, for example, in the hymenium of *Coprinus*

pubescent (surface of cap or stem): having minute, soft hairs; covered with short, soft, fine hairs

pulverulent: pruinose-velvety (surface of the cap): covered with a dense layer of fine powder so that it appears velvety

punctate (cap or stem): with small, dot-like elevations; of spores when these exhibit finely dot-like ornamentation, but without wart-like protrusions being visible in outline (beware of confusion with plasma granulation!)

pustulate (stem and cap surfaces): with small rounded warts (surface) having blister-like structures

putrescent (basidiocarp feature): able to rot or putrefy

pyriform (cystidia, cells): pear-shaped

rameales structure: a cap cuticle consisting of irregularly branched, coral-like, forking hyphae, often with outgrowths, (irregularly shaped and arranged, nodose or en brosse or diverticulate elements); the hyphae branch irregularly (nodulose, forked, coralloid, etc) as in some species of *Marasmius* section *Rameales*, but also in *Marasmiellus*, *Xeromphalina* and *Coprinus* subsection *Alachuani*,

regular (hymenophoral trama): having parallel hyphae; (gill edge): smooth, not toothed or notched in any way; (epithelium) of elements in erect rows

reniform: kidney-shaped

repent (hyphae): creeping, prostrate, not ascending

reticulate (spore ornamentation): netlike; (surface of cap or stem): having a net; netted; ornamented with a net-like pattern

rhizoid: a root-like structure; one of the large distinct strands of hyphae at the base of the stem, smaller than rhizomorphs

rhizomorph: mycelial strands massed into a cord, looking like a root, applied to the large, macroscopic root-like structure at the base of the stem (applied for example to the 'bootlaces' formed by *Armillariella* species)

rugulose (surface of cap or stem): with minute irregular wrinkles

saccate (volva): with the tissue in the form of a bag or sack around the base of the stem, bag-like; in the shape of a bag

saprobe (= saprogen, saprotrophe): an organism using dead organic material as food, and commonly causing its decay (saprobe is the preferred term for fungi)

scabrosities: erect scales which are often pointed (as on the stem of *Leccinum* species)

sclerotium (fungal structure): a firm, often dense mass of hyphae, with or without the incorporation of substrate material, which may give rise to a fruit-body or to mycelium; considered a means by which a fungus may survive unfavorable environmental conditions

secondary mycelium: the binucleate mycelium formed after mating and thus capable of fruit-body formation

septation: the formation of cell walls which originate during cell division and separate two adjacent cells in hyphae (cross walls)

seta (pl. setae): a long bristle-like hair

setule: thin-walled, elongated bristle-like cell protruding from the surface of the cap and visible with a hand lens

siderophilous: literally iron-loving: Iron and various other metals form a complex aggregate with carmine and certain protein compounds in some basidia. Such basidia then exhibit a dark granulation (siderophilous granules) when heated with Acetocarmine. They occur in *Lyophyllum* and a few closely related genera. Also known as carminophile basidia.

sinuate: of gills: notched at the junction with the stem. Of an edge: undulating, (and also of, e.g., a stem or cystidium).

sordid (colour): dirty or dingy

spathulate (cap): elliptic or oblong tapering gradually towards a lateral stem

sphaerocyst (type of cell): the rounded cell in the flesh of a basidiocarp; nests or clusters of sphaerocysts are responsible for the chalk-like or crumb-like consistency of the flesh of *Russula* and *Lactarius*

sporulate: shed spores

squamose (cap and stem surfaces): covered with coarse (appressed) scales

squamule (surface of cap or stem): a small scale; a small flat piece of tissue, often tapered to a point

squamulose (cap and stem surfaces): covered with minute scales (squamules)

squarrose (cap and stem surfaces): covered with projecting coarse, distinctly erect scales

sterigma (pl. sterigmata): spore-bearing processes arising from the tip of a basidium.

stipe: stem

striate (surface of cap or stem): marked with delicate lines, grooves, or ridges, radially oriented on the cap, longitudinally oriented on the stem

strigose (cap and stem surfaces): covered with long, coarse or thick, rather stiff hairs; term often used for such hairs at the stem base

sub- (prefix) 'somewhat' or 'not quite - the remainder of the word': e.g. subglobose = not quite globose, and see the following entries

subcellular: nearly cellular or consisting of cellular (rather than filamentous) elements

subdecurrent: applied to gills which barely run down stem; nearly decurrent

subhymenium: area of tissue beneath hymenium which sometimes contrasts with both the hymenium and the trama by virtue of different structure

submarginate (stem base): bulbous with an ill-defined rim

subporiform: with gills which anastomose to form shortly elongated pores

substrate:(substance): the material on which the fruit-body is found, from which the fungus obtains its nourishment, and in which the mycelium is found

subtomentose (surface of cap or stem): with a somewhat dense layer of matted down or soft hairs, or like a newly sheared lamb

sulcate (cap and stem surfaces): with grooves, more deeply grooved than striate and less deeply than plicate

suprahilar plage: see plage

taxon (pl.taxa): an exactly circumscribed entity or group of organisms, with a particular rank and placement within a classification

terete: circular or round in cross section; not flattened

tomentose (surface of cap or stem): densely matted and woolly or hairy, like a woolen blanket; also having a covering of soft, matted hairs

trama: a term used in microscopic description, the sterile interior tissue of a fruit-body, excluding the surface tissue, the flesh as seen through the compound microscope

translucent-striate (margin of cap): having translucent tissue which permits the attachments of the gills to show through as dark lines (striations)

trichoderm: a cap cuticle in which the hyphae of the uppermost layer covering the cap are \pm at right angles to the surface but not strictly parallel (if they are, the cuticle is a palisade) and not constituting a hymeniform layer; macroscopically the surface is velvety to lightly tomentose

Tricholoma-like applied to any mushroom characterized by sinuate gills (neither free, nor decurrent); stem \pm as long as diameter of cap; context of cap fleshy, continuous with context of stem which lacks a volva and rarely has a ring

truncate (spore, cystidium, umbo): cut off, ending abruptly as though the end had been cut off

tuberculate (surface of fruit-body or spore): having tubercles, (no connection with Koch's bacillus)

tuberous: having a tuber

umbilicate (cap surface): with a small umbo in a central depression, like a navel or umbilicus

umbo (on cap): cap centre raised above surrounding surface

umbonate (cap): having an umbo; varieties are: **acutely umbonate**: with a sharply delineated or pointed umbo; **broadly umbonate**: with a rounded, and broad umbo; **obtusely umbonate**; with a blunt or rounded umbo, often used if the umbo is blunt but not very broad

veil (layer of hyphae): a covering which partly or completely encloses a fruiting body; **partial**: enclosing the hymenium (sometimes also the cap surface); **universal**: enclosing the whole fruiting body when young

velar: of, forming, or relating to a veil

ventricose (stem, gills, cystidia): inflated, pot-bellied, considerably broader in the middle than at either end

verruca (pl. verrucae): a rounded ornamentation or roughening; a wart

verrucose: with moderately large outgrowths, larger than verruculose but smaller than warty

verruculose: diminutive of verrucose

villose (cap and stem surfaces): covered with fairly long, soft, weak, \pm straight, not interwoven hairs

viscid: very sticky but not slime-covered (i.e. slimy); compare with greasy (= lubricous)

References

- Anon. (1960). New Check List of British Agarics and Boleti. *TBMS*. **13**: 159.
- Antonin, V. & Noordeloos, M. (1993). *A Monograph of Marasmius, Collybia and related genera in Europe*. Part I: *Marasmius, Setulipes and Marasmiellus*. Libei Botanici Volume 8 IHW-Verlag.
- Bas, C., Kuyper, T.W., Noordeloos, M.E., & Vellinga, E.C., Eds. (1988-2001). *Flora Agaricina Neerlandica*. **Volumes 1-5**. Rotterdam, Balkema.
- Bingham, J. & D. *Squamanita paradoxa* in Shropshire. *Field Mycology* **6**(1):11-12
- Blackwell, E. (1992). The etymology of British Fungus names – *Lactarius* and *Russula* *KEYS 7* British Mycological Society, London.
- Blackwell, E. (2004). Some hints for Identifying wood in the field. *Field Mycology* **5**(1):17-21
- Boertmann, D. (1995). *Fungi of Northern Europe I. The genus Hygrocybe*. The Danish Mycological Society, Copenhagen.
- Brand, B., Henrici, A. & Leonard, P. (2001). *Guide to the Literature for the Identification of British Basidiomycetes*. British Mycological Society, Kew.
- Breitenbach, J. & Kränzlin, F. (1984-2000). **Volumes 2-5**. and Kränzlin, F. (2005). Volume 6. *Fungi of Switzerland*. Verlag Mykologie, Lucerne.
- Courtecuisse, R. & Duhem, B. (1995). *Mushrooms and Toadstools of Britain and Europe*. HarperCollins, Lndon.
- Cullington, P. (2006). Using gill attachment as an identification aid. *Field Mycology*. **7** (1): 13-15.
- Cullington, P. (2006). *Psathyrella* Species with a Red Gill Edge. *Field Mycology*. **7** (3): 93-99.
- Emmett, E., E. (1992). British *Mycena* species - 1. *Mycologist* **6** (1):72-76.
- Emmett, E., E. (1992). British *Mycena* species - 2. *Mycologist* **6** (3):114-122.
- Emmett, E., E. (1992). British *Mycena* species - 3. *Mycologist* **6** (4):165-173.
- Emmett, E., E. (1993). British *Mycena* species - 4. *Mycologist* **7** (1):4-11.
- Emmett, E., E. (1993). British *Mycena* species - 5. *Mycologist* **7** (2):63-67.
- Emmett, E., E. (1993). British *Mycena* species - 6. *Mycologist* **7** (4):176-180.
- Hansen, L. & Knudsen, H. (1992 and 1997). Vol 2 and Vol 3 *Nordic Macromycetes*. : Nordsvamp, Copenhagen.
- Heilmann-Clausen, J., Verbeke, A., & Vesterholt, J.(1998). *Fungi of Northern Europe II. The genus Lactarius*. The Danish Mycological Society, Copenhagen.
- Henrici, A. (2004). A key to *Paxillus* s. l. in Europe. *Field Mycology* **5** (3):87.
- Henrici, A. (2005). Further notes on *Squamanita*. *Field Mycology* **6** (1):13-14.
- Holden, L. (2005). *Squamanita pearsonii* collected in Aberdeenshire *Field Mycology* **6**(1):10
- Jordan, M., McAdam, A., Williamson, C., Cundall, R., Marriott, J. V. R., Spooner, B. & Roberts, P. (2004). ABFG Phonetics and Meanings Dictionary. Association of British Fungus Groups.
- Kibby, G. (2001). Key to the blackening species of *Russula* of Section *Compactae*. *Field Mycology* **2** (3):95-97.
- Kibby, G. (2006). *Leccinum* revisited - a new synoptic key to species. *Field Mycology* **7** (4):113-122
- Kibby, G. (2007). *The Genus Russula in Great Britain with synoptic keys to species*. Available from the author at 56 Bodnant Gardens, Raynes Park, London SW10 0UD, price (including P&P): £18.00.

- Kits van Waveren (1985). The Dutch, French and British species of *Psathyrella*. Persoonia, 13: Supplement to **Volume 2**.
- Knudsen, H. & Versterholt, J. (2008). *Funga Nordica*. Nordsvamp, Copenhagen.
- Lange, M. & Hora, F.B. (1963, reprinted often). *Collins Guide to Mushrooms and Toadstools*. Collins, London.
- Largent, D. (1986). *How to Identify Mushrooms to Genus I: Macroscopic Features*. Eureka, CA 95501: Mad River Press.
- Largent D. (1986). *How to Identify Mushrooms to Genus VI: Modern Genera*. Mad River Press. Eureka, CA 95501.
- Largent, D., Johnson, D. & Watling, R. (1986). *How to Identify Mushrooms to Genus III: Microscopic Features*. Mad River Press. Eureka, CA 95501.
- Legg, A. (1991). Introduction and provisional key to British species of *Tephroclybe* found on burnt ground. *KEYS 6*. British Mycological Society, London.
- Ligon, N.W. & Henrici, A. (2005). *Checklist of the British and Irish Basidiomycota*. Royal Botanic Gardens, London.
- Leonard, P. (1998). Keys to the British Species of *Amanita* and *Limacella*. *KEYS 12*. British Mycological Society, London
- Leonard, P. (1998). *Hygrocybe: QUICK KEY*. British Mycological Society, London.
- Leonard, P. (2008). (On BMS website: Updated and revised version of Leonard (2006) Synoptic Key to British Species of *Lactarius*. *KEYS 11* British Mycological Society, London.)
- Marriott, J.V.R. (1994). *Guide to Identification with a Microscope*. British Mycological Society Publications, London.
- Marriott, J.V.R. (1992). Keys to *Naucoria* species of damp ground. *KEYS. 8* British Mycological Society, London.
- Marriott, J. V.R. (1998). Keys to *Galerina* Species. *KEYS 12* British Mycological Society, London.
- Marriott, J.V.R. (2006). A provisional working key to *Crepidotus* species. *Forayer 2* (2):16-18.
- Moser, M. (1983). *Keys to Agarics and Boleti*. Roger Phillips, London.
- Noordeloos, M.E. (1992). *Fungi Europaei Volume 5 Entoloma*. Giovanna Biella, Saronno.
- Noordeloos, M.E. (2004). *Fungi Europaei Volume 5a Entoloma*. Candusso., Alasio.
- Orton, P.D. (1955). *The Genus Cortinarius: Part I - Myxacium and Phlegmacium*. Yorkshire Naturalists' Union, Leeds.
- Orton, P.D. (1958). *The Genus Cortinarius: Part II - Inoloma and Dermocybe*. Yorkshire Naturalists' Union, Leeds.
- Orton, P.D. (1984) *Tephroclybe* – checklist and key. *BMS Bull. 18* (2):114-120
- Phillips, R. (2006). *Mushrooms*. Macmillan, London.
- Ramsbottom, J. (1944). *Larger British Fungi*. British Museum, London.
- Rayner, R. W. & Brand, A. W. (1979). A tabulation of the genera of the Agaricales (Gill Fungi and Boletes) based primarily on macroscopic characters. *Bull BMS, 13*: 133-147.
- Rayner, R. W. (1985). *Keys to the British Species of Russula*. British Mycological Society, London.
- Reid, D.A. (1984). A revision of British *Naucoria* s.l. *TBMS, 82* (2): 191-237
- Robich, G. (2003). *Mycena D'Europa*. Fondazione Centro Studi Micologici Dell'A.M.B., Vicenza.

- Ryvarden, L. & Gilbertson, R.L. (1993). *European Polypores*. Grønlands Grafiske A/S, Oslo.
- Senn-Irlett, B. (1995). *The Genus Crepidotus in Europe*. *Persoonia* **16** (1):1-80
- Soop, K. (2005). *Cortinariarius in Sweden* 10th Edition. Scientrix, Stockholm.
- Stangl, J. (1989). *Die Gattung Inocybe in Bayern*. Verlag der Gesellschaft, Regensburg.
- Taylor, A. F. S., Hills, A. & Simonini, G. (2002). A fresh look at Xerocomoid fungi. *Field Mycology* **3** (3):89-102
- Tofts, R. (2002). The British species of *Lepiota* 1: Section Stenosporae *Field Mycoogy* **3** (4):124-136
- Vellinga, E. C. (1986). The genus *Flammulaster* (Agaricales) in the Netherlands and adjacent regions. *Persoonia* **13** (2):1-26
- Vesterholt, J.(2005). *Fungi of Northern Europe III. The genus Hebeloma*. The Danish Mycological Society, Copenhagen.
- Watling, R. & Gregory, N. M. (1989). *British Fungus Flora Volume 6*. Royal Botanic Gardens, Edinburgh.
- Watling, R. & Hills, A. E. (2005). *British Fungus Flora Volume 1*, 2nd Edition. Royal Botanic Gardens, Edinburgh.
- Watling, R. & Turnbull, E. (1998). *British Fungus Flora Volume 8*. Royal Botanic Gardens, Edinburgh.
- Watling, R. (1973). *Identification of the Larger Fungi*. Hulton Group Keys, Ed. Kenney A. R. Hulton Educational Publications, Amersham.
- Weightman, J. (2006). Small Mycenas et. al. *Field Mycoogy* **7** (1):16-21

Recommended Keys to Species for Beginners

This data is copied from Brand, Henrici and Leonard (2001) with some updating but in no way intended to replace that important source work. I have omitted *Flora Europae* references (*Entoloma* excepted) as I think that series of books is unlikely to be in the hands of beginners. In the table below there are extensive references to BFF, FAN and B&K with other citations where keys to species in a genus might be particularly helpful or difficult to find. Other valuable keys are available in the newly published *Funga Nordica* and on the internet. The BMS Keys project is at www.britmycolsoc.org.uk/resources

Agaricus	FAN5:23
Agrocybe	NM2:269, B&K4:44, (BFF3 has a narrower species concept), FAN6:204
Amanita	Leonard (1998)
Armillaria	FAN3:34 and NM2:97
Arrhenia	BFF6:27 and FAN3:39
Asterophora	As <i>Nyctalis</i> the 2 British species are illustrated in RP:88, C&D:212
Baeospora	BFF8:107, FAN4:165
Bolbitus	BFF3:31, FAN6:112
Boletopsis	NM3:309, B&K:2:236
Boletus	BFF1:12
Buchwaldoboletus	BFF1:59
Calocybe	British species are all illustrated in C&D:212
Camarophylloopsis	FAN2:111, NM2:75
Camarophyllus	NM2:76, = <i>Cuphophyllus</i> in C&D:154, otherwise in <i>Hygrocybe</i>
Cantharellula	BFF8:48, FAN3:41
Cantharellus	BFF8:15, NM3:261
Chaetocalathus	BFF6:34
Chalciporus	BFF1:62
Chamaemyces	FAN5:152, NM2:214
Cheimonophyllum	BFF6:35
Chlorophyllum	FAN5:74
Chroogomphus	BFF1:113, NM2:68
Chrysomphalina	B&K3:148 and illustrated in C&D:182 as <i>Gerronema</i> and FAN3:78 as <i>Omphalina</i>
Clitocybe	FAN3:42, B&K3:40, etc
Clitocybula	BFF8:109
Clitopilus	BFF6:112, FAN2:341
Collybia	FAN3:106
Conocybe	NM2:272, FAN6:120 (+ <i>Pholiotina</i> in FAN6:180)
Coprinus	FAN6:22
Cortinarius	Orton 1955 and 1958, Karl Soop (2006)
Craterellus	BFF8:26, NM3:263
Crepidotus	NM2:336, Marriott (2006), Senn-Irlett (1995)
Crinipellis	FAN3:135
Cystoderma	BFF8:36
Cystolepiota	FAN5:154

Delicatula	BFF8:87 and see Emmett in Mycologist 7(4):176
Dermoloma	BFF8:87, FAN3:30 Note very different treatments
Entoloma	FAN1:85, and Noordeloos' two volumes in Fungi Europei (his best key is Vol 2:806 but the illustrations are in both volumes), B&K4:33
Faerberia	B&K3:186, FAN2:30
Fayodia	BFF8:93, FAN3:153
Fistulina	NM3:294, illustrated in RP305, etc
Flammulaster	Vellinga (1986) is still the only reliable source
Flammulina	FAN3:170
Galerina	BFF7:9 has good descriptions. Roy Watling's revised Key is printed at the end of this booklet, B&K5:310 has pictures
Gamundia	BFF8:94, FAN3:155 (formerly included in Fayodia)
Gerronema	Difficult to be correct. Try BFF8:111
Gomphidius	BFF1:115, NM2:69
Gomphus	BFF8:29, NM3:269
Gymnopilus	BFF7:58
Gymnopus	Used by Antonin and Noordeloos for much of Collybia but in BFF8 only for Collybia fusipes.
Gyrodon	BFF1:101, NM2:52
Gyroporus	BFF1:97, NM2:53
Haasiella	FAN3:63
Hebeloma	Vesterholt (2005)
Hebelomina	<i>H. neerlandica</i> Mycologist 7(3) 108, (1993). Likely to cause grave difficulties in identification. Looks like a small whitish Tricholoma with dextrinoid, hyaline spores
Hemimycena	NM2:124, BFF8:116, B&K3:192
Hohenbuehelia	BFF6: NM3: (with several mainly nomenclatural differences), FAN3:158
Hydropus	FAN4:166, BFF8:131
Hygrocybe	BMS Quick Key, Boertmann (1995)
Hygrophoropsis	BFF1:106, FAN3:64
Hygrophorus	FAN2:115
Hypholoma	BFF5:9 (key relies rather heavily on ecology), FAN4:28 (as Psilocybe p.p.)
Hypsizygus	BFF6:50
Inocybe	Matching the fb to pictures in Stangl (1989) followed by comparison of micro characters is one solution. A difficult genus.
Kuehneromyces	BFF7:9 as Galerina p.p., FAN4: 80 (as Pholiota p.p.)
Laccaria	FAN3:96
Lacrymaria	Included in Psathyrella in Kits van Waveren (1985), separately treated In BFF5:71
Lactarius	Leonard (2008), BFF9:3, B&K6:25, Heilmann-Clausen et al. (1998)
Leccinum	Kibby (2006)
Lentinellus	B&K3:74
Lentinus	B&K3:13

Lepiota	FAN5:109, British species, Sect Staurospora Tofts (2002)
Lepista	FAN3:67
Leucoagaricus	FAN5:85
Leucocoprinus	FAN5:76
Leucocortinarius	BFF7:73
Leucopaxillus	BFF8:50, FAN3:76
Lichenomphalia	FAN3:89 as Phytoconis, in B&K3:190 among Gerronema and 2 of the British species are illustrated in Phillips (2006)
Limacella	Five of the six British species are in B&K4:161, while the sixth scarcely differs from <i>L. glioderma</i> (meally smell absent) (This genus now reduced to 4 spp. and 2 vars.)
Lyophyllum	Eight of nine British species are illustrated in B&K3:218 Tephrocyebe is often included in Lyophyllum, but British authors have maintained it as a distinct genus.
Macrocystidia	FAN3:174
Macrolepiota	FAN5:64, NM2:225
Marasmiellus	FAN3:123
Marasmius	FAN3:136, B&K3:232 (as most do not have access to Antonin and Noordeloos (1993))
Megacollybia	FAN4:172, BFF8:135
Melanoleuca	FAN4:153, BFF8:54
Melanomphalia	NM2:338
Melanophyllum	NM2
Melanotus	BFF5:24 and BFF6:18, FAN4:51 as sg of Psilocybe. Only <i>M.horizontalis</i> and <i>M. phillipsii</i> recognized as distinct in CBIB.
Micromphale	FAN3:129
Mycena	Emmett (1992-93): six articles in Mycologist. Robich (2003)
Mycenella	FAN4:173, NM2:169
Myxomphalia	BFF8:97, NM2:121
Naucoria	Henrici (2008) This genus is under review as described in this paper. See also Alnicola (as the genus appears in C&D right now)
Omphaliaster	FAN3:78
Omphalina	FAN3:78 and refer also to Chrysomphalina and Gerronema
Omphalotus	FAN3:88 and in BFF6:52 as <i>O. olearius</i>
Ossicaulis	BFF6:55, FAN3:131
Oudemansiella	NM2:175, BFF8:141, FAN3:177
Panaeolina	BFF5:80, B&K4:258
Panaeolus	BFF5:76, B&K4:254
Panellus	BFF6:57, repeated in BFF8:98, FAN3:168
Panus	B&K3:210 as <i>Lentinus torulosus</i> , NM2:47 as <i>Lentinus conchatus</i>
Paxillus	Henrici (2004), BFF1:102
Phaeocollybia	BFF7:75
Phaeogalera	BFF7:80
Phaeolepiota	BFF7:84
Phaeomarasmius	BFF7:86
Pholiota	FAN:480
Phylloporus	BFF1:87

Phyllotopsis	BFF6:19
Pleurocybella	BFF6:61 as Phyllotus
Pleuroflammula	BFF6:103 and 7:89
Pleurotus	FAN2:20
Plicatura	B&K2:170 as Plicaturopsis
Pluteus	BFF4:4 (recognises too many species), FAN2:32 (recognises too few), B&K4:118
Porphyrellus	BFF1:93
Porpoloma	BFF8:77, FAN4:149
Psathyrella	NM2:236, B&K4:262 illustrates 40 species, Psathyrella with pink gill edges: Cullington (2006)
Pseudobaeospora	FAN3:132
Pseudoboletus	BFF1:89
Pseudoclitocybe	BFF8:80, FAN3:92
Pseudocraterellus	BFF8:27
Pseudoomphalina	BFF8:83, FAN3:93,
Psilocybe	BFF5:30, FAN4:28 (in a wide sense that includes Hypholoma, Melanotus and Stropharia)
Resinomycena	BFF8:142, Emmett Mycologist 7(4):177 (1992/3)
Resupinatus	BFF6:62, FAN3:166
Rhodocybe	FAN1:77
Rhodotus	BFF6:65, FAN3:175
Rickenella	FAN3:157
Ripartites	FAN3:94
Rozites	BFF7:91
Rubinoboletus	BFF1:90
Russula	B&K6:31, Rayner (1985) Easiest key to use in my experience is Geoff Kibby's (2007) and blackening ones Kibby (2001)
Schizophyllum	BFF6:72
Simocybe	B&K5:304 shows all British species (in C&D as <i>Ramicola</i>)
Squamanita	Holden (2005.), J and D Bingham (2005), Henrici (2005)
Stagnicola	BFF7:93 (formerly in Phaeocollybia)
Strobilomyces	BFF1:95, NM2:72
Strobilurus	FAN4:178, BFF8:143
Stropharia	BFF5:56, FAN4:28 (as Psilocybe p.p.)
Suillus	BFF1:119
Tapinella	BFF1:109
Tephrocybe	Now usually considered a sg of Lyophyllum: Legg <i>Tephrocybe on Burnt Ground</i> (1991). The only useful general key is Orton (1984).
Tricholoma	FAN4:107
Tricholomopsis	FAN4:151, RP98
Tubaria	B&K4:356 (in Strophariaceae), but no satisfactory key exists.
Tylopilus	BFF1:92
Volvariella	FAN2:57, BFF4:61
Xerocomus	BFF1:12 (included in Boletus), Taylor, Hills and Simonini (2002).
Xeromphalina	BFF8:147
Xerula	FAN4:181, BFF8:149

Index of Genera in Various Publications

Nomenclature in Britain differs from that on the Continent of Europe. DNA studies are constantly producing new evidence so there is sometimes a clash between Mycologists about the name of the same genus. For instance, when we look for *Tephrocye* in B&K it appears under *Lyophyllum* while in C&D it is *Tephrocye*. Both authors place *Naucoria* species in *Alnicola*. *Hypholoma* becomes a subgenus of *Psilocybe* in FAN4. I have tried to take this into account, so a page number in the column for B&K or C&D, etc might seem to be wrong to the reader. I urge you to persist. Often the species name is preserved although the genus name is different. So *Robinoboletus rubinus* in BFF1 appears as *Chalciporus rubinus* in C&D. Where there is disagreement only a taxonomist can help.

Genera in this booklet		Genera in other publications								
	Page	FAN	B&K	FN	NM	CBIB	BFF	RP	C&D	MM
Agaricus	23	5:23	4:160	519	2:206	1		235	250	230
Agrocybe	61	6:204	4:290	826	2:269	8		246	360	289
Amanita	31		4:146	326	2:194	6	3:7	140	272	224
Armillaria	36	3:34	3:136	252	2:97	14		100	180	150
Arrhenia	29	3:39	3:140	226	2:98	15	6:27	266	152	134
Asterophora	27		3:298	495	2:100	17		88	212	142
Aureoboletus	15		3:88	163	2:66	19	1:11	285	422	70
Baeospora	54	4:165	3:142	274	2:100	20	8:107	80	220	193
Bolbitius	33	6:112	4:296	624	2:271	22	3:31	283	362	289
Boletopsis	14		2:236		3:309	22				
Boletus	16		3:52	163	2:56	23	1:12	275	428	72
Buchwaldoboletus	16		3:76	168	2:66	28	1:59	283	422	72
Calocybe	56		3:144	496	2:101	30		104	212	140
Camarophyllopsis	30	2:111		188	2:75	32			232	95
Cantharellula	49	3:41	3:146	234	2:103	32	8:48	94	182	142
Cantharellus	28		2:370		3:261	33	8:15	273	144	
Chaetocalathus	20			288		37	6:34			169
Chalciporus	15		3:66	169	2:63	37	1:62	279	422	1
Chamaemyces	31	5:152	4:182	530	2:214	37		136	240	239
Cheimonophyllum	20			275	2:104	37	6:35		152	151
Chlorophyllum	33	5:74		531		352		129	250	
Chroogomphus	52		3:94	153	2:68	38	1:13	271	418	81
Chrysomphalina	65		3:148	191	2:170	38		80	152	98/103
Claudopus	21	1:85			2:342	90			300	213
Clitocybe	50	3:42	3:148	392	2:105	42		89	172	106
Genera in this booklet		FAN	B&K	FN	NM	CBIB	BFF	RP	C&D	MM

Genera in this booklet				Genera in other publications						
	Page	FAN	B&K	FN	NM	CBIB	BFF	RP	C&D	MM
Clitocybula	53	3:42	3:170	277		45	8:109		182	143
Clitopilus	21	1:82	4:50	431	2:341	45	6:112	154	302	195
Collybia	44	3:106	3:172	403	2:114	46		120	216	151
Conocybe		6:120	4:298	626	2:272	50		224	362	282
	57	/180								
Coprinus	23	6:22	4:224	532	2:228	56		257	260	256
Cortinarius	38		5:142	661	2:279	63		169	324	349
Craterellus	27		2:372		3:263	80	8:26	274	144	63
Crepidotus	22		5:296	864	2:336	80	6:82	268	348	309
Crinipellis	16	3:135	3:184	288	2:117	81			214	169
Cystoderma	36		4:182	510	2:118	84	8:36	138	238	252
Cystolepiota	31	5:154	4:188	533	2:215	85		136	240	239
Delicatula	28		3:186	277	2:120	88	8:110		220	173
Dermoloma	54	3:30	3:186	404	2:120	88	8:87		236	190
Entoloma	45	1:85	4:52	433	2:342	90		160	290	196
Faerberia	19	2:30	3:186	72	2:46	106	6:11	106	152	65
Fayodia	63	3:153	3:188	278	2:121	106	8:93		186	191
Fistulina	14		2:334	250	3:294	107		305	140	
Flammulaster	58		4:318	778	2:254	107		230	348	304
Flammulina	43	3:170	3:188	254	2:123	109		228	234	193
Galerina	59		5:310	785	2:306	109	7:9	228	346	420
Gamundia	65	3:155		279		113	8:94		186	192
Gerronema	64		3:190	280	2:173	116	8:111		182	102
Gomphidius	52		3:96	154	2:69	117	1:115	270	418	80
Gomphus	27		2:368		3:269	118	8:29		144	
Gymnopilus	38		5:134	857	2:314	119	7:58	210	344	344
Gyrodon	15		3:68	159	2:52	120	1:101	285	420	66
Gyroporus	14		3:68	159	2:53	120	1:97	287	420	66
Haasiella	66	3:63		192	2:170	120				103
Hebeloma	40		5:106	804	2:315	121		215	304	334
Hebelomina	48					124				341
Hemimycena	56		3:192	265	2:124	124	8:116	87	220	171
Hohenbuehelia	19	3:158	3:196	313	2:127	127	6:38	268	152	158
Hydropus	54	4:166	3:198	282	2:128	129	8:131		236	189
Hygrocybe	30	2:71	3:100	194	2:77	130		72	154/6	89
Hygrophoropsis	29	3:64	3:90	151	2:53	136	1:106	125	418	80
Genera in this booklet		FAN	B&K	FN	NM	CBIB	BFF	RP	C&D	MM

Genera in this booklet		Genera in other publications								
	Page	FAN	B&K	FN	NM	CBIB	BFF	RP	C&D	MM
Hygrophorus	29	2:115	3:118	212	2:85	136		68	164	82
Hypholoma	42	4:68	4:320	832	2:255	144	5:9	231	358	294
Hypsizygus	19		3:230	497	2:129	147	6:50	264	210	121
Inocybe	40		5:42	868	2:321	148		218	310	314
Kuehneromyces	35	4:80	4:338	836	2:258	158	7:9	227	346	303
Laccaria	30	3:96	3:200	658	2:129	159		102	186	104
Lacrymaria	41		4:254	583	2:236	160	5:71	256	264	275
Lactarius	30		6:42	82	2:360	161	9:3	48	398	450
Leccinum	15		3:70	169	2:63	167	1:63	288	438	76
Lentinellus	18		3:204	78	2:92	169	6:74	268	148	464
Lentinus	18	2:25	3:206	72	2:92	170	6:13		148	64
Lepiota	33	5:109	4:190	538	2:216	170		126	242	240
Lepista	48	3:67	3:210	405	2:132	174		156	174/200	118
Leucoagaricus	32	5:85	4:206	548	2:222	176		134	246	249
Leucocoprinus	32	5:76	4:212	553	2:223	179		134	248	250
Leucocortinarius	37		5:296	827	2:330	180	7:73	38		418
Leucopaxillus	50	3:76	3:216	409	2:135	181	8:50	94	206	144
Lichenomphalia	65	3:90	3:190	223		181		79	184	
Limacella	32		4:156	332	2:198	182		115	272	229
Lyophyllum	44		3:218	498	2:137	185		328	208	134
Macrocyttidia	45	3:174	3:230	312	2:141	186		154	304	168
Macrolepiota	32	5:64	4:214	554	2:225	186		126	248	247
Marasmiellus	17	3:123	3:232	302	2:142	188		119	216	155
Marasmius	44	3:136	3:232	288	2:143	189		116	214	164
Megacollybia	43	4:172	3:246	285	2:147	191	8:135	96	234	161
Melanoleuca	42	4:153	3:246	347	2:148	192	8:54	98	202	146
Melanomphalia	52			861	2:338	194				309
Melanophyllum	33	5:161	4:220	557	2:227	194		136	250	238
Melanotus	23	4:28	4:328	845	2:259	195	5:24 &	6:118	356	298
Micromphale	17	3:129	3:254		2:151	196		78	216	156
Mycena	55		3:256	352	2:152	197		80	222	173
Mycenella	55	4:173	3:298	257	2:169	204	8:137		232	163
Myxomphalia	63	3:156	3:298	285	2:121	206	8:97	78	212	192
Naucoria	60		5:126	817	2:330	206		229	304	341
Omphaliaster	66	3:78	3:300		2:170	209		94		103
Genera in this booklet		FAN	B&K	FN	NM	CBIB	BFF	RP	C&D	MM

Genera in this booklet				Genera in other publications						
	Page	FAN	B&K	FN	NM	CBIB	BFF	RP	C&D	MM
Omphalina	65	3:78	3:300	235	2:170	209		79	184	97
Omphalotus	28	3:88		306		210	6:53	267	418	80
Ossicaulis	48	3:131	3:160	506	2:106	210	6:55	264	150	111
Oudemansiella	34	4:177	3:308	260	2:175	210	8:141	116	234	161
Panaeolina	61		4:258	646	2:234	211	5:80	263	366	269
Panaeolus	61		4:254	646	2:234	211	5:76	261	366	267
Panellus	18	3:168	3:308	387	2:175	212	6:57/8:98	270	149	160
Panus	19		3:210	73	2:46	213		266	148	63
Paxillus	26		3:90	160	2:54	213	1:102/6:106	208	418	79
Phaeocollybia	57		5:306	822	2:333	216	7:75	207	344	418
Phaeogalera	59		5:310	837	2:306	216	7:80		346	219
Phaeolepiota	34		4:222	515	2:176	216	7:84	139	238	255
Phaeomarasmius	58		5:330	781	2:259	217	7:86	217	348	304
Pholiota	39	4:80	4:328	837	2:260	224		211	350	298
Phylloporus	51		3:74		2:66	227	1:87		468	70
Phyllotopsis	21	2:24	3:310	243	2:92	227	6:19		150	62
Pleurocybella	20		3:312	243	2:176	229		267	150	151
Pleuroflammula	22			908		229	6:103& 7:89			308
Pleurotus	20	2:20	3:312	321	2:48	229	6:20	264	150	62
Plicatura	29		2:170		3:163	230			138	
Pluteus	45	2:31	4:118	335	2:199	230	4:4	164	282	218
Porphyrellus	16		3:50	173	2:71	235	1:93	286	420	65
Porpoloma	48	4:149	3:314	412	2:176	235	8:77		208	144
Psathyrella	61		4:262	586	2:236	238		253	264	269
Pseudobaecopora	32	3:132		515	2:227	245				247
Pseudoboletus	26		3:88		2:60	245	1:89	284	426	70
Pseudoclitocybe	49	3:92	3:314	238	2:177	245		94	180	143
Pseudocraterellus	28		2:374		3:263	246	8:27	274	144	
Pseudoomphalina	64	3:93		238	2:177	246	8:83		180	143
Psilocybe	62	4:28	4:344	844	2:264	247	5:30	251	356	296
Resinomycena	53			389		252	8:142		230	
Resupinatus	19	3:166	3:316	324	2:178	252	6:62		152	159
Rhodocybe	22	1:77	4:114	491	2:358	253		158	302	194
Rhodotus	21	3:175		261	2:179	254	6:65	268	238	194
Rickenella	52	3:157	3:316	69	2:173	254		88	182	103
Genera in this booklet		FAN	B&K	FN	NM	CBIB	BFF	RP	C&D	MM

Genera in this booklet				Genera in other publications						
	Page	FAN	B&K	FN	NM	CBIB	BFF	RP	C&D	MM
Ripartites	51	3:94	3:92	412	2:180	255		233	200	120
Rozites	35		5:296		2:334	256	7:91	207	324	418
Rubinoboletus	16			173		256	1:90	256	422	71
Russula	31		6:124	107	2:374	256		16	368	429
Schizophyllum	18		3:318	250	3:165	267	6:72	268	142	463
Simocybe	60		5:304	908	2:339	270		229	364	300
Squamanita	26		4:222	516	2:180	274	8:43		238	254
Stagnicola	57			910	2:333	275	7:94			218
Strobilomyces	14		3:50	173	2:72	276	1:95	286	420	65
Strobilurus	55	4:178	3:318	261	2:182	276	8:143	125	232	164
Stropharia	62	4:53	4:350	851	2:267	277	5:56	248	354	292
Suillus	15		3:76	154	2:69	280	1:119	292	422	67
Tapinella	22&26		3:94	150	2:54	282	1:109	208	418	79
Tephrocybe	56		3:218		2:137	282		124	212	137
Tricholoma	49	4:107	3:320	413	2:183	294		105	188	122
Tricholomopsis	48	4:151	3:344	334	2:191	298		98	198	121
Tubaria	58		4:356	782	2:340	299		230	348	306
Tylopilus	16		3:84	174	2:72	303	1:92	287	430	76
Volvariella	45	2:56	4:134	344	2:203	306	4:61	155	288	216
Xerocomus	16		3:84	174	2:56	23	1:12	284	426	70
Xeromphalina	17		3:346	240	2:192	308	8:147	80	232	192
Xerula	43	4:181	3:348	262		308	8:149	116	234	161
Genera in this booklet		FAN	B&K	FN	NM	CBIB	BFF	RP	C&D	MM

